Mitigation Project Name	Poplin Ridge Site	County	Union	USACE Action ID	2012-01079
DMS ID	95359	Date Project Instituted	7/5/2012	NCDWR Permit No	2013-1087
River Basin	Yadkin	Date Prepared	8/27/2018		
Cataloging Unit	03040105				

Credit Release Milestone	Stream Credits						Wetland Credits							
	Scheduled Releases (Stream)	Warm	Cool	Cold	Anticipated Release Year (Stream)	Actual Release Date (Stream)	Scheduled Releases (Forested)	Riparian Riverine	Riparian Non-riverine	Non-riparian	Scheduled Releases (Coastal)	Coastal	Anticipated Release Year (Wetland)	Actual Release Date (Wetland)
Potential Credits (Mitigation Plan)		6,346.270												
Potential Credits (As-Built Survey)		6,365.000												
Potential Credits (IRT Approved)		6,346.268												
1 (Site Establishment)	N/A				N/A	N/A	N/A				N/A		N/A	N/A
2 (Year 0 / As-Built)	30.00%	1,909.500			2015	9/4/2015	30%				30%		N/A	N/A
3 (Year 1 Monitoring)	10.00%	636.500			2016	4/25/2016	10%				10%		N/A	N/A
IRT Adjustment*		-7.493				10/20/2017							N/A	N/A
4 (Year 2 Monitoring) - NOT RELEASED	10.00%	634.627			2017	Not Released	10%				15%		N/A	N/A
5 (Year 3 Monitoring)	7.20%	457.054			2018	8/28/2018	15%				20%		N/A	N/A
5 (Year 3 Monitoring) - NOT RELEASED	2.80%	177.573			2018	Not Released								
6 (Year 4 Monitoring)	5.00%				2019		5%				10%		N/A	N/A
7 (Year 5 Monitoring)	10.00%				2020		15%				15%		N/A	N/A
8 (Year 6 Monitoring)	5.00%				2021		5%				N/A		N/A	N/A
9 (Year 7 Monitoring)	10.00%				2022		10%				N/A		N/A	N/A
Stream Bankfull Standard	10.00%	634.627			2017	10/20/2017	N/A				N/A			
Total Credits Released to Date		3,630.188												
TOTAL Credits at Risk to Date		812.200												

*NOTE: Adjustment required due to IRT concerns on how the as-built credits were calculated

DEBITS (released credits only)

			Ratios	1.04929	1.5	2.5	5	1	3	2	5	1	3	2	5	1	3	2	5
				Stream Restoration	Stream Enhancement I	Stream Enhancement II	Stream Preservation	Riparian Restoration	Riparian Creation	Riparian Enhancement	Riparian Preservation	Nonriparian Restoration	Nonriparian Creation	Nonriparian Enhancement	Nonriparian Preservation	Coastal Marsh Restoration	Coastal Marsh Creation	Coastal Marsh Enhancement	Coastal Marsh Preservation
IRT Approved As-Built Amounts (feet and acres)				3,697.000	3,305.000	953.000	1,192.000												
IRT Approved As-Built Amounts (mitigation credits)				3,523.335	2,203.333	381.200	238.400												
Percentage Released				58.38%	70.00%	28.28%	70.00%												
Total Released Amounts (feet / acres)				2,158.309	2,313.500	269.508	834.400												
Total Released Amounts (credits)				2,056.923	1,542.333	107.803	166.880												
NCDWR Permit	USACE Action ID	Project Name																	
2005-1396	2005-30393	NCDOT TIP R-2616 - US 601 Widening, Union County					170.150												
2011-0431	2011-01237	NCDOT TIP R-2123CE - Charlotte Outer Loop			749.835		545.050												
2011-0431	2011-01237	NCDOT TIP R-2248E - Charlotte Outer Loop		734.400	1,233.165	571.800													
Remaining Amounts (feet / acres)				1,423.909	330.500	-302.292	119.200												
Remaining Amounts (credits)				1,357.021	220.333	-120.917	23.840												

Contingencies (if any): None

Poplin Ridge

9/6/18

Signature of Wilmington District Official Approving Credit Release

Date

1 - For NCDMS, no credits are released during the first milestone

2 - For NCDMS projects, the second credit release milestone occurs automatically when the as-built report (baseline monitoring report) has been made available to the NCIRT by posting it to the NCDMS Portal, provided the following criteria have been met:

1) Approval of the final Mitigation Plan
2) Recordation of the preservation mechanism, as well as a title opinion acceptable to the USACE covering the property
3) Completion of all physical and biological improvements to the mitigation site pursuant to the mitigation plan
4) Reciept of necessary DA permit authorization or written DA approval for porjects where DA permit issuance is not required

3 - A 10% reserve of credits is to be held back until the bankfull event performance standard has been met

Annual Monitoring Report

Monitoring Year 4 of 7

FINAL

Poplin Ridge Stream Restoration Project
NCDMS Contract No.: 004672
NCDMS Project No.: 95359
USACE Permit Action ID: SAW-2012-01079
DWR Project No.: 13-1087

Union County, NC
Data Collected: September 2018
Date Submitted: February 2019

Submitted to:

North Carolina Division of Mitigation Services

NCDEQ-DMS, 1652 Mail Service Center Raleigh NC 27699-1652

302 Jefferson Street, Suite 110
Raleigh, NC 27605

Corporate Headquarters
5020 Montrose Blvd. Suite 650
Houston, TX 77006
Main: 713.520.5400

February 1, 2019

Paul Wiesner
NC DEQ Division of Mitigation Services
5 Ravenscroft Drive, Suite 102
Asheville, NC 28801

RE: Poplin Ridge Stream Restoration Site: MY4 Monitoring Report (NCDMS ID 95359)

Listed below are comments provided by DMS on January 9, 2019 regarding the Poplin Ridge Stream Restoration Site: Year 4 Monitoring Report and RES' responses.

General: An IRT credit release site visit meeting was held at the Poplin Ridge site on 7/11/19. RES generated a meeting minute memo on 7/19/18 which was provided to the IRT on 8/3/18. Please document the IRT site visit discussion in the report text and include the RES memo (attached) as an Appendix in the FINAL MY4 report.
Done.

General: During the 2018 IRT credit release, the IRT withheld mitigation credits as follows:

Poplin Ridge – DMS# 95359
UT2-2 in the pond (4+90-10+75): 585.0 SMUs
UT2-1 (0+00-4+90): 196.0 SMUs
UT2-A (4+50-5+28): 31.2 SMUs

Total SMUs Withheld (2018): **812.2 SMUs**

DMS will be withholding payment for the "at risk" credits that have been withheld by the IRT during 2018 credit release. If the IRT acknowledges that these credits are valid at a later date, DMS will revise contract payments accordingly.

When "at risk" credits are removed, there are 5,534 SMUs currently meeting success in MY4. At Task 10 (MY4), RES can bill for 80% of the adjusted contract value. The 80% value of the 5,534 SMUs currently meeting success = $1,465,403.20. To date, DMS has made $1,474,770.50 in total contract payments to RES. Accordingly, RES should not invoice for Task 10 (Contract 004672-RFP16-004110).
Noted.

Section 1.4 – Project Performance: The NCDMS website for the project document portal should be updated to: https://deq.nc.gov/about/divisions/mitigation-services/dms-projects
Done.

Section 1.4.1 -Vegetation & CCPV Maps: This section reports that areas were replanted in February 2018 and one (1) area of conservation easement encroachment was observed. Please clearly identify and label the replanted areas on the MY4 CCPV maps. Please add a legend label to the CCPV map for the small encroachment area (Figure 2 (6)).
The replant areas have been labeled on the CCPV and the legend label for the encroachment area is in the "Vegetation Condition Assessment" in the bottom right corner of the map.

Section 1.4.2 -Stream Geomorphology, CCPV Maps & Table 5: The report text notes, "*Small areas of bank scour, bed aggradation, and bed degradation were seen on-site but not all were considered problem areas in MY4.*" Any areas considered Stream Problems Areas should be discussed in the report text, photo documented, identified on the CCPV maps and documented in Table 5. Please update the report and/ or the Section 1.4.2 text accordingly.
This text has been updated to say, "Small areas of bank scour, bed aggradation, and bed degradation were reported as problem areas in previous years but are no longer problem areas MY4. RES will continue monitor these areas during future visits to assess the stability of the channel and the need for any repair."

