Monitoring Report MY01

Stony Fork Restoration Site
Upper Neuse River Basin - 03020201
Monitoring Year 01
DMS Contract 6830

DMS Project Number 97085
DWR #: 2016-0372
USACE Action ID: 2016-00875
Johnston County, North Carolina

Prepared for:
NCDMS, 1652 Mail Service Center, Raleigh, NC 27699-1652

Monitoring Data Collected: 2019
Date Submitted: January 2020

Monitoring and Design Firm

Prepared by:

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Email: tim.morris@kci.com

KCI ASSOCIATES OF NORTH CAROLINA, PA

ENGINEERS • SCIENTISTS • SURVEYORS • CONSTRUCTION MANAGERS

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

MEMORANDUM

Date: February 7, 2020
To: Lindsay Crocker, DMS Project Manager
From: Adam Spiller, Project Manager
KCI Associates of North Carolina, PA
Subject: MY-01 Monitoring Report Comments
Stony Fork DMS #6830, Contract 006830
Neuse River Basin CU 030202018
Johnston County, North Carolina

Please find below our responses in italics to the MY-01 Monitoring Report comments from NCDMS received on January 29, 2020 for the Stony Fork Restoration Site.

Digital Comments:

1. Report has asset table for Cedar Branch, not Stony Fork.
   KCI Response: This error has been corrected.

2. Please provide DMS with excel files used to create visual assessment tables.
   KCI Response: These have been added to the digital deliverables.

3. Note that in the cross-section figure for XS14 the legend has MY1 listed as 0%.
   KCI Response: This error has been corrected

Report Comments:

1. Asset tables Project Component/Reach ID does not match MY0 report, the riparian buffer credit is missing, and the numbers don't match. These tables should be the same every year. Update to show MY0 table.
   KCI Response: This error has been corrected.

Sincerely,

Adam Spiller
Project Manager

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Appendix E – Hydrologic Data

PROJECT SUMMARY

The Stony Fork Restoration Site (SFRS) was completed in May 2019 and restored a total of 6,810 linear feet of stream and 949,747 square feet of riparian buffer under the Neuse Buffer Rule (NCAC Rule 15A 02B.029). The SFRS is a riparian system in the Upper Neuse River Basin (03020201 8-digit cataloging unit) in Johnston County, North Carolina. The site's natural hydrologic regime had been substantially modified through the relocation and straightening of the existing stream channels, impacted by land clearing, and cleared of any riparian buffer. This completed project will restore impacted agricultural and timber lands to a stable stream ecosystem with a functional riparian buffer and floodplain access.

The SFRS is protected by a 24.4 acre permanent conservation easement, held by the State of North Carolina. The site is located approximately 5.5 miles north of Benson, NC. Specifically, the site is 0.2 mile west on Elevation Road from its intersection with Federal Road (SR-1331).

The North Carolina Ecosystem Enhancement Program (NCEEP) published the Neuse River Basin Priorities in 2010. These were updated in for the Neuse 01 cataloging unit (CU) in 2015 due to extensive mitigation needs and changes in watershed conditions since 2010. The project 14 digit CU (03020201150010) was identified as a Targeted Local Watershed (TLW) in the updated priorities. The goals and priorities for the SFRS are based on the information presented in the Neuse 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
- Improving/restoring riparian buffers
- Reducing sediment loading
- Improving stream stability

The goals for the project are to:

- Restore channelized and agriculture impacted streams to stable C/Cb channels.
- Restore a forested riparian buffer to provide bank stability, filtration, and shading.

The project goals will be addressed through the following objectives:

- Relocate a channelized stream to its historic landscape position.
- Install cross-sections sized to the bankfull discharge.
- Create bedform diversity with pools, riffles, and habitat structures
- Plant the site with native trees and shrubs and an herbaceous seed mix.

Project planting and construction were completed in May 2019. The SFRS involved restoration and establishment of a functioning stream ecosystem with 6,810 linear feet of stream 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 no major modifications from the design plan. The monitoring components were installed in May 2019. Four automatically recording pressure transducer stream gauges that take a reading every 10 minutes were installed in the upper third of T1, T1-A, T2 and T3 to document flow within those reaches. Cameras were installed in the vicinity of each of these gauges and set to record a short video once a day to provide additional verification of flow. An additional automatically recording pressure transducer stream gauge was installed near the bottom of the main stem (SF3) to record the occurrence of bankfull events. To determine the success of the planted mitigation areas, seven 10 m x 10 m permanent vegetation monitoring plots were established. An additional five 10 m x 10 m random vegetation monitoring plots were sampled 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 also grouped into size categories by species, but separate from the planted stems. Twelve permanent photo reference points were established and will be taken annually. Sixteen permanent cross-sections (eight riffle

cross-sections and eight 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 will be repeated in future monitoring years, but the longitudinal profile will only be repeated if there are concerns about bed elevation adjustments. Reports will be submitted to DMS each year.

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 for three out of the first four years of monitoring. 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 baseline 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.

Vegetative success criteria for the areas proposed for riparian buffer credit is 260 woody stems/acre at the end of five years of monitoring. Trees in each plot must average seven feet in height at Year 5. There should be a minimum of four native hardwood tree species, with no species accounting for greater than 50% of the stems. Volunteer species must be from the approved planting list to count toward vegetative success.

MONITORING RESULTS

The first-year vegetation monitoring was conducted November 5, 2019. The site averaged 946 planted stems/acre across all 12 plots. All thirteen plots had greater than 260 planted stems/acre. Including volunteers, the site averaged 1,072 total stems/acre. In general the site is well vegetated, with widespread herbaceous coverage and healthy planted stems.

The stream gauge near the bottom of SF3 did not record any bankfull events in 2019. All four stream flow gauges recorded at least 30 consecutive days of flow. The gauges on T1 and T1A recorded 60 consecutive days and 182 consecutive days respectively, while the one on T2 recorded 85 days and the one on T3 recorded 55 days. The gauge data was further backed up by the cameras on site. Based on the video recordings obtained from the cameras, T1A had flow for a maximum of 46 consecutive days, T2 had flow for a maximum of 84 consecutive days, and T3 had flow for a maximum of 55 consecutive days. The camera on T1 was obscured by moisture that got inside of the lens for most of the year. The difference in the numbers obtained from the cameras compared to those obtained from the gauge is largely due to the cameras becoming obscured by vegetation, or moisture on the lens for parts of the year.

The longitudinal profile was not repeated for the first-year survey because the baseline survey found that the stream was constructed as designed, and there were no concerns about bed elevation adjustments. The first-year cross-section survey found that the dimensions of the stream are as designed, with some small variation as is typical for stream restoration projects. The monitored cross-section data have been calculated by adjusting the bankfull elevation to maintain the baseline bankfull area for each cross-section.

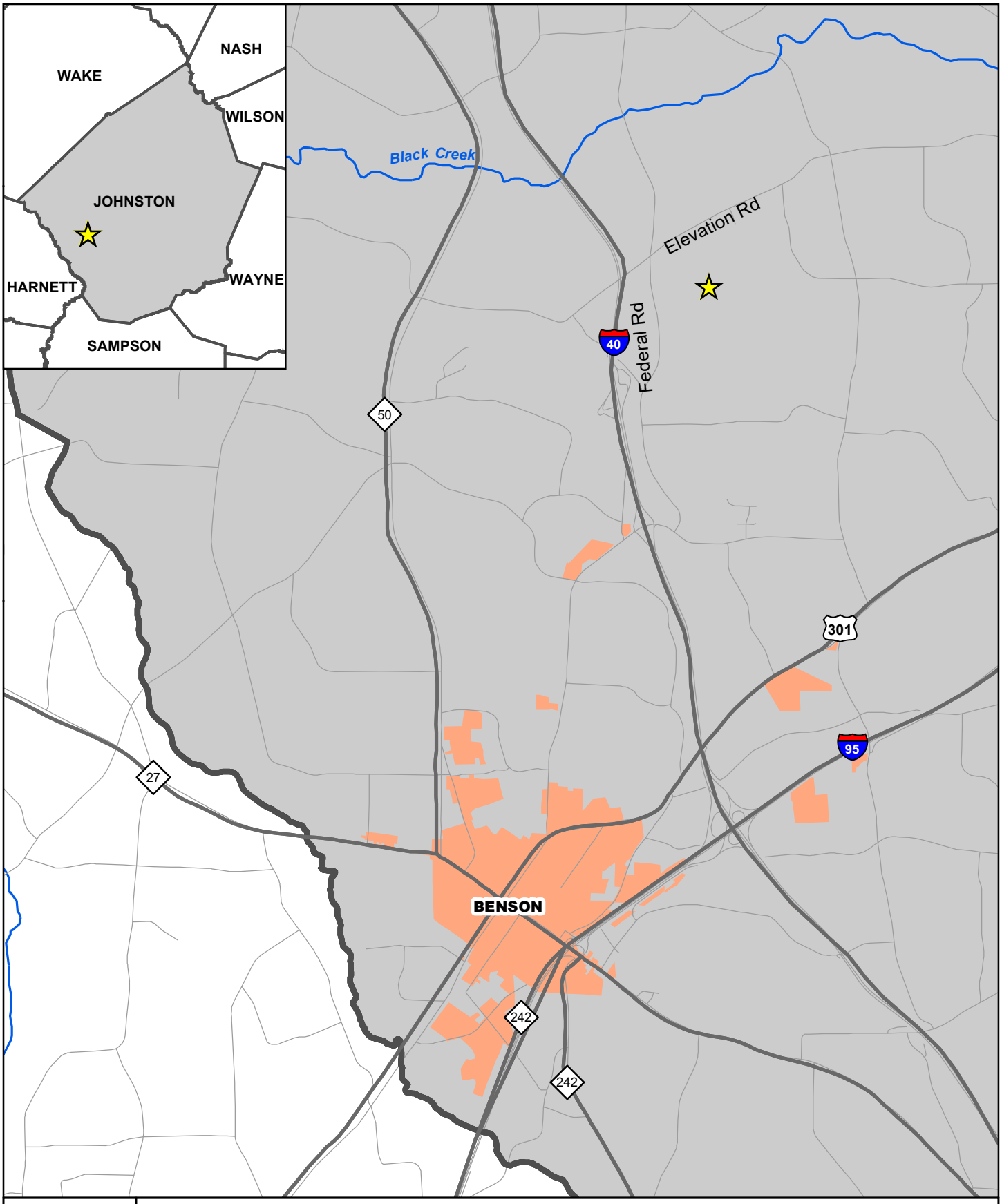

FIGURE 1. VICINITY MAP, STONY FORK RESTORATION SITE, JOHNSTON COUNTY, NC

KCI ASSOCIATES OF NC

Project Site Location
County Boundary
Major Roads
Minor Roads
Airports (none within a 5-mi radius)
Major Rivers and Streams
Cities and Towns

