Annual Monitoring Report

Monitoring Year 3 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: January – September 2017
Date Submitted: February 2018

Submitted to:

North Carolina Division of Mitigation Services

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February 2, 2018

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RE: Poplin Ridge Stream Restoration Site: MY3 Monitoring Report (NCDMS ID 95359)

Listed below are comments provided by DMS on January 17, 2018 regarding the Poplin Ridge Stream Restoration Site: Year 3 Monitoring Report and RES' responses.

Cover: Please include the USACE Permit Action ID and the DWR Project Number on the report cover page.
Done.

General: As noted in the report text; Poplin Ridge is one of the projects that the IRT has requested be reverted to the Mitigation Plan asset totals prior to the 2018 credit release. Total potential stream assets will be reduced to 6,346.27 SMUs per the approved mitigation plan. Please note that the approved mitigation plan had a minor rounding error. The project will potentially provide 6,107.87 Stream Mitigation Units (SMUs) (R) and 238.40 SMUs (RE). Please update and QA/QC the report accordingly.

During the 2017 IRT Credit Release meeting, the IRT withheld mitigation credits as follows:

Poplin Ridge – UT2-1, UT2-2, and UT2-A
UT2-2 in pond bed: STA 5+00 to 10+61.5 (561.5 of 1:1, 561.5 SMUs)
UT2-A in pond bed: STA 4+25 to 8+76 (451 LF of 2.5:1, 180.4 SMUs)
Total SMUs: 741.9 within pond bed on two reaches

DMS will be withholding payment for these "at risk" unreleased pond bed credits until the 2018 IRT credit release meeting. If the IRT acknowledges that these credits are valid and will be released, DMS will revise contract payments accordingly.

Contract 004672 stipulates a total of 6,944 SMUs. Contract invoices will need to be adjusted accordingly.

General: RES should consider collecting temporary vegetation plot data on the project site in MY4 after the proposed 2017/2018 supplemental planting effort noted in the MY3 report. This should be discussed with the IRT at the 2018 IRT credit release meeting.

Section 1.4.1 - Vegetation: As reported in Table 7, please report the MY3 (2017) estimated average planted stem tree height observed (in feet) in the report verbiage.
Done.

Section 1.4.2 Stream Geomorphology - Were any dry channels observed on the site in the MY3 monitoring period? Please update the text accordingly as this is a potential project concern in the slate belt region.
According to photos from April 2017 no dry channels were observed. Photos from September 2017, however, indicate that a couple reaches were dry with standing water in pools. RES will make it a priority to take better notes on dry channel conditions moving forward in the monitoring period. This has been added to the report.

Table 1: Please revert Table 1 back to the totals found in the Mitigation Plan. Please note that the approved mitigation plan had a minor rounding error. The project will potentially provide 6,107.87 Stream Mitigation Units (SMUs) (R) and 238.40 SMUs (RE) for a total of 6,346.27 SMUs. Add a note at the bottom of the table to acknowledge communications with the IRT regarding the change. Suggested table note: "* 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."
Done.

Table 2: Please list all invasive-exotic treatments and supplemental plantings in Table 2.
The only invasive-exotic treatment was completed in August 2017. Supplemental planting is scheduled for early 2018. This has been added to Table 2.

Cross Sections / Cross Section Tables – A couple of methods are currently being utilized to calculate the BHR from year to year. To compare subsequent monitoring years to the As-built condition one can hold the bankfull depth static (denominator) while allowing the Low TOB max depth (numerator) to vary. Another method that has been proposed and is being evaluated is to hold the As-built cross sectional area static within each year's new cross section and allow that to determine the max bankfull depth for each year. However; if there are large changes in the W/D ratio either method can make for somewhat distorted BHR values depending upon the direction and magnitude of the change in the W/D ratio. Please update the calculations to reflect changes observed in the overlays and explain in detail as a table footnote how the calculations were made. Be prepared to defend the method used for the 2018 credit release and justify through context whether or not any changes observed in a cross section represent an issue.
BHR was calculated on riffles using the baseline bankfull elevation. This method was used because the dimension of the channels has not changed enough to alter the bankfull elevation. Only two riffle cross sections (XS 1 and 24) documented a BHR over 1.2. Cross Section 1 has a BHR of 1.3 and is in the old pond bed and the baseline bankfull elevation is below the top of bank. Cross section 24 (BHR 1.5) is on an enhancement reach, has remained stable, and the baseline bankfull elevation is below top of bank. This has been added to the report text and to Table 11a.

Table 6 – Add Invasive Areas of Concern and Easement Encroachment Areas to the table. Both were included in the MY2 report.
The second half of Table 6, including the Invasive Areas of Concern and Easement Encroachment Areas, was mistakenly left out of the report. It has been added.

Table 14: Please provide estimated dates for the bankfull events reported in the table and provide the data collection dates.

The dates have been provided in Table 14. There has also been a correction in the number of bankfull events observed. This has been updated in the text as well.

Prepared by:

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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.

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

1.4. Project Performance

Monitoring Year 3 (MY3) data was collected from January 2017 to September 2017. Monitoring activities included visual assessment of all reaches and the surrounding easement, 17 permanent photo stations, 13 permanent vegetation monitoring plots, 29 cross-sections, and 15 pebble counts.

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 (http://deq.nc.gov/about/divisions/mitigation-services). 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. Bare areas noted in previous years have started to become vegetated and are not problem areas in MY3. Six areas of low stem density and one area of poor growth were also noted during MY3 monitoring, totaling 2.36 acres and 0.09 acres respectively. Areas of low stem density and poor growth rate/vigor are planned to be replanted at the end of MY3. Additionally, three areas of Chinese privet (*Ligustrum sinense*), covering a total of 1.56 acres, were noted within the easement (Table 6, Figure 2). These areas were treated heavily in MY3. Treatments will continue throughout the monitoring period. One small area of encroachment (0.01 acres) was located near the top of UT2-A. An easement corner marker pole was cut and damaged by passing farm equipment, but RES will replace the marker pole as soon as possible.

Monitoring of 13 permanent vegetation plots was completed during September 2017. Summary tables and photographs associated with MY3 monitoring can be found in Appendix C. With the exception of Plots 2, 8, 9, and 10, MY3 monitoring data indicates that all vegetation monitoring plots met the MY3 interim success criteria of 320 planted stems per acre. Planted stem densities among the plots ranged from 81 to 1,093 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 6,475 total stems per acre with a mean of 1,090 stems per acre across all plots. A total of 18 plant species were documented within the monitoring plots. The estimated average planted stem height was 201 cm (6.6 ft). Low stem densities in plots 2, 8, 9, and 10 are likely attributed to a combination of dry conditions and shallow, rocky soil.

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 seen on-site but not all were considered problem areas in MY3. Stream problem areas were noted on reaches UT1-1, UT1-2, and UT1-C, (**Table 5 and Figure 2**). On UT1-1 there is bank erosion on both banks for about 30 feet. On UT1-2 there is a small area of left bank erosion caused by rills forming at top of bank. On UT1-C there is a 24-foot segment of right bank erosion that has undercut the bank. A few stream structures are not performing as designed; however, they are still holding grade and providing habitat, therefore not considered problems in MY3. There is a structure on a gulley that flows in to UT2-2 that has failed and become a large headcut. RES will monitor these structures during future visits to assess the integrity of the structure and the need for any repair. All other structures are intact and performing as designed.

Geomorphic data for MY3 was collected during September 2017. Cross-section plots and summary tables related to stream morphology are located in Appendix D. The MY3 stream morphology data indicate that, in general, the stream is stable. Several small changes were noted in the cross-section dimensions; however, these are relatively minor and do not exceed expected adjustments in channel form. A decrease in bankfull widths was noted on UT2-2 (Cross Sections 1 & 2). These changes are attributed to the thick herbaceous layer that is present in the pond. Once the trees become established along this reach the herbaceous layer should get shaded out and the channel will return to normal parameters. BHR was

calculated on riffles using the baseline bankfull elevation. This method was used because the dimension of the channels has not changed enough to alter the bankfull elevation. Only two riffle cross sections (XS 1 and 24) documented a BHR over 1.2. Cross Section 1 has a BHR of 1.3 and is in the old pond bed and the baseline bankfull elevation is below the top of bank. Cross Section 24 (BHR 1.5) is on an enhancement reach, has remained stable, and the baseline bankfull elevation is below top of bank.

Bank pin arrays indicate that no erosion occurred during MY3. Bank pin array data will be collected and analyzed in future monitoring years to monitor bank erosion trends.

Substrate monitoring was performed during MY3. Pebble count D_{50} fell into the very coarse gravel range for UT1-1, fine gravel for UT1-2, medium gravel for UT1-3, coarse gravel for UT1-4, silty/clay for UT1-A, coarse gravel for UT1-B, medium gravel for UT1-C, silty/clay for UT2-3, coarse gravel for UT2-4, and fine gravel for UT2-A. The channel substrate will be monitored in future years for shifts in particle size distributions.

Overall, documented shifts in stream morphology do not exceed expectations between MY2 and MY3 as the newly reconstructed stream adjusts to conditions at the site. The project is meeting success criteria regarding stable dimension as well as substrate and sediment transport.

1.4.3.Stream Hydrology

Since project completion in April 2015, five bankfull event has been recorded on UT1-2, 11 on UT1-4, and 10 on UT2-3. MY3 bankfull events are identified by manual crest gauge readings (Table 13). According to photos from April 2017 no dry channels were observed. Photos from September 2017, however, indicate that a couple reaches were dry with standing water in pools. RES will make it a priority to take better notes on dry channel conditions moving forward in the monitoring period.

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 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

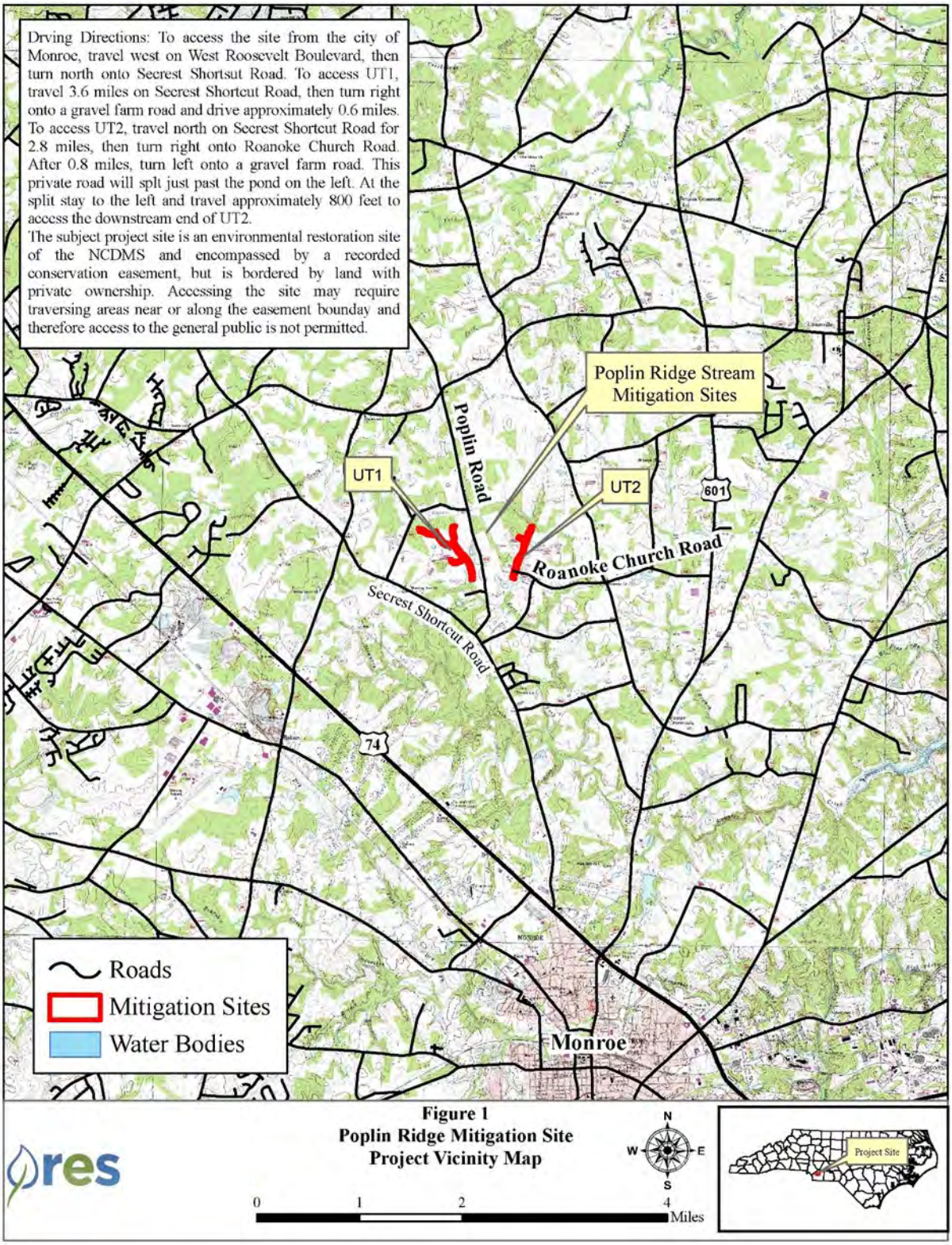

Figure 1
Poplin Ridge Mitigation Site
Project Vicinity Map

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

Project Component -or- Reach ID	As-Built Stationing/Location (LF)	Existing Footage/Acreage	Approach (PI, PII etc.)	Restoration -or- Restoration Equivalent	Restoration Footage or Acreage	Mitigation Ratio	SMUs
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

Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-riparian Wetland (acres)	Buffer (square feet)	Upland (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
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---	---	---	---

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.

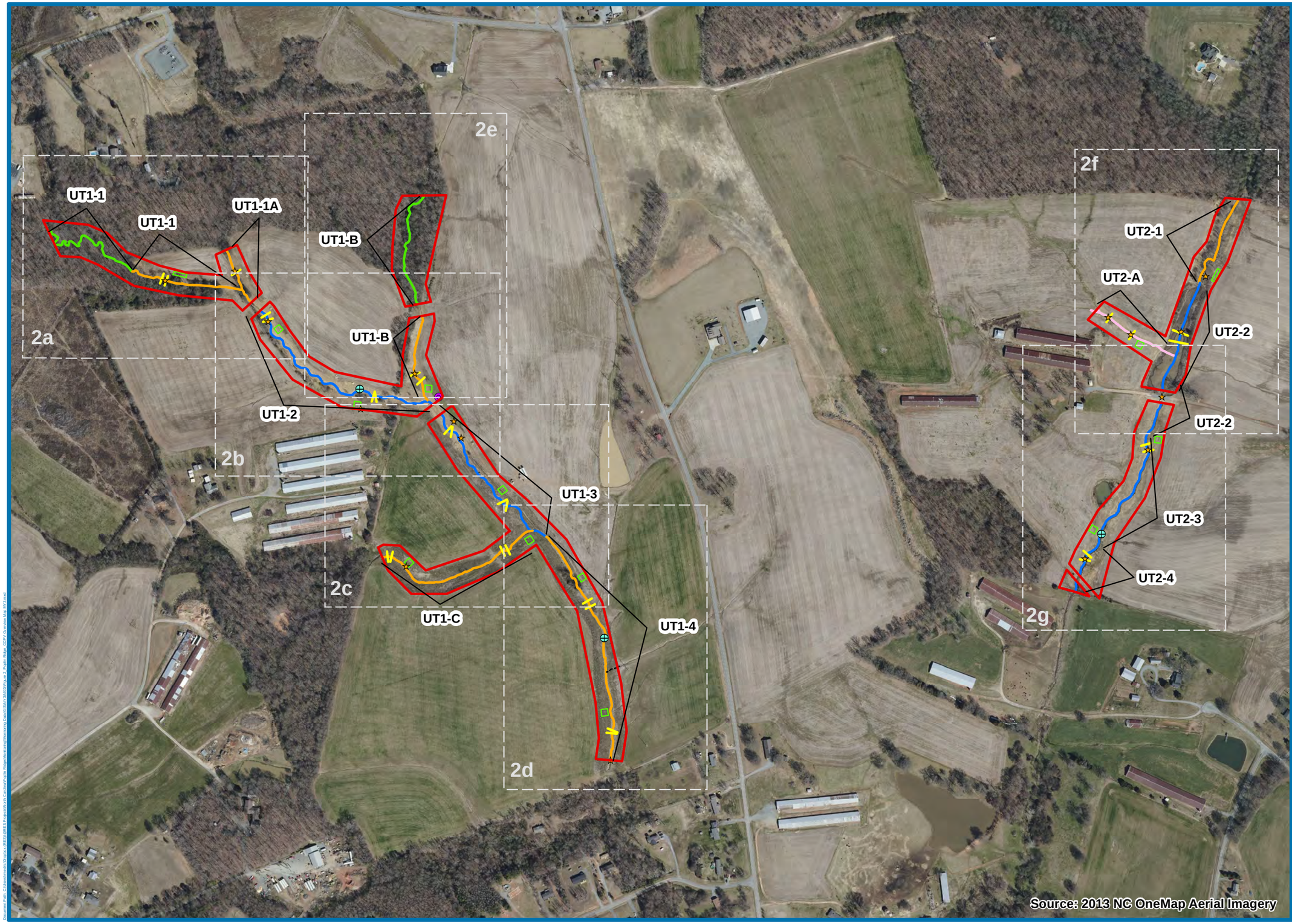
Table 2. Project Activity and Reporting History Poplin Ridge Stream Restoration Project		
Activity or Report	**Data Collection Complete**	**Completion or Delivery**
Mitigation Plan	NA	Jul-14
Final Design – Construction Plans	NA	Oct-14
Construction Completed	Apr-15	Apr-15
Site Planting Completed	Apr-15	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
Year 4 Monitoring		
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 (919) 209-1061 Daniel Ingram
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	

Appendix B
Visual Assessment Data



res

N
W E
S
0 225 450
Feet

1 inch = 450 feet

Figure 2

Poplin Ridge Stream Restoration Project MY3 2017

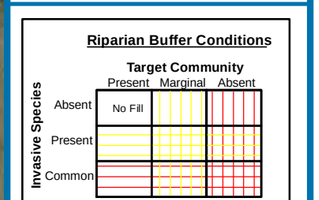
Current Conditions Overview Map

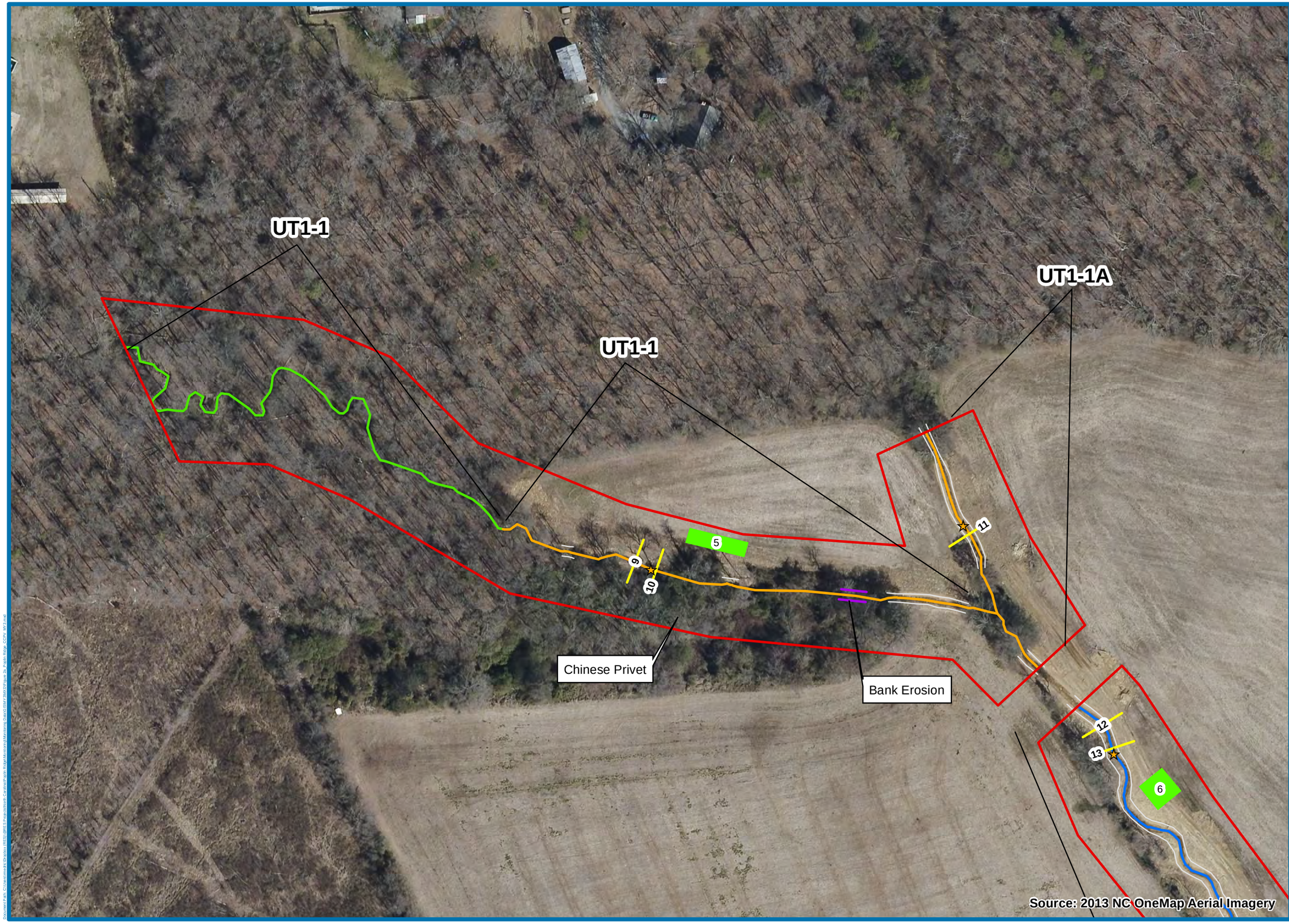
Date: 10/31/2017	Drawn by: RTM

LEGEND

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

Riparian Buffer Conditions





res

N
W E
S

0 50 100
Feet

1 inch = 100 feet

Figure 2a

Poplin Ridge Stream Restoration Project MY3 2017

Current Conditions Plan View

Date: 10/31/2017	Drawn by: RTM

LEGEND

- Conservation Easement
- Crest Gauge
- Rain Gauge
- Photo Station
- Cross Section
- Stream Structure
- Top of Bank
- BMP
- Enhancement I
- Enhancement II
- Preservation
- Restoration
- MY3 SPA

Vegetation Plot Success

- Criteria Met
- Criteria Not Met

Riparian Buffer Conditions

Target Community

Invasive Species	Present	Marginal	Absent
Absent	No Fill		
Present			
Common			

res

N
W E
S

0 50 100
Feet

1 inch = 100 feet

Figure 2b

Poplin Ridge Stream Restoration Project MY3 2017

Current Conditions Plan View

Date: 10/31/2017	Drawn by: RTM

LEGEND

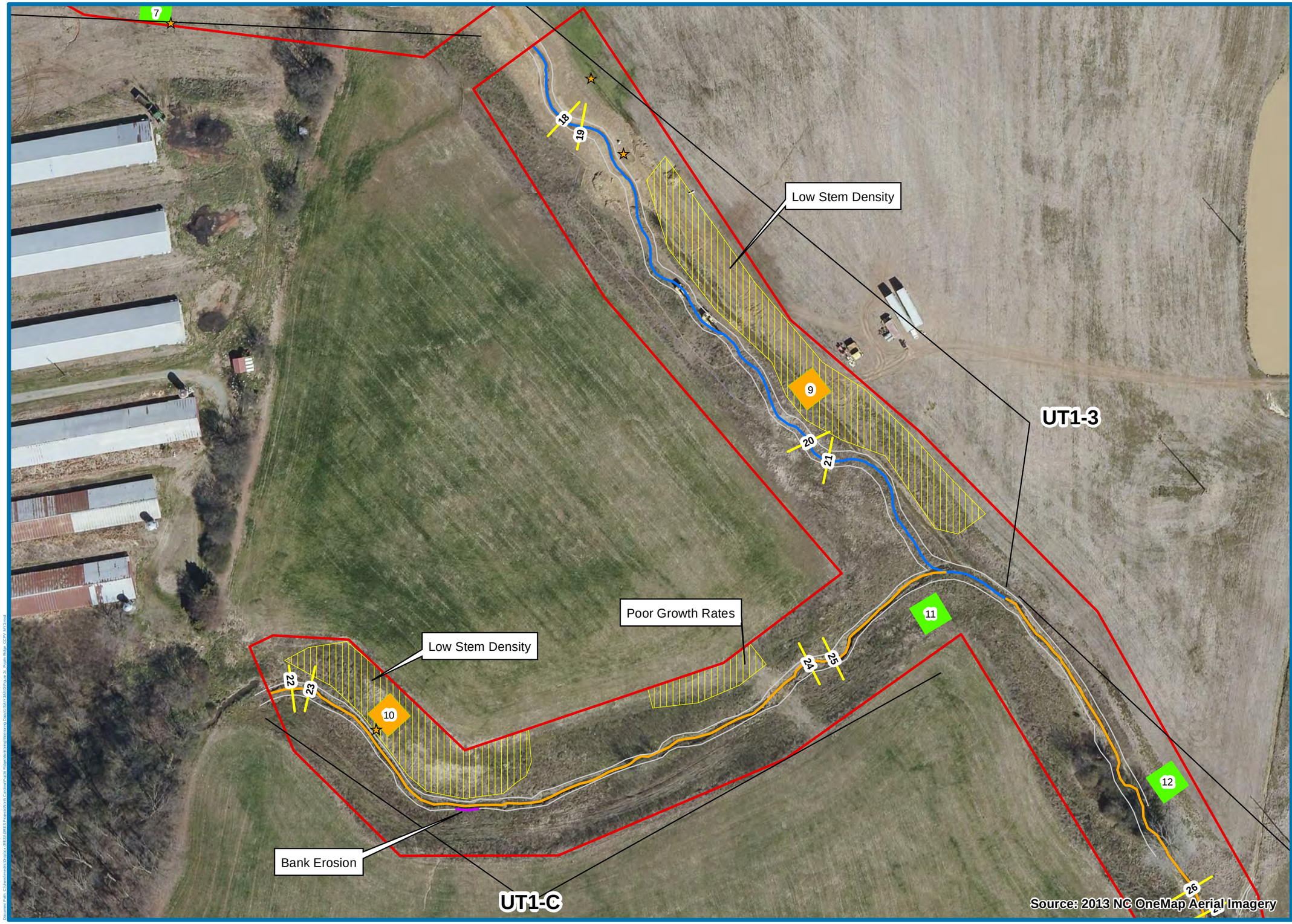
- Conservation Easement
- Cross Section
- Photo Station
- BMP
- Enhancement I
- Enhancement II
- Preservation
- Restoration
- Crest Gauge
- Rain Gauge
- Stream Structure
- Top of Bank
- MY3 SPAs

