

# **Annual Monitoring Report**

**Mill Dam Creek Restoration Site**

**Yadkin River Basin - 03040101**

**Monitoring Year 01**

**DEQ Contract 6898**

**DMS Project Number 97136**

**DWR #: 18-1349**

**USACE Action ID: 2016-01335**

**Yadkin County, North Carolina**



Prepared for:

NC Department of Environmental Quality

Division of Mitigation Services

1652 Mail Service Center

Raleigh, NC 27699

**Data Collected: 2020**

**Date Submitted: January 2021**

## Monitoring and Design Firm

Prepared by:



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**Project Contact: Tim Morris**  
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Mitigation Project Name	Mill Dam Creek Restoration	USACE Action ID	2016-01335
DMS ID	97136	DWR Permit	2018-1349
River Basin	Yadkin	Date Project Instituted	5/23/2016
Cataloging Unit	03040101	Stream/Wet. Service Area	Yadkin 03040101
County	Yadkin	Date Printed	8/7/2020

BROWNING.KIMBERLY.DANIELLE.1527683510 Digitally signed by BROWNING.KIMBERLY.DANIELLE.1527683510  
Date: 2020.09.03 15:29:22 -04'00'

**Signature of Official Approving Credit Release**

Credit Release Milestone	Warm Stream Credits						
Project Credits	Scheduled Releases %	Estimated Scheduled Release #	Proposed Released #	Not Approved # Releases	Approved Credits	Anticipated Release Year	Actual Release Date
1 - Site Establishment	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2 - Year 0 / As-Built	30.00%	3,087.200	3,087.200	0.000	3,087.200	2020	7/27/2020
3 - Year 1 Monitoring	10.00%	1,029.067				2021	
4 - Year 2 Monitoring	10.00%	1,029.067				2022	
5 - Year 3 Monitoring	10.00%	1,029.067				2023	
6 - Year 4 Monitoring	5.00%	514.533				2024	
7 - Year 5 Monitoring	10.00%	1,029.067				2025	
8 - Year 6 Monitoring	5.00%	514.533				2026	
9 - Year 7 Monitoring	10.00%	1,029.067				2024	
Stream Bankfull Standard	10.00%	1,029.067					
			<b>Totals</b>				

<b>Total Gross Credits</b>	10,290.666
<b>Total Unrealized Credits to Date</b>	0.000
<b>Total Released Credits to Date</b>	3,087.200
<b>Total Percentage Released</b>	30.00%
<b>Remaining Unreleased Credits</b>	7,203.466

**Notes**

**Contingencies (if any)**

**Project Quantities**

Mitigation Type	Restoration Type	Physical Quantity
Warm Stream	Restoration	7,166.000
Warm Stream	Enhancement I	2,209.000
Warm Stream	Enhancement II	4,130.000

Mitigation Project Name      Mill Dam Creek Restoration  
DMS ID                                97136  
River Basin                         Yadkin  
Cataloging Unit                 03040101  
County                                Yadkin

USACE Action ID                2016-01335  
DWR Permit                        2018-1349  
Date Project Instituted        5/23/2016  
Stream/Wet. Service Area      Yadkin 03040101  
Date Printed                        8/7/2020

**Debits**

Warm Stream  
Restoration  
Credits

Beginning Balance (mitigation credits)							10,290.666
Released Credits							3,087.200
Unrealized Credits							0.000
Converted Credits							0.000
Owning Program	Req. Id	TIP #	Project Name	USACE Permit #	DWR Permit #	DCM Permit #	
Remaining Balance (Released credits)							3,087.200
Remaining Balance (Unreleased credits)							7,203.466
Total Remaining Balance (Released and Unreleased credits)							10,290.666





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ENGINEERS • SCIENTISTS • SURVEYORS • CONSTRUCTION MANAGERS

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4505 Falls of Neuse Road Suite 400 Raleigh, NC 27609 (919) 783-9214 (919) 783-9266 Fax

## MEMORANDUM

Date: February 12, 2021

To: Matthew Reid, DMS Project Manager

From: Tim Morris, Project Manager  
KCI Associates of North Carolina, PA

Subject: Mill Dam Creek Stream Restoration Site  
MY-01 Monitoring Report Comments  
Yadkin River Basin CU 03040101  
NCDMS Project # 97136  
Contract # 6898

Please find below our responses in italics to the MY-00 Baseline Monitoring Report comments from NCDMS received on February 5, 2021, for the Mill Dam Creek Stream Restoration Site.

- Table of contents page numbers do not match report. Please update as necessary.  
*KCI Response: The issue with the page numbers has been fixed.*
- Project Summary: Last paragraph states that project planting and construction were completed in March 2020. According to Table 2, the construction/grading was completed in Dec 2019 and the repair was completed in March 2020. Please revise to state that construction was completed in Dec 2019 and planting was completed in March 2020. The March 2020 repair is discussed later in the same paragraph. This will make it consistent with the project activity and reporting history timeline in Table 2.  
*KCI Response: This change has been made.*
- Monitoring Results: Please add short discussion in second paragraph concerning erosion areas noted on CCPV and the damaged boulder sill on UTHC4-1 in regards to heavy rainfall events in 2020.  
*KCI Response: This discussion has been added to the report.*
- Monitoring Results: First paragraph states that vegetation monitoring results for the year are 822/970, Table 7 shows MY1 results to be 823/972. Please review and revise.  
*KCI Response: A rounding error in Table 7 was causing this error. In the process of reviewing Table 7 (see below) other errors were noted and corrected that changed the average on-site. The totals for the site are 836/986.*
- Monitoring Results: There were numerous gage failures on the site in 2020. Have the gages been repaired or replaced? Please update this section with a brief summary of the failure and solution.

*KCI Response: The failure was a result of the memory banks becoming full due to waiting too long between downloads. The stream gauges, which are set to record every 10 minutes, can hold approximately 5.5 months of data. The gauges were installed in January 2020 and not downloaded again until December 2020. This oversight will not be repeated in future monitoring years.*

- Table 5: Please add a Visual Stream Morphology Stability Assessment for the EI reaches (UTHC2, UTHC4-1 and UTCH4-3).

*KCI Response: These tables have been added to the report.*

- Please submit the random vegetation plot as polygons.

*KCI Response: The point shapefiles mill\_dam\_rando\_veg and mill\_dam\_veg\_plots represent the vegetation plot locations shot during the baseline setup. These were unintentionally included in the digital submission and have been removed. The polygon shapefile MillDam\_veg\_plots contains the MY01 vegetation plot locations.*

- Please review the mill\_dam\_erosion shapefile, and ensure that the number of features in this shapefile reflects the number of segment lengths reported in Table 5.

*KCI Response: This shapefile has been reviewed and all features that are located along R or EI reaches are included in the appropriate visual assessment tables.*

- Please review Table 7. The spreadsheet that was provided shows different planted and total values for Plot 6, 7, and 11, for example.

*KCI Response: Some of the calculations in the data sheets had not been updated from the previous year and so they did not match the numbers in Table 7. The calculations in Table 7 are performed independent of these and so in most cases the Table 7 numbers were accurate. The exception to this was Plot R12, which was not calculating correctly. This error has been updated.*

- It appears that in some instances depressional features external to the main channel and below the low bank elevation were not excluded from the loop used in determining the BHR (XS15, XS18 for example). Please be sure the areas outside of the channel are excluded for these calculations.

*KCI Response: All of the XS sheets were reviewed and these errors were corrected. Table 9 was also updated to reflect the correct numbers.*

- It is great to see KCI using a loop for the calculations. For the most part, KCI's calculations were the most accurate of the reports reviewed this year, but that accuracy relies entirely on the exclusion of the areas mentioned above.

*KCI Response: The functionality to exclude these areas is built into the spreadsheets. We will be sure to review them more thoroughly in future monitoring years to ensure that all calculations are accurate.*

Please contact me if you have any questions or would like clarification concerning these responses.

Sincerely,



Tim Morris  
Project Manager

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## **PROJECT SUMMARY**

The Mill Dam Creek Restoration Site (MDCRS) was completed in March 2020 and restored and enhanced a total of 13,505 linear feet of stream. The MDCRS is a riparian system in the Upper Yadkin Pee-Dee River Basin (3040101 8-digit cataloging unit) in Yadkin County, North Carolina. The site's natural hydrologic regime had been substantially modified through the relocation and straightening of the existing stream channels, livestock impacts, and clearing of riparian buffer. This completed project will restore streams impacted by pasture and agriculture to a stable headwater ecosystem with a functional riparian buffer and floodplain access.

The MDCRS is protected by a 40.2 acre permanent conservation easement, held by the State of North Carolina. The site is located approximately 0.5 miles north of East Bend, NC. Specifically, the site is 0.2 mile north on Shady Grove Church Road (SR-1538) from its intersection with Shoals Road (SR-1546).

The North Carolina Ecosystem Enhancement Program (NCEEP) published the Upper Yadkin Pee-Dee River Basin Restoration Priorities (RBRP) in 2009. The project's 14 digit CU (03040101110070, Grassy Creek and Horne Creek) was identified as a Targeted Local Watershed (TLW) in the RBRP. The goals and priorities for the MDCRS are based on the information presented in the Upper Yadkin Pee-Dee River Basin Restoration Priorities: maintaining and enhancing water quality, restoring hydrology, and improving fish and wildlife habitat (NCEEP, 2009). The project will support the following basin priorities:

- Managing stormwater runoff
- Reducing fecal coliform inputs
- Improving/restoring riparian buffers
- Reducing sediment loading
- Improving stream stability
- Reducing nutrient loading
- Excluding livestock and implementing other agricultural BMP's
- Protecting high-resource value waters, including water supply watershed designated waters

The project is also located in the Ararat River Local Watershed Plan (LWP) study area. The Ararat River was designated a LWP Study Area due to poor water quality and aquatic habitat degradation issues, as well as the presence of good candidate sites for stream restoration in rural catchments (NCEEP, 2009). The stressors within the Ararat River LWP are erosion and sedimentation, missing or degraded riparian buffers, stormwater runoff, and nutrient and fecal coliform "hot spots" (NCEEP, 2013).

The goals for the project are to:

- Restore channelized and livestock-impacted streams to stable C and B type channels.
- Restore a forested riparian buffer to provide bank stability, filtration, and shading.

The project goals will be addressed through the following objectives:

- Relocate or stabilize channelized and/or incised streams to connect to a floodplain or floodprone area.
- Install a cross-section sized to the bankfull discharge.
- Create bedform diversity with pools, riffles, and habitat structures
- Fence out livestock to reduce nutrient, bacterial, and sediment impacts from adjacent grazing and farming practices to the project tributaries
- Plant the site with native trees and shrubs and an herbaceous seed mix.

Project construction was completed in December 2019 and project planting was completed in March 2020. The 13,505 linear feet of streams at MDCRS were enhanced and restored by re-meandering the stream and by tying the bankfull elevation to the historic floodplain where feasible. The entire site was planted to

establish a forested riparian buffer. The site was constructed as designed with only minor modifications from the design plan. These modifications generally consisted of slight adjustments in the alignment and spacing of riffles/pools due to bedrock encountered during construction. Several areas of additional bank stabilization were also installed. On February 6, 2020, shortly after construction was completed and before woody stems had been planted, the site received over 6 inches of rain in a 24 hour period. This storm caused significant damage to portions of the site and required repairs to be completed in March 2020. These repairs mainly involved repair of bank erosion through the installation of live lifts, removal of aggradation from the stream channel, and regrading areas of floodplain scour. Approximately 500 cubic yards of topsoil were also brought in and placed on the floodplain in areas of severe floodplain scour.

The monitoring components were installed in March/April 2020. Five automatically recording pressure transducer stream gauges that take a reading every 10 minutes were installed: one each in the upper third of T1A, T5A, and T8A to document flow within those reaches, and two on UTHC to record the occurrence of bankfull events. Cameras were installed in the vicinity of each of the flow gauges and set to record a short video once a day to provide additional verification of flow. Two automatically recording pressure transducer groundwater monitoring gauges were installed within pre-existing wetlands on the site to monitor wetland hydrology and ensure the existing wetlands on the site are not adversely affected by the restoration project. One of these gauges is located in the vicinity of the pre-existing wetland on the left bank of T7 and the other is located within the pre-existing wetland on the right bank of T8. To determine the success of the planted mitigation areas, eighteen 10 m x 10 m permanent vegetation monitoring plots were established. An additional twelve 10 m x 10 m random temporary vegetation monitoring plots are sampled during each monitoring year as well. The locations of the planted stems relative to the origin were recorded within the permanent plots and the species and height of each planted stem were recorded for all plots. Any volunteers found within the plots were grouped into size categories by species, but separate from the planted stems. Twelve permanent photo reference points were established and are taken annually. Thirty-two permanent cross-sections (24 riffle cross-sections and 8 pool cross-sections) were also established and a detailed longitudinal profile of the stream was taken. Wolman pebble counts were performed at all of the riffle cross-sections. The cross-section measurements are repeated in monitoring years 1, 2, 3, 5, and 7, but the longitudinal profile will only be repeated if there are concerns about bed elevation adjustments. Reports will be submitted to DMS each year.

## **SUCCESS CRITERIA**

Vegetative success criteria for the stream mitigation is 260 woody stems/acre after five years, and 210 woody stems/acre after seven years. Trees in each plot must average seven feet in height at Year 5 and ten feet in height at Year 7. Volunteer species must be present for a minimum of two growing seasons and must be a species from the approved planting list to count toward vegetative success. A single species may not account for more than 50% of the required number of stems within any plot.

A minimum of four bankfull events must also be recorded during the monitoring period. All project streams must show a minimum of 30 continuous days of flow within a calendar year (assuming normal precipitation) A “normal” year is based on NRCS climatological data for Yadkin County with the 30<sup>th</sup> and 70<sup>th</sup> percentile thresholds as the range of normal, as documented in the USACE Technical Report “Assessing and Using Meteorological Data to Evaluate Wetland Hydrology, April 2000.”

Bank height ratios (BHR) should not exceed 1.2 and the entrenchment ratios (ER) should be 2.2 or greater. BHR and ER at any measured riffle cross-section should not change more than 10% from the previous condition during any given monitoring interval (e.g. no more than 10% between years 1 and 2, 2 and 3, 3 and 5, or 5 and 7). Visual assessments will also be used to identify problem areas.

## **MONITORING RESULTS**

The MY01 vegetation monitoring was conducted October 26-29, 2020. 29 of the 30 vegetation monitoring plots had greater than 260 woody stems/acre. The average stem density across all the surveyed plots is 836 planted stems/acre. Including volunteers, the site averaged 986 stems/acre.

The cross-sections were surveyed for MY01 between December 17 and 22, 2020. None of the 32 cross-sections had a bank height ratio greater than 1.2 or an entrenchment ratio less than 2.2. Some of the pools on site have widened slightly from their baseline conditions (XS3, 8, and 25), while a few of the riffles have lowered slightly (XS2, 9, 13, 23, 32). These changes are a result of the normal settling that occurs after construction, and an unusually large number of high rainfall events that the site experienced in 2020. After the large storm on February 6 and the repairs that were completed, the site experienced four separate rainfalls of greater than 3" in 24 hours. Although these heavy rainfall events did cause some damage to the site, the majority of the site was undamaged and overall the site is functioning as designed. As a result of these heavy rainfall events, one area of aggradation formed at the beginning of UTHC4-3. Bank erosion is also present along several of the outer bends on UTHC and one of the boulders from the second boulder sill on UTHC4-1 was rolled approximately 15 feet downstream. KCI is currently evaluating the need for any additional repair work and will perform this work in 2021 as needed. Please see Appendix B – Visual Assessment Data for more information.

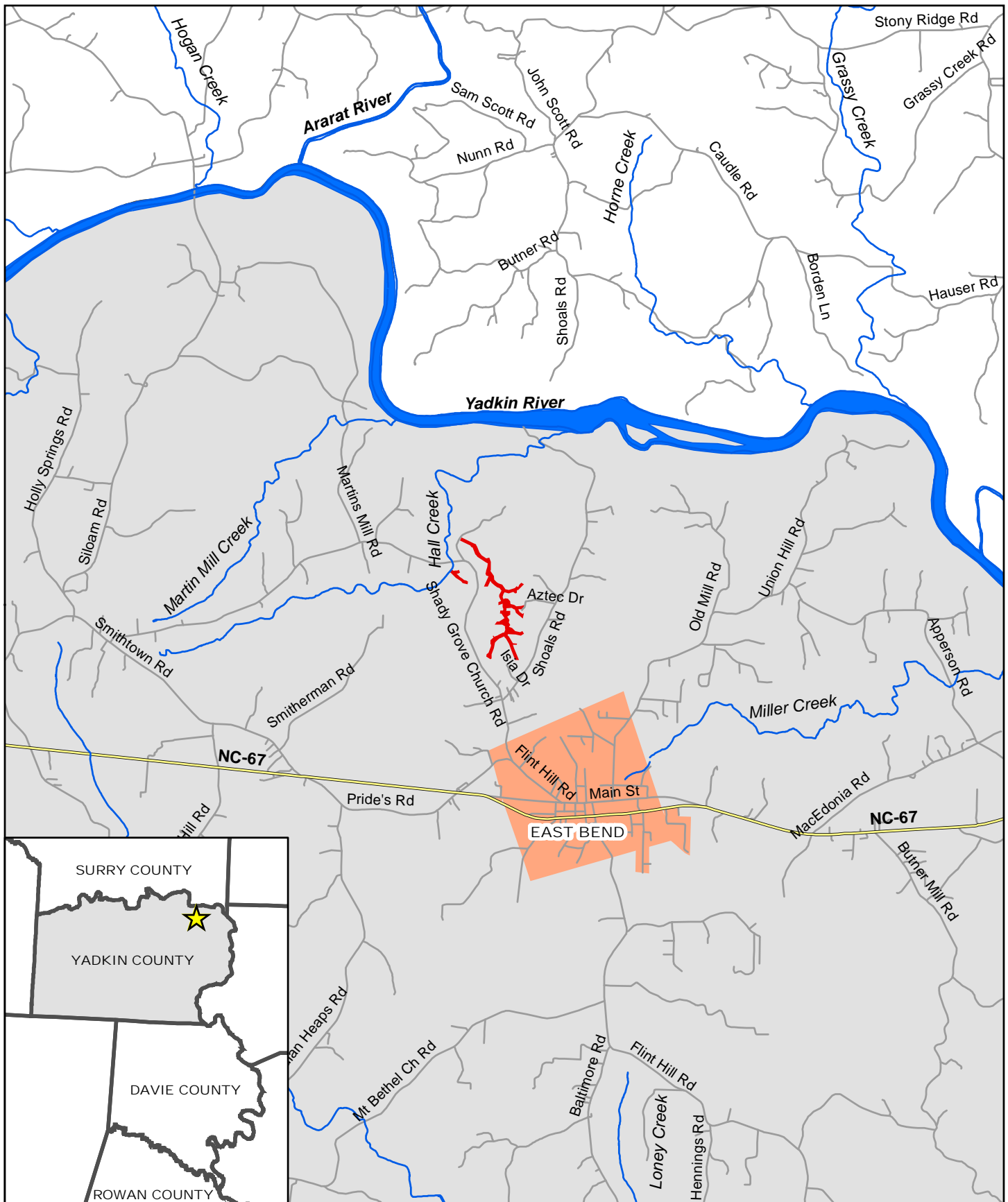
During 2020, the stream gauge on UTHC-1 recorded 10 bankful events, while the stream gauge on UTHC-3 recorded 5 bankful events. All three of the reaches being monitored for flow demonstrated more than 30 consecutive days of flow during 2020. The gauge on T1A recorded a maximum of 68 consecutive days, while the gauges on T5A and T8A both recorded a maximum of 152 consecutive days. These numbers would likely have been higher, but the stream gauges stopped recording on June 15, 2020 after their memories filled up. The gauge data was further backed up by the cameras on site. Based on the video recordings obtained from the cameras, T1A had a maximum of 44 consecutive days of flow, T5A had a maximum of 70 consecutive days of flow, and T8A had a maximum of 84 consecutive days of flow. These numbers also would likely have been higher, but the cameras were obscured by vegetation for the majority of the summer.

Overall the site is functioning as designed with no major problem areas or threats to project success identified during MY01. The few areas that were damaged by the heavy rains in 2020 are of limited extent and are being evaluated to determine if future repairs are necessary.



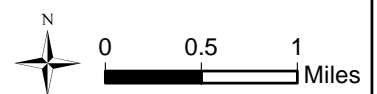
## **REFERENCES**

- NCDENR, Ecosystem Enhancement Program. 2009. Upper Yadkin Pee-Dee River Basin Restoration Priorities 2009. Raleigh, NC.  
[https://files.nc.gov/ncdeq/Mitigation%20Services/Watershed\\_Planning/Yadkin\\_River\\_Basin/2009%20Upper%20Yadkin%20RBRP\\_Final%20Final%2C%2026feb%2709.pdf](https://files.nc.gov/ncdeq/Mitigation%20Services/Watershed_Planning/Yadkin_River_Basin/2009%20Upper%20Yadkin%20RBRP_Final%20Final%2C%2026feb%2709.pdf)
- NCDEQ, Division of Mitigation Services. June 2017. “As-built Baseline Monitoring Report Format, Data and Content Requirement.”  
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- USACE, Sprecher, S. W.; Warne, A. G. 2000. “Accessing and Using Meteorological Data to Evaluate Wetland Hydrology.”  
<https://ntrl.ntis.gov/NTRL/dashboard/searchResults/titleDetail/ADA378910.xhtml>



**Figure 1. Vicinity Map, Mill Dam Creek, Yadkin County, NC**

- |  |  |   |
|--|--|---|
| <span style="color: red;">■</span> Project Easement    | <span style="color: blue;">—</span> Streams      | <span style="color: gray;">—</span> Roads           |
| <span style="color: orange;">■</span> Cities and Towns | <span style="color: blue;">—</span> Major Rivers | <span style="color: yellow;">—</span> State Highway |



# **APPENDIX A**

## Background Tables

Table 1. Project Components and Mitigation Credits Mill Dam Creek Restoration Site, DMS Project #97136										
Mitigation Credits										
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer		Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE	R	RE		
Linear Feet/Acres	7,166	6,340								
Credits	7,166.000	3,124.666								
TOTAL CREDITS	10,290.666									
Project Components										
Project Component -or- Reach ID	Stationing/ Location	Existing Footage/ Acreage	Restoration Footage or Acreage	Creditable Footage or Acreage	Restoration Level	Approach (PI, PII etc.)	Mitigation Ratio (X:1)	Mitigation Credits	Notes/Comments	
UTHC1 Top	10+00-22+81	1,333	1,281	1,249	R	P2 10+00-11+50, then P1	1	1,249.000	Crossing Exception STA 20+51 – 20+83	
UTHC1 Bottom	22+81-27+39	541	457	438	R	P1, then P2 24+50-27+39	1	438.000	Crossing Exception STA 25+72 – 25+91	
UTHC2	27+39-42+32	1,494	1,493	1,493	EI	N/A	1.5	995.333		
UTHC3	42+32-55+57	1,411	1,325	1,240	R	P1 except P2 42+32-44+00 and 53+50-55+57	1	1,240.000	Utility Exception STA54+07 – 54+49 Crossing Exception STA 55+14 – 55+57	
UTHC4-1	55+57-58+53	1,840	297	297	EI	N/A	1.5	198.000		
UTHC4-2	58+53-63+75		521	521	EII	N/A	2.5	208.400		
UTHC4-3	63+75-68+55		481	419	EI	N/A	1.5	279.333	Crossing Exception STA 63+75 -64+37	
UTHC4-4	68+55-73+97		542	497	EII	N/A	2.5	199.800	Utility Exception STA 68+55 – 69+00	
T1	100+00-107+51	764	751	734	R	P2 100+00-101+80, then P1	1	734.000	Crossing Exception STA 104+00-104+16	
T1A	150+00-157+95	746	795	795	R	P2	1	795.000		

Project Component -or- Reach ID	Stationing/ Location	Existing Footage/ Acreage	Restoration Footage or Acreage	Creditable Footage or Acreage	Restoration Level	Approach (PI, PII etc.)	Mitigation Ratio (X:1)	Mitigation Credits	Notes/Comments
T2-1	200+00-204+98	499	498	498	EII	N/A	2.5	199.200	
T2-2	204+98-207+63	232	265	265	R	P2	1	265.000	
T3	300+00-303+69	378	369	369	R	P1/P2	1	369.000	
T4	400+00-401+51	151	151	151	R	P1	1	151.000	
T5	1000+00-1012+13	1,205	1,213	1,182	EII	N/A	2.5	472.800	Crossing Exception STA 1003+59-1003+90
T5A	1200+00-1200+65	65	65	65	EII	N/A	2.5	26.000	
T5B	1300+00-1304+38	438	438	438	EII	N/A	2.5	175.200	
T6-1	600+00-603+22	325	322	259	EII	N/A	2.5	103.600	Crossing Exception STA 602+59 – 603+22
T6-2	603+22-609+80	621	658	658	R	P1	1	658.000	
T6A-1	650+00-650+60	60	60	60	EII	N/A	2.5	24.000	
T6A-2	650+60-651+61	97	101	101	R	P1	1	101.000	
T7-1	700+00-701+65	165	165	165	EII	N/A	2.5	66.000	
T7-2	701+65-705+13	335	348	348	R	P1	1	348.000	
T8-1	800+00-804+45	445	445	445	EII	N/A	2.5	178.000	
T8-2	804+45-808+94	486	448	426	R	P1	1	426.000	Crossing Exception STA 808+20 – 808+42
T8A	850+00-852+63	258	263	263	R	P1	1	263.000	
T9	900+00-901+29	133	129	129	R	P1, then P2 900+71-901+29	1	129.000	
<b>TOTAL</b>		<b>14,024</b>	<b>13,882</b>	<b>13,505</b>				<b>10,290.666</b>	

Component Summation					
Restoration Level	Stream (linear feet)	Riparian Wetlands (Acres)		Non-Riparian Wetlands (Acres)	Buffer (square feet)
		Riverine	Non-Riverine		
Restoration	7,166				
Enhancement					
Enhancement I	2,209				
Enhancement II	4,130				
Creation					
Preservation					
High Quality Preservation					

**Table 2. Project Activity & Reporting History**  
**Mill Dam Creek Restoration Site, DMS Project #97136**

Activity or Report	Data Collection Complete	Actual Completion or Delivery
Mitigation Plan		Dec. 7, 2018
Final Design - Construction Plans		Jan. 14, 2019
Construction Grading Completed		Dec. 12, 2019
Repairs from Storm Damage Completed		March 26, 2020
Planting Completed		March 26, 2020
Baseline Monitoring/Report		May 2020
Vegetation Monitoring	April 24, 2020	
Stream Survey	April 16, 2020	
Year 1 Monitoring		December 2020
Vegetation Monitoring	October 28, 2020	
Stream Survey	December 22, 2020	



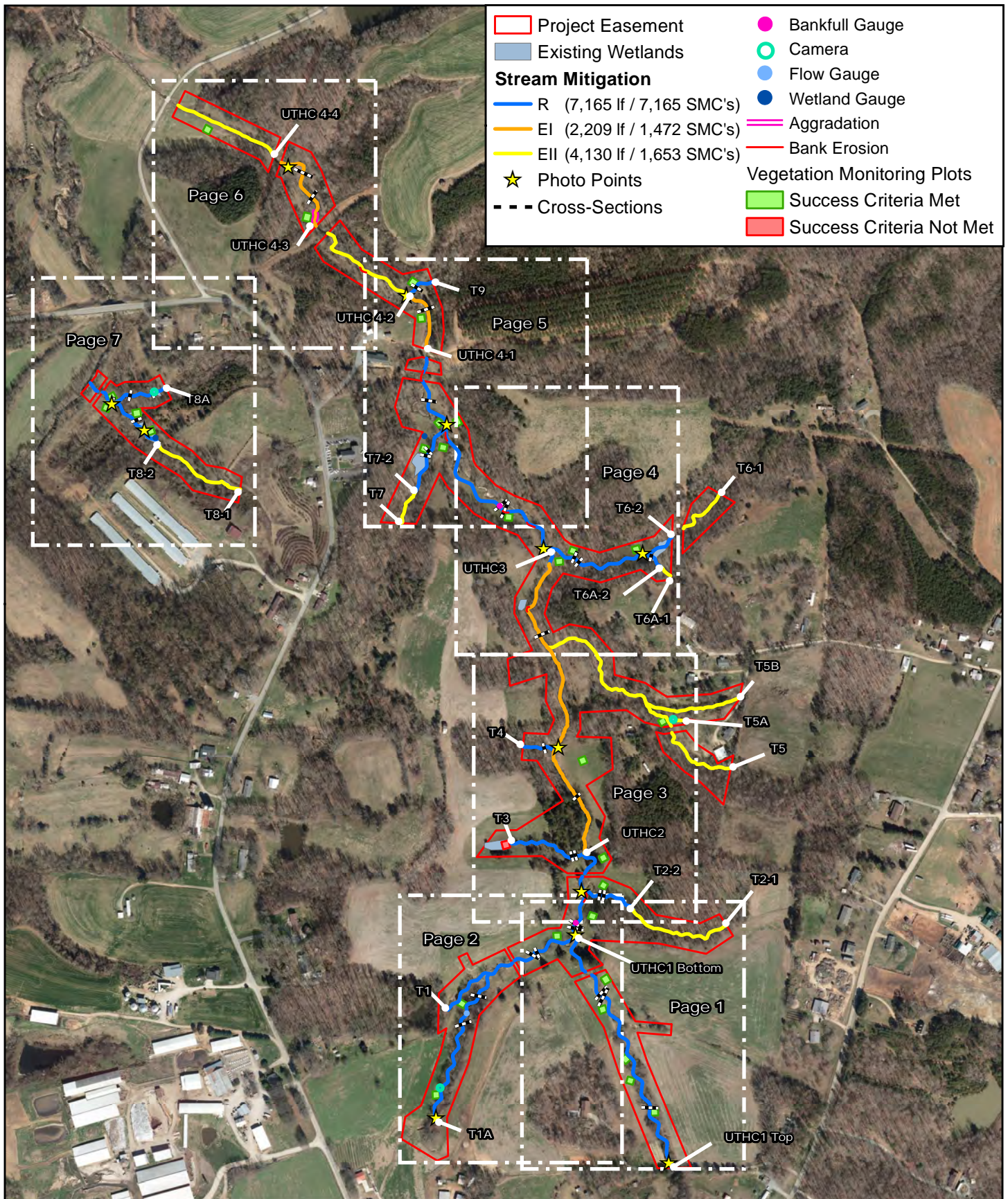
<b>Table 3. Project Contacts</b> <b>Mill Dam Creek Restoration Site, DMS Project #97136</b>	
<b>Design Firm</b>	KCI Associates of North Carolina 4505 Falls of Neuse Road Suite 400 Raleigh, NC 27609 Contact: Mr. Tim Morris Phone: (919) 278-2512 Fax: (919) 783-9266
<b>Construction Contractor</b>	Carolina Environmental Contracting, Inc. PO Box 1905 Mount Airy, NC 27030 Contact: Mr. Wayne Taylor Phone: (336)320-3849
<b>Planting Contractor</b>	Shenandoah Habitats 1983 Jefferson Highway Waynesboro, VA 22980 Contact: Mr. David Coleman Phone: (540) 941-0067
<b>Monitoring Performers</b>	
	KCI Associates of North Carolina 4505 Falls of Neuse Road Suite 400 Raleigh, NC 27609 Contact: Mr. Adam Spiller Phone: (919) 278-2514 Fax: (919) 783-9266

Table 4. Project Information			
Mill Dam Creek Restoration Site, DMS Project #97136			
Project Name	Mill Dam Creek Restoration Site		
County	Yadkin County		
Project Area	40.2 acres		
Project Coordinates (lat. and long.)	36.2390 °N, 80.5201°W		
Planted Acreage (acres of woody stems planted)	29.2 acres		
Project Watershed Summary Information			
Physiographic Province	Piedmont		
River Basin	Yadkin		
USGS Hydrologic Unit 8-digit	030401014	USGS Hydrologic Unit 14-digit	03010101110070
DWQ Sub-basin	03-07-02		
Project Drainage Area (acres)	400 acres		
Project Drainage Area Percentage of Impervious Area	3%		
CGIA Land Use Classification	Forest (45%), Pasture/Farmland (39%), Low-density Residential Development (15%), and Roads (1%)		
Existing Reach Summary Information			
Parameters	All Reaches Combined		
Length of reach (linear feet)	14,024		
Valley confinement	Partially confined to confined		
Drainage area (acres)	400 acres		
Perennial, Intermittent, Ephemeral	Intermittent – Perennial		
NCDWQ Water Quality Classification	C (Aquatic Life, Secondary Recreation)		
Rosgen Stream Classification (Existing / Proposed)	F4/G4/C4/B4		
Evolutionary trend (Simon)	Stage III		
FEMA classification	Zone AE at confluence of T8 and Hall Creek, otherwise none		
Existing Wetland Summary Information			
Parameters	WA, WB, WE, WG, WK	WC	WH, WI , WJ
Size of Wetland (acres)	0.23	0.10	0.10
Wetland Type	Riparian Non-riverine	Riparian Non-riverine	Riparian Non-riverine
Mapped Soil Series	Fairview	Fairview	Siloam
Drainage class	Well drained	Well drained	Well drained
Soil Hydric Status	Non-Hydric	Non-Hydric	Non-Hydric
Source of Hydrology	Groundwater	Groundwater	Groundwater
Restoration or Enhancement Method	N/A (Preservation)	Areas of erosion to stabilize	N/A (Preservation)
Regulatory Considerations			
Regulation	Applicable?	Resolved?	Supporting Documentation
Waters of the United States – Section 404	Yes	NWP 27	Preliminary JD
Waters of the United States – Section 401	Yes	NWP 27	Preliminary JD
Endangered Species Act	Yes	Yes	USFWS
Historic Preservation Act	No	Yes	NCSHPO
Coastal Zone Management Act (CZMA)/ Coastal Area Management Act (CAMA)	No	N/A	N/A
FEMA Floodplain Compliance	No	Yes	N/A
Essential Fisheries Habitat	No	N/A	N/A

# **APPENDIX B**

## Visual Assessment Data





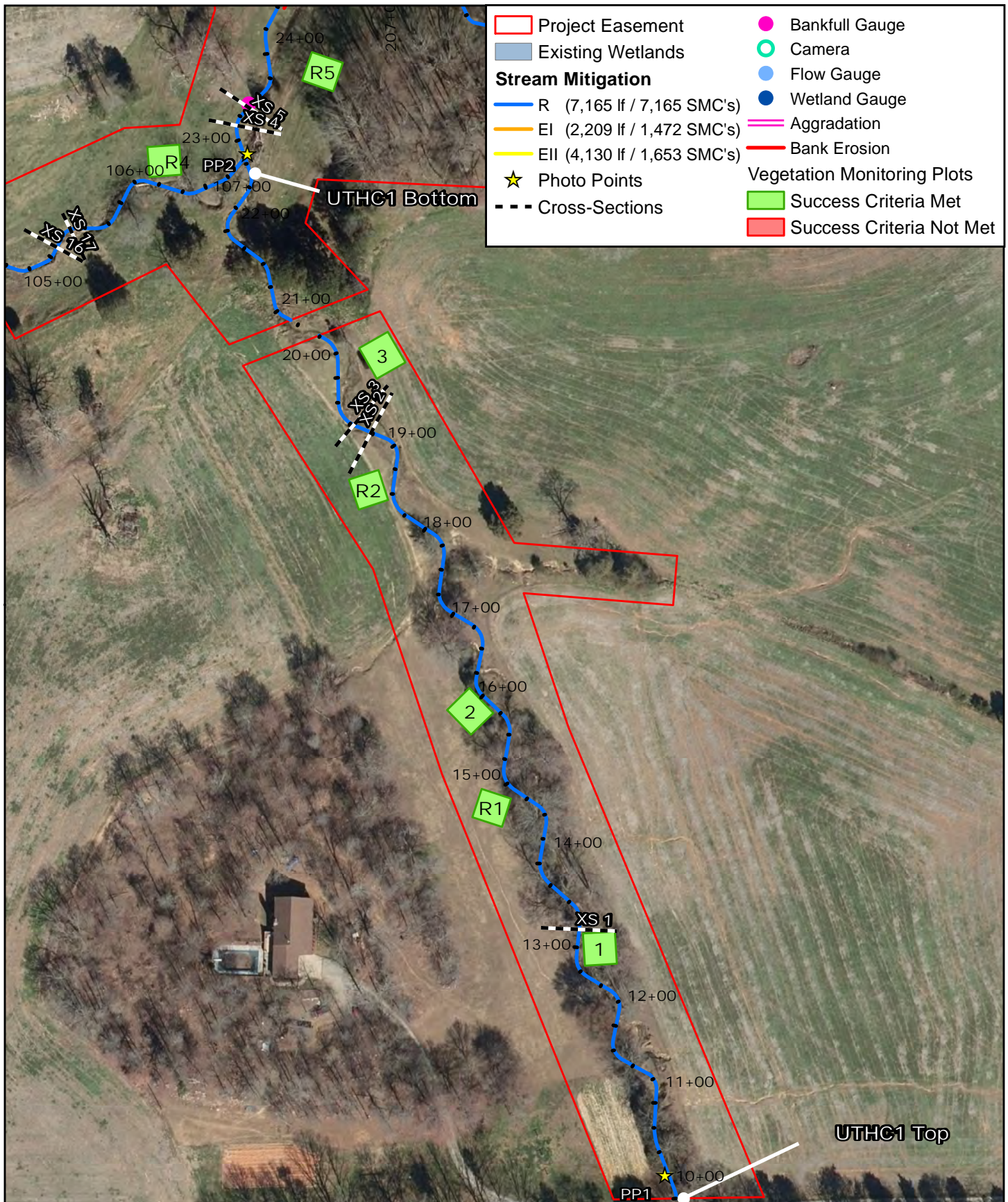
Current Conditions Plan View  
 Mill Dam Creek Restoration Site  
 DMS Project #97136  
 Yadkin County, NC  
 Overview Page



0 500 1,000  
 Feet

Image Source: NC OneMap Orthoimagery, 2015.





**Current Conditions Plan View**  
**Mill Dam Creek Restoration Site**  
**DMS Project #97136**  
**Yadkin County, NC**  
**Page 1**

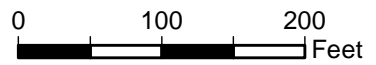
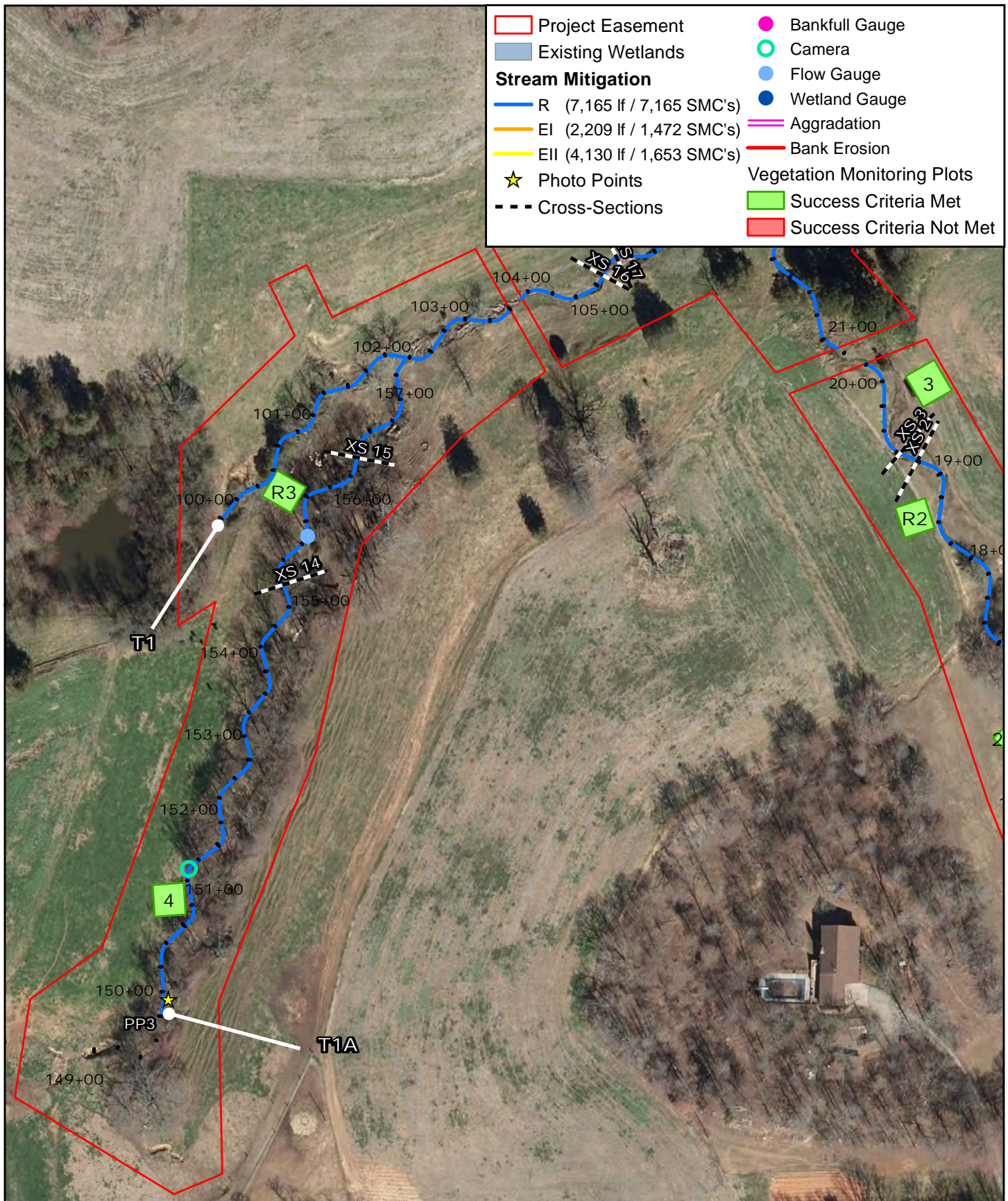


Image Source: NC OneMap Orthoimagery, 2015.





**Current Conditions Plan View**  
**Mill Dam Creek Restoration Site**  
**DMS Project #97136**  
**Yadkin County, NC**  
**Page 2**



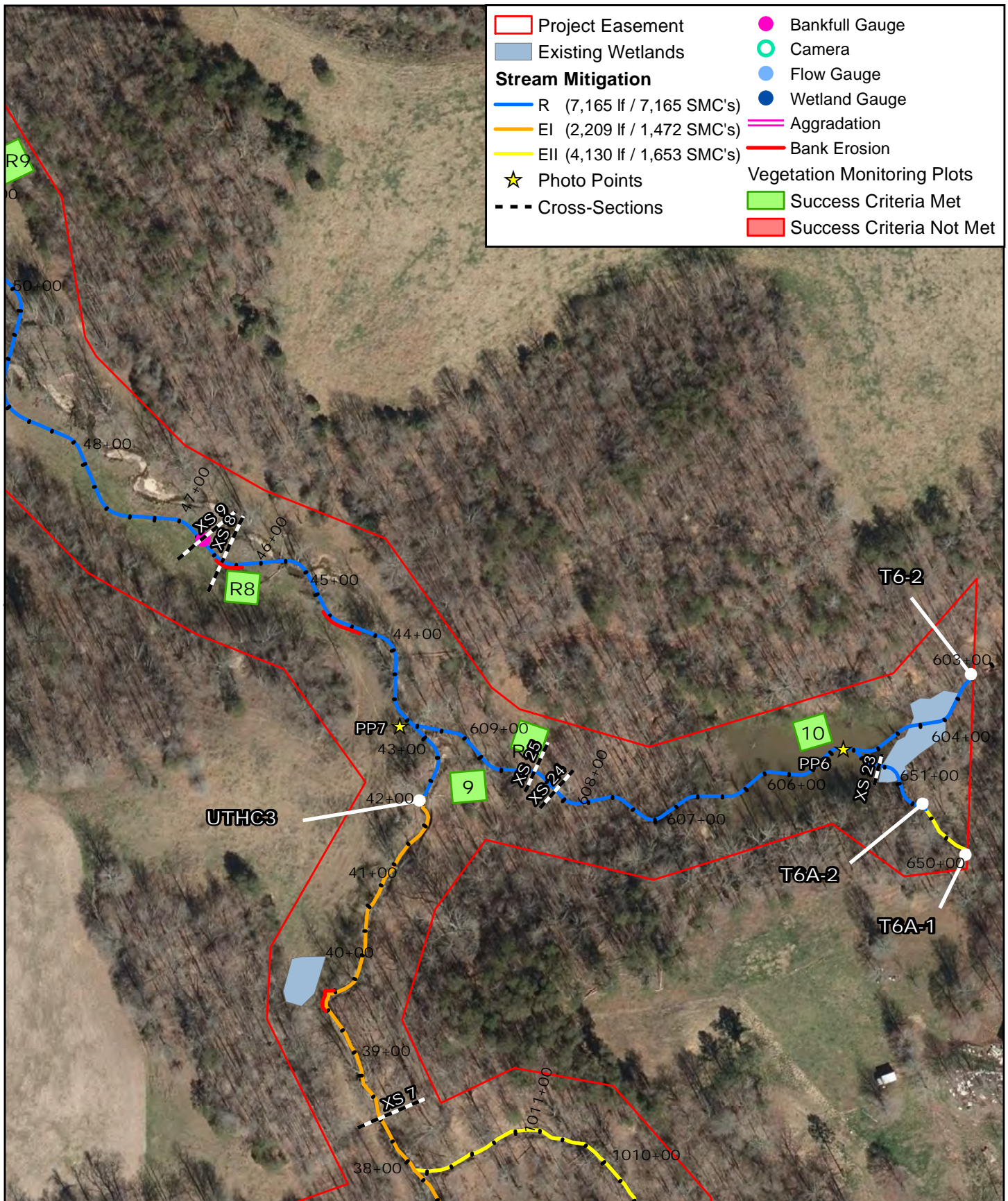
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Image Source: NC OneMap Orthoimagery, 2015.