N

0 0.5 1 Miles

REFERENCES

NCDENR, Ecosystem Enhancement Program. 2009. Broad River Basin Restoration Priorities 2009. Raleigh, NC. Last accessed 1/2016 at: http://portal.ncdenr.org/c/document_library/get_file?uuid=705d1b58-cb91-451e-aa58-4ef128b1e5ab&groupId=60329

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NC Wetland Functional Assessment Team. 2010. NC Wetland Assessment Method (NC WAM) User Manual, version 4.1. Last accessed 11/2012 at: http://portal.ncdenr.org/c/document_library/get_file?uuid=76f3c58b-dab8-4960-ba43-45b7faf06f4c&groupId=38364

Schafale, M.P. and A.S. Weakley. 2012. Guide to the Natural Communities of North Carolina: Fourth Approximation. Natural Heritage Program, Division of Parks and Recreation, N.C. Department of Environment and Natural Resources. Raleigh, NC.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. *Soil Survey of Randolph County, North Carolina*. 2006

APPENDIX A

Background Tables

Table 1. Project Components and Mitigation Credits
Stony Fork Restoration Site, DMS Project #97085

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	6,405	405					450,285 sf	499,462 sf		
Credits	6,405	181					425,434	59,904		
TOTAL CREDITS	**6,586**						**480,338**			

Project Components

Project Component -or- Reach ID	Stationing/ Location	Existing Footage/ Square Footage	Approach (PI, PII etc.)	Restoration -or- Restoration Equivalent	MP Restoration Footage*	As-built Restoration Footage	Mitigation Ratio
SF1	10+00 – 21+55	1,235	PI/PII	R	1,155	1,155	1:1
SF2	21+55 – 49+54	2,453	PI	R	2,707**	2,714**	1:1
SF3	49+54 – 56+08	618	PI	R	624**	624**	1:1
T1	100+00 – 105+10	365	PI/PII	R	510	510	1:1
T1A	150+00 – 151+59	47	PI/PII	R	159	159	1:1
T2-1	200+00 – 203+34	327	N/A	EII	334	334	2.5:1
T2-2	203+34 – 206+71	326	PI/PII	R	337	337	1:1
T2-3	206+71 – 215+26	780	PI/PII	R	855	855	1:1
T3-1	300+00 – 300+71	72	PI/PII	EI	71	71	1.5:1
T3-2	300+71 – 301+29	82	PI/PII	R	58	58	1:1
Buffer Restoration TOB to 100’	N/A	413,194	N/A	R	413,194	413,194	100%
Buffer Restoration 101-200’	N/A	37,091	N/A	R	37,091	37,091	33%
Buffer Enhancement TOB to 100’	N/A	74,802	N/A	E	74,802	74,802	50%
Buffer Preservation TOB to 100’	N/A	424,660	N/A	P	424,660	424,660	10%

*Mitigation Plan footage used for credit calculations. **Crossings have been removed from creditable linear footage for all project streams

Component Summation					
Restoration Level	**Stream (linear feet)**	**Riparian Wetlands (Acres)**		**Non-Riparian Wetlands (Acres)**	**Buffer (square feet)**
		Riverine	Non-Riverine		
Restoration	6,405				450,285
Enhancement					74,802
Enhancement I	71				
Enhancement II	334				
Creation					
Preservation					424,660 (175,029 allowable for credit)
High Quality Preservation					
TOTAL CREDITS	6,586				480,338

Table 2. Project Activity & Reporting History
Stony Fork Restoration Sites, DMS Project #97085

Activity or Report	Data Collection Complete	Actual Completion or Delivery
Mitigation Plan		September 5, 2018
Final Design - Construction Plans		Oct. 15, 2018
Construction Grading Completed		May 3, 2019
Planting Completed		May 6 2019
Baseline Monitoring/Report	May 2019	July 2018
Vegetation Monitoring	*May 9, 2019*	
Stream Survey	*May 15, 2019*	
Year 1 Monitoring	November 2019	January 2020
Vegetation Monitoring	*November 5, 2019*	
Stream Survey	*November 11, 2019*	

Table 3. Project Contacts Stony Fork Restoration Site, DMS Project #97085	
Design Firm	KCI Associates of North Carolina, PC 4505 Falls of Neuse Road Suite 400 Raleigh, NC 27609 Contact: Mr. Tim Morris Phone: (919) 278-2512 Fax: (919) 783-9266
Construction Contractor Stony Fork and T3	Fluvial Solutions, Inc. PO Box 28749 Raleigh, NC 27611 Contact: Mr. Peter Jelenevsky Phone: (919) 605-6134
Construction Contractor T1, T1A, and T2	KCI Environmental Technologies and Construction 4505 Falls of Neuse Road, Suite 400 Raleigh, NC 27609 Contact: Mr. Tim Morris Phone: (919) 278-2512
Planting Contractor	Bruton Natural Systems, Inc. PO Box 1197 Fremont, NC 27830 Contact: Mr. Charlie Bruton Phone: (919)783-9214
Monitoring Performers	
	KCI Associates of North Carolina, PC 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 Stony Fork Restoration Site, DMS Project #97085				
Project Name	Stony Fork Restoration Site			
County	Johnston County			
Project Area (acres)	24.4 acres			
Project Coordinates (lat. and long.)	35°26'55.0"N, 78°31'18.5"W			
Project Watershed Summary Information				
Physiographic Province	Coastal Plain			
River Basin	Neuse			
USGS Hydrologic Unit 8-digit	03020201	**USGS Hydrologic Unit 14-digit**	03020201150010	
DWQ Sub-basin	03-04-04			
Project Drainage Area (acres)	497 acres			
Project Drainage Area Percentage of Impervious Area	5%			
CGIA Land Use Classification	Managed Herbaceous Cover 53% (262 ac), Mixed Hardwoods/Conifers 31% (150 ac), Low Density Developed 9% (42 ac), Medium Density Residential 5% (24 ac), Transportation/Impervious 3% (13 ac)			
Existing Reach Summary Information				
Parameters	**Stony Fork**	**T1 and T1A**	**T2**	**T3**
Length of reach (linear feet)	3,141	412	1,433	154
Drainage area (acres)	497	12	150	29
Perennial, Intermittent, Ephemeral	Perennial	Intermittent	Perennial	Intermittent
NCDWQ Water Quality Classification	C; NSW	C; NSW	C; NSW	C; NSW
Stream Classification (exisiting)	G4c	G4	G4	G4
Stream Classifcation (proposed)	C4	C4	C4	C4
Evolutionary trend (Simon)	Channelized, Stage III	Channelized, Stage III	Channelized, Stage III	Modified with pond, Stage III
FEMA classification	None	None	None	None
Existing Wetland Summary Information				
Parameters				
Size of Wetland (acres)	0.33 (WA and WE)	0.06 (WB)	0.14 (WC and WF)	
Wetland Type	Headwater Forest	Bottomland Hardwood Forest	Non-Tidal Freshwater Marsh	
Mapped Soil Series	Gilead sandy loam	Bibb sandy loam	Bibb sandy loam	
Drainage class	Moderately Well Drained	Poorly Drained	Poorly Drained	
Soil Hydric Status	Non-hydric	Hydric	Hydric	
Source of Hydrology	Surface Water	Stream Floodplain	Stream Floodplain	
Restoration or Enhancement Method	N/A	N/A	N/A	

Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the United States – Section 404	Yes	Yes	404 permit
Waters of the United States – Section 401	Yes	Yes	401 permit
Endangered Species Act	No	N/A	N/A
Historic Preservation Act	No	N/A	N/A
Coastal Zone Management Act (CZMA)/ Coastal Area Management Act (CAMA)	No	N/A	N/A
Fema Floodplain Compliance	No	Yes	
Essential Fisheries Habitat	No	N/A	N/A

APPENDIX B

Visual Assessment Data

Stream Mitigation

- R *(6,405 lf / 6,405 SMCs)*
- EI *(71 lf / 47 SMCs)*
- EII *(334 lf / 134 SMCs)*

Buffer Mitigation

- R 0-100' *(413,194 sf / 413,194 credits)*
- R 101-200' *(37,091 sf / 12,240 credits)*
- E *(74,802 sf / 37,401 credits)*
- P *(424,660 sf / 17,503 credits)*

- Project Easement
- Cross-Sections
- Photo Points
- Flow Gauge
- Camera
- Bankfull Gauge

Vegetation Monitoring Plots

- Success Criteria Met
- Success Criteria Not Met

Sheet 1
Sheet 2
Sheet 3
Sheet 4
1331
T1
T1A
T2-1
T2-2
T2-3
T3-1
T3-2
SF1
SF2
SF3
R1
R2
R3
R4
R5
Start SF1