Section 1.4.3 – Stream Hydrology & Table 14: The report indicates that MY4 (2018) bankfull events were limited to one (1) event at 1 of 3 crest gauges. Please confirm that the three (3) crest gauges installed on the site are functioning properly and have been maintained. Based on the precipitation data it appears likely that the site had more than 1 bankfull event in 2018. Additionally, the raw data support file provided shows more than one bankfull event at each station in 2018; however, the report text indicates that manual readings were utilized. If the installed crest gauges (automated or manual) are not capturing accurate yearly bankfull events, DMS recommends replacing the monitoring equipment. Please review the data and update the report text and table accordingly.
Due to the flashy nature of the channels on site, RES had been previously only reporting bankfull events with durations of over six hours. This was reported incorrectly in the MY4 Draft Report and has now been updated. The crest gauge on UT1-2, however, reported abnormally high readings throughout the year. All the transducers on site were replaced in January 2019. This has been added to the report.

Section 1.4.4 – Adaptive Management: Providing the general proposed adaptive management plan for the site in the MY4 report is helpful for documentation purposes. DMS also recommends submitting a standalone detailed adaptive management plan with figures and drawings (as necessary) to the IRT for comment prior to implementation. The standalone adaptive management plan should be submitted to DMS for review first and then DMS will submit the final adaptive management plan to the IRT for review and comment.

The adaptive management plan should discuss any supplemental monitoring elements and/or additional monitoring time being proposed to close the site with the IRT. If no supplemental monitoring elements and/or additional monitoring time are being proposed, it should be discussed and justified in the adaptive management plan.
Noted.

Table 2: Please list all invasive-exotic treatments, supplemental plantings, and maintenance activity efforts in Table 2. The table should report ALL maintenance efforts post construction.
Done.

CCPV Maps & Table 6: The CCPV maps and Table 6 indicate that invasive-exotic plant species are absent on the site. Invasive-exotic plant species have been an issue on the Poplin Ridge site since construction. DMS understands that numerous treatments were conducted in 2018. Please confirm the site's invasive-exotic assessment and update the report text, CCPV maps and table as necessary.
RES treated the invasive species on site three times in 2018. This treatment included mulching, cutting, and spraying. As of the last site visit in 2018, there are no invasive species problem areas to report. RES will continue to monitor for invasive species on site, especially in the areas that have been treated in previous years.

Electronic Deliverables: Please provide ALL project GIS shapefiles (stream layer, TOB, etc.) in the FINAL MY4 electronic deliverable CD.
Done.

Prepared by:

302 Jefferson Street, Suite 110
Raleigh, North Carolina 27605

Contents

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Appendix C. Vegetation Plot Data

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(Not required for MY4)

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1.0 PROJECT SUMMARY

1.1. Goals and Objectives

The project goals address stressors identified in the TLW, and include the following:

- Nutrient removal,
- Sediment removal,
- Reducing runoff from animal operations,
- Filtration of runoff, and
- Improved aquatic and terrestrial habitat.

The project goals will be addressed through the following project objectives:

- Establishing riparian buffer areas adjacent to CAFOs.
- Converting active farm fields to forested buffers,
- Stabilization of eroding stream banks,
- Reduction in streambank slope,
- Restoration of riparian buffer bottomland hardwood habitats, and
- Construction of in-stream structures designed to improve bedform diversity and trap detritus.

1.2. Success Criteria

The success criteria for the Poplin Ridge Stream Restoration Site follows accepted and approved success criteria presented in the USACE Stream Mitigation Guidelines and subsequent NCDMS and agency guidance. Specific success criteria components are presented below.

1.2.1. Stream Restoration

Bankfull Events - Two bankfull flow events must be documented within the seven-year monitoring period. The two bankfull events must occur in separate years. Otherwise, stream monitoring will continue until two bankfull events have been documented in separate years. Bankfull events will be documented using crest gauges, auto-logging crest gauges, photographs, and visual assessments for evidence of debris wrack lines.

Cross-Sections - There should be little change in as-built cross-section. If changes do take place, they should be evaluated to determine if they represent a movement toward a less stable condition, or minor changes that represent an increase in stability.

Bank Pin Arrays - Bank pin arrays will be used as a supplemental method to monitor erosion on selected meander bends. Bank pin exposure will be recorded at each monitoring event.

Digital Image Stations- Digital images will be used to subjectively evaluate channel aggradation or degradation, bank erosion, success of riparian vegetation, and effectiveness of erosion control measures. Longitudinal images should indicate the absence of developing bars within the channel or an excessive increase in channel depth. Lateral images should not indicate excessive erosion or continuing degradation of banks over time. A series of images over time should indicate successional maturation of riparian vegetation.

1.2.2.Vegetation

Interim measures of vegetative success for the site will be the survival of at least 320 three-year-old trees per acre at the end of Year 3 and 260 five-year old trees per acre at the end of Year-5. The final vegetative success criteria will be the survival of 210 trees per acre at the end of Year 7.

1.3. Project Setting and Background

The Poplin Ridge Stream Restoration Site (Site) encompasses approximately 27.17 acres, of which 4.69 acres are wooded and the remaining 22.48 acres are agricultural fields and pastures. The western and eastern systems, UT1 and UT2 respectively, consist of unnamed tributaries to the East Fork of Stewarts Creek. UT1 is divided into seven reaches and UT2 is divided into five reaches. The Site is located within the Yadkin River Watershed (NCDWR sub basin 03-07-14 and HUC 03040105070050) in Union County, North Carolina, approximately six miles north of Monroe. The Site is located within the Stewarts Creek Watershed, a NCDMS targeted local watershed.

Following 2016 monitoring the NCIRT requested a review of the differential between the Approved Mitigation Plan and Baseline Monitoring Report. The table below details the discrepancies by reach. The primary cause of increased baseline SMUs is survey methodology (thalweg vs. centerline). The Mitigation Plan lengths were based on centerline. Also, UT2-4 had a large decrease in SMUs due to loss of land control. RES has reverted back to the Mitigation Plan (Proposed) SMUs.

Reach	Mitigation Type	Proposed Length (LF)*	Mitigation Ratio	Proposed SMUs	Baseline SMUs
UT1-1	Preservation	572	5:1	114	114
UT1-1	Enhancement I	566	1.5:1	377	377
UT1-2	P1 Restoration	1,171	1:1	1,171	1,178
UT1-3	P1 Restoration	901	1:1	901	893
UT1-4	Enhancement I	1,210	1.5:1	807	815
UT1-A	Enhancement I	217	1.5:1	145	144
UT1-B	Preservation	620	5:1	124	124
UT1-B	Enhancement I	455	1.5:1	303	303
UT1-C	Enhancement I	857	1.5:1	571	586
UT2-1	Enhancement II	490	2.5:1	196	196
UT2-2	P1 Restoration	847	1:1	847	847
UT2-3	P1 Restoration	521	1.5:1	347	347
UT2-4*	P1 Restoration	257	1:1	257	257
UT2-A	Enhancement II	463	2.5:1	185	184
	Total	**9,147**		**6,346**	**6,365**

*Reach was shortened due to loss of land control.

**The contracted amount of credits for this Site was 6,944 SMUs

On July 11, 2018, the IRT, DMS, and RES had a site visit to discuss credit release at Poplin Ridge. It was determined that credits from UT2-1, UT2-2, and UT2-A associated with the drained pond bottom would be withheld (812.2 SMUs). Additionally, it was requested that RES submits a Remedial Action Plan to address the issues in the drained pond bottom and that a flow gauge is to be installed on UT2-A to document at least intermittent flow. A memo documenting this site visit is attached in **Appendix F**.

1.4. Project Performance

Monitoring Year 4 (MY4) data was collected in September 2018. Monitoring activities included visual assessment of all reaches and the surrounding easement, 17 permanent photo stations, and 13 permanent vegetation monitoring plots. Per the Approved Mitigation Plan, geomorphic data was not collected in MY4.

Summary information and data related to the occurrence of items such as beaver activity or easement encroachment and statistics related to 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 Baseline Monitoring Report (formerly the Mitigation Plan) and in the Mitigation Plan (formerly the Restoration Plan) documents available on NCDMS' website (https://deq.nc.gov/about/divisions/mitigation-services/dms-projects). All raw data supporting the tables and figures in the appendices is available from NCDMS upon request.

1.4.1.Vegetation

Visual assessment of the site indicates that herbaceous vegetation has become well established on-site. The areas of low stem density and poor growth were replanted in February 2018 with 1,000 containerized trees. Two of the vegetation plots (9 and 10) in the replanting areas still did not meet success. RES will re-evaluate these areas as well as the pond bottom for replanting in MY5. The invasive species areas were treated in February, June, and August of 2018 and treatments will continue as needed throughout the monitoring period. The small encroachment area is still present and RES will add additional marker poles to prohibit the encroachment in MY5.