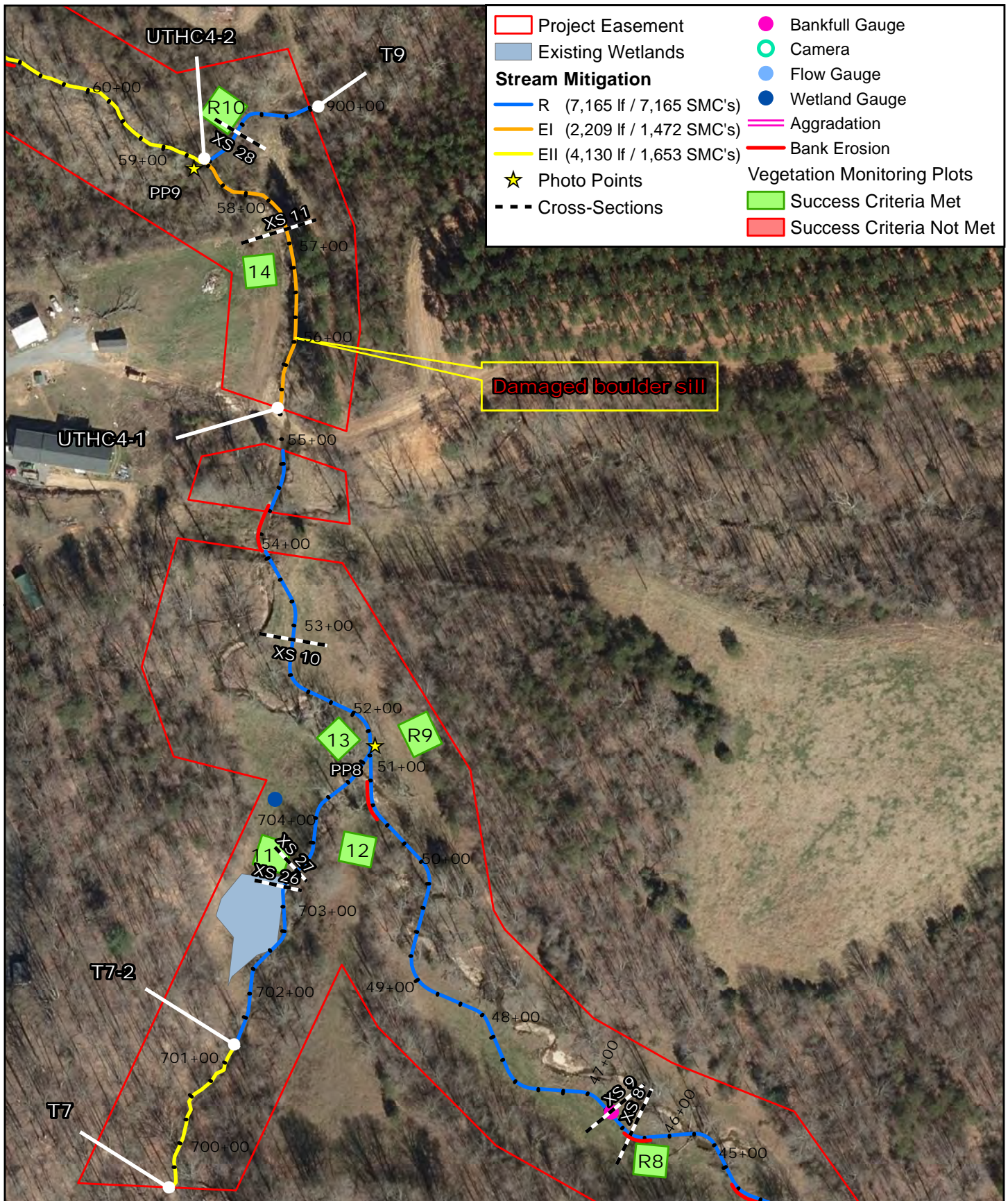
**Current Conditions Plan View**  
**Mill Dam Creek Restoration Site**  
**DMS Project #97136**  
**Yadkin County, NC**  
**Page 4**



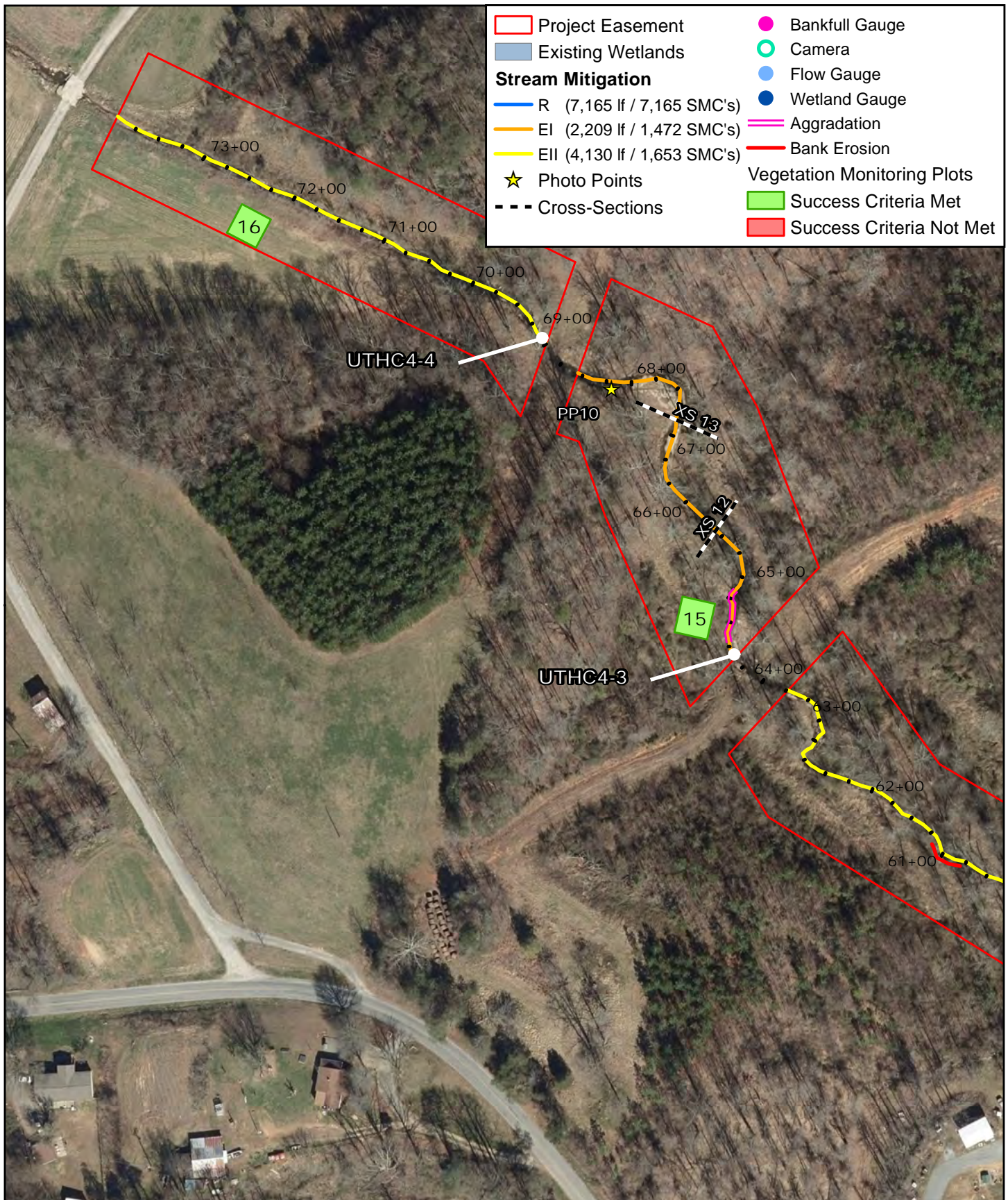
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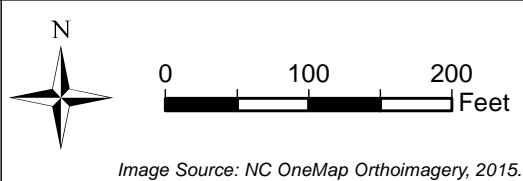




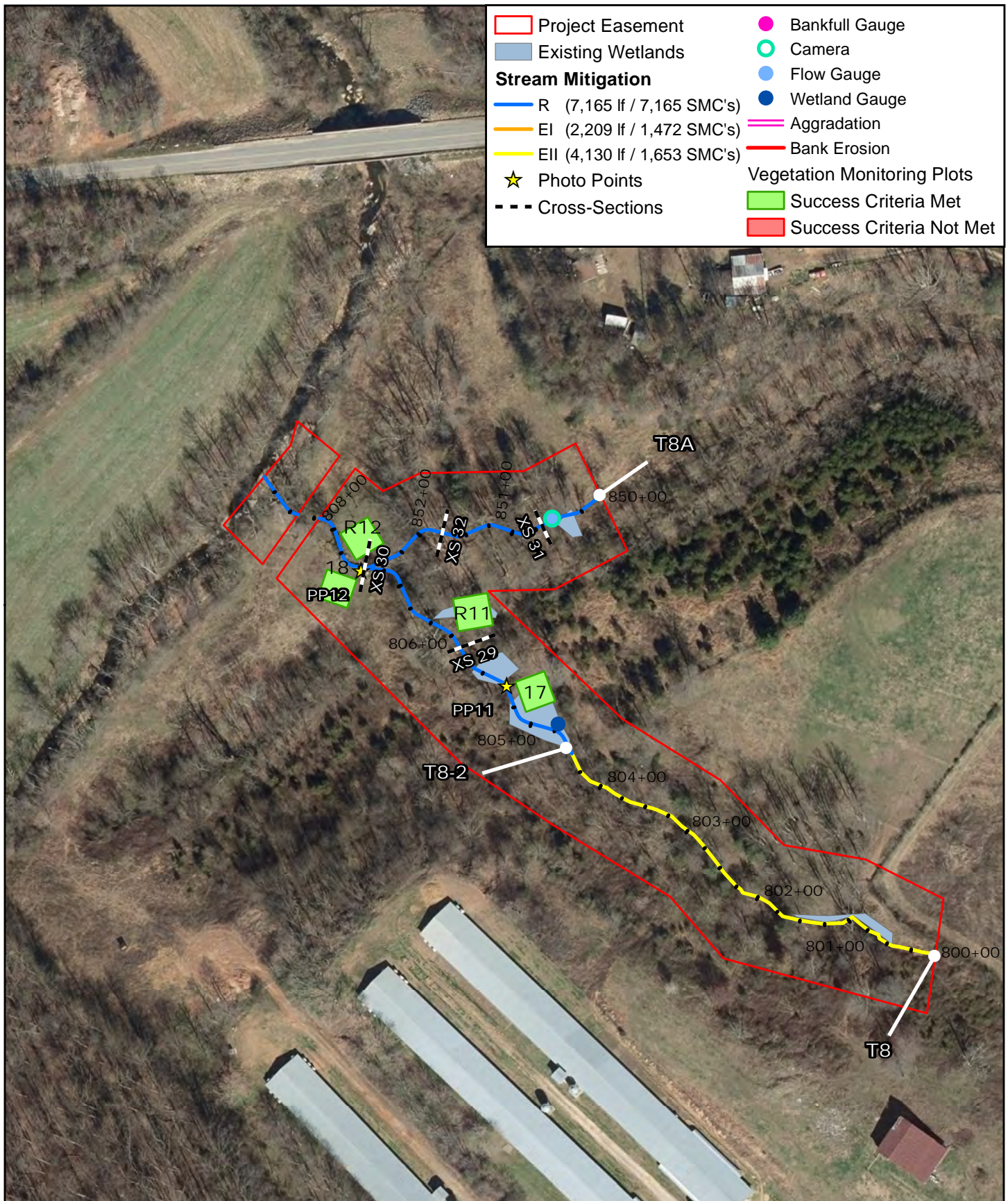




**Current Conditions Plan View**  
**Mill Dam Creek Restoration Site**  
**DMS Project #97136**  
**Yadkin County, NC**  
**Page 6**







**Current Conditions Plan View**  
**Mill Dam Creek Restoration Site**  
**DMS Project #97136**  
**Yadkin County, NC**  
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0 100 200 Feet

Image Source: NC OneMap Orthoimagery, 2015.

Table 5 Visual Stream Morphology Stability Assessment

Mill Dam Creek Stream Restoration Site, DMS Project #97136

Reach ID UTHC1

Assessed Length 1,739

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
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	30	30		100%	
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	29	29		100%	
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	29	29		100%	
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	29	29		100%	
		2. Thalweg centering at downstream of meander (Glide)	29	29		100%	
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			1	50	99%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%
Totals					1	50	99%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	22	22		100%	
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	22	22		100%	
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	22	22		100%	
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	22	22		100%	
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	22	22		100%	



Table 5 Visual Stream Morphology Stability Assessment

Mill Dam Creek Stream Restoration Site, DMS Project #97136

Reach ID UTHC2

Assessed Length 1,494

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
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	8	8		100%	
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	8	8		100%	
		2. <u>Length</u> 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 (Glide)	8	8		100%	
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			1	31	99%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%
Totals					1	31	99%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	0	0			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	0	0			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	0	0			
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	0	0			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	0	0			

Table 5 Visual Stream Morphology Stability Assessment

Mill Dam Creek Stream Restoration Site, DMS Project #97136

Reach ID UTHC3

Assessed Length 1,325

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
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	18	18		100%	
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	17	17		100%	
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	17	17		100%	
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	17	17		100%	
		2. Thalweg centering at downstream of meander (Glide)	17	17		100%	
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			4	161	94%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%
Totals					4	161	94%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	8	8		100%	
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	8	8		100%	
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	8	8		100%	
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	8	8		100%	
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	8	8		100%	

Table 5 Visual Stream Morphology Stability Assessment

Mill Dam Creek Stream Restoration Site, DMS Project #97136

Reach ID UTHC4-1

Assessed Length 297

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
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	3	3		100%	
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	3	3		100%	
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	3	3		100%	
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	3	3		100%	
		2. Thalweg centering at downstream of meander (Glide)	3	3		100%	
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%
Totals					0	0	100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	1	2		50%	
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	1	2		50%	
	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 <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	2	2		100%	
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	2	2		100%	

Table 5 Visual Stream Morphology Stability Assessment

Mill Dam Creek Stream Restoration Site, DMS Project #97136

Reach ID UTHC4-3

Assessed Length 419

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
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			1	56	87%
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	4	4			100%
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	3	3			100%
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	3	3			100%
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	3	3			100%
		2. Thalweg centering at downstream of meander (Glide)	3	3	100%		
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%
Totals					0	0	100%
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 <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	1	1			100%
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	1	1			100%

Table 5 Visual Stream Morphology Stability Assessment

Mill Dam Creek Stream Restoration Site, DMS Project #97136

Reach ID T1

Assessed Length 751

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
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	16	16		100%	
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	16	16		100%	
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	16	16		100%	
	4.Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	16	16		100%	
		2. Thalweg centering at downstream of meander (Glide)	16	16		100%	
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%
Totals					0	0	100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	8	8		100%	
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	8	8		100%	
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	8	8		100%	
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	8	8		100%	
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	8	8		100%	

Table 5 Visual Stream Morphology Stability Assessment

Mill Dam Creek Stream Restoration Site, DMS Project #97136

Reach ID T1A

Assessed Length 795

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
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	16	16		100%	
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	16	16		100%	
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	16	16		100%	
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	16	16		100%	
		2. Thalweg centering at downstream of meander (Glide)	16	16		100%	
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%
Totals					0	0	100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	11	11		100%	
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	11	11		100%	
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	11	11		100%	
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	11	11		100%	
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	11	11		100%	

Table 5 Visual Stream Morphology Stability Assessment

Mill Dam Creek Stream Restoration Site, DMS Project #97136

Reach ID T2-2

Assessed Length 265

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
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	8	8		100%	
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	7	7		100%	
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	7	7		100%	
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	7	7		100%	
		2. Thalweg centering at downstream of meander (Glide)	7	7		100%	
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <b>NOT</b> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%
Totals					0	0	100%
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 <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	5	5		100%	
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	5	5		100%	

Table 5 Visual Stream Morphology Stability Assessment

Mill Dam Creek Stream Restoration Site, DMS Project #97136

Reach ID T3

Assessed Length 369

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
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	13	13		100%	
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	12	12		100%	
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	12	12		100%	
	4.Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	12	12		100%	
		2. Thalweg centering at downstream of meander (Glide)	12	12		100%	
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%
Totals					0	0	100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	14	14		100%	
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	14	14		100%	
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	14	14		100%	
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	14	14		100%	
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	14	14		100%	



Table 5 Visual Stream Morphology Stability Assessment

Mill Dam Creek Stream Restoration Site, DMS Project #97136

Reach ID T4

Assessed Length 151

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
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	7	7		100%	
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	7	7		100%	
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	7	7		100%	
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	7	7		100%	
		2. Thalweg centering at downstream of meander (Glide)	7	7		100%	
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%
Totals					0	0	100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	6	6		100%	
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	6	6		100%	
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	6	6		100%	
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	6	6		100%	
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	6	6		100%	

Table 5 Visual Stream Morphology Stability Assessment

Mill Dam Creek Stream Restoration Site, DMS Project #97136

Reach ID T6-2

Assessed Length 658

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
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	15	15		100%	
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	15	15		100%	
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	15	15		100%	
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	15	15		100%	
		2. Thalweg centering at downstream of meander (Glide)	15	15		100%	
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <b>NOT</b> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%
Totals					0	0	100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	16	16		100%	
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	16	16		100%	
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	16	16		100%	
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	16	16		100%	
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	16	16		100%	

Table 5 Visual Stream Morphology Stability Assessment

Mill Dam Creek Stream Restoration Site, DMS Project #97136

Reach ID T6A-2

Assessed Length 101

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
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	3	3		100%	
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	3	3		100%	
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	3	3		100%	
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	3	3		100%	
		2. Thalweg centering at downstream of meander (Glide)	3	3		100%	
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%
Totals					0	0	100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	6	6		100%	
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	6	6		100%	
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	6	6		100%	
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	6	6		100%	
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	6	6		100%	

Table 5 Visual Stream Morphology Stability Assessment

Mill Dam Creek Stream Restoration Site, DMS Project #97136

Reach ID T7-2

Assessed Length 348

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
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	6	6		100%	
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	6	6		100%	
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	6	6		100%	
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	6	6		100%	
		2. Thalweg centering at downstream of meander (Glide)	6	6		100%	
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <b>NOT</b> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%
Totals					0	0	100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	4	4		100%	
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	4	4		100%	
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	4	4		100%	
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	4	4		100%	
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	4	4		100%	

Table 5 Visual Stream Morphology Stability Assessment

Mill Dam Creek Stream Restoration Site, DMS Project #97136

Reach ID T8-2

Assessed Length 448

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
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	10	10		100%	
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	10	10		100%	
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	10	10		100%	
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	10	10		100%	
		2. Thalweg centering at downstream of meander (Glide)	10	10		100%	
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%
Totals					0	0	100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	12	12		100%	
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	12	12		100%	
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	12	12		100%	
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	12	12		100%	
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	12	12		100%	

Table 5 Visual Stream Morphology Stability Assessment

Mill Dam Creek Stream Restoration Site, DMS Project #97136

Reach ID T8A

Assessed Length 262

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
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	7	7			100%
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	7	7			100%
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	7	7			100%
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	7	7			100%
		2. Thalweg centering at downstream of meander (Glide)	7	7			100%
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <b>NOT</b> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%
Totals					0	0	100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	7	7			100%
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	7	7			100%
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	7	7			100%
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	7	7			100%
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	7	7			100%

Table 5 Visual Stream Morphology Stability Assessment

Mill Dam Creek Stream Restoration Site, DMS Project #97136

Reach ID T9

Assessed Length 129

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
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	4	4			100%
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	3	3			100%
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	3	3			100%
	4.Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	3	3			100%
		2. Thalweg centering at downstream of meander (Glide)	3	3			100%
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%
Totals					0	0	100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	4	4			100%
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	4	4			100%
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	4	4			100%
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	4	4			100%
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	4	4			100%

**Table 6** **Vegetation Condition Assessment**

**Mill Dam Creek Stream Restoration Site, DMS Project # 97136**

**Planted Acreage 29.5**

<b>Vegetation Category</b>	<b>Definitions</b>	<b>Mapping Threshold</b>	<b>CCPV Depiction</b>	<b>Number of Polygons</b>	<b>Combined Acreage</b>	<b>% of Planted Acreage</b>
<b>1. Bare Areas</b>	Very limited cover of both woody and herbaceous material.	0.1 acres	Pattern and Color	0	0.00	0.0%
<b>2. Low Stem Density Areas</b>	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Pattern and Color	0	0.00	0.0%
<b>Total</b>				<b>0</b>	<b>0.00</b>	<b>0.0%</b>
<b>3. Areas of Poor Growth Rates or Vigor</b>	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	Pattern and Color	0	0.00	0.0%
<b>Cumulative Total</b>				<b>0</b>	<b>0.00</b>	<b>0.0%</b>
<b>Easement Acreage</b>	<b>20.6</b>					
<b>Vegetation Category</b>	<b>Definitions</b>	<b>Mapping Threshold</b>	<b>CCPV Depiction</b>	<b>Number of Polygons</b>	<b>Combined Acreage</b>	<b>% of Easement Acreage</b>
<b>4. Invasive Areas of Concern</b>	Areas or points (if too small to render as polygons at map scale).	1000 SF	Pattern and Color	0	0.00	0.0%
<b>5. Easement Encroachment Areas</b>	Areas or points (if too small to render as polygons at map scale).	none	Pattern and Color	0	0.00	0.0%



## Photo Reference Photos



PP1 – MY00 – 4/17/20



PP1 – MY01 – 12/17/20



PP2 – MY00 – 4/17/20



PP2 – MY01 – 12/17/20



PP3 – MY00 – 4/17/20



PP3 – MY01 – 12/17/20





PP4 – MY00 – 4/17/20



PP4 – MY01 – 12/17/20



PP5 – MY00 – 4/17/20



PP5 – MY01 – 12/17/20



PP6 – MY00 – 4/16/20



PP6 – MY01 – 12/18/20





PP7 – MY00 – 4/16/20



PP7 – MY01 – 12/18/20



PP8 – MY00 – 4/16/20



PP8 – MY01 – 12/18/20

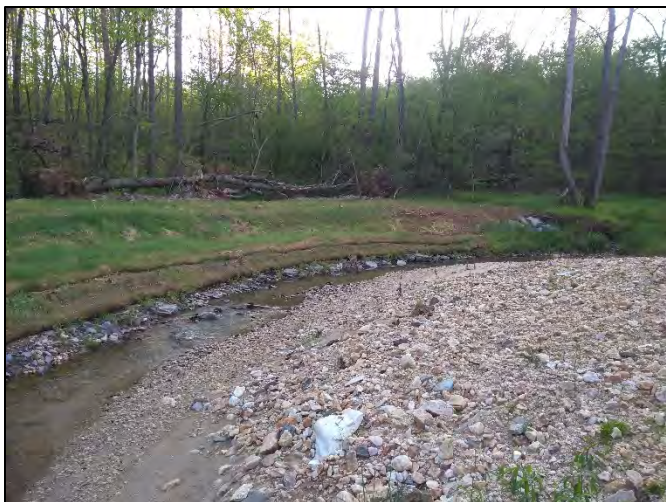


PP9 – MY00 – 4/17/20



PP9 – MY01 – 12/18/20

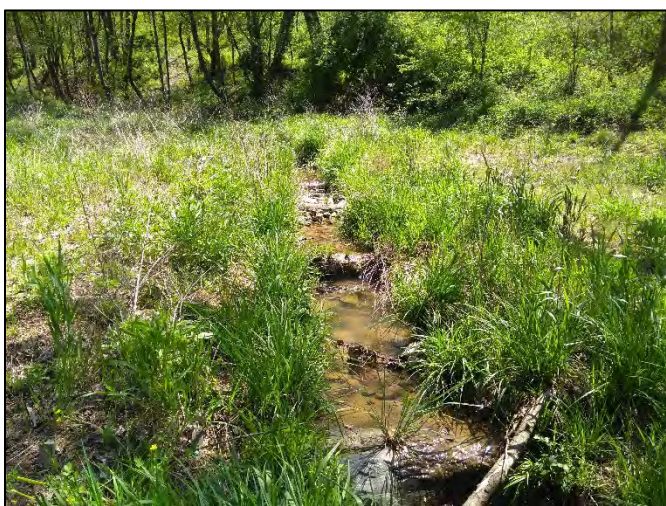




PP10 – MY00 – 4/17/20



PP10 – MY01 – 12/18/20



PP11 – MY00 – 4/16/20



PP11 – MY01 – 12/18/20



PP12 – MY00 – 4/16/20



PP12 – MY01 – 12/18/20



## Vegetation Monitoring Plot Photos



Vegetation Plot 1 – MY01 – 10/28/20



Vegetation Plot 2 – MY01 – 10/28/20



Vegetation Plot 3 – MY01 – 10/28/20



Vegetation Plot 4 – MY01 – 10/27/20



Vegetation Plot 5 – MY01 – 10/27/20



Vegetation Plot 6 – MY01 - 10/27/20





Vegetation Plot 7 – MY01 – 10/27/20



Vegetation Plot 8 – MY01 – 10/27/20



Vegetation Plot 9 – MY01 – 10/26/20



Vegetation Plot 10 – MY01 – 10/26/20



Vegetation Plot 11 – MY01 – 10/26/20



Vegetation Plot 12 – MY01 – 10/26/20





Vegetation Plot 13 – MY00 – 10/26/20



Vegetation Plot 14 – MY01 – 10/27/20



Vegetation Plot 15 – MY01 – 10/26/20



Vegetation Plot 16 – MY01 – 10/26/20



Vegetation Plot 17 – MY01 – 10/27/20



Vegetation Plot 18 – MY01 – 10/27/20





Vegetation Plot R1 – MY01 – 10/28/20



Vegetation Plot R2 – MY01 – 10/28/20



Vegetation Plot R3 – MY01 – 10/27/20



Vegetation Plot R4 – MY01 – 10/27/20



Vegetation Plot R5 – MY01 – 10/27/20



Vegetation Plot R6 – MY01 – 10/27/20





Vegetation Plot R7 – MY01 – 10/26/20



Vegetation Plot R8 – MY01 – 10/26/20



Vegetation Plot R9 – MY01 – 10/26/20



Vegetation Plot R10 – MY01 – 10/26/20



Vegetation Plot R11 – MY01 – 10/27/20



Vegetation Plot R12 – MY01 – 10/27/20



## Problem Area Photos



Outer bend erosion, Sta 39+50, 12/18/20



Outer bend erosion, Sta 46+25, 12/18/20



Outer bend erosion, Sta 50+75, 12/18/20



Outer bend erosion, Sta 54+25, 12/18/20



Damaged boulder sill, Sta 55+60, 12/18/20



Outer bend erosion, Sta 61+00, 12/18/20



# **APPENDIX C**

## **Vegetation Plot Data**

Table 7. Stem Count by Plot and Species Mill Dam Creek Restoration Site, DMS Project #97136														
Species	Current Plot Data (MY01 2020)													
	Plot 01		Plot 02		Plot 03		Plot 04		Plot 05		Plot 06		Plot 07	
	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
American Holly ( <i>Ilex opaca</i> )														
American Hornbeam ( <i>Carpinus caroliniana</i> )														
American Sycamore ( <i>Platanus occidentalis</i> )	2	2	5	5	2	2	6	6	2	2	1	1	1	1
Black Walnut ( <i>Juglans nigra</i> )						2								
Black Willow ( <i>Salix nigra</i> )														
Boxelder ( <i>Acer negundo</i> )				1										
Eastern Red Cedar ( <i>Juniperus virginiana</i> )														
Elderberry ( <i>Sambucus canadensis</i> )														
Northern Red Oak ( <i>Quercus rubra</i> )														
Oak ( <i>Quercus sp.</i> )														
Persimmon ( <i>Diospyros virginiana</i> )														
Pin Oak ( <i>Quercus palustris</i> )													11	11
Red Maple ( <i>Acer rubrum</i> )														
River Birch ( <i>Betula nigra</i> )	6	6	5	5	2	2	5	5	4	4	1	1	5	5
Southern Red Oak ( <i>Quercus falcata</i> )														
Swamp Chestnut Oak ( <i>Quercus michauxii</i> )			1	1	1	1	1	1					1	1
Tulip Poplar ( <i>Liriodendron tulipifera</i> )	1	1			4	5	4	4	4	4			2	2
White Oak ( <i>Quercus alba</i> )													1	1
Willow Oak ( <i>Quercus phellos</i> )	8	8	11	11	8	8	5	5	11	11	1	1	3	3
Unknown														
<b>Stem count</b>	17	17	22	23	17	20	21	21	21	21	3	3	24	24
<b>size (ares)</b>	1		1		1		1		1		1		1	
<b>size (ACRES)</b>	0.025		0.025		0.025		0.025		0.025		0.025		0.025	
<b>Species count</b>	4	4	4	5	5	6	5	5	4	4	3	3	7	7
<b>Stems per ACRE</b>	688	688	890	931	688	809	850	850	850	850	121	121	971	971

Species	Current Plot Data (MY01 2020)													
	Plot 08		Plot 09		Plot 10		Plot 11		Plot 12		Plot 13		Plot 14	
	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
American Holly ( <i>Ilex opaca</i> )														
American Hornbeam ( <i>Carpinus caroliniana</i> )														
American Sycamore ( <i>Platanus occidentalis</i> )	2	26		6	6	6	2	2		2		5	5	5
Black Walnut ( <i>Juglans nigra</i> )												1		
Black Willow ( <i>Salix nigra</i> )							2	2			3	3		
Boxelder ( <i>Acer negundo</i> )		1												
Eastern Red Cedar ( <i>Juniperus virginiana</i> )														
Elderberry ( <i>Sambucus canadensis</i> )		1					1							
Northern Red Oak ( <i>Quercus rubra</i> )		1												
Oak ( <i>Quercus</i> sp.)														
Persimmon ( <i>Diospyros virginiana</i> )														
Pin Oak ( <i>Quercus palustris</i> )			2	2			1	1			5	5		
Red Maple ( <i>Acer rubrum</i> )		1												
River Birch ( <i>Betula nigra</i> )	1	2	5	5	8	8						1		
Southern Red Oak ( <i>Quercus falcata</i> )										5				
Swamp Chestnut Oak ( <i>Quercus michauxii</i> )														
Tulip Poplar ( <i>Liriodendron tulipifera</i> )	10	11	2	2	1	1	5	5	8	13	4	5	6	6
White Oak ( <i>Quercus alba</i> )			2	2					5	7	2	2		
Willow Oak ( <i>Quercus phellos</i> )	8	8	7	7	4	4	5	5	8	11	8	8	20	20
Unknown														
<b>Stem count</b>	21	51	18	24	19	19	15	16	21	38	22	30	31	31
<b>size (ares)</b>	1		1		1		1		1		1		1	
<b>size (ACRES)</b>	0.025		0.025		0.025		0.025		0.025		0.025		0.025	
<b>Species count</b>	4	8	5	6	4	4	5	6	3	5	5	8	3	3
<b>Stems per ACRE</b>	850	2,064	728	971	769	769	607	647	850	1,538	890	1,214	1,255	1,255

Table 7. Stem Count by Plot and Species Mill Dam Creek Restoration Site, DMS Project #97136														
Species	Current Plot Data (MY01 2020)													
	Plot 15		Plot 16		Plot 17		Plot 18		Plot R1		Plot R2		Plot R3	
	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
American Holly ( <i>Ilex opaca</i> )														
American Hornbeam ( <i>Carpinus caroliniana</i> )														
American Sycamore ( <i>Platanus occidentalis</i> )	9	9			2	2	11	22	6	6	4	4	4	4
Black Walnut ( <i>Juglans nigra</i> )		1						2						
Black Willow ( <i>Salix nigra</i> )														
Boxelder ( <i>Acer negundo</i> )								6		1				
Eastern Red Cedar ( <i>Juniperus virginiana</i> )														
Elderberry ( <i>Sambucus canadensis</i> )														
Northern Red Oak ( <i>Quercus rubra</i> )														
Oak ( <i>Quercus sp.</i> )														
Persimmon ( <i>Diospyros virginiana</i> )														
Pin Oak ( <i>Quercus palustris</i> )														
Red Maple ( <i>Acer rubrum</i> )										1				
River Birch ( <i>Betula nigra</i> )	8	8	9	9					4	4	3	3	2	2
Southern Red Oak ( <i>Quercus falcata</i> )														
Swamp Chestnut Oak ( <i>Quercus michauxii</i> )	2	2	1	1							1	1	4	4
Tulip Poplar ( <i>Liriodendron tulipifera</i> )	3	3	1	1	1	1	5	7	1	1	2	2	2	2
White Oak ( <i>Quercus alba</i> )														
Willow Oak ( <i>Quercus phellos</i> )	10	10	10	10	8	8	14	14	6	6	4	4	8	8
Unknown														
<b>Stem count</b>	32	33	21	21	11	11	30	51	17	19	14	14	20	20
<b>size (ares)</b>	1		1		1		1		1		1		1	
<b>size (ACRES)</b>	0.025		0.025		0.025		0.025		0.025		0.025		0.025	
<b>Species count</b>	5	6	4	4	3	3	3	5	4	6	5	5	5	5
<b>Stems per ACRE</b>	1,295	1,335	850	850	445	445	1,214	2,064	688	769	567	567	809	809



Table 7. Stem Count by Plot and Species Mill Dam Creek Restoration Site, DMS Project #97136														
Species	Current Plot Data (MY01 2020)													
	Plot R4		Plot R5		Plot R6		Plot R7		Plot R8		Plot R9		Plot R10	
	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
American Holly ( <i>Ilex opaca</i> )														
American Hornbeam ( <i>Carpinus caroliniana</i> )														1
American Sycamore ( <i>Platanus occidentalis</i> )	13	13	1	1	4	4	42	42	1	1	6	6		
Black Walnut ( <i>Juglans nigra</i> )														
Black Willow ( <i>Salix nigra</i> )													9	9
Boxelder ( <i>Acer negundo</i> )														
Eastern Red Cedar ( <i>Juniperus virginiana</i> )														
Elderberry ( <i>Sambucus canadensis</i> )														
Northern Red Oak ( <i>Quercus rubra</i> )														
Oak ( <i>Quercus sp.</i> )														
Persimmon ( <i>Diospyros virginiana</i> )														
Pin Oak ( <i>Quercus palustris</i> )									1	1				
Red Maple ( <i>Acer rubrum</i> )				5										1
River Birch ( <i>Betula nigra</i> )			3	3	2	2	3	3			4	4	1	1
Southern Red Oak ( <i>Quercus falcata</i> )														
Swamp Chestnut Oak ( <i>Quercus michauxii</i> )			1	1	1	1	1	1						
Tulip Poplar ( <i>Liriodendron tulipifera</i> )	6	6	10	10	4	4	1	1			1	1	4	4
White Oak ( <i>Quercus alba</i> )														
Willow Oak ( <i>Quercus phellos</i> )	6	6	2	2	7	7	6	6	5	5	7	7	6	6
Unknown														
<b>Stem count</b>	25	25	17	22	18	18	53	53	7	7	18	18	20	22
<b>size (ares)</b>	1		1		1		1		1		1		1	
<b>size (ACRES)</b>	0.025		0.025		0.025		0.025		0.025		0.025		0.025	
<b>Species count</b>	3	3	5	6	5	5	5	5	3	3	4	4	4	6
<b>Stems per ACRE</b>	1,012	1,012	688	890	728	728	2,145	2,145	283	283	728	728	809	890

Table 7. Stem Count by Plot and Species Mill Dam Creek Restoration Site, DMS Project #97136								
Species	Current Plot Data (MY01 2020)				Annual Means			
	Plot R11		Plot R12		MY01 (2020)		MY00 (2020)	
	Planted	Total	Planted	Total	Planted	Total	Planted	Total
American Holly ( <i>Ilex opaca</i> )		1				1		
American Hornbeam ( <i>Carpinus caroliniana</i> )		1				2		
American Sycamore ( <i>Platanus occidentalis</i> )	4	4	18	18	159	207	88	88
Black Walnut ( <i>Juglans nigra</i> )						6		4
Black Willow ( <i>Salix nigra</i> )					14	14	5	5
Boxelder ( <i>Acer negundo</i> )		7		4		20		
Eastern Red Cedar ( <i>Juniperus virginiana</i> )		1				1		
Elderberry ( <i>Sambucus canadensis</i> )						2		
Northern Red Oak ( <i>Quercus rubra</i> )						1		1
Oak ( <i>Quercus sp.</i> )							206	206
Persimmon ( <i>Diospyros virginiana</i> )			7	7			1	1
Pin Oak ( <i>Quercus palustris</i> )					20	20		
Red Maple ( <i>Acer rubrum</i> )						8		
River Birch ( <i>Betula nigra</i> )	2	2			83	85	107	107
Southern Red Oak ( <i>Quercus falcata</i> )						5		
Swamp Chestnut Oak ( <i>Quercus michauxii</i> )					15	15	20	20
Tulip Poplar ( <i>Liriodendron tulipifera</i> )	1	1	6	6	99	109	172	172
White Oak ( <i>Quercus alba</i> )					10	12		
Willow Oak ( <i>Quercus phellos</i> )	4	4	10	10	220	223	30	30
Unknown							89	89
<b>Stem count</b>	11	21	41	45	620	731	718	723
<b>size (ares)</b>	1		1		30		30	
<b>size (ACRES)</b>	0.025		0.025		0.741		0.741	
<b>Species count</b>	4	8	4	5	8	17	9	11
<b>Stems per ACRE</b>	445	850	1,659	1,821	836	986	969	975

# **APPENDIX D**

## **Stream Measurement and Geomorphology Data**

<b>Table 8a. UTHC-1 Data Summary</b>							
<b>Mill Dam Creek Restoration Site, DMS Project #97136</b>							
<b>Parameter</b>	<b>Pre-Existing Condition</b>	<b>Reference Reach(es) Data</b>	<b>Design</b>	<b>As-built</b>			
<b>Dimension - Riffle</b>				<b>Min</b>	<b>Mean</b>	<b>Max</b>	<b>n</b>
Bankfull Width (ft)	5.8 – 10.6	9.0 – 10.0	6.5 – 9	6.0	7.6	8.9	3
Floodprone Width (ft)	9.0 – 27.3	13 – 21	50	59.1	64.6	68.3	3
Bankfull Mean Depth (ft)	0.4 – 0.8	1.1 – 1.2	0.5 – 0.7	0.6	0.7	0.7	3
Bankfull Max Depth (ft)	0.4 – 1.2	1.3 – 1.5	0.8 – 1.0	1.0	1.1	1.2	3
Bankfull Cross-Sectional Area (ft <sup>2</sup> )	2.8 – 4.5	10.4 – 10.7	3.4 – 6.1	4.5	5.1	5.5	3
Width/Depth Ratio	7.6 – 28.2	8 – 10	12.4 – 13.4	8.2	11.6	14.4	3
Entrenchment Ratio	1.2 – 2.6	1.3 – 2.3	5.6 – 7.7	6.6	8.7	11.0	3
Bank Height Ratio	1.0 – 10.4	1.0	1.0	1.0	1.0	1.0	3
<b>Pattern</b>							
Channel Beltwidth (ft)	*	45	26 – 61	26 – 61			
Radius of Curvature (ft)	*	13 – 42	18 – 27	18 – 27			
Rc:Bankfull width (ft/ft)	*	1.3 – 4.4	2.0 – 4.1	2.0 – 4.1			
Meander Wavelength (ft)	*	93 – 136	54 – 125	54 – 125			
Meander Width Ratio	*	4.5 – 5.0	4.0 – 7.5	4.0 – 7.5			
Riffle Length (ft)	*			4.2	27.2	40.9	30
Riffle Slope (ft/ft)	0.024 – 0.033	0.013 – 0.028	0.018 – 0.046	0.011	0.024	0.059	30
Pool Length (ft)	*			9.8	61.1	161.9	28
Pool Spacing (ft)	*	30 – 59	48 – 70	31.3	59.3	118.6	27
SC% / Sa% / G% / C% / B% /Be%	2/18/51/28/0/0			1/19/51/26/0/0			
d16 / d35 / d50 / d84 / d95 (mm)	1.3/18/37/97/130	Gravel	Gravel	1.3/9.7/31/91/147			
Channel length (ft)	1,874		1,739	1,739			
Drainage Area (acres)	114	Variable	114	114			
Rosgen Classification	F4	B4c	C4	C4			
Sinuosity	1.2	1.2	1.2	1.2			
Water Surface Slope (ft/ft)	0.021	0.013	0.025	0.026			

\* : no data shown due to channelization / lack of bed diversity

<b>Table 8b. UTHC3 Baseline Stream Data Summary Mill Dam Creek Restoration Site, DMS Project #97136</b>							
Parameter	Pre-Existing Condition	Reference Reach(es) Data (SF)	Design	As-built			
<b>Dimension - Riffle</b>				Min	Mean	Max	n
Bankfull Width (ft)	8.5 – 14.1	9.0 – 10.0	12	10.9	11.3	11.7	2
Floodprone Width (ft)	17.1	13 – 21	68	69.4	72.6	75.8	2
Bankfull Mean Depth (ft)	0.8 – 1.6	1.1 – 1.2	0.9	1.0	1.1	1.1	2
Bankfull Max Depth (ft)	1.1 – 2.0	1.3 – 1.5	1.5	1.4	1.5	1.7	2
Bankfull Cross-Sectional Area (ft <sup>2</sup> )	8.5 – 12.5	10.4 – 10.7	11.4	10.6	12.0	13.3	2
Width/Depth Ratio	17	8 – 10	12.7	10.2	10.7	11.1	2
Entrenchment Ratio	1.2	1.3 – 2.3	5.7	5.9	6.5	7.0	2
Bank Height Ratio	3.2	1.0	1.0	1.0	1.0	1.0	2
<b>Pattern</b>							
Channel Beltwidth (ft)	*	45	39 – 57	39 – 57			
Radius of Curvature (ft)	*	13 – 42	24 – 36	24 – 36			
Rc:Bankfull width (ft/ft)	*	1.3 – 4.4	24 – 36	24 – 36			
Meander Wavelength (ft)	*	93 – 136	111 – 173	111 – 173			
Meander Width Ratio	*	4.5 – 5.0	3.3 – 4.8	3.3 – 4.8			
<b>Profile</b>							
Riffle Length (ft)	*			18.2	46.0	85.8	18
Riffle Slope (ft/ft)	0.015	0.013 – 0.028	0.0007 – 0.032	0.003	0.015	0.040	18
Pool Length (ft)	*			15.9	26.6	49.1	17
Pool Spacing (ft)	*	30 – 59	52 – 101	48.8	75.5	113.5	16
<b>Substrate and Transport Parameters</b>							
SC% / Sa% / G% / C% / B% /Be%	3/15/57/19/0/6			0/13/48/37/1/0			
d16 / d35 / d50 / d84 / d95 (mm)	2.7/15/26/40/92	Gravel	Gravel	2.5/23/48/125/165			
Channel length (ft)	1,411		1,325	1,325			
Drainage Area (acres)	297	Variable	297	297			
Rosgen Classification	F4	B4c	C4	C4			
Sinuosity	1.2	1.2	1.2	1.2			
Water Surface Slope (ft/ft)	0.014	0.013	0.015	0.015			

\* : no data shown due to channelization / lack of bed diversity

Table 8c. T1 Baseline Stream Data Summary Mill Dam Creek Restoration Site, DMS Project #97136								
Parameter	Pre-Existing Condition	Reference Reach(es) Data (SF)	Design	As-built				
Dimension – Riffle								
Bankfull Width (ft)	4.1 – 7.5		6.5	6.5				
Floodprone Width (ft)	6.0 – 32.8		35	48.4				
Bankfull Mean Depth (ft)	0.5 – 0.7		0.5	0.6				
Bankfull Max Depth (ft)	0.8 – 1.0		0.8	1.2				
Bankfull Cross-Sectional Area (ft²)	2.7 – 3.8		3.4	3.9				
Width/Depth Ratio	6.2 – 14.9	12 – 18	12.4	10.9				
Entrenchment Ratio	1.5 – 4.4	2.2+	5.4	7.5				
Bank Height Ratio	1.0 – 4.5	1.0 – 1.1	1.0	1.0				
Pattern								
Channel Beltwidth (ft)	*		23 – 41	23 – 41				
Radius of Curvature (ft)	*		15 – 22	15 – 22				
Rc:Bankfull width (ft/ft)	*		2.2 – 3.4	2.2 – 3.4				
Meander Wavelength (ft)	*		60 – 83	60 – 83				
Meander Width Ratio	*		3.5 – 6.3	3.5 – 6.3				
Profile								
Riffle Length (ft)	*			7.8	22.0	42.2	16	
Riffle Slope (ft/ft)	0.019 – 0.028		0.015 – 0.60	0.002	0.022	0.035	16	
Pool Length (ft)	*			3.5	12.6	20.1	16	
Pool Spacing (ft)	*		25 – 63	24.4	41.3	58.4	15	
Substrate and Transport Parameters								
SC% / Sa% / G% / C% / B% /Be%	31/21/44/4/1/0			2/15/66/17/0/0				
d16 / d35 / d50 / d84 / d95 (mm)	0.13/0.37/3/38/66	Gravel	Gravel	1.9/8.8/22/67/94				
Channel length (ft)	764		751	751				
Drainage Area (acres)	43	Variable	43	43				
Rosgen Classification	B4, C4, G4	B4c	C4b	C4b				
Sinuosity	1.1	1.1 – 1.3	1.1	1.1				
Water Surface Slope (ft/ft)	0.026	N/A	0.026	0.025				