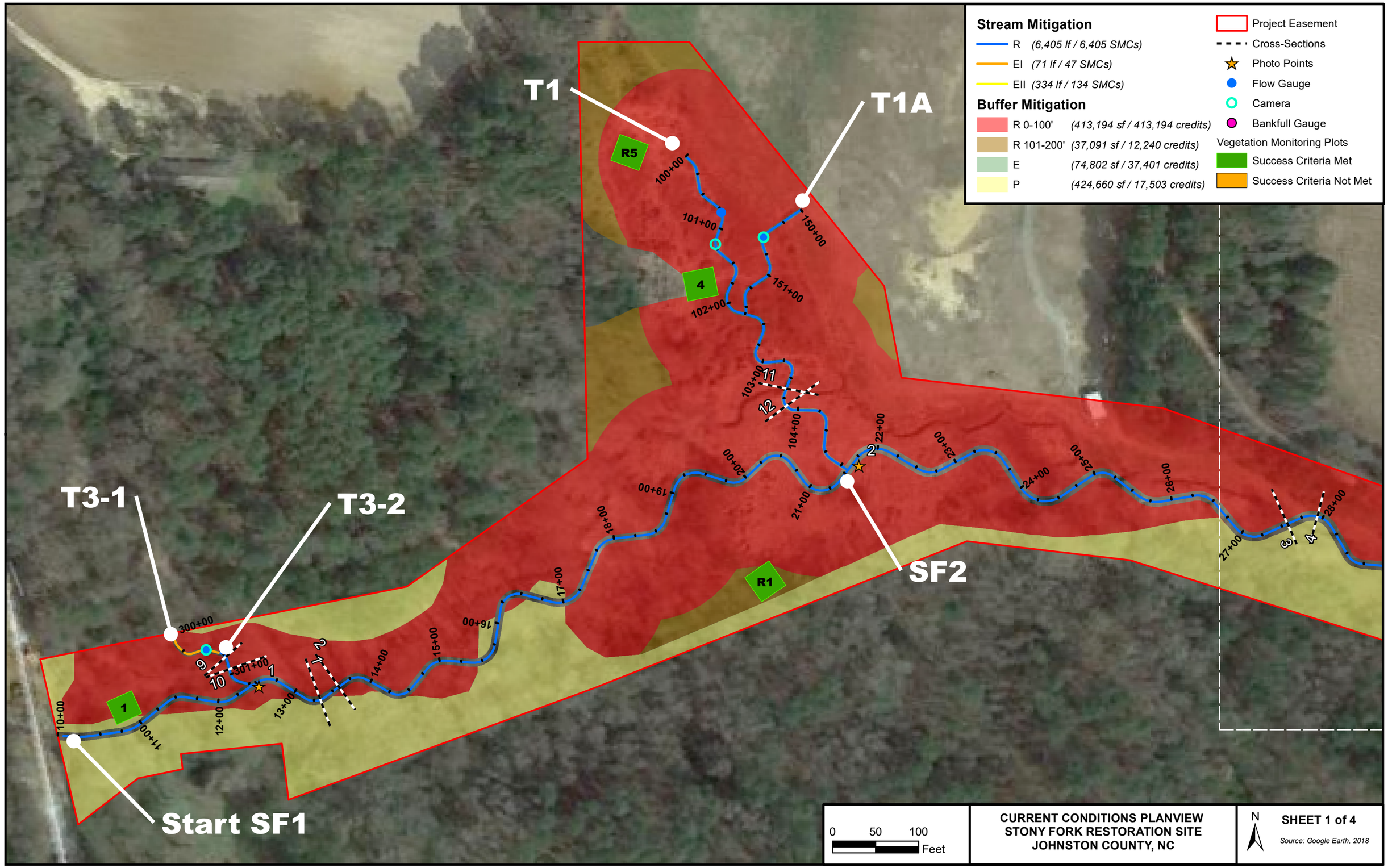
0 150 300 Feet

CURRENT CONDITIONS PLANVIEW
STONY FORK RESTORATION SITE
JOHNSTON COUNTY, NC

N

Overview

Source: Google Earth, 2018


T1
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SF2
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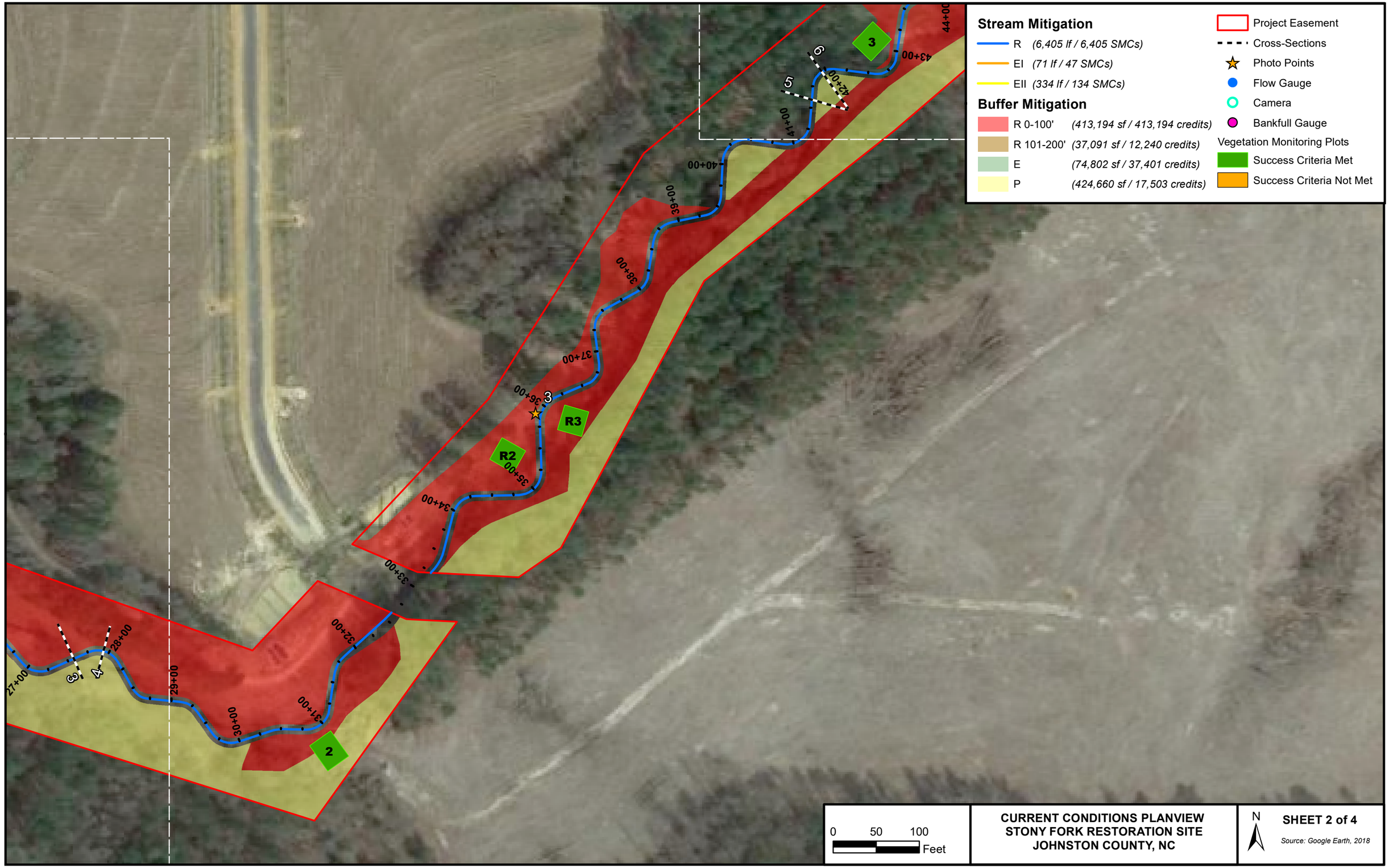
SHEET 1 of 4
Source: Google Earth, 2018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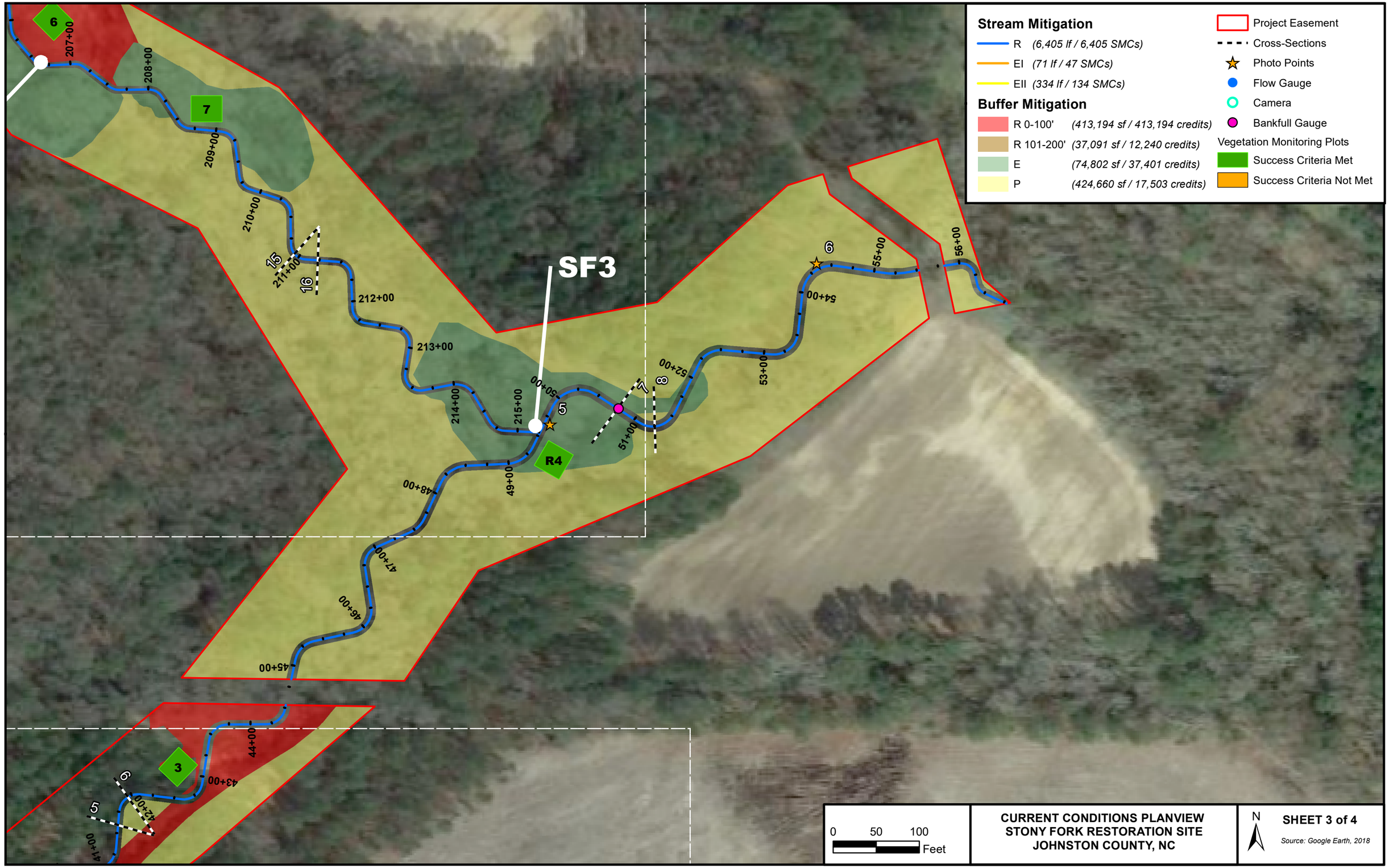
SHEET 2 of 4
Source: Google Earth, 2018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CURRENT CONDITIONS PLANVIEW
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SHEET 3 of 4
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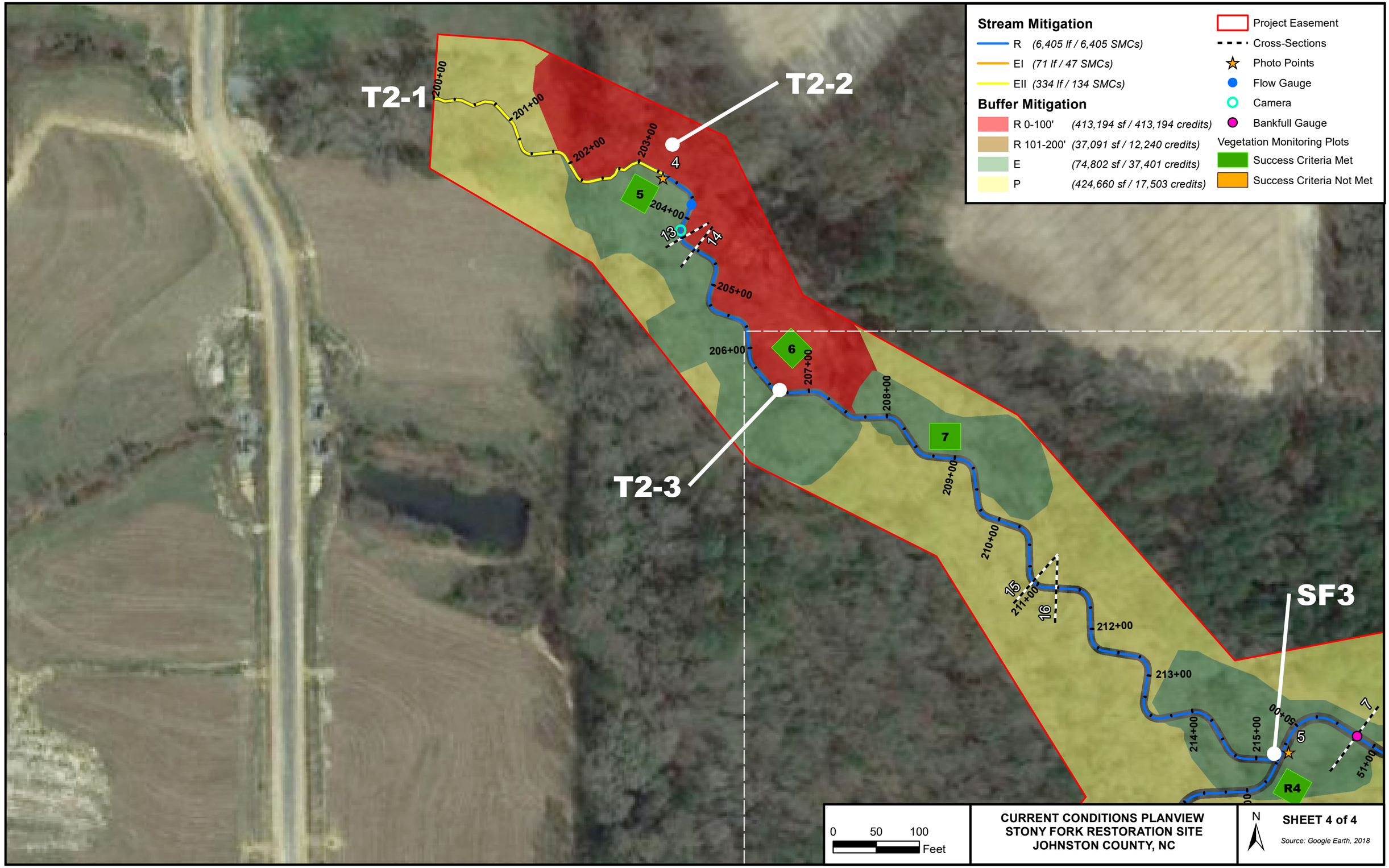
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0 50 100
Feet
CURRENT CONDITIONS PLANVIEW
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JOHNSTON COUNTY, NC
N
SHEET 4 of 4
Source: Google Earth, 2018