Monitoring of 13 permanent vegetation plots was completed in September 2018. Summary tables and photographs associated with MY4 monitoring can be found in **Appendix C**. With the exception of Plots 9 and 10, MY4 monitoring data indicates that all vegetation monitoring plots met the MY5 interim success criteria of 260 planted stems per acre. Planted stem densities among the plots ranged from 40 to 1,052 planted stems per acre with a mean of 595 stems per acre across all plots. When volunteer stems are included, densities ranged between 121 and 1,578 total stems per acre with a mean of 672 stems per acre across all plots. A total of 19 plant species were documented within the monitoring plots. The estimated average planted stem height was 6.8 feet. Low stem densities in plots 9 and 10 are likely attributed to a combination of dry conditions and shallow, rocky soil. The areas in and around these plots were replanted in early 2018 but the replanted stems did not survive.

1.4.2. Stream Geomorphology

Visual assessment of the stream channel was performed in order to document signs of instability, such as eroding banks, structural instability, or excessive sedimentation. Small areas of bank scour, bed aggradation, and bed degradation were reported as problem areas in previous years but are no longer problem areas MY4. RES will continue monitor these areas during future visits to assess the stability of the channel and the need for any repair.

Geomorphic data, including cross-section, bank pin array, and substrate, for MY4 was not collected. It will be collected and reported again in MY5 and MY7.

1.4.3.Stream Hydrology

Since project completion in April 2015, six bankfull event have been recorded on UT1-2, 25 on UT1-4, and 16 on UT2-3. MY4 bankfull events are identified by manual crest gauge and transducer gauge readings (**Table 13**). Stream hydrology issues were identified and discussed with the NCIRT during a site visit in

July 2018. RES installed a flow gauge downstream of XS-3 on UT2-A in January 2019. These issues are discussed further in Section 1.4.4.

1.4.4. Adaptive Management

During a site visit with NCIRT and NCDMS at the Poplin Ridge Site in July 2018, several problem areas were identified (**Appendix F**). Per the request of NCIRT, RES is providing an Adaptive Management Plan to be sent to the IRT in early 2019. The Adaptive Management Plan proposes to add log sills in the old pond bottom on UT2-1 as well as notch the log structure inhibiting flow at the top of the reach and notch the filter berm that is damming flow at the bottom of the reach. Additionally it describes how RES will document at least intermittent flow on UT2-A and treat the vegetation growth in the channel of UT2-2.

2.0 METHODS

Visual assessment of the project was performed at the beginning and end of the monitoring year. Permanent photo station photos were also collected during the morphologic and vegetation data collection events. Additionally, photos were taken of vegetation or stream problem areas not revealed in the permanent photo station images.

Geomorphic measurements (MY0, MY1, MY2, MY3, MY5, MY7) were taken during low flow conditions using a Topcon GTS-312 Total Station. Three-dimensional coordinates associated with each cross-section data were collected in the field and geo-referenced (NAD83 State Plane feet FIPS 3200). Morphological data was limited to 29 cross-sections. Survey data were imported into CAD, ArcGIS, and Excel for data processing and analysis. Channel substrate was characterized using a Wolman Pebble Count as outlined in Harrelson et al. (1994) and processed using Microsoft Excel.

Vegetation success is being monitored at 13 permanent monitoring plots. Vegetation monitoring follows the CVS-EEP Level 2 Protocol for Recording Vegetation, version 4.2 (Lee et al. 2008) and includes analysis of species composition and density of planted specimens. Data is processed using the CVS data entry tool. In the field, the four corners of each plot were permanently marked with rebar and photos of each plot are taken from the origin each monitoring year.

Precipitation data was collected using an Onset HOBO Data Logging Rain Gauge. Bankfull events were documented with manual crest gauges, which were installed within each of the following reaches - UT1-2, UT1-4, and UT2-3. Crest gauge data was downloaded during quarterly site visits.

3.0 REFERENCES

Environmental Banc & Exchange. 2014. Poplin Ridge Stream Restoration Project Final Mitigation Plan. North Carolina Ecosystems Enhancement Program, Raleigh.

Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation. Version 4.2. http://cvs.bio.unc.edu/methods.htm; accessed November 2008.

Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology. Pagosa Springs, Colorado.

Appendix A
General Tables and Figures

Table 1. Project Components and Mitigation Credits
Poplin Ridge Stream Restoration Project

Mitigation Credits

	Stream*		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	6107.9	238.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Project Components

	As-Built	Existing	Approach (PI, PII etc.)	Restoration -or- Restoration Equivalent	Restoration Footage or Acreage	Mitigation Ratio	SMUs
Project Component -or- Reach ID	Stationing/Location (LF)	Footage/Acreage					
UT1-1	1+20 to 6+92	572	Preservation	RE	572	1 : 5	114
UT1-1	6+92 to 12+58	566	EI	R	566	1 : 1.5	377
UT1-2	12+58 to 24+96	1,284	PI	R	1,171	1 : 1	1,171
UT1-3	24+96 to 34+50	833	PI	R	901	1 : 1	901
UT1-4	34+50 to 46+73	1,252	EI	R	1,210	1 : 1.5	807
UT1-A	0+73 to 2+89	197	EI	R	217	1 : 1.5	145
UT1-B	0+09 to 6+29	620	Preservation	RE	620	1 : 5	124
UT1-B	6+90 to 11+45	512	EI	R	455	1 : 1.5	303
UT1-C	1+21 to 10+01	883	EI	R	857	1 : 1.5	571
UT2-1	0+00 to 4+90	490	EII	R	490	1 : 2.5	196
UT2-2	4+90 to 13+97	875	PI	R	847	1 : 1	847
UT2-3	13+97 to 19+18	495	PI	R	521	1 : 1.5	347
UT2-4	19+18 to 22+07	270	PI	R	257	1 : 1	257
UT2-A	0+45 to 5+06	365	EII	R	463	1 : 2.5	185

Component Summation

	Stream	Riparian Wetland		Non-riparian Wetland	Buffer	Upland
Restoration Level	(linear feet)	(acres)		(acres)	(square feet)	(acres)
		Riverine	Non-Riverine			
Restoration	3,697					
Enhancement I	3,305					
Enhancement II	953					
Creation						
Preservation	1,192					
High Quality Preservation						

BMP Elements

Element	Location	Purpose/Function	Notes
---	---	---	---
---	---	---	---
---	---	---	---

BMP Elements

BR = Bioretention Cell; SF = Sand Filter; SW = Stormwater Wetland; WDP = Wet Detention Pond; DDP = Dry Detention Pond; FS = Filter Strip; S = Grassed Swale; LS = Level Spreader; NI = Natural Infiltration Area; FB = Forested Buffer

* Stream credit calculations were originally calculated along the as-built thalweg. Based on the April 3, 2017 IRT Credit Release Meeting, these stream credits have been reverted back to the amounts in the IRT approved mitigation plan.

Table 2. Project Activity and Reporting History Poplin Ridge Stream Restoration Project		
Activity or Report	**Data Collection Complete**	**Completion or Delivery**
Mitigation Plan	NA	Jul-14
Final Design – Construction Plans	NA	Oct-14
Construction Completed	Apr-15	Apr-15
Site Planting Completed	Apr-15	Apr-15
Baseline Monitoring Document (Year 0 Monitoring – baseline)	Apr-15	Jul-15
Year 1 Monitoring	Dec-15	Jan-16
Year 2 Monitoring	Sep-16	Oct-16
Invasive Species Treatment	NA	Aug-17
Year 3 Monitoring	Vegetation: Sep-17 Stream: Sep-17	Nov-17
Invasive Species Treatment and Supplemental Planting	NA	Feb-18
Invasive Species Treatment	NA	June-18
Invasive Species Treatment	NA	Aug-18
Year 4 Monitoring	Vegetation: Sep-18	Feb-19
Year 5 Monitoring		
Year 6 Monitoring		
Year 7 Monitoring		