Vegetation Plot Success

- Criteria Met
- Criteria Not Met

Riparian Buffer Conditions

Invasive Species	Target Community: Present	Marginal	Absent
Absent	No Fill		
Present			
Common			



res

N
W E
S

0 50 100
Feet

1 inch = 100 feet

Figure 2c

Poplin Ridge Stream Restoration Project MY3 2017

Current Conditions Plan View

Date: 10/31/2017	Drawn by: RTM

LEGEND

- Conservation Easement
- Photo Station
- Crest Gauge
- Rain Gauge
- Cross Section
- Stream Structure
- MY3 SPA
- Top of Bank
- BMP
- Enhancement I
- Enhancement II
- Preservation
- Restoration

Vegetation Plot Success

- Criteria Met
- Criteria Not Met

Riparian Buffer Conditions

Invasive Species	Target Community: Present	Marginal	Absent
Absent	No Fill		
Present			
Common			

res

N
E
S
W

0 50 100
Feet

1 inch = 100 feet

Figure 2d

Poplin Ridge Stream Restoration Project MY3 2017

Current Conditions Plan View

Date: 10/31/2017	Drawn by: RTM

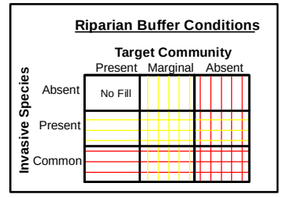
LEGEND

- Conservation Easement
- Photo Station
- Crest Gauge
- Rain Gauge
- Cross Section
- MY3 SPAs
- Stream Structure
- BMP
- Enhancement I
- Enhancement II
- Preservation
- Restoration

Vegetation Plot Success

- Criteria Met
- Criteria Not Met

Riparian Buffer Conditions



res

N
W
E
S

0 50 100
Feet

1 inch = 100 feet

Figure 2e

Poplin Ridge Stream Restoration Project MY3 2017

Current Conditions Plan View

Date: 10/31/2017	Drawn by: RTM

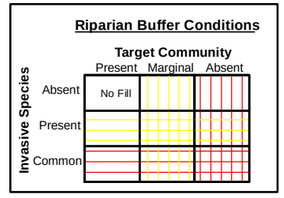
LEGEND

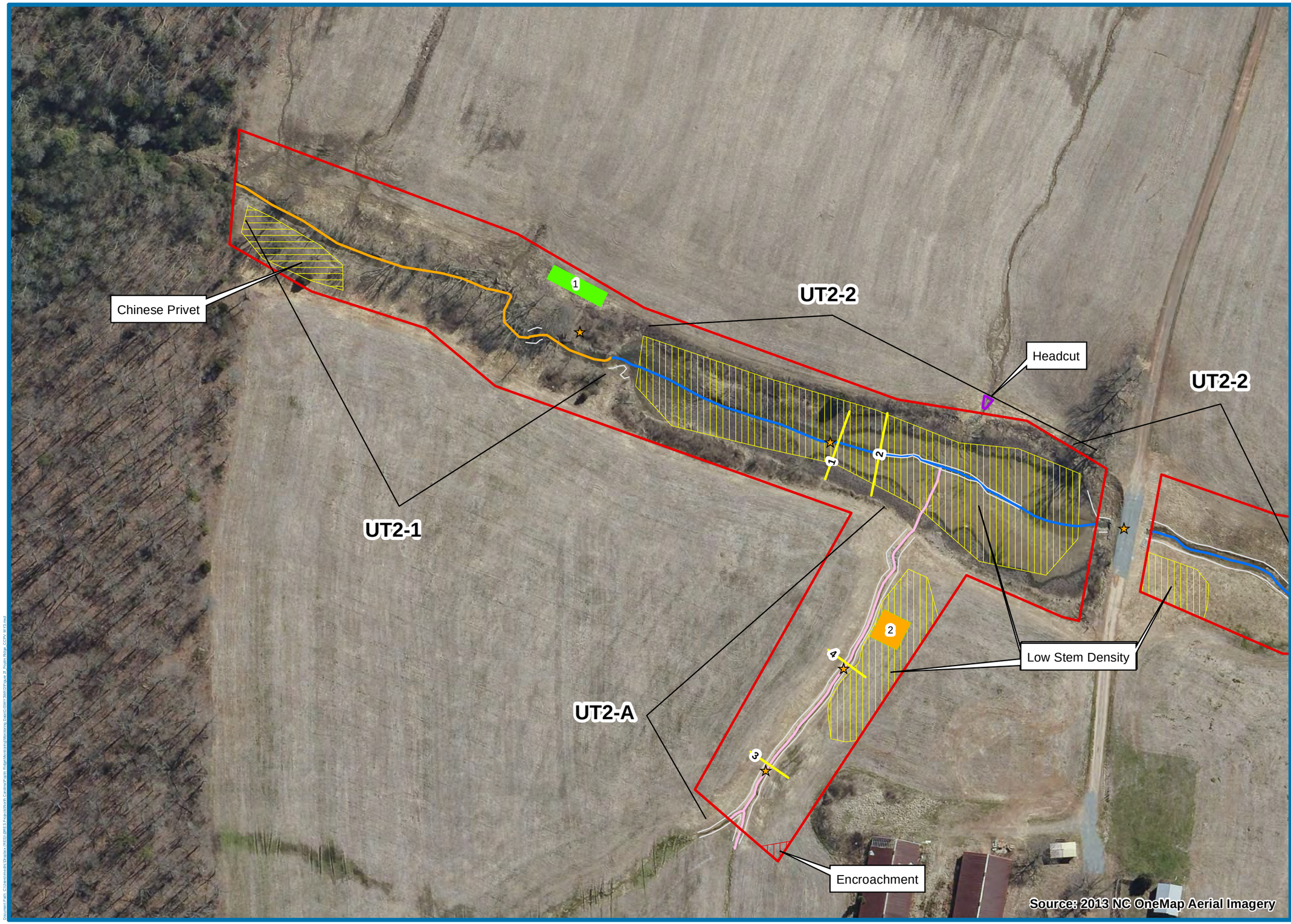
- Conservation Easement
- Photo Station
- Crest Gauge
- Rain Gauge
- Cross Section
- Stream Structure
- BMP
- Enhancement I
- Enhancement II
- Preservation
- Restoration

Vegetation Plot Success

- Criteria Met
- Criteria Not Met

Riparian Buffer Conditions





res

0 50 100
Feet

1 inch = 100 feet

Figure 2f

Poplin Ridge Stream Restoration Project MY3 2017

Current Conditions Plan View

Date: 10/31/2017	Drawn by: RTM

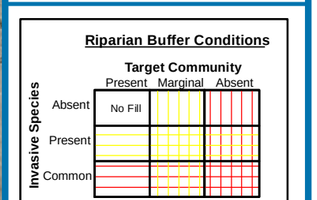
LEGEND

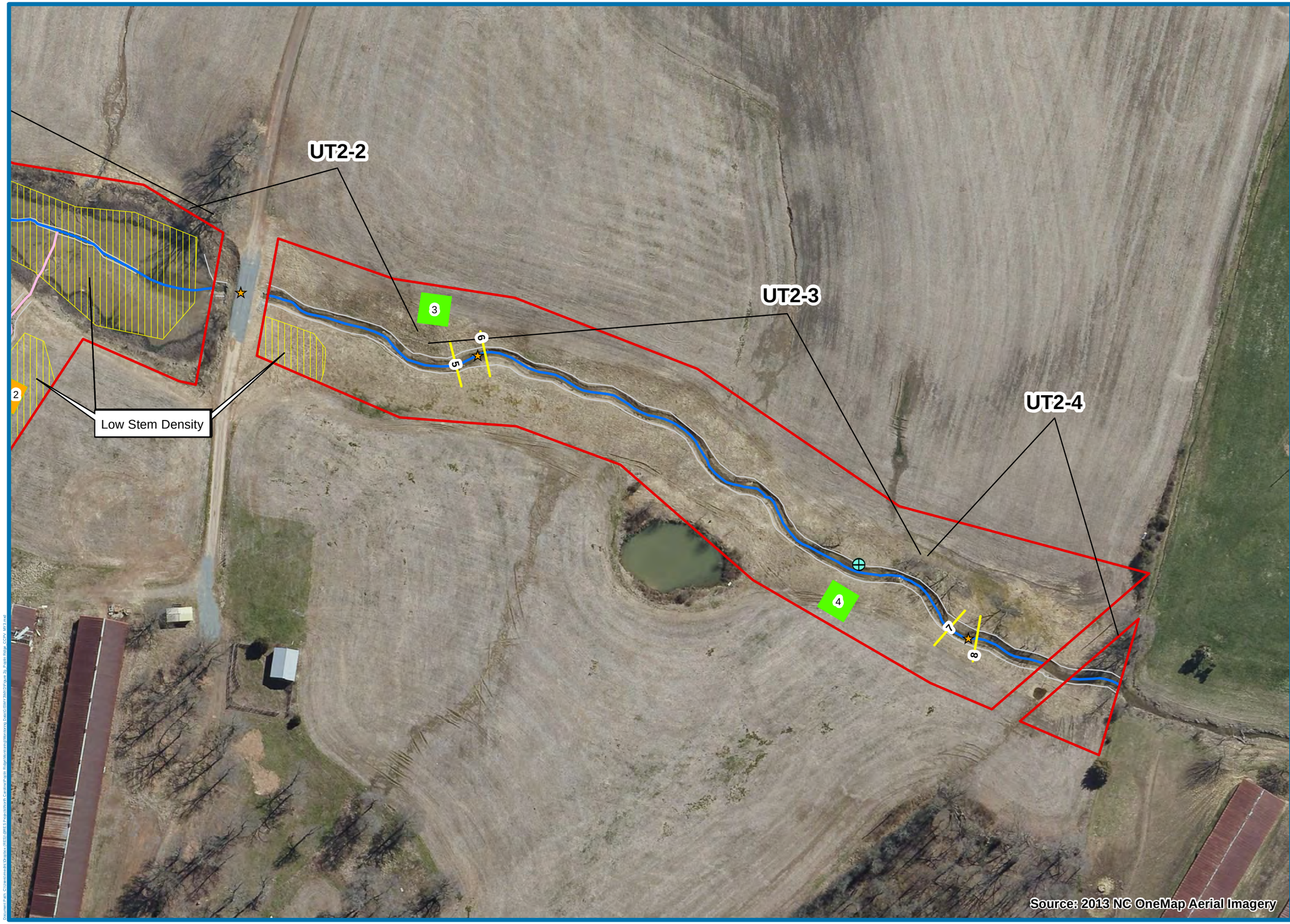
- Conservation Easement
- Photo Station
- BMP
- Enhancement I
- Enhancement II
- Preservation
- Restoration
- Top of Bank
- MY3 SPA
- Crest Gauge
- Rain Gauge
- Cross Section

Vegetation Plot Success

- Criteria Met
- Criteria Not Met

Riparian Buffer Conditions





ores

N
W
E
S

0 50 100
Feet

1 inch = 100 feet

Figure 2g

Poplin Ridge Stream Restoration Project MY3 2017

Current Conditions Plan View

Date: 10/31/2017	Drawn by: RTM

LEGEND

- Conservation Easement
- Photo Station
- BMP
- Enhancement I
- Enhancement II
- Preservation
- Restoration
- Crest Gauge
- Rain Gauge
- Cross Section
- Stream Structure
- Top of Bank

Vegetation Plot Success

- Criteria Met
- Criteria Not Met

Riparian Buffer Conditions

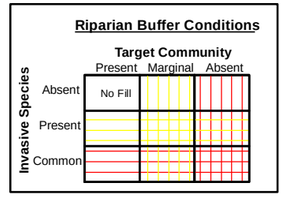


Table 5. Visual Stream Morphology Stability Assessment
Poplin Ridge Stream Restoration Site - UT1-1 - Enhancement I
Assessed Length 566 feet

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.			2	58	95%	0	0	95%
	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	2	58	95%	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 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 - UT1-3 - 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 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 - UT1-4 - 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 does NOT 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 does NOT 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 does NOT 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.			1	24	99%	0	0	99%
	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	1	24	99%	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 - UT2-1 - 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 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 - UT2-3 - 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 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 - 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 does NOT 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 does NOT 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.	Vertical Red Lines	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.	Vertical Yellow Lines	6	2.36	10%
		Totals	6	2.36	10%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	Vertical Yellow Lines	1	0.09	0%
		Cumulative Totals	7	2.45	11%

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).	Horizontal Lines (Red - Dense/**Yellow - Present**)	3	1.56	6%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	Vertical Red Lines	1	0.01	0%

N/A - Item does not apply.

Monitoring Year 3 – 2017 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*
September 19, 2017
* - *Direction is opposite of last year's photo (was Upstream in MY2)*

Project Reach UT1-3 – Permanent Photo Station 4
Station 26+50 – Looking Upstream at Crossing
September 19, 2017

Project Reach UT1-3 – Permanent Photo Station 5
Station 27+50 – Looking Downstream
September 19, 2017

Project Reach UT1-4 – Permanent Photo Station 6
Station 47+20 – Looking Upstream
September 20, 2017

Project Reach UT1-A - Permanent Photo Station 7
Station 2+00 – Looking Downstream
September 27, 2017

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
September 19, 2017

Project Reach UT2-1 – Permanent Photo Station 10
Station 4+50 – Looking Upstream
September 19, 2017

Project Reach UT2-2– Permanent Photo Station 11
Station 11+00 – Looking Upstream at Pond Bottom
September 19, 2017

Project Reach UT2-2 – Permanent Photo Station 12
Station 11+00 – Looking Downstream
April 26, 2017

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 3 – 2017 Problem Area Photos

Farm field east of UT2-2 – Headcut

UT1-1 – Left and Right Bank Erosion

UT1-C – Right Bank Erosion

UT1-2 – Left Bank Erosion

Appendix C
Vegetation Plot Data

Table 7. MY3 Vegetation Plot Criteria Attainment

Plot #	Stream Stems Per Acre	Volunteers Per Acre	Total Stems Per Acre	Success Criteria Met?	Average Tree Height (cm)*
1	769	283	1052	Yes	251
2	81	40	121	No	196
3	688	40	728	Yes	214
4	1093	40	1133	Yes	294
5	1052	5423	6475	Yes	262
6	809	0	809	Yes	171
7	809	0	809	Yes	336
8	283	364	647	No	78
9	162	0	162	No	78
10	40	40	81	No	194
11	607	81	688	Yes	144
12	486	0	486	Yes	274
13	850	121	971	Yes	126
Project Avg	**595**	**495**	**1090**	**Yes**	**201**

* Only the tallest eight trees were averaged, as this is the amount that represents 320 stems/acre.

Table 8. CVS Vegetation Plot Metadata Poplin Ridge Stream Restoration Site	
Report Prepared By	Matt DeAngelo
Date Prepared	10/2/2017 13:16
database name	Poplin_Ridge_95359_2017_MY3_CVS_Vegetation.mdb
database location	C:\Users\mdeangelo\Dropbox (RES)\@RES Projects\North Carolina\Poplin Ridge\Monitoring\Monitoring Data\MY3_2017\Vegetation Data
computer name	DESKTOP-F4AI5MT
file size	62828544
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 (MY3 2017)																																		
			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			2																																		
Acer negundo var. negundo	boxelder	Tree																																					
Acer rubrum	red maple	Tree			1												120																						
Acer rubrum var. rubrum	red maple	Tree																																					
Asimina triloba	pawpaw	Tree																																			1	1	1
Baccharis halimifolia	eastern baccharis	Shrub																																					
Betula nigra	river birch	Tree	2	2	2				3	3	3										1	1	1														1	1	1
Carya	hickory	Tree																																					
Carya alba	mockernut hickory	Tree			2									1																									
Celtis occidentalis	common hackberry	Tree																																					
Diospyros virginiana	common persimmon	Tree						1			1										1	1	1											1						
DONTKNOW: unsure record																																							
Fraxinus pennsylvanica	green ash	Tree																											1	1	1			1					
Liquidambar styraciflua	sweetgum	Tree															14								1														
Liriodendron tulipifera	tuliptree	Tree							1	1	1				1	1	1																				4	4	4
Nyssa sylvatica	blackgum	Tree										4	4	4																									
Platanus occidentalis	American sycamore	Tree										2	2	2	3	3	3	3	3	3	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								1	1	1
Quercus nigra	water oak	Tree	16	16	16				4	4	4	12	12	12	4	4	4	1	1	1	6	6	6	4	4	4	2	2	2				5	5	5	4	4	4	7	7	7
Quercus phellos	willow oak	Tree	1	1	1				8	8	8	7	7	7	9	9	9	10	10	10	2	2	2	1	1	1	1	1	1				3	3	3	1	1	1	2	2	2
Quercus rubra	northern red oak	Tree				1	1	1							6	6	6	1	1	1	5	5	5	1	1	1							2	2	2	2	2	2	1	1	1
Quercus velutina	black oak	Tree				1	1	1							3	3	3	3	3	3				1	1	1							3	3	3	2	2	2	1	1	1
Sambucus canadensis	Common Elderberry	Shrub																																					
Ulmus alata	winged elm	Tree			2																					8					1								3
Ulmus rubra	slippery elm	Tree																																					
		Stem count	19	19	26	2	2	3	17	17	18	27	27	28	26	26	160	20	20	20	20	20	20	7	7	16	4	4	4	1	1	2	15	15	17	12	12	12	21	21	24
		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	7	2	2	3	5	5	6	5	5	6	6	6	8	7	7	7	6	6	6	4	4	6	3	3	3	1	1	2	5	5	7	5	5	5	9	9	10
		Stems per ACRE	769	769	1052	81	81	121	688	688	728	1093	1093	1133	1052	1052	6475	809	809	809	809	809	809	283	283	647	162	162	162	40	40	81	607	607	688	486	486	486	850	850	971

Poplin Ridge			Annual Means											
			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
Acer negundo	boxelder	Tree			2									
Acer negundo var. negundo	boxelder	Tree						4						
Acer rubrum	red maple	Tree			121									
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	7	7	7	9	9	9	9	9	9	27	27	27
Carya	hickory	Tree						6			2			
Carya alba	mockernut hickory	Tree			3									
Celtis occidentalis	common hackberry	Tree						32			9			
Diospyros virginiana	common persimmon	Tree	1	1	4			4			2			
DONTKNOW: unsure record												7	7	7
Fraxinus pennsylvanica	green ash	Tree	1	1	2			3			2			
Liquidambar styraciflua	sweetgum	Tree			15			106			8			
Liriodendron tulipifera	tuliptree	Tree	6	6	6	7	7	7	7	7	7	34	34	34
Nyssa sylvatica	blackgum	Tree	4	4	4	4	4	4	3	3	3			
Platanus occidentalis	American sycamore	Tree	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									
Quercus michauxii	swamp chestnut oak	Tree	4	4	4	5	5	5	4	4	4	8	8	8
Quercus nigra	water oak	Tree	65	65	65	79	79	79	69	69	69	22	22	22
Quercus phellos	willow oak	Tree	45	45	45	43	43	43	46	46	46	50	50	50
Quercus rubra	northern red oak	Tree	19	19	19	21	21	21	8	8	17			
Quercus velutina	black oak	Tree	14	14	14	14	14	14	6	6	6			
Sambucus canadensis	Common Elderberry	Shrub						2						
Ulmus alata	winged elm	Tree			14									
Ulmus rubra	slippery elm	Tree						2						
		Stem count	191	191	350	209	209	499	213	213	252	340	340	340
		size (ares)	13			13			13			13		
		size (ACRES)	0.32			0.32			0.32			0.32		
		Species count	13	13	18	11	11	21	13	13	19	11	11	11
		Stems per ACRE	594.58	594.58	1089.5	650.61	650.61	1553.4	663.06	663.06	784.47	1058.4	1058.4	1058.4

Color for Density

- Exceeds requirements by 10%
- Exceeds requirements, but by less than 10%
- Fails to meet requirements, by less than 10%
- Fails to meet requirements by more than 10%
- Recruit Stems

Monitoring Year 3 – 2017 Vegetation Plot Photos

Poplin Ridge - Vegetation Monitoring Plot 1
September 19, 2017

Poplin Ridge - Vegetation Monitoring Plot 2
September 19, 2017

Poplin Ridge - Vegetation Monitoring Plot 3
September 19, 2017

Poplin Ridge - Vegetation Monitoring Plot 4
September 19, 2017

Poplin Ridge - Vegetation Monitoring Plot 5
September 19, 2017

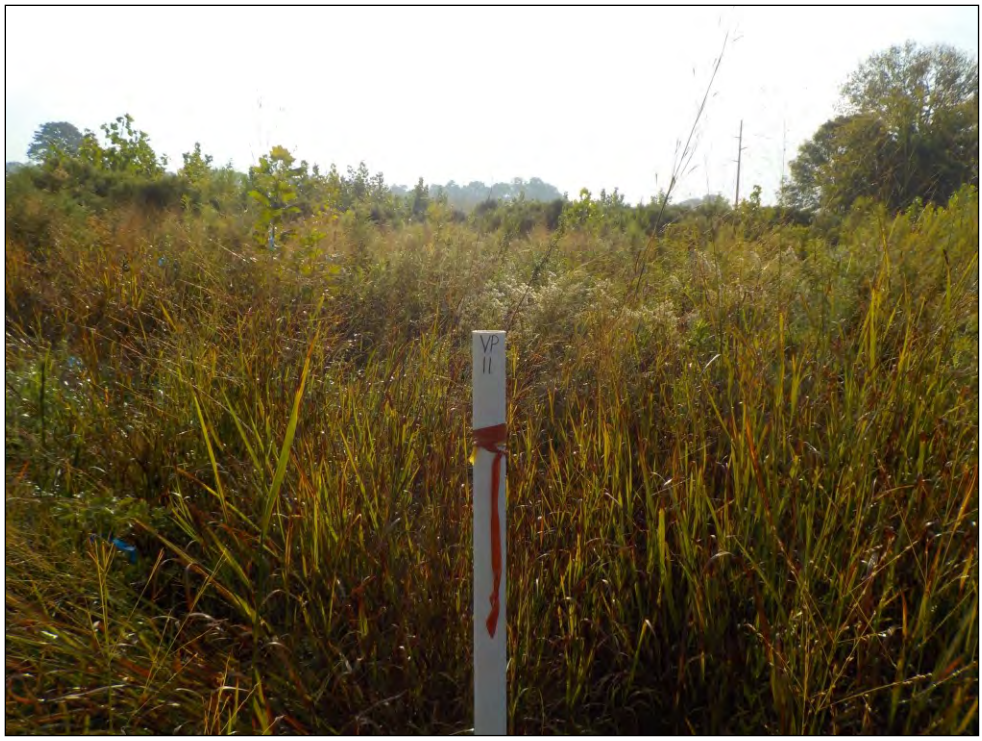
Poplin Ridge - Vegetation Monitoring Plot 6
September 19, 2017

Poplin Ridge - Vegetation Monitoring Plot 7
September 19, 2017

Poplin Ridge - Vegetation Monitoring Plot 8
September 19, 2017

Poplin Ridge - Vegetation Monitoring Plot 9
September 19, 2017

Poplin Ridge - Vegetation Monitoring Plot 10
September 19, 2017



Poplin Ridge - Vegetation Monitoring Plot 11
September 20, 2017

Poplin Ridge - Vegetation Monitoring Plot 12
September 20, 2017

Poplin Ridge - Vegetation Monitoring Plot 13
September 20, 2017

Appendix D
Stream Geomorphology Data

Table 10 - Morphological Parameters Summary (Reach UT1)

Project Name/Number: Poplin Ridge Stream Restoration Project

	Reference Reach		Existing									Design				As-Built MY0			
			UT1-R1	UT1-R1	UT1-R2	UT1-R3	UT1-R4	UT1-A	UT1-B	UT1-B	UT1-C	UT1-R2		UT1-R3		UT1-R2		UT1-R3	
			Pres.	Enh. I	Rest.	Rest.	Enh. I	Enh. I	Pres.	Enh. I	Enh. I	Rest.		Rest.		Rest.		Rest.	
Feature	Riffle	Pool	Riffle	Riffle	Riffle	Riffle	Riffle	Riffle	Riffle	Riffle	Riffle	Riffle	Pool	Riffle	Pool	Riffle	Pool	Riffle	Pool
Drainage Area (ac)	426	426	136	136	248	384	728	88	120	120	250	248		384		248		384	
NC Regional Curve Discharge (cfs)	69		31	31	47	64	100	22	28	28	47	47		64		47		64	
Design/Approx. Bankfull Discharge (cfs)	50		22	22	35	55	65	20	15	30	50	35		52		35		52	
Dimension																			
BF Width (ft)	13.7	15.0	7.9	7.5	9.9	12.8	17.5	6.9	11.2	6.0	10.0	11.8	12.8	13.6	14.8	12.95	14.85	15.35	15.15
Floodprone Width (ft)	>50	NA	>50	>50	>50	>50	>50	>50	>50	>50	>40	>50	NA	>50	>50	>50	>50	>50	NA
BF Cross Sectional Area (ft^2)	18.1	23.4	10.1	10.4	14.2	22.2	21.9	6.8	6.1	5.5	10.0	14.5	19.9	18.8	26.9	17.3	19.15	22.4	21.45
BF Mean Depth (ft)	1.4	1.6	1.3	1.4	1.4	1.7	1.2	1.0	0.5	0.9	1.0	1.2	1.6	1.4	1.8	1.3	1.25	1.45	1.45
BF Max Depth (ft)	1.7	2.7	2.0	1.8	2.0	2.4	2.3	1.4	1.0	1.1	1.3	1.8	2.4	1.9	2.8	2.1	2.35	2.25	2.55
Width/Depth Ratio	9.8	9.6	6.2	5.4	7.0	7.4	14.0	6.9	20.4	6.6	10.0	9.8	8.2	9.9	8.1	9.7	11.65	10.5	10.75
Entrenchment Ratio	>2.2	NA	>2.2	>2.2	>2.2	>2.2	>2.2	>2.2	>2.2	>2.2	>2.2	>2.2	NA	>2.2	NA	>2.2	>2.2	>2.2	>2.2
Wetted Perimeter (ft)	14.9	16.8	10.4	9.1	11.6	14.5	19.0	8.2	11.8	7.5	11.1	12.6	14	14.7	16.2	13.9	15.95	16.35	16.4
Hydraulic Radius (ft)	1.2	1.4	1.0	1.1	1.2	1.5	1.2	0.8	0.5	0.7	0.9	1.1	1.4	1.4	1.7	1.25	1.15	1.4	1.3
Substrate																			
D16 (mm)	2.8		0.062	0.062	0.062	2	3	0.062	2	3	2	2		2		0.062		1.7	
D50 (mm)	11.0		0.062	16.0	2	8	25	0.1	29	12	11	8		8		0.062		25	
D84 (mm)	16.0		0.062	63.0	7	25	51	0.4	60	27	45	25		25		26		60	
Pattern																			
	Min	**Max**	**Med**	---	---	---	---	---	---	---	---	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Channel Beltwidth (ft)	26.3	55.5	37.3	---	---	---	---	---	---	---	---	38	57	44	65	35	60	42	65
Radius of Curvature (ft)	13.5	103.3	41.2	---	---	---	---	---	---	---	---	18	89	20	103	15	75	17	80
Radius of Curvature Ratio	1.0	7.6	3.0	---	---	---	---	---	---	---	---	1.5	7.6	1.5	7.6	1.5	7.6	1.5	7.6
Meander Wavelength (ft)	49.4	66.0	59.7	---	---	---	---	---	---	---	---	38	57	44	65	35	52	37	56
Meander Width Ratio	3.6	4.8	4.4	---	---	---	---	---	---	---	---	3.2	4.8	3.2	4.8	2.7	4.0	2.7	4.3
Profile																			
	Min	**Max**	**Med**	---	---	---	---	---	---	---	---	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Riffle Length (ft)	6	18	9	---	---	---	---	---	---	---	---	5	16	6	18	6	18	7	22
Riffle Slope (%)	1.1	3.4	2.3	---	---	---	---	---	---	---	---	1.1	3.4	1.1	3.4	1.0	3.6	1.0	3.7
Run Length (ft)	7	15	8	---	---	---	---	---	---	---	---	6	13	7	15	6	15	8.0	18.0
Run Slope (%)	4.8	11.5	8.2	---	---	---	---	---	---	---	---	4.8	11.5	4.8	11.5	4.6	12.0	5.0	11.0
Glide Length (ft)	5	13	9	---	---	---	---	---	---	---	---	4	11	5	13	4	12	6.0	13.2
Glide Slope (%)	4.8	9.2	7.0	---	---	---	---	---	---	---	---	4.8	9.2	4.8	9.2	4.7	10.0	5.0	10.9
Pool Length (ft)	5	42	15	---	---	---	---	---	---	---	---	4	36	5	42	6	42	8.0	50.0
Pool Slope (%)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1.1	2.5	1.1	2.4
Pool-to-Pool Spacing (ft)	18.0	64.0	30.0	---	---	---	---	---	---	---	---	16	55	18	64	20	60	20	70
Additional Reach Parameters																			
Valley Length (ft)	279		622	534	1,173	731	1,294	264	573	434	908	---		---		1,070		1,115	
Channel Length (ft)	318		716	541	1,197	738	1,340	270	618	449	921	---		---		1,178		1,223	
Sinuosity	1.14		1.2	1.0	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.1		1.1		1.1		1.1	
Water Surface Slope (ft/ft)	0.0048		NA	NA	NA	0.003	0.004	NA	NA	NA	NA	---		---		NA		NA	
Channel Slope (ft/ft)	0.0047		0.0048	0.011	0.007	0.004	0.005	0.012	0.012	0.018	0.008	0.0059		0.0046		0.0066		0.0041	
Rosgen Classification	E4		E4	E4	E4	E4	C4	E5	C4	E4	E4	E4		E4		E4		E4	