Table 5 **Visual Stream Morphology Stability Assessment**

Stony Fork Stream Restoration Site, DMS Project#97085

Reach ID **SF1**

Assessed Length **1,155**

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. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. Degradation - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	18	18			100%
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	17	17			100%
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem 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			0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	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 not 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 ≥ 1.6 Rootwads/logs providing some cover at base-flow.	5	5			100%

Table 5 **Visual Stream Morphology Stability Assessment**

Stony Fork Stream Restoration Site, DMS Project#97085

Reach ID **SF2**

Assessed Length **2,802**

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. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. Degradation - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	36	36			100%
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	35	35			100%
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	35	35			100%
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	35	35			100%
		2. Thalweg centering at downstream of meander (Glide)	35	35			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 NOT 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 not 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 ≥ 1.6 Rootwads/logs providing some cover at base-flow.	8	8			100%

Table 5 **Visual Stream Morphology Stability Assessment**

Stony Fork Stream Restoration Site, DMS Project#97085

Reach ID **SF3**

Assessed Length **618**

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. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. Degradation - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	9	9			100%
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	8	8			100%
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem 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			0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%
	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 not 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 ≥ 1.6 Rootwads/logs providing some cover at base-flow.	1	1			100%

Table 5 **Visual Stream Morphology Stability Assessment**

Stony Fork Stream Restoration Site, DMS Project#97085

Reach ID **T1**

Assessed Length **365**

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. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. Degradation - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	13	13			100%
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	12	12			100%
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem 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 NOT 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 not 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 ≥ 1.6 Rootwads/logs providing some cover at base-flow.	4	4			100%

Table 5 **Visual Stream Morphology Stability Assessment**

Stony Fork Stream Restoration Site, DMS Project#97085

Reach ID **T2**

Assessed Length **1,433**

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. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. Degradation - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	27	27			100%
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	26	26			100%
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	26	26			100%
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	26	26			100%
		2. Thalweg centering at downstream of meander (Glide)	26	26			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 NOT 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 not 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 ≥ 1.6 Rootwads/logs providing some cover at base-flow.	7	7			100%

Table 5 **Visual Stream Morphology Stability Assessment**

Stony Fork Stream Restoration Site, DMS Project#97085

Reach ID **T3**

Assessed Length **154**

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. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%
		2. Degradation - Evidence of downcutting			0	0	100%
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	3	3			100%
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	2	2			100%
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	2	2			100%
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	2	2			100%
		2. Thalweg centering at downstream of meander (Glide)	2	2			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 NOT 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.	N/A	N/A			N/A
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	N/A	N/A			N/A
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	N/A	N/A			N/A
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	N/A	N/A			N/A
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	N/A	N/A			N/A

Table 6 **Vegetation Condition Assessment**

Stony Fork Stream Restoration Site, DMS Project# 97085

Planted Acreage **24.4**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	Pattern and Color	0	0.00	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Pattern and Color	0	0.00	0.0%
			Total	0	0.00	0.0%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	Pattern and Color	0	0.00	0.0%
			Cumulative Total	0	0.00	0.0%
Easement Acreage	**9.5**					
Vegetation Category	**Definitions**	**Mapping Threshold**	**CCPV Depiction**	**Number of Polygons**	**Combined Acreage**	**% of Easement Acreage**
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	1000 SF	Pattern and Color	0	0.00	0.0%
5. Easement Encroachment Areas	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

PP1U – MY-00 – 5/15/19

PP1U – MY-01 – 11/8/19

PP1D – MY-00 – 5/15/19

PP1D – MY-01 – 11/8/19

PP2U – MY-00 – 5/15/19

PP2U – MY-01 – 11/8/19

PP2D – MY-00 – 5/15/19

PP2D – MY-01 – 11/8/19

PP3U – MY-00 – 5/15/19

PP3U – MY-01 – 11/8/19

PP3D – MY-00 – 5/15/19

PP3D – MY-01 – 11/8/19

PP4U – MY-00 – 5/15/19

PP4U – MY-01 – 11/8/19

PP4D – MY-00 – 5/15/19

PP4D – MY-01 – 11/8/19

PP5U – MY-00 – 5/15/19

PP5U – MY-01 – 11/8/19

PP5D – MY-00 – 5/15/19

PP5D – MY-01 – 11/8/19

PP6U – MY-00 – 5/15/19

PP6U – MY-01 – 11/8/19

PP6D – MY-00 – 5/15/19

PP6D – MY-01 – 11/8/19

Permanent Vegetation Monitoring Plot Photos

Vegetation Plot 1 – MY-00 – 5/15/19

Vegetation Plot 1 – MY-01 – 11/5/19

Vegetation Plot 2 – MY-00 – 5/15/19

Vegetation Plot 2 – MY-01 – 11/5/19

Vegetation Plot 3 – MY-00 – 5/15/19

Vegetation Plot 3 – MY-01 – 11/5/19

Vegetation Plot 4 – MY-00 – 5/15/19

Vegetation Plot 4 – MY-01 – 11/5/19

Vegetation Plot 5 – MY-00 – 5/15/19

Vegetation Plot 5 – MY-01 – 11/5/19

Vegetation Plot 6 – MY-00 – 5/15/19

Vegetation Plot 6 – MY-01 – 11/5/19

Vegetation Plot 7 – MY-00 – 5/15/19

Vegetation Plot 7 – MY-01 – 11/5/19

Random Vegetation Monitoring Plot Photos

Vegetation Plot R1 – MY-01 – 11/5/19

Vegetation Plot R2 – MY-01 – 11/5/19

Vegetation Plot R3 – MY-01 – 11/5/19

Vegetation Plot R4 – MY-01 – 11/5/19

Vegetation Plot R5 – MY-01 – 11/5/19

APPENDIX C

Vegetation Plot Data

Table 7. Stem Count by Plot and Species
Stony Fork Restoration Site, DMS Project #97085

	Current Plot Data (MY01 2019)													
	Plot 01		Plot 02		Plot 03		Plot 04		Plot 05		Plot 06		Plot 07	
Species	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**
Bald Cypress (*Taxodium distichum*)							1	1			1	1	5	5
Black Willow (*Salix nigra*)		2												
Elderberry (*Sambucus canadensis*)														
Green Ash (*Fraxinus pennsylvanica*)	2	2	4	4	3	3			4	4	1	1		
Loblolly Pine (*Pinus taeda*)														
Oak (*Quercus sp.*)							1	1						
Persimmon (*Diospyros virginiana*)														
Pin Oak (*Quercus palustris*)	2	2									1	1		
Red Maple (*Acer rubrum*)		3		2						2				
River Birch (*Betula nigra*)					1	1	1	1	1	1	2	2	3	3
Silky Dogwood (*Cornus amomum*)							6	6			1	1	1	1
Southern Red Oak (*Quercus falcata*)														
Sugar Berry (Celtis laevigata)														
Swamp Chestnut Oak (*Quercus michauxi*)	3	3							1	1	1	1	1	1
Sweet Bay (*Magnolia virginiana*)										1				
Sweet Gum (*Liquidambar styraciflua*)						6								
Sycamore (*Platanus occidentalis*)	3	3	6	6	2	2	1	1	1	1	2	2	1	1
Tulip Poplar (*Liriodendron tulipifera*)	3	9	3	3	2	2								
Water Oak (*Quercus nigra*)														
White Oak (*Quercus alba*)	1	1			1	1				3				
Willow Oak (*Quercus phellos*)	4	4	2	2	6	6	5	5	1	1	3	3	2	2
Unknown					1	1	1	1	1	1			1	1
Stem count	18	29	15	17	16	22	16	16	9	15	12	12	14	14
size (ares)	1		1		1		1		1		1		1	
size (ACRES)	0.025		0.025		0.025		0.025		0.025		0.025		0.025	
Species count	7	9	4	5	7	8	7	7	6	9	8	8	7	7
Stems per ACRE	728	1,174	607	688	647	890	647	647	364	607	486	486	567	567

Table 7. Stem Count by Plot and Species
Stony Fork Restoration Site, DMS Project #97085