Table 3. Project Contacts Table Poplin Ridge Stream Restoration Project	
Designer	WK Dickson and Co., Inc. 720 Corporate Center Drive Raleigh, NC 27607 (919) 782-0495 Frasier Mullen, PE
Construction Contractor	Wright Contracting PO Box 545 Siler City, NC 27344 (919) 663-0810 Joseph Wright
Planting Contractor	Resource Environmental Solutions, LLC 302 Jefferson Street, Suite 110 Raleigh, NC 27605 (919) 209-1061 David Godley
Seeding Contractor	Wright Contracting PO Box 545 Siler City, NC 27344 (919) 663-0810 Joseph Wright
Seed Mix Sources	Green Resource
Nursery Stock Suppliers	Arbogen, NC Forestry Services Nursery
Full Delivery Provider Project Manager:	Resource Environmental Solutions, LLC 302 Jefferson Street, Suite 110 Raleigh, NC 27605 Brad Breslow
Monitoring Performers (MY0) Project Manager:	Resource Environmental Solutions, LLC 302 Jefferson Street, Suite 110 Raleigh, NC 27605 (919) 209-1061 Brian Hockett, PLS
Monitoring Performers (MY1-MY2) 2015-2016 Project Manager:	Equinox 37 Haywwod Street, Suite 100 Asheville, NC 28801 Drew Alderman (828) 253-6856
Monitoring Performers (MY3+) 2017+ Project Manager:	Resource Environmental Solutions, LLC 302 Jefferson Street, Suite 110 Raleigh, NC 27605 (919) 741-6268 Ryan Medric

Table 4. Project Information Poplin Ridge Stream Restoration Project						
Project Name	Poplin Ridge Stream Restoration Project					
County	Union					
Project Area (acres)	27.17					
Project Coordinates (latitude and longitude)	UT1: 35° 03' 15.97" N 80° 34' 21.64" W					
	UT2: 35° 03' 17.99" N 80° 33' 46.77" W					
Project Watershed Summary Information						
Physiographic Province	Piedmont					
River Basin	Yadkin					
USGS Hydrologic Unit 8-digit	3040105					
USGS Hydrologic Unit 14-digit	03040105070050					
DWQ Sub-basin	03-07-14					
Project Drainage Area (acres)	UT1: 1.14 square miles (728 acres)					
	UT2: 1.35 square miles (861 acres)					
Project Drainage Area Percentage of Impervious Area	UT1: 8%					
	UT2: 5%					
CGIA Land Use Classification	developed (open space, low density, med. density, high density), cultivated crops, pasture/hay, deciduous forest, evergreen forest					
Reach Summary Information						
Parameters	**UT1-R1**	**UT1-R2**	**UT1-R3**	**UT1-R4**	**UT1-A**	**UT1-B**
Length of reach (linear feet)	1,138	1,178	893	1,223	216	1,075
Valley Classification	VIII	VIII	VIII	VIII	VIII	VIII
Drainage area (acres)	136	248	384	728	88	120
NCDWQ stream identification score	35	22.5	30	31	35	35
NCDWQ Water Quality Classification	WS-III	WS-III	WS-III	WS-III	WS-III	WS-III
Morphological Description (stream type)	E4	E4	E4	C4	E4	E4/C4
Evolutionary trend	Stage I	Stage II	Stage II	Stage V	Stage I	Stage I/III
Underlying mapped soils	CmB	CmB, TbB2	CmB, TbB2	ChA	CmB	CmB
Drainage class	mod. well	mod. well; well	mod. well; well	somewhat poorly	mod. well	mod. well
Soil Hydric status	Not Hydric	Not Hydric	Not Hydric	Partially Hydric	Not Hydric	Not hydric
Slope	0.48%	0.70%	0.40%	0.50%	1.20%	1.80%
FEMA classification	N/A	N/A	N/A	Zone AE	N/A	N/A
Native vegetation community	mixed hardwood forest, cultivated	cultivated	cultivated	cultivated	cultivated	mixed hardwood forest, cultivated
Percent composition of exotic invasive vegetation	10%	0%	0%	0%	5%	15%

Table 4 Cont'd. Project Information Poplin Ridge Stream Restoration Project						
Reach Summary Information						
Parameters	**UT1-C**	**UT2-R1**	**UT2-R2**	**UT2-R3**	**UT2-R4**	**UT2-A**
Length of reach (linear feet)	880	490	847	521	257	461
Valley Classification	VIII	VIII	VIII	VIII	VIII	VIII
Drainage area (acres)	250	631	726	792	861	49
NCDWQ stream identification score	35	33.5	33.5	22.5	33.5	33.5
NCDWQ Water Quality Classification	WS-III	WS-III	WS-III	WS-III	WS-III	WS-III
Morphological Description (stream type)	E4	C4c	N/A	E4	E4	C4
Evolutionary trend	Stage IV	Stage VI	N/A	Stage II	Stage II	Stage IV
Underlying mapped soils	TbB2	ChA	ChA	ChA, BaB	ChA	ChA, CmA
Drainage class	well	somewhat poorly	somewhat poorly	somewhat poorly; well	somewhat poorly	somewhat poorly; mod. well
Soil Hydric status	Not Hydric	Partially Hydric	Partially Hydric	Partially Hydric	Partially Hydric	Not Hydric
Slope	0.80%	0.27%	0.10%	0.57%	0.31%	1.30%
FEMA classification	N/A	Zone AE	Zone AE	Zone AE	Zone AE	N/A
Native vegetation community	cultivated	woody cover, cultivated	cultivated	cultivated	cultivated	cultivated
Percent composition of exotic invasive vegetation	0%	20%	0%	0%	0%	0%
Regulatory Considerations						
Regulation	**Applicable?**		**Resolved?**		**Supporting Documentation**	
Waters of the United States - Section 404	Yes		Yes		SAW-2012-01079	
Waters of the United States - Section 401	Yes		Yes		DWR# 13-1087	
Endangered Species Act	Yes		Yes		USFWS (Corr. Letter)	
Historic Preservation Act	Yes		Yes		SHPO (Corr. Letter)	
Coastal Zone Management Act (CZMA)/Coastal Area Management Act (CAMA)	No		N/A		N/A	
FEMA Floodplain Compliance	Yes		Yes		EEP Floodplain Requirements Checklist	
Essential Fisheries Habitat	No		N/A		N/A	