Table 10 Cont'd - Morphological Parameters Summary (Reach UT2)

Project Name/Number: Poplin Ridge Stream Restoration Project

	Reference Reach		Existing					Design				As-Built MY0			
			UT2-R1	UT2-R2	UT2-R3	UT2-R4	UT2-A	UT1-R2		UT1-R3/R4		UT1-R2		UT1-R3/R4	
			Enh. II	Rest.	Rest.	Rest.	Enh. II	Rest.		Rest.		Rest.		Rest.	
Feature	Riffle	Pool	Riffle	Pond	Riffle	Riffle	Riffle	Riffle	Pool	Riffle	Pool	Riffle	Pool	Riffle	Pool
Drainage Area (ac)	426	426	634	723	742	864	51	723		864		723		864	
NC Regional Curve Discharge (cfs)	69							100		113		100		113	
Design/Approx. Bankfull Discharge (cfs)	50		---	---	---	---	---	52		70		52		70	
Dimension															
BF Width (ft)	13.7	15.0	25.6	---	16.2	12.1	6.1	17.2	18.6	18.2	19.6	21	19.6	17.4	21.1
Floodprone Width (ft)	>50	NA	>50	---	>50	>50	>50	>50	NA	>50	NA	>50	>50	>50	>50
BF Cross Sectional Area (ft^2)	18.1	23.4	19.6	---	22.4	12.6	3.0	31.5	42	34.8	47.6	26.5	32.6	30.8	34.4
BF Mean Depth (ft)	1.4	1.6	0.8	---	1.4	1.0	0.5	1.8	2.3	1.9	2.4	1.3	1.7	1.8	1.6
BF Max Depth (ft)	1.7	2.7	1.7	---	2.6	1.6	1.2	2.5	3.5	2.6	3.8	2.2	3.1	2.5	3.5
Width/Depth Ratio	9.8	9.6	33.5	---	11.8	11.6	12.2	9.4	8.2	9.5	8.1	16.6	11.7	9.8	12.9
Entrenchment Ratio	>2.2	NA	>2.2	---	>2.2	>2.2	>2.2	>2.2	NA	>2.2	NA	>2.2	>2.2	>2.2	>2.2
Wetted Perimeter (ft)	14.9	16.8	26.2	---	17.9	13.1	7.0	18.5	20.3	19.5	21.5	21.7	21.2	18.5	22.9
Hydraulic Radius (ft)	1.2	1.4	0.7	---	1.3	1.0	0.4	1.7	2.1	1.8	2.2	1.2	1.5	1.7	1.5
Substrate															
D16 (mm)	2.8		0.062	---	0.062	1.5	0.062	1.5		1.5		0.062		0.062	
D50 (mm)	11.0		0.062	---	0.062	7.8	0.062	7.8		7.8		0.062		28	
D84 (mm)	16.0		0.72	---	4.8	15.0	0.57	15		15		24		61	
Pattern															
	Min	**Max**	**Med**	---	---	---	---	---	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Channel Beltwidth (ft)	26	56	37	---	---	---	---	---	55	83	58	87	67	101	56	84
Radius of Curvature (ft)	13	103	41	---	---	---	---	---	26	130	27	138	32	160	26	132
Radius of Curvature Ratio	1.0	7.6	3.0	---	---	---	---	---	1.5	7.6	1.5	7.6	1.5	7.6	1.5	7.6
Meander Wavelength (ft)	49	66	60	---	---	---	---	---	55	83	58	87	67	101	56	84
Meander Width Ratio	1.9	4.1	2.7	---	---	---	---	---	3.2	4.8	3.2	4.8	3.2	4.8	3.2	4.8
Profile															
	Min	**Max**	**Med**	---	---	---	---	---	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Riffle Length (ft)	6	18	9						8	23	8	24	9.0	25.0	8.2	26.5
Riffle Slope (%)	1.1	3.4	2.3	---	---	---	---	---	1.1	3.4	1.1	3.4	1.1	3.6	1.2	3.8
Run Length (ft)	7	15	8						9	19	9	20	11.0	17.0	10.2	21.0
Run Slope (%)	4.8	11.5	8.2	---	---	---	---	---	4.8	11.5	4.8	11.5	4.2	12.0	3.8	11.2
Glide Length (ft)	5	13	9						6	16	7	17	6.2	18.2	7.5	16.3
Glide Slope (%)	4.8	9.2	7.0	---	---	---	---	---	4.8	9.2	4.8	9.2	5.1	9.6	4.8	9.1
Pool Length (ft)	5	42	15						6	53	7	56	7.8	47.0	8.5	60.0
Pool Slope (%)	---	---	---	---	---	---	---	---	---	---	---	---	3.5	10.0	4.1	10.1
Pool-to-Pool Spacing (ft)	18.0	64.0	30.0	---	---	---	---	---	23	81	24	85	18.0	90.0	20.5	92.0
Additional Reach Parameters															
Valley Length (ft)	279		410	641	779	1,015	427	---		---		785		710	
Channel Length (ft)	318		443	641	781	1,032	437	---		---		847		778	
Sinuosity	1.14		1.1	1.0	1.0	1.0	1.0	1.1		1.1		1.08		1.1	
Water Surface Slope (ft/ft)	0.0048		NA	NA	NA	0.0027	NA	---		---		---		---	
Channel Slope (ft/ft)	0.0047		0.0027	0.001	0.0057	0.0031	0.013	0.0029		0.0028		0.0061		0.002	
Rosgen Classification	E4		C5c	NA	E5	E4	C5	E4		E4		E4		E4	

Table 11a. - Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Poplin Ridge Stream Restoration Project

	Cross Section 1 Reach UT2-2							Cross Section 2 Reach UT2-2							Cross Section 3 (Riffle) Reach UT2-A							Cross Section 4 (Riffle) Reach UT2-A							Cross Section 5 (Run) Reach UT2-2						
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1[1]**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**
Record elevation (datum) used	577.24	577.24	577.24	577.24				577.10	577.10	577.10	577.10				586.40	586.40	586.40	586.40				585.00	585.00	585.00	585.00				576.32	576.32	576.32	576.32			
Bankfull Width (ft)	3.2	5.5	5.2	4.3				3.0	5.6	5.3	3.9				8.2	8.0	7.5	7.5				11.0	8.8	7.5	8.5				21.0	19.3	18.0	17.1			
Floodprone Width (ft)	>17.2	>17.2	>17.2	26.2				>15.2	>15.2	>15.2	11.2				>50.0	>50.0	>50.0	44.0				>44.4	>44.4	>50.0	39.8				>50	>50	>50	>50			
Bankfull Mean Depth (ft)	0.5	0.7	0.6	0.3				0.4	0.5	0.4	0.1				1.0	0.8	0.8	0.6				0.7	0.6	0.8	0.5				1.3	1.3	1.3	1.1			
Bankfull Max Depth (ft)	0.9	1.4	1.1	0.5				0.6	1.3	0.8	0.3				1.7	1.5	1.3	1.2				1.3	1.1	1.3	1.1				2.2	2.2	2.4	1.8			
Bankfull Cross Sectional Area (ft^2)	0.6	3.7	3.3	1.1				1.1	2.7	2.2	0.5				7.9	6.7	5.7	4.7				7.4	5.0	5.7	4.1				26.5	25.2	22.9	19.0			
Bankfull Width/Depth Ratio	6.4	8.2	8.1	16.7				7.9	11.5	12.5	28.8				8.5	9.5	9.9	11.9				16.4	15.6	9.9	17.4				16.6	14.9	14.2	15.5			
Bankfull Entrenchment Ratio	>2.2	>3.1	>3.3	6.0				>2.2	>2.7	>2.9	2.9				>2.2	>6.3	>6.7	5.9				>2.2	>5.0	>6.7	4.7				>2.2	>2.6	>2.8	>2.9			
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.3				1.0	1.0	1.0	2.0				1.0	1.0	1.0	1.1				1.0	1.0	1.0	1.1				1.0	1.0	1.0	0.9			

	Cross Section 6 (Pool) Reach UT2-3							Cross Section 7 (Pool) Reach UT2-4							Cross Section 8 (Riffle) Reach UT2-4							Cross Section 9 (Riffle) Reach UT1-1							Cross Section 10 (Pool) Reach UT1-1						
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1[1]**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**
Record elevation (datum) used	576.48	576.48	576.48	576.48				575.00	575.00	575.00	575.00				575.01	575.01	575.01	575.01				602.06	602.06	602.06	602.06				602.28	602.28	602.28	602.28			
Bankfull Width (ft)	19.6	19.1	19.4	18.7				21.1	18.7	18.5	18.8				17.4	17.1	16.9	17.2				11.7	11.4	11.4	11.6				15.2	14.7	14.6	15.5			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0				>50.0	>50.0	>50.0	>50.0				>50.0	>50.0	>50.0	>50.0				>50.0	>50.0	>50.0	>50.0				>50	>50	>50	>50			
Bankfull Mean Depth (ft)	1.7	1.6	1.6	1.4				1.6	1.7	1.7	1.6				1.8	1.7	1.7	1.6				1.1	1.1	1.1	1.1				1.4	1.3	1.3	1.3			
Bankfull Max Depth (ft)	3.1	3.0	3.0	2.8				3.5	3.4	3.4	3.2				2.5	2.4	2.5	2.3				1.8	1.8	1.8	1.8				2.6	2.5	2.5	2.6			
Bankfull Cross Sectional Area (ft^2)	32.6	30.0	30.5	25.6				34.4	32.0	31.6	31.0				30.8	28.4	28.5	26.7				13.0	12.1	12.4	12.3				21.0	19.8	19.7	20.2			
Bankfull Width/Depth Ratio	11.7	12.2	12.3	13.7				12.9	10.9	10.9	11.4				9.8	10.3	10.0	11.0				10.4	10.7	10.4	10.9				11.1	10.9	10.9	11.9			
Bankfull Entrenchment Ratio	>2.2	>2.6	>2.6	N/A				>2.2	>2.7	>2.7	N/A				>2.2	>2.9	>3.0	>2.9				>2.2	>4.4	>4.4	>4.3				>2.2	>3.4	>3.4	N/A			
Bankfull Bank Height Ratio	1.0	1.0	1.0	N/A				1.0	1.0	1.0	N/A				1.0	1.0	1.0	1.1				1.0	1.0	1.0	1.0				1.0	1.0	1.0	N/A			

	Cross Section 11 (Riffle) Reach UT1-A							Cross Section 12 (Pool) Reach UT1-2							Cross Section 13 (Riffle) Reach UT1-2							Cross Section 14 (Pool) Reach UT1-2							Cross Section 15 (Riffle) Reach UT1-2						
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**
Record elevation (datum) used	599.06	599.06	599.06	599.06				596.26	596.26	596.26	596.26				595.97	595.97	595.97	595.97				591.21	591.21	591.21	591.21				591.48	591.48	591.48	591.48			
Bankfull Width (ft)	10.0	10.2	10.0	9.6				17.4	17.4	17.6	17.4				12.5	12.2	12.3	12.6				12.3	12.0	11.5	12.1				13.4	12.9	12.9	13.2			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0				>50.0	>50.0	>50.0	>50.0				>50.0	>50.0	>50.0	>50.0				>50.0	>50.0	>50.0	>50.0				>50	>50	>50	>50			
Bankfull Mean Depth (ft)	1.0	1.0	1.0	1.1				1.4	1.3	1.2	1.1				1.2	1.2	1.2	1.2				1.1	1.0	1.0	1.0				1.4	1.3	1.3	1.3			
Bankfull Max Depth (ft)	1.7	1.6	1.6	1.6				2.5	2.4	2.5	2.2				1.9	1.9	2.0	2.2				2.2	2.0	2.0	2.1				2.3	2.2	2.2	2.1			
Bankfull Cross Sectional Area (ft^2)	10.5	10.1	10.1	10.1				24.4	21.8	21.8	19.9				15.6	14.4	14.6	14.8				13.9	11.9	11.5	12.6				19.0	17.3	17.2	17.0			
Bankfull Width/Depth Ratio	9.6	10.3	10.0	9.1				12.4	13.9	14.2	15.2				10.0	10.4	10.3	10.7				10.9	12.1	11.6	11.5				9.4	9.7	9.7	10.3			
Bankfull Entrenchment Ratio	>2.2	>4.9	>5.0	>5.2				>2.2	>2.9	>2.8	N/A				>2.2	>4.1	>4.1	>4.0				>2.2	>4.2	>4.3	N/A				>2.2	>3.9	>3.9	>3.8			
Bankfull Bank Height Ratio	1.0	1.0	1.0	0.9				1.0	1.0	1.0	N/A				1.0	1.0	1.0	1.0				1.0	1.0	1.0	N/A				1.0	1.0	1.0	1.0			

[1]Calculations updated to show corrected values

Note: Starting in MY3, Bankfull Bank Height Ratio was calculated on riffles using the baseline bankfull elevation. This method was used because the dimension of the channels has not changed enough to alter the bankfull elevation.

Table 11a. Cont'd - Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Poplin Ridge Stream Restoration Project

	Cross Section 16 (Riffle) Reach UT1-B							Cross Section 17 (Pool) Reach UT1-B							Cross Section 18 (Pool) Reach UT1-3							Cross Section 19 (Riffle) Reach UT1-3							Cross Section 20 (Riffle) Reach UT1-3						
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**
Record elevation (datum) used	591.84	591.84	591.84	591.84				590.93	590.93	590.93	590.93				588.03	588.03	588.03	588.03				588.19	588.19	588.19	588.19				586.15	586.15	586.15	586.15			
Bankfull Width (ft)	11.7	10.8	10.5	11.1				14.2	13.1	13.2	13.2				14.5	14.3	13.9	14.2				15.2	15.1	14.9	15.4				15.5	16.1	15.2	15.1			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0				>50.0	>50.0	>50.0	>50.0				>50.0	>50.0	>50.0	>50.0				>50.0	>50.0	>50.0	>50.0				>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.1	1.0	1.1	1.0				0.7	0.6	0.7	0.7				1.5	1.4	1.4	1.4				1.5	1.4	1.4	1.4				1.4	1.3	1.3	1.3			
Bankfull Max Depth (ft)	1.8	1.7	1.7	1.7				1.4	1.3	1.4	1.6				2.6	2.6	2.5	2.6				2.4	2.1	2.2	2.1				2.1	2.1	2.1	2.1			
Bankfull Cross Sectional Area (ft^2)	12.3	11.2	11.1	10.8				10.2	8.5	9.2	9.6				21.5	19.6	19.7	19.3				23.0	21.8	21.3	21.0				21.9	20.9	20.0	19.6			
Bankfull Width/Depth Ratio	11.2	10.4	9.9	11.3				19.7	20.2	19.1	18.3				9.8	10.4	9.9	10.5				10.1	10.5	10.5	11.2				11.0	12.4	11.6	11.6			
Bankfull Entrenchment Ratio	>2.2	>4.6	>4.8	>4.5				>2.2	>3.8	>3.8	N/A				>2.2	>3.5	>3.6	N/A				>2.2	>3.3	>3.3	>3.3				>2.2	>3.1	>3.3	>3.3			
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.1				1.0	1.0	1.0	N/A				1.0	1.0	1.0	N/A				1.0	1.0	1.0	1.0				1.0	1.0	1.0	1.1			

	Cross Section 21 (Pool) Reach UT1-3							Cross Section 22 (Riffle) Reach UT1-C							Cross Section 23 (Pool) Reach UT1-C							Cross Section 24 (Riffle) Reach UT1-C							Cross Section 25 (Pool) Reach UT1-C						
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**
Record elevation (datum) used	585.60	585.60	585.60	585.60				592.04	592.04	592.04	592.04				591.80	591.80	591.80	591.80				586.30	586.30	586.30	586.30				585.80	585.80	585.80	585.80			
Bankfull Width (ft)	15.8	15.0	15.2	15.0				13.2	12.5	12.5	12.4				14.6	14.0	13.9	13.7				14.2	13.8	14.0	14.0				12.0	11.1	11.2	10.5			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0				>50.0	>50.0	>50.0	>50.0				>50.0	>50.0	>50.0	>50.0				>46.6	>46.6	>46.6	38.0				>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.4	1.3	1.3	1.3				1.3	1.1	1.1	1.0				1.3	1.1	1.0	1.0				1.0	0.9	0.9	0.8				1.3	1.3	1.3	1.3			
Bankfull Max Depth (ft)	2.5	2.4	2.6	2.7				1.9	1.6	1.7	1.7				2.1	1.9	2.0	2.2				1.7	1.6	1.6	1.6				2.3	2.1	2.1	2.1			
Bankfull Cross Sectional Area (ft^2)	21.4	19.1	19.4	19.3				16.8	13.6	14.2	12.5				19.1	14.8	14.2	14.3				14.0	12.2	12.4	10.8				15.5	14.3	14.5	14.1			
Bankfull Width/Depth Ratio	11.7	11.8	11.8	11.7				10.4	11.5	10.9	12.3				11.1	13.3	13.5	13.2				14.3	15.6	15.7	18.1				9.4	8.6	8.7	7.8			
Bankfull Entrenchment Ratio	>2.2	>3.3	>3.3	N/A				>2.2	>4.0	>4.0	>4.0				>2.2	>3.6	>3.6	N/A				>2.2	>3.4	>3.3	2.7				>2.2	>4.5	>4.5	N/A			
Bankfull Bank Height Ratio	1.0	1.0	1.0	N/A				1.0	1.0	1.0	0.9				1.0	1.0	1.0	N/A				1.0	1.0	1.0	1.5				1.0	1.0	1.0	N/A			

	Cross Section 26 (Pool) Reach UT1-4							Cross Section 27 (Riffle) Reach UT1-4							Cross Section 28 (Riffle) Reach UT1-4							Cross Section 29 (Pool) Reach UT1-4													
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY+**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	MY+
Record elevation (datum) used	581.70	581.70	581.70	581.70				582.15	582.15	582.15	582.15				579.70	579.70	579.70	579.70				579.80	579.80	579.80	579.80										
Bankfull Width (ft)	14.8	14.1	13.0	11.2				16.5	15.9	15.6	15.4				15.9	15.4	15.3	15.0				20.3	20.8	20.0	19.4										
Floodprone Width (ft)	>47.0	>47.0	>47.0	>50.0				>50.0	>50.0	>50.0	>50.0				>50.0	>50.0	>50.0	>50.0				>50.0	>50.0	>50.0	>50.0										
Bankfull Mean Depth (ft)	1.2	1.2	1.3	1.6				1.3	1.2	1.1	1.0				1.5	1.4	1.4	1.3				1.6	1.4	1.4	1.5										
Bankfull Max Depth (ft)	2.1	2.1	2.2	2.3				2.1	1.9	1.9	1.8				2.6	2.5	2.5	2.5				3.1	2.9	2.9	3.0										
Bankfull Cross Sectional Area (ft^2)	17.6	16.2	17.2	18.2				21.5	18.3	17.8	15.6				24.2	21.7	21.9	20.0				33.2	30.0	28.9	29.2										
Bankfull Width/Depth Ratio	12.5	12.3	9.7	6.9				12.7	13.8	13.6	15.1				10.4	10.9	10.8	11.2				12.5	14.4	13.9	12.9										
Bankfull Entrenchment Ratio	>2.2	>3.3	>3.6	N/A				>2.2	>3.1	>3.2	>3.3				>2.2	>3.3	>3.3	>3.3				>2.2	>2.4	>2.5	N/A										
Bankfull Bank Height Ratio	1.0	1.0	1.0	N/A				1.0	1.0	1.0	1.1				1.0	1.0	1.0	1.1				1.0	1.0	1.0	N/A										

Note: Starting in MY3, Bankfull Bank Height Ratio was calculated on riffles using the baseline bankfull elevation. This method was used because the dimension of the channels has not changed enough to alter the bankfull elevation.

Table 11b. Monitoring Data - Stream Reach Data Summary
Poplin Ridge Stream Restoration Project - UT1-2 (1,178 feet)

Parameter	Baseline						MY - 1						MY - 2						MY - 3						MY - 4						MY - 5						MY - 6						MY - 7					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	-	12.95	-	-	-	-	12.2	12.6	12.6	12.9	0.5	2	12.3	12.6	12.6	12.9	0.5	2	12.6	12.9	12.9	13.2	0.42	2																								
Floodprone Width (ft)	-	>50	-	-	-	-	50.0	50.0	50.0	50.0	0.0	2	50	50	50	50	0.0	2	50.0	50.0	50.0	50.0	0	2																								
Bankfull Mean Depth (ft)	-	1.3	-	-	-	-	1.2	1.3	1.3	1.3	0.1	2	1.2	1.3	1.3	1.3	0.1	2	1.2	1.3	1.3	1.3	0.07	2																								
Bankfull Max Depth (ft)	-	2.1	-	-	-	-	1.9	2.1	2.1	2.2	0.2	2	2.0	2.1	2.1	2.2	0.2	2	2.1	2.2	2.2	2.2	0.07	2																								
Bankfull Cross-Sectional Area (ft^2)	-	17.3	-	-	-	-	14.4	15.9	15.9	17.3	2.1	2	14.6	15.9	15.9	17.2	1.8	2	14.8	15.9	15.9	17.0	1.56	2																								
Width/Depth Ratio	-	9.7	-	-	-	-	9.7	10.1	10.1	10.4	0.5	2	9.7	10.0	10.0	10.3	0.4	2	10.3	10.5	10.5	10.7	0.28	2																								
Entrenchment Ratio	-	>2.2	-	-	-	-	3.9	4.0	4.0	4.1	0.1	2	3.9	4.0	4.0	4.1	0.2	2	3.8	3.9	3.9	4.0	0.14	2																								
Bank Height Ratio	-	1.0	-	-	-	-	1.0	1.0	1.0	1.0	0.0	2	1.0	1.0	1.0	1.0	0.0	2	1.0	1.0	1.0	1.0	0.0	2																								
Profile																																															
Riffle Length (ft)	6.0	-	-	18.0	-	-																																									
Riffle Slope (ft/ft)	0.010	-	-	0.036	-	-																																									
Pool Length (ft)	6.0	-	-	42.0	-	-																																									
Pool Max Depth (ft)	-	-	-	-	-	-																																								
Pool Spacing (ft)	20.0	-	-	60.0	-	-																																								
Pattern																																															
Channel Belt Width (ft)	35.0	-	-	60.0	-	-																																								
Radius of Curvature (ft)	15.0	-	-	75.0	-	-																																								
Rc: Bankfull Width (ft/ft)	1.50	-	-	7.60	-	-																																							
Meander Wavelength (ft)	35.0	-	-	52.0	-	-																																								
Meander Width Ratio	2.7	-	-	4.0	-	-																																								
Additional Reach Parameters																																															
Rosgen Classification	E4																																														
Channel Thalweg Length (ft)	1,178																																														
Sinuosity (ft)	1.1																																														
Water Surface Slope (Channel) (ft/ft)	-																																													
Bankfull Slope (ft/ft)	0.0066																																														
Ri% / Ru% / P% / G% / S%	-	-	-	-	-																																									

- Information Unavailable.

N/A - Information does not apply.

Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step

Table 11b Cont'd. Monitoring Data - Stream Reach Data Summary
Poplin Ridge Stream Restoration Project - UT1-3 (893 feet)

Parameter	Baseline						MY - 1						MY - 2						MY - 3						MY - 4						MY - 5						MY - 6						MY - 7					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	-	15.35	-	-	-	-	15.1	15.6	15.6	16.1	0.7	2	14.9	15.1	15.1	15.2	0.2	2	15.1	15.3	15.3	15.4	0.21	2																								
Floodprone Width (ft)	-	>50	-	-	-	-	50.0	50.0	50.0	50.0	0.0	2	50	50	50	50	0.0	2	50.0	50.0	50.0	50.0	0	2																								
Bankfull Mean Depth (ft)	-	1.45	-	-	-	-	1.3	1.4	1.4	1.4	0.1	2	1.3	1.4	1.4	1.4	0.1	2	1.3	1.4	1.4	1.4	0.07	2																								
Bankfull Max Depth (ft)	-	2.25	-	-	-	-	2.1	2.1	2.1	2.1	0.0	2	2.1	2.1	2.1	2.2	0.1	2	2.1	2.1	2.1	2.1	0	2																								
Bankfull Cross-Sectional Area (ft^2)	-	22.4	-	-	-	-	20.9	21.4	21.4	21.8	0.6	2	20.0	20.6	20.6	21.3	0.9	2	19.6	20.3	20.3	21.0	0.99	2																								
Width/Depth Ratio	-	10.50	-	-	-	-	10.5	11.5	11.5	12.4	1.3	2	10.5	11.0	11.0	11.6	0.8	2	11.2	11.4	11.4	11.6	0.28	2																								
Entrenchment Ratio	-	>2.2	-	-	-	-	3.1	3.2	3.2	3.3	0.1	2	3.3	3.3	3.3	3.3	0.0	2	3.3	3.3	3.3	3.3	0	2																								
Bank Height Ratio	-	1.0	-	-	-	-	1.0	1.0	1.0	1.0	0.0	2	1.0	1.0	1.0	1.0	0.0	2	1.0	1.1	1.1	1.1	0.07	2																								
Profile																																															
Riffle Length (ft)	7.0	-	-	22.0	-	-																																									
Riffle Slope (ft/ft)	0.010	-	-	0.037	-	-																																									
Pool Length (ft)	8.0	-	-	50.0	-	-																																									
Pool Max Depth (ft)	-	-	-	-	-	-																																								
Pool Spacing (ft)	20.0	-	-	70.0	-	-																																								
Pattern																																															
Channel Belt Width (ft)	42.0	-	-	65.0	-	-																																									
Radius of Curvature (ft)	17.0	-	-	80.0	-	-																																									
Rc: Bankfull Width (ft/ft)	1.50	-	-	7.60	-	-																																									
Meander Wavelength (ft)	37.0	-	-	56.0	-	-																																									
Meander Width Ratio	2.7	-	-	4.3	-	-																																									
Additional Reach Parameters																																															
Rosgen Classification	E4																																														
Channel Thalweg Length (ft)	893																																														
Sinuosity (ft)	1.1																																														
Water Surface Slope (Channel) (ft/ft)	-																																														
Bankfull Slope (ft/ft)	0.004																																														
Ri% / Ru% / P% / G% / S%	-	-	-	-	-																																										

- Information Unavailable.

N/A - Information does not apply.

Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step

Table 11b Cont'd. Monitoring Data - Stream Reach Data Summary
Poplin Ridge Stream Restoration Project - UT2-2 (847 feet)

Parameter	Baseline						MY - 1[1]						MY - 2						MY - 3						MY - 4						MY - 5						MY - 6						MY - 7					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	-	21.0	-	-	-	-	-	19.3	-	-	N/A	1	-	18.0	-	-	N/A	1	-	17.1	-	-	N/A	1																								
Floodprone Width (ft)	-	>50	-	-	-	-	-	50.0	-	-	N/A	1	-	50	-	-	N/A	1	-	50.0	-	-	N/A	1																								
Bankfull Mean Depth (ft)	-	1.3	-	-	-	-	-	1.3	-	-	N/A	1	-	1.3	-	-	N/A	1	-	1.1	-	-	N/A	1																								
Bankfull Max Depth (ft)	-	2.2	-	-	-	-	-	2.2	-	-	N/A	1	-	2.4	-	-	N/A	1	-	1.8	-	-	N/A	1																								
Bankfull Cross-Sectional Area (ft^2)	-	26.5	-	-	-	-	-	25.2	-	-	N/A	1	-	22.9	-	-	N/A	1	-	19.0	-	-	N/A	1																								
Width/Depth Ratio	-	16.6	-	-	-	-	-	14.9	-	-	N/A	1	-	14.2	-	-	N/A	1	-	15.5	-	-	N/A	1																								
Entrenchment Ratio	-	>2.2	-	-	-	-	-	2.6	-	-	N/A	1	-	2.8	-	-	N/A	1	-	2.9	-	-	N/A	1																								
Bank Height Ratio	-	1.0	-	-	-	-	-	1.0	-	-	N/A	1	-	1.0	-	-	N/A	1	-	1.3	-	-	N/A	1																								
Profile																																															
Riffle Length (ft)	9.0	-	-	25.0	-	-																																									
Riffle Slope (ft/ft)	0.0	-	-	0.036	-	-																																									
Pool Length (ft)	7.8	-	-	47.0	-	-																																									
Pool Max Depth (ft)	-	-	-	-	-	-																																								
Pool Spacing (ft)	18.0	-	-	90.0	-	-																																								
Pattern																																														
Channel Belt Width (ft)	67.0	-	-	101.0	-	-																																								
Radius of Curvature (ft)	32.0	-	-	160.0	-	-																																								
Rc: Bankfull Width (ft/ft)	1.50	-	-	7.60	-	-																																							
Meander Wavelength (ft)	67.0	-	-	101.0	-	-																																								
Meander Width Ratio	3.2	-	-	4.8	-	-																																								
Additional Reach Parameters																																														
Rosgen Classification	E4																																													
Channel Thalweg Length (ft)	847																																												
Sinuosity (ft)	1.08																																												
Water Surface Slope (Channel) (ft/ft)	-																																											
Bankfull Slope (ft/ft)	0.0061																																												
Ri% / Ru% / P% / G% / S%	-	-	-	-	-																																								

- Information Unavailable.

N/A - Information does not apply.

Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step

[1]Calculations updated to show corrected values

Table 11b Cont'd. Monitoring Data - Stream Reach Data Summary
Poplin Ridge Stream Restoration Project - UT2-3/4 (521 feet)

Parameter	Baseline						MY - 1						MY - 2						MY - 3						MY - 4						MY - 5						MY - 6						MY - 7					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	-	17.4	-	-	-	-	-	17.1	-	-	N/A	1	-	16.9	-	-	N/A	1	-	17.2	-	-	N/A	1																								
Floodprone Width (ft)	-	>50	-	-	-	-	-	50.0	-	-	N/A	1	-	50.0	-	-	N/A	1	-	50.0	-	-	N/A	1																								
Bankfull Mean Depth (ft)	-	1.8	-	-	-	-	-	1.7	-	-	N/A	1	-	1.7	-	-	N/A	1	-	1.6	-	-	N/A	1																								
Bankfull Max Depth (ft)	-	2.5	-	-	-	-	-	2.4	-	-	N/A	1	-	2.5	-	-	N/A	1	-	2.3	-	-	N/A	1																								
Bankfull Cross-Sectional Area (ft^2)	-	30.8	-	-	-	-	-	28.4	-	-	N/A	1	-	28.5	-	-	N/A	1	-	26.7	-	-	N/A	1																								
Width/Depth Ratio	-	9.8	-	-	-	-	-	10.3	-	-	N/A	1	-	10.0	-	-	N/A	1	-	11.0	-	-	N/A	1																								
Entrenchment Ratio	-	>2.2	-	-	-	-	-	2.9	-	-	N/A	1	-	3.0	-	-	N/A	1	-	2.9	-	-	N/A	1																								
Bank Height Ratio	-	1.0	-	-	-	-	-	1.0	-	-	N/A	1	-	1.0	-	-	N/A	1	-	1.1	-	-	N/A	1																								
Profile																																															
Riffle Length (ft)	8.2	-	-	26.5	-	-																																									
Riffle Slope (ft/ft)	0.012	-	-	0.038	-	-																																									
Pool Length (ft)	8.5	-	-	60.0	-	-																																									
Pool Max Depth (ft)	-	-	-	-	-	-																																								
Pool Spacing (ft)	20.5	-	-	92.0	-	-																																								
Pattern																																															
Channel Belt Width (ft)	56.0	-	-	84.0	-	-																																									
Radius of Curvature (ft)	32.0	-	-	160.0	-	-																																									
Rc: Bankfull Width (ft/ft)	1.5	-	-	7.6	-	-																																									
Meander Wavelength (ft)	56.0	-	-	84.0	-	-																																									
Meander Width Ratio	3.2	-	-	4.8	-	-																																									
Additional Reach Parameters																																															
Rosgen Classification	E4																																														
Channel Thalweg Length (ft)	778																																														
Sinuosity (ft)	1.1																																														
Water Surface Slope (Channel) (ft/ft)	N/A																																														
Bankfull Slope (ft/ft)	0.002																																														
Ri% / Ru% / P% / G% / S%	-	-	-	-	-																																										

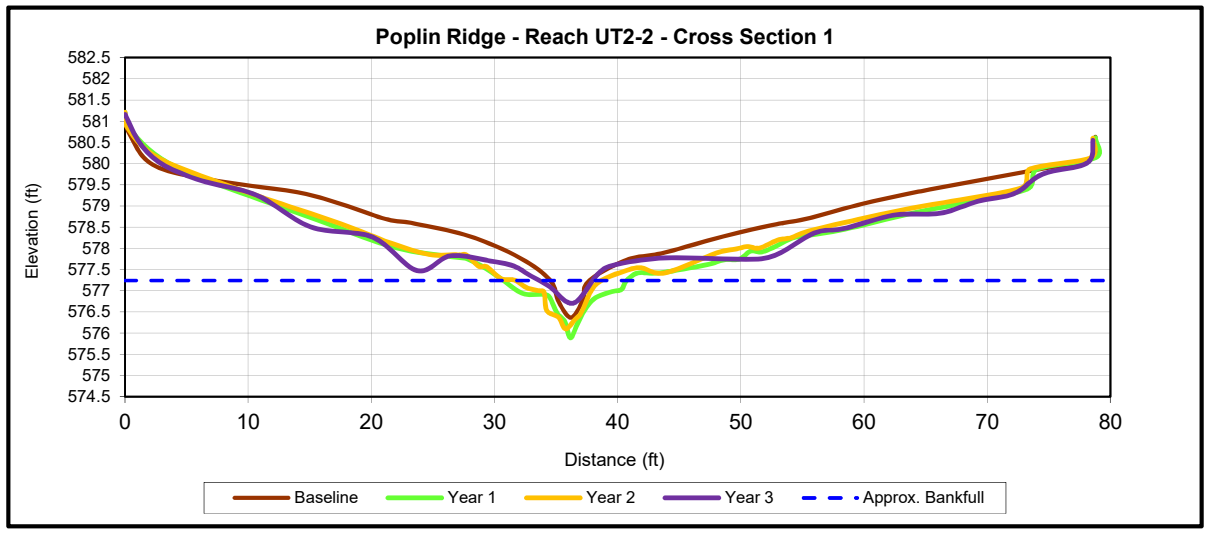
- Information Unavailable.

N/A - Information does not apply.

Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step

Upstream

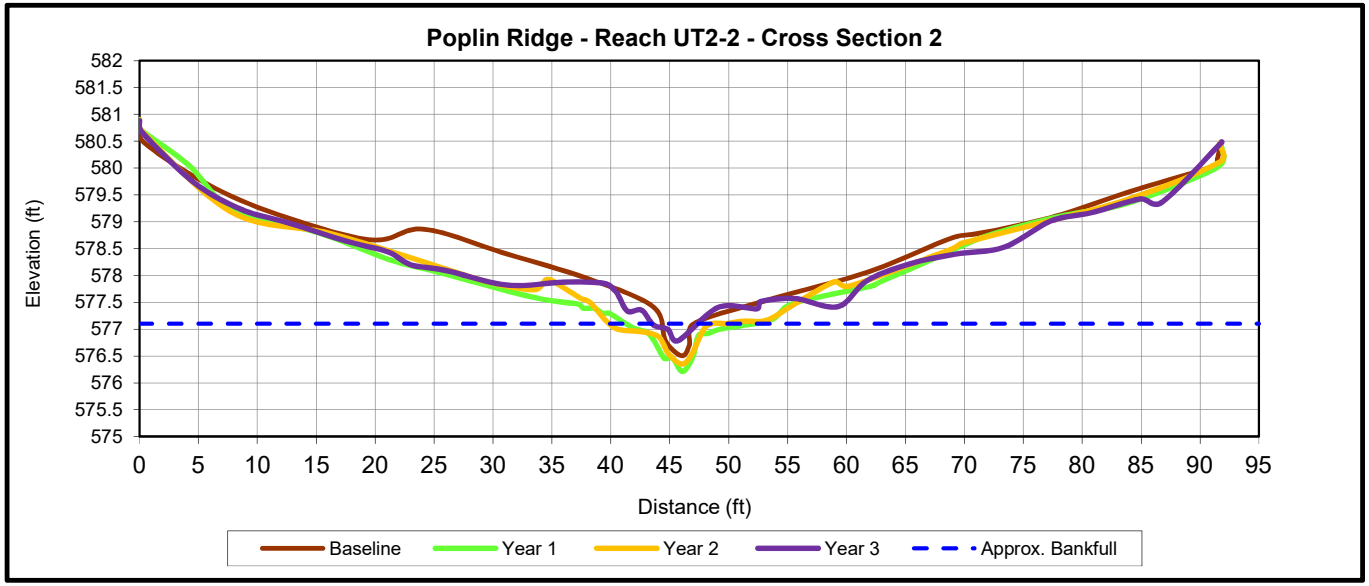
Downstream



	Cross Section 1						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	577.2	577.2	577.2	577.2			
Bankfull Width (ft)	3.2	5.5	5.2	4.3			
Floodprone Width (ft)	>17.2	>17.2	>17.2	26.2			
Bankfull Mean Depth (ft)	0.5	0.7	0.6	0.3			
Bankfull Max Depth (ft)	0.9	1.4	1.1	0.5			
Bankfull Cross Sectional Area (ft^2)	0.6	3.7	3.3	1.1			
Bankfull Width/Depth Ratio	6.4	8.2	8.1	16.7			
Bankfull Entrenchment Ratio	>2.2	>3.1	>3.3	6.0			
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.3			

Upstream

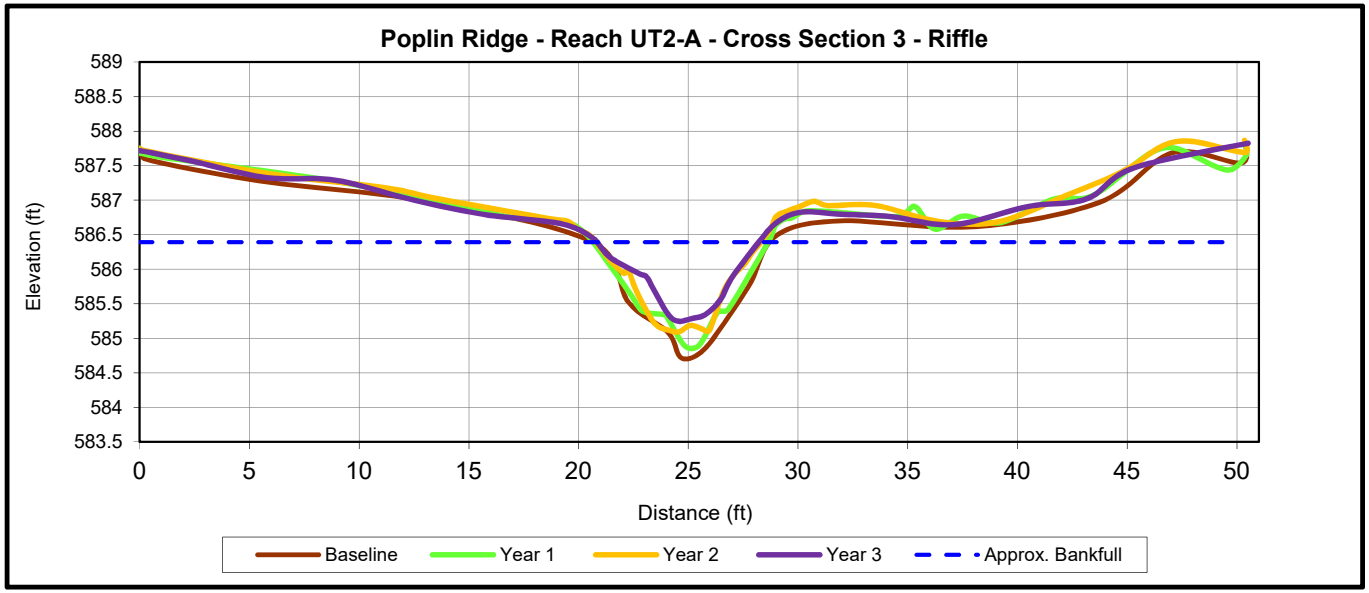
Downstream



	Cross Section 2						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	577.1	577.1	577.1	577.1			
Bankfull Width (ft)	3.0	5.6	5.3	3.9			
Floodprone Width (ft)	>15.2	>15.2	>15.2	11.2			
Bankfull Mean Depth (ft)	0.4	0.5	0.4	0.1			
Bankfull Max Depth (ft)	0.6	1.3	0.8	0.3			
Bankfull Cross Sectional Area (ft^2)	1.1	2.7	2.2	0.5			
Bankfull Width/Depth Ratio	7.9	11.5	12.5	28.8			
Bankfull Entrenchment Ratio	>2.2	>2.7	>2.9	2.9			
Bankfull Bank Height Ratio	1.0	1.0	1.0	2.0			

Upstream

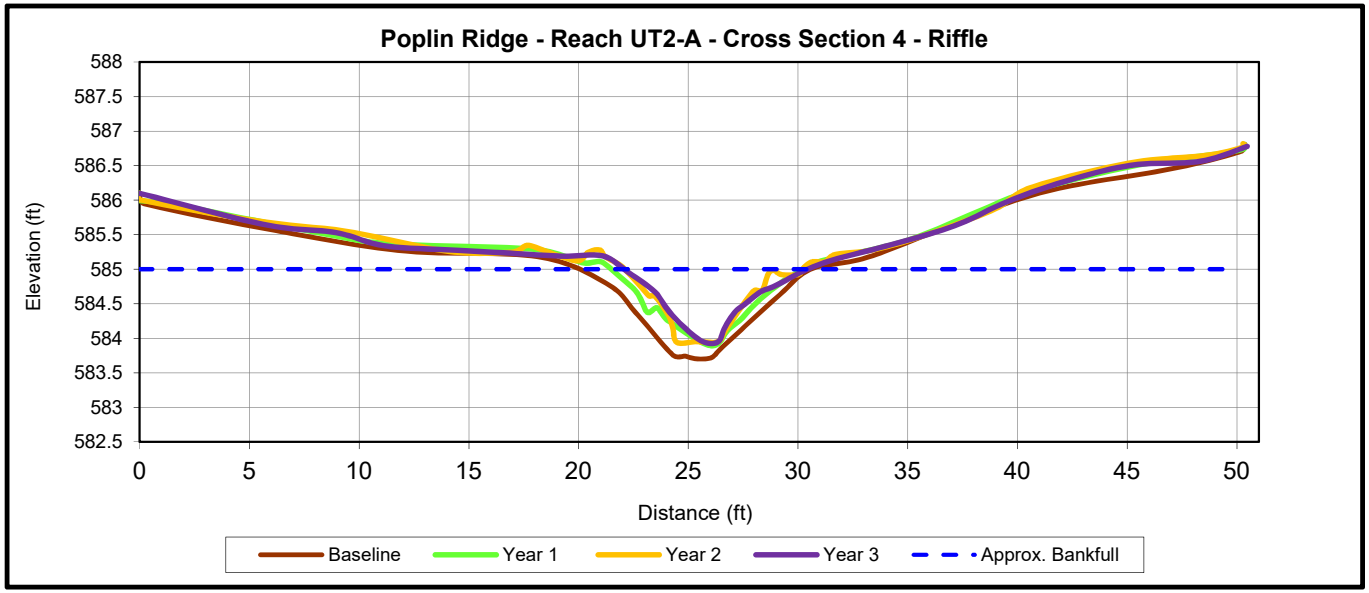
Downstream



	Cross Section 3 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	586.4	586.4	586.4	586.4			
Bankfull Width (ft)	8.2	8.0	7.5	7.5			
Floodprone Width (ft)	>50.0	>50.0	>50.0	44.0			
Bankfull Mean Depth (ft)	1.0	0.8	0.8	0.6			
Bankfull Max Depth (ft)	1.7	1.5	1.3	1.2			
Bankfull Cross Sectional Area (ft^2)	7.9	6.7	5.7	4.7			
Bankfull Width/Depth Ratio	8.5	9.5	9.9	11.9			
Bankfull Entrenchment Ratio	>2.2	>6.3	>6.7	5.9			
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.1			

Upstream

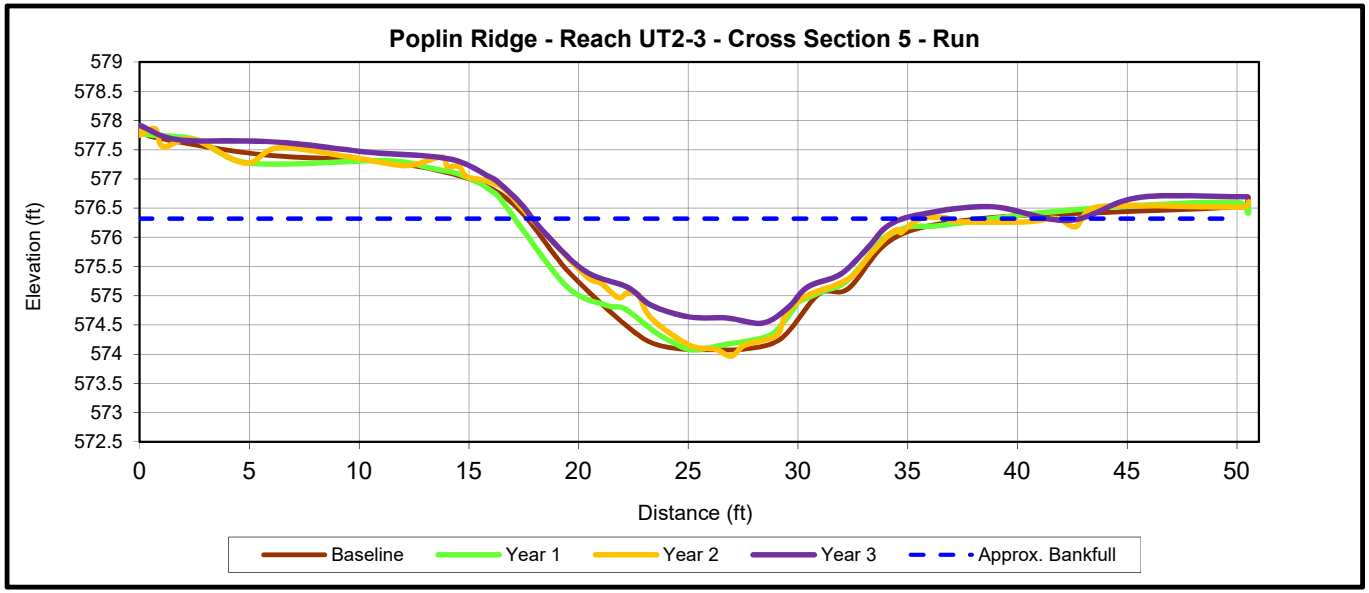
Downstream



	Cross Section 4 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	585.0	585.0	585.0	585.0			
Bankfull Width (ft)	11.0	8.8	7.5	8.5			
Floodprone Width (ft)	>44.4	>44.4	>50.0	39.8			
Bankfull Mean Depth (ft)	0.7	0.6	0.8	0.5			
Bankfull Max Depth (ft)	1.3	1.1	1.3	1.1			
Bankfull Cross Sectional Area (ft^2)	7.4	5.0	5.7	4.1			
Bankfull Width/Depth Ratio	16.4	15.6	9.9	17.4			
Bankfull Entrenchment Ratio	>2.2	>5.0	>6.7	4.7			
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.1			

Upstream

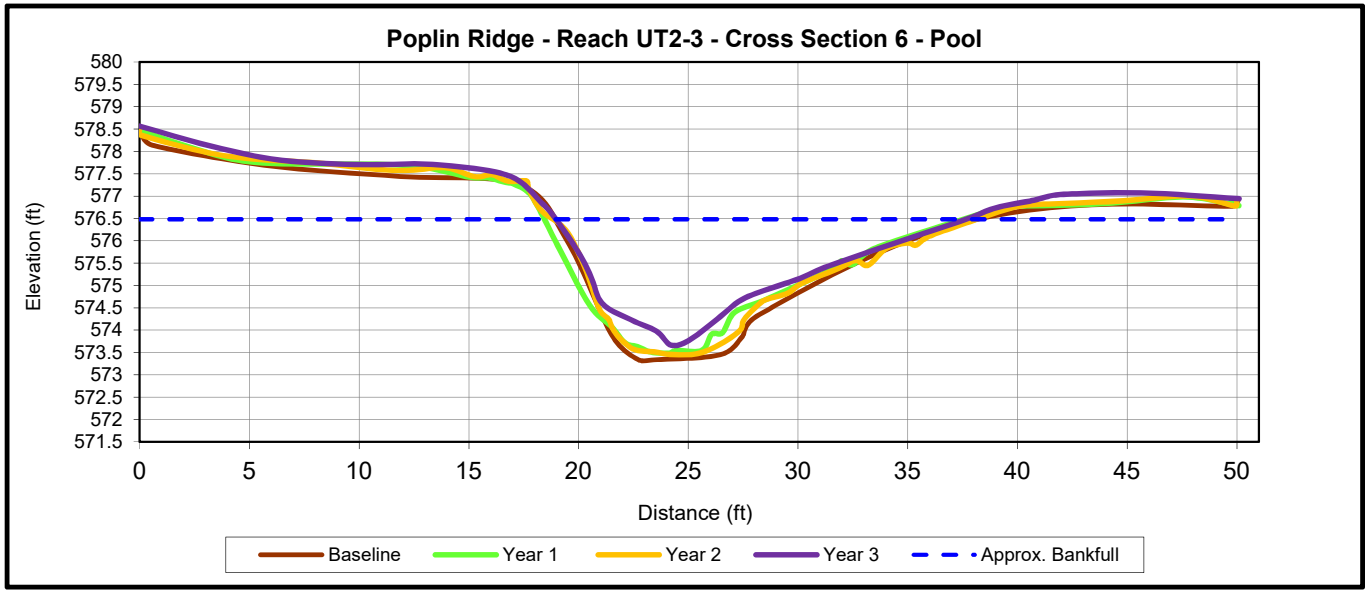
Downstream



	Cross Section 5 (Run)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	576.3	576.3	576.3	576.3			
Bankfull Width (ft)	21.0	19.3	18.0	17.1			
Floodprone Width (ft)	>50	>50	>50	>50			
Bankfull Mean Depth (ft)	1.3	1.3	1.3	1.1			
Bankfull Max Depth (ft)	2.2	2.2	2.4	1.8			
Bankfull Cross Sectional Area (ft^2)	26.5	25.2	22.9	19.0			
Bankfull Width/Depth Ratio	16.6	14.9	14.2	15.5			
Bankfull Entrenchment Ratio	>2.2	>2.6	>2.8	>2.9			
Bankfull Bank Height Ratio	1.0	1.0	1.0	0.9			