	Current Plot Data (MY01 2019)										Annual Means			
	Plot R1		Plot R2		Plot R3		Plot R4		Plot R5		MY01 (2019)		MY00 (2019)	
Species	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**
Bald Cypress (*Taxodium distichum*)											7	7	1	1
Black Willow (*Salix nigra*)												2		
Elderberry (*Sambucus canadensis*)										1		1		2
Green Ash (*Fraxinus pennsylvanica*)			5	5	4	4	2	2			25	25	29	29
Loblolly Pine (*Pinus taeda*)		1								1		2		
Oak (*Quercus sp.*)											1	1	18	18
Persimmon (*Diospyros virginiana*)	1	1					1	1	2	2	4	4		
Pin Oak (*Quercus palustris*)	3	3							1	1	7	7	3	3
Red Maple (*Acer rubrum*)							3	3	1	1	4	11		2
River Birch (*Betula nigra*)			1	1	4	4	4	4			17	17	2	2
Silky Dogwood (*Cornus amomum*)											8	8	10	10
Southern Red Oak (*Quercus falcata*)									2	2	2	2		
Sugar Berry (Celtis laevigata)														2
Swamp Chestnut Oak (*Quercus michauxi*)							1	1			7	7	7	7
Sweet Bay (*Magnolia virginiana*)												1		1
Sweet Gum (*Liquidambar styraciflua*)										2		8		
Sycamore (*Platanus occidentalis*)			1	1	11	11	11	11	1	1	40	40	9	9
Tulip Poplar (*Liriodendron tulipifera*)			2	2	3	3			1	1	14	20	14	14
Water Oak (*Quercus nigra*)														1
White Oak (*Quercus alba*)	6	6	1	1					3	3	12	15	1	4
Willow Oak (*Quercus phellos*)	1	1	1	1	1	1	4	4			30	30	3	3
Unknown											4	4	199	199
Stem count	11	12	11	11	23	23	26	26	11	15	182	212	296	307
size (ares)	1		1		1		1		1		8		8	
size (ACRES)	0.025		0.025		0.025		0.025		0.025		0.200		0.200	
Species count	4	5	6	6	5	5	7	7	7	10	15	20	12	17
Stems per ACRE	445	486	445	445	931	931	1,052	1,052	445	607	910	1,060	1,480	1,535

APPENDIX D

Stream Measurement and Geomorphology Data

Table 8a. SF1 Data Summary
Stony Fork Restoration Site, DMS Project #97085

Parameter	Pre-Existing Condition	Reference Reach(es) Data	Design	As-built			
Dimension - Riffle				Min	Mean	Max	n
Bankfull Width (ft)	7.2	14.8-18.8	9.7		9.3		1
Floodprone Width (ft)	8.7	>50	100		>80		1
Bankfull Mean Depth (ft)	0.9	1.3-1.8	0.7		0.8		1
Bankfull Max Depth (ft)	1.2	1.9-2.4	1.1		1.2		1
Bankfull Cross-Sectional Area (ft^2)	6.4	25	7.0		7.0		1
Width/Depth Ratio	8.1	9.0-14.0	13.5		12.2		1
Entrenchment Ratio	1.2	>2.5	10.3		8.7		1
Bank Height Ratio	2.9	1.0-1.2	1.0		1.0		1
Pattern							
Channel Beltwidth (ft)	*	60	30-55		30-55		
Radius of Curvature (ft)	*	16—87	20-29		20-29		
Rc:Bankfull width (ft/ft)	*	3.5—12.9	9.6-13.6		9.6-13.6		
Meander Wavelength (ft)	*	66—191	93-132		93-132		
Meander Width Ratio	*	4.1	3.1-5.7		3.1-5.7		
Profile							
Riffle Length (ft)				23.40	31.55	40.95	17
Riffle Slope (ft/ft)	0.009	0.013—0.035	0.009-0.015	0.0031	0.0141	0.0137	17
Pool Length (ft)	*	14—33	21-46	12.47	28.73	41.34	17
Pool Spacing (ft)	*	2.7—7.1	5.6-7.3	44.28	68.72	142.01	17
Substrate and Transport Parameters							
SC% / Sa% / G% / C% / B% /Be%	3/40/57/0/0/0			0/4/90/7/0/0			
d16 / d35 / d50 / d84 / d95 (mm)	0.15/1.2/2.2/7.5/11/-0.4/7.1	Gravel	Gravel	9.4/16/22/33/53/70			
Channel length (ft)	1235		1155	1155			
Drainage Area (SM)	0.27	1.49	0.27	0.27			
Rosgen Classification	G4c	C4	C4	C4			
Sinuosity	1.3	1.3	1.2	1.2			
Water Surface Slope (ft/ft)	0.009	0.005	0.009	0.01			

* : no data shown for pools, radius of curvature or meanders in existing stream do to channelization / lack of bed diversity

Table 8b. SF2 Baseline Stream Data Summary Stony Fork Restoration Site, DMS Project #97085							
Parameter	Pre-Existing Condition	Reference Reach(es) Data (SF)	Design	As-built			
Dimension - Riffle				Min	Mean	Max	n
Bankfull Width (ft)	5.0-10.0	14.8-18.8	11.3	12.2	12.4	12.6	2
Floodprone Width (ft)	7.4-14.5	>50	100	53.3	67.0	80.7	2
Bankfull Mean Depth (ft)	1.0-1.4	1.3-1.8	0.8	0.9	0.95	1.0	2
Bankfull Max Depth (ft)	1.3-2.2	1.9-2.4	1.2	1.4	1.5	1.6	2
Bankfull Cross-Sectional Area (ft^2)	6.9-8.9	25	9.4	10.6	11.6	12.5	2
Width/Depth Ratio	3.7-11.2	9.0-14.0	13.5	12.8	13.5	14.1	2
Entrenchment Ratio	1.4-1.5	>2.5	8.8	4.2	5.4	6.6	2
Bank Height Ratio	1.6-2.1	1.0-1.2	1.0	1	1	1	2
Pattern							
Channel Beltwidth (ft)	*	60	37-65	37-65			
Radius of Curvature (ft)	*	16—87	22-33	22-33			
Rc:Bankfull width (ft/ft)	*	3.5—12.9	9.3-13.1	9.3-13.1			
Meander Wavelength (ft)	*	66—191	105-148	105-148			
Meander Width Ratio	*	4.1	3.3-5.8	3.3-5.8			
Profile							
Riffle Length (ft)				17.58	39.07	86.38	36
Riffle Slope (ft/ft)	0.003-0.008	0.013—0.035	0.009 - 0.015	0.0021	0.0118	0.0256	36
Pool Length (ft)	*	14—33	24-52	12.51	28.83	52.39	34
Pool Spacing (ft)	*	2.7—7.1	5.2-7.4	43.01	81.44	178.86	34
Substrate and Transport Parameters							
SC% / Sa% / G% / C% / B% /Be%	20.3/30/49.8/0/0/0			5/8/54/33/0/0			
d16 / d35 / d50 / d84 / d95 (mm)	0.33/0.61/1.2/6.2/9.8/0.3/5.5	Gravel	Gravel	5.9/31/45/61/98.5/140			
Channel length (ft)	2453		2802	2802			
Drainage Area (SM)	0.41	1.49	0.41	0.41			
Rosgen Classification	G4c—G5c	C4	C4	C4			
Sinuosity	1.1	1.3	1.2	1.2			
Water Surface Slope (ft/ft)	0.008	0.005	0.008	0.008			

* : no data shown for pools, radius of curvature or meanders in existing stream do to channelization / lack of bed diversity

Table 8c. SF3 Baseline Stream Data Summary
Stony Fork Restoration Site, DMS Project #97085

Parameter	Pre-Existing Condition	Reference Reach(es) Data (SF)	Design	As-built			
Dimension - Riffle				Min	Mean	Max	n
Bankfull Width (ft)	10.5	14.8-18.8	12.6		11.6		1
Floodprone Width (ft)	14.4	>50	100		92.4		1
Bankfull Mean Depth (ft)	1.2	1.3-1.8	0.9		1.1		1
Bankfull Max Depth (ft)	1.3	1.9-2.4	1.4		1.7		1
Bankfull Cross-Sectional Area (ft^2)	12.5	25	11.8		12.9		1
Width/Depth Ratio	8.9	9.0-14.0	13.5		10.4		1
Entrenchment Ratio	1.4	>2.5	7.9		8.0		1
Bank Height Ratio	2.0	1.0-1.2	1.0		1.0		1
Pattern							
Channel Beltwidth (ft)	*	60	46-77		46-77		
Radius of Curvature (ft)	*	16—87	28-35		28-35		
Rc:Bankfull width (ft/ft)	*	3.5—12.9	11.7-14		11.7-14		
Meander Wavelength (ft)	*	66—191	148-176		148-176		
Meander Width Ratio	*	4.1	3.7-6.1		3.7-6.1		
Profile							
Riffle Length (ft)				7.4	35.2	52.4	7
Riffle Slope (ft/ft)	0.006	0.013—0.035	0.01	0.0032	0.0075	0.0175	7
Pool Length (ft)	*	14—33	35-62	12.4	33.9	39.7	7
Pool Spacing (ft)	*	2.7—7.1	6.7-8.0	92.0	103.1	114.4	7
Substrate and Transport Parameters							
SC% / Sa% / G% / C% / B% /Be%	10/0/0/0/0/0			21/21/40/18/0/0			
d16 / d35 / d50 / d84 / d95 (mm)	1.1/6.0/8.3/12/15/-0.7/3.3	Gravel	Gravel	0.06/0.77/16/29/70/120			
Channel length (ft)	618		654	654			
Drainage Area (SM)	0.84	1.49	0.84	0.84			
Rosgen Classification	G4c	C4	C4	C4			
Sinuosity	1.1	1.3	1.2	1.2			
Water Surface Slope (ft/ft)	0.006	0.005	0.008	0.006			

* : no data shown for pools, radius of curvature or meanders in existing stream do to channelization / lack of bed diversity