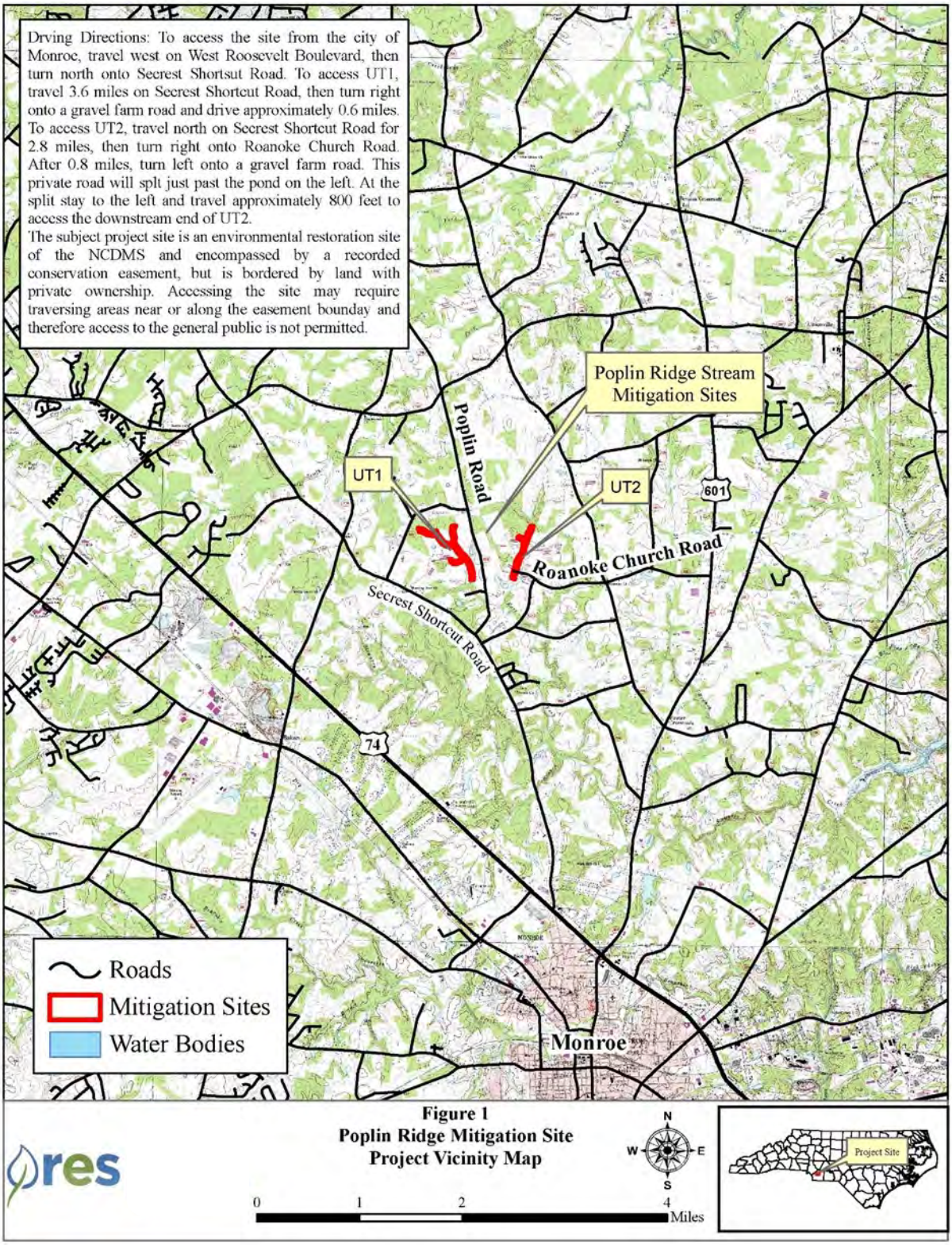

Figure 1
Poplin Ridge Mitigation Site
Project Vicinity Map

Appendix B
Visual Assessment Data

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Feet

1 inch = 450 feet

Figure 2

Poplin Ridge Stream Restoration Project MY4 2018

Current Conditions Overview Map

Date: 2/1/2019	Drawn by: RTM

LEGEND

- Conservation Easement
- Vegetation Plot
- BMP
- Enhancement I
- Enhancement II
- Preservation
- Restoration
- Cross Section
- Crest Gauge
- Flow Gauge
- Rain Gauge
- Photo Station

Document Path: S:\@RES Projects\North Carolina\0114_Poplin Ridge\Monitoring\Monitoring Data\2018\MY4\MXD\Figure 2_Poplin Ridge_CCPV Overview Map_MY4.mxd

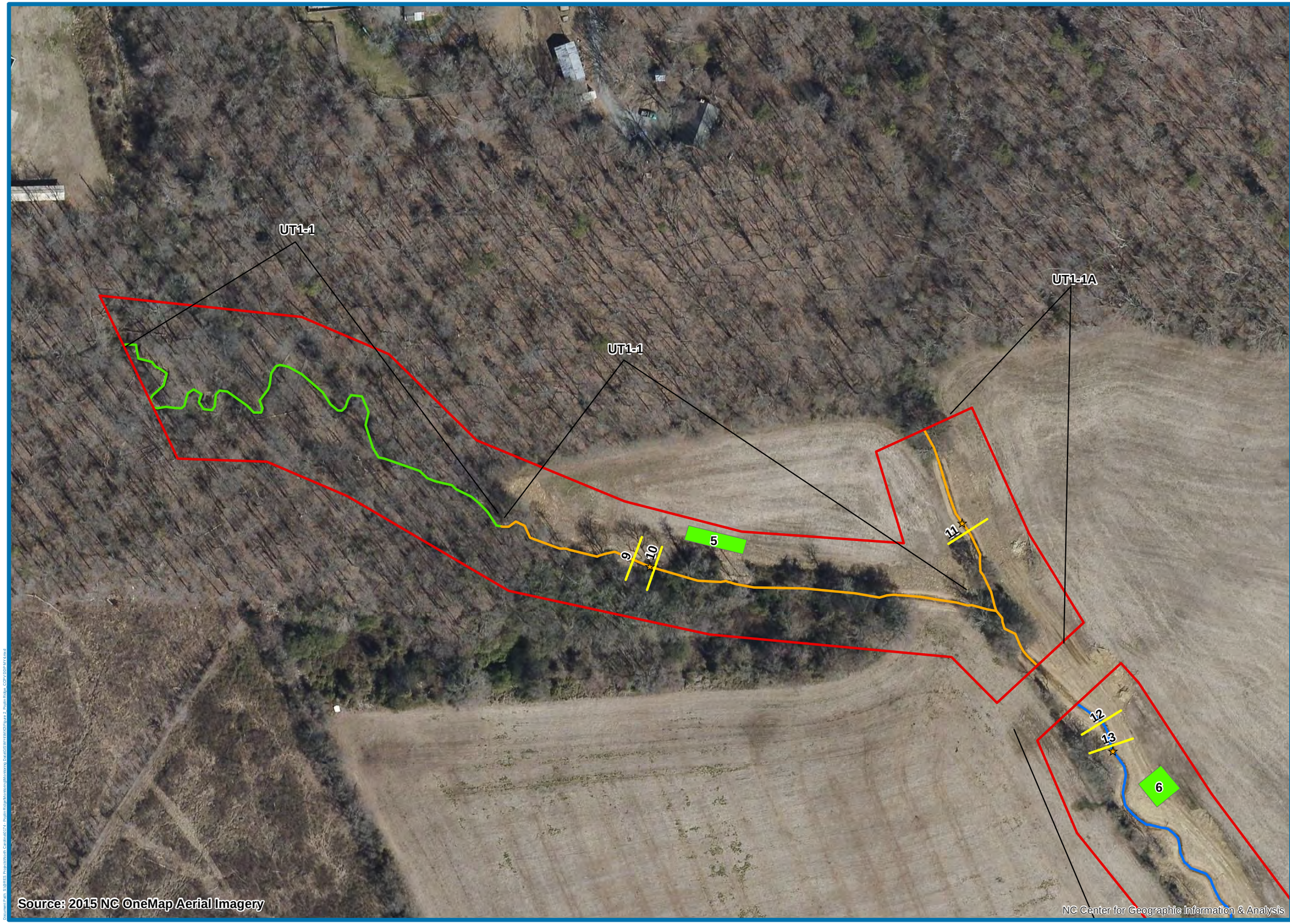

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Figure 2
1

Poplin Ridge Stream Restoration Project MY4 2018

Current Conditions Plan View

Date: 2/1/2019	Drawn by: RTM

1 inch = 100 feet

LEGEND

- Conservation Easement
- Vegetation Plot
- >260 stems/acre
- <260 stems/acre
- Cross Section
- Feb 2018 Replant Area
- BMP
- Enhancement I
- Enhancement II
- Preservation
- Restoration
- Stream Structure
- Crest Gauge
- Flow Gauge
- Rain Gauge
- Photo Station

Vegetation Condition Assessment

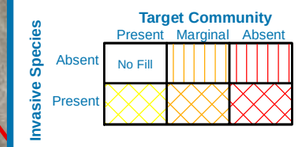

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Figure 2
2

Poplin Ridge Stream Restoration Project MY4 2018

Current Conditions Plan View

Date: 2/1/2019 | Drawn by: RTM

1 inch = 100 feet

LEGEND

- Conservation Easement
- Vegetation Plot
- >260 stems/acre
- <260 stems/acre
- Cross Section
- Feb 2018 Replant Area
- BMP
- Enhancement I
- Enhancement II
- Preservation
- Restoration
- Stream Structure
- Crest Gauge
- Flow Gauge
- Rain Gauge
- Photo Station

Vegetation Condition Assessment

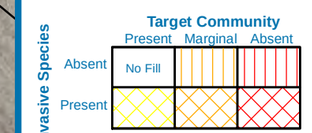

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Figure 2
3

Poplin Ridge Stream Restoration Project MY4 2018

Current Conditions Plan View

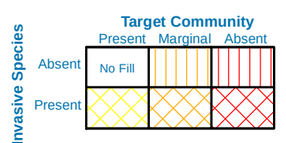
Date: 2/1/2019	Drawn by: RTM

1 inch = 100 feet

LEGEND

- Conservation Easement
- Vegetation Plot
- >260 stems/acre
- <260 stems/acre
- Cross Section
- Feb 2018 Replant Area
- BMP
- Enhancement I
- Enhancement II
- Preservation
- Restoration
- Stream Structure
- Crest Gauge
- Flow Gauge
- Rain Gauge
- Photo Station

Vegetation Condition Assessment



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res

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Feet

Figure 2
4

Poplin Ridge Stream Restoration Project MY4 2018

Current Conditions Plan View

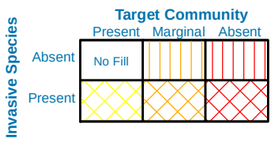
Date: 2/1/2019	Drawn by: RTM

1 inch = 100 feet

LEGEND

- Conservation Easement
- Vegetation Plot
- >260 stems/acre
- <260 stems/acre
- Cross Section
- Feb 2018 Replant Area
- BMP
- Enhancement I
- Enhancement II
- Preservation
- Restoration
- Stream Structure
- Crest Gauge
- Flow Gauge
- Rain Gauge
- Photo Station