\* : no data shown due to channelization / lack of bed diversity

Table 8d. T1A Baseline Stream Data Summary Mill Dam Creek Restoration Site, DMS Project #97136							
Parameter	Pre-Existing Condition	Reference Reach(es) Data (SF)	Design	As-built			
<b>Dimension - Riffle</b>				Min	Mean	Max	n
Bankfull Width (ft)	7.1		5.5	5.4	5.6	5.8	2
Floodprone Width (ft)	7.7		35	44.5	49.4	54.4	2
Bankfull Mean Depth (ft)	0.4		0.5	0.3	0.4	0.4	2
Bankfull Max Depth (ft)	0.5		0.7	0.7	0.7	0.7	2
Bankfull Cross-Sectional Area (ft <sup>2</sup> )	2.8		2.5	1.8	2.1	2.3	2
Width/Depth Ratio	18.2	12 – 18	12.1	14.1	15.0	15.9	2
Entrenchment Ratio	1.1	2.2+	6.4	7.7	8.9	10.1	2
Bank Height Ratio	19.6	1.0 – 1.1	1.0	1.0	1.0	1.0	2
<b>Pattern</b>							
Channel Beltwidth (ft)	*		20 – 28	20 – 28			
Radius of Curvature (ft)	*		15 – 22	15 – 22			
Rc:Bankfull width (ft/ft)	*		2.3 – 3.4	2.3 – 3.4			
Meander Wavelength (ft)	*		72 – 84	72 – 84			
Meander Width Ratio	*		3.6 – 5.1	3.6 – 5.1			
<b>Profile</b>							
Riffle Length (ft)				1.4	20.7	51.8	16
Riffle Slope (ft/ft)	0.025		0.020 – 0.062	0.000	0.025	0.046	16
Pool Length (ft)				4.9	14.7	27.2	16
Pool Spacing (ft)	*		32 – 58	32.8	44.7	65.8	15
<b>Substrate and Transport Parameters</b>							
SC% / Sa% / G% / C% / B% /Be%	31/51/12/6/0/0			5/19/62/14/0/0			
d16 / d35 / d50 / d84 / d95 (mm)	0.062/0.072/0.13/2.9/71	Gravel	Gravel	0.7/5.8/20/59/99			
Channel length (ft)	746		795	795			
Drainage Area (acres)	29	Variable	29	29			
Rosgen Classification	F4	B4c	C4b	C4b			
Sinuosity	1.1	1.1 – 1.3	1.1	1.1			
Water Surface Slope (ft/ft)	0.022	N/A	0.030	0.030			

\* : no data shown due to channelization / lack of bed diversity



Table 8e. T2-2 Baseline Stream Data Summary Mill Dam Creek Restoration Site, DMS Project #97136							
Parameter	Pre-Existing Condition	Reference Reach(es) Data	Design	As-built			
Dimension - Riffle							
Bankfull Width (ft)	3.1		4.5	4.7			
Floodprone Width (ft)	4		22	24.1			
Bankfull Mean Depth (ft)	0.5		0.4	0.5			
Bankfull Max Depth (ft)	0.8		0.6	0.9			
Bankfull Cross-Sectional Area (ft²)	1.5		1.7	2.3			
Width/Depth Ratio	6.3	12 – 18	12.0	9.9			
Entrenchment Ratio	1.3	2.2+	4.9	5.1			
Bank Height Ratio	3.3	1.0 – 1.1	1.0	1.0			
Pattern							
Channel Beltwidth (ft)	*		N/A	N/A			
Radius of Curvature (ft)	*		N/A	N/A			
Rc:Bankfull width (ft/ft)	*		N/A	N/A			
Meander Wavelength (ft)	*		N/A	N/A			
Meander Width Ratio	*		N/A	N/A			
Profile				Min	Mean	Max	n
Riffle Length (ft)				1.6	13.2	40.9	8
Riffle Slope (ft/ft)	0.04		0.024-0.063	0.023	0.049	0.099	8
Pool Length (ft)				3.6	14.8	31.4	7
Pool Spacing (ft)	*		21 – 34	24.1	37.8	55.6	6
Substrate and Transport Parameters							
SC% / Sa% / G% / C% / B% /Be%	11/14/63/13/0/0			14/30/27/30/0/0			
d16 / d35 / d50 / d84 / d95 (mm)	0.26/13/21/58/84	Gravel	Gravel	0.1/0.7/6/87/130			
Channel length (ft)	232		265	265			
Drainage Area (acres)	16	Variable	16	16			
Rosgen Classification	G4	B4c	C4b	C4b			
Sinuosity	1.1	1.1 – 1.3	1.1	1.1			
Water Surface Slope (ft/ft)	0.038	N/A	0.042	0.040			

\* : no data shown due to channelization / lack of bed diversity

Table 8f. T3 Baseline Stream Data Summary Mill Dam Creek Restoration Site, DMS Project #97136							
Parameter	Pre-Existing Condition	Reference Reach(es) Data	Design	As-built			
Dimension - Riffle							
Bankfull Width (ft)	3.5		4.5	4.7			
Floodprone Width (ft)	4.2		18	19.2			
Bankfull Mean Depth (ft)	0.3		0.4	0.4			
Bankfull Max Depth (ft)	0.4		0.6	0.7			
Bankfull Cross-Sectional Area (ft²)	1.1		1.7	1.9			
Width/Depth Ratio	11.3	12 – 18	12.0	11.6			
Entrenchment Ratio	1.2	2.2+	4.0	4.1			
Bank Height Ratio	3.3	1.0 – 1.1	1.0	1.0			
Pattern							
Channel Beltwidth (ft)	*		N/A	N/A			
Radius of Curvature (ft)	*		N/A	N/A			
Rc:Bankfull width (ft/ft)	*		N/A	N/A			
Meander Wavelength (ft)	*		N/A	N/A			
Meander Width Ratio	*		N/A	N/A			
Profile				Min	Mean	Max	n
Riffle Length (ft)				2.2	13.3	25.7	13
Riffle Slope (ft/ft)	0.058		0.051 – 0.074	0.032	0.058	0.125	13
Pool Length (ft)				3.4	9.5	20.7	12
Pool Spacing (ft)	*		20 – 30	22.8	28.2	46.7	11
Substrate and Transport Parameters							
SC% / Sa% / G% / C% / B% /Be%	28/5/38/27/4			6/11/71/13/0/0			
d16 / d35 / d50 / d84 / d95 (mm)	0.062/3.1/25/130/240	Gravel	Gravel	1.7/7.8/28/61/84			
Channel length (ft)	378		369	369			
Drainage Area (acres)	7	Variable	7	7			
Rosgen Classification	G4	B4c	C4b	C4b			
Sinuosity	1.1	1.1 – 1.3	1.1	1.1			
Water Surface Slope (ft/ft)	0.059	N/A	0.059	0.057			

\* : no data shown due to channelization / lack of bed diversity

Table 8g. T4 Baseline Stream Data Summary Mill Dam Creek Restoration Site, DMS Project #97136							
Parameter	Pre-Existing Condition	Reference Reach(es) Data	Design	As-built			
Dimension - Riffle							
Bankfull Width (ft)	2.5		4.5	4.0			
Floodprone Width (ft)	4.7		16	18.7			
Bankfull Mean Depth (ft)	0.3		0.6	0.5			
Bankfull Max Depth (ft)	0.4		0.6	0.8			
Bankfull Cross-Sectional Area (ft²)	0.7		1.7	1.9			
Width/Depth Ratio	9.4	12 – 18	12.0	8.3			
Entrenchment Ratio	1.9	2.2+	3.6	4.7			
Bank Height Ratio	6.9	1.0 – 1.1	1.0	1.0			
Pattern							
Channel Beltwidth (ft)	*		N/A	N/A			
Radius of Curvature (ft)	*		N/A	N/A			
Rc:Bankfull width (ft/ft)	*		N/A	N/A			
Meander Wavelength (ft)	*		N/A	N/A			
Meander Width Ratio	*		N/A	N/A			
Profile				Min	Mean	Max	n
Riffle Length (ft)				7.9	13.4	22.2	7
Riffle Slope (ft/ft)	0.1		0.102 – 0.103	0.039	0.11	0.23	7
Pool Length (ft)				3.2	5.4	11.0	7
Pool Spacing (ft)	*		24 – 27	9.5	19.5	26.5	6
Substrate and Transport Parameters							
SC% / Sa% / G% / C% / B% /Be%	12/65/13/8/2/0			0/15/77/8/0/0			
d16 / d35 / d50 / d84 / d95 (mm)	0.11/0.16/0.21/4.3/120	Gravel	Gravel	2.2/9.6/15/48/76			
Channel length (ft)	151		151	151			
Drainage Area (acres)	3	Variable	3	3			
Rosgen Classification	B4	B4c	C4b	C4b			
Sinuosity	1.0	1.1 – 1.3	1.0	1.0			
Water Surface Slope (ft/ft)	0.089	N/A	0.113	0.109			

\* : no data shown due to channelization / lack of bed diversity

Table 8h. T6-2 Baseline Stream Data Summary Mill Dam Creek Restoration Site, DMS Project #97136								
Parameter	Pre-Existing Condition	Reference Reach(es) Data	Design	As-built				
Dimension - Riffle								
Bankfull Width (ft)	4.4		5.5	5.6				
Floodprone Width (ft)	5.4		24	27.4				
Bankfull Mean Depth (ft)	0.6		0.5	0.5				
Bankfull Max Depth (ft)	0.7		0.7	1.0				
Bankfull Cross-Sectional Area (ft²)	2.6		2.5	2.6				
Width/Depth Ratio	7.5	12 – 18	12.1	11.9				
Entrenchment Ratio	1.1	2.2+	4.4	4.9				
Bank Height Ratio	4.4	1.0 – 1.1	1.0	1.0				
Pattern								
Channel Beltwidth (ft)	*		N/A	N/A				
Radius of Curvature (ft)	*		N/A	N/A				
Rc:Bankfull width (ft/ft)	*		N/A	N/A				
Meander Wavelength (ft)	*		N/A	N/A				
Meander Width Ratio	*		N/A	N/A				
Profile				Min	Mean	Max	n	
Riffle Length (ft)				15.4	25.1	37.9	15	
Riffle Slope (ft/ft)	0.02		0.020 – 0.063	0.007	0.033	0.070	15	
Pool Length (ft)				5.9	14.1	22.7	15	
Pool Spacing (ft)	*		32 – 47	28.8	42.9	50.9	14	
Substrate and Transport Parameters								
SC% / Sa% / G% / C% / B% /Be%	7/33/60/0/0/0			1/16/53/30/0/0				
d16 / d35 / d50 / d84 / d95 (mm)	0.19/1.6/4.1/13/27	Gravel	Gravel	1.7/16/38/93/140				
Channel length (ft)	621		658	658				
Drainage Area (acres)	29	Variable	29	29				
Rosgen Classification	G4	B4c	C4b	C4b				
Sinuosity	1.0	1.1 – 1.3	1.1	1.1				
Water Surface Slope (ft/ft)	0.041	N/A	0.034	0.037				

\* : no data shown due to channelization / lack of bed diversity

Table 8i. T6A-2 Baseline Stream Data Summary Mill Dam Creek Restoration Site, DMS Project #97136							
Parameter	Pre-Existing Condition	Reference Reach(es) Data	Design	As-built			
Dimension - Riffle							
Bankfull Width (ft)	**		4.5	4.4			
Floodprone Width (ft)	**		24	25.3			
Bankfull Mean Depth (ft)	**		0.4	0.4			
Bankfull Max Depth (ft)	**		0.6	0.6			
Bankfull Cross-Sectional Area (ft²)	**		1.7	1.7			
Width/Depth Ratio	**	12 – 18	12.0	11.0			
Entrenchment Ratio	**	2.2+	5.3	5.8			
Bank Height Ratio	**	1.0 – 1.1	1.0	1.0			
Pattern							
Channel Beltwidth (ft)	**		N/A	N/A			
Radius of Curvature (ft)	**		N/A	N/A			
Rc:Bankfull width (ft/ft)	**		N/A	N/A			
Meander Wavelength (ft)	**		N/A	N/A			
Meander Width Ratio	**		N/A	N/A			
Profile				Min	Mean	Max	n
Riffle Length (ft)	**			9.3	14.8	24.0	3
Riffle Slope (ft/ft)	**		0.087 – 0.099	0.056	0.091	0.118	3
Pool Length (ft)	**			14.2	16.7	19.5	3
Pool Spacing (ft)	**		22 – 23	29.4	30.0	30.6	2
Substrate and Transport Parameters							
SC% / Sa% / G% / C% / B% /Be%	**			0/14/70/16/0/0			
d16 / d35 / d50 / d84 / d95 (mm)	**	Gravel	Gravel	2.6/25/36/64/85			
Channel length (ft)	97		101	101			
Drainage Area (acres)	9	Variable	9	9			
Rosgen Classification	**	B4c	C4b	C4b			
Sinuosity	**	1.1 – 1.3	1.1	1.1			
Water Surface Slope (ft/ft)	**	N/A	0.091	0.095			

\*\* Existing conditions are ponded



Table 8j. T7-2 Baseline Stream Data Summary Mill Dam Creek Restoration Site, DMS Project #97136								
Parameter	Pre-Existing Condition	Reference Reach(es) Data	Design	As-built				
Dimension - Riffle								
Bankfull Width (ft)	3.2		6.5	10.1				
Floodprone Width (ft)	4.6		28	47.4				
Bankfull Mean Depth (ft)	0.8		0.5	0.4				
Bankfull Max Depth (ft)	1.1		0.8	1.0				
Bankfull Cross-Sectional Area (ft²)	2.4		3.4	4.3				
Width/Depth Ratio	4.1	12 – 18	12.4	23.9				
Entrenchment Ratio	1.4	2.2+	4.3	4.7				
Bank Height Ratio	1.7	1.0 – 1.1	1.0	1.0				
Pattern								
Channel Beltwidth (ft)	*		20 – 24	20 – 24				
Radius of Curvature (ft)	*		15 – 22	15 – 22				
Rc:Bankfull width (ft/ft)	*		2.3 – 3.4	2.3 – 3.4				
Meander Wavelength (ft)	*		85 – 88	85 – 88				
Meander Width Ratio	*		3.1 – 3.7	3.1 – 3.7				
Profile				Min	Mean	Max	n	
Riffle Length (ft)				4.5	32.4	68.1	6	
Riffle Slope (ft/ft)	0.032		0.017 – 0.043	0.015	0.025	0.029	6	
Pool Length (ft)				4.9	12.5	19.7	6	
Pool Spacing (ft)	*		36 – 57	45.7	54.6	86.6	5	
Substrate and Transport Parameters								
SC% / Sa% / G% / C% / B% /Be%	3/18/62/16/1/0			0/20/62/17/0/0				
d16 / d35 / d50 / d84 / d95 (mm)	1.2/7.9/22/66/89	Gravel	Gravel	0.8/8.5/17/67/110				
Channel length (ft)	335		348	348				
Drainage Area (acres)	41	Variable	41	41				
Rosgen Classification	G4	B4c	C4b	C4b				
Sinuosity	1.1	1.1 – 1.3	1.1	1.1				
Water Surface Slope (ft/ft)	0.033	N/A	0.024	0.022				

\* : no data shown due to channelization / lack of bed diversity

Table 8k. T8-2 Baseline Stream Data Summary Mill Dam Creek Restoration Site, DMS Project #97136								
Parameter	Pre-Existing Condition	Reference Reach(es) Data	Design	As-built				
<b>Dimension - Riffle</b>				Min	Mean	Max	n	
Bankfull Width (ft)	3.6		5.5	5.5	5.6	5.7	2	
Floodprone Width (ft)	4.1		25	34.8	39.1	43.4	2	
Bankfull Mean Depth (ft)	0.7		0.5	0.6	0.6	0.6	2	
Bankfull Max Depth (ft)	0.9		0.7	1.0	1.0	1.0	2	
Bankfull Cross-Sectional Area (ft²)	2.4		2.5	3.2	3.3	3.4	2	
Width/Depth Ratio	5.5	12 – 18	12.1	9.1	9.6	10.1	2	
Entrenchment Ratio	1.1	2.2+	4.4	6.3	7.0	7.6	2	
Bank Height Ratio	2.5	1.0 – 1.1	1.0	1.0	1.0	1.0	2	
<b>Pattern</b>								
Channel Beltwidth (ft)	*		N/A	N/A				
Radius of Curvature (ft)	*		N/A	N/A				
Rc:Bankfull width (ft/ft)	*		N/A	N/A				
Meander Wavelength (ft)	*		N/A	N/A				
Meander Width Ratio	*		N/A	N/A				
<b>Profile</b>								
Riffle Length (ft)				9.3	23.3	31.9	10	
Riffle Slope (ft/ft)	0.041		0.043 – 0.050	0.033	0.048	0.063	10	
Pool Length (ft)				7.9	13.4	16.6	10	
Pool Spacing (ft)	*		32 - 45	34.1	42.2	53.6	9	
<b>Substrate and Transport Parameters</b>								
SC% / Sa% / G% / C% / B% /Be%	18/27/40/14/0/0			4/17/52/27/0/0				
d16 / d35 / d50 / d84 / d95 (mm)	0.13/2.2/8.5/81/140	Gravel	Gravel	0.7/14/37/95/135				
Channel length (ft)	486		448	448				
Drainage Area (acres)	21	Variable	21	21				
Rosgen Classification	G4	B4c	C4b	C4b				
Sinuosity	1.1	1.1 – 1.3	1.1	1.1				
Water Surface Slope (ft/ft)	0.044	N/A	0.045	0.048				

\* : no data shown due to channelization / lack of bed diversity

Table 8L. T8A Baseline Stream Data Summary Mill Dam Creek Restoration Site, DMS Project #97136							
Parameter	Pre-Existing Condition	Reference Reach(es) Data	Design	As-built			
<b>Dimension - Riffle</b>				Min	Mean	Max	n
Bankfull Width (ft)	3.1		4.5	4.7	5.7	6.6	2
Floodprone Width (ft)	4.1		20	21.6	44.7	67.9	2
Bankfull Mean Depth (ft)	0.3		0.4	0.4	0.5	0.5	2
Bankfull Max Depth (ft)	0.9		0.6	0.9	1.0	1.1	2
Bankfull Cross-Sectional Area (ft²)	1.0		1.7	2.6	2.7	2.9	2
Width/Depth Ratio	5.5	12 – 18	12.0	8.6	11.9	15.2	2
Entrenchment Ratio	1.1	2.2+	4.4	4.6	7.4	10.3	2
Bank Height Ratio	2.7	1.0 – 1.1	1.0	1.0	1.0	1.0	2
<b>Pattern</b>							
Channel Beltwidth (ft)	*		N/A	N/A			
Radius of Curvature (ft)	*		N/A	N/A			
Rc:Bankfull width (ft/ft)	*		N/A	N/A			
Meander Wavelength (ft)	*		N/A	N/A			
Meander Width Ratio	*		N/A	N/A			
<b>Profile</b>							
Riffle Length (ft)				12.3	22.7	42.7	7
Riffle Slope (ft/ft)	0.044		0.019 – 0.062	0.027	0.053	0.10	7
Pool Length (ft)				6.3	12.4	22.4	6
Pool Spacing (ft)	*		28 – 38	27.7	40.3	66.1	5
<b>Substrate and Transport Parameters</b>							
SC% / Sa% / G% / C% / B% /Be%	100/0/0/0/0/0			4/17/54/25/0/0			
d16 / d35 / d50 / d84 / d95 (mm)	0.062/0.062/0.062/0.062/0.062	Gravel	Gravel	1.8/23/32/84/135			
Channel length (ft)	258		262	262			
Drainage Area (acres)	7	Variable	7	7			
Rosgen Classification	G4	B4c	C4b	C4b			
Sinuosity	1.1	1.1 – 1.3	1.1	1.1			
Water Surface Slope (ft/ft)	0.052	N/A	0.044	0.047			

\* : no data shown due to channelization / lack of bed diversity

Table 8m. T9 Baseline Stream Data Summary Mill Dam Creek Restoration Site, DMS Project #97136								
Parameter	Pre-Existing Condition	Reference Reach(es) Data	Design	As-built				
Dimension - Riffle								
Bankfull Width (ft)	2.9		5.5	4.1				
Floodprone Width (ft)	5.5		22	29.6				
Bankfull Mean Depth (ft)	0.7		0.5	0.7				
Bankfull Max Depth (ft)	0.9		0.7	0.9				
Bankfull Cross-Sectional Area (ft²)	2.0		2.5	2.8				
Width/Depth Ratio	4.3	12 – 18	12.1	6.0				
Entrenchment Ratio	1.9	2.2+	4.0	7.2				
Bank Height Ratio	1.7	1.0 – 1.1	1.0	1.0				
Pattern								
Channel Beltwidth (ft)	*		N/A	N/A				
Radius of Curvature (ft)	*		N/A	N/A				
Rc:Bankfull width (ft/ft)	*		N/A	N/A				
Meander Wavelength (ft)	*		N/A	N/A				
Meander Width Ratio	*		N/A	N/A				
Profile				Min	Mean	Max	n	
Riffle Length (ft)				10.5	22.8	31.7	4	
Riffle Slope (ft/ft)	0.031		0.037	0.033	0.039	0.056	4	
Pool Length (ft)				3.9	6.2	7.7	3	
Pool Spacing (ft)	*		34 – 36	37.02	39.1	41.1	2	
Substrate and Transport Parameters								
SC% / Sa% / G% / C% / B% /Be%	26/66/8/0/0/0			3/7/59/31/0/0				
d16 / d35 / d50 / d84 / d95 (mm)	0.062/0.13/0.15/0.23/3.7	Gravel	Gravel	12/32/42/90/150				
Channel length (ft)	133		129	129				
Drainage Area (acres)	29	Variable	29	29				
Rosgen Classification	B4	B4c	C4b	C4b				
Sinuosity	1.0	1.1 – 1.3	1.1	1.1				
Water Surface Slope (ft/ft)	0.039	N/A	0.042	0.038				

\* : no data shown due to channelization / lack of bed diversity

**Table 9. Cross Section Dimensional Morphology Summary**  
**Mill Dam Creek Restoration Site, DMS Project #97136**

Dimension and Substrate	Cross-Section 1 (Riffle) Station 13+50, UTHC-1							Cross-Section 2 (Riffle) Station 19+25, UTHC-1							Cross-Section 3 (Pool) Station 19+50, UTHC-1						
	MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07	
Bankfull Elevation (ft) based on AB BKF area	948.8	948.8						931.0	930.9						930.3	930.1					
Bankfull Width (ft)	6.0	6.6						8.0	7.0						8.4	7.8					
Floodprone Width (ft)	66.3	66.6						68.3	70.7						---	---					
Bankfull Mean Depth (ft)	0.7	0.7						0.7	0.8						0.9	0.9					
Bankfull Max Depth (ft)	1.2	1.2						1.2	1.4						1.7	1.7					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF area	4.5	4.5						5.3	5.3						7.4	7.4					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF elevation	4.5	4.4						5.3	6.1						7.4	9.5					
Bankfull Width/Depth Ratio	8.2	9.6						12.1	9.2						---	---					
Bankfull Entrenchment Ratio	11.0	10.1						8.6	10.1						---	---					
Bankfull Bank Height Ratio	1.0	1.0						1.0	0.9						---	---					
d50 (mm)	48	48						24	40						---	---					
	Cross-Section 4 (Pool) Station 23+17, UTHC-1							Cross-Section 5 (Riffle) Station 23+32, UTHC-1							Cross-Section 6 (Riffle) Station 30+20, UTHC-2						
	MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07	
Bankfull Elevation (ft) based on AB BKF area	923.0	922.9						922.8	922.9						908.7	908.7					
Bankfull Width (ft)	13.1	12.1						8.9	8.6						22.6	22.8					
Floodprone Width (ft)	---	---						59.1	57.6						43.0	43.0					
Bankfull Mean Depth (ft)	1.2	1.3						0.6	0.6						2.5	2.4					
Bankfull Max Depth (ft)	2.2	2.4						1.0	0.9						3.7	3.6					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF area	15.4	15.4						5.5	5.5						55.5	55.5					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF elevation	15.4	16.8						5.5	4.9						55.5	55.9					
Bankfull Width/Depth Ratio	---	---						14.4	13.2						9.2	9.3					
Bankfull Entrenchment Ratio	---	---						6.6	6.7						1.9	1.9					
Bankfull Bank Height Ratio	---	---						1.0	0.8						1.0	1.0					
d50 (mm)	---	---						21	38						19	31					
	Cross-Section 7 (Riffle) Station 38+52, UTHC-2							Cross-Section 8 (Pool) Station 46+20, UTHC-3							Cross-Section 9 (Riffle) Station 46+48, UTHC-3						
	MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07	
Bankfull Elevation (ft) based on AB BKF area	883.7	883.7						871.2	871.2						871.0	870.9					
Bankfull Width (ft)	12.9	11.8						10.4	10.4						10.9	11.2					
Floodprone Width (ft)	37.6	38.4						---	---						75.8	76.1					
Bankfull Mean Depth (ft)	1.3	1.4						2.0	2.0						1.0	1.0					
Bankfull Max Depth (ft)	2.0	2.2						3.8	3.8						1.4	1.6					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF area	16.7	16.7						20.8	20.8						10.6	10.6					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF elevation	16.7	16.6						20.8	20.8						10.6	11.4					
Bankfull Width/Depth Ratio	9.9	8.3						---	---						11.1	11.7					
Bankfull Entrenchment Ratio	2.9	3.3						---	---						7.0	6.8					
Bankfull Bank Height Ratio	1.0	1.0						---	---						1.0	1.0					
d50 (mm)	19	55						---	---						50	64					



**Table 9. Cross Section Dimensional Morphology Summary**  
**Mill Dam Creek Restoration Site, DMS Project #97136**

Dimension and Substrate	Cross-Section 10 (Riffle) Station 53+10, UTHC-3							Cross-Section 11 (Riffle) Station 57+40, UTHC-4							Cross-Section 12 (Riffle) Station 65+80, UTHC-6						
	MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07	
Bankfull Elevation (ft) based on AB BKF area	861.6	861.7						853.8	853.9						845.4	845.4					
Bankfull Width (ft)	11.7	14.0						11.9	12.1						17.6	19.0					
Floodprone Width (ft)	69.4	69.5						43.2	43.8						30.7	17.7					
Bankfull Mean Depth (ft)	1.1	1.0						1.4	1.4						1.7	1.6					
Bankfull Max Depth (ft)	1.7	1.7						2.2	2.3						2.8	2.6					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF area	13.3	13.3						17.3	17.3						30.2	29.7					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF elevation	13.3	12.1						17.3	16.0						30.2	29.7					
Bankfull Width/Depth Ratio	10.2	14.7						8.2	8.5						10.3	12.2					
Bankfull Entrenchment Ratio	5.9	5.0						3.6	3.6						1.7	0.9					
Bankfull Bank Height Ratio	1.0	1.0						1.1	1.0						3.2	1.0					
d50 (mm)	45	51						19	72						20	65					
	Cross-Section 13 (Riffle) Station 67+20, UTHC-6							Cross-Section 14 (Riffle) Station 155+00, T1A							Cross-Section 15 (Riffle) Station 156+20, T1A						
	MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07	
Bankfull Elevation (ft) based on AB BKF area	847.4	847.2						943.6	943.6						938.9	939.1					
Bankfull Width (ft)	24.9	27.3						5.4	4.8						5.8	5.5					
Floodprone Width (ft)	67.7	68.1						54.4	54.3						44.5	46.4					
Bankfull Mean Depth (ft)	1.6	1.4						0.3	0.4						0.4	0.4					
Bankfull Max Depth (ft)	2.6	3.2						0.7	0.8						0.7	0.7					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF area	38.7	38.7						1.8	1.8						2.3	2.3					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF elevation	38.7	42.1						1.8	1.9						2.3	1.7					
Bankfull Width/Depth Ratio	16.0	19.3						15.9	12.5						14.1	12.9					
Bankfull Entrenchment Ratio	2.7	2.5						10.1	11.4						7.7	8.4					
Bankfull Bank Height Ratio	1.0	0.9						1.0	1.0						1.0	0.8					
d50 (mm)	21	37						24	29						16	19					
	Cross-Section 16 (Riffle) Station 104+80, T1							Cross-Section 17 (Pool) Station 105+10, T1							Cross-Section 18 (Riffle) Station 206+60, T2						
	MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07	
Bankfull Elevation (ft) based on AB BKF area	929.2	929.2						928.4	928.4						923.4	923.4					
Bankfull Width (ft)	6.5	8.6						8.7	7.8						4.7	5.8					
Floodprone Width (ft)	48.4	49.6						---	---						24.1	24.6					
Bankfull Mean Depth (ft)	0.6	0.4						1.0	1.1						0.5	0.4					
Bankfull Max Depth (ft)	1.2	1.3						2.3	2.1						0.9	0.9					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF area	3.9	3.9						8.3	8.3						2.3	2.3					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF elevation	3.9	3.7						8.3	8.4						2.3	1.9					
Bankfull Width/Depth Ratio	10.9	19.3						---	---						9.9	14.7					
Bankfull Entrenchment Ratio	7.5	5.7						---	---						5.1	4.3					
Bankfull Bank Height Ratio	1.0	0.9						---	---						1.0	0.8					
d50 (mm)	22	27						---	---						6.4	69					

**Table 9. Cross Section Dimensional Morphology Summary**  
**Mill Dam Creek Restoration Site, DMS Project #97136**

Dimension and Substrate	Cross-Section 19 (Pool) Station 206+80, T2							Cross-Section 20 (Riffle) Station 302+80, T3							Cross-Section 21 (Pool) Station 303+30 T3						
	MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07	
Bankfull Elevation (ft) based on AB BKF area	922.6	922.6						917.7	917.8						916.6	916.6					
Bankfull Width (ft)	6.7	6.6						4.7	4.8						7.8	7.2					
Floodprone Width (ft)	---	---						19.2	19.0						---	---					
Bankfull Mean Depth (ft)	0.8	0.8						0.4	0.4						1.0	1.1					
Bankfull Max Depth (ft)	1.7	1.9						0.7	0.7						1.9	1.8					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF area	5.6	5.6						1.9	1.9						7.7	7.7					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF elevation	5.6	5.2						1.9	1.3						7.7	8.1					
Bankfull Width/Depth Ratio	---	---						11.6	12.3						---	---					
Bankfull Entrenchment Ratio	---	---						4.1	3.9						---	---					
Bankfull Bank Height Ratio	---	---						1.0	1.0						---	---					
d50 (mm)	---	---						28	26						---	---					
	Cross-Section 22 (Riffle) Station 400+90, T4							Cross-Section 23 (Riffle) Station 651+25, T6A							Cross-Section 24 (Riffle) Station 608+15, T6						
	MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07	
Bankfull Elevation (ft) based on AB BKF area	906.2	906.2						894.3	894.3						877.9	878.4					
Bankfull Width (ft)	4.0	4.4						4.4	3.5						5.6	3.8					
Floodprone Width (ft)	18.7	19.2						25.3	29.8						27.4	43.8					
Bankfull Mean Depth (ft)	0.5	0.4						0.4	0.5						0.5	0.7					
Bankfull Max Depth (ft)	0.8	0.9						0.6	0.9						1.0	1.0					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF area	1.9	1.9						1.7	1.7						2.6	2.6					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF elevation	1.9	1.9						1.7	1.8						2.6	0.8					
Bankfull Width/Depth Ratio	8.3	10.0						11.0	7.1						11.9	5.5					
Bankfull Entrenchment Ratio	4.7	4.4						5.8	8.5						4.9	11.6					
Bankfull Bank Height Ratio	1.0	0.5						1.0	1.1						1.0	0.6					
d50 (mm)	15	12						36	35						38	15					
	Cross-Section 25 (Pool) Station 608+40, T6							Cross-Section 26 (Pool) Station 703+40, T7							Cross-Section 27 (Riffle) Station 703+70, T7						
	MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07	
Bankfull Elevation (ft) based on AB BKF area	877.6	877.7						868.2	868.0						867.5	867.6					
Bankfull Width (ft)	8.4	5.1						7.2	6.0						10.1	7.3					
Floodprone Width (ft)	---	---						---	---						47.4	47.0					
Bankfull Mean Depth (ft)	0.6	1.0						0.6	0.8						0.4	0.6					
Bankfull Max Depth (ft)	1.1	1.6						1.2	1.4						1.0	1.0					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF area	5.1	5.1						4.6	4.6						4.3	4.3					
Cross-Sectional Area (ft <sup>2</sup> ) based on AB BKF elevation	5.1	4.4						4.6	5.8						4.3	3.5					
Bankfull Width/Depth Ratio	---	---						---	---						23.9	12.4					
Bankfull Entrenchment Ratio	---	---						---	---						4.7	6.5					
Bankfull Bank Height Ratio	---	---						---	---						1.0	0.9					
d50 (mm)	---	---						---	---						17	22					

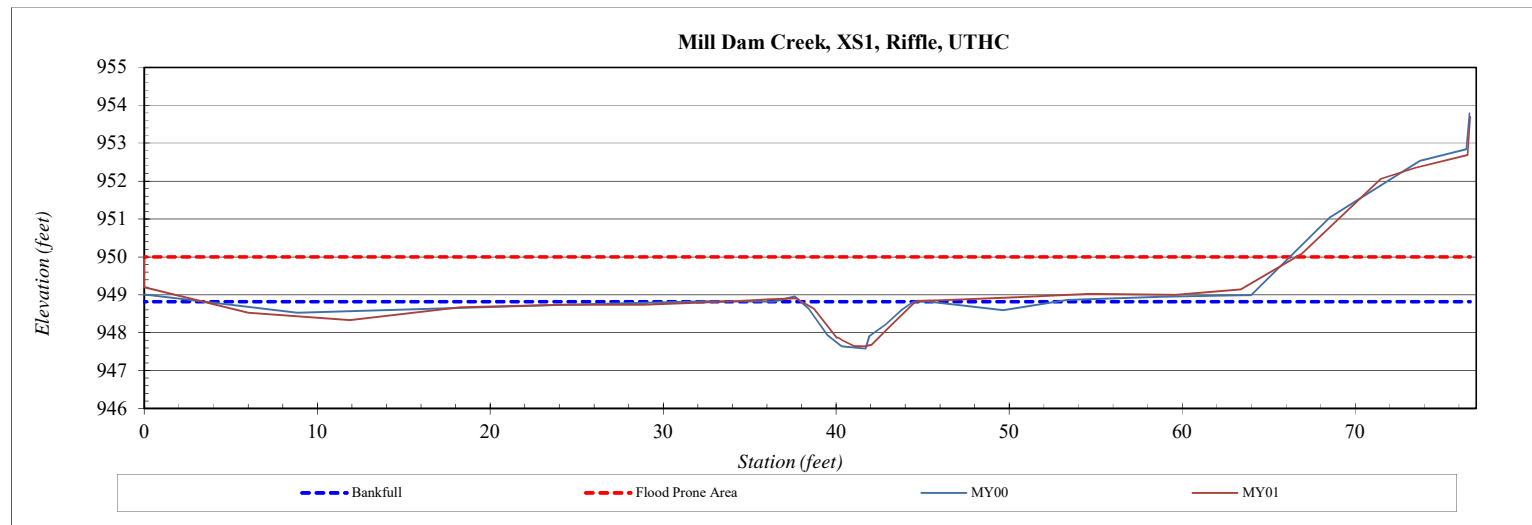
Table 9. Cross Section Dimensional Morphology Summary Mill Dam Creek Restoration Site, DMS Project #97136																					
Dimension and Substrate	Cross-Section 28 (Riffle) Station 900+80, T9							Cross-Section 29 (Riffle) Station 806+10, T8							Cross-Section 30 (Riffle) Station 807+45, T8						
	MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07	
Bankfull Elevation (ft) based on AB BKF area	853.0	853.3						849.8	849.9						842.8	842.8					
Bankfull Width (ft)	4.1	4.7						5.5	5.5						5.7	5.8					
Floodprone Width (ft)	29.6	31.9						34.8	43.8						43.4	42.0					
Bankfull Mean Depth (ft)	0.7	0.6						0.6	0.6						0.6	0.6					
Bankfull Max Depth (ft)	0.9	1.2						1.0	1.2						1.0	1.0					
Cross-Sectional Area (ft2) based on AB BKF area	2.8	2.8						3.4	3.4						3.2	3.2					
Cross-Sectional Area (ft2) based on AB BKF elevation	2.8	1.5						3.4	2.9						3.2	3.4					
Bankfull Width/Depth Ratio	6.0	7.9						9.1	9.0						10.1	10.5					
Bankfull Entrenchment Ratio	7.2	6.7						6.3	7.9						7.6	7.2					
Bankfull Bank Height Ratio	1.0	1.0						1.0	0.9						1.0	1.0					
d50 (mm)	42	6.7						36	68						37	16					
	Cross-Section 31 (Riffle) Station 850+60, T8A							Cross-Section 32 (Riffle) Station 851+75, T8A													
	MY00	MY01	MY02	MY03	MY05	MY07		MY00	MY01	MY02	MY03	MY05	MY07								
Bankfull Elevation (ft) based on AB BKF area	850.8	850.9						845.8	845.6												
Bankfull Width (ft)	4.7	5.2						4.8	4.1												
Floodprone Width (ft)	21.6	21.8						49.3	49.4												
Bankfull Mean Depth (ft)	0.5	0.5						0.4	0.5												
Bankfull Max Depth (ft)	1.1	1.1						0.9	1.0												
Cross-Sectional Area (ft2) based on AB BKF area	2.6	2.6						2.1	2.1												
Cross-Sectional Area (ft2) based on AB BKF elevation	2.6	2.3						2.1	2.8												
Bankfull Width/Depth Ratio	8.6	10.7						11.4	8.2												
Bankfull Entrenchment Ratio	4.6	4.2						10.2	12.0												
Bankfull Bank Height Ratio	1.0	1.0						1.0	1.2												
d50 (mm)	54	5						10	54												

## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS1
<b>Drainage Area (sq mi):</b>	0.18
<b>Date:</b>	12/17/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	949.92
0.0	949.20
6.0	948.52
11.9	948.33
18.2	948.67
24.1	948.74
28.9	948.74
34.2	948.83
36.1	948.88
37.7	948.91
38.7	948.62
40.0	947.87
40.1	947.87
40.4	947.80
41.0	947.65
41.7	947.64
42.0	947.68
43.0	948.13
44.6	948.84
46.1	948.86
50.2	948.93
54.7	949.02
59.6	949.00
63.4	949.14
66.9	950.08
71.5	952.06
73.4	952.34
76.5	952.69
76.6	953.70

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	948.82
<b>Bankfull Cross-Sectional Area:</b>	4.5
<b>Total Cross-Sectional Area:</b>	4.4
<b>Bankfull Width:</b>	6.6
<b>Flood Prone Area Elevation:</b>	950.00
<b>Flood Prone Width:</b>	66.6
<b>Max Depth at Bankfull:</b>	1.2
<b>Mean Depth at Bankfull:</b>	0.7
<b>W / D Ratio:</b>	9.6
<b>Entrenchment Ratio:</b>	10.1
<b>Bank Height Ratio:</b>	1.0
<b>Thalweg Elevation:</b>	947.64

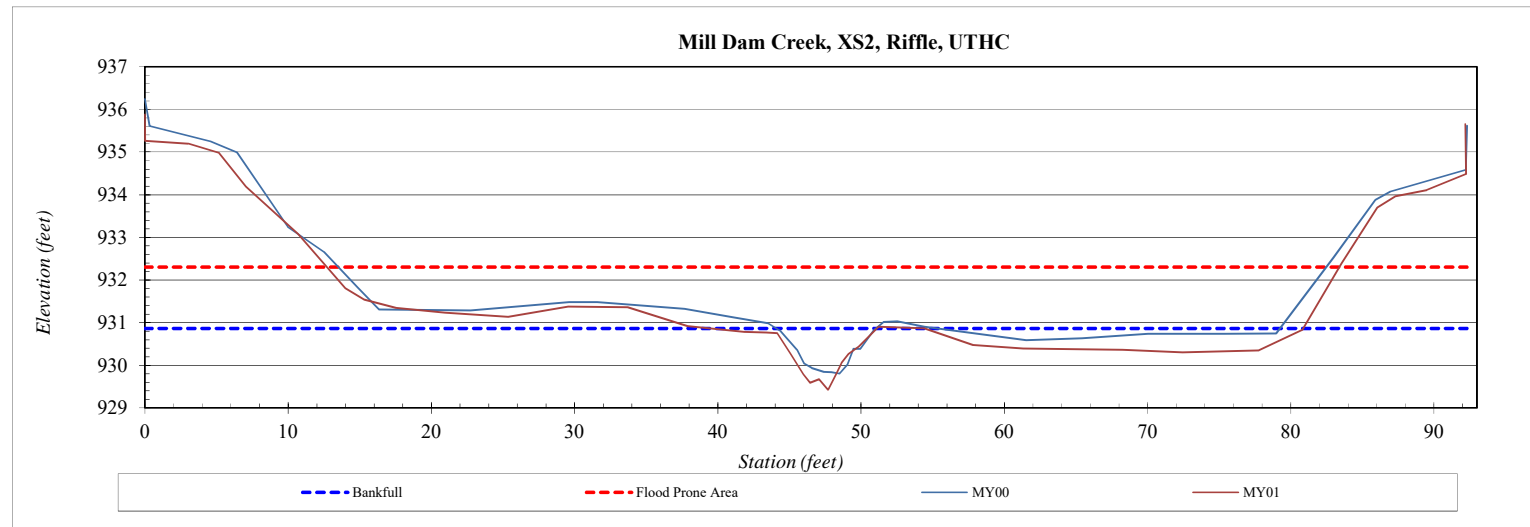


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS2
<b>Drainage Area (sq mi):</b>	0.18
<b>Date:</b>	12/17/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	935.88
0.0	935.27
3.0	935.20
5.2	934.98
7.1	934.19
10.7	933.08
14.0	931.81
15.3	931.54
17.5	931.35
20.9	931.23
25.4	931.14
29.6	931.38
33.7	931.36
37.9	930.92
41.8	930.78
43.4	930.77
44.2	930.75
45.1	930.27
46.0	929.79
46.4	929.60
47.1	929.68
47.7	929.43
48.3	929.81
48.6	930.05
49.1	930.27
49.8	930.44
51.2	930.90
52.5	930.89
54.4	930.87
57.8	930.48
61.3	930.39
64.7	930.38
68.3	930.37
72.4	930.31
77.8	930.35
80.8	930.83

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	930.86
<b>Bankfull Cross-Sectional Area:</b>	5.3
<b>Total Cross-Sectional Area:</b>	6.1
<b>Bankfull Width:</b>	7.0
<b>Flood Prone Area Elevation:</b>	932.30
<b>Flood Prone Width:</b>	70.7
<b>Max Depth at Bankfull:</b>	1.4
<b>Mean Depth at Bankfull:</b>	0.8
<b>W / D Ratio:</b>	9.2
<b>Entrenchment Ratio:</b>	10.1
<b>Bank Height Ratio:</b>	0.9
<b>Thalweg Elevation:</b>	929.43

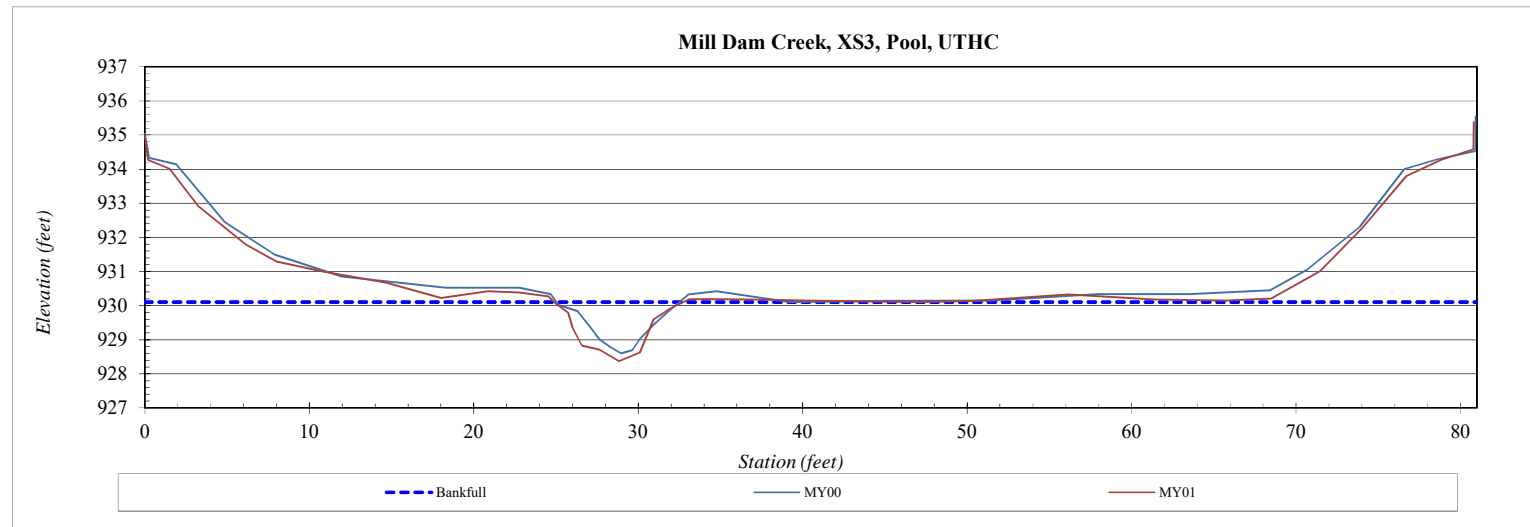


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS3
<b>Drainage Area (sq mi):</b>	0.18
<b>Date:</b>	12/17/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	934.94
0.2	934.27
1.5	934.01
3.2	932.92
6.1	931.79
8.0	931.30
10.9	930.99
14.7	930.67
18.0	930.22
20.9	930.42
22.8	930.39
24.5	930.28
25.0	930.06
25.7	929.79
26.0	929.35
26.6	928.82
27.6	928.72
28.8	928.37
30.1	928.62
30.9	929.60
31.9	929.92
33.1	930.19
34.4	930.19
37.2	930.17
40.1	930.15
42.7	930.13
47.2	930.11
50.4	930.14
56.2	930.32
61.5	930.18
65.7	930.16
68.5	930.20
71.5	931.00
74.0	932.28
76.7	933.79
78.8	934.27