Table 8d. T1 Baseline Stream Data Summary Stony Fork Restoration Site, DMS Project #97085							
Parameter	Pre-Existing Condition	Reference Reach(es) Data (SF)	Design	As-built			
Dimension - Riffle				Min	Mean	Max	n
Bankfull Width (ft)	3.4	14.8-18.8	5.0		4.2		1
Floodprone Width (ft)	4.5	>50	50		45.0		1
Bankfull Mean Depth (ft)	0.3	1.3-1.8	0.4		0.2		1
Bankfull Max Depth (ft)	0.4	1.9-2.4	0.6		0.5		1
Bankfull Cross-Sectional Area (ft^2)	0.9	25	1.9		0.9		1
Width/Depth Ratio	12.7	9.0-14.0	13.5		18.6		1
Entrenchment Ratio	1.3	>2.5	10		10.8		1
Bank Height Ratio	4.5	1.0-1.2	1.0		1.0		1
Pattern							
Channel Beltwidth (ft)	*	60	23-37		23-37		
Radius of Curvature (ft)	*	16—87	11-17		11-17		
Rc:Bankfull width (ft/ft)	*	3.5—12.9	11.6-14.4		11.6-14.4		
Meander Wavelength (ft)	*	66—191	58-72		58-72		
Meander Width Ratio	*	4.1	4.6-7.4		4.6-7.4		
Profile							
Riffle Length (ft)				4.53	18.2	29.1	11
Riffle Slope (ft/ft)	0.035	0.013—0.035	0.014-0.04	0.00	0.024	0.045	11
Pool Length (ft)	*	14—33	11-29	7.29	40.2	65.6	11
Pool Spacing (ft)	*	2.7—7.1	6.2-8.8	35.7	45.7	60.3	11
Substrate and Transport Parameters							
SC% / Sa% / G% / C% / B% /Be%				10/3/21/66/0/0			
d16 / d35 / d50 / d84 / d95 (mm)	Silt-Clay	Gravel	Gravel	37/65/78/94/130/170			
Channel length (ft)	365		510	510			
Drainage Area (SM)	0.02	1.49	0.02	0.02			
Rosgen Classification	G5	C4	C4	C4			
Sinuosity	1.0	1.3	1.2	1.2			
Water Surface Slope (ft/ft)	0.035	0.005	0.020	0.019			

* : no data shown for pools, radius of curvature or meanders in existing stream do to channelization / lack of bed diversity

Table 8e. T2-1 Baseline Stream Data Summary Stony Fork Restoration Site, DMS Project #97085				
Parameter	Pre-Existing Condition	Reference Reach(es) Data	Design	As-built
Dimension - Riffle				
Bankfull Width (ft)	4.5-5.7	14.8-18.8	5.0	
Floodprone Width (ft)	5.7-30.7	>50	50	
Bankfull Mean Depth (ft)	0.8-1.7	1.3-1.8	0.4	
Bankfull Max Depth (ft)	1.2-2.1	1.9-2.4	0.6	
Bankfull Cross-Sectional Area (ft^2)	3.6-9.4	25	1.9	
Width/Depth Ratio	3.4-5.4	9.0-14.0	13.5	
Entrenchment Ratio	1.3-5.4	>2.5	10	
Bank Height Ratio	1.5-4.1	1.0-1.2	1.0	
Pattern				
Channel Beltwidth (ft)	*	60	25-40	25-40
Radius of Curvature (ft)	*	16—87	12-15	12-15
Rc:Bankfull width (ft/ft)	*	3.5—12.9	14	14
Meander Wavelength (ft)	*	66—191	70	70
Meander Width Ratio	*	4.1	5.0-8.0	5.0-8.0
Profile				
Riffle Length (ft)				
Riffle Slope (ft/ft)	0.009-0.020	0.013—0.035	0.016	
Pool Length (ft)	*	14—33	6-16	
Pool Spacing (ft)	*	2.7—7.1	6.4-8.0	
Substrate and Transport Parameters				
SC% / Sa% / G% / C% / B% /Be%				
d16 / d35 / d50 / d84 / d95 (mm)	Silt-Clay	Gravel	Gravel	
Channel length (ft)	327		334	334
Drainage Area (SM)	0.23	1.49	0.04	0.04
Rosgen Classification	G5c	C4	C4	C4
Sinuosity	1.1	1.3	1.2	1.2
Water Surface Slope (ft/ft)	0.014	0.005	0.012	

* : no data shown for pools, radius of curvature or meanders in existing stream do to channelization / lack of bed diversity

Table 8f. T2-2 Baseline Stream Data Summary
Stony Fork Restoration Site, DMS Project #97085

Parameter	Pre-Existing Condition	Reference Reach(es) Data	Design	As-built			
				Min	Mean	Max	n
Bankfull Width (ft)	4.5-5.7	14.8-18.8	7.6		9.7		1
Floodprone Width (ft)	5.7-30.7	>50	50		43.4		1
Bankfull Mean Depth (ft)	0.8-1.7	1.3-1.8	0.6		0.6		1
Bankfull Max Depth (ft)	1.2-2.1	1.9-2.4	0.8		1.0		1
Bankfull Cross-Sectional Area (ft^2)	3.6-9.4	25	4.3		5.8		1
Width/Depth Ratio	3.4-5.4	9.0-14.0	13.4		16.4		1
Entrenchment Ratio	1.3-5.4	>2.5	6.6		4.5		1
Bank Height Ratio	1.5-4.1	1.0-1.2	1.0		1.0		1
Pattern							
Channel Beltwidth (ft)	*	60	28-45		28-45		
Radius of Curvature (ft)	*	16—87	16-23		16-23		
Rc:Bankfull width (ft/ft)	*	3.5—12.9	11.2-11.8		11.2-11.8		
Meander Wavelength (ft)	*	66—191	85-90		85-90		
Meander Width Ratio	*	4.1	3.7-5.9		3.7-5.9		
Profile							
Riffle Length (ft)				20.0	29.0	56.7	6
Riffle Slope (ft/ft)	0.009-0.020	0.013—0.035	0.014	0.01	0.018	0.028	6
Pool Length (ft)	*	14—33	14-24	10.8	17.6	22.8	6
Pool Spacing (ft)	*	2.7—7.1	5.7-6.6	47.0	48.8	51.2	6
Substrate and Transport Parameters							
SC% / Sa% / G% / C% / B% /Be%				6/45/15/33/0/0			
d16 / d35 / d50 / d84 / d95 (mm)	Silt-Clay	Gravel	Gravel	26/35/42/51/74/110			
Channel length (ft)	326		337	337			
Drainage Area (SM)	0.23	1.49	0.15	0.15			
Rosgen Classification	G5c	C4	C4	C4			
Sinuosity	1.1	1.3	1.2	1.2			
Water Surface Slope (ft/ft)	0.014	0.005	0.012	0.011			

* : no data shown for pools, radius of curvature or meanders in existing stream do to channelization / lack of bed diversity

Table 8g. T2-3 Baseline Stream Data Summary Stony Fork Restoration Site, DMS Project #97085							
Parameter	Pre-Existing Condition	Reference Reach(es) Data	Design	As-built			
Dimension - Riffle				Min	Mean	Max	n
Bankfull Width (ft)	4.5-5.7	14.8-18.8	9.0		8.6		1
Floodprone Width (ft)	5.7-30.7	>50	50		80.9		1
Bankfull Mean Depth (ft)	0.8-1.7	1.3-1.8	0.6		0.7		1
Bankfull Max Depth (ft)	1.2-2.1	1.9-2.4	1.0		1.2		1
Bankfull Cross-Sectional Area (ft^2)	3.6-9.4	25	5.8		6.0		1
Width/Depth Ratio	3.4-5.4	9.0-14.0	13.9		12.3		1
Entrenchment Ratio	1.3-5.4	>2.5	5.6		9.4		1
Bank Height Ratio	1.5-4.1	1.0-1.2	1.0		1.0		1
Pattern							
Channel Beltwidth (ft)	*	60	32-45		32-45		
Radius of Curvature (ft)	*	16—87	18-23		18-23		
Rc:Bankfull width (ft/ft)	*	3.5—12.9	10.2-11.1		10.2-11.1		
Meander Wavelength (ft)	*	66—191	92-100		92-100		
Meander Width Ratio	*	4.1	3.6-6.0		3.6-6.0		
Profile							
Riffle Length (ft)				25.8	33.6	38.9	15
Riffle Slope (ft/ft)	0.009-0.020	0.013—0.035	0.012-0.015	0.002	0.014	0.024	15
Pool Length (ft)	*	14—33	12-34	8.48	35.6	91.4	14
Pool Spacing (ft)	*	2.7—7.1	5.1-7.0	45.7	57.3	77.4	14
Substrate and Transport Parameters							
SC% / Sa% / G% / C% / B% /Be%				4/7/65/24/0/0			
d16 / d35 / d50 / d84 / d95 (mm)	0.031/0.13/0.21/2.0/6.1/0.1/8	Gravel	Gravel	18/35/45/77/120			
Channel length (ft)	780		855	855			
Drainage Area (SM)	0.23	1.49	0.23	0.23			
Rosgen Classification	G5c	C4	C4	C4			
Sinuosity	1.1	1.3	1.2	1.2			
Water Surface Slope (ft/ft)	0.014	0.005	0.011	0.011			

* : no data shown for pools, radius of curvature or meanders in existing stream do to channelization / lack of bed diversity

Table 8h. T3 Baseline Stream Data Summary Stony Fork Restoration Site, DMS Project #97085							
Parameter	Pre-Existing Condition	Reference Reach(es) Data	Design	As-built			
Dimension - Riffle				Min	Mean	Max	n
Bankfull Width (ft)	4.2-4.8	14.8	5.0		5.2		1
Floodprone Width (ft)	5.0-5.9	>50	50		38.0		1
Bankfull Mean Depth (ft)	0.4-0.6	1.3-1.8	0.4		0.4		1
Bankfull Max Depth (ft)	0.6-0.7	1.9-2.4	0.6		0.7		1
Bankfull Cross-Sectional Area (ft^2)	1.9-2.6	25	1.9		2.1		1
Width/Depth Ratio	6.9-12.6	9.0-14.0	13.5		13.0		1
Entrenchment Ratio	1.2	>2.5	10		7.2		1
Bank Height Ratio	3.2-3.4	1.0-1.2	1.0		1.0		1
Pattern							
Channel Beltwidth (ft)	**	60	16-26		16-26		
Radius of Curvature (ft)	**	16—87	11-14		11-14		
Rc:Bankfull width (ft/ft)	**	3.5—12.9	8.6-9.4		8.6-9.4		
Meander Wavelength (ft)	**	66—191	43-47		43-47		
Meander Width Ratio	**	4.1	3.2-5.2		3.2-5.2		
Profile							
Riffle Length (ft)				34.3	36.9	39.5	2
Riffle Slope (ft/ft)	**	0.013—0.035	0.0025	0.006	0.0098	0.014	2
Pool Length (ft)	**	14—33	7-15	38.43			1
Pool Spacing (ft)	**	2.7—7.1	4.2-5.4				
Substrate and Transport Parameters							
SC% / Sa% / G% / C% / B% /Be%	8/67/25/0/0/0			9/15/58/19/0/0			
d16 / d35 / d50 / d84 / d95 (mm)	N/A	Gravel	Gravel	0.3/8.2/18/35/72/140			
Channel length (ft)	154		129	129			
Drainage Area (SM)	0.05	1.49	0.02	0.02			
Rosgen Classification	G4	C4	C4	C4			
Sinuosity	1.0	1.3	1.2	1.2			
Water Surface Slope (ft/ft)	0.007	0.005	0.0016	0.005			