Vegetation Condition Assessment



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res

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Feet

Figure 2
5

Poplin Ridge Stream Restoration Project MY4 2018

Current Conditions Plan View

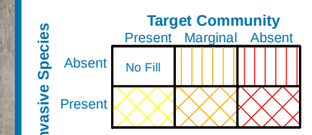
Date: 2/1/2019 | Drawn by: RTM

1 inch = 100 feet

LEGEND

- Conservation Easement
- Vegetation Plot
- >260 stems/acre
- <260 stems/acre
- Cross Section
- Feb 2018 Replant Area
- BMP
- Enhancement I
- Enhancement II
- Preservation
- Restoration
- Stream Structure
- Crest Gauge
- Flow Gauge
- Rain Gauge
- Photo Station

Vegetation Condition Assessment



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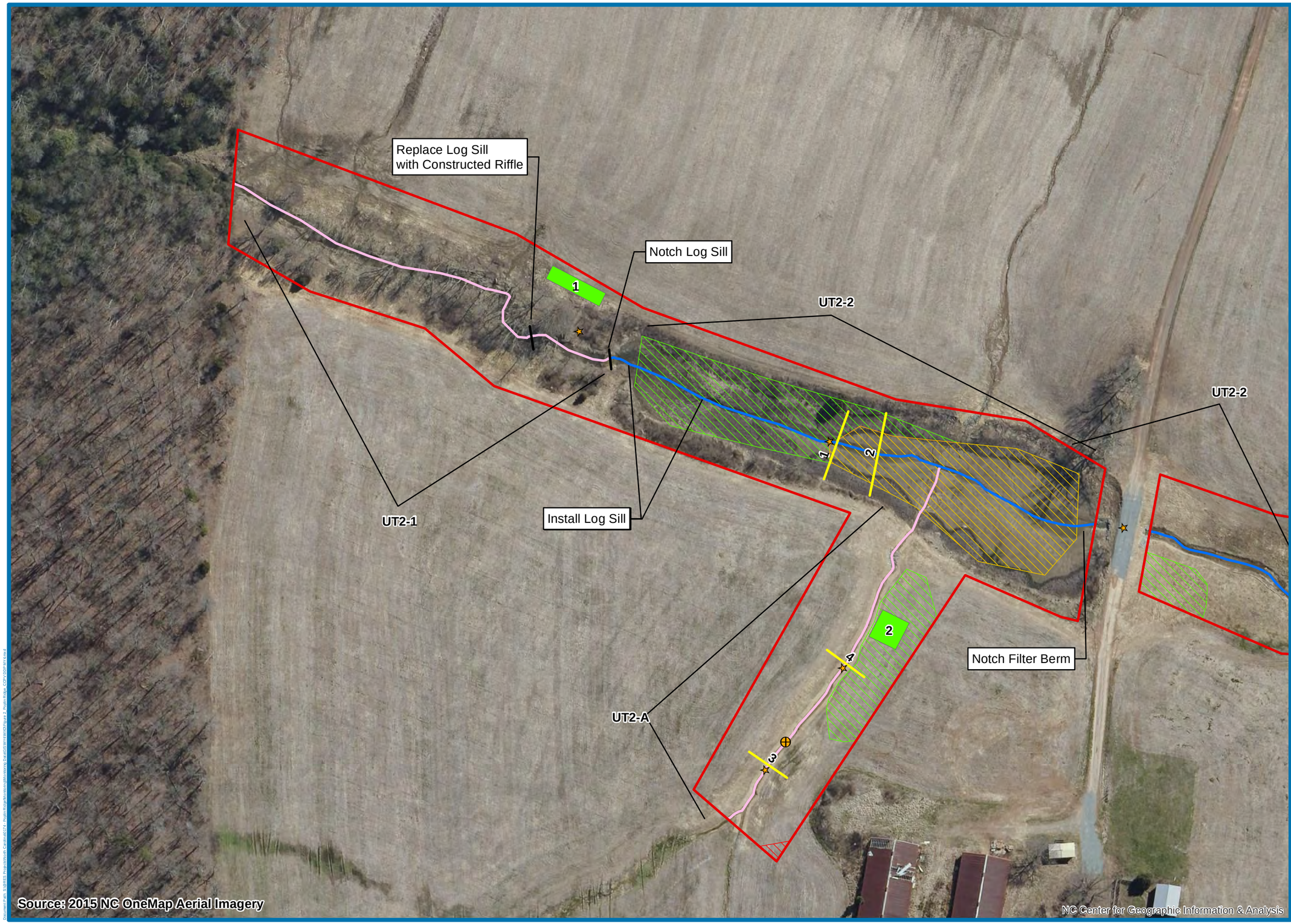


res

N E S W

0 50 100
Feet

Figure 2
6

Poplin Ridge Stream Restoration Project MY4 2018

Current Conditions Plan View

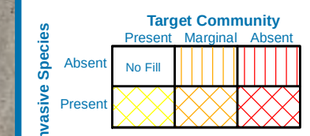
Date: 2/1/2019	Drawn by: RTM

1 inch = 100 feet

LEGEND

- Conservation Easement
- Vegetation Plot
- >260 stems/acre
- <260 stems/acre
- Cross Section
- Feb 2018 Replant Area
- BMP
- Enhancement I
- Enhancement II
- Preservation
- Restoration
- Stream Structure
- Crest Gauge
- Flow Gauge
- Rain Gauge
- Photo Station

Vegetation Condition Assessment



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res

N E S W

0 50 100
Feet

Figure 2
7

Poplin Ridge Stream Restoration Project MY4 2018

Current Conditions Plan View

Date: 2/1/2019	Drawn by: RTM

1 inch = 100 feet

LEGEND

- Conservation Easement
- Vegetation Plot
- >260 stems/acre
- <260 stems/acre
- Cross Section
- Feb 2018 Replant Area
- BMP
- Enhancement I
- Enhancement II
- Preservation
- Restoration
- Stream Structure
- Crest Gauge
- Flow Gauge
- Rain Gauge
- Photo Station

Vegetation Condition Assessment

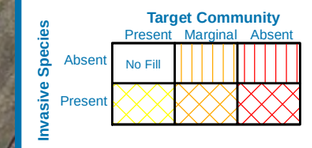

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Table 5. Visual Stream Morphology Stability Assessment
Poplin Ridge Stream Restoration Site - UT1-1 - Enhancement I
Assessed Length 566 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	-	-			-			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth≥ 1.6).	-	-			-			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	-	-			-			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	-	-			-			
		2. Thalweg centering at downstream of meander bend (Glide).	-	-			-			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	3	3			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	3	3			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	3	3			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	3	3			100%			
	4. Habitat	Pool forming structures maintaining~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	3	3			100%			

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Poplin Ridge Stream Restoration Site - UT1-2 - P1 Restoration
Assessed Length 1,178 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	26	26			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth≥ 1.6).	25	25			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	25	25			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	25	25			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	25	25			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			1	8	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	3	3			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	3	3			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	3	3			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence doesNOT exceed 15%.	3	3			100%			
	4. Habitat	Pool forming structures maintaining~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	3	3			100%			

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Poplin Ridge Stream Restoration Site - UT1-3 - P1 Restoration
Assessed Length 893 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	18	18			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth≥ 1.6).	18	18			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	18	18			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	18	18			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	18	18			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	3	3			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	3	3			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	3	3			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence doesNOT exceed 15%.	3	3			100%			
	4. Habitat	Pool forming structures maintaining~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	3	3			100%			

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Poplin Ridge Stream Restoration Site - UT1-4 - Enhancement I
Assessed Length 1,223 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	-	-			-			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth≥ 1.6).	-	-			-			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	-	-			-			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	-	-			-			
		2. Thalweg centering at downstream of meander bend (Glide).	-	-			-			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	N/A	N/A			N/A			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	N/A	N/A			N/A			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	N/A	N/A			N/A			
	3. Bank Protection	Bank erosion within the structures extent of influence doesNOT exceed 15%.	N/A	N/A			N/A			
	4. Habitat	Pool forming structures maintaining~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	N/A	N/A			N/A			

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Poplin Ridge Stream Restoration Site - UT1-A - Enhancement I
Assessed Length 216 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	-	-			-			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth≥ 1.6).	-	-			-			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	-	-			-			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	-	-			-			
		2. Thalweg centering at downstream of meander bend (Glide).	-	-			-			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	N/A	N/A			N/A			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	N/A	N/A			N/A			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	N/A	N/A			N/A			
	3. Bank Protection	Bank erosion within the structures extent of influence doesNOT exceed 15%.	N/A	N/A			N/A			
	4. Habitat	Pool forming structures maintaining~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	N/A	N/A			N/A			