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	930.10
<b>Bankfull Cross-Sectional Area:</b>	7.4
<b>Total Cross-Sectional Area:</b>	9.5
<b>Bankfull Width:</b>	7.8
<b>Flood Prone Area Elevation:</b>	---
<b>Flood Prone Width:</b>	---
<b>Max Depth at Bankfull:</b>	1.7
<b>Mean Depth at Bankfull:</b>	0.9
<b>W / D Ratio:</b>	---
<b>Entrenchment Ratio:</b>	---
<b>Bank Height Ratio:</b>	---
<b>Thalweg Elevation:</b>	928.37



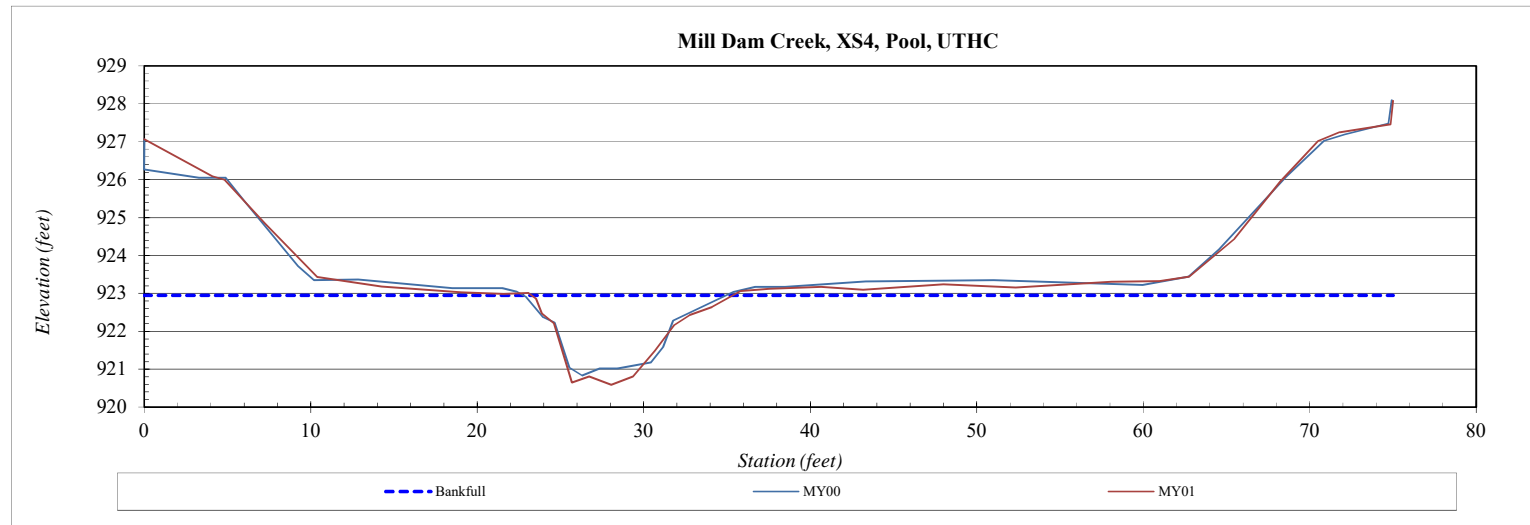


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS4
<b>Drainage Area (sq mi):</b>	0.18
<b>Date:</b>	12/17/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	927.07
4.1	926.09
4.8	925.99
7.3	924.84
10.4	923.43
14.3	923.18
19.0	923.03
21.6	922.99
23.1	923.02
23.5	922.86
23.9	922.47
24.6	922.21
25.7	920.65
26.7	920.81
28.1	920.59
29.4	920.81
30.7	921.49
31.8	922.17
32.8	922.43
34.1	922.64
35.8	923.06
37.5	923.12
40.7	923.17
43.2	923.10
48.0	923.24
52.4	923.15
58.1	923.31
61.0	923.33
62.8	923.44
65.5	924.44
68.2	925.95
70.5	927.02
71.8	927.25
74.9	927.46
75.0	928.08

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	922.95
<b>Bankfull Cross-Sectional Area:</b>	15.4
<b>Total Cross-Sectional Area:</b>	16.8
<b>Bankfull Width:</b>	12.1
<b>Flood Prone Area Elevation:</b>	---
<b>Flood Prone Width:</b>	---
<b>Max Depth at Bankfull:</b>	2.4
<b>Mean Depth at Bankfull:</b>	1.3
<b>W / D Ratio:</b>	---
<b>Entrenchment Ratio:</b>	---
<b>Bank Height Ratio:</b>	---
<b>Thalweg Elevation:</b>	920.59

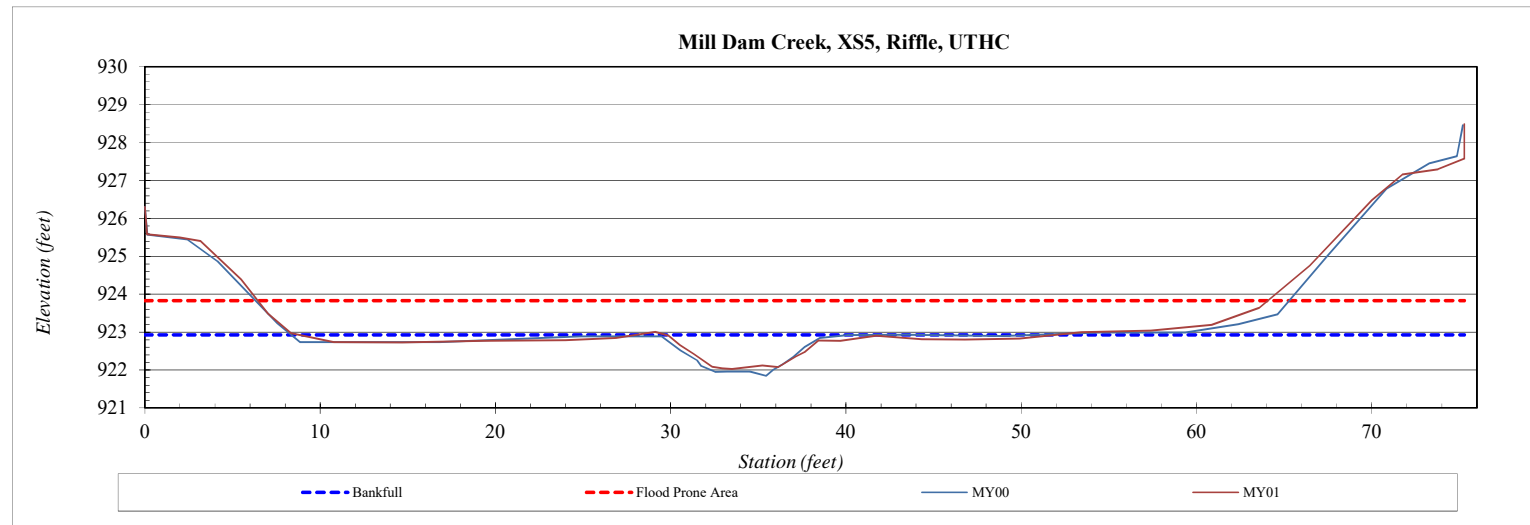


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS5
<b>Drainage Area (sq mi):</b>	0.18
<b>Date:</b>	12/22/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	926.30
0.1	925.59
2.0	925.50
3.2	925.40
5.5	924.39
7.0	923.49
8.3	922.98
10.8	922.74
14.7	922.73
19.3	922.78
24.0	922.79
26.9	922.84
29.1	923.01
29.9	922.91
30.5	922.66
31.3	922.43
32.4	922.09
33.0	922.04
33.5	922.03
35.2	922.12
36.1	922.08
37.1	922.36
37.6	922.46
38.4	922.78
39.7	922.77
41.7	922.91
44.3	922.82
46.8	922.80
49.9	922.83
53.4	923.00
57.4	923.05
60.9	923.20
63.6	923.64
66.5	924.76
70.0	926.49
71.8	927.16

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	922.93
<b>Bankfull Cross-Sectional Area:</b>	5.5
<b>Total Cross-Sectional Area:</b>	4.9
<b>Bankfull Width:</b>	8.6
<b>Flood Prone Area Elevation:</b>	923.83
<b>Flood Prone Width:</b>	57.6
<b>Max Depth at Bankfull:</b>	0.9
<b>Mean Depth at Bankfull:</b>	0.6
<b>W / D Ratio:</b>	13.2
<b>Entrenchment Ratio:</b>	6.7
<b>Bank Height Ratio:</b>	0.8
<b>Thalweg Elevation:</b>	922.03

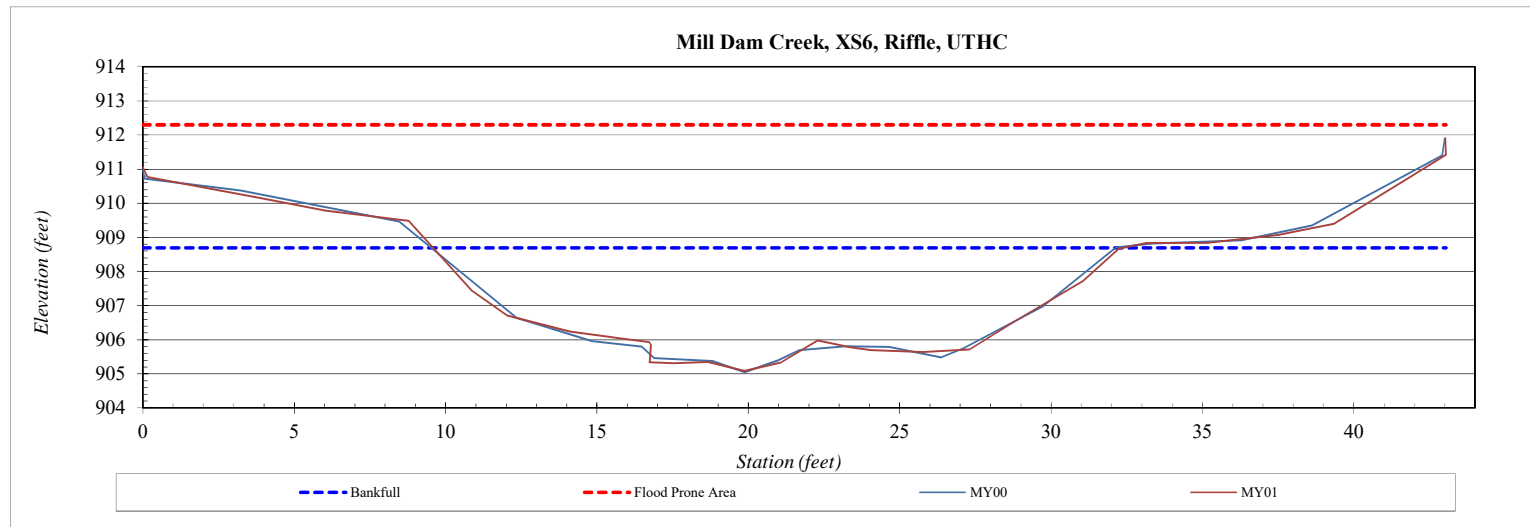


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS6
<b>Drainage Area (sq mi):</b>	0.22
<b>Date:</b>	12/17/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	911.06
0.2	910.77
3.9	910.16
6.0	909.78
8.8	909.49
10.9	907.44
12.0	906.71
14.1	906.24
15.8	906.04
16.7	905.93
16.8	905.84
16.7	905.34
17.5	905.31
18.7	905.35
19.9	905.09
21.1	905.33
22.3	905.98
23.4	905.78
24.0	905.69
25.8	905.64
27.3	905.71
29.0	906.64
31.0	907.71
32.2	908.67
33.2	908.84
35.2	908.84
37.5	909.07
39.4	909.40
41.8	910.71
43.0	911.42
43.0	911.91

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	908.69
<b>Bankfull Cross-Sectional Area:</b>	55.5
<b>Total Cross-Sectional Area:</b>	55.9
<b>Bankfull Width:</b>	22.8
<b>Flood Prone Area Elevation:</b>	912.30
<b>Flood Prone Width:</b>	43.0
<b>Max Depth at Bankfull:</b>	3.6
<b>Mean Depth at Bankfull:</b>	2.4
<b>W / D Ratio:</b>	9.3
<b>Entrenchment Ratio:</b>	1.9
<b>Bank Height Ratio:</b>	1.0
<b>Thalweg Elevation:</b>	905.09

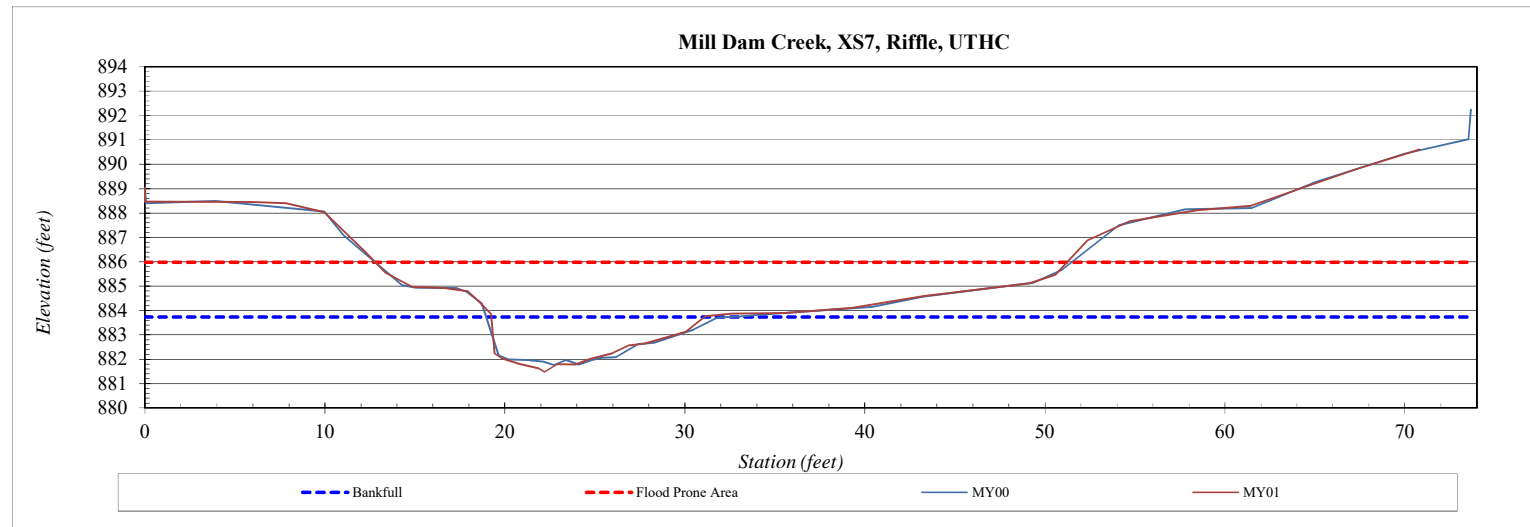


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS7
<b>Drainage Area (sq mi):</b>	0.22
<b>Date:</b>	12/22/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	889.03
0.0	888.47
5.9	888.46
7.9	888.40
10.0	888.04
12.3	886.39
13.4	885.54
14.8	884.97
16.6	884.92
17.9	884.79
18.5	884.40
19.2	883.86
19.4	882.24
19.8	882.03
20.8	881.81
21.9	881.63
22.2	881.48
22.9	881.80
23.9	881.78
24.7	882.01
26.0	882.25
26.9	882.57
27.7	882.64
30.0	883.13
31.1	883.77
32.6	883.87
35.6	883.90
39.3	884.11
43.3	884.60
49.2	885.12
50.6	885.47
52.4	886.87
54.7	887.67
58.4	888.11
61.5	888.31
67.4	889.83

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	883.73
<b>Bankfull Cross-Sectional Area:</b>	16.7
<b>Total Cross-Sectional Area:</b>	16.6
<b>Bankfull Width:</b>	11.8
<b>Flood Prone Area Elevation:</b>	885.98
<b>Flood Prone Width:</b>	38.4
<b>Max Depth at Bankfull:</b>	2.2
<b>Mean Depth at Bankfull:</b>	1.4
<b>W / D Ratio:</b>	8.3
<b>Entrenchment Ratio:</b>	3.3
<b>Bank Height Ratio:</b>	1.0
<b>Thalweg Elevation:</b>	881.48

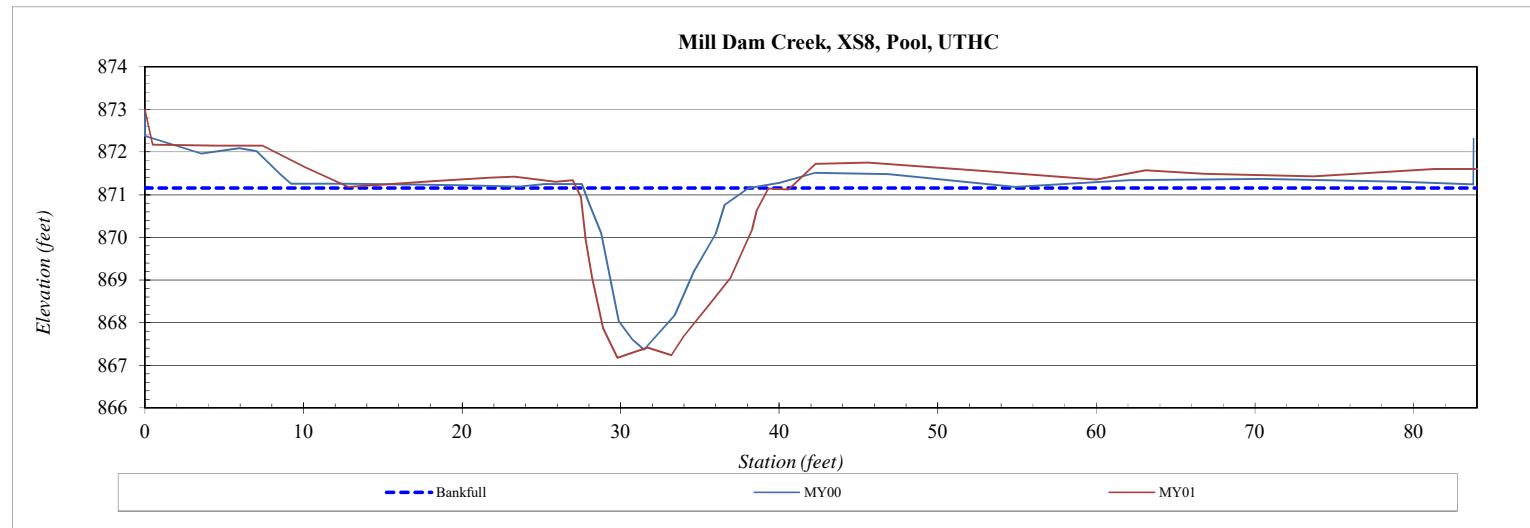


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS8
<b>Drainage Area (sq mi):</b>	1.07
<b>Date:</b>	12/22/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	872.99
0.5	872.18
4.5	872.16
7.4	872.16
10.1	871.65
12.8	871.19
18.5	871.33
21.8	871.41
23.3	871.43
25.9	871.31
27.0	871.35
27.5	870.95
27.8	869.94
28.2	869.05
28.9	867.88
29.8	867.18
31.7	867.42
33.2	867.24
34.0	867.69
35.5	868.38
36.9	869.04
38.3	870.20
38.6	870.66
39.3	871.15
40.6	871.13
42.3	871.73
45.6	871.76
53.1	871.56
60.0	871.36
63.1	871.58
66.8	871.50
73.7	871.44
81.3	871.61
84.6	871.61
84.7	872.29

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	871.16
<b>Bankfull Cross-Sectional Area:</b>	20.8
<b>Total Cross-Sectional Area:</b>	20.8
<b>Bankfull Width:</b>	10.4
<b>Flood Prone Area Elevation:</b>	---
<b>Flood Prone Width:</b>	---
<b>Max Depth at Bankfull:</b>	3.8
<b>Mean Depth at Bankfull:</b>	2.0
<b>W / D Ratio:</b>	---
<b>Entrenchment Ratio:</b>	---
<b>Bank Height Ratio:</b>	---
<b>Thalweg Elevation:</b>	867.37



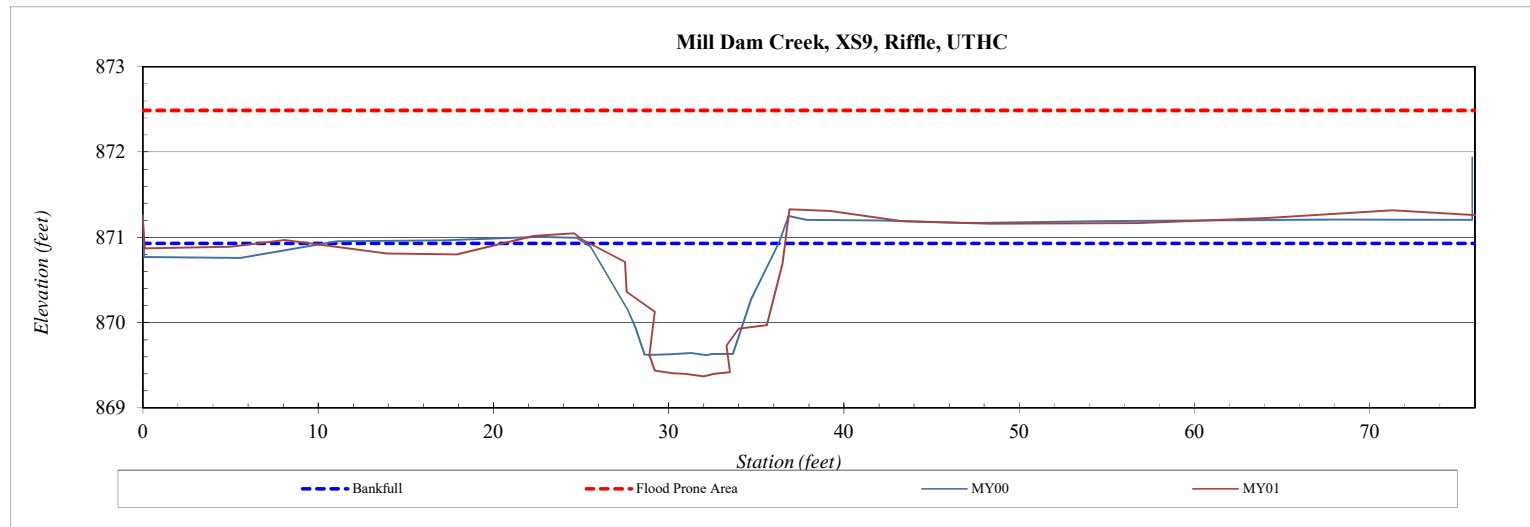


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS9
<b>Drainage Area (sq mi):</b>	0.46
<b>Date:</b>	12/22/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	871.23
0.1	870.87
5.0	870.89
8.1	870.97
13.9	870.81
17.9	870.80
22.3	871.02
24.6	871.05
25.1	870.97
27.5	870.71
27.6	870.36
29.2	870.13
28.9	869.62
29.2	869.44
30.2	869.41
30.9	869.40
32.0	869.37
32.6	869.40
33.5	869.42
33.3	869.73
34.0	869.93
35.6	869.97
36.5	870.69
36.9	871.33
39.2	871.31
43.3	871.19
48.4	871.16
56.8	871.17
64.2	871.23
71.3	871.32
76.9	871.25
76.1	871.72

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	870.93
<b>Bankfull Cross-Sectional Area:</b>	10.6
<b>Total Cross-Sectional Area:</b>	11.4
<b>Bankfull Width:</b>	11.2
<b>Flood Prone Area Elevation:</b>	872.49
<b>Flood Prone Width:</b>	76.1
<b>Max Depth at Bankfull:</b>	1.6
<b>Mean Depth at Bankfull:</b>	1.0
<b>W / D Ratio:</b>	11.7
<b>Entrenchment Ratio:</b>	6.8
<b>Bank Height Ratio:</b>	1.0
<b>Thalweg Elevation:</b>	869.37



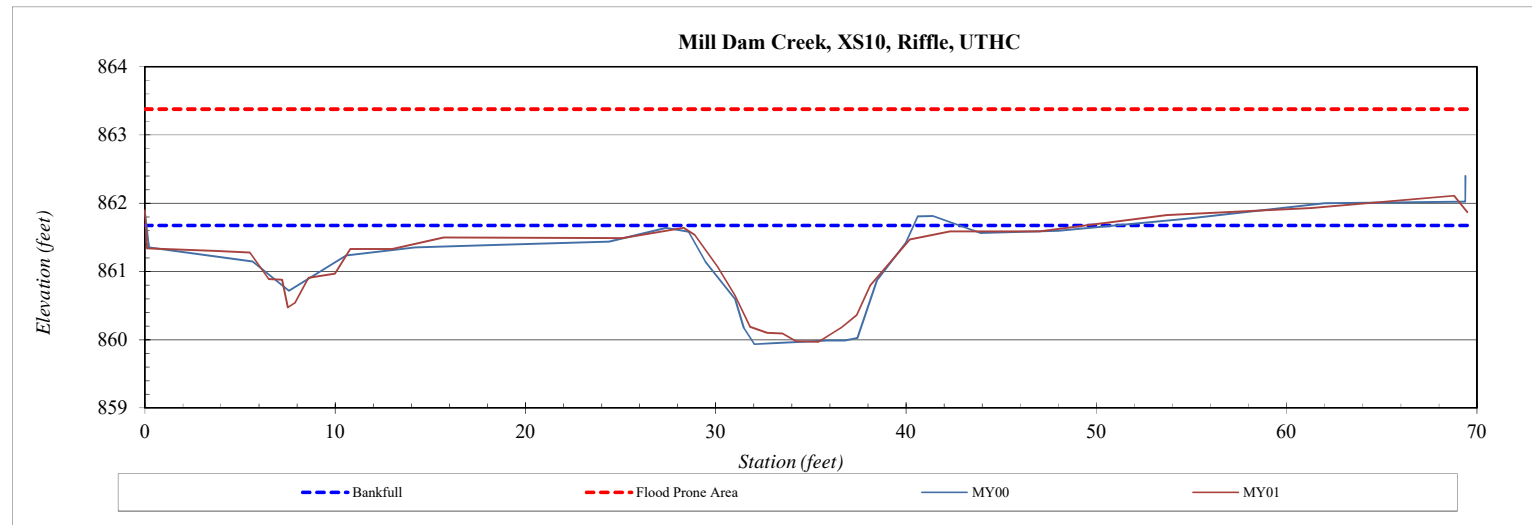


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS10
<b>Drainage Area (sq mi):</b>	0.46
<b>Date:</b>	12/22/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	861.90
0.1	861.34
3.7	861.30
5.5	861.28
6.5	860.89
7.2	860.88
7.5	860.47
7.9	860.54
8.6	860.91
10.0	860.97
10.8	861.33
13.0	861.33
15.7	861.50
25.1	861.49
28.3	861.64
28.9	861.53
30.1	861.07
31.0	860.65
31.8	860.19
32.7	860.10
33.5	860.09
34.2	859.98
35.4	859.97
36.6	860.18
37.4	860.36
38.1	860.79
40.2	861.47
42.3	861.59
47.0	861.59
53.7	861.83
61.3	861.93
68.8	862.11
69.5	861.87

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	861.67
<b>Bankfull Cross-Sectional Area:</b>	13.3
<b>Total Cross-Sectional Area:</b>	12.1
<b>Bankfull Width:</b>	14.0
<b>Flood Prone Area Elevation:</b>	863.38
<b>Flood Prone Width:</b>	69.5
<b>Max Depth at Bankfull:</b>	1.7
<b>Mean Depth at Bankfull:</b>	1.0
<b>W / D Ratio:</b>	14.7
<b>Entrenchment Ratio:</b>	5.0
<b>Bank Height Ratio:</b>	1.0
<b>Thalweg Elevation:</b>	859.97

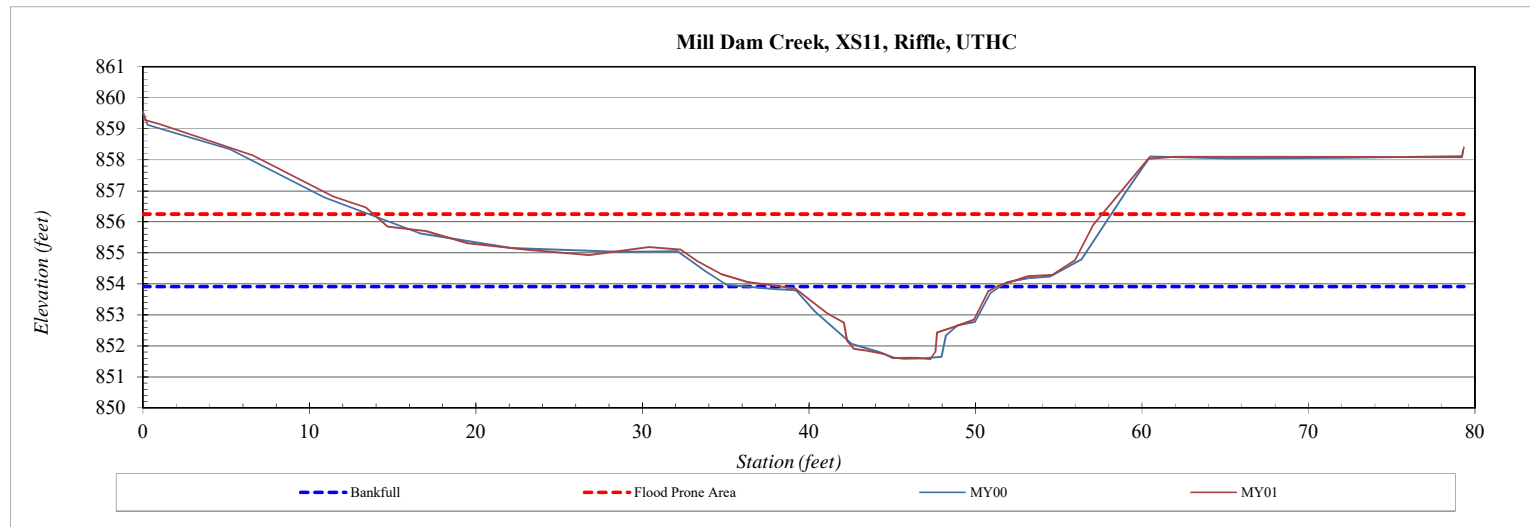


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS11
<b>Drainage Area (sq mi):</b>	0.46
<b>Date:</b>	12/22/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	859.57
0.1	859.29
1.1	859.13
6.6	858.14
11.4	856.82
13.4	856.46
14.7	855.85
17.0	855.71
19.5	855.31
23.0	855.11
26.8	854.93
30.4	855.19
32.3	855.11
33.3	854.73
34.7	854.32
36.3	854.06
38.3	853.92
39.2	853.85
40.1	853.47
41.1	853.05
42.1	852.74
42.3	852.17
42.7	851.91
43.5	851.84
44.5	851.74
45.0	851.61
45.9	851.62
46.5	851.62
47.3	851.57
47.6	851.81
47.7	852.43
48.9	852.65
49.9	852.85
50.8	853.75
51.4	853.93
53.2	854.25

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	853.91
<b>Bankfull Cross-Sectional Area:</b>	17.3
<b>Total Cross-Sectional Area:</b>	16.0
<b>Bankfull Width:</b>	12.1
<b>Flood Prone Area Elevation:</b>	856.25
<b>Flood Prone Width:</b>	43.8
<b>Max Depth at Bankfull:</b>	2.3
<b>Mean Depth at Bankfull:</b>	1.4
<b>W / D Ratio:</b>	8.5
<b>Entrenchment Ratio:</b>	3.6
<b>Bank Height Ratio:</b>	1.0
<b>Thalweg Elevation:</b>	851.57

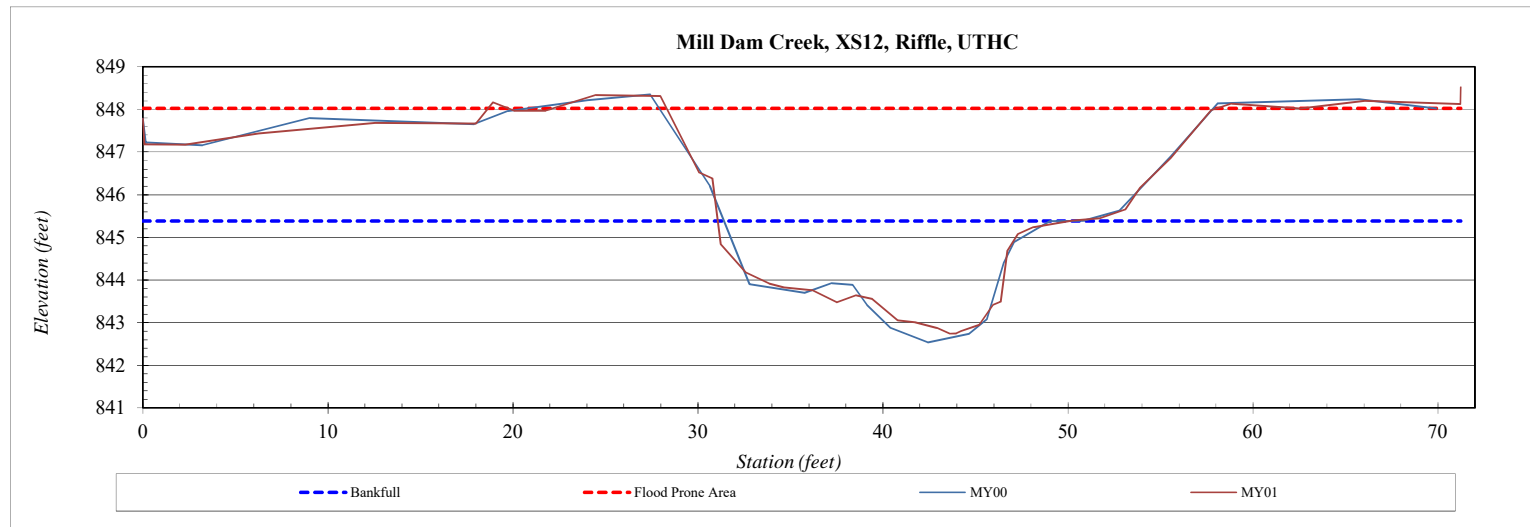


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS12
<b>Drainage Area (sq mi):</b>	0.61
<b>Date:</b>	12/22/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	847.79
0.1	847.18
2.3	847.18
6.3	847.44
12.5	847.69
15.4	847.68
18.0	847.67
18.9	848.16
20.1	847.97
21.8	847.97
24.5	848.34
28.0	848.32
30.0	846.52
30.8	846.38
31.2	844.84
32.6	844.17
33.8	843.92
34.6	843.83
36.2	843.76
37.5	843.47
38.6	843.64
39.4	843.56
40.8	843.05
41.7	843.01
42.9	842.88
43.6	842.74
44.0	842.75
44.2	842.80
45.2	842.95
46.0	843.42
46.4	843.49
46.7	844.69
47.3	845.07
48.1	845.24
50.3	845.40
51.8	845.45

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	845.38
<b>Bankfull Cross-Sectional Area:</b>	29.7
<b>Total Cross-Sectional Area:</b>	29.7
<b>Bankfull Width:</b>	19.0
<b>Flood Prone Area Elevation:</b>	848.02
<b>Flood Prone Width:</b>	17.7
<b>Max Depth at Bankfull:</b>	2.6
<b>Mean Depth at Bankfull:</b>	1.6
<b>W / D Ratio:</b>	12.2
<b>Entrenchment Ratio:</b>	0.9
<b>Bank Height Ratio:</b>	1.0
<b>Thalweg Elevation:</b>	842.74



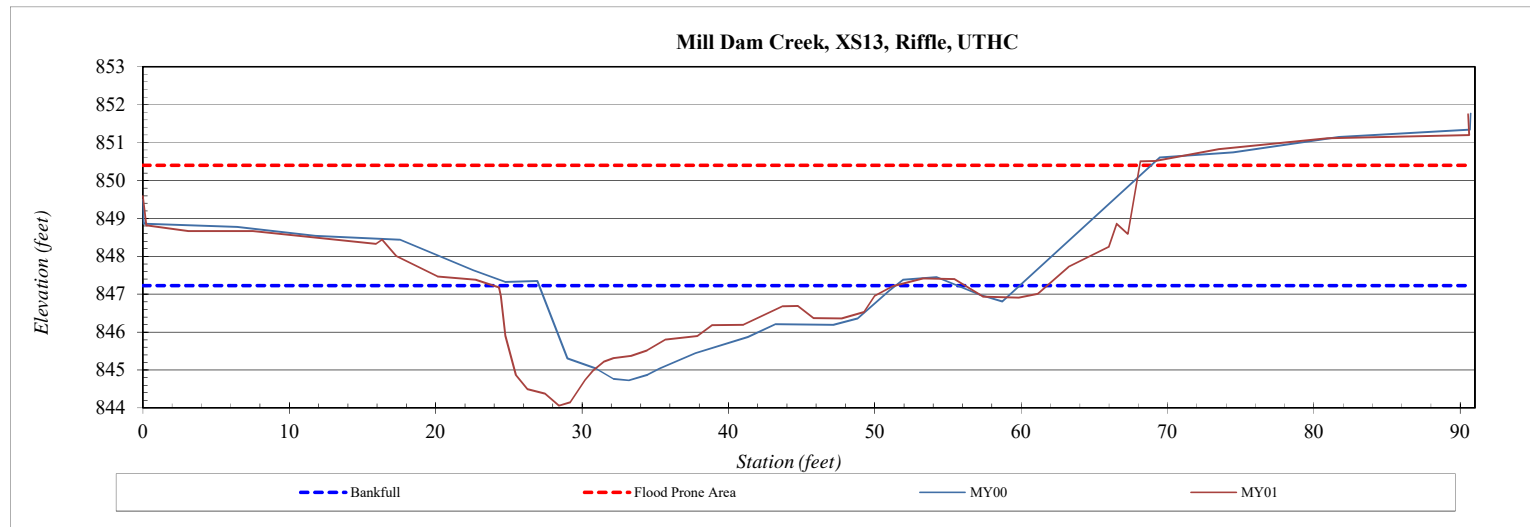


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS13
<b>Drainage Area (sq mi):</b>	0.04
<b>Date:</b>	12/22/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	849.59
0.2	848.82
3.1	848.66
7.5	848.67
15.9	848.33
16.3	848.44
17.3	848.00
20.1	847.47
22.7	847.38
24.3	847.18
24.4	846.94
24.8	845.90
25.5	844.86
26.3	844.50
27.5	844.38
28.4	844.06
29.2	844.15
30.2	844.74
30.8	844.99
31.5	845.22
32.1	845.32
33.4	845.38
34.5	845.52
35.7	845.81
37.9	845.90
38.9	846.18
41.0	846.19
43.7	846.68
44.8	846.69
45.8	846.37
47.7	846.36
49.3	846.53
50.0	846.95
51.3	847.22
53.3	847.42
55.4	847.40

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	847.23
<b>Bankfull Cross-Sectional Area:</b>	38.7
<b>Total Cross-Sectional Area:</b>	42.1
<b>Bankfull Width:</b>	27.3
<b>Flood Prone Area Elevation:</b>	850.40
<b>Flood Prone Width:</b>	68.1
<b>Max Depth at Bankfull:</b>	3.2
<b>Mean Depth at Bankfull:</b>	1.4
<b>W / D Ratio:</b>	19.3
<b>Entrenchment Ratio:</b>	2.5
<b>Bank Height Ratio:</b>	0.9
<b>Thalweg Elevation:</b>	844.06

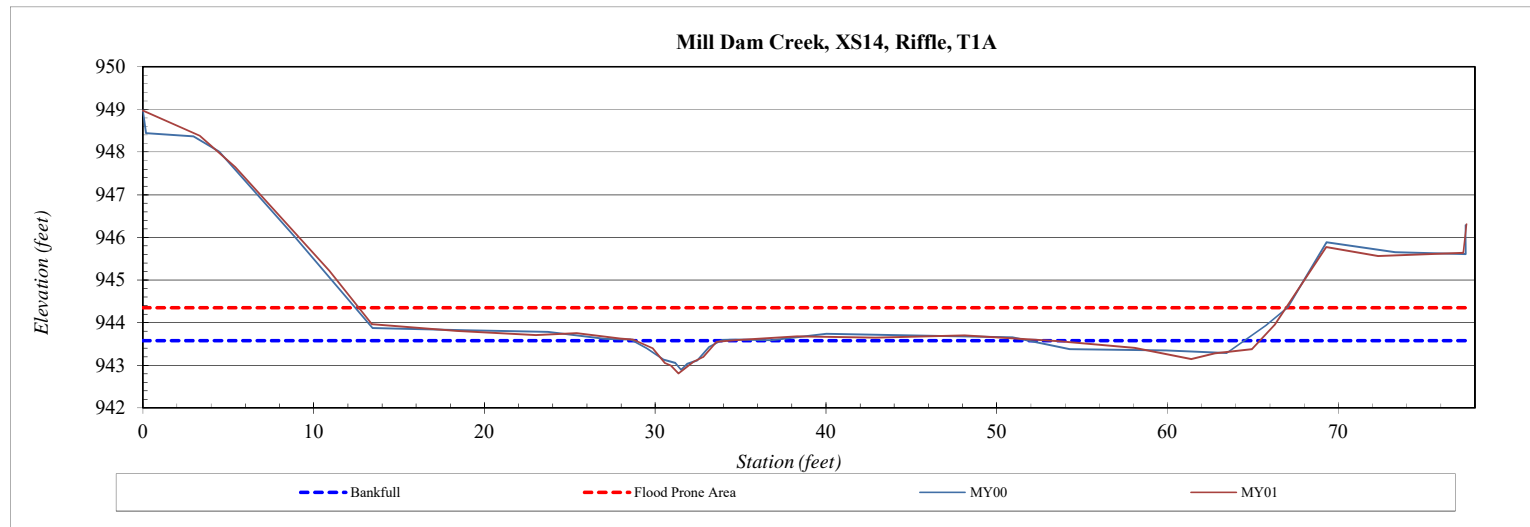


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS14
<b>Drainage Area (sq mi):</b>	0.04
<b>Date:</b>	12/17/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	948.98
3.3	948.38
5.4	947.65
10.9	945.22
13.4	943.97
18.4	943.81
23.0	943.71
25.4	943.75
28.0	943.63
28.7	943.61
29.9	943.39
30.6	943.05
30.9	942.99
31.4	942.81
32.2	943.07
32.8	943.19
33.6	943.55
34.7	943.59
38.3	943.68
42.9	943.65
48.1	943.70
53.6	943.57
58.1	943.41
61.4	943.14
62.8	943.28
64.9	943.38
66.3	943.95
69.3	945.78
72.3	945.57
77.3	945.64
77.5	946.31

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	943.58
<b>Bankfull Cross-Sectional Area:</b>	1.8
<b>Total Cross-Sectional Area:</b>	1.9
<b>Bankfull Width:</b>	4.8
<b>Flood Prone Area Elevation:</b>	944.35
<b>Flood Prone Width:</b>	54.3
<b>Max Depth at Bankfull:</b>	0.8
<b>Mean Depth at Bankfull:</b>	0.4
<b>W / D Ratio:</b>	12.5
<b>Entrenchment Ratio:</b>	11.4
<b>Bank Height Ratio:</b>	1.0
<b>Thalweg Elevation:</b>	942.81

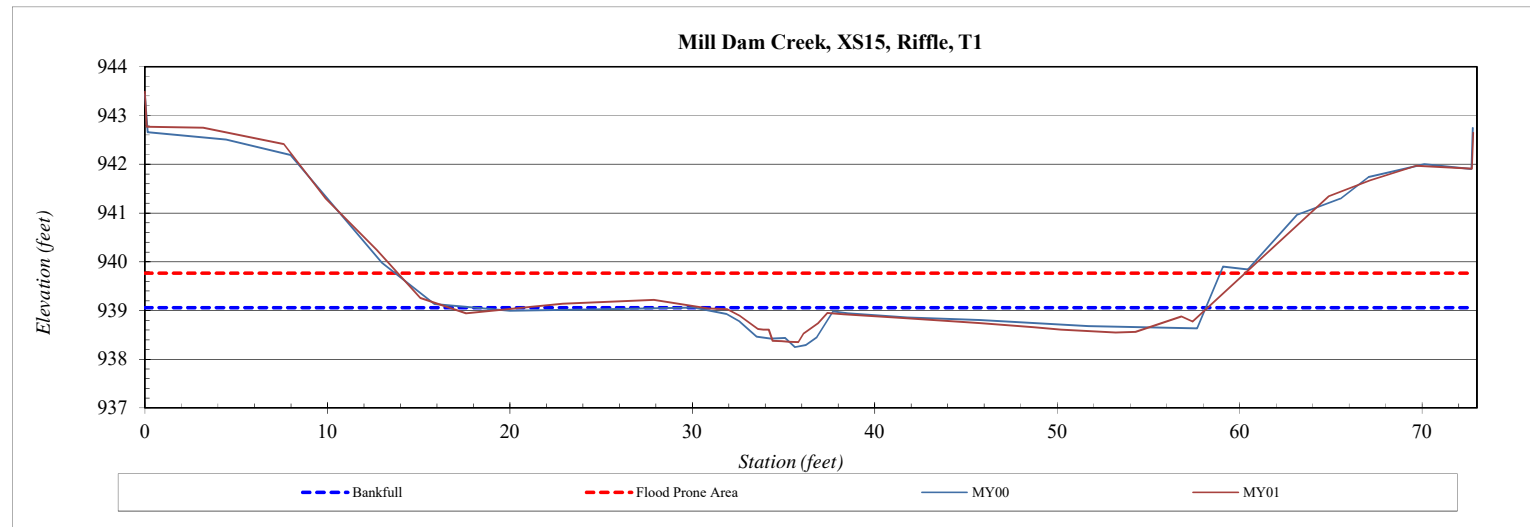


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS15
<b>Drainage Area (sq mi):</b>	0.07
<b>Date:</b>	12/17/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	943.49
0.1	942.77
3.2	942.75
7.6	942.42
9.9	941.30
12.7	940.24
15.1	939.26
17.6	938.94
22.9	939.14
27.9	939.22
30.9	939.04
31.9	939.03
32.6	938.89
33.6	938.62
33.9	938.61
34.2	938.61
34.4	938.38
34.9	938.37
35.3	938.36
35.8	938.35
36.1	938.53
36.9	938.74
37.4	938.95
38.3	938.92
39.9	938.89
41.3	938.85
43.4	938.80
45.4	938.75
48.2	938.67
50.2	938.61
53.2	938.55
54.3	938.56
56.8	938.88
57.4	938.77
64.9	941.34
67.2	941.67