** :channel affected by former pond

Table 9. Cross Section Dimensional Morphology Summary
Stony Fork Stream Restoration Site, DMS Project #97085

Dimension and Substrate	Cross-Section 1 (Pool) Station 13+58, SF							Cross-Section 2 (Riffle) Station 13+85, SF							Cross-Section 3 (Riffle) Station 22+44, SF						
	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Bankfull Elevation (ft) based on AB BKF area	206.8	206.7						206.6	206.6						192.5	192.5					
Bankfull Width (ft)	12.6	11.7						9.3	11.0						12.6	11.9					
Floodprone Width (ft)	-	-						>80	>80						53.3	53.2					
Bankfull Mean Depth (ft)	0.9	1.0						0.8	0.6						1.0	1.0					
Bankfull Max Depth (ft)	1.9	2.0						1.2	1.1						1.6	1.7					
Cross-Sectional Area (ft^2) based on AB BKF area	11.5	11.5						7.0	7.0						12.5	12.5					
Cross-Sectional Area (ft^2) based on AB BKF elevation	11.5	11.9						7.0	7.1						12.5	13.2					
Bankfull Width/Depth Ratio	-	-						12.2	17.3						12.8	11.4					
Bankfull Entrenchment Ratio	-	-						8.7	7.2						4.2	4.5					
Bankfull Bank Height Ratio	-	-						1.0	0.9						1.0	1.0					
d50 (mm)	-	-						22	32						38	46					
	Cross-Section 4 (Pool) Station 26+17, SF							Cross-Section 5 (Riffle) Station 35+12, SF							Cross-Section 6 (Pool) Station 41+94, SF						
	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Bankfull Elevation (ft) based on AB BKF area	192.0	191.9						182.1	182.2						181.7	181.8					
Bankfull Width (ft)	12.5	13.0						12.2	13.6						12.0	13.1					
Floodprone Width (ft)	-	-						>80	>80						-	-					
Bankfull Mean Depth (ft)	1.1	1.1						0.9	0.8						1.2	1.1					
Bankfull Max Depth (ft)	1.9	2.1						1.4	1.3						2.4	2.4					
Cross-Sectional Area (ft^2) based on AB BKF area	13.6	13.6						10.6	10.6						14.5	14.5					
Cross-Sectional Area (ft^2) based on AB BKF elevation	13.6	14.5						10.6	10.1						14.5	14.3					
Bankfull Width/Depth Ratio	-	-						14.1	17.4						-	-					
Bankfull Entrenchment Ratio	-	-						6.6	5.9						-	-					
Bankfull Bank Height Ratio	-	-						1.0	1.0						-	-					
d50 (mm)	-	-						52	44						-	-					

Table 9. Cross Section Dimensional Morphology Summary
Stony Fork Stream Restoration Site, DMS Project #97085

	Cross-Section 7 (Riffle) Station 42+58, SF							Cross-Section 8 (Pool) Station 57+19, SF							Cross-Section 9 (Pool) Station 57+44, T3						
	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Bankfull Elevation (ft) based on AB BKF area	176.0	176.0						175.3	175.2						207.0	206.9					
Bankfull Width (ft)	11.6	13.4						13.5	14.5						5.5	5.9					
Floodprone Width (ft)	>90	>90						-	-						-	-					
Bankfull Mean Depth (ft)	1.1	1.0						1.5	1.4						0.7	0.6					
Bankfull Max Depth (ft)	1.7	1.6						2.7	2.7						1.1	1.1					
Cross-Sectional Area (ft^2) based on AB BKF area	12.8	12.8						20.7	20.7						3.7	3.7					
Cross-Sectional Area (ft^2) based on AB BKF elevation	12.8	13.2						20.7	21.4						3.7	4.0					
Bankfull Width/Depth Ratio	10.4	14.0						-	-						-	-					
Bankfull Entrenchment Ratio	8.0	6.8						-	-						-	-					
Bankfull Bank Height Ratio	1.0	1.0						-	-						-	-					
d50 (mm)	16	29						-	-						-	-					
	Cross-Section 10 (Riffle) Station 96+69, T3							Cross-Section 11 (Riffle) Station 99+07, T1							Cross-Section 12 (Pool) Station 99+25, T1						
	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Bankfull Elevation (ft) based on AB BKF area	207.1	207.1						198.4	198.3						198.4	198.3					
Bankfull Width (ft)	6.2	5.5						6.0	5.8						7.5	7.3					
Floodprone Width (ft)	38.0	39.4						>60	>60						-	-					
Bankfull Mean Depth (ft)	0.4	0.4						0.3	0.3						0.6	0.7					
Bankfull Max Depth (ft)	0.7	0.7						0.7	0.7						1.2	1.2					
Cross-Sectional Area (ft^2) based on AB BKF area	2.2	2.2						2.0	2.0						4.8	4.8					
Cross-Sectional Area (ft^2) based on AB BKF elevation	2.2	2.1						2.0	2.6						4.8	5.5					
Bankfull Width/Depth Ratio	17.7	13.7						18.3	17.1						-	-					
Bankfull Entrenchment Ratio	6.1	7.2						10.9	10.9						-	-					
Bankfull Bank Height Ratio	1.0	0.9						1.0	1.1						-	-					
d50 (mm)	18	20						78	75						-	-					

Table 9. Cross Section Dimensional Morphology Summary
Stony Fork Stream Restoration Site, DMS Project #97085

	Cross-Section 13 (Pool) Station 252+25, T2							Cross-Section 14 (Riffle) Station 225+97, T2							Cross-Section 15 (Pool) Station 226+04, T2						
	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Bankfull Elevation (ft) based on AB BKF area	188.4	188.4						187.9	187.9						180.9	180.8					
Bankfull Width (ft)	11.3	12.7						9.7	11.8						11.8	11.7					
Floodprone Width (ft)	-	-						43.4	46.8						-	-					
Bankfull Mean Depth (ft)	0.8	0.7						0.6	0.5						1.0	1.0					
Bankfull Max Depth (ft)	1.5	1.4						1.0	1.1						1.8	1.9					
Cross-Sectional Area (ft^2) based on AB BKF area	9.3	9.3						5.8	5.8						11.2	11.2					
Cross-Sectional Area (ft^2) based on AB BKF elevation	9.3	8.7						5.8	5.3						11.2	11.8					
Bankfull Width/Depth Ratio	-	-						16.4	24.0						-	-					
Bankfull Entrenchment Ratio	-	-						4.5	4.0						-	-					
Bankfull Bank Height Ratio	-	-						1.0	0.8						-	-					
d50 (mm)	-	-						42	16						-	-					

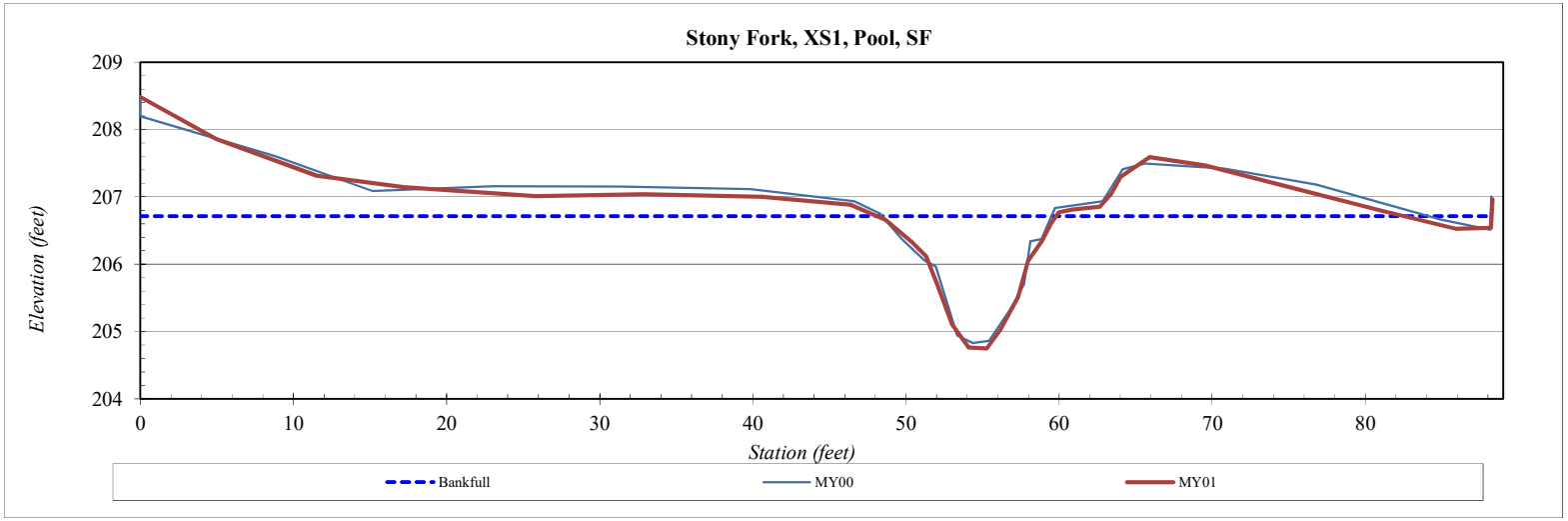
	Cross-Section 16 (Riffle) Station 252+25, T2						
	Base	MY1	MY2	MY3	MY4	MY5	MY+
Bankfull Elevation (ft) based on AB BKF area	180.7	180.7					
Bankfull Width (ft)	8.6	9.9					
Floodprone Width (ft)	>80	>80					
Bankfull Mean Depth (ft)	0.7	0.6					
Bankfull Max Depth (ft)	1.2	1.1					
Cross-Sectional Area (ft^2) based on AB BKF area	6.0	6.0					
Cross-Sectional Area (ft^2) based on AB BKF elevation	6.0	5.8					
Bankfull Width/Depth Ratio	12.3	16.3					
Bankfull Entrenchment Ratio	9.4	8.3					
Bankfull Bank Height Ratio	1.0	1.0					
d50 (mm)	45	44					

Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS1
Drainage Area (sq mi):	0.28
Date:	11/8/2019
Field Crew:	T. Seelinger, A. Gutierrez

Station	Elevation
0.0	208.48
5.0	207.86
11.5	207.32
17.2	207.14
25.8	207.01
32.9	207.04
40.6	207.00
46.4	206.88
48.7	206.66
50.4	206.33
51.3	206.12
52.1	205.68
53.0	205.10
54.1	204.76
55.3	204.75
56.2	205.03
57.3	205.50
58.0	206.05
58.9	206.34
59.5	206.60
60.0	206.77
60.9	206.81
62.7	206.85
63.4	207.06
64.0	207.30
65.9	207.59
69.5	207.47
74.7	207.17
81.2	206.79
85.9	206.53
88.2	206.54
88.3	206.96