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Poplin Ridge Stream Restoration Site - UT1-B - Enhancement I
Assessed Length 455 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	11	11			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth≥ 1.6).	11	11			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	11	11			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	11	11			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	11	11			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	1	1			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	1	1			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence doesNOT exceed 15%.	1	1			100%			
	4. Habitat	Pool forming structures maintaining~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	1	1			100%			

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Poplin Ridge Stream Restoration Site - UT1-C - Enhancement I
Assessed Length 880 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	14	14			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth≥ 1.6).	13	13			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	13	13			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	13	13			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	13	13			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	2	2			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	2	2			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence doesNOT exceed 15%.	2	2			100%			
	4. Habitat	Pool forming structures maintaining~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	2	2			100%			

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Poplin Ridge Stream Restoration Site - UT2-1 - Enhancement II
Assessed Length 490 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	-	-			-			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth≥ 1.6).	-	-			-			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	-	-			-			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	-	-			-			
		2. Thalweg centering at downstream of meander bend (Glide).	-	-			-			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	2	2			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	2	2			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	2	2			100%			
	4. Habitat	Pool forming structures maintaining~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	2	2			100%			

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Poplin Ridge Stream Restoration Site - UT2-2 - P1 Restoration
Assessed Length 847 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	5	5			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth≥ 1.6).	5	5			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	5	5			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	5	5			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	5	5			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	2	2			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	2	2			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence doesNOT exceed 15%.	2	2			100%			
	4. Habitat	Pool forming structures maintaining~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	2	2			100%			

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Poplin Ridge Stream Restoration Site - UT2-3 - P1 Restoration
Assessed Length 521 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	8	8			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth≥ 1.6).	8	8			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	8	8			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	8	8			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	8	8			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	3	3			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	3	3			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	3	3			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence doesNOT exceed 15%.	3	3			100%			
	4. Habitat	Pool forming structures maintaining~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	3	3			100%			

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Poplin Ridge Stream Restoration Site - UT2-4 - P1 Restoration
Assessed Length 257 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	4	4			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth≥ 1.6).	5	5			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	5	5			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	5	5			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	5	5			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	N/A	N/A			N/A			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	N/A	N/A			N/A			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	N/A	N/A			N/A			
	3. Bank Protection	Bank erosion within the structures extent of influence doesNOT exceed 15%.	N/A	N/A			N/A			
	4. Habitat	Pool forming structures maintaining~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	N/A	N/A			N/A			

Table 5 cont'd. Visual Stream Morphology Stability Assessment
Poplin Ridge Stream Restoration Site - UT2-A - Enhancement II
Assessed Length 461 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	10	10			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth≥ 1.6).	13	13			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	13	13			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	13	13			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	13	13			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	5	5			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	5	5			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	5	5			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence doesNOT exceed 15%.	5	5			100%			
	4. Habitat	Pool forming structures maintaining~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	5	5			100%			

Table 6. Vegetation Condition Assessment Poplin Ridge Stream Restoration Site					
Planted Acreage :	**22.5**				
Vegetation Category	**Definitions**	**CCPV Depiction**	**Number of Polygons**	**Combined Acreage**	**% of Planted Acreage**
1. Bare Areas	Very limited cover of both woody and herbaceous material.	N/A	0	0.00	0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	Orange Simple Hatch	3	0.83	4%
		Totals	3	0.83	4%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	N/A	0	0.00	0%
		Cumulative Totals	3	0.83	4%
Easement Acreage :	**27.1**				
Vegetation Category	**Definitions**	**CCPV Depiction**	**Number of Polygons**	**Combined Acreage**	**% of Easement Acreage**
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	N/A	0	0.00	0%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	Red Simple Hatch	1	0.01	0%

N/A - Item does not apply.

Monitoring Year 4 – 2018 Photo Station Photos

Project Reach UT1-1 – Permanent Photo Station 1
Station 8+53 – Looking Upstream
September 27, 2017

Project Reach UT1-2 – Permanent Photo Station 2
Station 14+58 – Looking Upstream at Crossing
September 27, 2017

Project Reach UT1-2 – Permanent Photo Station 3
Station 21+50 – Looking Downstream

Project Reach UT1-3 – Permanent Photo Station 4
Station 26+50 – Looking Upstream at Crossing

Project Reach UT1-3 – Permanent Photo Station 5
Station 27+50 – Looking Downstream

Project Reach UT1-4 – Permanent Photo Station 6
Station 47+20 – Looking Upstream

Project Reach UT1-A - Permanent Photo Station 7
Station 2+00 – Looking Downstream

Project Reach UT1-B – Permanent Photo Station 8
Station 9+86 – Looking Downstream
September 27, 2017

Project Reach UT1-C – Permanent Photo Station 9
Station 2+50 – Looking Upstream

Project Reach UT2-1 – Permanent Photo Station 10
Station 4+50 – Looking Upstream

Project Reach UT2-2– Permanent Photo Station 11
Station 11+00 – Looking Upstream at Pond Bottom

Project Reach UT2-2 – Permanent Photo Station 12
Station 11+00 – Looking Downstream

Project Reach UT2-2 – Permanent Photo Station 13
Station 7+59 – Looking Downstream
September 26, 2017

Project Reach UT2-3 – Permanent Photo Station 14
Station 13+83 – Looking Downstream
September 26, 2017

Project Reach UT2-4 – Permanent Photo Station 15
Station 20+39 – Looking Downstream
September 26, 2017

Project Reach UT2-A – Permanent Photo Station 16
Station 1+22 – Looking Upstream
September 26, 2017

Project Reach UT2-A – Permanent Photo Station 17
Station 2+62 – Looking Downstream
September 26, 2017

Monitoring Year 4 – 2018 Problem Area Photos

UT1-2 – Left Bank Headcut

Appendix C
Vegetation Plot Data

Table 7. MY4 Vegetation Plot Criteria Attainment

Plot #	Planted Stems/Acre	Volunteer Stems/Acre	Total Stems/Acre	Success Criteria Met?	Average Tree Height (ft)
1	688	202	890	Yes	7.7
2	324	40	364	Yes	5.7
3	647	40	688	Yes	8.5
4	971	40	1012	Yes	8.1
5	1052	526	1578	Yes	7.5
6	769	0	769	Yes	6.0
7	809	40	850	Yes	8.5
8	647	0	647	Yes	3.7
9	121	0	121	No	4.3
10	40	121	162	No	8.2
11	526	0	526	Yes	4.7
12	445	0	445	Yes	9.4
13	688	0	688	Yes	5.9
Project Avg	**595**	**78**	**672**	**Yes**	**6.8**

Table 8. CVS Vegetation Plot Metadata Poplin Ridge Stream Restoration Site	
Report Prepared By	Ryan Medric
Date Prepared	9/7/2018 0:00
database name	Poplin_Ridge_95359_2018_MY4_CVS_Vegetation.mdb
database location	
computer name	
file size	
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY----------	
Project Code	95359
project Name	Poplin Ridge Stream Restoration Project
Description	
River Basin	Yadkin-Pee Dee
length(ft)	
stream-to-edge width (ft)	
area (sq m)	
Required Plots (calculated)	
Sampled Plots	13