Upstream

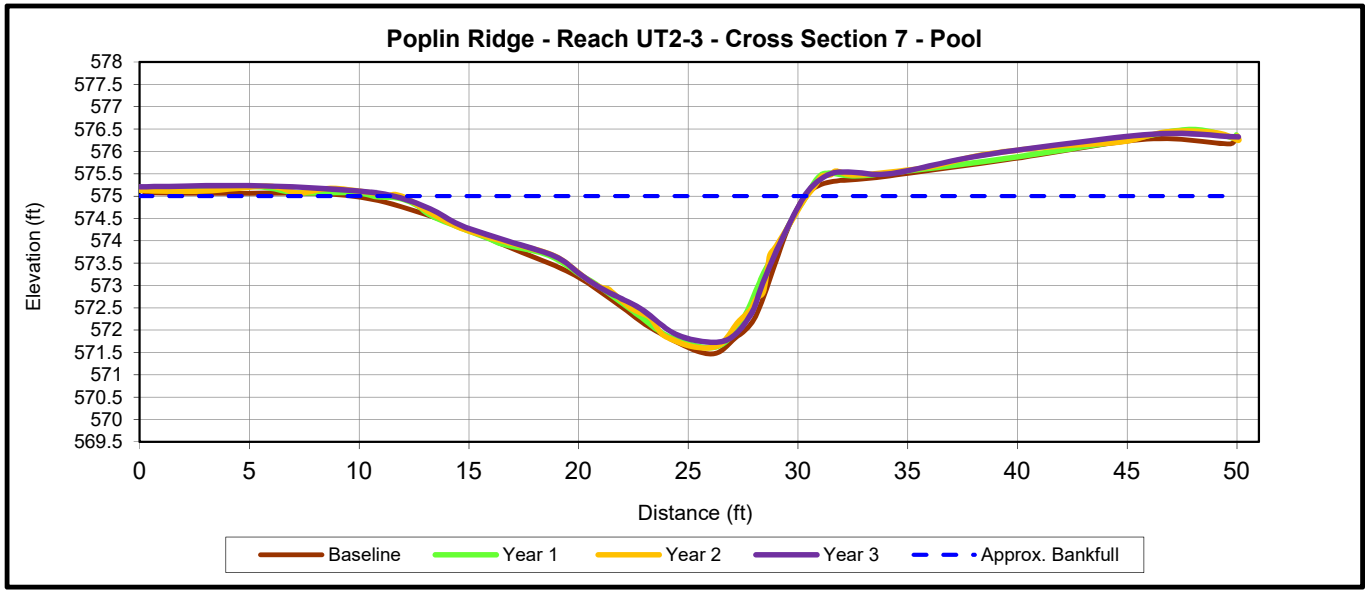
Downstream



	Cross Section 6 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	576.5	576.5	576.5	576.5			
Bankfull Width (ft)	19.6	19.1	19.4	18.7			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.7	1.6	1.6	1.4			
Bankfull Max Depth (ft)	3.1	3.0	3.0	2.8			
Bankfull Cross Sectional Area (ft^2)	32.6	30.0	30.5	25.6			
Bankfull Width/Depth Ratio	11.7	12.2	12.3	13.7			
Bankfull Entrenchment Ratio	>2.2	>2.6	>2.6	N/A			
Bankfull Bank Height Ratio	1.0	1.0	1.0	N/A			

Upstream

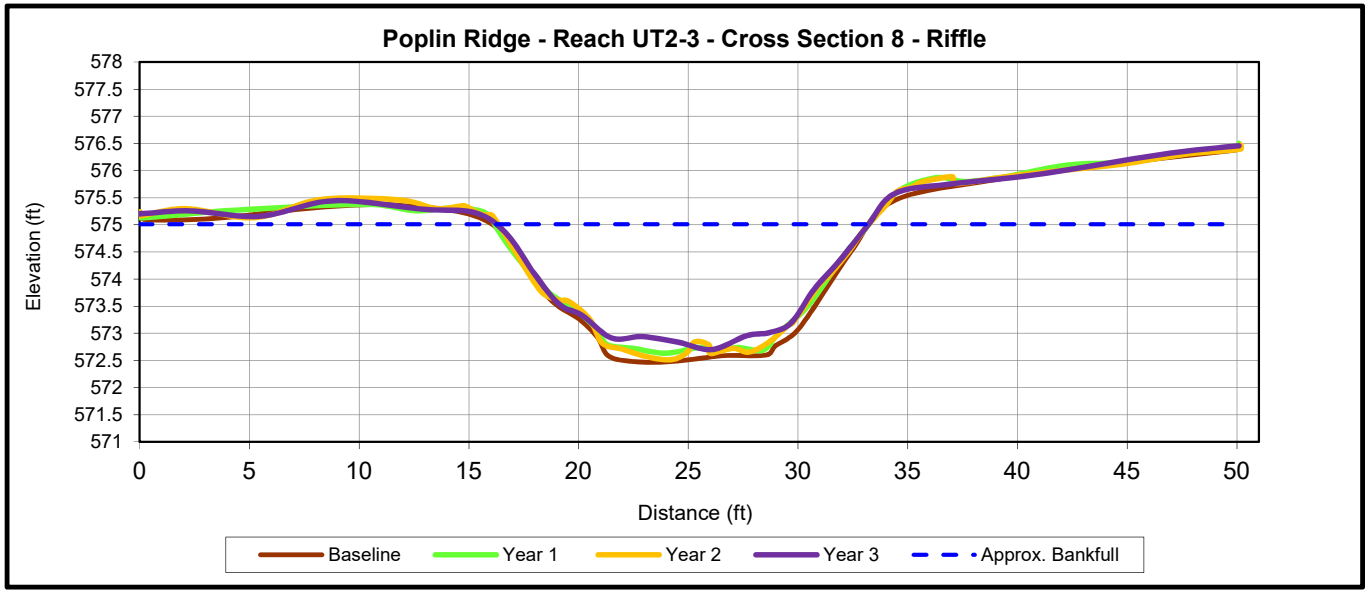
Downstream



	Cross Section 7 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	575.0	575.0	575.0	575.0			
Bankfull Width (ft)	21.1	18.7	18.5	18.8			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.6	1.7	1.7	1.6			
Bankfull Max Depth (ft)	3.5	3.4	3.4	3.2			
Bankfull Cross Sectional Area (ft^2)	34.4	32.0	31.6	31.0			
Bankfull Width/Depth Ratio	12.9	10.9	10.9	11.4			
Bankfull Entrenchment Ratio	>2.2	>2.7	>2.7	N/A			
Bankfull Bank Height Ratio	1.0	1.0	1.0	N/A			

Upstream

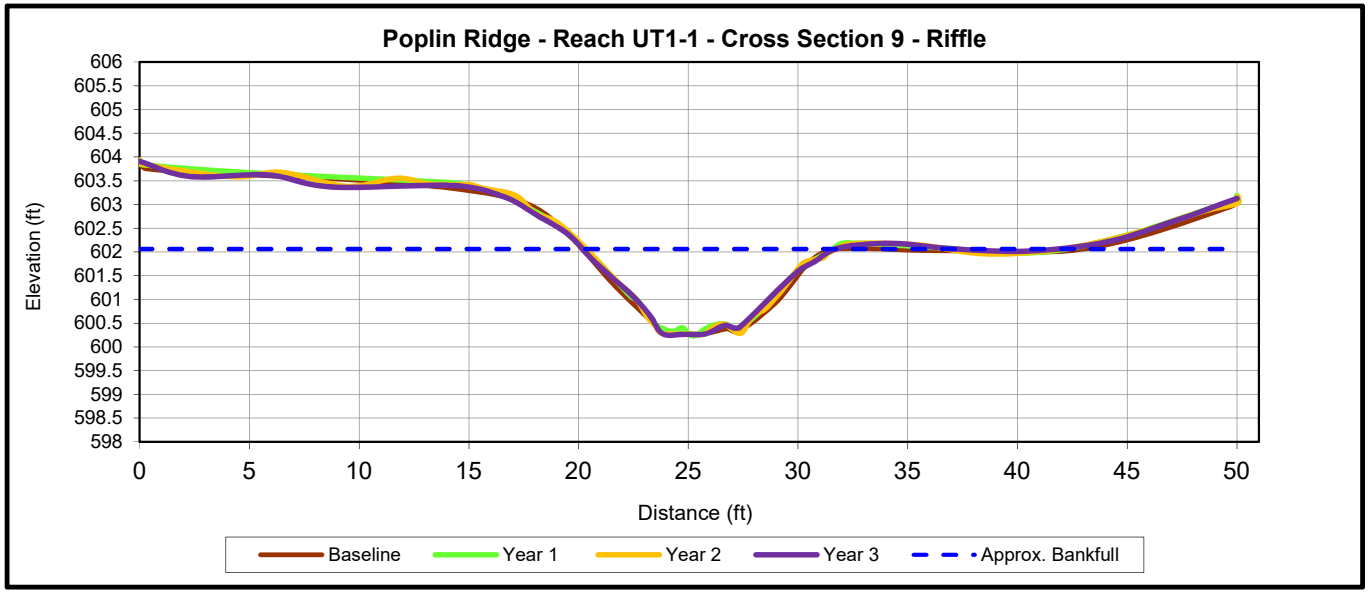
Downstream



	Cross Section 8 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	575.0	575.0	575.0	575.0			
Bankfull Width (ft)	17.4	17.1	16.9	17.2			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.8	1.7	1.7	1.6			
Bankfull Max Depth (ft)	2.5	2.4	2.5	2.3			
Bankfull Cross Sectional Area (ft^2)	30.8	28.4	28.5	26.7			
Bankfull Width/Depth Ratio	9.8	10.3	10.0	11.0			
Bankfull Entrenchment Ratio	>2.2	>2.9	>3.0	>2.9			
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.1			

Upstream

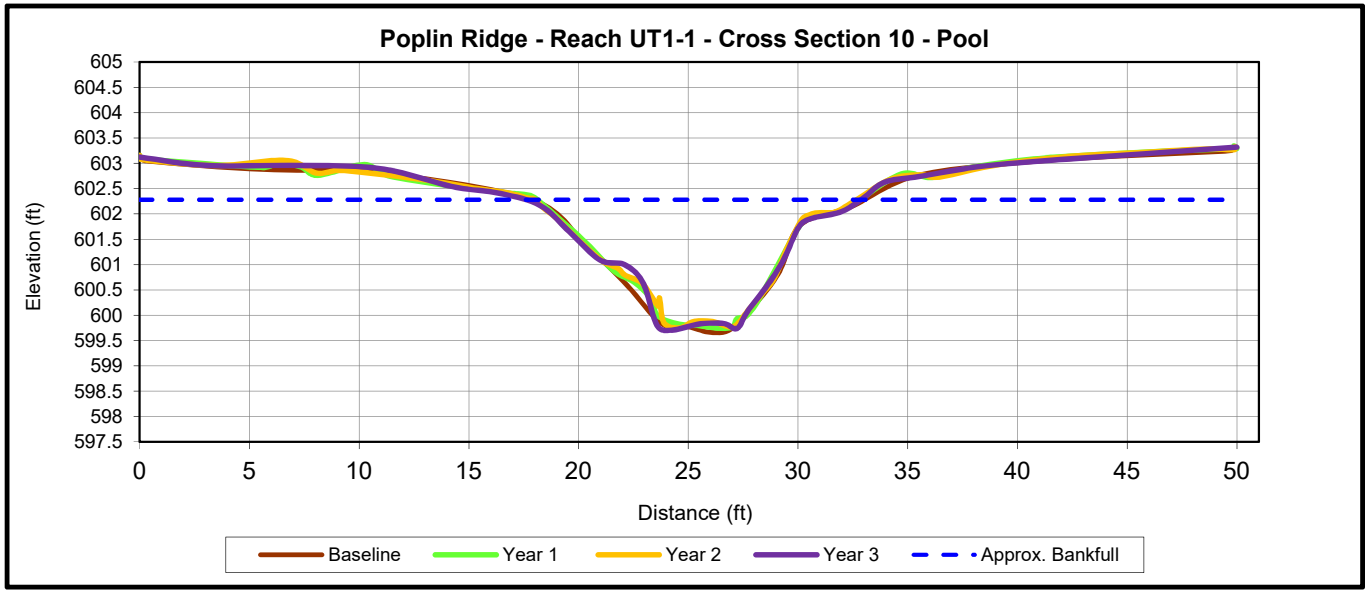
Downstream



	Cross Section 9 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	602.1	602.1	602.1	602.1			
Bankfull Width (ft)	11.7	11.4	11.4	11.6			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.1	1.1	1.1	1.1			
Bankfull Max Depth (ft)	1.8	1.8	1.8	1.8			
Bankfull Cross Sectional Area (ft^2)	13.0	12.1	12.4	12.3			
Bankfull Width/Depth Ratio	10.4	10.7	10.4	10.9			
Bankfull Entrenchment Ratio	>2.2	>4.4	>4.4	>4.3			
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.0			

Upstream

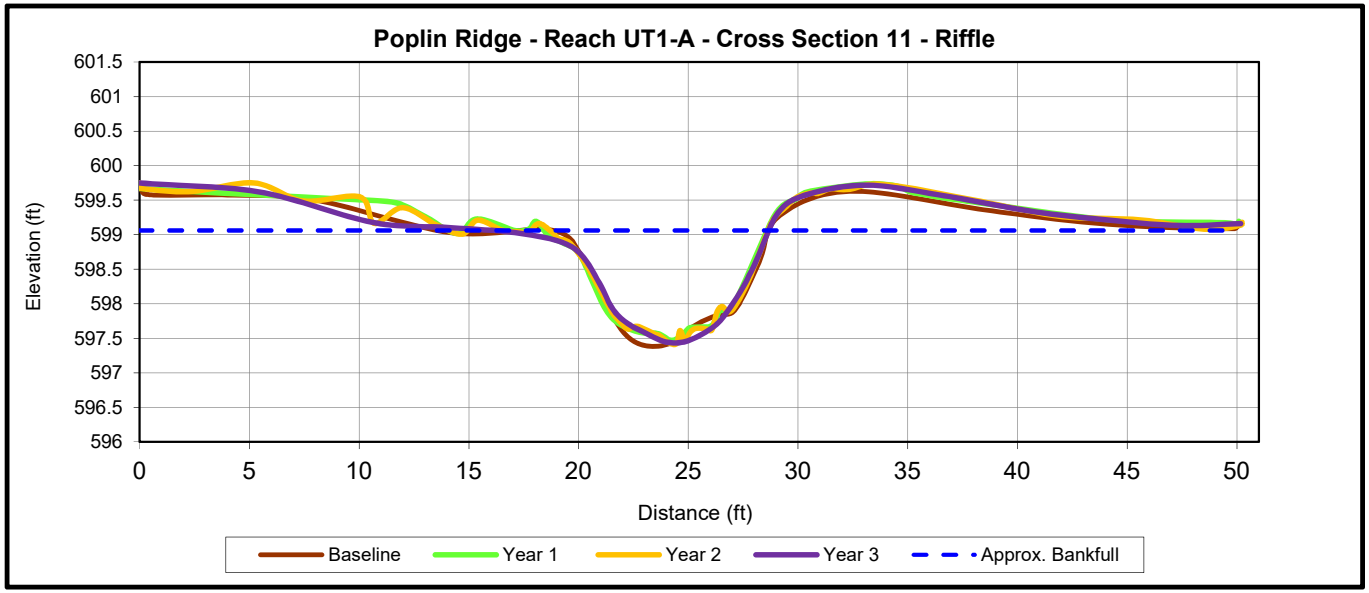
Downstream



	Cross Section 10 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	602.3	602.3	602.3	602.3			
Bankfull Width (ft)	15.2	14.7	14.6	15.5			
Floodprone Width (ft)	>50	>50	>50	>50			
Bankfull Mean Depth (ft)	1.4	1.3	1.3	1.3			
Bankfull Max Depth (ft)	2.6	2.5	2.5	2.6			
Bankfull Cross Sectional Area (ft^2)	21.0	19.8	19.7	20.2			
Bankfull Width/Depth Ratio	11.1	10.9	10.9	11.9			
Bankfull Entrenchment Ratio	>2.2	>3.4	>3.4	N/A			
Bankfull Bank Height Ratio	1.0	1.0	1.0	N/A			

Upstream

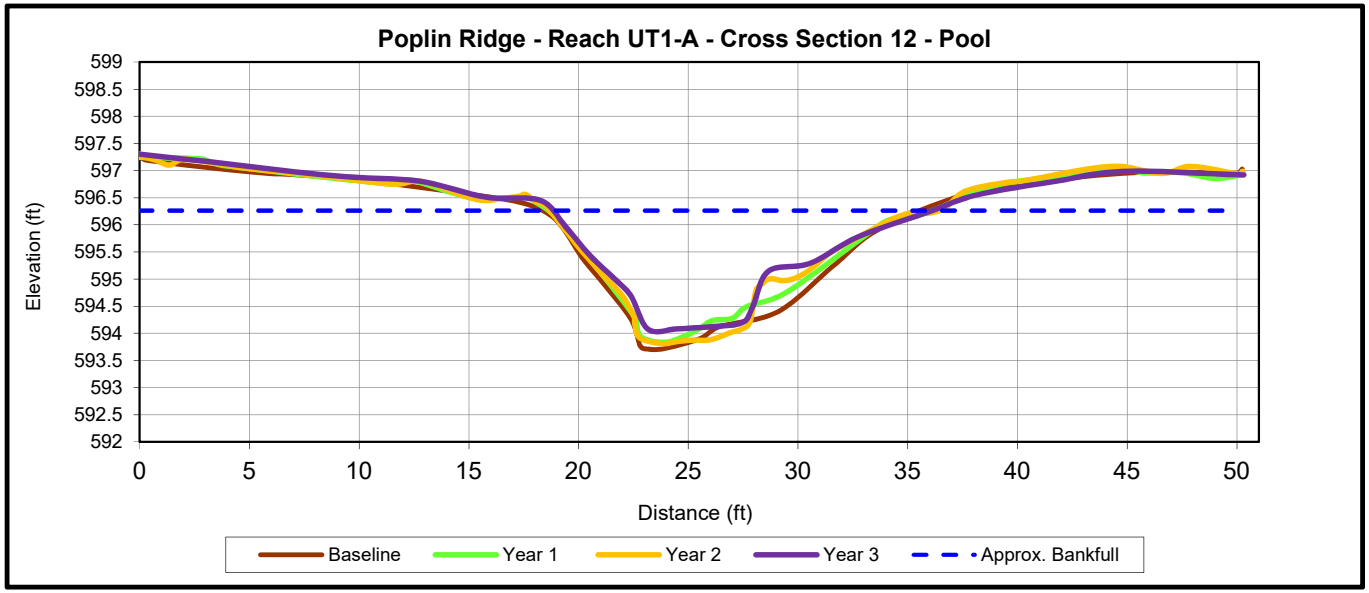
Downstream



	Cross Section 11 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	599.1	599.1	599.1	599.1			
Bankfull Width (ft)	10.0	10.2	10.0	9.6			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.0	1.0	1.0	1.1			
Bankfull Max Depth (ft)	1.7	1.6	1.6	1.6			
Bankfull Cross Sectional Area (ft^2)	10.5	10.1	10.1	10.1			
Bankfull Width/Depth Ratio	9.6	10.3	10.0	9.1			
Bankfull Entrenchment Ratio	>2.2	>4.9	>5.0	>5.2			
Bankfull Bank Height Ratio	1.0	1.0	1.0	0.9			

Upstream

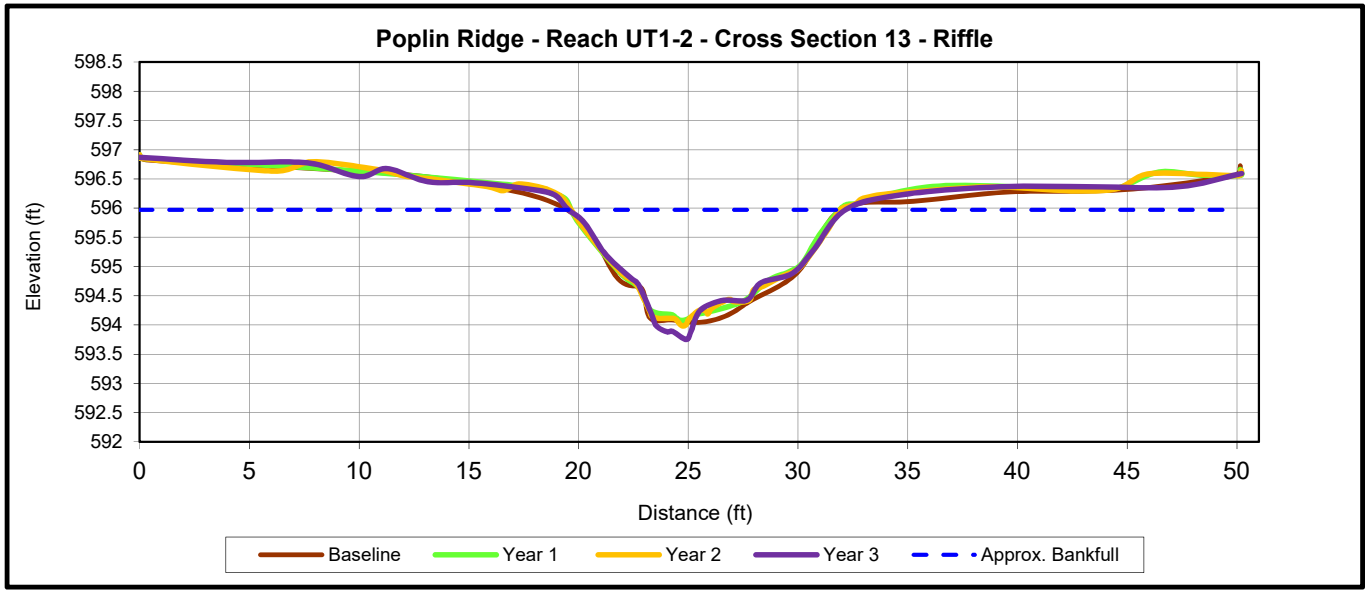
Downstream



	Cross Section 12 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	596.3	596.3	596.3	596.3			
Bankfull Width (ft)	17.4	17.4	17.6	17.4			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.4	1.3	1.2	1.1			
Bankfull Max Depth (ft)	2.5	2.4	2.5	2.2			
Bankfull Cross Sectional Area (ft^2)	24.4	21.8	21.8	19.9			
Bankfull Width/Depth Ratio	12.4	13.9	14.2	15.2			
Bankfull Entrenchment Ratio	>2.2	>2.9	>2.8	N/A			
Bankfull Bank Height Ratio	1.0	1.0	1.0	N/A			

Upstream

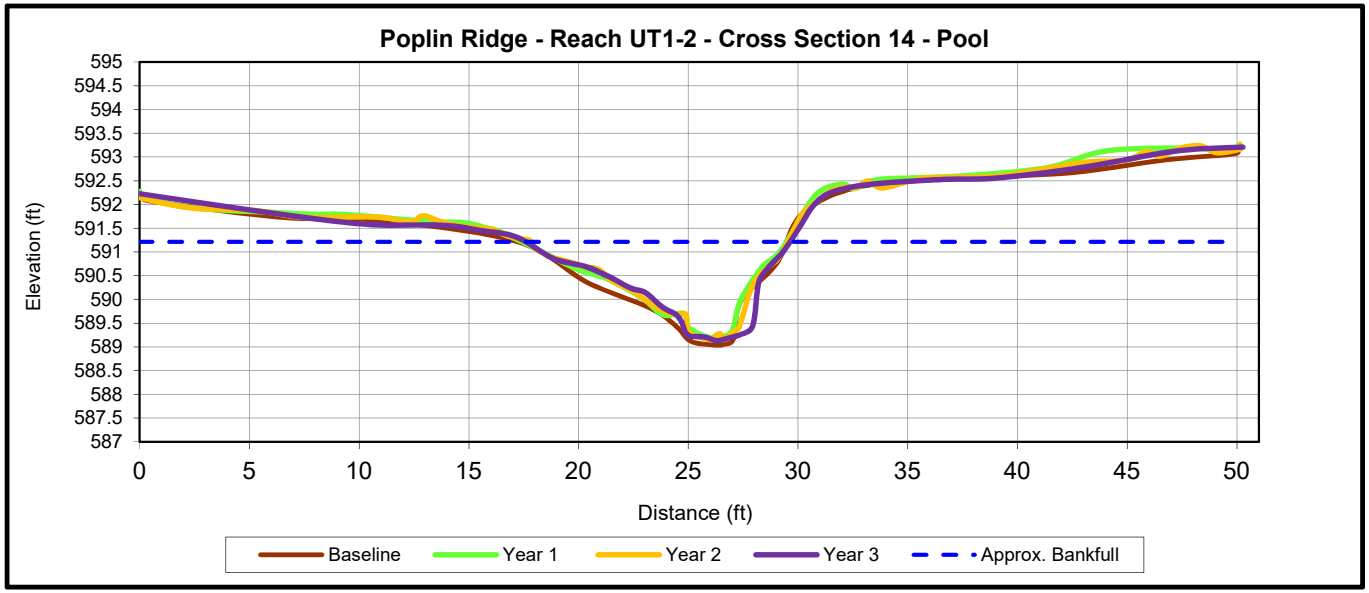
Downstream



	Cross Section 13 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	596.0	596.0	596.0	596.0			
Bankfull Width (ft)	12.5	12.2	12.3	12.6			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.2	1.2	1.2	1.2			
Bankfull Max Depth (ft)	1.9	1.9	2.0	2.2			
Bankfull Cross Sectional Area (ft^2)	15.6	14.4	14.6	14.8			
Bankfull Width/Depth Ratio	10.0	10.4	10.3	10.7			
Bankfull Entrenchment Ratio	>2.2	>4.1	>4.1	>4.0			
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.0			