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	939.06
<b>Bankfull Cross-Sectional Area:</b>	2.3
<b>Total Cross-Sectional Area:</b>	1.7
<b>Bankfull Width:</b>	5.5
<b>Flood Prone Area Elevation:</b>	939.76
<b>Flood Prone Width:</b>	46.4
<b>Max Depth at Bankfull:</b>	0.7
<b>Mean Depth at Bankfull:</b>	0.4
<b>W / D Ratio:</b>	12.9
<b>Entrenchment Ratio:</b>	8.4
<b>Bank Height Ratio:</b>	0.8
<b>Thalweg Elevation:</b>	938.35



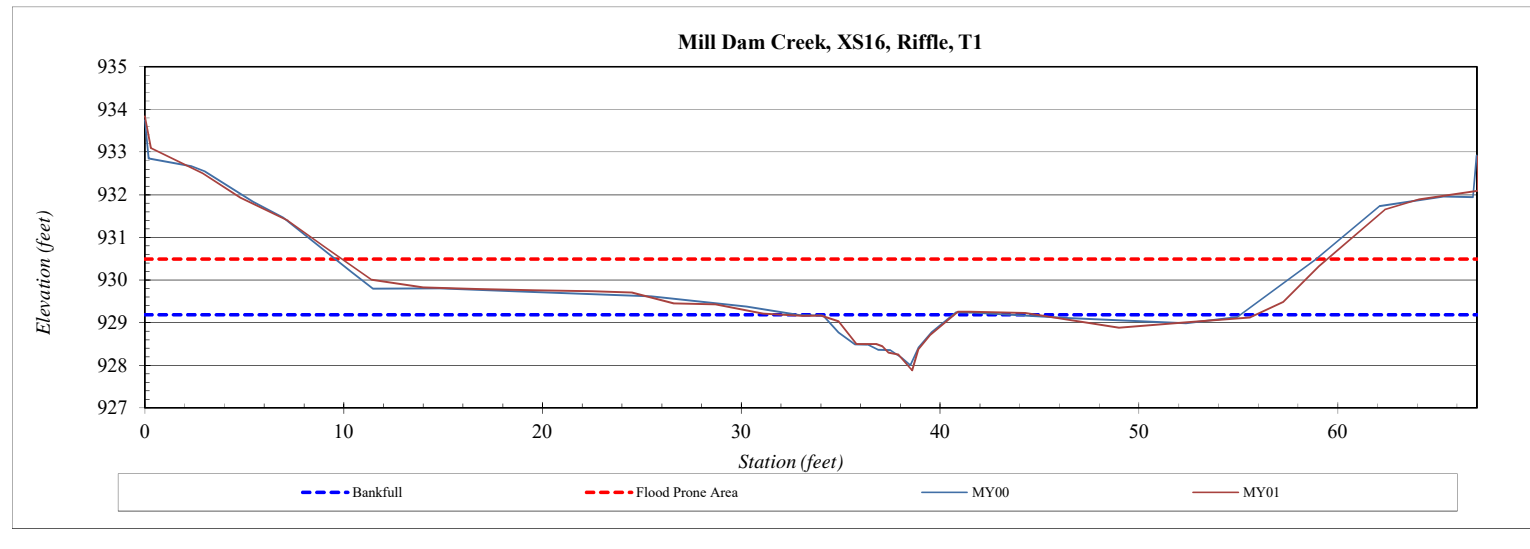


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS16
<b>Drainage Area (sq mi):</b>	0.07
<b>Date:</b>	12/17/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	933.84
0.3	933.09
2.9	932.50
4.8	931.93
7.2	931.39
9.1	930.76
11.4	930.01
14.0	929.83
16.7	929.79
19.6	929.76
22.5	929.74
24.5	929.71
26.6	929.45
28.7	929.43
31.1	929.21
33.1	929.16
34.0	929.17
34.9	929.03
35.8	928.50
36.4	928.50
36.8	928.50
37.1	928.45
37.4	928.30
37.9	928.25
38.6	927.88
38.9	928.37
39.5	928.71
40.9	929.26
41.5	929.26
44.3	929.23
49.0	928.88
52.4	929.01
55.6	929.12
57.3	929.48
59.1	930.32
62.4	931.65

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	929.19
<b>Bankfull Cross-Sectional Area:</b>	3.9
<b>Total Cross-Sectional Area:</b>	3.7
<b>Bankfull Width:</b>	8.6
<b>Flood Prone Area Elevation:</b>	930.49
<b>Flood Prone Width:</b>	49.6
<b>Max Depth at Bankfull:</b>	1.3
<b>Mean Depth at Bankfull:</b>	0.4
<b>W / D Ratio:</b>	19.3
<b>Entrenchment Ratio:</b>	5.7
<b>Bank Height Ratio:</b>	0.9
<b>Thalweg Elevation:</b>	927.88

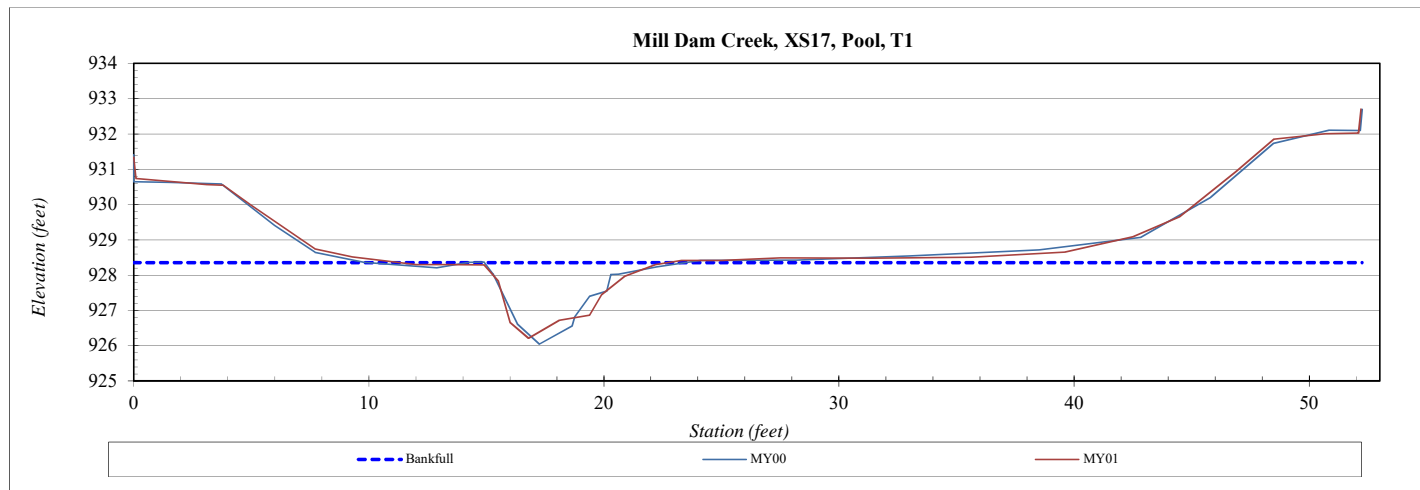


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS17
<b>Drainage Area (sq mi):</b>	0.07
<b>Date:</b>	12/22/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	931.34
0.1	930.74
3.1	930.57
3.8	930.55
5.0	929.98
7.7	928.74
9.3	928.52
12.0	928.30
13.4	928.30
14.9	928.29
15.5	927.84
16.0	926.66
16.8	926.21
18.1	926.72
19.4	926.87
19.9	927.44
20.9	927.97
22.2	928.30
23.3	928.42
25.0	928.42
27.5	928.49
31.4	928.48
35.6	928.51
39.6	928.65
42.5	929.09
44.5	929.66
46.9	930.94
48.5	931.85
50.7	932.01
52.1	932.03
52.2	932.70

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	928.35
<b>Bankfull Cross-Sectional Area:</b>	8.3
<b>Total Cross-Sectional Area:</b>	8.4
<b>Bankfull Width:</b>	7.8
<b>Flood Prone Area Elevation:</b>	---
<b>Flood Prone Width:</b>	---
<b>Max Depth at Bankfull:</b>	2.1
<b>Mean Depth at Bankfull:</b>	1.1
<b>W / D Ratio:</b>	---
<b>Entrenchment Ratio:</b>	---
<b>Bank Height Ratio:</b>	---
<b>Thalweg Elevation:</b>	926.21

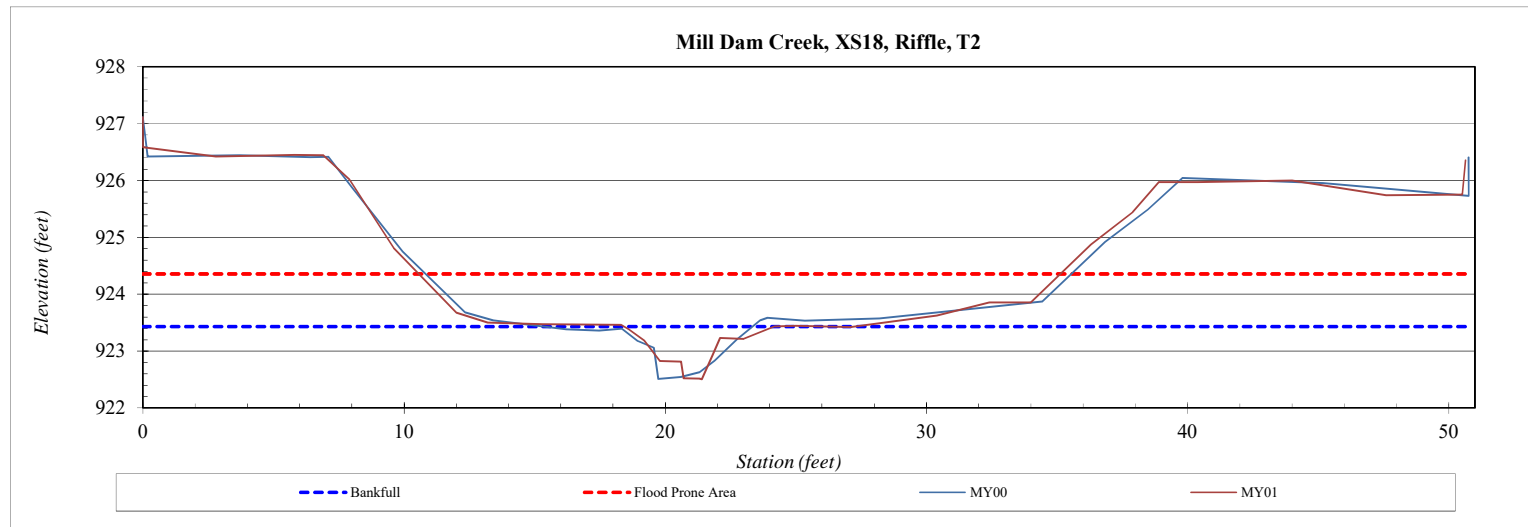


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS18
<b>Drainage Area (sq mi):</b>	0.02
<b>Date:</b>	12/22/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	927.11
0.0	926.58
2.8	926.42
5.8	926.45
6.9	926.44
7.9	926.02
9.6	924.81
12.0	923.67
13.2	923.50
15.3	923.47
18.3	923.46
18.6	923.38
19.2	923.18
19.8	922.82
20.6	922.81
20.7	922.52
21.3	922.51
21.4	922.50
21.8	922.92
22.1	923.23
23.0	923.21
24.2	923.43
25.0	923.44
27.1	923.42
30.4	923.62
32.4	923.85
34.0	923.85
36.3	924.87
37.9	925.44
38.9	925.97
40.4	925.97
44.0	926.00
47.6	925.74
50.5	925.75
50.6	926.35

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	923.43
<b>Bankfull Cross-Sectional Area:</b>	2.3
<b>Total Cross-Sectional Area:</b>	1.9
<b>Bankfull Width:</b>	5.8
<b>Flood Prone Area Elevation:</b>	924.36
<b>Flood Prone Width:</b>	24.6
<b>Max Depth at Bankfull:</b>	0.9
<b>Mean Depth at Bankfull:</b>	0.4
<b>W / D Ratio:</b>	14.7
<b>Entrenchment Ratio:</b>	4.3
<b>Bank Height Ratio:</b>	0.8
<b>Thalweg Elevation:</b>	922.50





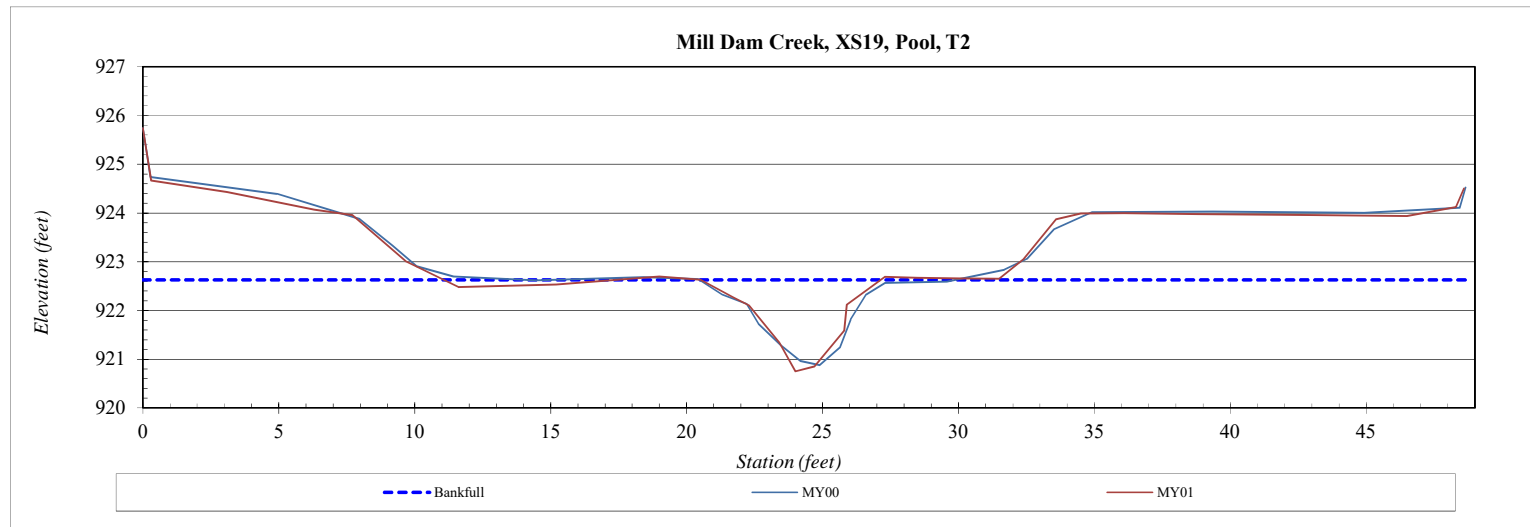
## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS19
<b>Drainage Area (sq mi):</b>	0.02
<b>Date:</b>	12/17/2020
<b>Field Crew:</b>	TS, KB



Station	Elevation
0.0	925.74
0.3	924.67
3.1	924.43
6.3	924.07
7.7	923.96
9.7	923.00
11.6	922.48
15.2	922.53
19.0	922.70
20.5	922.63
21.7	922.27
22.3	922.10
23.4	921.35
24.0	920.75
24.7	920.85
25.8	921.59
25.9	922.12
27.3	922.69
28.5	922.67
30.1	922.66
31.5	922.65
32.4	923.05
33.6	923.87
34.5	923.99
36.1	924.00
38.8	923.98
43.1	923.96
46.5	923.94
48.3	924.12
48.6	924.50

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	922.63
<b>Bankfull Cross-Sectional Area:</b>	5.6
<b>Total Cross-Sectional Area:</b>	5.2
<b>Bankfull Width:</b>	6.6
<b>Flood Prone Area Elevation:</b>	---
<b>Flood Prone Width:</b>	---
<b>Max Depth at Bankfull:</b>	1.9
<b>Mean Depth at Bankfull:</b>	0.8
<b>W / D Ratio:</b>	---
<b>Entrenchment Ratio:</b>	---
<b>Bank Height Ratio:</b>	---
<b>Thalweg Elevation:</b>	920.75

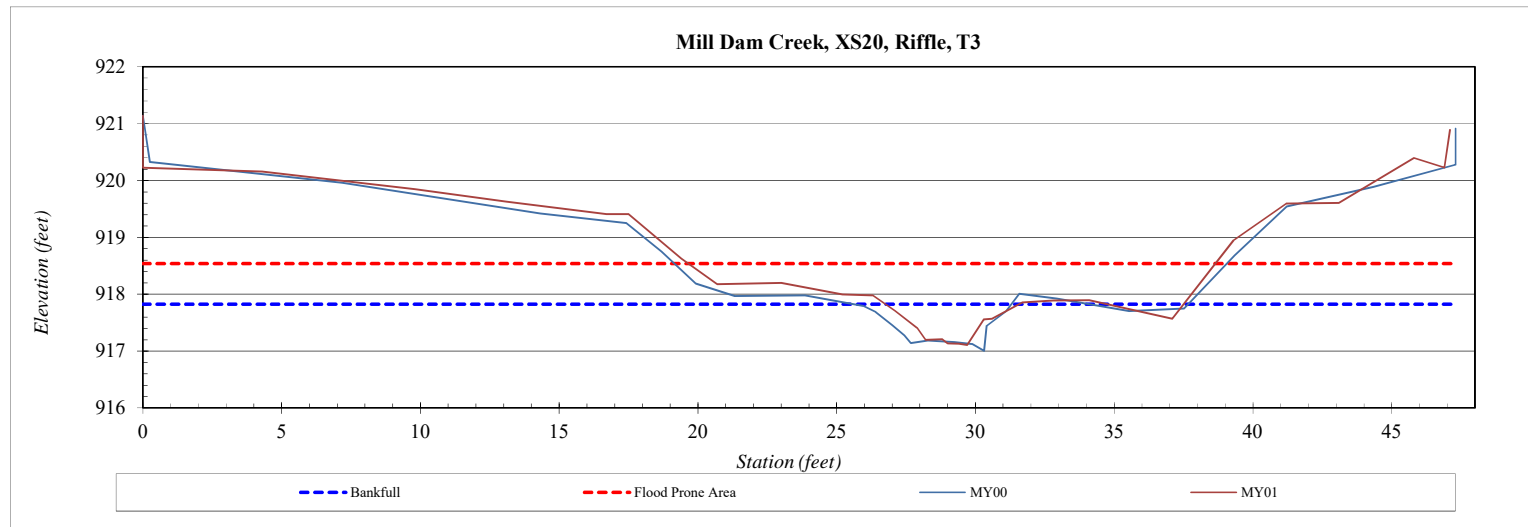


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS20
<b>Drainage Area (sq mi):</b>	0.01
<b>Date:</b>	12/22/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	921.14
0.0	920.23
4.3	920.16
9.8	919.85
13.1	919.63
16.7	919.41
17.5	919.41
19.4	918.63
20.7	918.18
23.0	918.20
25.2	918.00
26.3	917.98
27.1	917.71
27.9	917.41
28.2	917.20
28.8	917.21
29.0	917.14
29.4	917.13
29.7	917.11
30.3	917.56
30.6	917.57
31.7	917.86
32.8	917.89
34.1	917.90
37.1	917.57
39.3	918.95
41.2	919.60
43.1	919.61
45.8	920.40
46.9	920.23
47.1	920.89

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	917.82
<b>Bankfull Cross-Sectional Area:</b>	1.9
<b>Total Cross-Sectional Area:</b>	1.3
<b>Bankfull Width:</b>	4.8
<b>Flood Prone Area Elevation:</b>	918.54
<b>Flood Prone Width:</b>	19.0
<b>Max Depth at Bankfull:</b>	0.7
<b>Mean Depth at Bankfull:</b>	0.4
<b>W / D Ratio:</b>	12.3
<b>Entrenchment Ratio:</b>	3.9
<b>Bank Height Ratio:</b>	1.0
<b>Thalweg Elevation:</b>	917.11



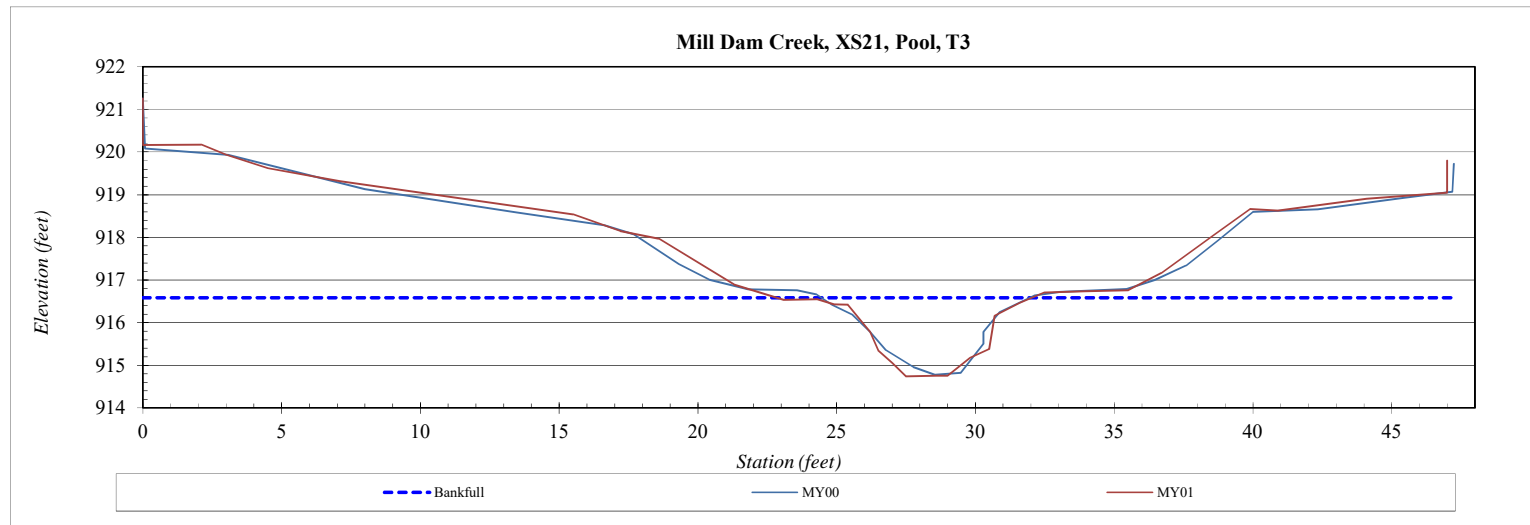
## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS21
<b>Drainage Area (sq mi):</b>	0.01
<b>Date:</b>	12/22/2020
<b>Field Crew:</b>	TS, KB



Station	Elevation
0.0	921.26
0.0	920.17
2.1	920.18
3.0	919.94
4.5	919.62
7.1	919.32
15.5	918.54
17.2	918.15
18.6	917.97
21.3	916.90
23.1	916.54
24.3	916.55
24.9	916.43
25.4	916.42
26.2	915.79
26.5	915.35
27.0	915.06
27.5	914.74
28.6	914.76
29.0	914.76
29.8	915.17
30.5	915.38
30.7	916.16
31.6	916.46
32.5	916.71
34.0	916.74
35.5	916.76
36.7	917.17
38.6	918.06
39.9	918.67
40.9	918.63
44.1	918.91
47.0	919.05
47.0	919.80

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	916.59
<b>Bankfull Cross-Sectional Area:</b>	7.7
<b>Total Cross-Sectional Area:</b>	8.1
<b>Bankfull Width:</b>	7.2
<b>Flood Prone Area Elevation:</b>	---
<b>Flood Prone Width:</b>	---
<b>Max Depth at Bankfull:</b>	1.8
<b>Mean Depth at Bankfull:</b>	1.1
<b>W / D Ratio:</b>	---
<b>Entrenchment Ratio:</b>	---
<b>Bank Height Ratio:</b>	---
<b>Thalweg Elevation:</b>	914.74



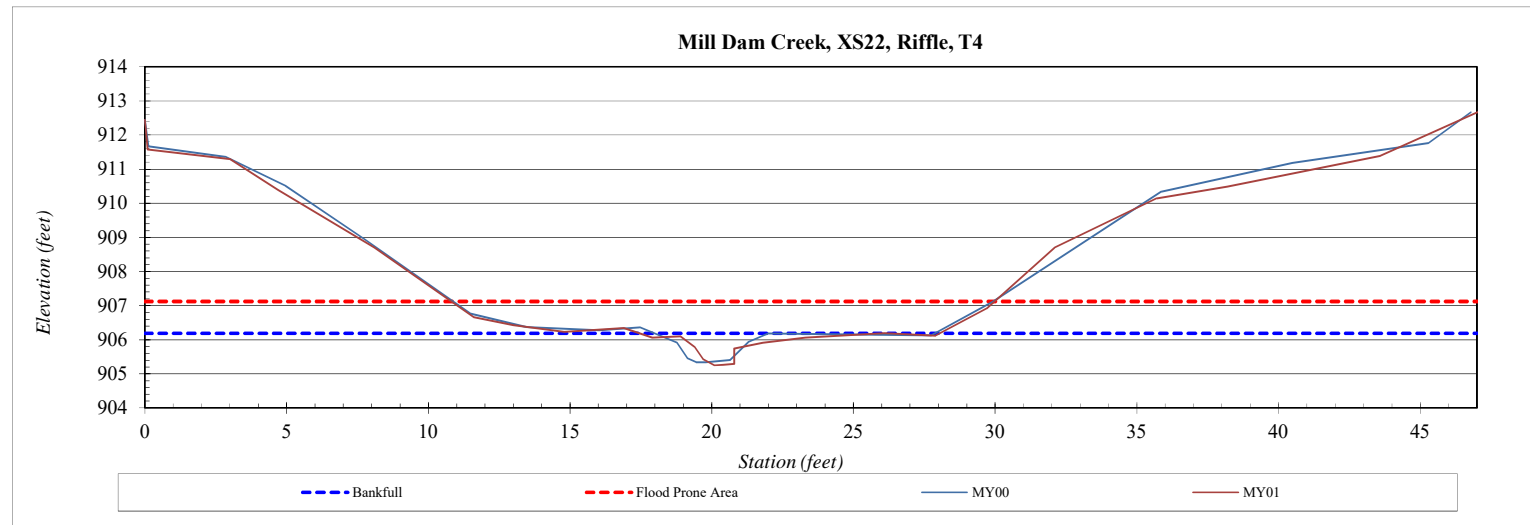


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS22
<b>Drainage Area (sq mi):</b>	0.01
<b>Date:</b>	12/17/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	912.44
0.1	911.58
3.0	911.30
4.7	910.39
8.1	908.70
11.6	906.66
13.0	906.43
14.8	906.23
16.9	906.34
17.9	906.06
18.9	906.10
19.4	905.79
19.7	905.42
20.1	905.25
20.4	905.26
20.8	905.29
20.8	905.74
21.8	905.91
23.3	906.06
26.1	906.19
27.9	906.12
29.7	906.92
32.1	908.70
35.7	910.14
38.2	910.49
43.6	911.39
47.2	912.73
47.1	913.67

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	906.19
<b>Bankfull Cross-Sectional Area:</b>	1.9
<b>Total Cross-Sectional Area:</b>	1.9
<b>Bankfull Width:</b>	4.4
<b>Flood Prone Area Elevation:</b>	907.12
<b>Flood Prone Width:</b>	19.2
<b>Max Depth at Bankfull:</b>	0.9
<b>Mean Depth at Bankfull:</b>	0.4
<b>W / D Ratio:</b>	10.0
<b>Entrenchment Ratio:</b>	4.4
<b>Bank Height Ratio:</b>	0.5
<b>Thalweg Elevation:</b>	905.25

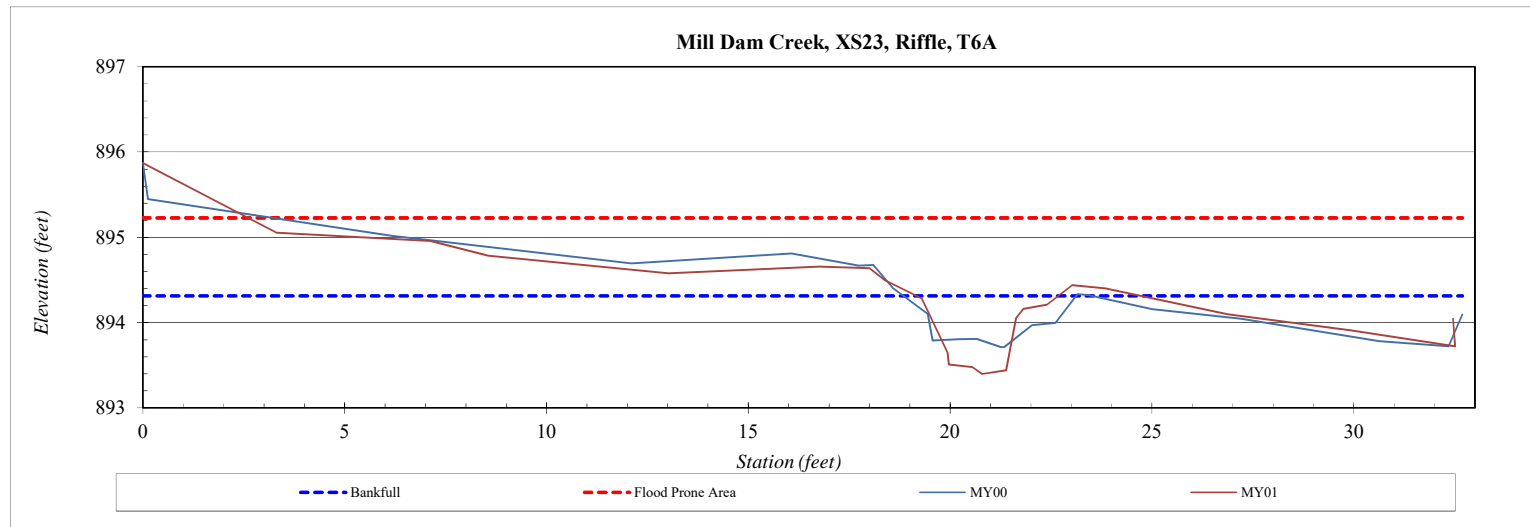


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS23
<b>Drainage Area (sq mi):</b>	0.01
<b>Date:</b>	12/22/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	895.87
3.3	895.06
7.1	894.96
8.6	894.78
13.0	894.58
16.8	894.66
18.0	894.64
18.4	894.49
19.3	894.28
19.9	893.64
20.0	893.51
20.5	893.48
20.8	893.40
21.4	893.44
21.6	894.05
21.8	894.16
22.4	894.21
23.0	894.44
23.8	894.40
26.9	894.10
29.9	893.91
32.5	893.73
32.5	894.05

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	894.31
<b>Bankfull Cross-Sectional Area:</b>	1.7
<b>Total Cross-Sectional Area:</b>	1.8
<b>Bankfull Width:</b>	3.5
<b>Flood Prone Area Elevation:</b>	895.23
<b>Flood Prone Width:</b>	29.8
<b>Max Depth at Bankfull:</b>	0.9
<b>Mean Depth at Bankfull:</b>	0.5
<b>W / D Ratio:</b>	7.1
<b>Entrenchment Ratio:</b>	8.5
<b>Bank Height Ratio:</b>	1.1
<b>Thalweg Elevation:</b>	893.40

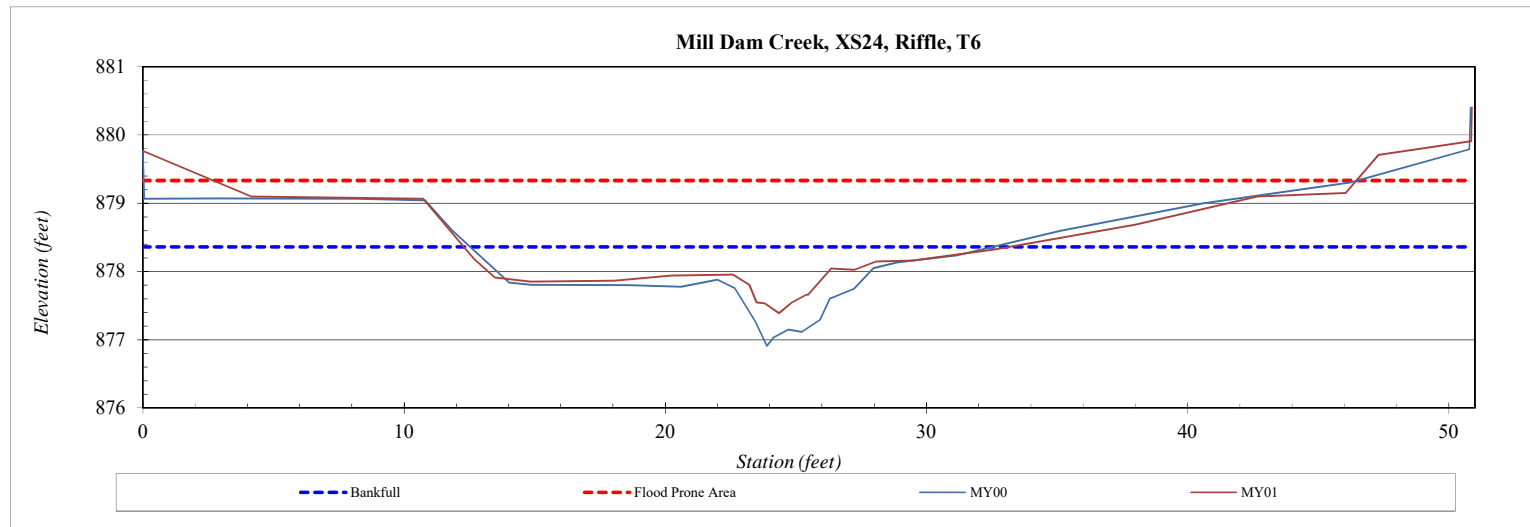


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS24
<b>Drainage Area (sq mi):</b>	0.07
<b>Date:</b>	12/22/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	879.77
4.1	879.10
10.7	879.07
12.7	878.18
13.5	877.91
14.8	877.85
18.0	877.87
20.2	877.94
22.6	877.96
23.2	877.80
23.5	877.55
23.8	877.54
24.4	877.39
24.8	877.54
25.4	877.66
25.5	877.66
26.4	878.04
27.3	878.02
28.1	878.15
29.5	878.16
32.6	878.33
38.0	878.69
42.7	879.10
46.1	879.15
47.3	879.71
50.9	879.91
50.9	880.41

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	878.36
<b>Bankfull Cross-Sectional Area:</b>	2.6
<b>Total Cross-Sectional Area:</b>	0.8
<b>Bankfull Width:</b>	3.8
<b>Flood Prone Area Elevation:</b>	879.33
<b>Flood Prone Width:</b>	43.8
<b>Max Depth at Bankfull:</b>	1.0
<b>Mean Depth at Bankfull:</b>	0.7
<b>W / D Ratio:</b>	5.5
<b>Entrenchment Ratio:</b>	11.6
<b>Bank Height Ratio:</b>	0.6
<b>Thalweg Elevation:</b>	877.39

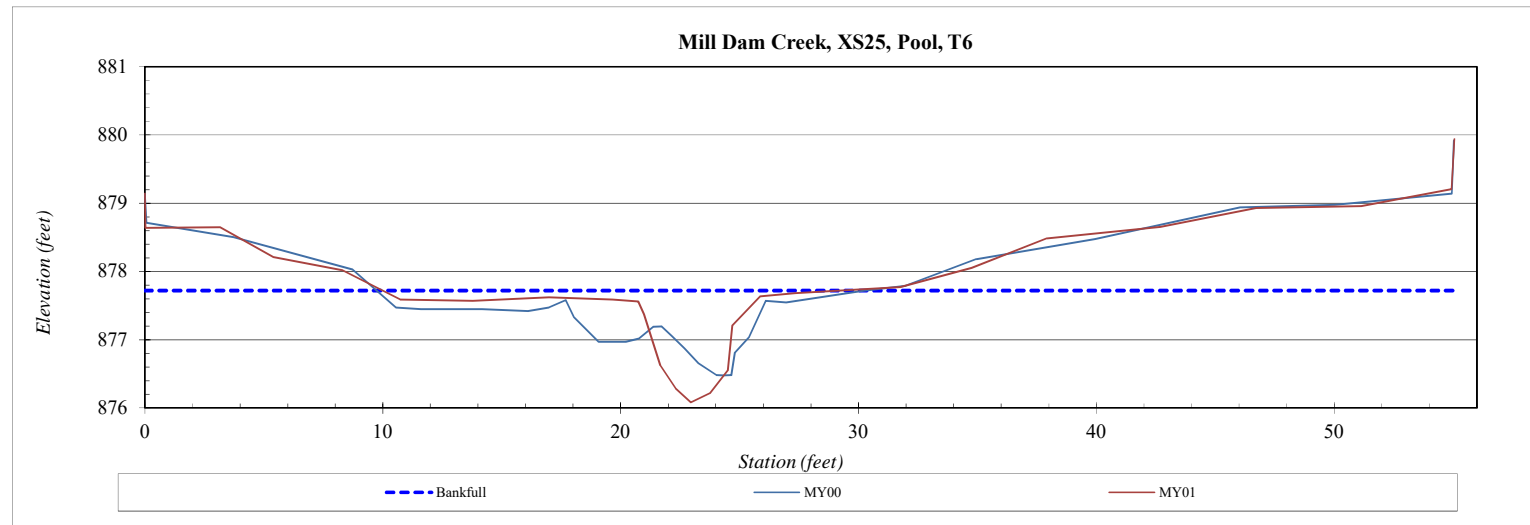


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS25
<b>Drainage Area (sq mi):</b>	0.07
<b>Date:</b>	12/17/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	879.14
0.0	878.64
3.2	878.65
5.4	878.21
8.3	878.02
10.7	877.59
13.8	877.57
17.0	877.62
19.7	877.59
20.7	877.56
21.0	877.37
21.7	876.62
22.3	876.28
23.0	876.08
23.8	876.22
24.5	876.55
24.7	877.21
25.9	877.64
27.4	877.68
31.8	877.77
34.8	878.05
37.9	878.48
42.7	878.65
46.7	878.93
51.1	878.96
54.9	879.21
55.1	879.94

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	877.72
<b>Bankfull Cross-Sectional Area:</b>	5.1
<b>Total Cross-Sectional Area:</b>	4.4
<b>Bankfull Width:</b>	5.1
<b>Flood Prone Area Elevation:</b>	---
<b>Flood Prone Width:</b>	---
<b>Max Depth at Bankfull:</b>	1.6
<b>Mean Depth at Bankfull:</b>	1.0
<b>W / D Ratio:</b>	---
<b>Entrenchment Ratio:</b>	---
<b>Bank Height Ratio:</b>	---
<b>Thalweg Elevation:</b>	876.08



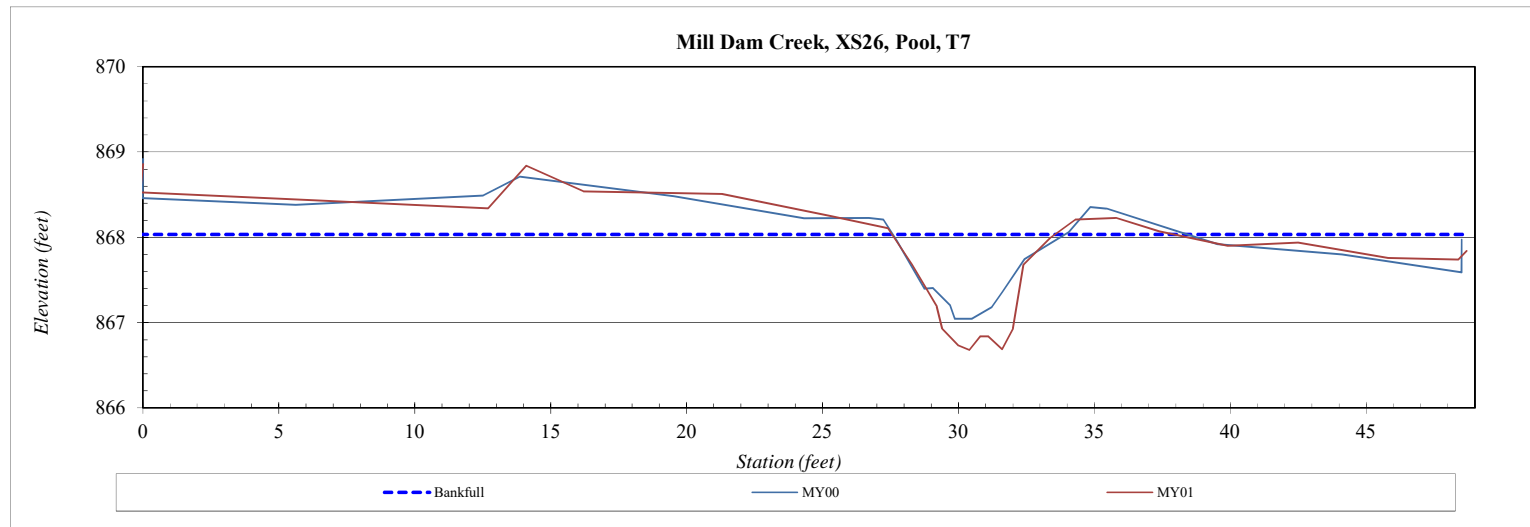


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS26
<b>Drainage Area (sq mi):</b>	0.07
<b>Date:</b>	12/22/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	868.86
-0.1	868.53
6.1	868.44
12.7	868.34
14.1	868.84
16.2	868.54
21.3	868.51
25.3	868.25
27.4	868.11
28.3	867.68
29.2	867.19
29.4	866.93
30.0	866.73
30.4	866.68
30.8	866.84
31.1	866.84
31.6	866.69
32.0	866.93
32.4	867.68
33.4	868.00
34.3	868.21
35.8	868.23
37.4	868.07
39.9	867.90
42.5	867.94
45.8	867.76
48.4	867.74
48.7	867.84

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	868.03
<b>Bankfull Cross-Sectional Area:</b>	4.6
<b>Total Cross-Sectional Area:</b>	5.8
<b>Bankfull Width:</b>	6.0
<b>Flood Prone Area Elevation:</b>	---
<b>Flood Prone Width:</b>	---
<b>Max Depth at Bankfull:</b>	1.4
<b>Mean Depth at Bankfull:</b>	0.8
<b>W / D Ratio:</b>	---
<b>Entrenchment Ratio:</b>	---
<b>Bank Height Ratio:</b>	---
<b>Thalweg Elevation:</b>	866.68

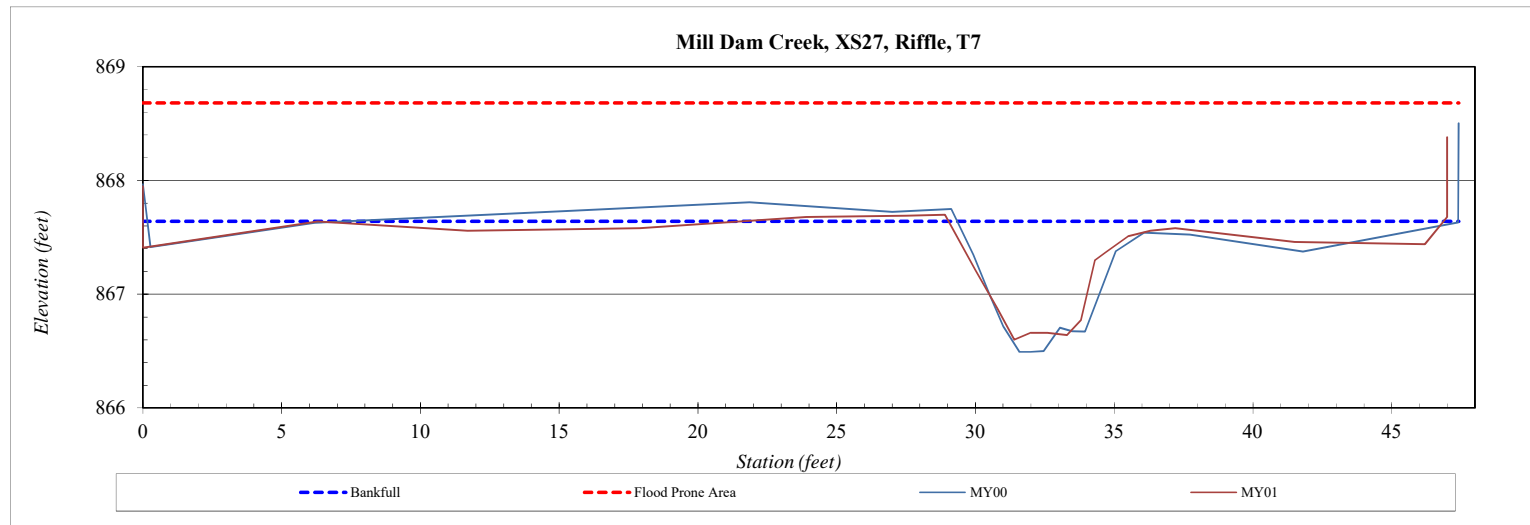


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS27
<b>Drainage Area (sq mi):</b>	0.07
<b>Date:</b>	12/22/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	867.95
0.0	867.41
6.3	867.64
11.7	867.56
17.9	867.58
23.9	867.68
27.5	867.69
28.9	867.70
30.0	867.21
30.8	866.87
31.4	866.60
32.0	866.66
32.6	866.66
33.3	866.64
33.8	866.77
34.3	867.30
34.7	867.37
35.5	867.51
36.3	867.56
37.2	867.58
41.5	867.46
46.2	867.44
47.0	867.68
47.0	868.38