Table 9. Total Planted Stem Counts

Poplin Ridge			Current Plot Data (MY4 2018)																																				
			95359-01-0001			95359-01-0002			95359-01-0003			95359-01-0004			95359-01-0005			95359-01-0006			95359-01-0007			95359-01-0008			95359-01-0009			95359-01-0010			95359-01-0011			95359-01-0012			95359-01-0013		
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	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	Tree			4																																			
Acer negundo var. negun	boxelder	Tree																																						
Acer rubrum	red maple	Tree															2																							
Acer rubrum var. rubrum	red maple	Tree																																						
Asimina triloba	pawpaw	Tree																																						
Baccharis halimifolia	eastern baccharis	Shrub																																						
Betula nigra	river birch	Tree	2	2	2	3	3	3	3	3	3										1	1	1	2	2	2										1	1	1		
Carya	hickory	Tree																																						
Carya alba	mockernut hickory	Tree			1																																			
Celtis laevigata	sugarberry	Tree																				1																		
Celtis occidentalis	common hackberry	Tree																																						
Diospyros virginiana	common persimmon	Tree						1			1										1	1	1																	
DONTKNOW: unsure record																																								
Fraxinus pennsylvanica	green ash	Tree				1	1	1																2	2	2				1	1	1								
Juniperus virginiana	eastern redcedar	Tree																														1								
Liquidambar styraciflua	sweetgum	Tree												1			11																							
Liriodendron tulipifera	tuliptree	Tree				1	1	1	1	1	1				1	1	1							1	1	1											2	2	2		
Nyssa sylvatica	blackgum	Tree										4	4	4																										
Platanus occidentalis	American sycamore	Tree				1	1	1				2	2	2	3	3	3	3	3	3	5	5	5	5	5	5							2	2	2	3	3	3	3	3	3
Populus deltoides	eastern cottonwood	Tree																																						
Quercus	oak	Tree																																						
Quercus alba	white oak	Tree																																						
Quercus falcata	southern red oak	Tree																																						
Quercus lyrata	overcup oak	Tree										2	2	2				1	1	1																				
Quercus michauxii	swamp chestnut oak	Tree							1	1	1																1	1	1									1	1	1
Quercus nigra	water oak	Tree	14	14	14				3	3	3	10	10	10	4	4	4	1	1	1	6	6	6	3	3	3	2	2	2				5	5	5	4	4	4	7	7	7
Quercus phellos	willow oak	Tree	1	1	1				8	8	8	6	6	6	9	9	9	10	10	10	2	2	2	1	1	1							3	3	3	1	1	1	1	1	1
Quercus rubra	northern red oak	Tree				1	1	1							6	6	6	1	1	1	5	5	5	1	1	1							1	1	1	2	2	2	1	1	1
Quercus velutina	black oak	Tree				1	1	1							3	3	3	3	3	3				1	1	1							2	2	2	1	1	1	1	1	1
Sambucus canadensis	Common Elderberry	Shrub																																						
Ulmus alata	winged elm	Tree																											2											
Ulmus rubra	slippery elm	Tree																																						
		Stem count	17	17	22	8	8	9	16	16	17	24	24	25	26	26	39	19	19	19	20	20	21	16	16	16	3	3	3	1	1	4	13	13	13	11	11	11	17	17	17
		size (ares)	1			1			1			1			1			1			1			1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	3	3	5	6	6	7	5	5	6	5	5	6	6	6	8	6	6	6	6	6	7	8	8	8	2	2	2	1	1	3	5	5	5	5	5	5	8	8	8
		Stems per ACRE	688	688	890	324	324	364	647	647	688	971	971	1012	1052	1052	1578	769	769	769	809	809	850	647	647	647	121	121	121	40	40	162	526	526	526	445	445	445	688	688	688

Table 9. Total Planted Stem Counts

Poplin Ridge			Annual Means															
			MY4 (2018)			MY3 (2017)			MY2 (2016)			MY1 (2015)			MY0 (2015)		
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
Acer negundo	boxelder	Tree			4			3									
Acer negundo var. negun	boxelder	Tree									4						
Acer rubrum	red maple	Tree			2			123									
Acer rubrum var. rubrum	red maple	Tree									121						
Asimina triloba	pawpaw	Tree				1	1	1	4	4	4	5	5	5	21	21	21
Baccharis halimifolia	eastern baccharis	Shrub									10						
Betula nigra	river birch	Tree	12	12	12	7	7	7	9	9	9	9	9	9	27	27	27
Carya	hickory	Tree									6			2			
Carya alba	mockernut hickory	Tree			1			5									
Celtis laevigata	sugarberry	Tree			1												
Celtis occidentalis	common hackberry	Tree									32			9			
Diospyros virginiana	common persimmon	Tree	1	1	3	1	1	7			4			2			
DONTKNOW: unsure record															7	7	7
Fraxinus pennsylvanica	green ash	Tree	4	4	4	1	1	3			3			2			
Juniperus virginiana	eastern redcedar	Tree			1												
Liquidambar styraciflua	sweetgum	Tree			12			17			106			8			
Liriodendron tulipifera	tuliptree	Tree	6	6	6	6	6	6	7	7	7	7	7	7	34	34	34
Nyssa sylvatica	blackgum	Tree	4	4	4	4	4	4	4	4	4	3	3	3			
Platanus occidentalis	American sycamore	Tree	27	27	27	21	21	21	21	21	21	20	20	20	26	26	26
Populus deltoides	eastern cottonwood	Tree												7			
Quercus	oak	Tree							2	2	2	31	31	31	126	126	126
Quercus alba	white oak	Tree										1	1	1	9	9	9
Quercus falcata	southern red oak	Tree										4	4	4	10	10	10
Quercus lyrata	overcup oak	Tree	3	3	3	3	3	3									
Quercus michauxii	swamp chestnut oak	Tree	3	3	3	4	4	4	5	5	5	4	4	4	8	8	8
Quercus nigra	water oak	Tree	59	59	59	65	65	65	79	79	79	69	69	69	22	22	22
Quercus phellos	willow oak	Tree	42	42	42	45	45	45	43	43	43	46	46	46	50	50	50
Quercus rubra	northern red oak	Tree	18	18	18	19	19	19	21	21	21	8	8	17			
Quercus velutina	black oak	Tree	12	12	12	14	14	14	14	14	14	6	6	6			
Sambucus canadensis	Common Elderberry	Shrub									2						
Ulmus alata	winged elm	Tree			2			18									
Ulmus rubra	slippery elm	Tree									2						
		Stem count	191	191	216	191	191	365	209	209	499	213	213	252	340	340	340
		size (ares)	13			13			13			13			13		
		size (ACRES)	0.32			0.32			0.32			0.32			0.32		
		Species count	12	12	19	13	13	18	11	11	21	13	13	19	11	11	11
		Stems per ACRE	595	595	672	595	595	1136	651	651	1553	663	663	784	1058	1058	1058

Monitoring Year 4 – 2018 Vegetation Plot Photos

Poplin Ridge - Vegetation Monitoring Plot 1

Poplin Ridge - Vegetation Monitoring Plot 2

Poplin Ridge - Vegetation Monitoring Plot 3

Poplin Ridge - Vegetation Monitoring Plot 4

Poplin Ridge - Vegetation Monitoring Plot 5

Poplin Ridge - Vegetation Monitoring Plot 6

Poplin Ridge - Vegetation Monitoring Plot 7

Poplin Ridge - Vegetation Monitoring Plot 8

Poplin Ridge - Vegetation Monitoring Plot 9

Poplin Ridge - Vegetation Monitoring Plot 10

Poplin Ridge - Vegetation Monitoring Plot 11

Poplin Ridge - Vegetation Monitoring Plot 12

Poplin Ridge - Vegetation Monitoring Plot 13

Appendix D
Stream Geomorphology Data
(Not required for MY4)

Appendix E
Hydrology Data

Table 14. Verification of Bankfull Events

Crest Gauge	Number of Bankfull Events	Maximum Bankfull Height (ft)
CG1 UT1-2		
MY1	1	0.50
MY2	0	N/A
MY3	4	0.49
MY4	1	0.95
CG2 UT1-4		
MY1	2	2.00
MY2	5	0.80
MY3	4	2.60
MY4	14	4.86
CG3 UT2-3		
MY1	2	4.30
MY2	5	2.00
MY3	3	2.83
MY4	6	3.70

Table 15. 2018 Rainfall Summary

Month	Average	Normal Limits		Monroe Station Precipitation	On-Site Monthly Precipitaiton*
		30 Percent	70 Percent		
January	4.07	2.74	4.87	4.47	3.76
February	3.49	2.39	4.17	2.43	2.30
March	4.45	3.10	5.29	3.95	4.41
April	3.07	1.82	3.72	3.81	4.07
May	3.47	2.22	4.18	2.94	1.22
June	4.57	2.91	5.50	2.65	---
July	4.50	2.90	5.42	3.30	---
August	4.71	2.78	5.18	4.73	---
September	4.24	2.02	5.18	12.36	---
October	3.81	2.00	4.57	5.59	---
November	3.33	1.90	4.05	6.83	---
December	3.85	2.56	4.62	7.06	---
Total	47.56	29.34	56.75	60.12	15.76

*On-site rain gauge malfunctioned after May 2018

Photo Verification of Bankfull Events

Crest Gauge @ UT1-2 – 0.95 ft. (Est. Date of Occurrence: 9/16/2018)

Crest Gauge @ UT1-4 – 4.86 ft. (Est. Date of Occurrence: 9/16/2018)

Crest Gauge @ UT2-3 – 3.70 ft. (Est. Date of Occurrence: 9/16/2018)