Upstream

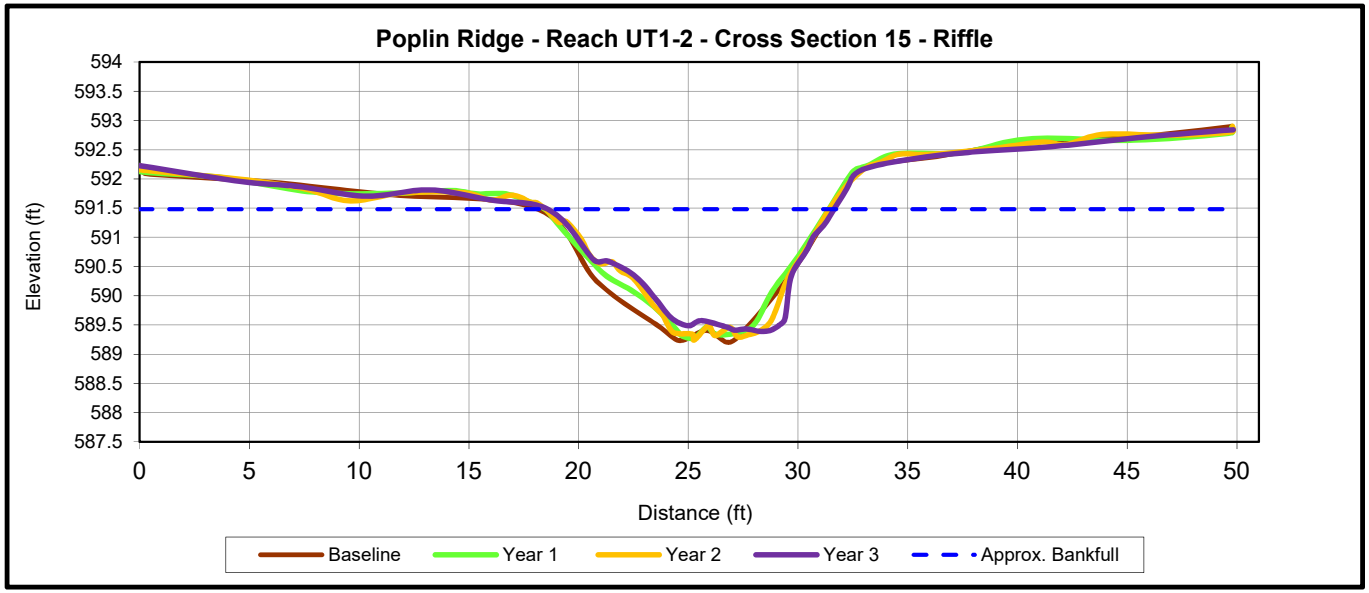
Downstream



	Cross Section 14 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	591.2	591.2	591.2	591.2			
Bankfull Width (ft)	12.3	12.0	11.5	12.1			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.1	1.0	1.0	1.0			
Bankfull Max Depth (ft)	2.2	2.0	2.0	2.1			
Bankfull Cross Sectional Area (ft^2)	13.9	11.9	11.5	12.6			
Bankfull Width/Depth Ratio	10.9	12.1	11.6	11.5			
Bankfull Entrenchment Ratio	>2.2	>4.2	>4.3	N/A			
Bankfull Bank Height Ratio	1.0	1.0	1.0	N/A			

Upstream

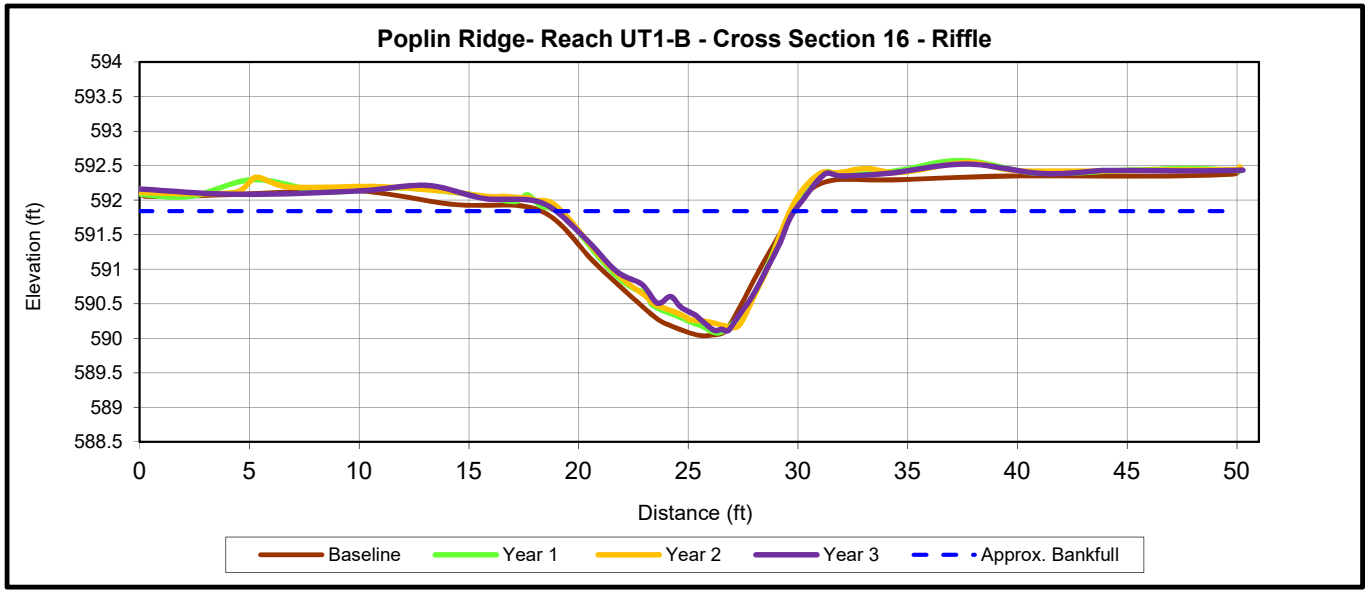
Downstream



	Cross Section 15 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	591.5	591.5	591.5	591.5			
Bankfull Width (ft)	13.4	12.9	12.9	13.2			
Floodprone Width (ft)	>50	>50	>50	>50			
Bankfull Mean Depth (ft)	1.4	1.3	1.3	1.3			
Bankfull Max Depth (ft)	2.3	2.2	2.2	2.1			
Bankfull Cross Sectional Area (ft^2)	19.0	17.3	17.2	17.0			
Bankfull Width/Depth Ratio	9.4	9.7	9.7	10.3			
Bankfull Entrenchment Ratio	>2.2	>3.9	>3.9	>3.8			
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.0			

Upstream

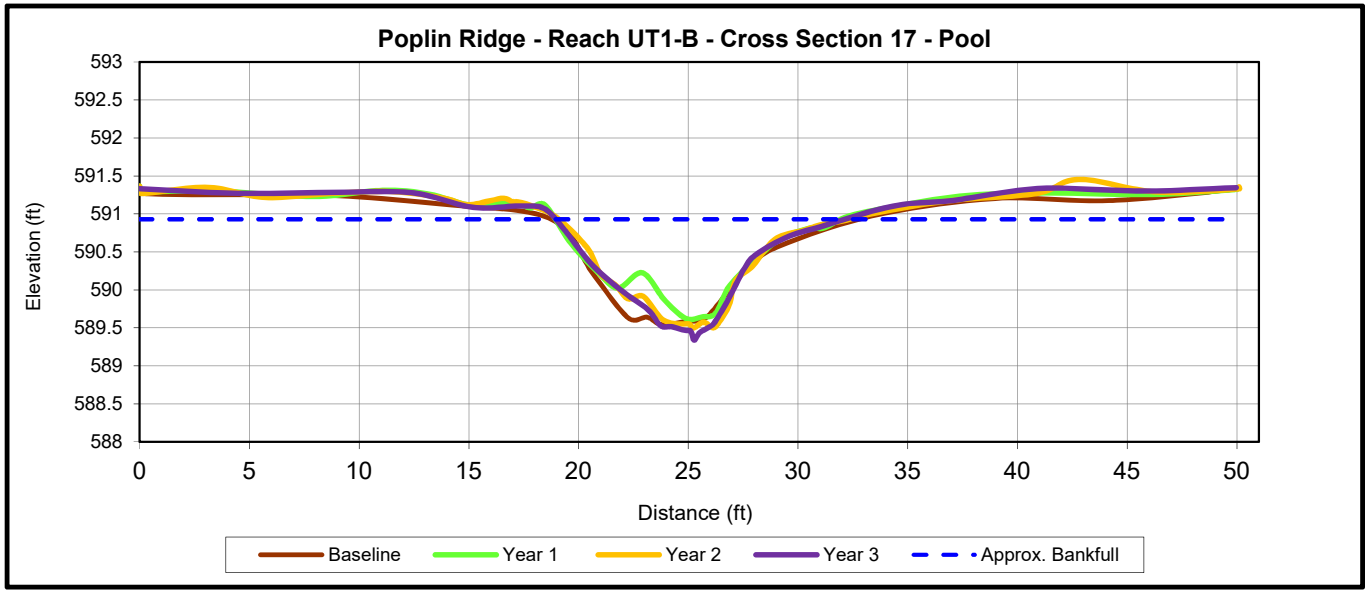
Downstream



	Cross Section 16 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	591.8	591.8	591.8	591.8			
Bankfull Width (ft)	11.7	10.8	10.5	11.1			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.1	1.0	1.1	1.0			
Bankfull Max Depth (ft)	1.8	1.7	1.7	1.7			
Bankfull Cross Sectional Area (ft^2)	12.3	11.2	11.1	10.8			
Bankfull Width/Depth Ratio	11.2	10.4	9.9	11.3			
Bankfull Entrenchment Ratio	>2.2	>4.6	>4.8	>4.5			
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.1			

Upstream

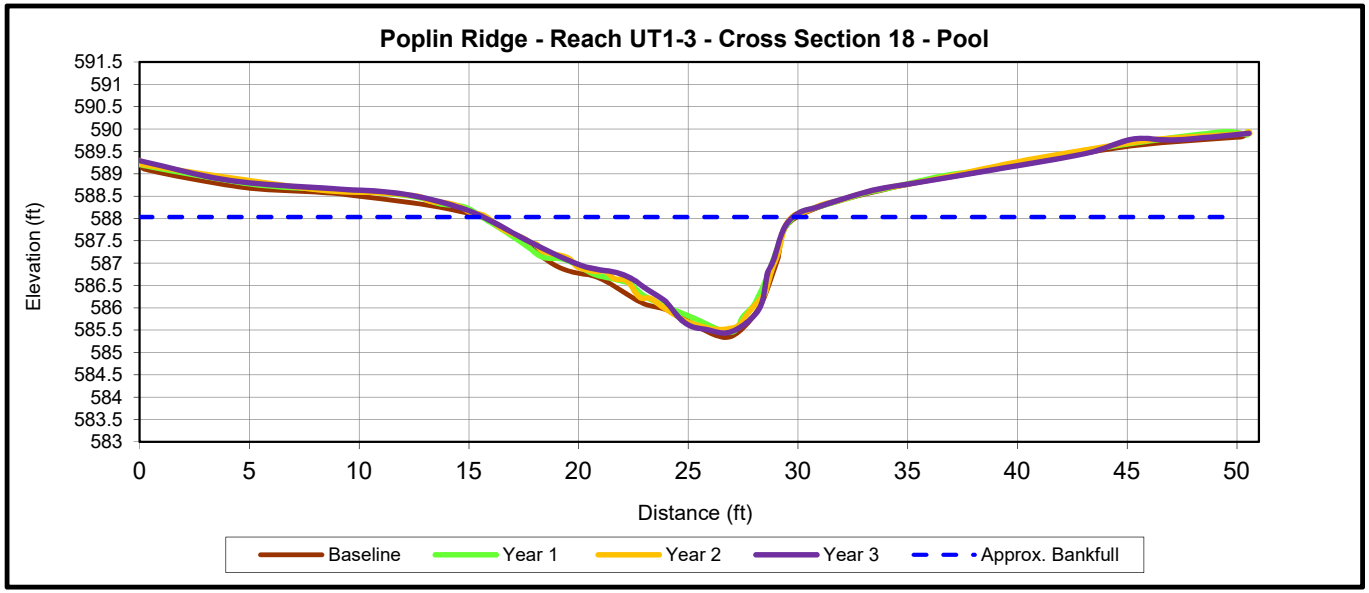
Downstream



	Cross Section 17 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	590.9	590.9	590.9	590.9			
Bankfull Width (ft)	14.2	13.1	13.2	13.2			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	0.7	0.6	0.7	0.7			
Bankfull Max Depth (ft)	1.4	1.3	1.4	1.6			
Bankfull Cross Sectional Area (ft^2)	10.2	8.5	9.2	9.6			
Bankfull Width/Depth Ratio	19.7	20.2	19.1	18.3			
Bankfull Entrenchment Ratio	>2.2	>3.8	>3.8	N/A			
Bankfull Bank Height Ratio	1.0	1.0	1.0	N/A			

Upstream

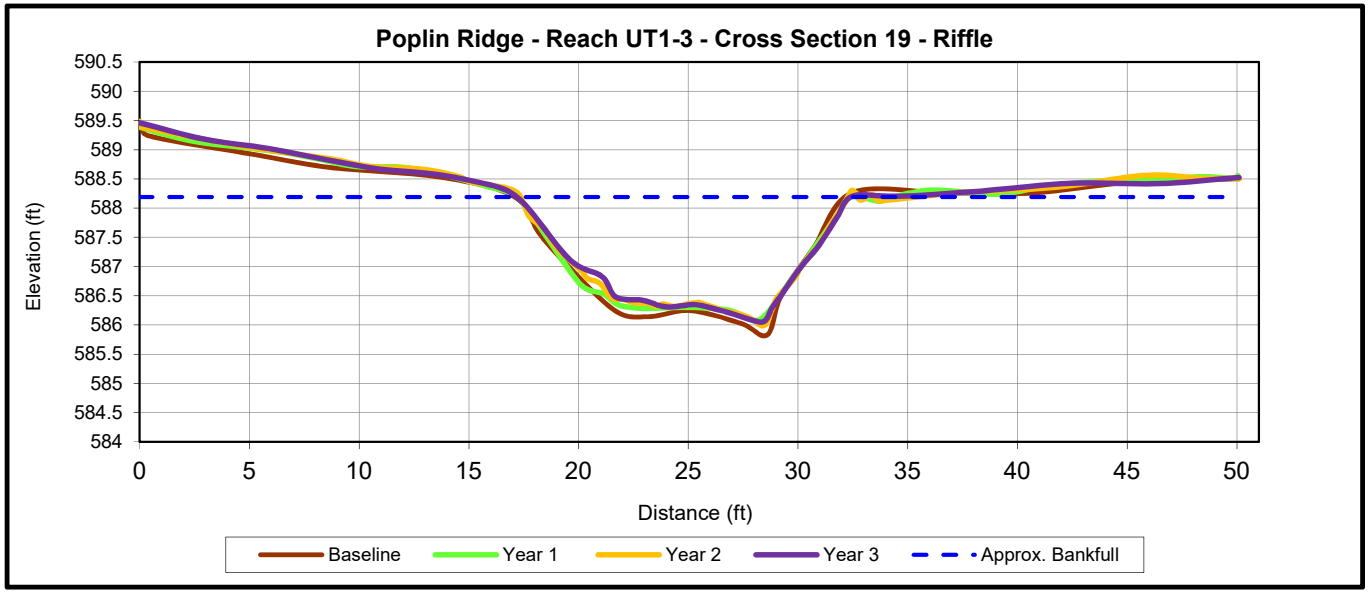
Downstream



	Cross Section 18 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	588.0	588.0	588.0	588.0			
Bankfull Width (ft)	14.5	14.3	13.9	14.2			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.5	1.4	1.4	1.4			
Bankfull Max Depth (ft)	2.6	2.6	2.5	2.6			
Bankfull Cross Sectional Area (ft^2)	21.5	19.6	19.7	19.3			
Bankfull Width/Depth Ratio	9.8	10.4	9.9	10.5			
Bankfull Entrenchment Ratio	>2.2	>3.5	>3.6	N/A			
Bankfull Bank Height Ratio	1.0	1.0	1.0	N/A			

Upstream

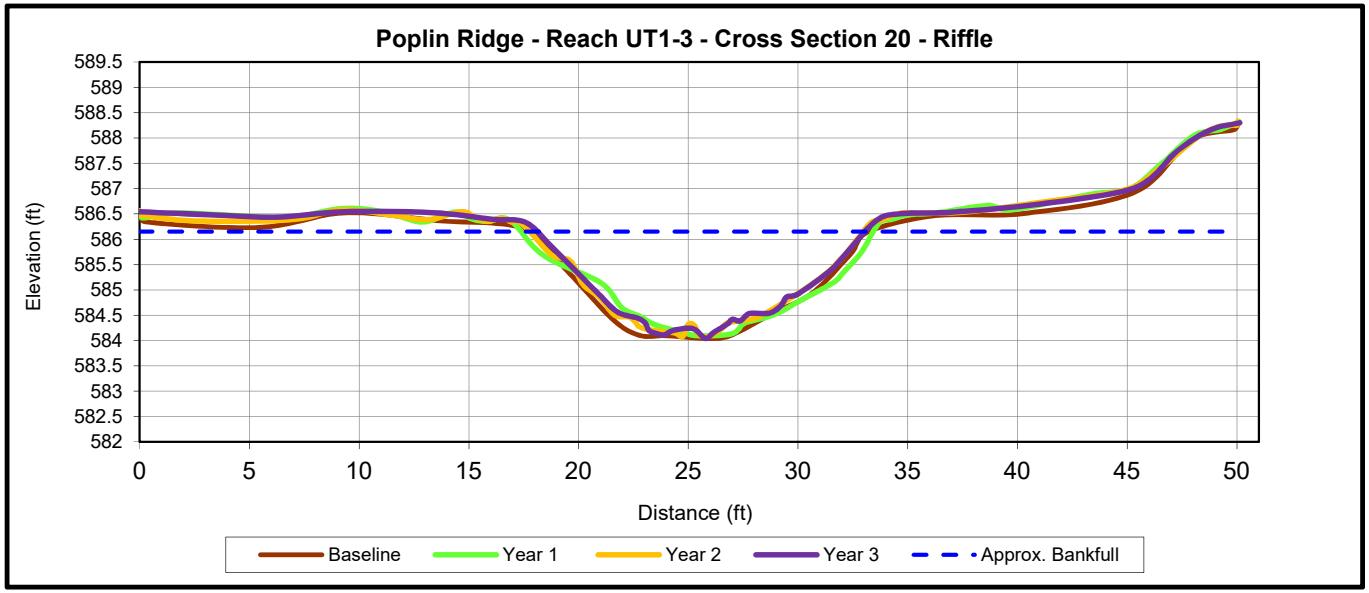
Downstream



	Cross Section 19 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	588.2	588.2	588.2	588.2			
Bankfull Width (ft)	15.2	15.1	14.9	15.4			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.5	1.4	1.4	1.4			
Bankfull Max Depth (ft)	2.4	2.1	2.2	2.1			
Bankfull Cross Sectional Area (ft^2)	23.0	21.8	21.3	21.0			
Bankfull Width/Depth Ratio	10.1	10.5	10.5	11.2			
Bankfull Entrenchment Ratio	>2.2	>3.3	>3.3	>3.3			
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.0			

Upstream

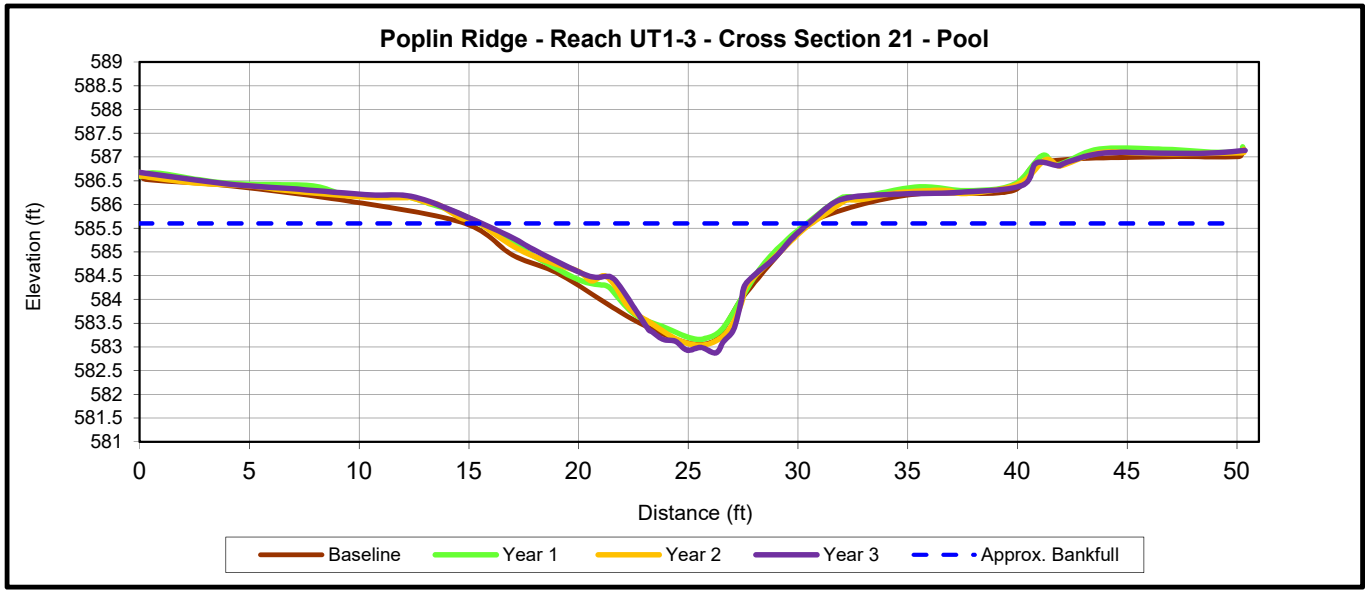
Downstream



	Cross Section 20 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	586.2	586.2	586.2	586.2			
Bankfull Width (ft)	15.5	16.1	15.2	15.1			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.4	1.3	1.3	1.3			
Bankfull Max Depth (ft)	2.1	2.1	2.1	2.1			
Bankfull Cross Sectional Area (ft^2)	21.9	20.9	20.0	19.6			
Bankfull Width/Depth Ratio	11.0	12.4	11.6	11.6			
Bankfull Entrenchment Ratio	>2.2	>3.1	>3.3	>3.3			
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.1			

Upstream

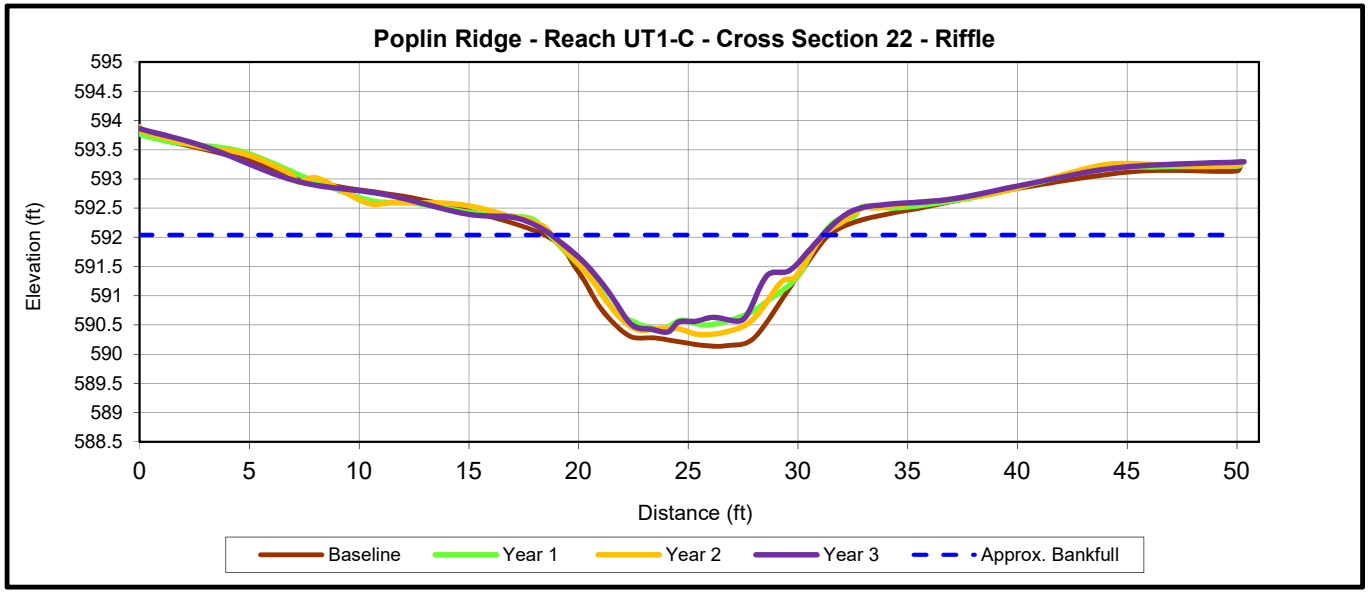
Downstream



	Cross Section 21 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	585.6	585.6	585.6	585.6			
Bankfull Width (ft)	15.8	15.0	15.2	15.0			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.4	1.3	1.3	1.3			
Bankfull Max Depth (ft)	2.5	2.4	2.6	2.7			
Bankfull Cross Sectional Area (ft^2)	21.4	19.1	19.4	19.3			
Bankfull Width/Depth Ratio	11.7	11.8	11.8	11.7			
Bankfull Entrenchment Ratio	>2.2	>3.3	>3.3	N/A			
Bankfull Bank Height Ratio	1.0	1.0	1.0	N/A			

Upstream

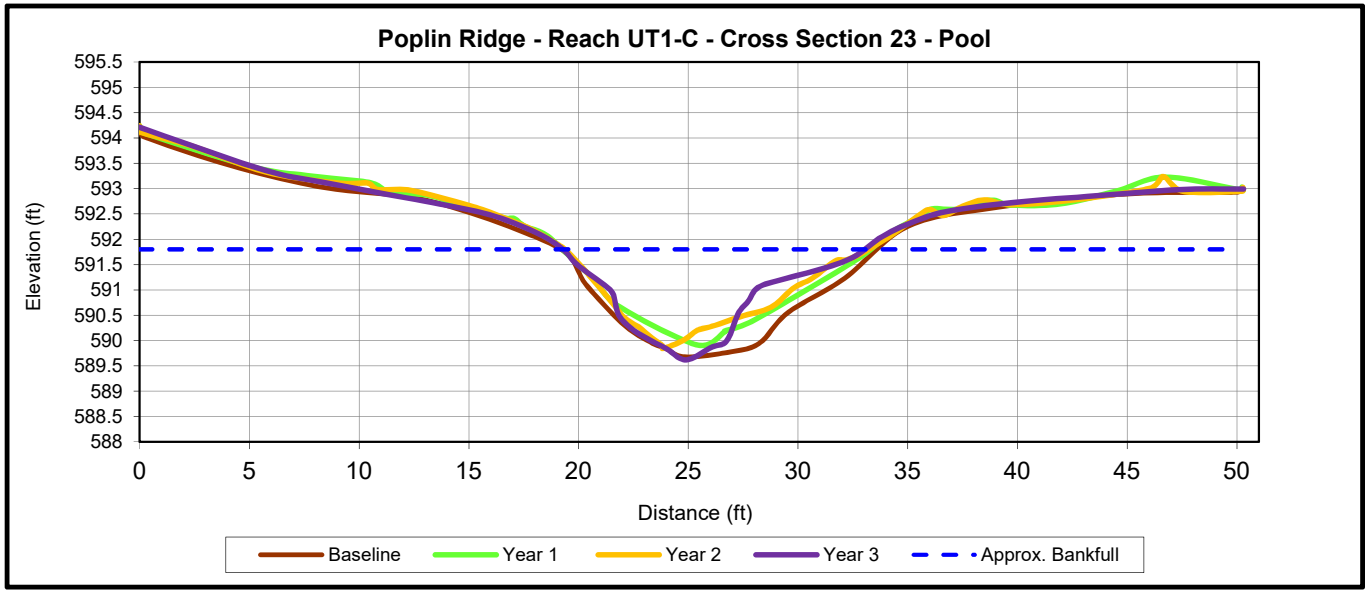
Downstream



	Cross Section 22 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	592.0	592.0	592.0	592.0			
Bankfull Width (ft)	13.2	12.5	12.5	12.4			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.3	1.1	1.1	1.0			
Bankfull Max Depth (ft)	1.9	1.6	1.7	1.7			
Bankfull Cross Sectional Area (ft^2)	16.8	13.6	14.2	12.5			
Bankfull Width/Depth Ratio	10.4	11.5	10.9	12.3			
Bankfull Entrenchment Ratio	>2.2	>4.0	>4.0	>4.0			
Bankfull Bank Height Ratio	1.0	1.0	1.0	0.9			