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	867.64
<b>Bankfull Cross-Sectional Area:</b>	4.3
<b>Total Cross-Sectional Area:</b>	3.5
<b>Bankfull Width:</b>	7.3
<b>Flood Prone Area Elevation:</b>	868.68
<b>Flood Prone Width:</b>	47.0
<b>Max Depth at Bankfull:</b>	1.0
<b>Mean Depth at Bankfull:</b>	0.6
<b>W / D Ratio:</b>	12.4
<b>Entrenchment Ratio:</b>	6.5
<b>Bank Height Ratio:</b>	0.9
<b>Thalweg Elevation:</b>	866.60



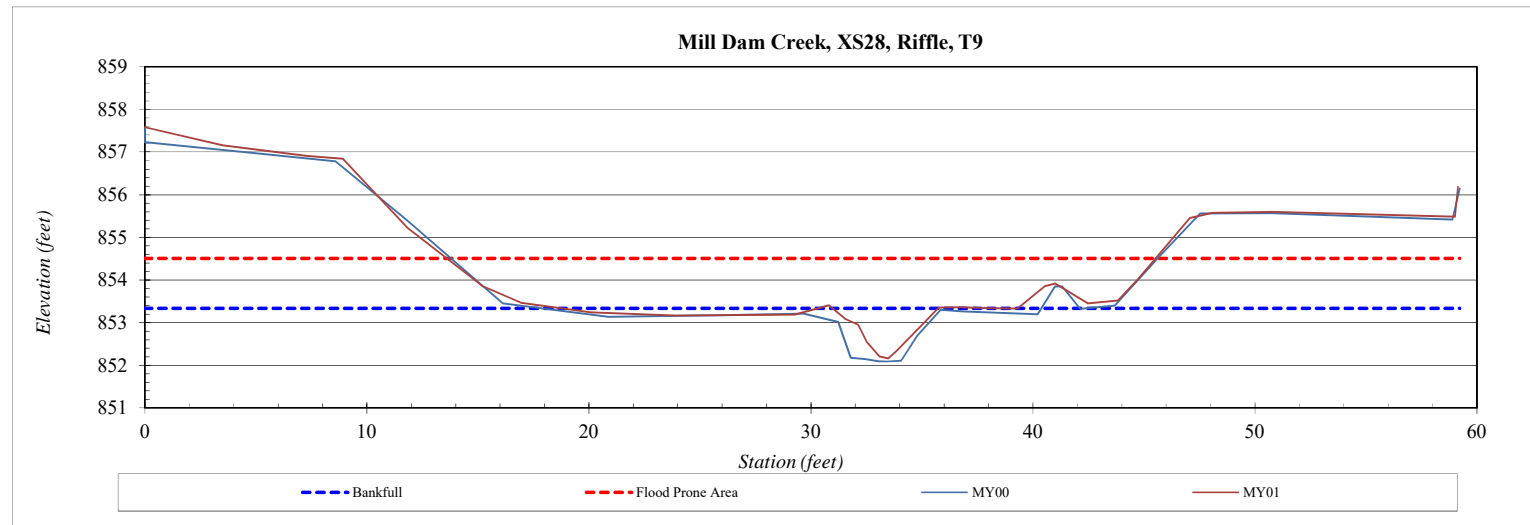
## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS28
<b>Drainage Area (sq mi):</b>	0.04
<b>Date:</b>	12/22/2020
<b>Field Crew:</b>	TS, KB



Station	Elevation
0.0	857.58
3.5	857.16
7.3	856.92
8.9	856.85
11.8	855.22
15.2	853.85
16.9	853.47
20.1	853.24
23.9	853.17
29.3	853.19
30.8	853.41
31.6	853.07
32.1	852.95
32.5	852.56
33.1	852.21
33.5	852.16
33.9	852.34
34.2	852.53
35.0	852.96
35.8	853.36
36.7	853.36
38.1	853.34
39.3	853.33
40.5	853.86
41.0	853.92
42.5	853.45
43.8	853.52
44.7	854.02
47.1	855.45
48.1	855.58
50.8	855.60
54.7	855.55
59.0	855.49
59.1	856.19

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	853.34
<b>Bankfull Cross-Sectional Area:</b>	2.8
<b>Total Cross-Sectional Area:</b>	1.5
<b>Bankfull Width:</b>	4.7
<b>Flood Prone Area Elevation:</b>	854.51
<b>Flood Prone Width:</b>	31.9
<b>Max Depth at Bankfull:</b>	1.2
<b>Mean Depth at Bankfull:</b>	0.6
<b>W / D Ratio:</b>	7.9
<b>Entrenchment Ratio:</b>	6.7
<b>Bank Height Ratio:</b>	1.0
<b>Thalweg Elevation:</b>	852.16

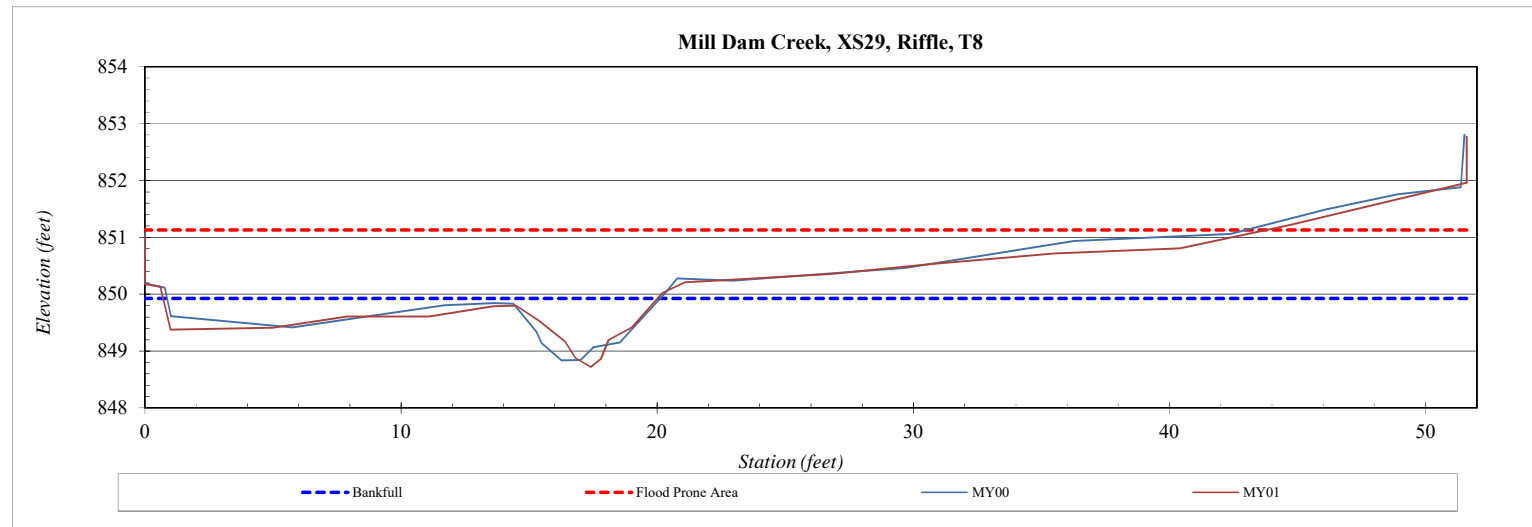


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS29
<b>Drainage Area (sq mi):</b>	0.03
<b>Date:</b>	12/17/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	851.02
0.0	850.18
0.6	850.13
1.0	849.38
5.0	849.41
7.9	849.61
11.1	849.61
13.6	849.79
14.5	849.80
15.4	849.53
16.4	849.17
16.8	848.88
17.4	848.72
17.8	848.86
18.1	849.19
19.0	849.41
20.2	850.02
21.1	850.21
22.7	850.25
26.8	850.36
30.7	850.53
35.5	850.72
40.4	850.81
44.7	851.22
51.6	851.96
51.6	852.77

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	849.93
<b>Bankfull Cross-Sectional Area:</b>	3.4
<b>Total Cross-Sectional Area:</b>	2.9
<b>Bankfull Width:</b>	5.5
<b>Flood Prone Area Elevation:</b>	851.13
<b>Flood Prone Width:</b>	43.8
<b>Max Depth at Bankfull:</b>	1.2
<b>Mean Depth at Bankfull:</b>	0.6
<b>W / D Ratio:</b>	9.0
<b>Entrenchment Ratio:</b>	7.9
<b>Bank Height Ratio:</b>	0.9
<b>Thalweg Elevation:</b>	848.72



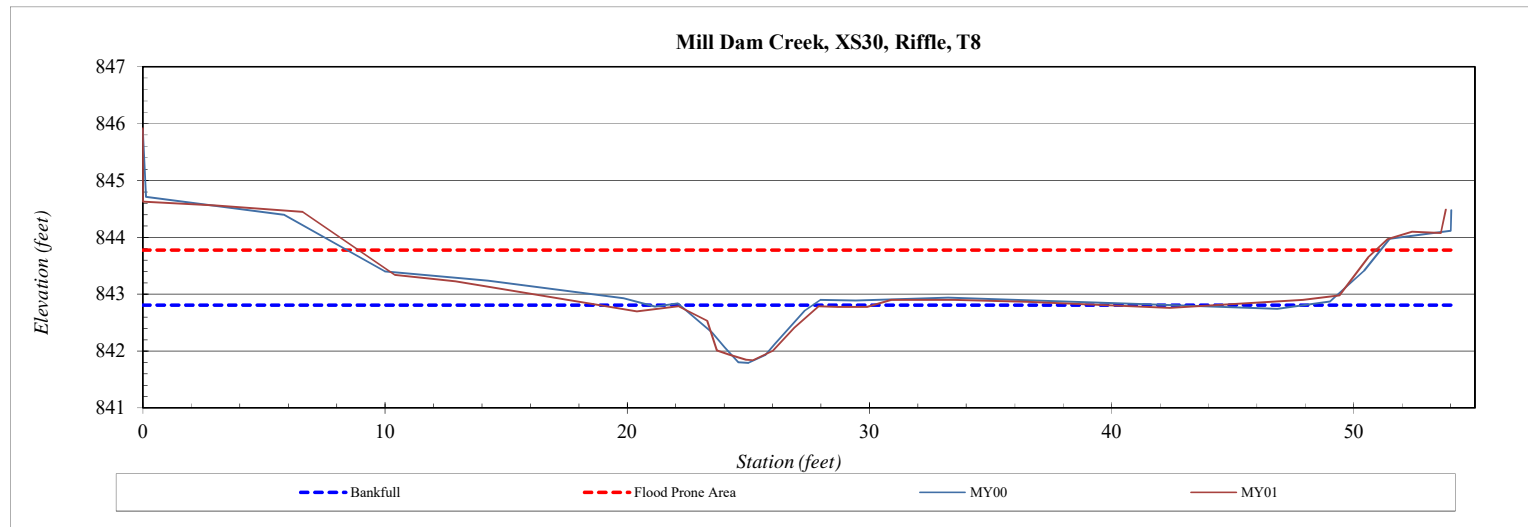


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS30
<b>Drainage Area (sq mi):</b>	0.03
<b>Date:</b>	12/17/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	845.92
0.0	844.63
3.0	844.56
6.6	844.45
10.4	843.34
12.9	843.23
18.1	842.86
20.4	842.70
22.1	842.79
23.3	842.53
23.7	842.01
24.2	841.94
24.9	841.85
25.2	841.84
25.7	841.94
26.0	842.00
26.9	842.41
27.9	842.79
28.7	842.78
29.9	842.78
30.9	842.90
33.5	842.90
36.5	842.87
42.4	842.76
47.9	842.90
49.4	842.98
50.6	843.65
51.4	843.97
52.4	844.10
53.6	844.08
53.8	844.49

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	842.81
<b>Bankfull Cross-Sectional Area:</b>	3.2
<b>Total Cross-Sectional Area:</b>	3.4
<b>Bankfull Width:</b>	5.8
<b>Flood Prone Area Elevation:</b>	843.78
<b>Flood Prone Width:</b>	42.0
<b>Max Depth at Bankfull:</b>	1.0
<b>Mean Depth at Bankfull:</b>	0.6
<b>W / D Ratio:</b>	10.5
<b>Entrenchment Ratio:</b>	7.2
<b>Bank Height Ratio:</b>	1.0
<b>Thalweg Elevation:</b>	841.84

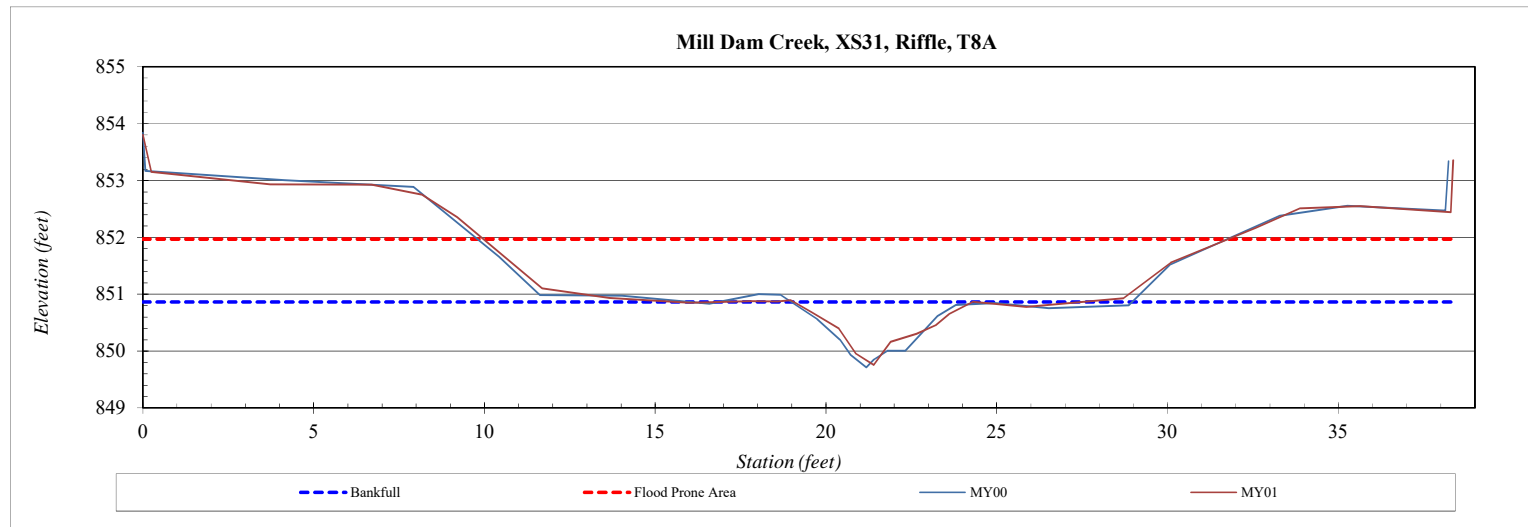


## Cross-Section Plots

<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS31
<b>Drainage Area (sq mi):</b>	0.01
<b>Date:</b>	12/17/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	853.80
0.3	853.16
3.7	852.93
6.7	852.93
8.2	852.75
9.2	852.35
11.7	851.11
13.7	850.94
16.0	850.85
17.8	850.88
18.6	850.88
19.0	850.89
19.6	850.68
20.4	850.40
20.9	849.95
21.4	849.76
21.6	849.95
21.9	850.17
22.7	850.30
23.2	850.45
23.6	850.65
24.3	850.87
25.9	850.78
28.7	850.93
30.1	851.56
32.6	852.17
33.9	852.51
35.6	852.55
38.3	852.44
38.4	853.36

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	850.86
<b>Bankfull Cross-Sectional Area:</b>	2.6
<b>Total Cross-Sectional Area:</b>	2.3
<b>Bankfull Width:</b>	5.2
<b>Flood Prone Area Elevation:</b>	851.97
<b>Flood Prone Width:</b>	21.8
<b>Max Depth at Bankfull:</b>	1.1
<b>Mean Depth at Bankfull:</b>	0.5
<b>W / D Ratio:</b>	10.7
<b>Entrenchment Ratio:</b>	4.2
<b>Bank Height Ratio:</b>	1.0
<b>Thalweg Elevation:</b>	849.76

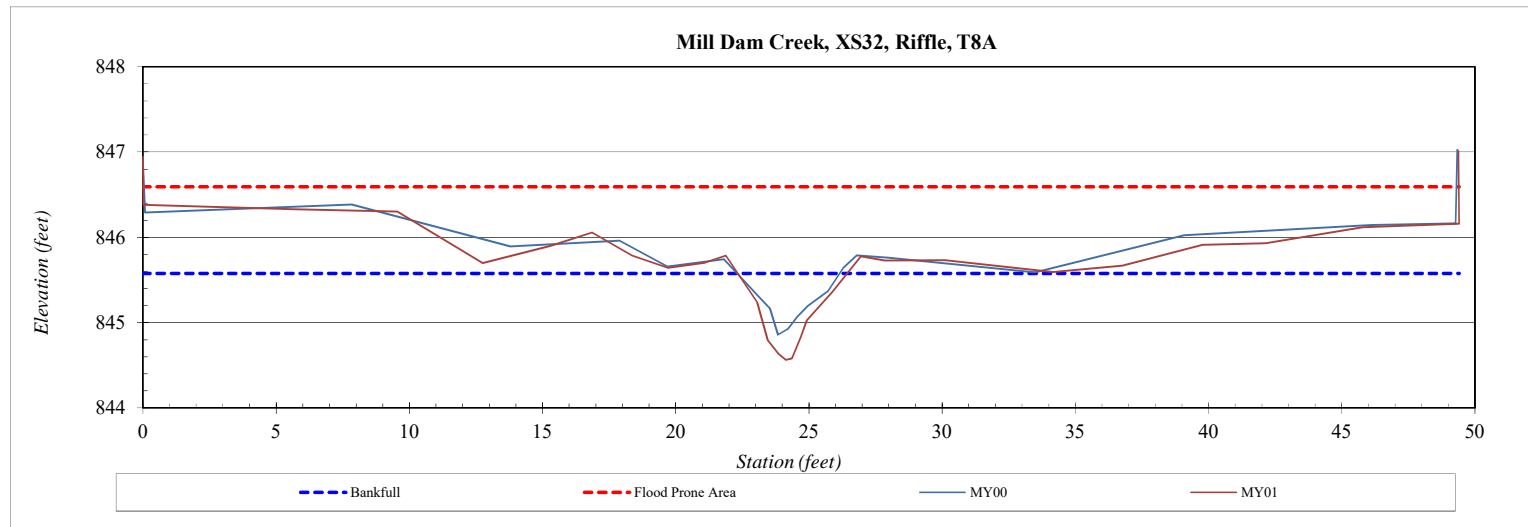


## Cross-Section Plots

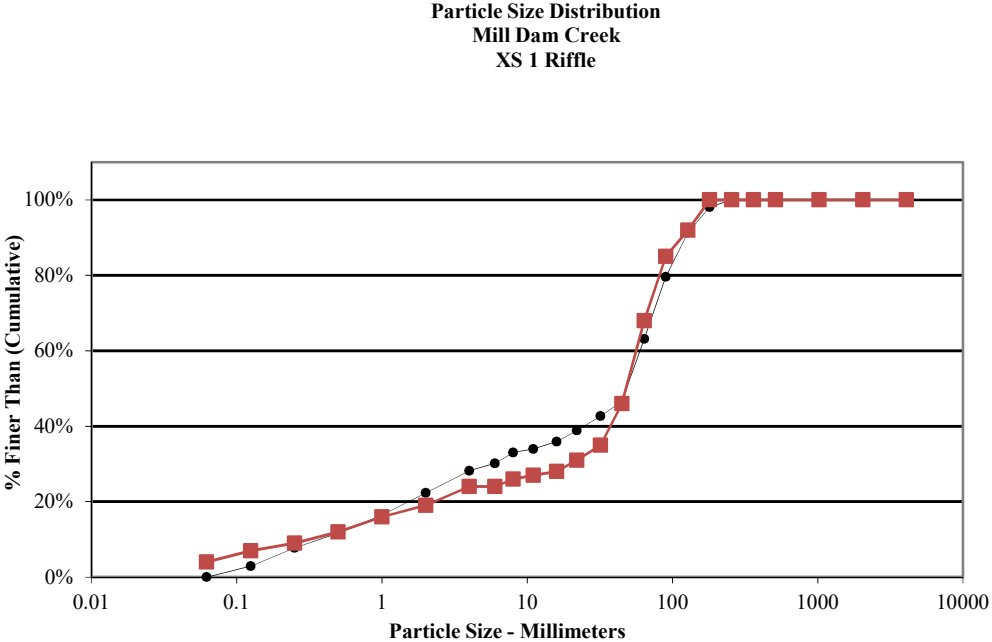
<b>River Basin:</b>	Yadkin River
<b>Site:</b>	Mill Dam Creek
<b>XS ID</b>	XS32
<b>Drainage Area (sq mi):</b>	0.01
<b>Date:</b>	12/17/2020
<b>Field Crew:</b>	TS, KB

Station	Elevation
0.0	846.94
0.0	846.38
5.8	846.33
9.5	846.30
12.7	845.70
15.3	845.90
16.9	846.06
18.4	845.79
19.7	845.64
21.1	845.70
21.9	845.79
23.1	845.24
23.5	844.80
23.9	844.64
24.1	844.56
24.4	844.58
24.7	844.82
24.9	845.03
25.9	845.36
26.9	845.78
27.8	845.73
30.1	845.73
34.2	845.60
36.8	845.67
39.8	845.91
42.1	845.93
45.8	846.12
49.4	846.16
49.4	847.01

SUMMARY DATA	
<b>Bankfull Elevation (ft) - Based on AB-Bankfull Area</b>	845.58
<b>Bankfull Cross-Sectional Area:</b>	2.1
<b>Total Cross-Sectional Area:</b>	2.8
<b>Bankfull Width:</b>	4.1
<b>Flood Prone Area Elevation:</b>	846.59
<b>Flood Prone Width:</b>	49.4
<b>Max Depth at Bankfull:</b>	1.0
<b>Mean Depth at Bankfull:</b>	0.5
<b>W / D Ratio:</b>	8.2
<b>Entrenchment Ratio:</b>	12.0
<b>Bank Height Ratio:</b>	1.2
<b>Thalweg Elevation:</b>	844.56



Cross-Section 1 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	4
Very Fine	.062 - .125	S	3
Fine	.125 - .25	A	2
Medium	.25 - .50	N	3
Coarse	.50 - 1	D	4
Very Coarse	1 - 2	S	3
Very Fine	2 - 4		5
Fine	4 - 5.7	G	
Fine	5.7 - 8	R	2
Medium	8 - 11.3	A	1
Medium	11.3 - 16	V	1
Coarse	16 - 22.6	E	3
Coarse	22.6 - 32	L	4
Very Coarse	32 - 45	S	11
Very Coarse	45 - 64		22
Small	64 - 90	C	17
Small	90 - 128	O	7
Large	128 - 180	B	8
Large	180 - 256	L	
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	100
Note:			



Size (mm)	
D16	1.0
D35	32
D50	48
D65	61
D84	88
D95	150

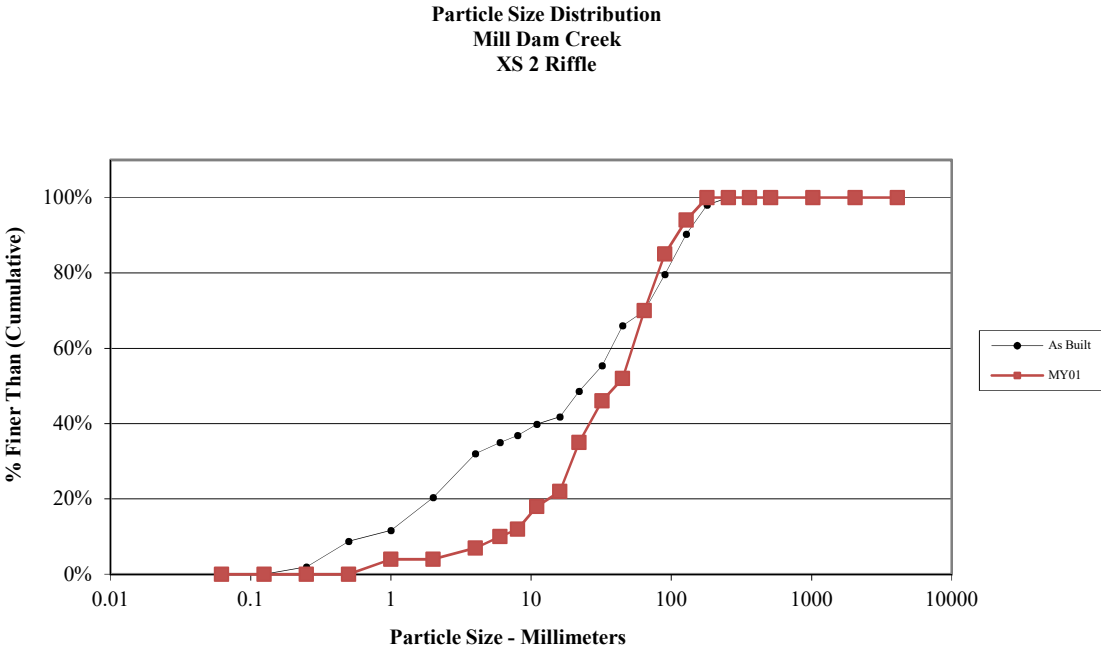
Size Distribution	
mean	9.4
dispersion	24.9
skewness	-0.51

Type	
silt/clay	4%
sand	15%
gravel	49%
cobble	24%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%



Cross-Section 2 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	
Medium	.25 - .50	N	
Coarse	.50 - 1	D	4
Very Coarse	1 - 2	S	
Very Fine	2 - 4		3
Fine	4 - 5.7	G	3
Fine	5.7 - 8	R	2
Medium	8 - 11.3	A	6
Medium	11.3 - 16	V	4
Coarse	16 - 22.6	E	13
Coarse	22.6 - 32	L	11
Very Coarse	32 - 45	S	6
Very Coarse	45 - 64		18
Small	64 - 90	C	15
Small	90 - 128	O	9
Large	128 - 180	B	6
Large	180 - 256	L	
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	100

Note:



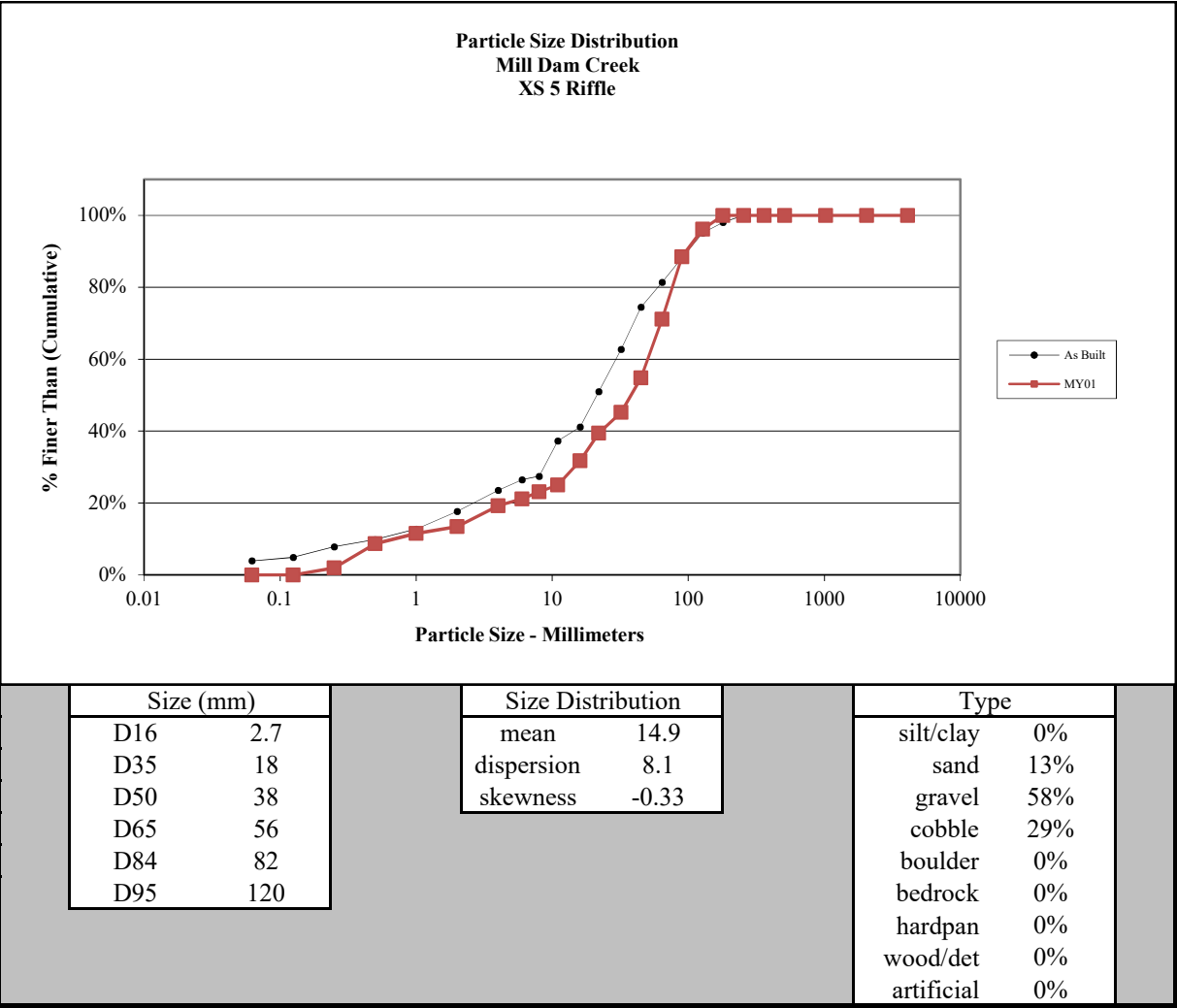
Size (mm)	
D16	9.9
D35	22
D50	40
D65	58
D84	88
D95	140

Size Distribution	
mean	29.5
dispersion	3.1
skewness	-0.14

Type	
silt/clay	0%
sand	4%
gravel	66%
cobble	30%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

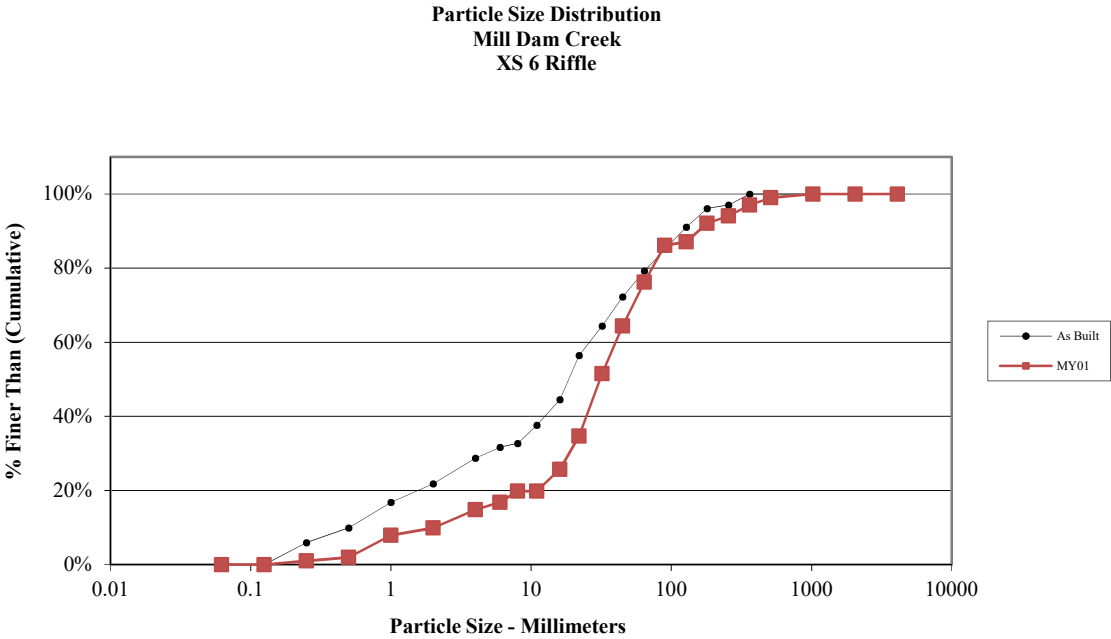
Cross-Section 5 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	2
Medium	.25 - .50	N	7
Coarse	.50 - 1	D	3
Very Coarse	1 - 2	S	2
Very Fine	2 - 4		6
Fine	4 - 5.7	G	2
Fine	5.7 - 8	R	2
Medium	8 - 11.3	A	2
Medium	11.3 - 16	V	7
Coarse	16 - 22.6	E	8
Coarse	22.6 - 32	L	6
Very Coarse	32 - 45	S	10
Very Coarse	45 - 64		17
Small	64 - 90	C	18
Small	90 - 128	O	8
Large	128 - 180	B	4
Large	180 - 256	L	
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	104

Note:



Cross-Section 6 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	1
Medium	.25 - .50	N	1
Coarse	.50 - 1	D	6
Very Coarse	1 - 2	S	2
Very Fine	2 - 4		5
Fine	4 - 5.7	G	2
Fine	5.7 - 8	R	3
Medium	8 - 11.3	A	
Medium	11.3 - 16	V	6
Coarse	16 - 22.6	E	9
Coarse	22.6 - 32	L	17
Very Coarse	32 - 45	S	13
Very Coarse	45 - 64		12
Small	64 - 90	C	10
Small	90 - 128	O	1
Large	128 - 180	B	5
Large	180 - 256	L	2
Small	256 - 362	B	3
Small	362 - 512	L	2
Medium	512 - 1024	D	1
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	101

Note:



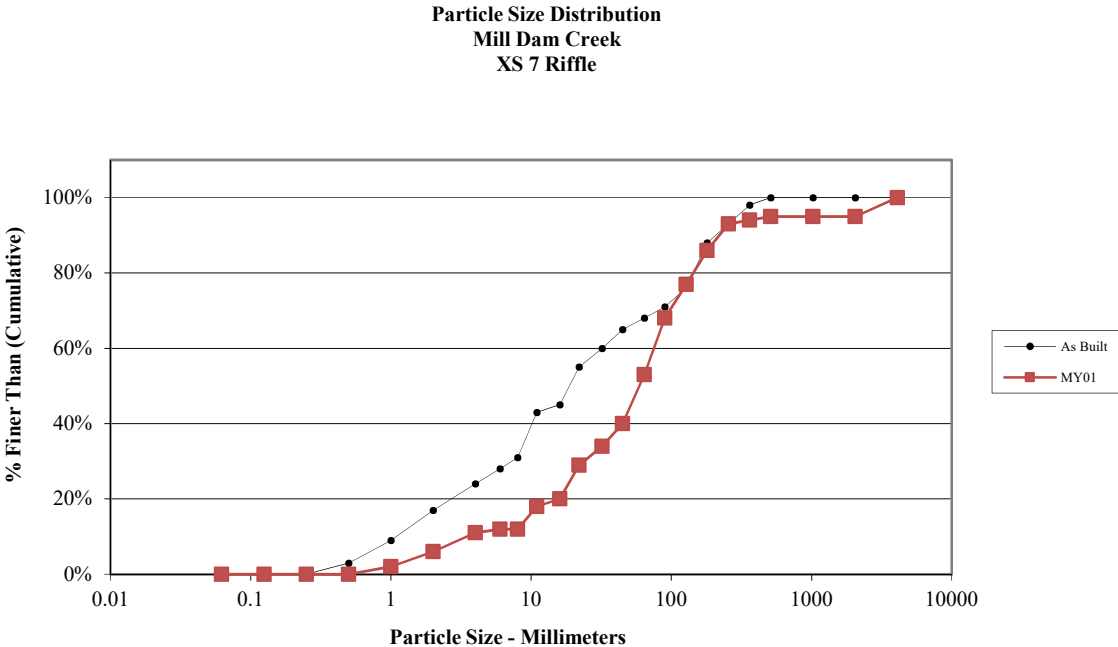
Size (mm)	
D16	5.1
D35	22
D50	31
D65	46
D84	84
D95	290

Size Distribution	
mean	20.7
dispersion	4.4
skewness	-0.16

Type	
silt/clay	0%
sand	10%
gravel	66%
cobble	18%
boulder	6%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

Cross-Section 7 Riffle -MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	
Medium	.25 - .50	N	
Coarse	.50 - 1	D	2
Very Coarse	1 - 2	S	4
Very Fine	2 - 4		5
Fine	4 - 5.7	G	1
Fine	5.7 - 8	R	
Medium	8 - 11.3	A	6
Medium	11.3 - 16	V	2
Coarse	16 - 22.6	E	9
Coarse	22.6 - 32	L	5
Very Coarse	32 - 45	S	6
Very Coarse	45 - 64		13
Small	64 - 90	C	15
Small	90 - 128	O	9
Large	128 - 180	B	9
Large	180 - 256	L	7
Small	256 - 362	B	1
Small	362 - 512	L	1
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	5
		<b>Total</b>	100

Note:



Size (mm)	
D16	9.5
D35	30
D50	55
D65	78
D84	140
D95	220

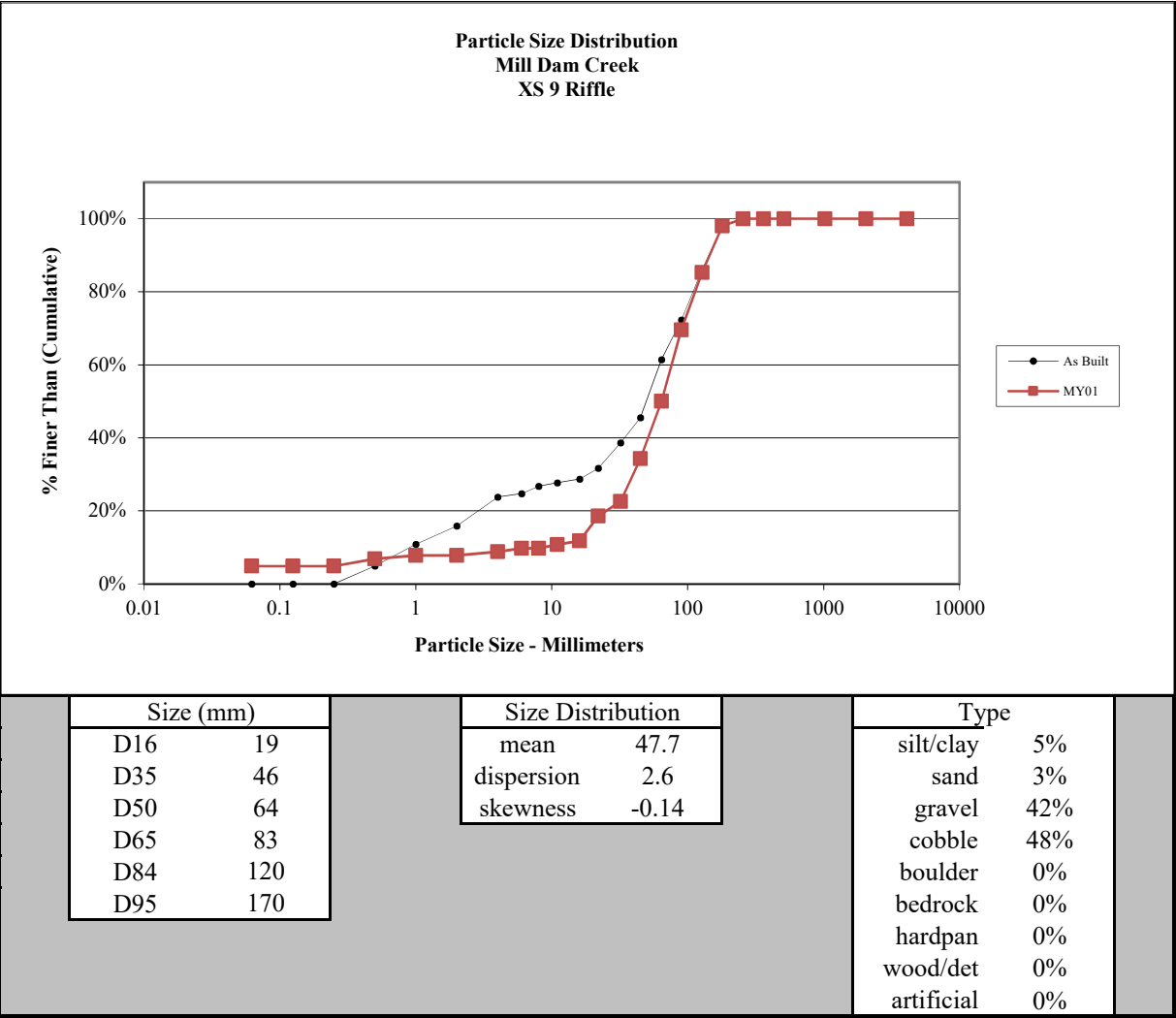
Size Distribution	
mean	36.5
dispersion	4.2
skewness	-0.17

Type	
silt/clay	0%
sand	6%
gravel	47%
cobble	33%
boulder	2%
bedrock	5%
hardpan	0%
wood/det	0%
artificial	0%



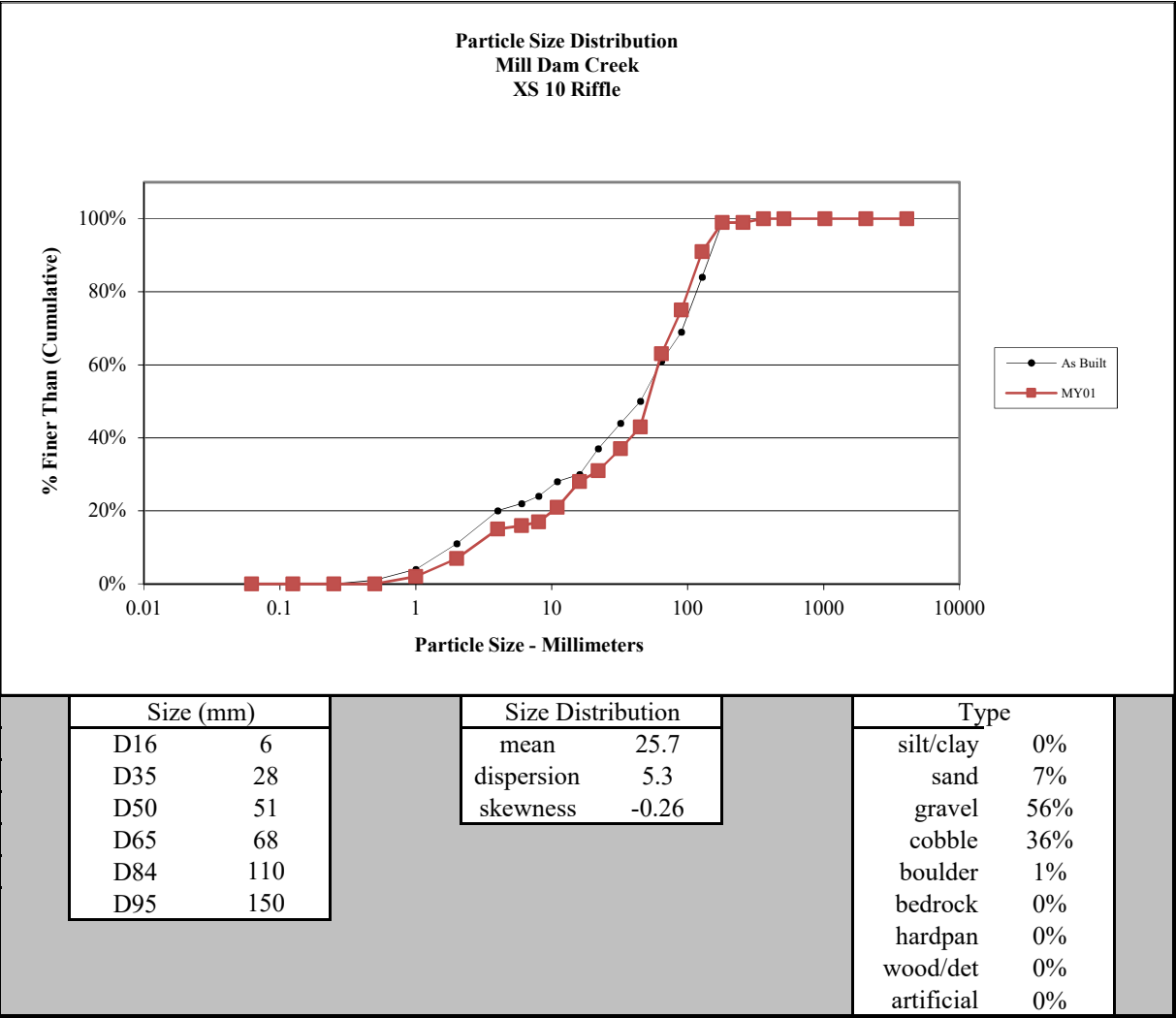
Cross-Section 9 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	5
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	
Medium	.25 - .50	N	2
Coarse	.50 - 1	D	1
Very Coarse	1 - 2	S	
Very Fine	2 - 4		1
Fine	4 - 5.7	G	1
Fine	5.7 - 8	R	
Medium	8 - 11.3	A	1
Medium	11.3 - 16	V	1
Coarse	16 - 22.6	E	7
Coarse	22.6 - 32	L	4
Very Coarse	32 - 45	S	12
Very Coarse	45 - 64		16
Small	64 - 90	C	20
Small	90 - 128	O	16
Large	128 - 180	B	13
Large	180 - 256	L	2
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	102