Upstream

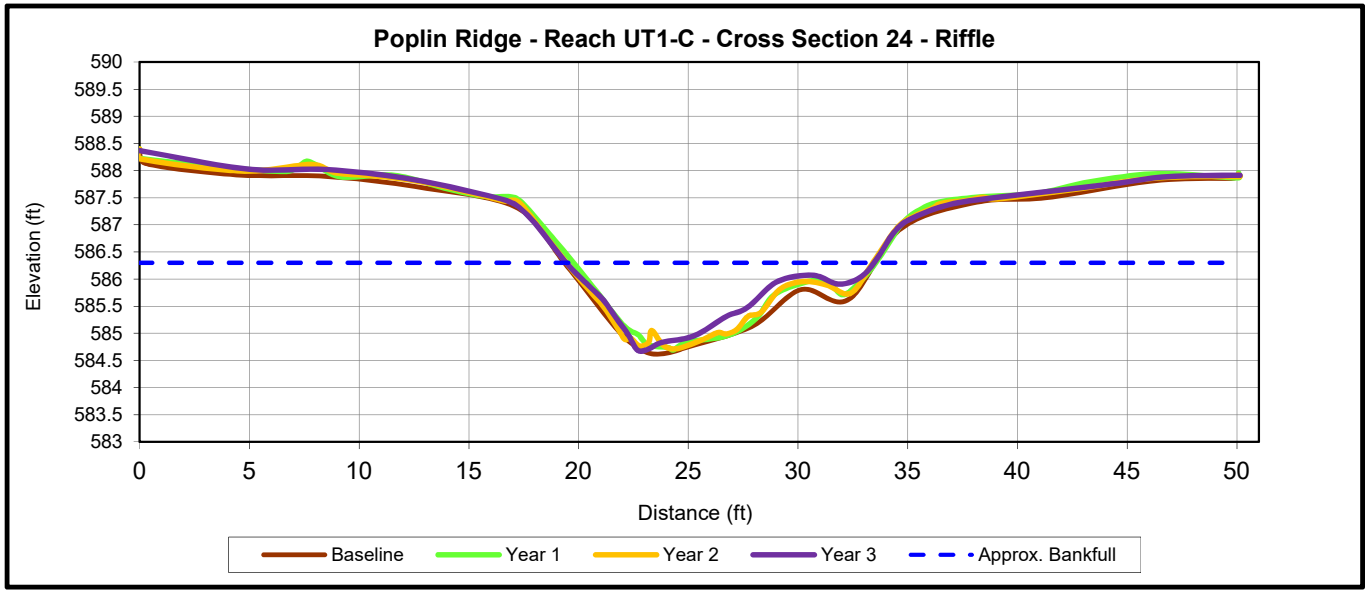
Downstream



	Cross Section 23 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	591.8	591.8	591.8	591.8			
Bankfull Width (ft)	14.6	14.0	13.9	13.7			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.3	1.1	1.0	1.0			
Bankfull Max Depth (ft)	2.1	1.9	2.0	2.2			
Bankfull Cross Sectional Area (ft^2)	19.1	14.8	14.2	14.3			
Bankfull Width/Depth Ratio	11.1	13.3	13.5	13.2			
Bankfull Entrenchment Ratio	>2.2	>3.6	>3.6	N/A			
Bankfull Bank Height Ratio	1.0	1.0	1.0	N/A			

Upstream

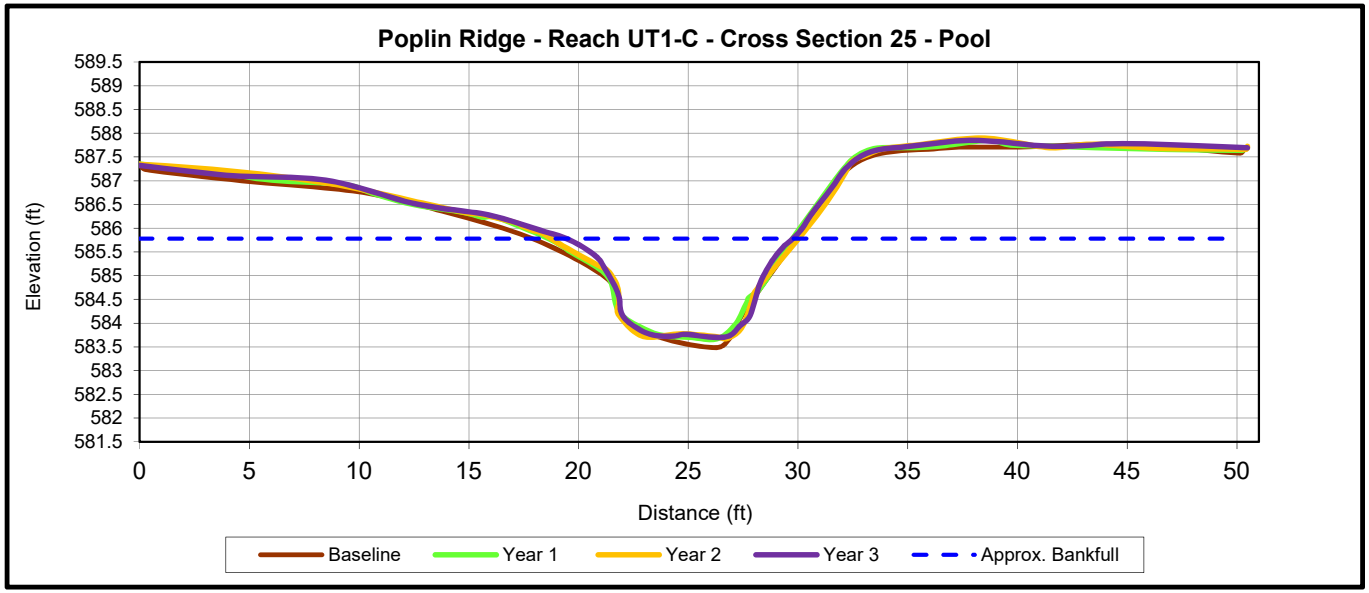
Downstream



	Cross Section 24 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	586.3	586.3	586.3	586.3			
Bankfull Width (ft)	14.2	13.8	14.0	14.0			
Floodprone Width (ft)	>46.6	>46.6	>46.6	38.0			
Bankfull Mean Depth (ft)	1.0	0.9	0.9	0.8			
Bankfull Max Depth (ft)	1.7	1.6	1.6	1.6			
Bankfull Cross Sectional Area (ft^2)	14.0	12.2	12.4	10.8			
Bankfull Width/Depth Ratio	14.3	15.6	15.7	18.1			
Bankfull Entrenchment Ratio	>2.2	>3.4	>3.3	2.7			
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.5			

Upstream

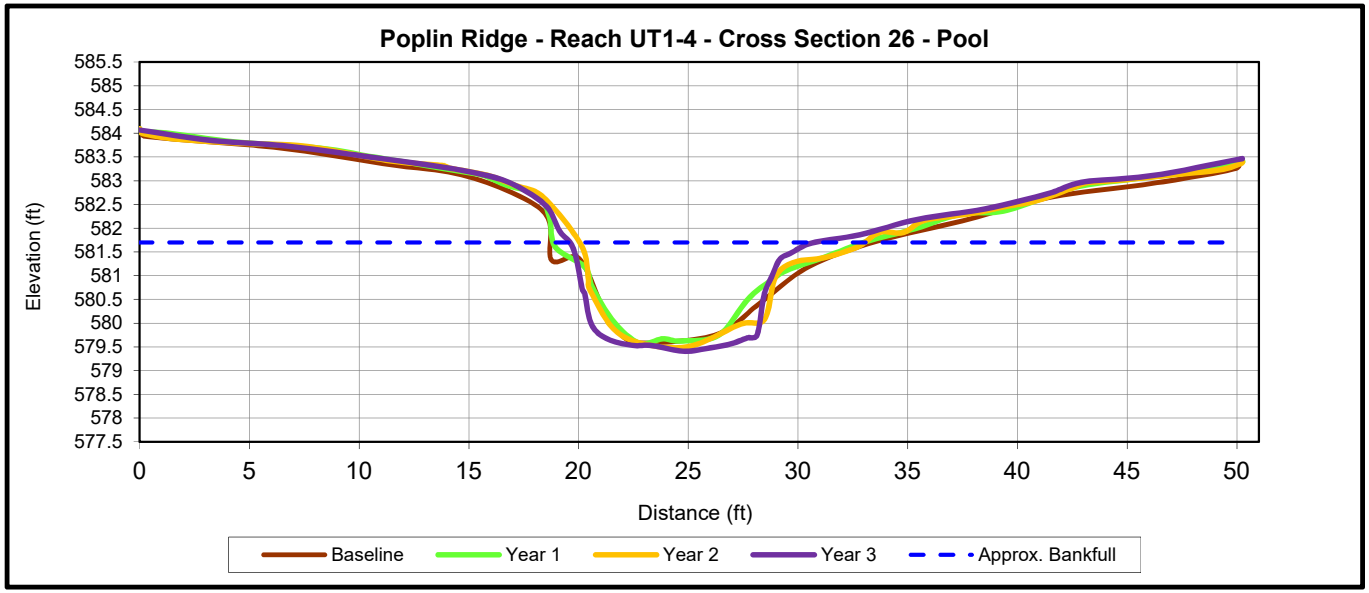
Downstream



	Cross Section 25 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	585.8	585.8	585.8	585.8			
Bankfull Width (ft)	12.0	11.1	11.2	10.5			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.3	1.3	1.3	1.3			
Bankfull Max Depth (ft)	2.3	2.1	2.1	2.1			
Bankfull Cross Sectional Area (ft^2)	15.5	14.3	14.5	14.1			
Bankfull Width/Depth Ratio	9.4	8.6	8.7	7.8			
Bankfull Entrenchment Ratio	>2.2	>4.5	>4.5	N/A			
Bankfull Bank Height Ratio	1.0	1.0	1.0	N/A			

Upstream

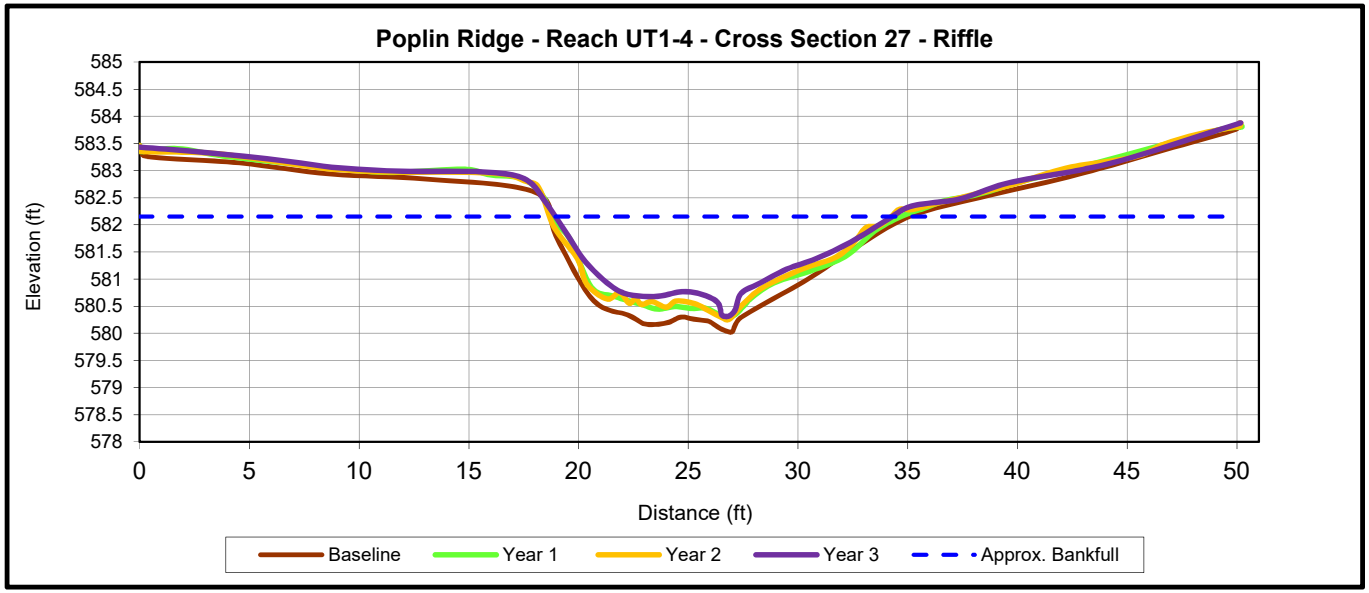
Downstream



	Cross Section 26 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	581.7	581.7	581.7	581.7			
Bankfull Width (ft)	14.8	14.1	13.0	11.2			
Floodprone Width (ft)	>47.0	>47.0	>47.0	>50.0			
Bankfull Mean Depth (ft)	1.2	1.2	1.3	1.6			
Bankfull Max Depth (ft)	2.1	2.1	2.2	2.3			
Bankfull Cross Sectional Area (ft^2)	17.6	16.2	17.2	18.2			
Bankfull Width/Depth Ratio	12.5	12.3	9.7	6.9			
Bankfull Entrenchment Ratio	>2.2	>3.3	>3.6	N/A			
Bankfull Bank Height Ratio	1.0	1.0	1.0	N/A			

Upstream

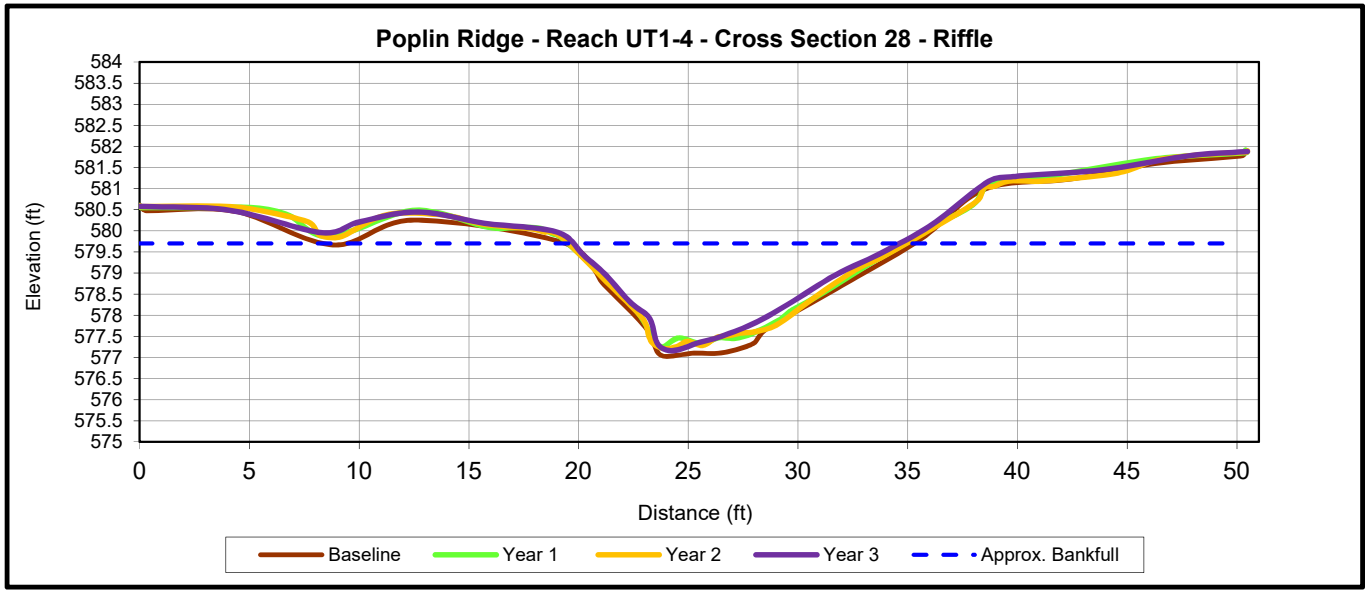
Downstream



	Cross Section 27 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	582.2	582.2	582.2	582.2			
Bankfull Width (ft)	16.5	15.9	15.6	15.4			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.3	1.2	1.1	1.0			
Bankfull Max Depth (ft)	2.1	1.9	1.9	1.8			
Bankfull Cross Sectional Area (ft^2)	21.5	18.3	17.8	15.6			
Bankfull Width/Depth Ratio	12.7	13.8	13.6	15.1			
Bankfull Entrenchment Ratio	>2.2	>3.1	>3.2	>3.3			
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.1			

Upstream

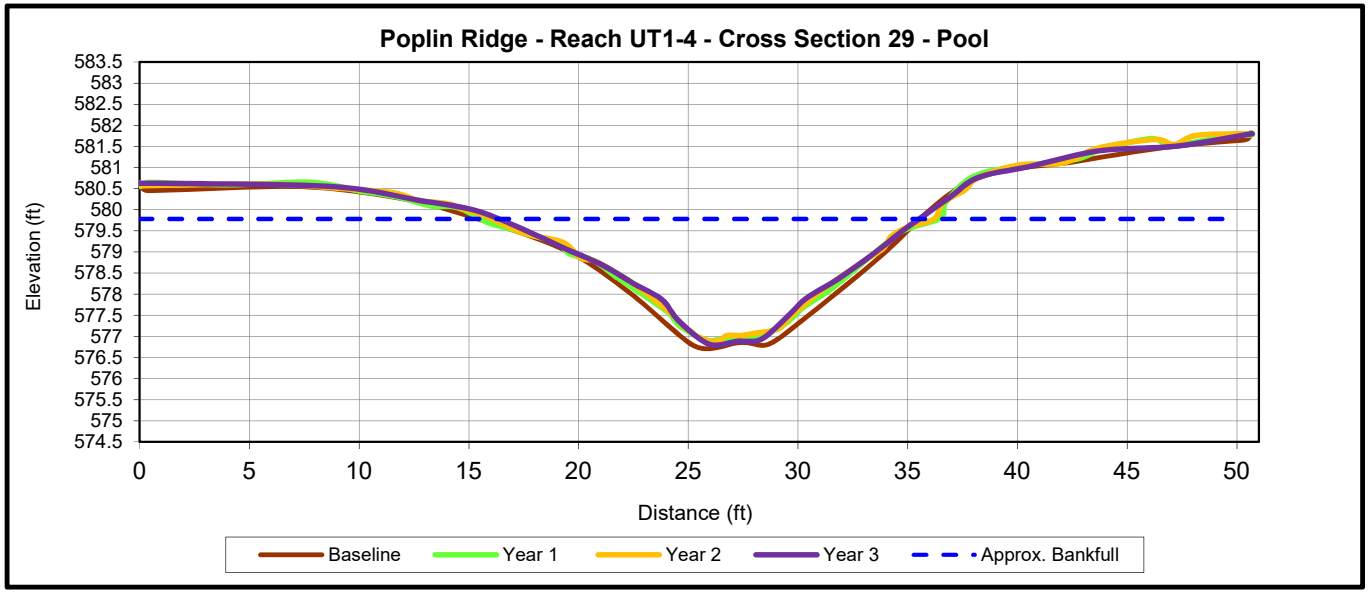
Downstream



	Cross Section 28 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	579.7	579.7	579.7	579.7			
Bankfull Width (ft)	15.9	15.4	15.3	15.0			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.5	1.4	1.4	1.3			
Bankfull Max Depth (ft)	2.6	2.5	2.5	2.5			
Bankfull Cross Sectional Area (ft^2)	24.2	21.7	21.9	20.0			
Bankfull Width/Depth Ratio	10.4	10.9	10.8	11.2			
Bankfull Entrenchment Ratio	>2.2	>3.3	>3.3	>3.3			
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.1			

Upstream

Downstream



	Cross Section 29 (Pool)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY5	MY7	MY+
Record elevation (datum) used	579.8	579.8	579.8	579.8			
Bankfull Width (ft)	20.3	20.8	20.0	19.4			
Floodprone Width (ft)	>50.0	>50.0	>50.0	>50.0			
Bankfull Mean Depth (ft)	1.6	1.4	1.4	1.5			
Bankfull Max Depth (ft)	3.1	2.9	2.9	3.0			
Bankfull Cross Sectional Area (ft^2)	33.2	30.0	28.9	29.2			
Bankfull Width/Depth Ratio	12.5	14.4	13.9	12.9			
Bankfull Entrenchment Ratio	>2.2	>2.4	>2.5	N/A			
Bankfull Bank Height Ratio	1.0	1.0	1.0	N/A			

Table 12. Pebble Count Data Summary

Stream Reach	MY1 - 2015		MY2 - 2016		MY3 - 2017		MY4 - 2018		MY5 - 2019		MY6 - 2020		MY7 - 2021	
	Pebble Count		Pebble Count		Pebble Count		Pebble Count		Pebble Count		Pebble Count		Pebble Count	
	D_{50} (mm)	D_{84} (mm)	D_{50} (mm)	D_{84} (mm)	D_{50} (mm)	D_{84} (mm)	D_{50} (mm)	D_{84} (mm)	D_{50} (mm)	D_{84} (mm)	D_{50} (mm)	D_{84} (mm)	D_{50} (mm)	D_{84} (mm)
UT1-1	13	43	5.2	26	48	76								
UT1-1A	0.15	0.64	0.2	26	0.062	32								
UT1-B	23	42	4.9	22	27	59								
UT1-C	9.6	24	3.5	24	9.6	51.5								
UT1-2	0.7	12.3	4.6	25.8	7.5	26.8								
UT1-3	23.5	62.5	7.9	29.5	16.7	80.5								
UT1-4	4	15.5	4.2	11.8	27.1	44								
UT2-A	0.062	0.6	0.6	6.1	6.5	14								
UT2-3	0.062	6.4	1.4	11	0.062	12								
UT2-4	0.062	42	0.062	24	28	79								

Charts 1-11. MY3 Stream Reach Substrate Composition Charts

Chart 1.

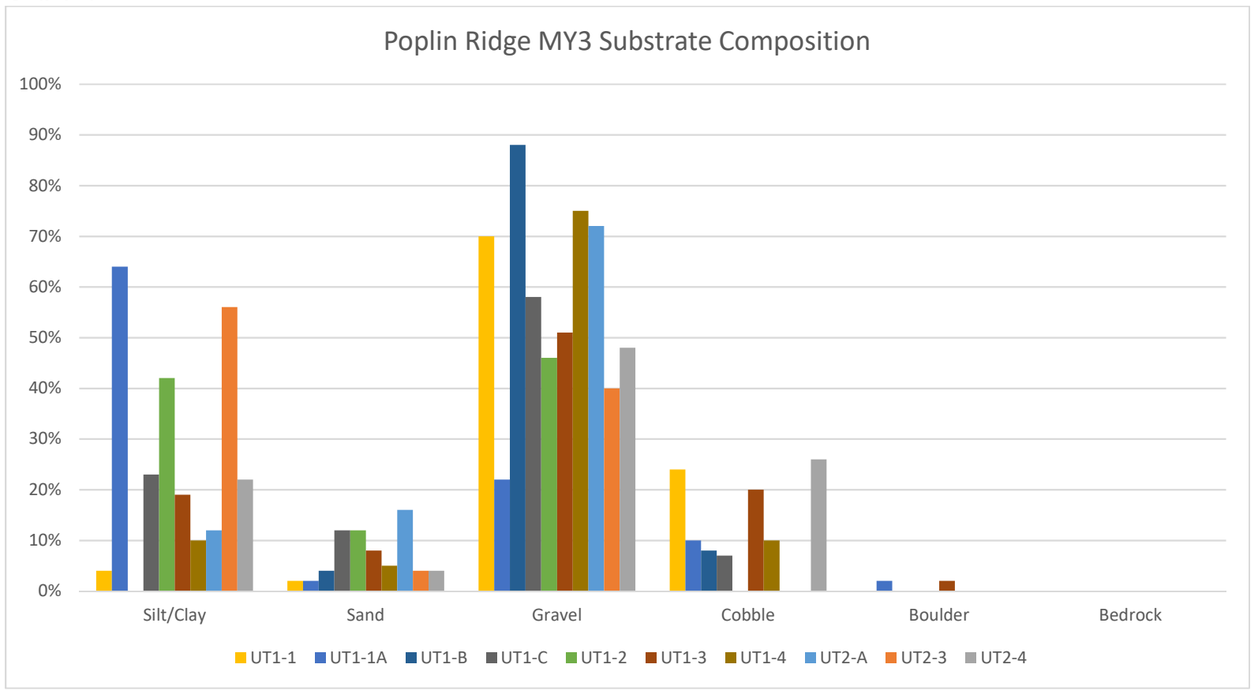


Chart 2.

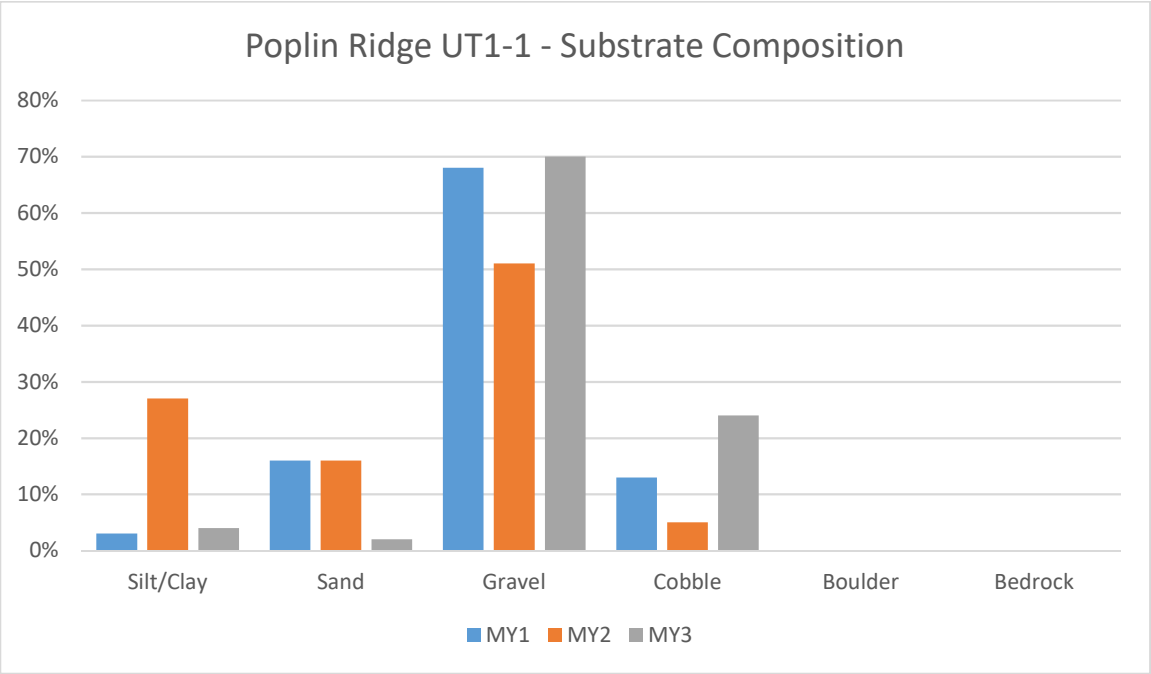


Chart 3.