Note:

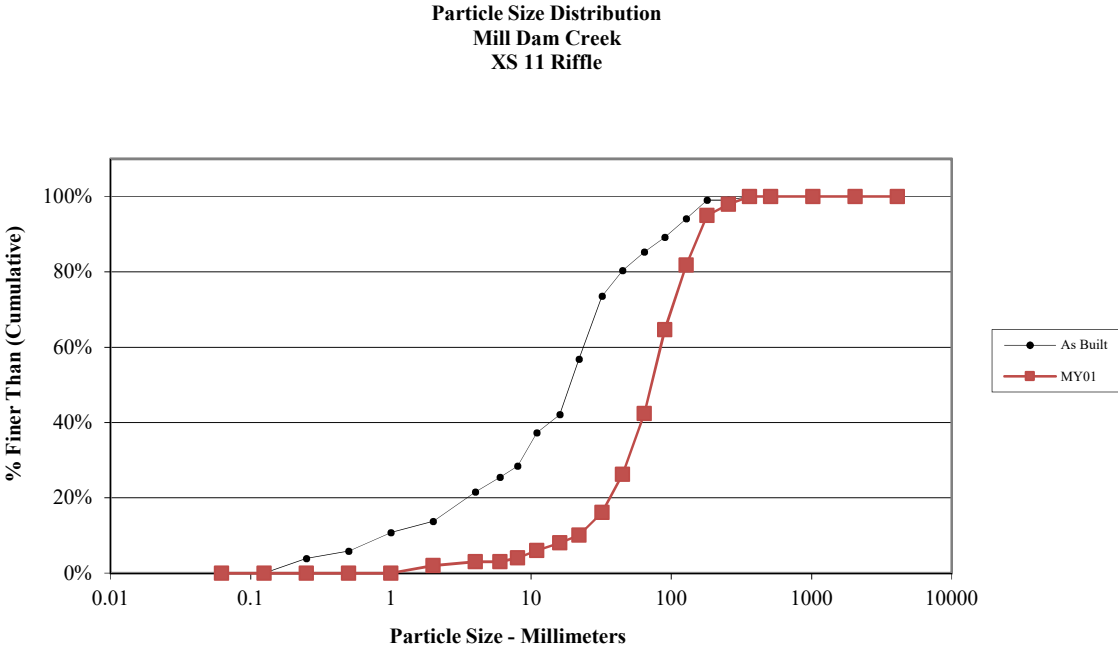


Cross-Section 10 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	
Medium	.25 - .50	N	
Coarse	.50 - 1	D	2
Very Coarse	1 - 2	S	5
Very Fine	2 - 4		8
Fine	4 - 5.7	G	1
Fine	5.7 - 8	R	1
Medium	8 - 11.3	A	4
Medium	11.3 - 16	V	7
Coarse	16 - 22.6	E	3
Coarse	22.6 - 32	L	6
Very Coarse	32 - 45	S	6
Very Coarse	45 - 64		20
Small	64 - 90	C	12
Small	90 - 128	O	16
Large	128 - 180	B	8
Large	180 - 256	L	
Small	256 - 362	B	1
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	100

Note:



Cross-Section 11 Rifle -MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	
Medium	.25 - .50	N	
Coarse	.50 - 1	D	
Very Coarse	1 - 2	S	2
Very Fine	2 - 4		1
Fine	4 - 5.7	G	
Fine	5.7 - 8	R	1
Medium	8 - 11.3	A	2
Medium	11.3 - 16	V	2
Coarse	16 - 22.6	E	2
Coarse	22.6 - 32	L	6
Very Coarse	32 - 45	S	10
Very Coarse	45 - 64		16
Small	64 - 90	C	22
Small	90 - 128	O	17
Large	128 - 180	B	13
Large	180 - 256	L	3
Small	256 - 362	B	2
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	99

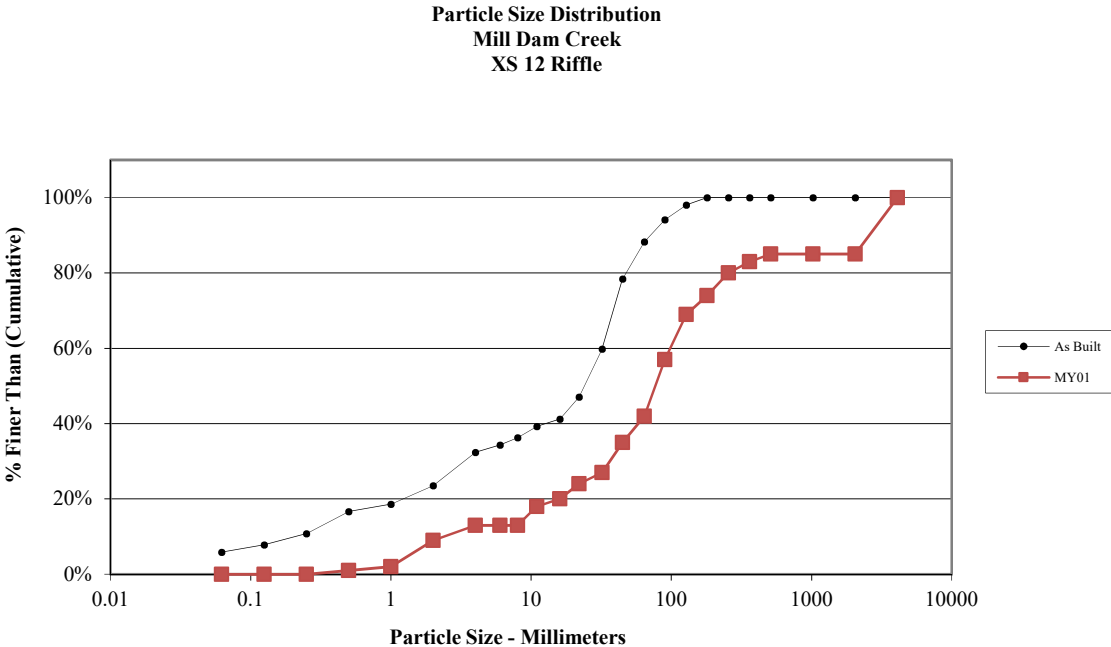


Size (mm)	
D16	32
D35	54
D50	72
D65	91
D84	140
D95	180

Size Distribution	
mean	66.9
dispersion	2.1
skewness	-0.04

Type	
silt/clay	0%
sand	2%
gravel	40%
cobble	56%
boulder	2%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

Cross-Section 12 Rifle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	
Medium	.25 - .50	N	1
Coarse	.50 - 1	D	1
Very Coarse	1 - 2	S	7
Very Fine	2 - 4		4
Fine	4 - 5.7	G	
Fine	5.7 - 8	R	
Medium	8 - 11.3	A	5
Medium	11.3 - 16	V	2
Coarse	16 - 22.6	E	4
Coarse	22.6 - 32	L	3
Very Coarse	32 - 45	S	8
Very Coarse	45 - 64		7
Small	64 - 90	C	15
Small	90 - 128	O	12
Large	128 - 180	B	5
Large	180 - 256	L	6
Small	256 - 362	B	3
Small	362 - 512	L	2
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	15
		<b>Total</b>	100

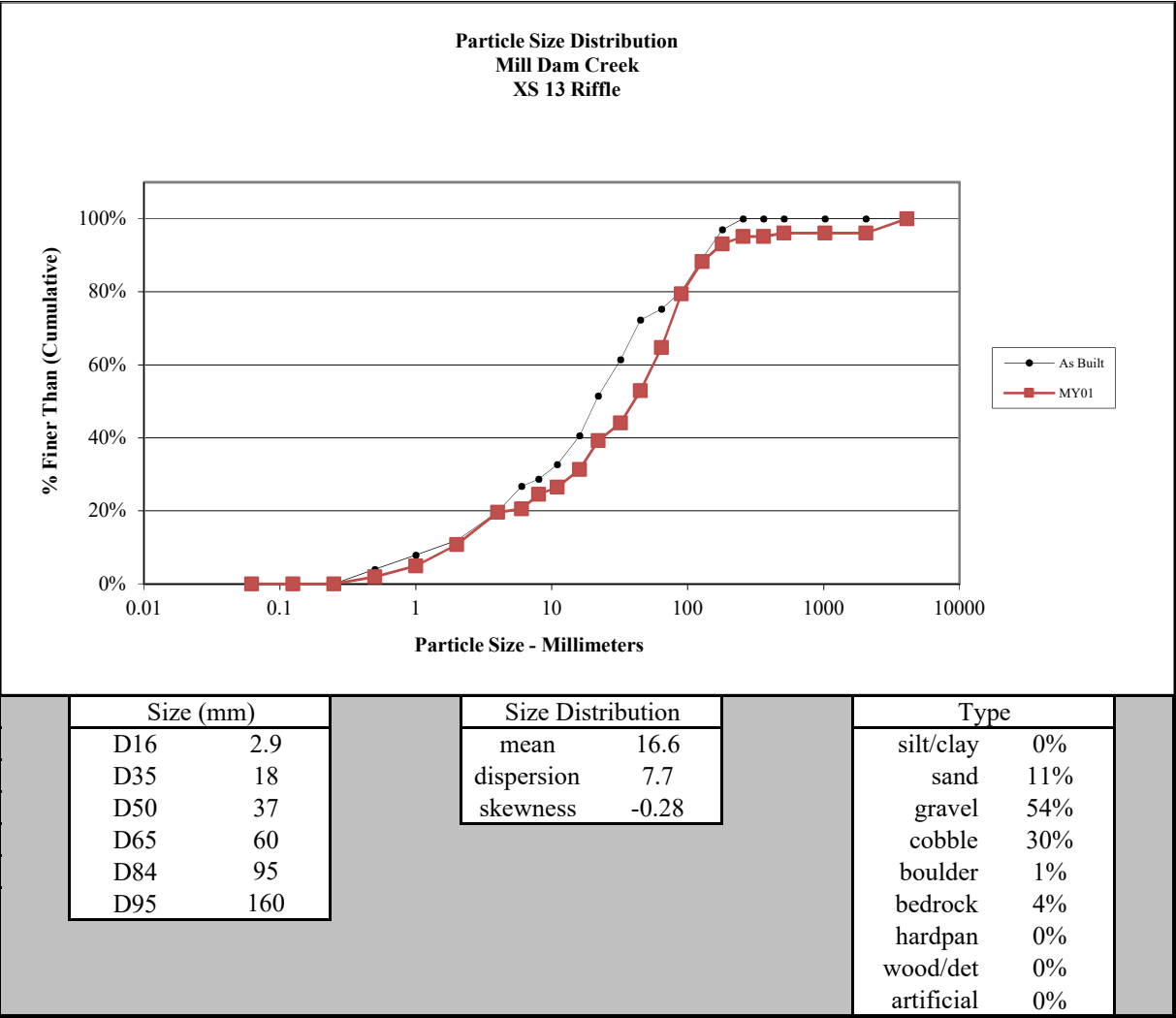


Size (mm)		Size Distribution		Type	
D16	8.3	mean	35.3	silt/clay	0%
D35	36	dispersion	5.1	sand	9%
D50	65	skewness	-0.24	gravel	33%
D65	86			cobble	38%
D84	150			boulder	5%
D95	280			bedrock	15%
				hardpan	0%
				wood/det	0%
				artificial	0%



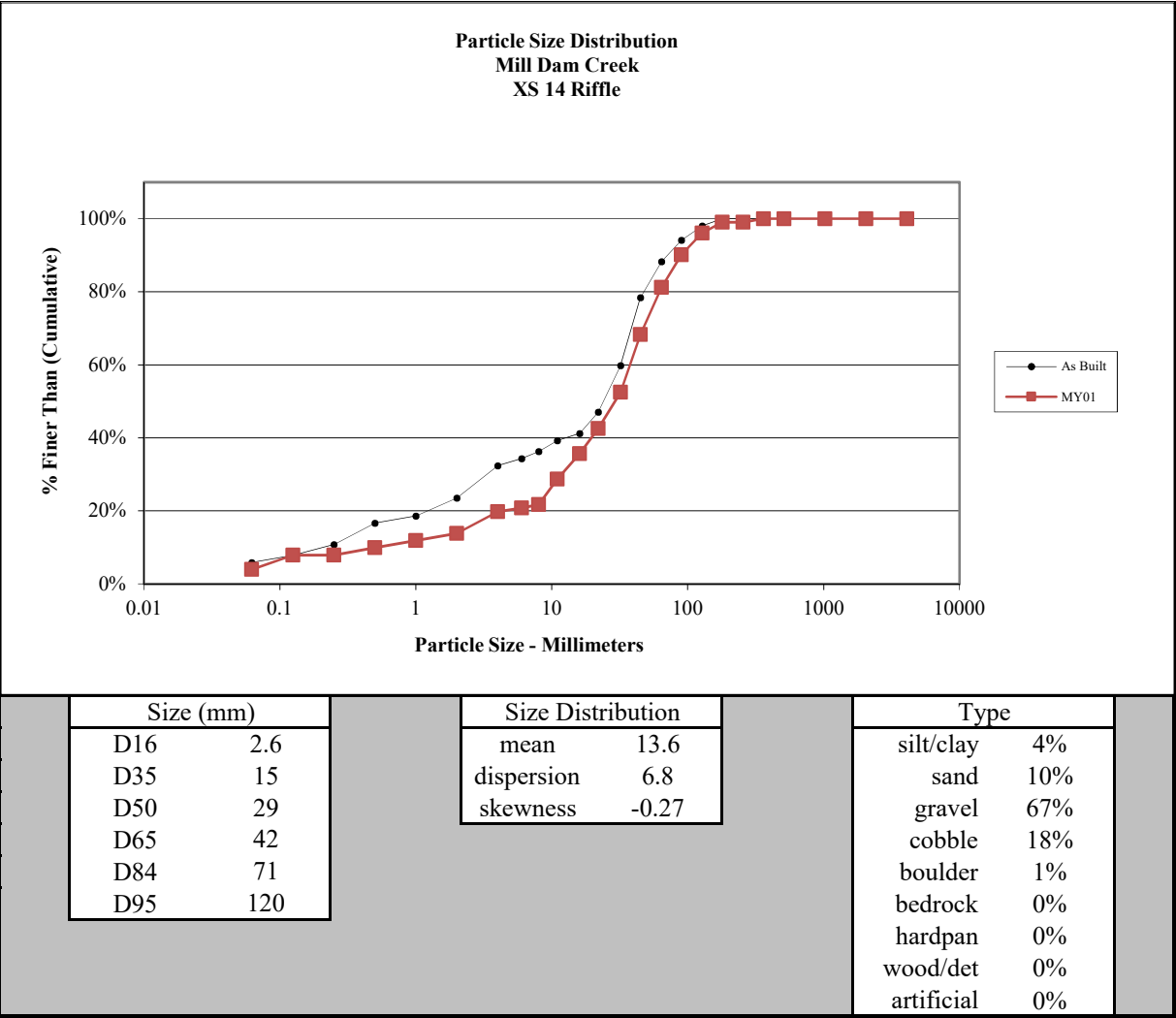
Cross-Section 13 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	
Medium	.25 - .50	N	2
Coarse	.50 - 1	D	3
Very Coarse	1 - 2	S	6
Very Fine	2 - 4		9
Fine	4 - 5.7	G	1
Fine	5.7 - 8	R	4
Medium	8 - 11.3	A	2
Medium	11.3 - 16	V	5
Coarse	16 - 22.6	E	8
Coarse	22.6 - 32	L	5
Very Coarse	32 - 45	S	9
Very Coarse	45 - 64		12
Small	64 - 90	C	15
Small	90 - 128	O	9
Large	128 - 180	B	5
Large	180 - 256	L	2
Small	256 - 362	B	
Small	362 - 512	L	1
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	4
		<b>Total</b>	102

Note:



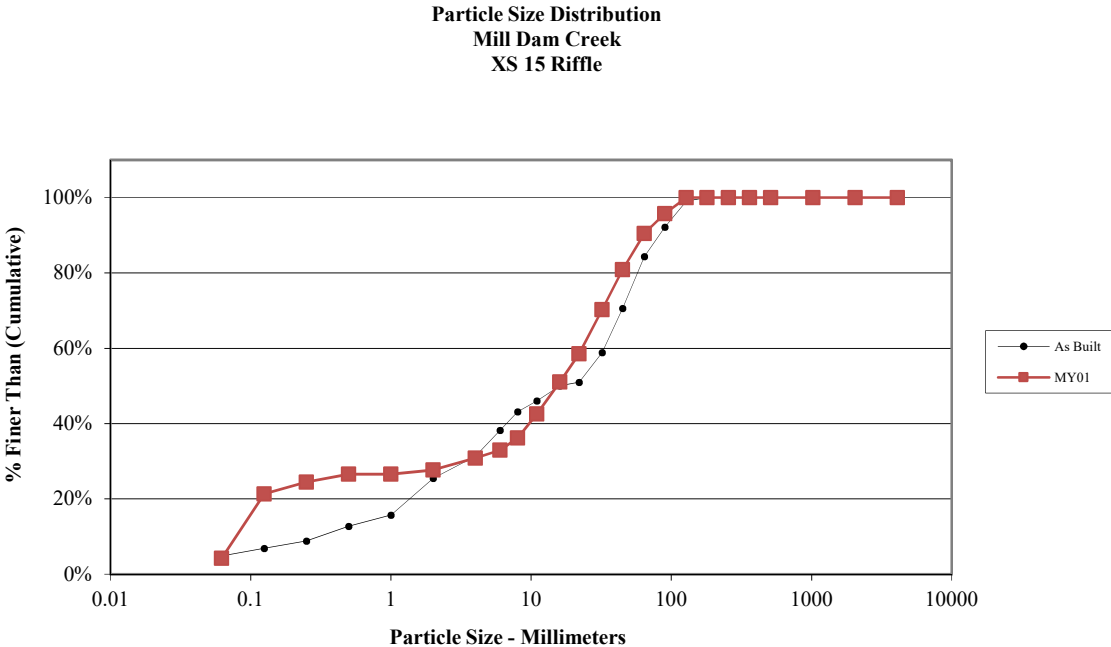
Cross-Section 14 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	4
Very Fine	.062 - .125	S	4
Fine	.125 - .25	A	
Medium	.25 - .50	N	2
Coarse	.50 - 1	D	2
Very Coarse	1 - 2	S	2
Very Fine	2 - 4		6
Fine	4 - 5.7	G	1
Fine	5.7 - 8	R	1
Medium	8 - 11.3	A	7
Medium	11.3 - 16	V	7
Coarse	16 - 22.6	E	7
Coarse	22.6 - 32	L	10
Very Coarse	32 - 45	S	16
Very Coarse	45 - 64		13
Small	64 - 90	C	9
Small	90 - 128	O	6
Large	128 - 180	B	3
Large	180 - 256	L	
Small	256 - 362	B	1
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	101

Note:



Cross-Section 15 Rifle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	4
Very Fine	.062 - .125	S	16
Fine	.125 - .25	A	3
Medium	.25 - .50	N	2
Coarse	.50 - 1	D	
Very Coarse	1 - 2	S	1
Very Fine	2 - 4		3
Fine	4 - 5.7	G	2
Fine	5.7 - 8	R	3
Medium	8 - 11.3	A	6
Medium	11.3 - 16	V	6
Coarse	16 - 22.6	E	8
Coarse	22.6 - 32	L	7
Very Coarse	32 - 45	S	11
Very Coarse	45 - 64		10
Small	64 - 90	C	9
Small	90 - 128	O	5
Large	128 - 180	B	4
Large	180 - 256	L	
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	100

Note:



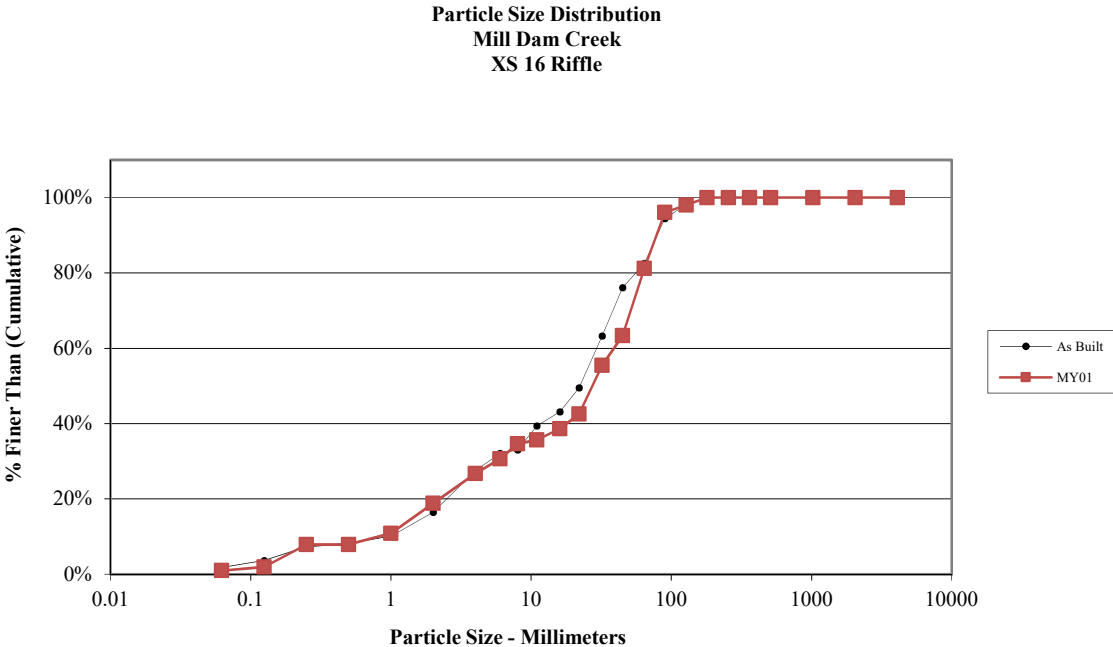
Size (mm)	
D16	0.1
D35	8.4
D50	19
D65	36
D84	69
D95	120

Size Distribution	
mean	2.6
dispersion	96.8
skewness	-0.51

Type	
silt/clay	4%
sand	22%
gravel	56%
cobble	18%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

Cross-Section 16 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	1
Very Fine	.062 - .125	S	1
Fine	.125 - .25	A	6
Medium	.25 - .50	N	
Coarse	.50 - 1	D	3
Very Coarse	1 - 2	S	8
Very Fine	2 - 4		8
Fine	4 - 5.7	G	4
Fine	5.7 - 8	R	4
Medium	8 - 11.3	A	1
Medium	11.3 - 16	V	3
Coarse	16 - 22.6	E	4
Coarse	22.6 - 32	L	13
Very Coarse	32 - 45	S	8
Very Coarse	45 - 64		18
Small	64 - 90	C	15
Small	90 - 128	O	2
Large	128 - 180	B	2
Large	180 - 256	L	
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	101

Note:



Size (mm)	
D16	1.6
D35	8.9
D50	27
D65	46
D84	68
D95	88

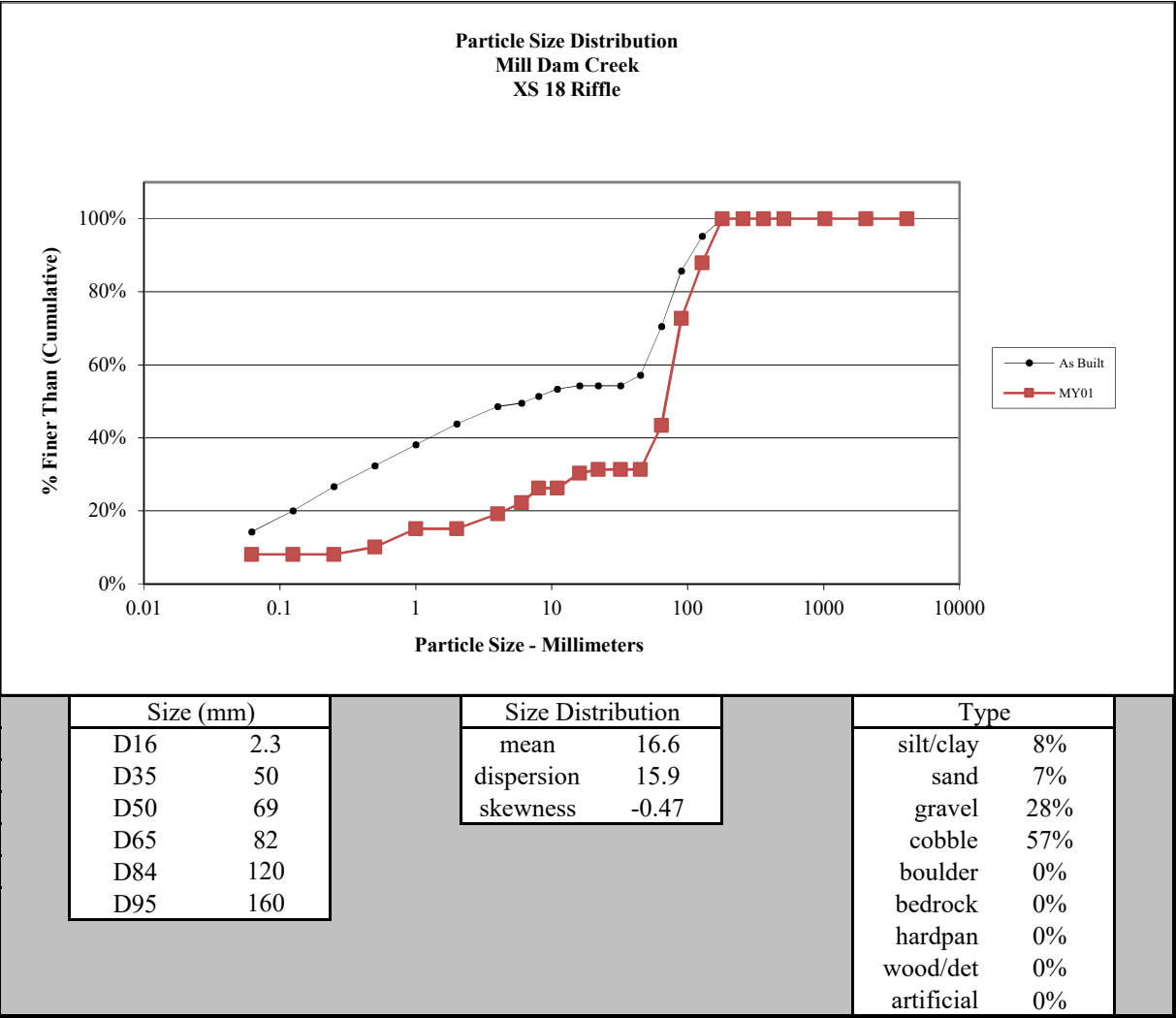
Size Distribution	
mean	10.4
dispersion	9.7
skewness	-0.32

Type	
silt/clay	1%
sand	18%
gravel	62%
cobble	19%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

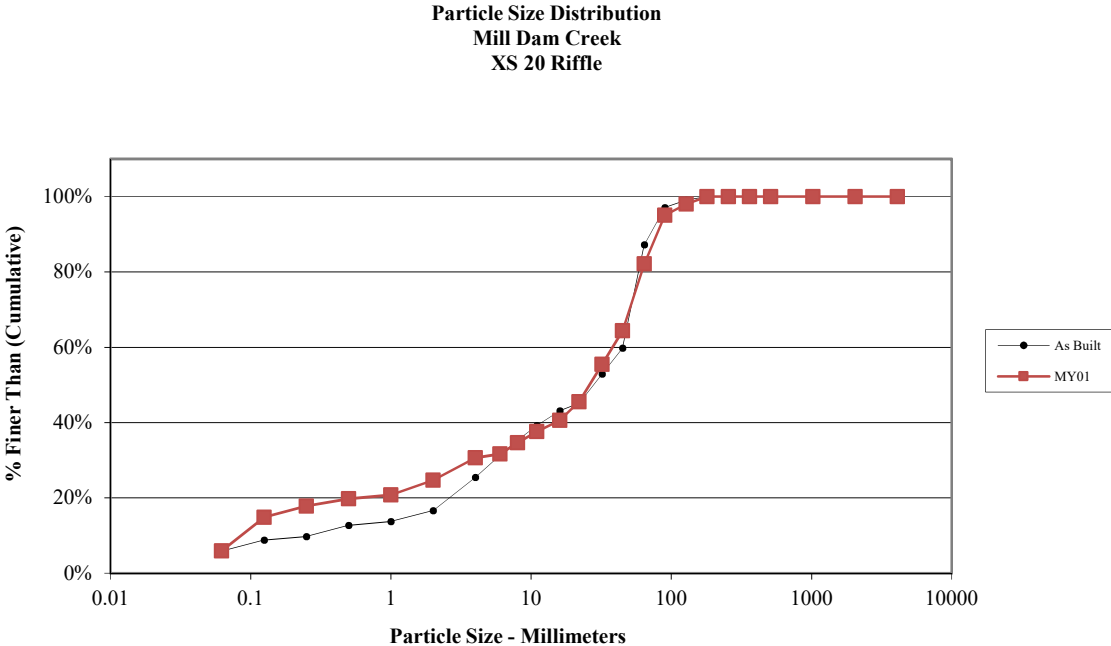


Cross-Section 18 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	8
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	
Medium	.25 - .50	N	2
Coarse	.50 - 1	D	5
Very Coarse	1 - 2	S	
Very Fine	2 - 4		4
Fine	4 - 5.7	G	3
Fine	5.7 - 8	R	4
Medium	8 - 11.3	A	
Medium	11.3 - 16	V	4
Coarse	16 - 22.6	E	1
Coarse	22.6 - 32	L	
Very Coarse	32 - 45	S	
Very Coarse	45 - 64		12
Small	64 - 90	C	29
Small	90 - 128	O	15
Large	128 - 180	B	12
Large	180 - 256	L	
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	99

Note:



Cross-Section 20 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	6
Very Fine	.062 - .125	S	9
Fine	.125 - .25	A	3
Medium	.25 - .50	N	2
Coarse	.50 - 1	D	1
Very Coarse	1 - 2	S	4
Very Fine	2 - 4		6
Fine	4 - 5.7	G	1
Fine	5.7 - 8	R	3
Medium	8 - 11.3	A	3
Medium	11.3 - 16	V	3
Coarse	16 - 22.6	E	5
Coarse	22.6 - 32	L	10
Very Coarse	32 - 45	S	9
Very Coarse	45 - 64		18
Small	64 - 90	C	13
Small	90 - 128	O	3
Large	128 - 180	B	2
Large	180 - 256	L	
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	101



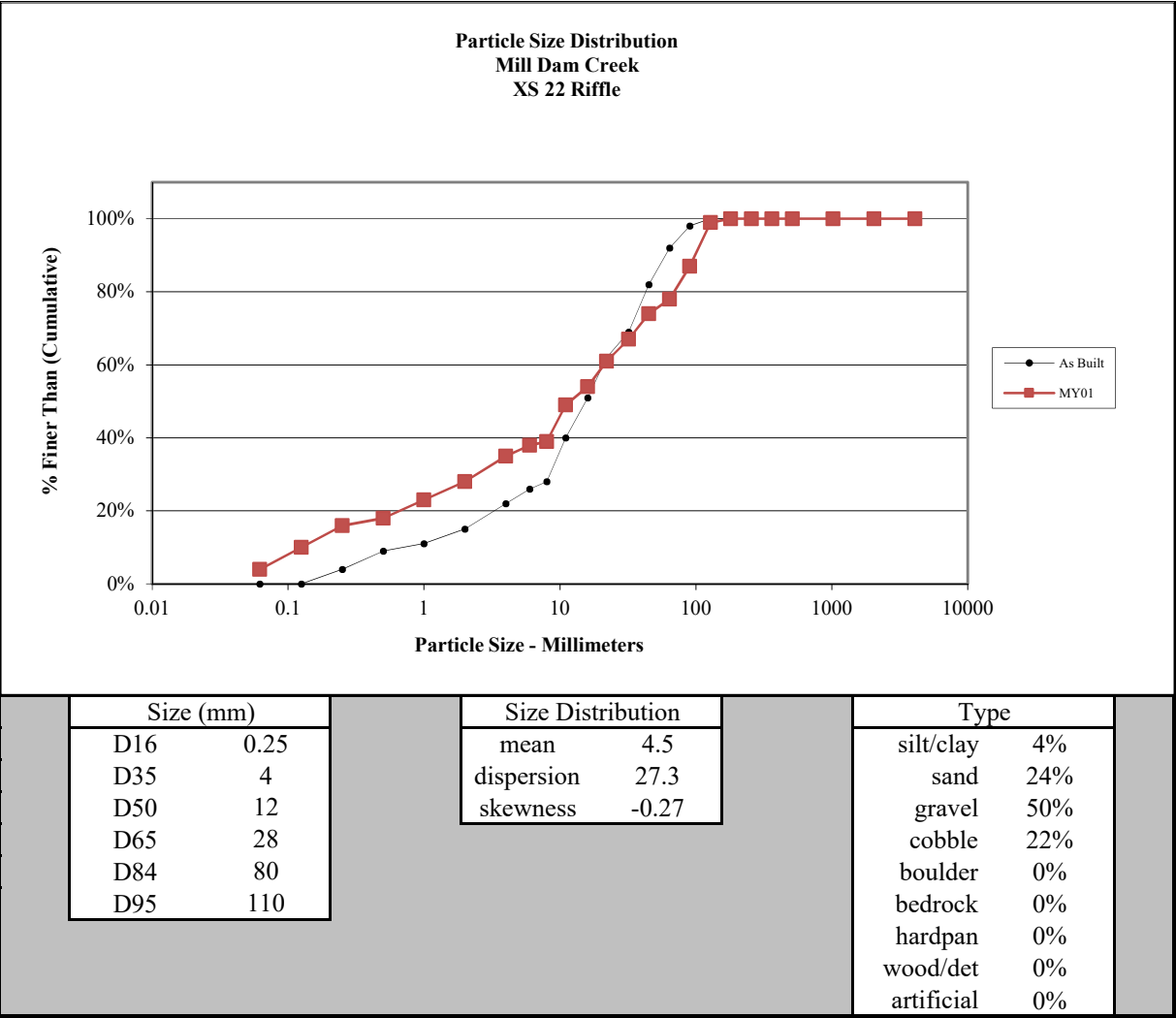
Size (mm)	
D16	0.16
D35	8.3
D50	26
D65	46
D84	67
D95	90

Size Distribution	
mean	3.3
dispersion	82.5
skewness	-0.56

Type	
silt/clay	6%
sand	19%
gravel	57%
cobble	18%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

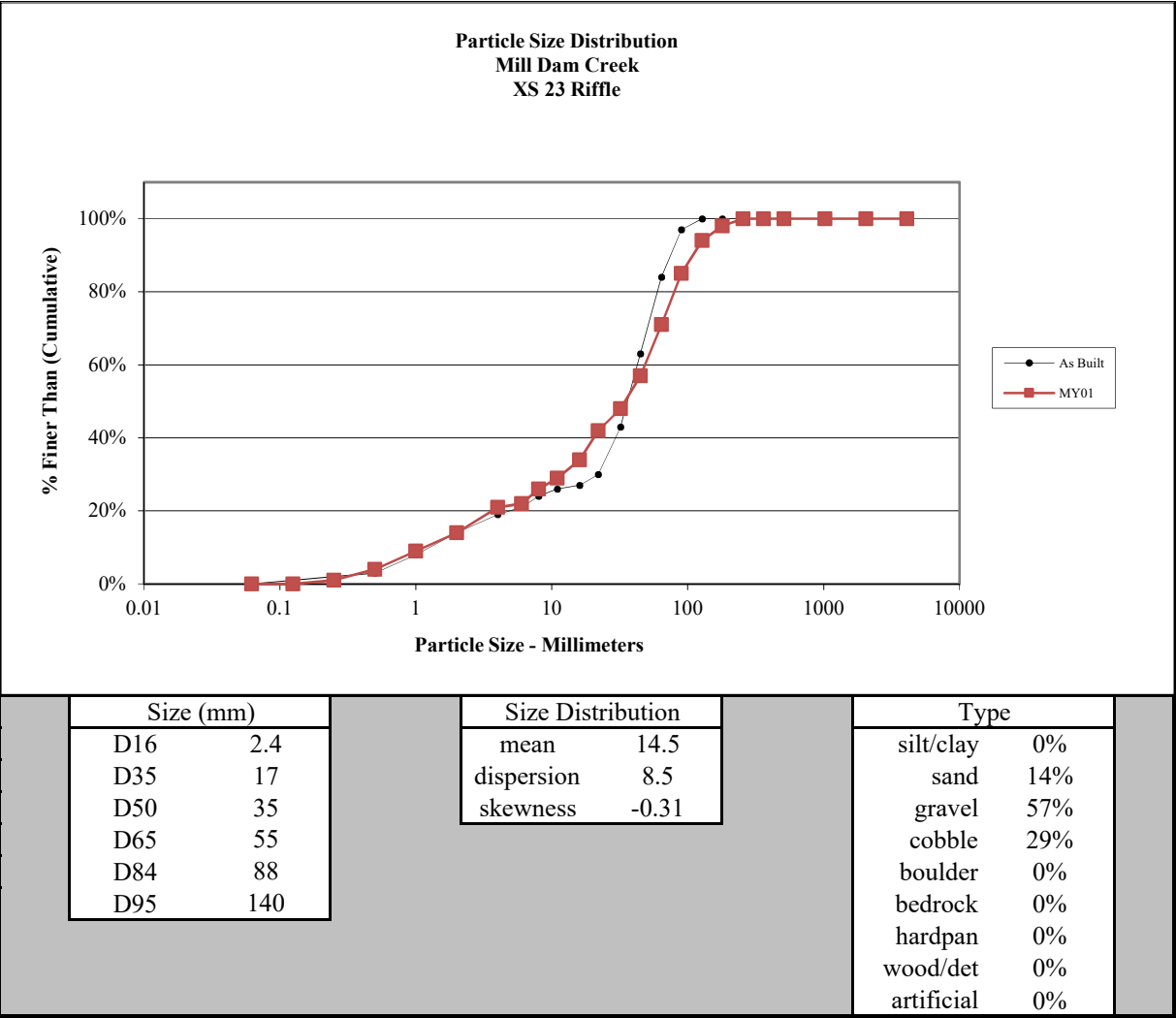
Cross-Section 22 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	4
Very Fine	.062 - .125	S	6
Fine	.125 - .25	A	6
Medium	.25 - .50	N	2
Coarse	.50 - 1	D	5
Very Coarse	1 - 2	S	5
Very Fine	2 - 4		7
Fine	4 - 5.7	G	3
Fine	5.7 - 8	R	1
Medium	8 - 11.3	A	10
Medium	11.3 - 16	V	5
Coarse	16 - 22.6	E	7
Coarse	22.6 - 32	L	6
Very Coarse	32 - 45	S	7
Very Coarse	45 - 64		4
Small	64 - 90	C	9
Small	90 - 128	O	12
Large	128 - 180	B	1
Large	180 - 256	L	
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	100

Note:



Cross-Section 23 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	1
Medium	.25 - .50	N	3
Coarse	.50 - 1	D	5
Very Coarse	1 - 2	S	5
Very Fine	2 - 4		7
Fine	4 - 5.7	G	1
Fine	5.7 - 8	R	4
Medium	8 - 11.3	A	3
Medium	11.3 - 16	V	5
Coarse	16 - 22.6	E	8
Coarse	22.6 - 32	L	6
Very Coarse	32 - 45	S	9
Very Coarse	45 - 64		14
Small	64 - 90	C	14
Small	90 - 128	O	9
Large	128 - 180	B	4
Large	180 - 256	L	2
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	100

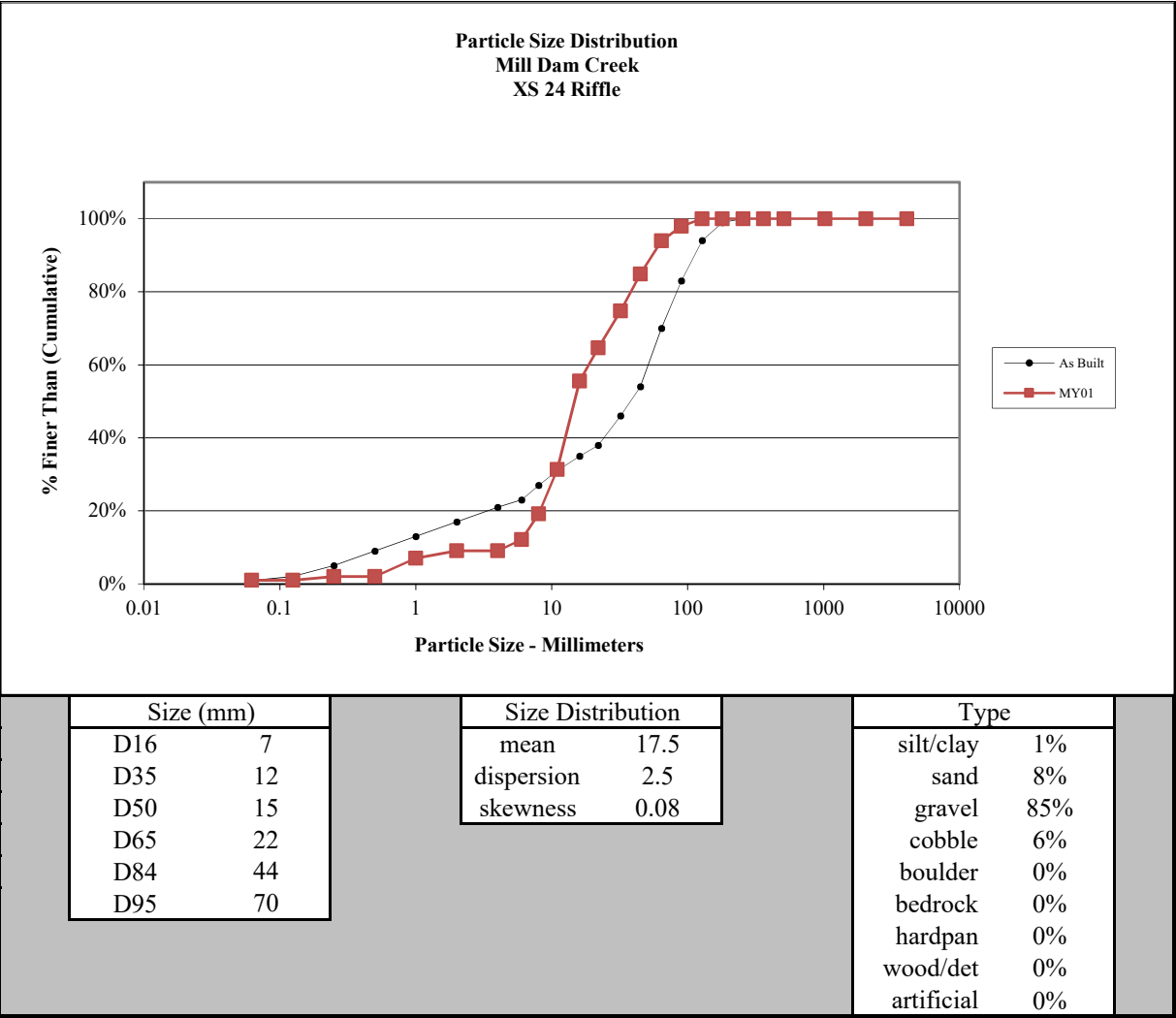
Note:





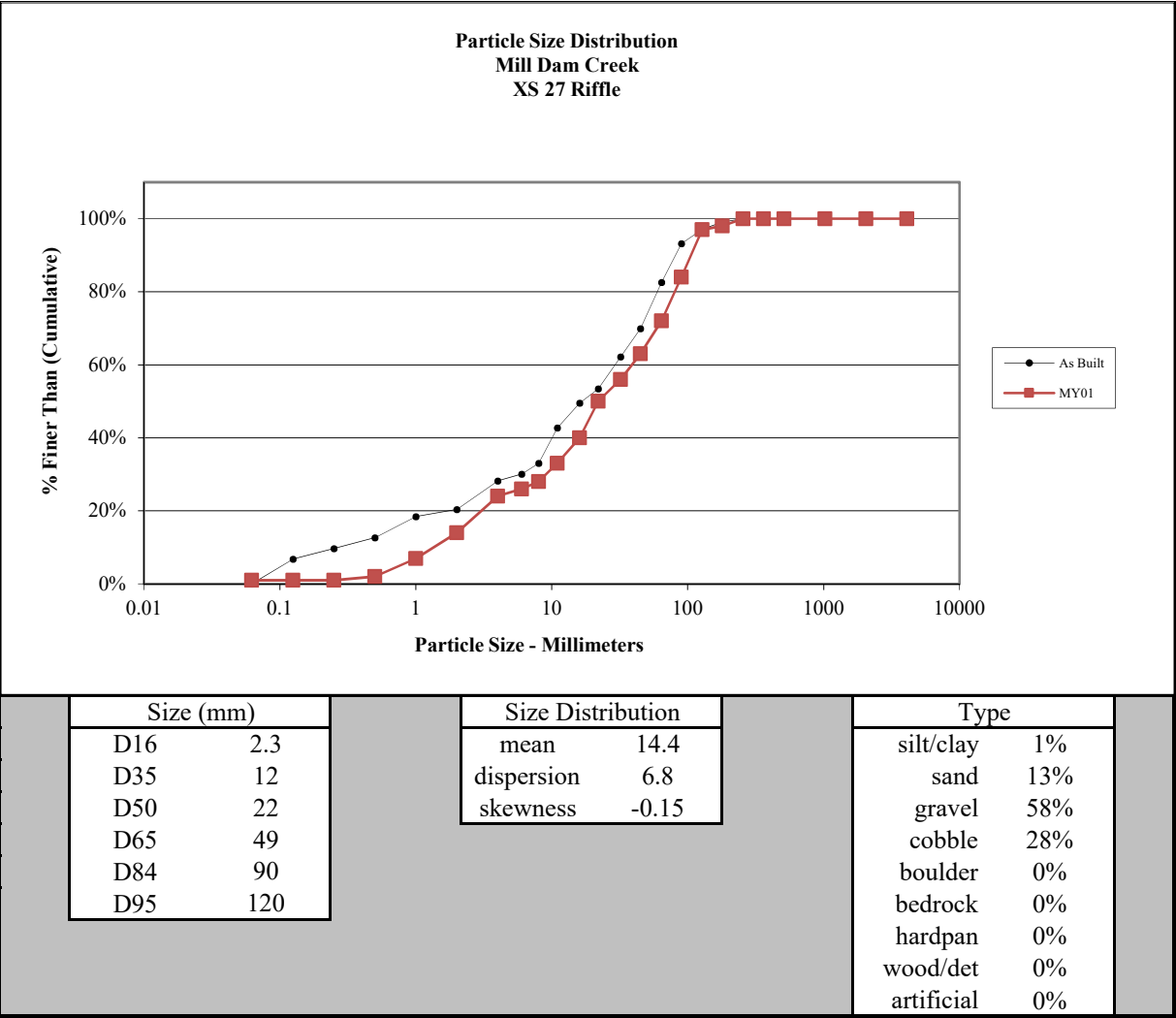
Cross-Section 24 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	1
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	1
Medium	.25 - .50	N	
Coarse	.50 - 1	D	5
Very Coarse	1 - 2	S	2
Very Fine	2 - 4		
Fine	4 - 5.7	G	3
Fine	5.7 - 8	R	7
Medium	8 - 11.3	A	12
Medium	11.3 - 16	V	24
Coarse	16 - 22.6	E	9
Coarse	22.6 - 32	L	10
Very Coarse	32 - 45	S	10
Very Coarse	45 - 64		9
Small	64 - 90	C	4
Small	90 - 128	O	2
Large	128 - 180	B	
Large	180 - 256	L	
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	99