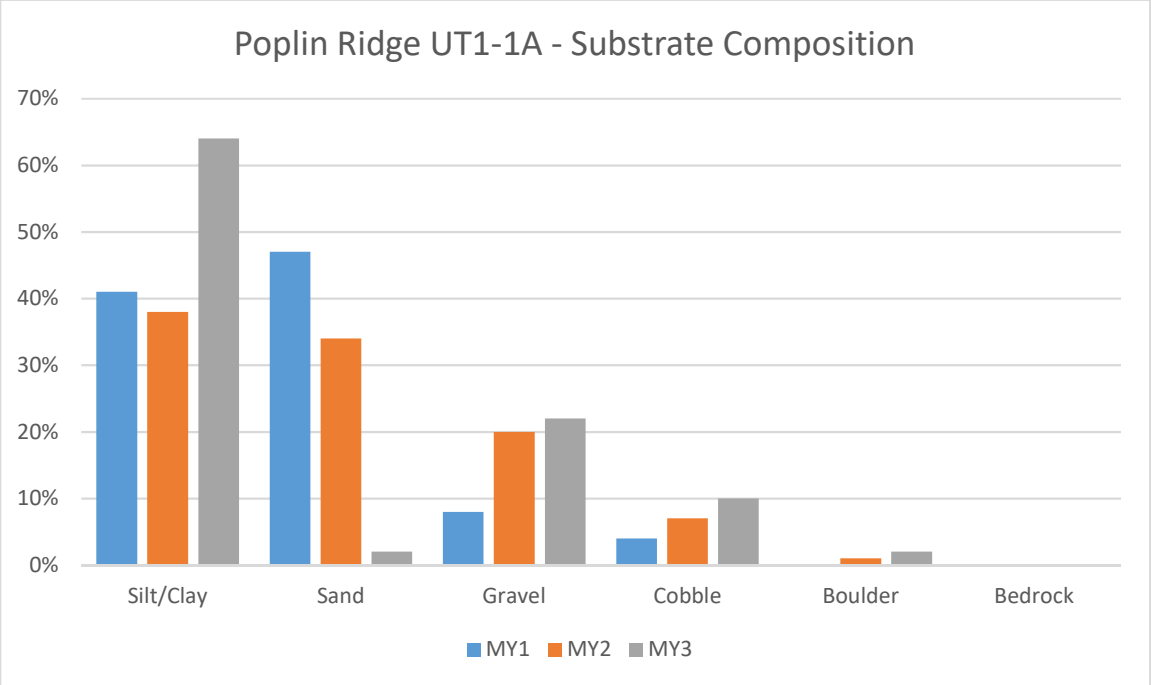


Chart 4.

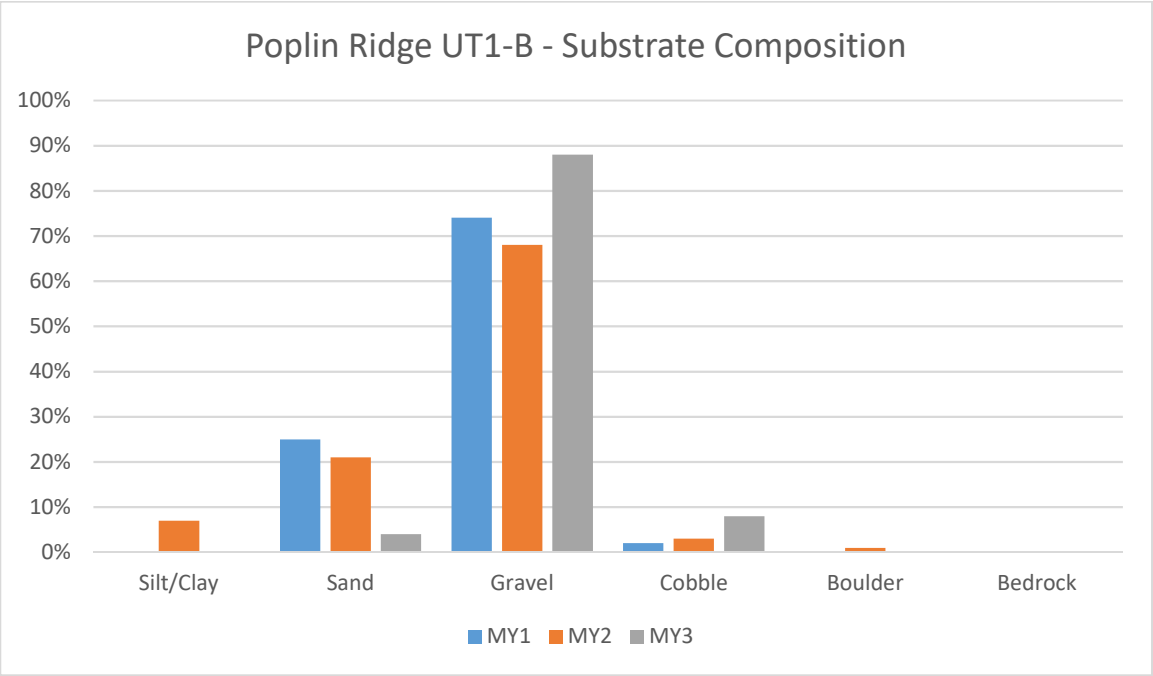


Chart 5.

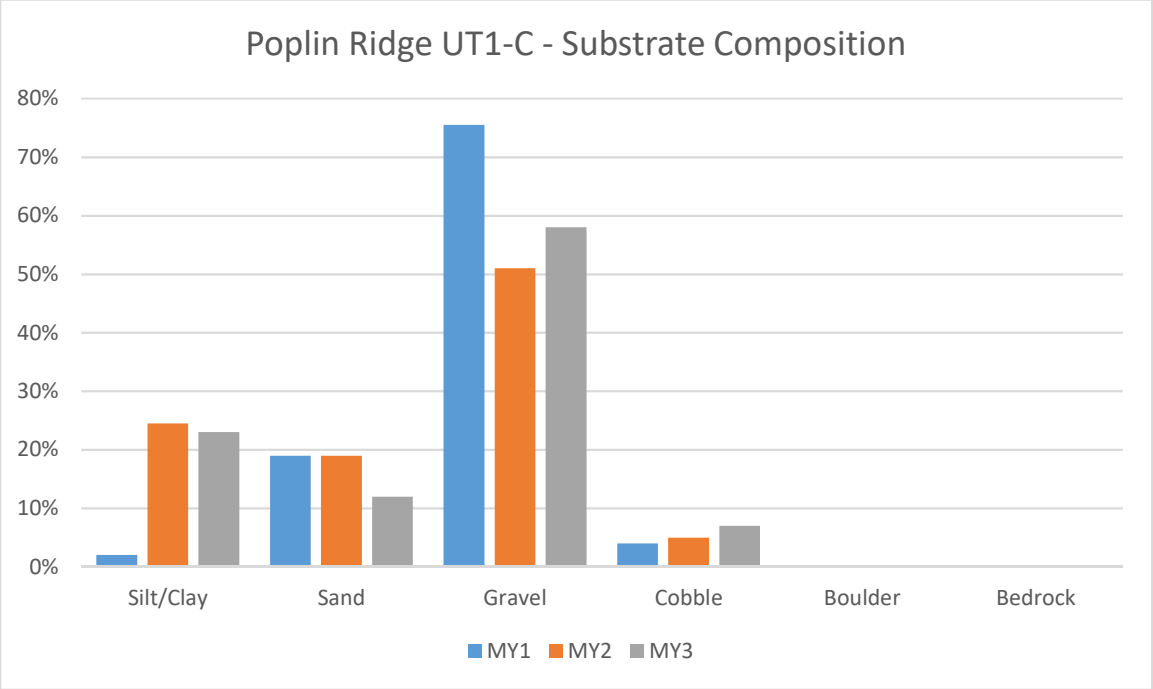


Chart 6.

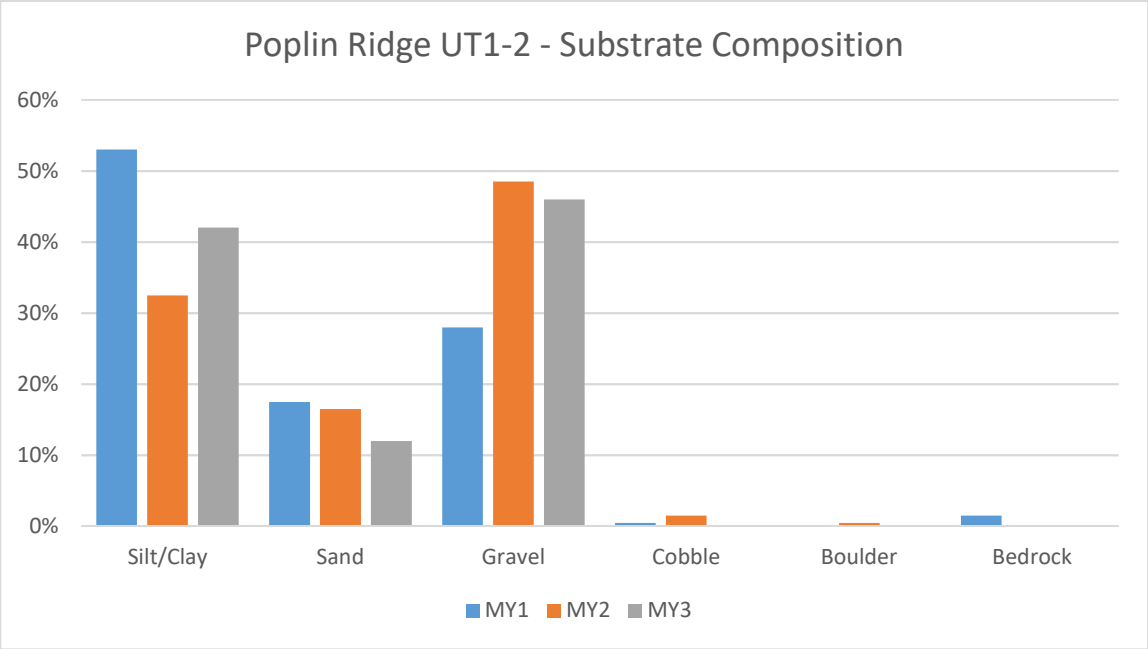


Chart 7.

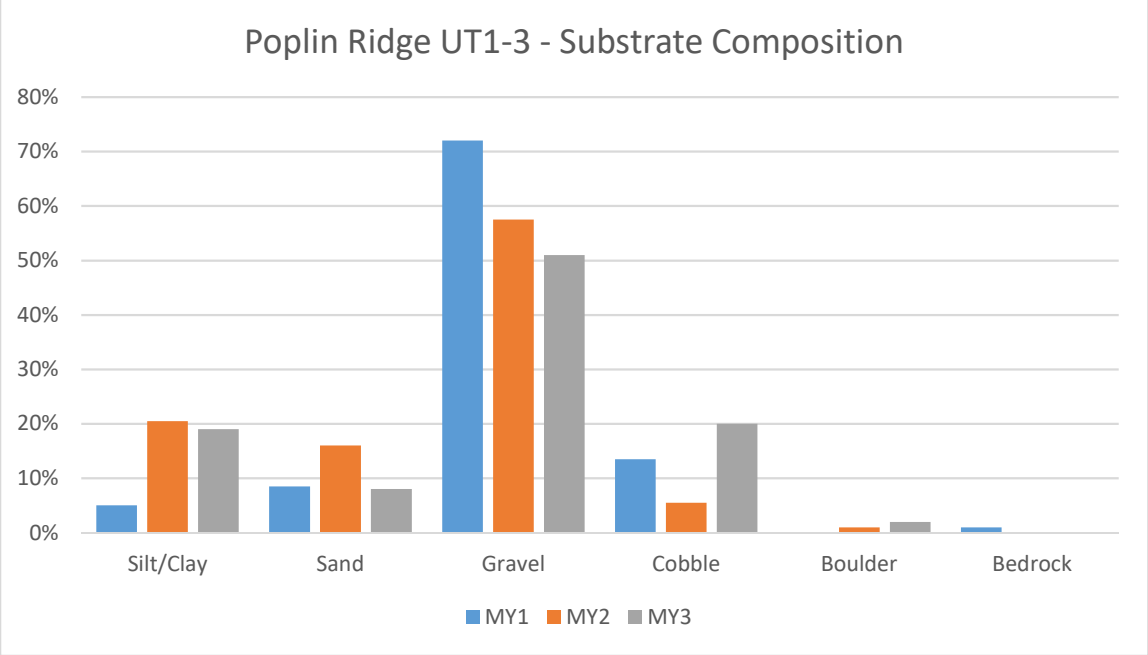


Chart 8.

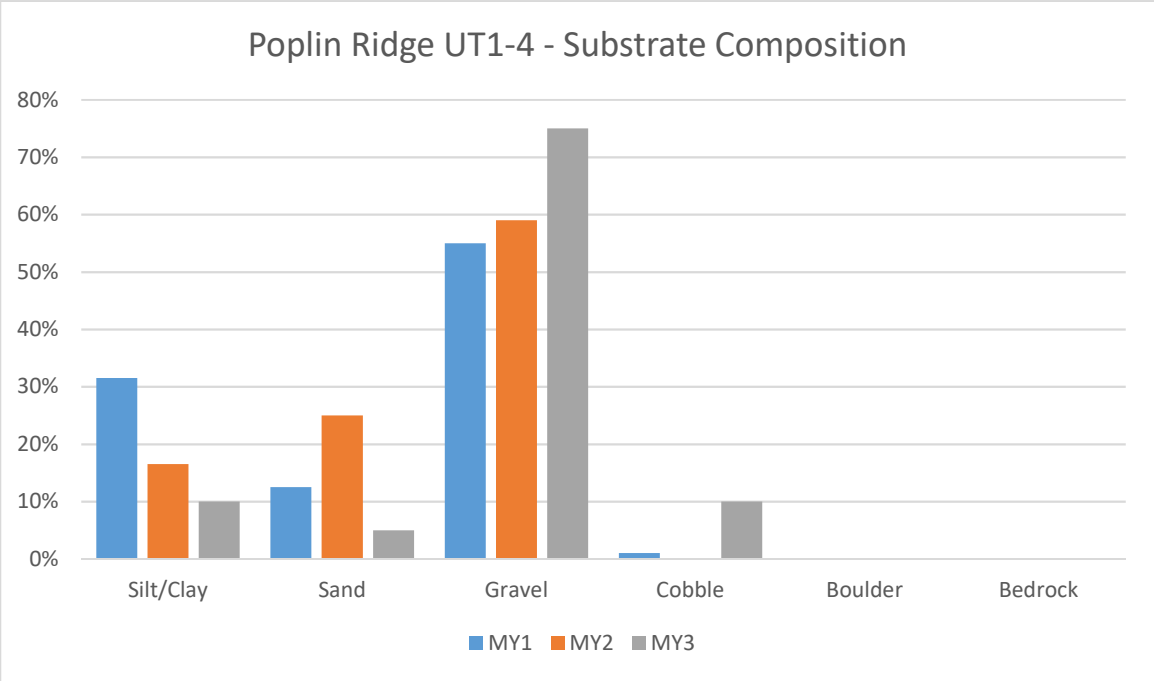


Chart 9.

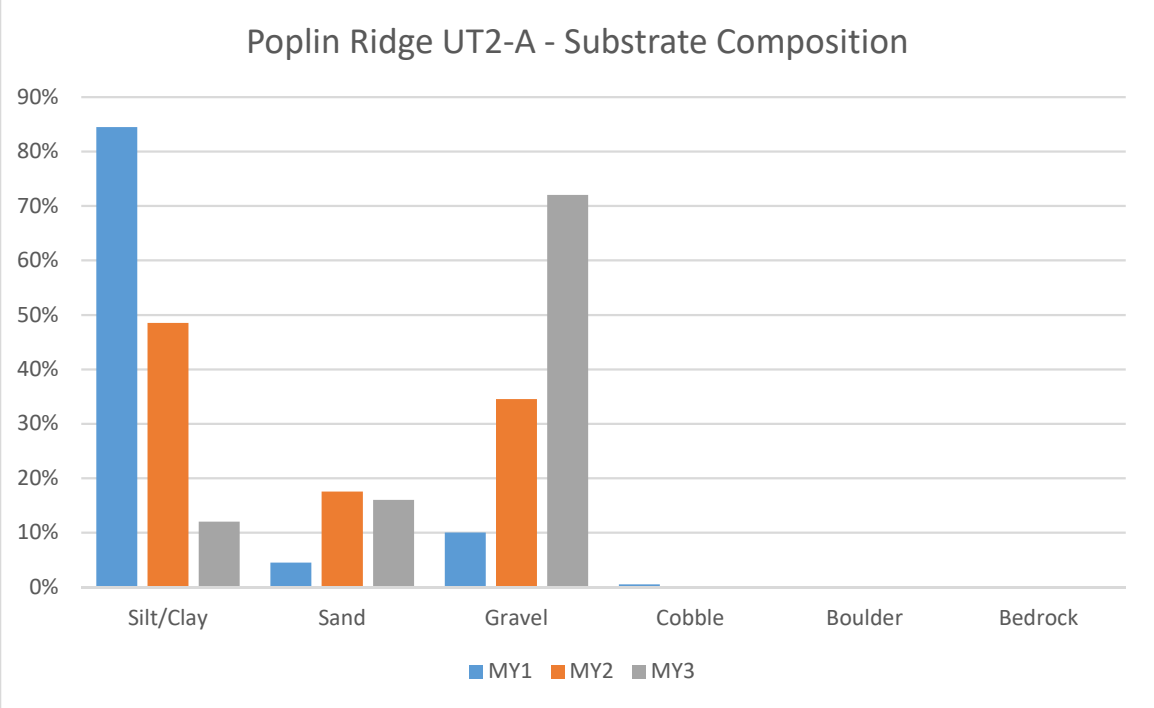


Chart 10.

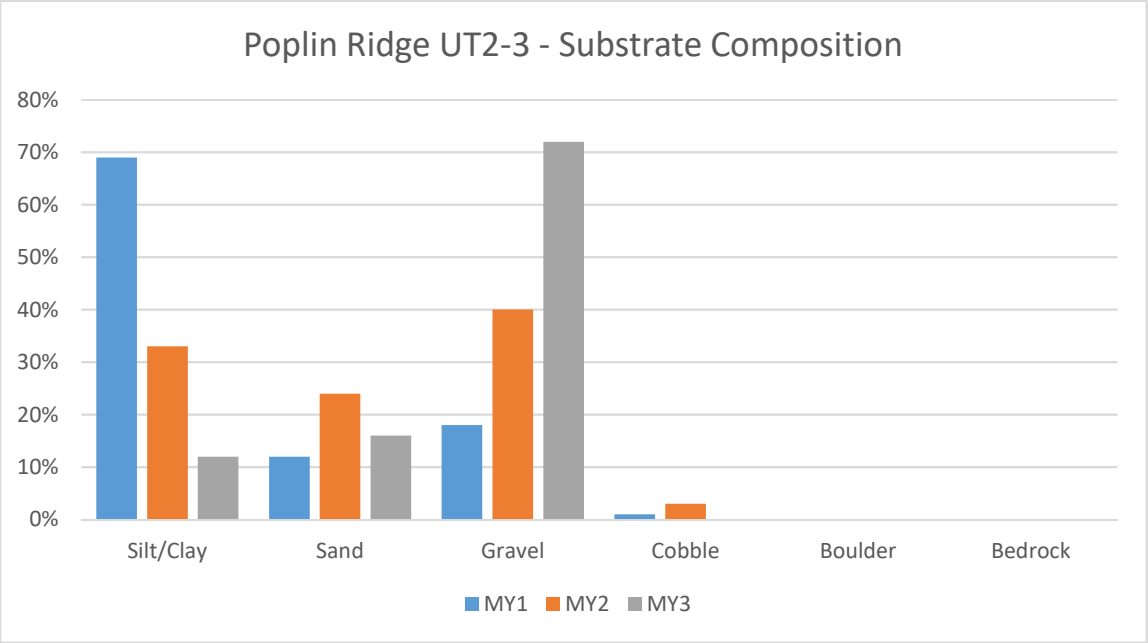


Chart 11.

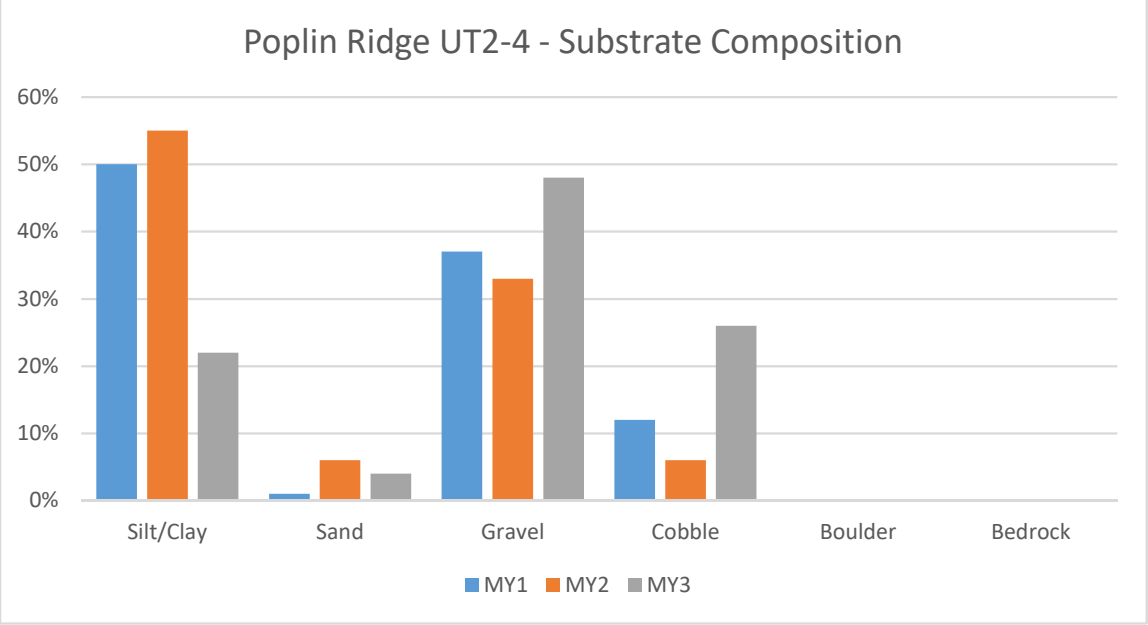


Table 13. Poplin Ridge Bank Pin Array Summary

Bank Pin Location	Position	Year 1 Reading (mm)	Year 2 Reading (mm)	Year 3 Reading (mm)
Reach UT2-2	Upper	0.0	0.0	0.0
	Middle	0.0	0.0	0.0
	Lower	0.0	0.0	0.0
Reach UT2-3	Upper	0.0	0.0	0.0
	Middle	0.0	0.0	0.0
	Lower	0.0	0.0	0.0
Reach UT1-2	Upper	0.0	44.5	0.0
	Middle	0.0	0.0	0.0
	Lower	0.0	0.0	0.0
Reach UT1-3	Upper	44.5	0.0	0.0
	Middle	92.3	0.0	0.0
	Lower	31.8	0.0	0.0
Reach UT1-C	Upper	0.0	35.6	0.0
	Middle	0.0	0.0	0.0
	Lower	139.7	0.0	0.0
Reach UT1-4	Upper	0.0	31.8	0.0
	Middle	0.0	0.0	0.0
	Lower	108.0	0.0	0.0

Appendix E
Hydrologic Data

Table 14. Verification of Bankfull Events

Date of Data Collection	Estimated Date of Occurrence	Method	Maximum Bankfull Height (ft.)
UT1-2			
10/14/2015	8/19/2015	Crest Gauge	0.50
4/26/2017	1/23/2017	Crest Gauge	0.34
4/26/2017	4/25/2017	Crest Gauge	0.42
4/26/2017	4/24/2017	Crest Gauge	0.49
9/26/2017	6/20/2017	Crest Gauge	0.42
UT1-4			
10/15/2015	8/19/2015	Crest Gauge	2.00
10/15/2015	10/3/2015	Crest Gauge	1.00
1/16/2016	11/2/2015	Crest Gauge	0.80
1/16/2016	11/9/2015	Crest Gauge	0.70
1/16/2016	12/22/2015	Crest Gauge	0.40
9/23/2016	6/6/2016	Crest Gauge	0.50
9/23/2016	8/5/2016	Crest Gauge	0.40
4/26/2017	4/25/2017	Crest Gauge	2.05
4/26/2017	4/24/2017	Crest Gauge	2.15
4/26/2017	1/23/2017	Crest Gauge	1.95
9/26/2017	6/20/2017	Crest Gauge	2.60
UT2-3			
10/13/2015	8/19/2015	Crest Gauge	4.30
10/13/2015	10/3/2015	Crest Gauge	1.20
1/16/2016	11/2/2015	Crest Gauge	2.00
1/16/2016	11/9/2015	Crest Gauge	0.10
1/16/2016	11/19/2015	Crest Gauge	1.70
1/16/2016	12/22/2015	Crest Gauge	1.30
1/16/2016	12/30/2015	Crest Gauge	0.30
4/26/2017	4/24/2017	Crest Gauge	2.20
4/26/2017	4/25/2017	Crest Gauge	1.65
9/26/2017	6/20/2017	Crest Gauge	2.83

Photo Verification of Bankfull Events

Crest Gauge @ UT1-2 – 0.49 ft.

Crest Gauge @ UT1-4 – 2.6 ft.

Crest Gauge @ UT2-3 – 2.83 ft.

Table 15. Rainfall Summary

Month	Average	Normal Limits		Monroe Station Precipitation	On-Site Monthly Precipitaiton
		30 Percent	70 Percent		
January	4.07	2.74	4.87	5.51	5.79
February	3.49	2.39	4.17	1.31	1.30
March	4.45	3.10	5.29	2.62	2.58
April	3.07	1.82	3.72	6.27	6.27
May	3.47	2.22	4.18	5.87	6.32
June	4.57	2.91	5.50	8.08	7.34
July	4.50	2.90	5.42	5.49	5.08
August	4.71	2.78	5.18	2.67	6.02
September	4.24	2.02	5.18	3.95	3.59
October	3.81	2.00	4.57	---	---
November	3.33	1.90	4.05	---	---
December	3.85	2.56	4.62	---	---
Total	47.56	29.34	56.75	41.77	44.29
*Rainfall data reported up until September 29					

Chart 12. 2017 Precipitation Data Compared to Average 30th and 70th Percentiles, Union County