Note:



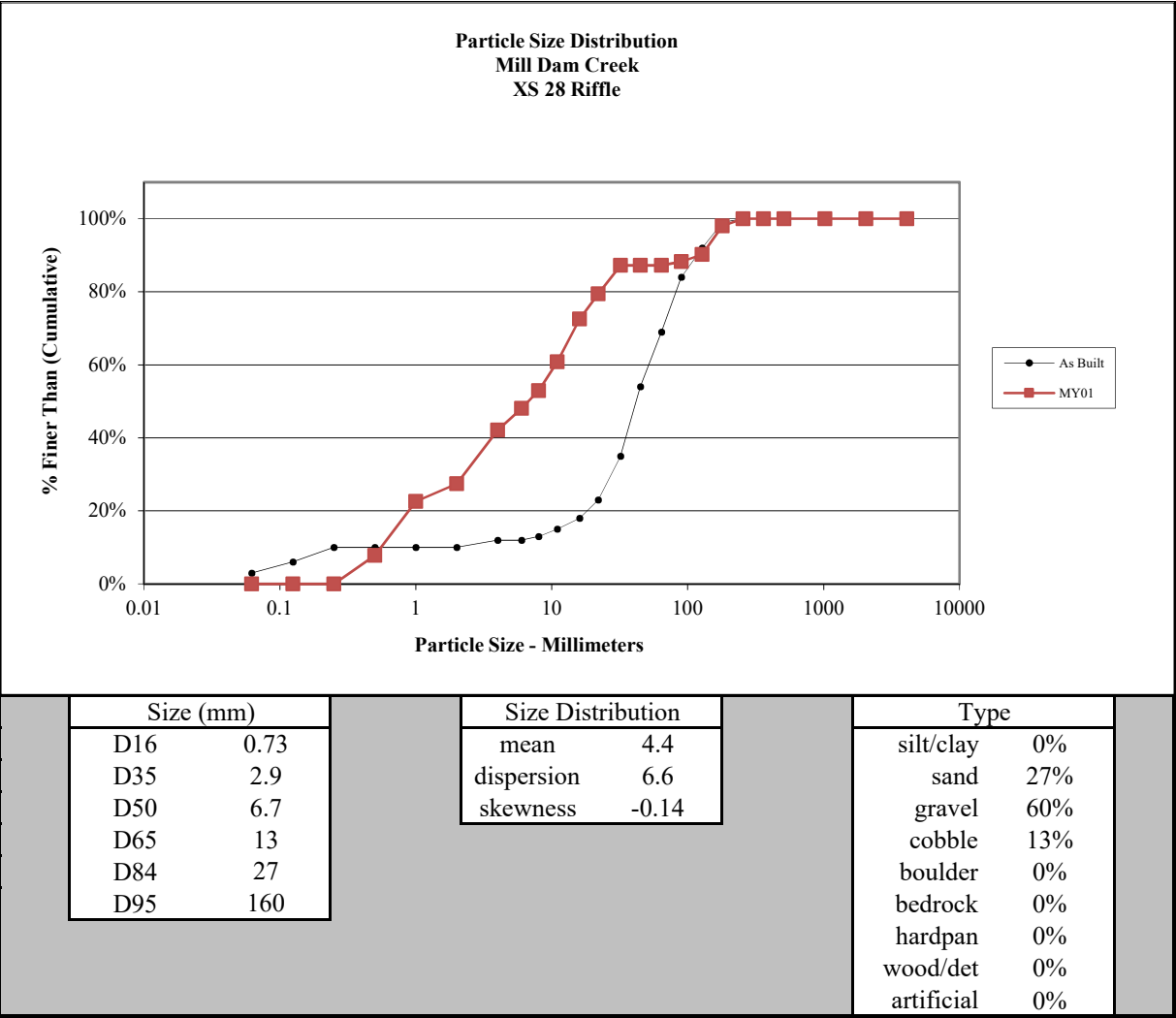
Cross-Section 27 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	1
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	
Medium	.25 - .50	N	1
Coarse	.50 - 1	D	5
Very Coarse	1 - 2	S	7
Very Fine	2 - 4		10
Fine	4 - 5.7	G	2
Fine	5.7 - 8	R	2
Medium	8 - 11.3	A	5
Medium	11.3 - 16	V	7
Coarse	16 - 22.6	E	10
Coarse	22.6 - 32	L	6
Very Coarse	32 - 45	S	7
Very Coarse	45 - 64		9
Small	64 - 90	C	12
Small	90 - 128	O	13
Large	128 - 180	B	1
Large	180 - 256	L	2
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	100

Note:



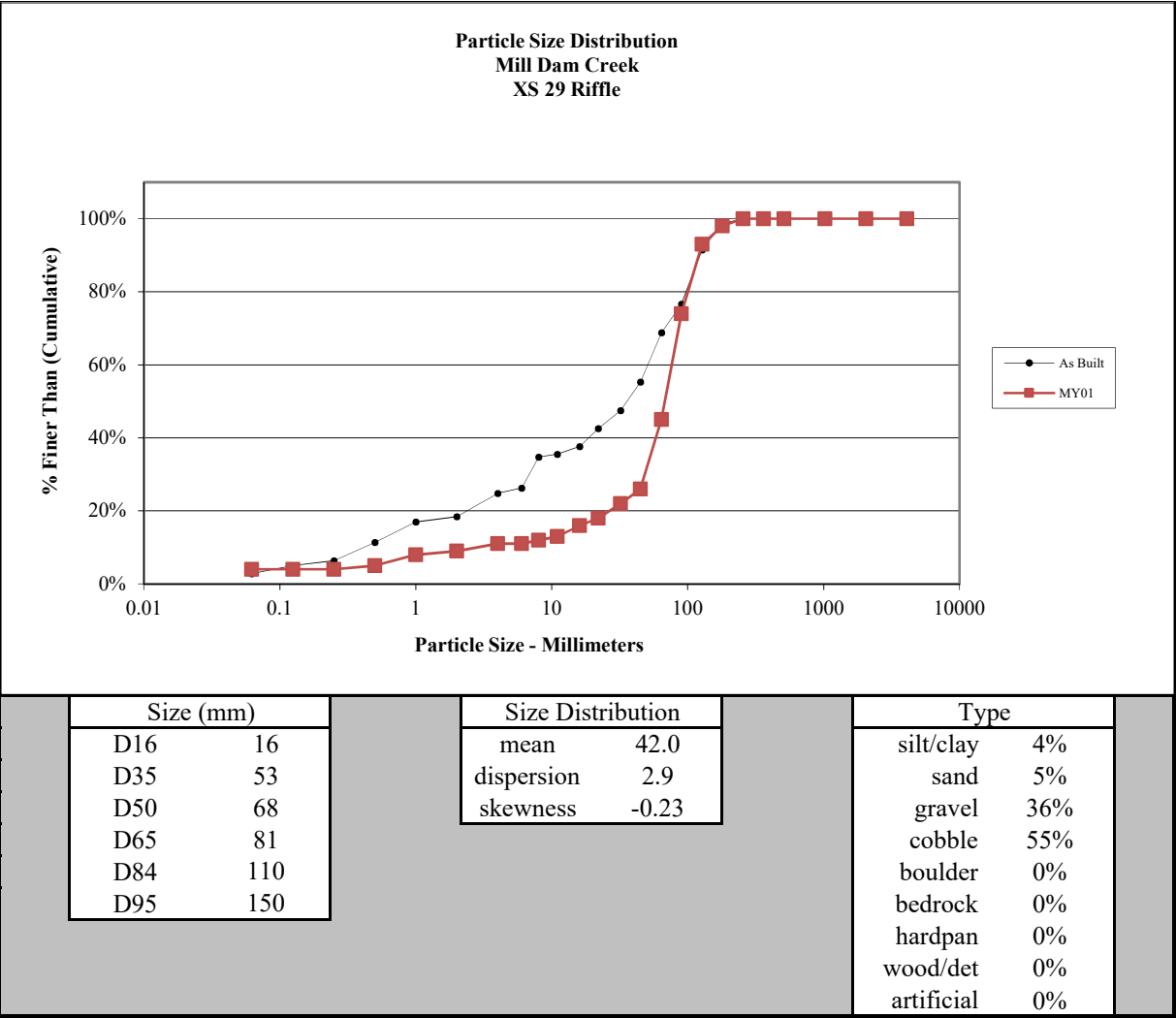
Cross-Section 28 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	
Medium	.25 - .50	N	8
Coarse	.50 - 1	D	15
Very Coarse	1 - 2	S	5
Very Fine	2 - 4		15
Fine	4 - 5.7	G	6
Fine	5.7 - 8	R	5
Medium	8 - 11.3	A	8
Medium	11.3 - 16	V	12
Coarse	16 - 22.6	E	7
Coarse	22.6 - 32	L	8
Very Coarse	32 - 45	S	
Very Coarse	45 - 64		
Small	64 - 90	C	1
Small	90 - 128	O	2
Large	128 - 180	B	8
Large	180 - 256	L	2
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	102

Note:



Cross-Section 29 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	4
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	
Medium	.25 - .50	N	1
Coarse	.50 - 1	D	3
Very Coarse	1 - 2	S	1
Very Fine	2 - 4		2
Fine	4 - 5.7	G	
Fine	5.7 - 8	R	1
Medium	8 - 11.3	A	1
Medium	11.3 - 16	V	3
Coarse	16 - 22.6	E	2
Coarse	22.6 - 32	L	4
Very Coarse	32 - 45	S	4
Very Coarse	45 - 64		19
Small	64 - 90	C	29
Small	90 - 128	O	19
Large	128 - 180	B	5
Large	180 - 256	L	2
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	100

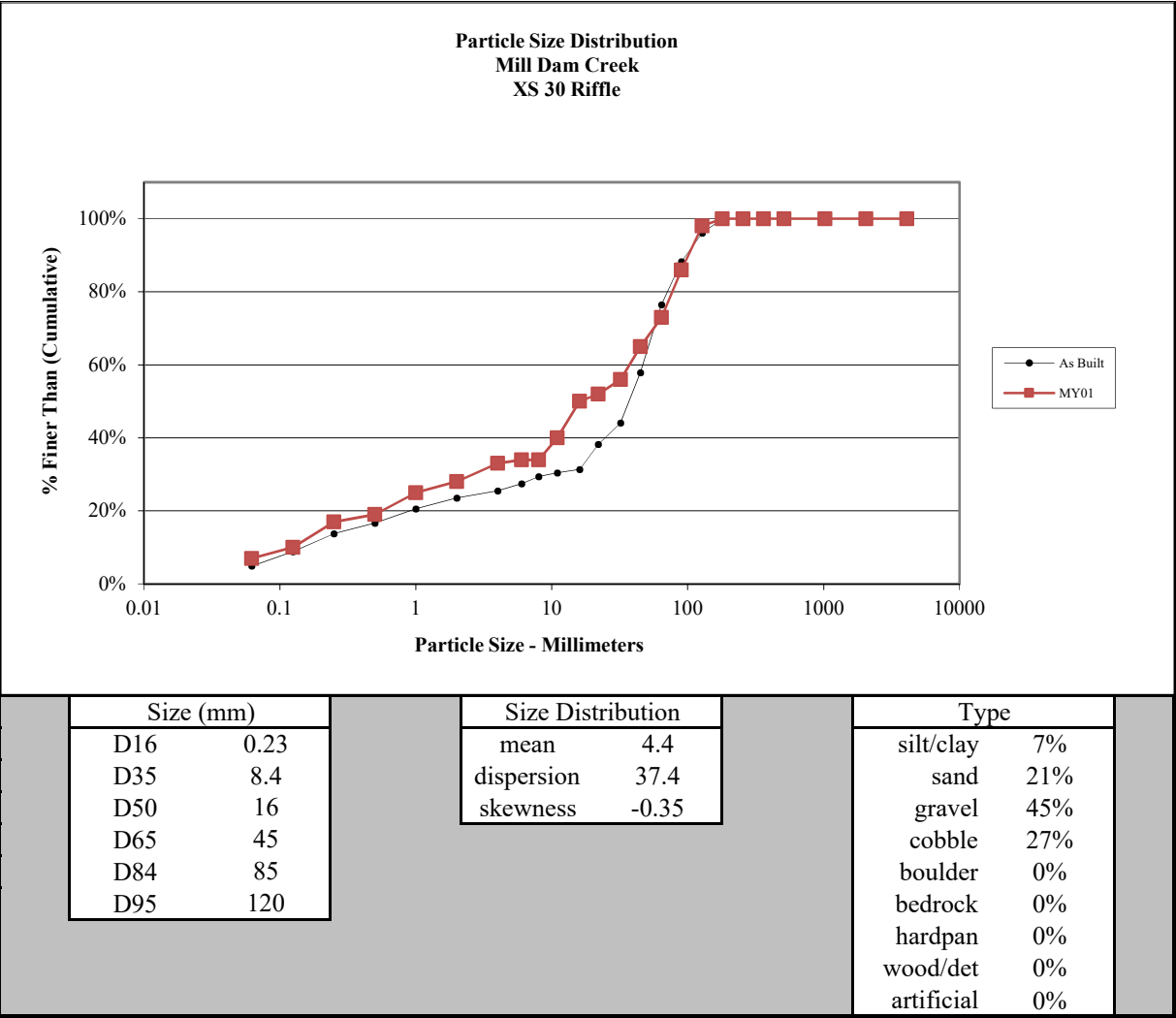
Note:





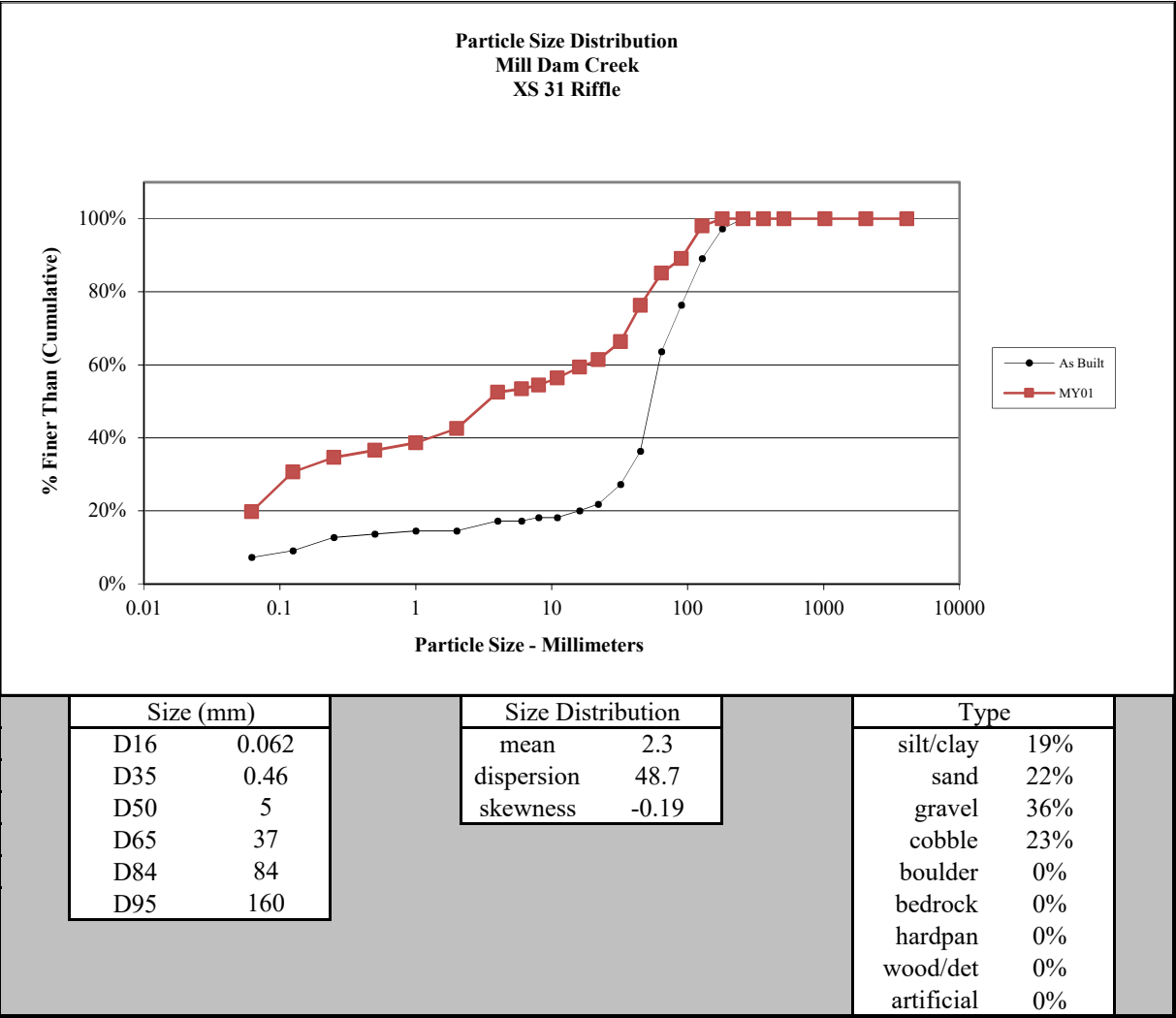
Cross-Section 30 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	7
Very Fine	.062 - .125	S	3
Fine	.125 - .25	A	7
Medium	.25 - .50	N	2
Coarse	.50 - 1	D	6
Very Coarse	1 - 2	S	3
Very Fine	2 - 4		5
Fine	4 - 5.7	G	1
Fine	5.7 - 8	R	
Medium	8 - 11.3	A	6
Medium	11.3 - 16	V	10
Coarse	16 - 22.6	E	2
Coarse	22.6 - 32	L	4
Very Coarse	32 - 45	S	9
Very Coarse	45 - 64		8
Small	64 - 90	C	13
Small	90 - 128	O	12
Large	128 - 180	B	2
Large	180 - 256	L	
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	100

Note:

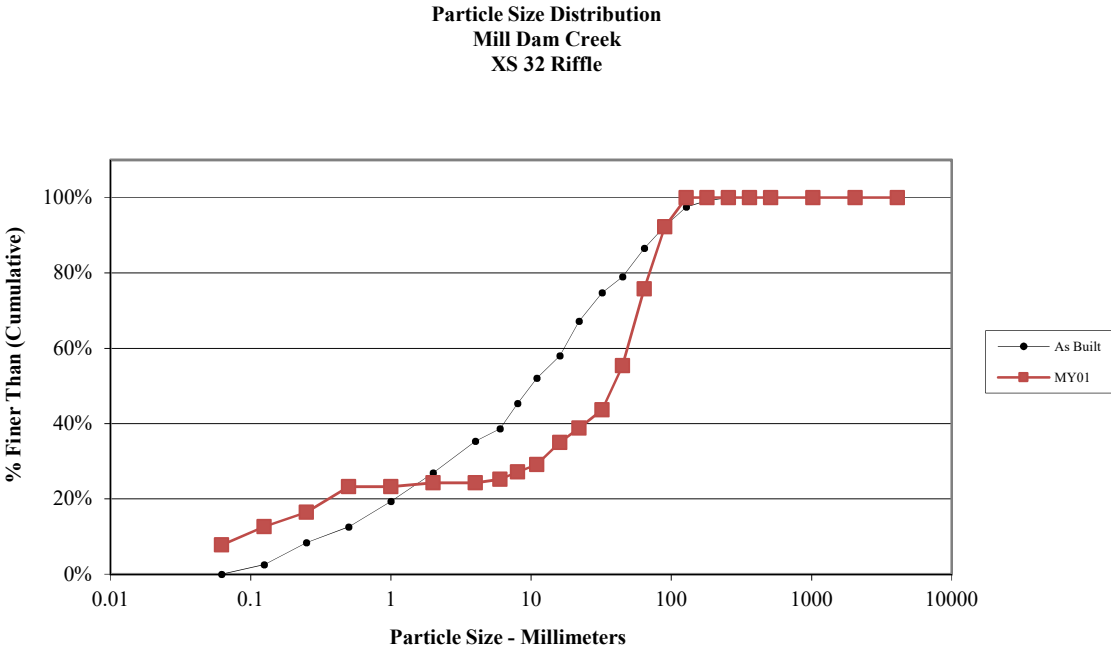


Cross-Section 31 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	20
Very Fine	.062 - .125	S	11
Fine	.125 - .25	A	4
Medium	.25 - .50	N	2
Coarse	.50 - 1	D	2
Very Coarse	1 - 2	S	4
Very Fine	2 - 4		4
Fine	4 - 5.7	G	10
Fine	5.7 - 8	R	1
Medium	8 - 11.3	A	1
Medium	11.3 - 16	V	2
Coarse	16 - 22.6	E	3
Coarse	22.6 - 32	L	2
Very Coarse	32 - 45	S	5
Very Coarse	45 - 64		10
Small	64 - 90	C	9
Small	90 - 128	O	4
Large	128 - 180	B	9
Large	180 - 256	L	2
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	105

Note:



Cross-Section 32 Riffle - MY01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	8
Very Fine	.062 - .125	S	5
Fine	.125 - .25	A	4
Medium	.25 - .50	N	7
Coarse	.50 - 1	D	
Very Coarse	1 - 2	S	1
Very Fine	2 - 4		
Fine	4 - 5.7	G	
Fine	5.7 - 8	R	1
Medium	8 - 11.3	A	2
Medium	11.3 - 16	V	2
Coarse	16 - 22.6	E	6
Coarse	22.6 - 32	L	4
Very Coarse	32 - 45	S	5
Very Coarse	45 - 64		12
Small	64 - 90	C	21
Small	90 - 128	O	17
Large	128 - 180	B	8
Large	180 - 256	L	
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		<b>Total</b>	103



Size (mm)	
D16	0.23
D35	22
D50	54
D65	75
D84	110
D95	140

Size Distribution	
mean	5.0
dispersion	118.4
skewness	-0.63

Type	
silt/clay	8%
sand	17%
gravel	31%
cobble	45%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

# **APPENDIX E**

## Hydrologic Data



**Table 10. Verification of Bankfull Events  
Mill Dam Creek Restoration Site, DMS Project #97136**

<b>Date of Occurrence</b>	<b>Method</b>	<b>Reach</b>
January 24, 2020	Onsite stream gauge	UTHC1
February 6, 2020	Onsite stream gauge	UTHC1, UTHC3
February 11, 2020	Onsite stream gauge	UTHC1
February 13, 2020	Onsite stream gauge	UTHC1
March 24, 2020	Onsite stream gauge	UTHC1
April 13, 2020	Onsite stream gauge	UTHC1, UTHC3
April 25, 2020	Onsite stream gauge	UTHC1
April 29, 2020	Onsite stream gauge	UTHC1, UTHC3
May 21, 2020	Onsite stream gauge	UTHC1, UTHC3
May 27, 2020	Onsite stream gauge	UTHC1, UTHC3
December 16, 2020	Photos taken on-site	UTHC1, UTHC3, T1, T2, T6, T8



Photo 1. Wrack lines above bankfull, UTHC1 – 12/18/2020



Photo 2. Wrack lines above bankfull, UTHC3 – 12/18/2020



Photo 3. Wrack lines above bankfull, T1 – 12/18/2020



Photo 4. Wrack lines above bankfull, T2 – 12/18/2020



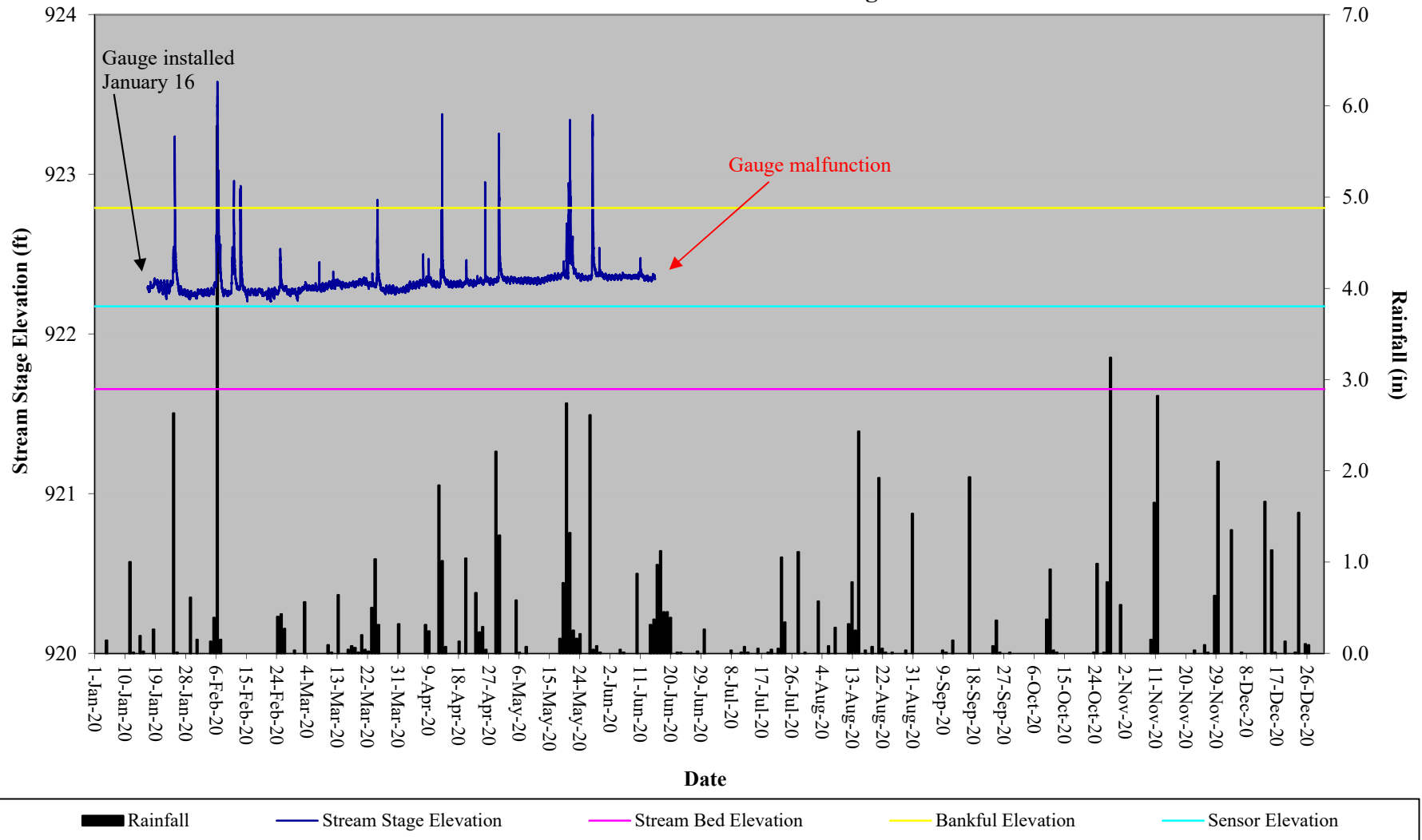


Photo 5. Wrack lines above bankfull, T6 – 12/18/2020

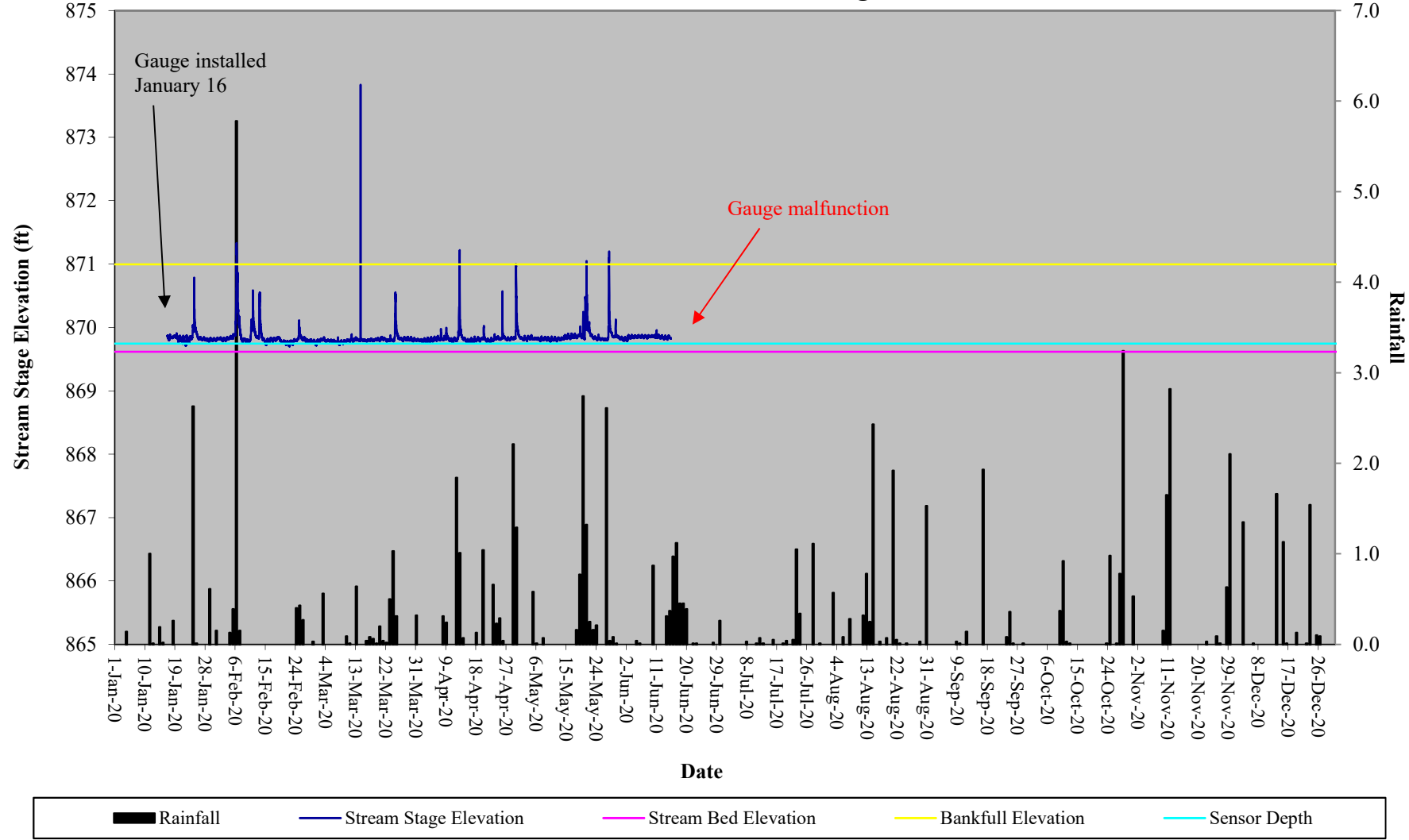


Photo 6. Wrack lines above bankfull, T8 – 12/18/2020

Mill Dam Creek Restoration Site  
Hydrograph  
UTHC-1 Stream Flow Gauge



Mill Dam Creek Restoration Site  
Hydrograph  
UTHC-3 Stream Flow Gauge

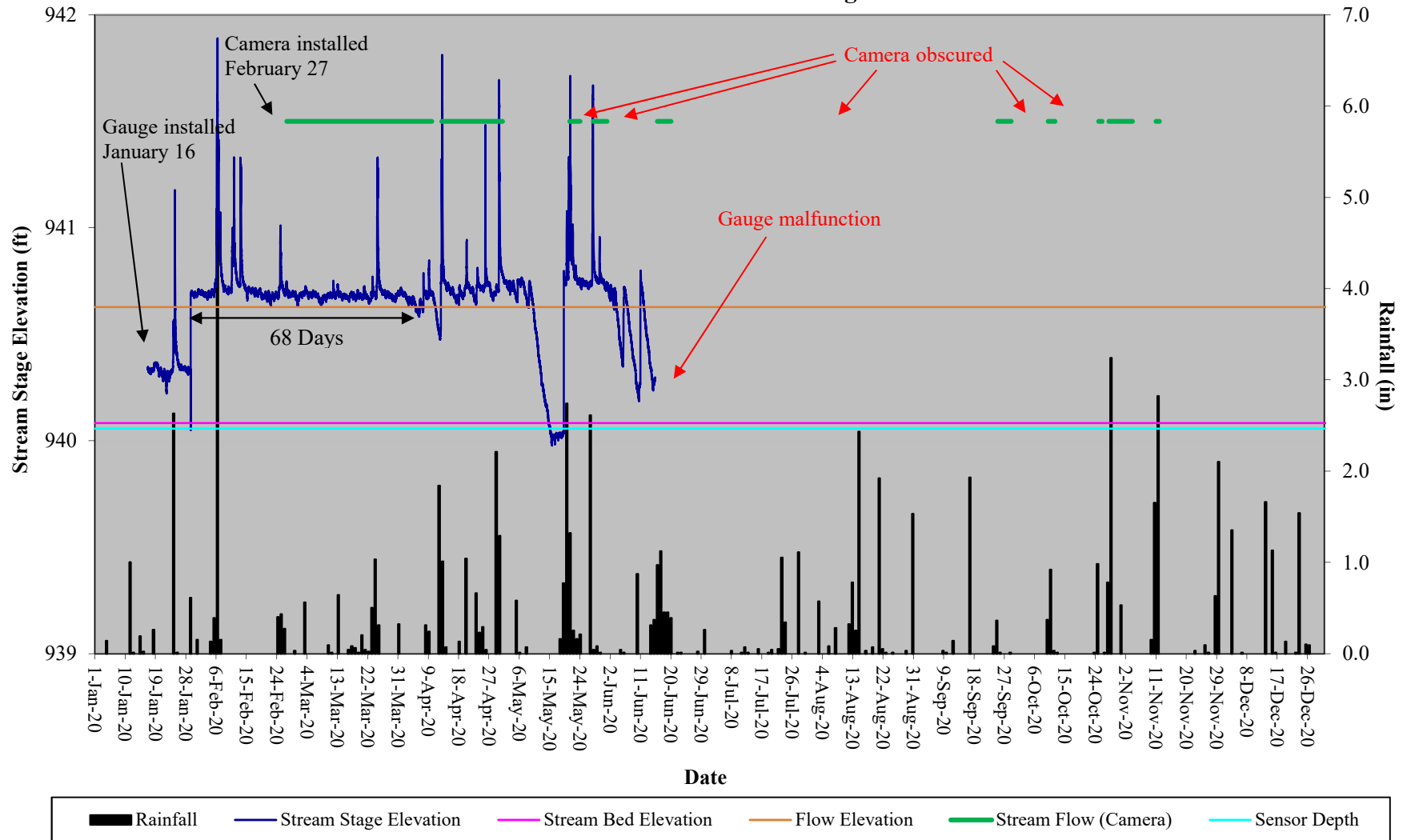




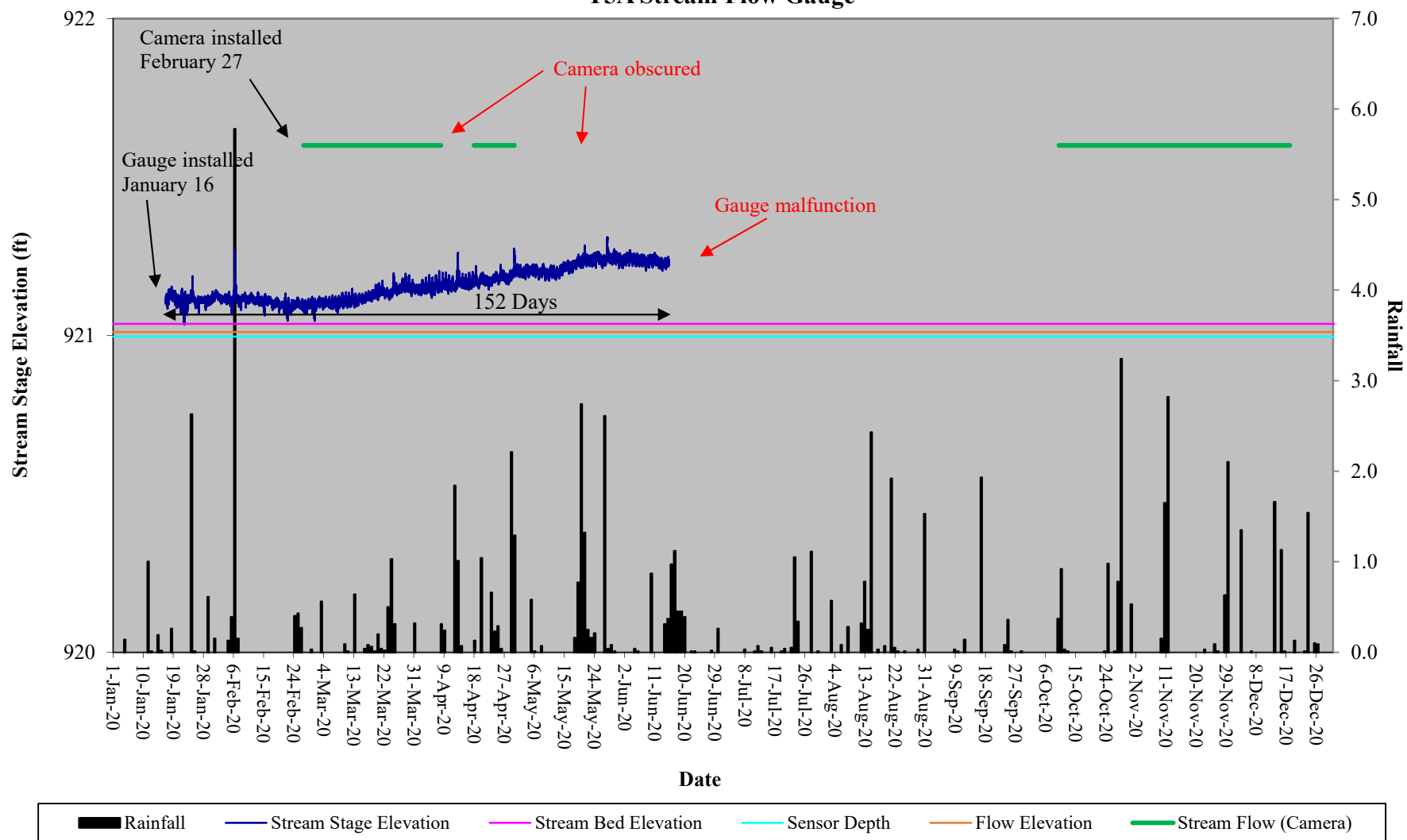
<b>Table 11. Verification of Stream Flow</b> <b>Mill Dam Creek Restoration Site, DMS Project #97136</b>				
	<b>Gauge</b>		<b>Camera</b>	
<b>Reach</b>	<b>Dates Achieving</b>	<b>Maximum Consecutive Days</b>	<b>Dates Achieving</b>	<b>Maximum Consecutive Days</b>
T1A	February 27 – April 5	68	February 27 – April 10	44
T5A	January 16 – June 15	152	February 27 – April 8; October 10 – December 18	70
T8A	January 16 – June 15	152	February 29 – May 22; July 31 – September 3; October 25 – December 18	84

<b>Table 12. Stream Flow Criteria Attainment</b> <b>Mill Dam Creek Restoration Site, DMS Project #97136</b>							
	<b>Greater than 30 Days of Flow/Max Consecutive Days</b>						
<b>Reach</b>	<b>MY-01 2020</b>	<b>MY-02 2021</b>	<b>MY-03 2022</b>	<b>MY-04 2023</b>	<b>MY-05 2024</b>	<b>MY-06 2025</b>	<b>MY-07 2026</b>
T1A (Gauge)	Yes/68						
T1A (Camera)	Yes/44						
T5A (Gauge)	Yes/152						
T5A (Camera)	Yes/70						
T8A (Gauge)	Yes/152						
T8A (Camera)	Yes/84						

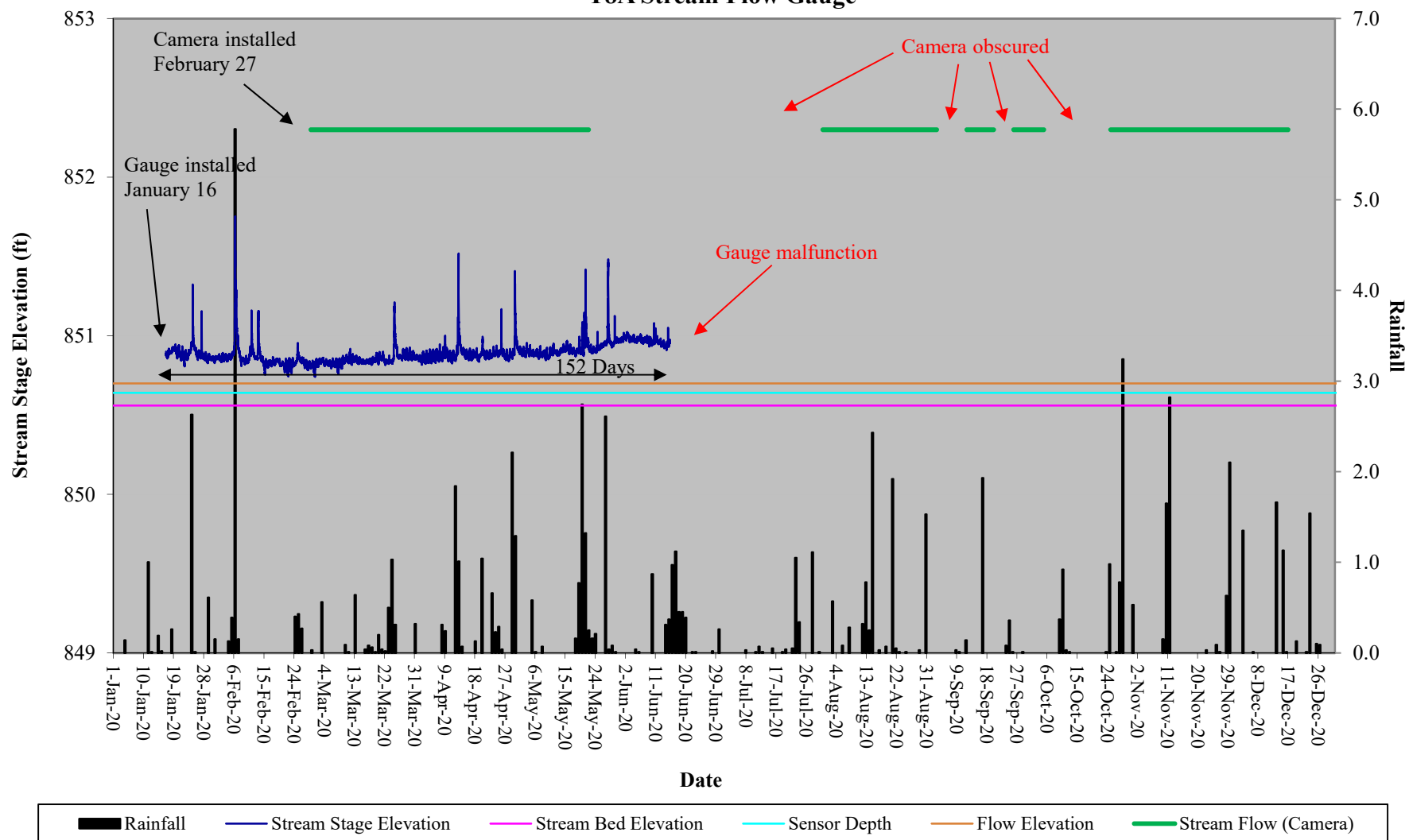
# Mill Dam Creek Restoration Site Hydrograph T1A Stream Flow Gauge



# Mill Dam Creek Restoration Site Hydrograph T5A Stream Flow Gauge



Mill Dam Creek Restoration Site  
Hydrograph  
T8A Stream Flow Gauge





<b>Table 13. Wetland Hydrology Verification</b> <b>Mill Dam Creek Restoration Site, DMS Project #97136</b>								
		Max Consecutive Days During Growing Season (Percentage)						
Gauge #	Location	MY-01 2020	MY-02 2021	MY-03 2022	MY-04 2023	MY-05 2024	MY-06 2025	MY-07 2026
Gauge 1	T7	45 (19.7%)						
Gauge 2	T8	Gauge malfunction						

Mill Dam Creek Restoration Site  
Hydrograph  
Wetland Gauge 1, T7