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	206.71
Bankfull Cross-Sectional Area:	11.5
Total Cross-Sectional Area:	11.9
Bankfull Width:	11.7
Flood Prone Area Elevation:	---
Flood Prone Width:	---
Max Depth at Bankfull:	2.0
Mean Depth at Bankfull:	1.0
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	204.7

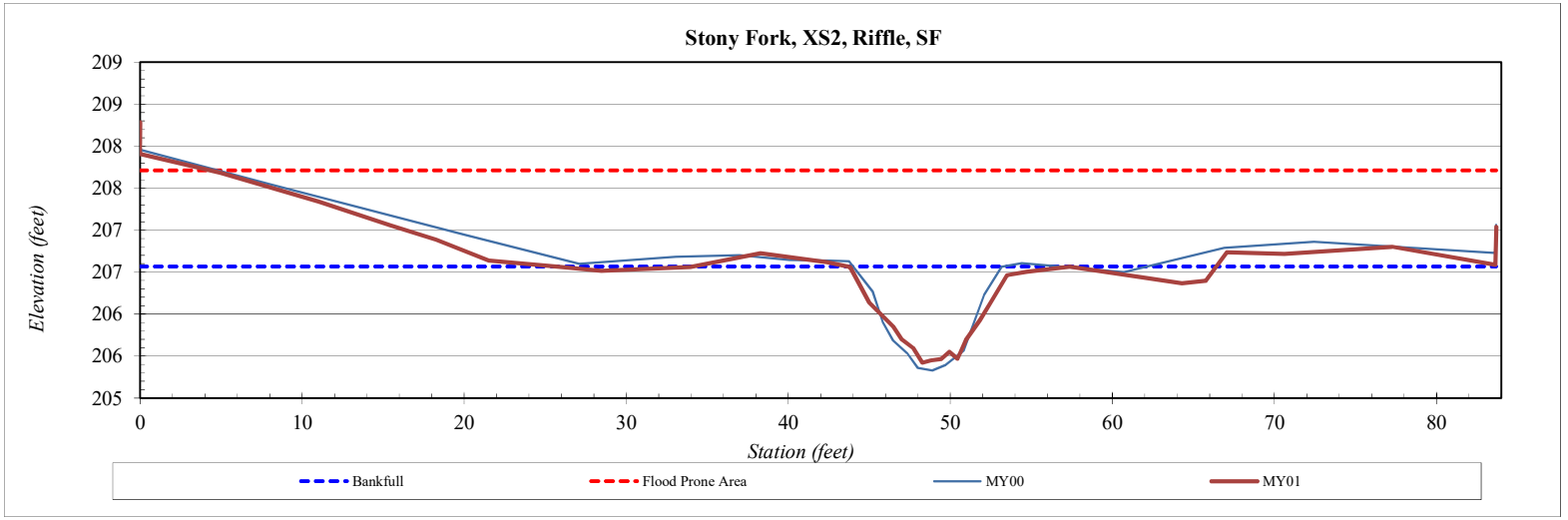


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS2
Drainage Area (sq mi):	0.28
Date:	11/8/2019
Field Crew:	T. Seelinger, A. Gutierrez

Station	Elevation
0.0	208.28
0.0	207.91
5.0	207.69
11.0	207.34
15.4	207.06
18.3	206.89
21.6	206.64
25.8	206.57
28.5	206.52
34.0	206.56
38.3	206.72
42.4	206.62
43.8	206.56
45.0	206.14
46.5	205.85
47.0	205.70
47.7	205.59
48.3	205.42
48.8	205.45
49.5	205.47
50.0	205.55
50.4	205.47
51.0	205.69
51.8	205.93
52.5	206.14
53.5	206.46
54.7	206.50
57.4	206.57
60.4	206.48
64.3	206.37
65.8	206.40
67.1	206.74
70.6	206.72
77.3	206.80
83.6	206.59
83.7	207.04

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	206.57
Bankfull Cross-Sectional Area:	7.0
Total Cross-Sectional Area:	7.1
Bankfull Width:	11.0
Flood Prone Area Elevation:	207.7
Flood Prone Width:	79.3
Max Depth at Bankfull:	1.1
Mean Depth at Bankfull:	0.6
W / D Ratio:	17.3
Entrenchment Ratio:	7.2
Bank Height Ratio:	0.9
Thalweg Elevation:	205.4

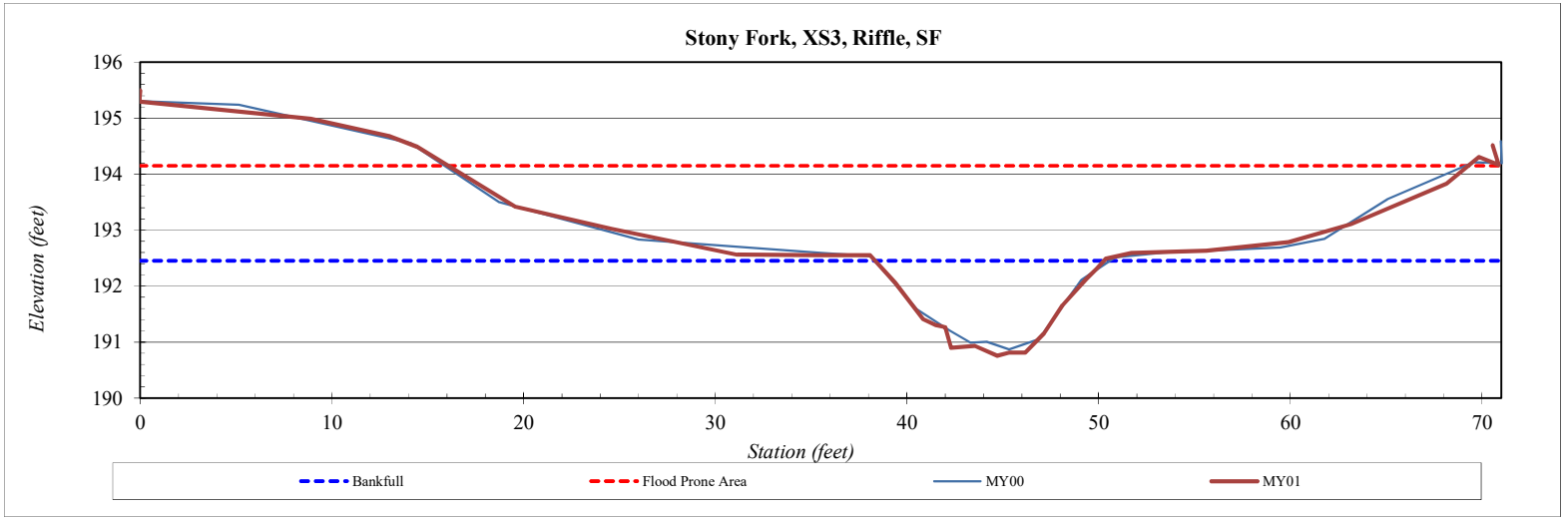


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS3
Drainage Area (sq mi):	0.46
Date:	11/8/2019
Field Crew:	T. Seelinger, A. Gutierrez

Station	Elevation
0.0	195.49
-0.1	195.30
8.9	194.99
13.0	194.68
14.5	194.49
19.6	193.42
24.6	193.02
31.1	192.56
35.3	192.55
38.1	192.55
39.4	192.06
40.8	191.41
41.5	191.30
42.0	191.27
42.3	190.90
43.5	190.93
44.7	190.76
45.3	190.81
46.2	190.81
47.1	191.15
48.1	191.66
49.4	192.13
49.9	192.31
50.4	192.49
51.7	192.60
55.6	192.63
59.9	192.79
63.2	193.11
68.1	193.83
69.8	194.31
70.9	194.16
70.6	194.52

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	192.45
Bankfull Cross-Sectional Area:	12.5
Total Cross-Sectional Area:	13.2
Bankfull Width:	11.9
Flood Prone Area Elevation:	194.1
Flood Prone Width:	53.2
Max Depth at Bankfull:	1.7
Mean Depth at Bankfull:	1.0
W / D Ratio:	11.4
Entrenchment Ratio:	4.5
Bank Height Ratio:	1.0
Thalweg Elevation:	190.8

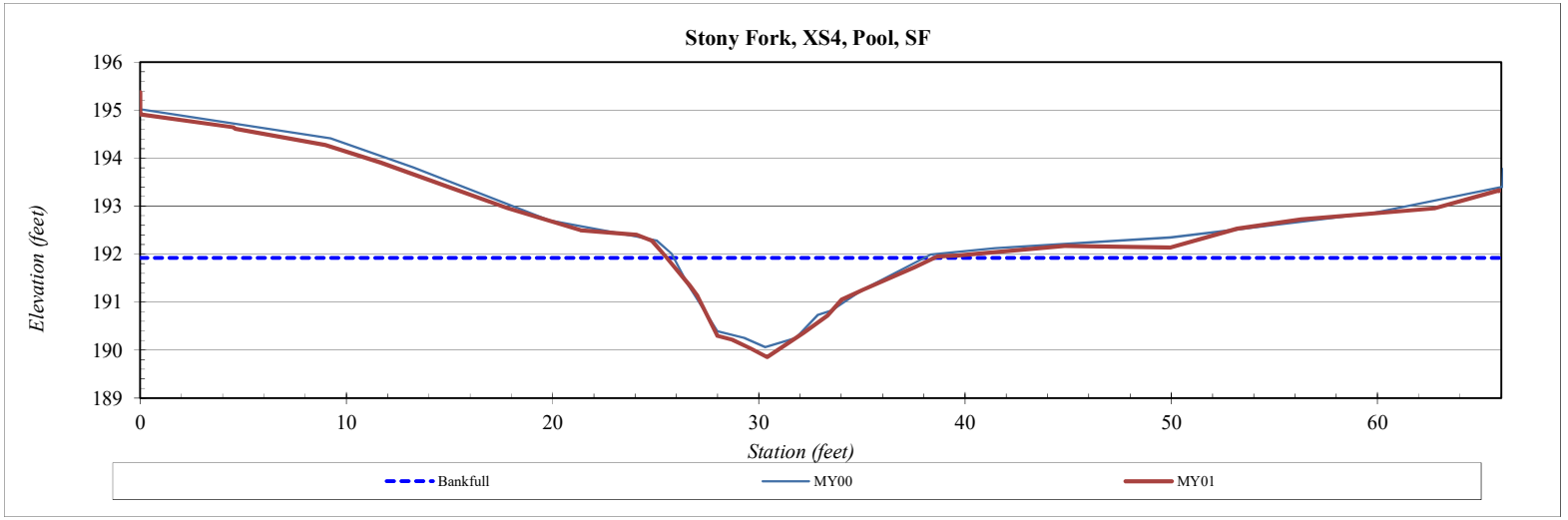


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS4
Drainage Area (sq mi):	0.46
Date:	11/8/2019
Field Crew:	T. Seelinger, A. Gutierrez

Station	Elevation
0.0	195.37
0.0	194.91
4.5	194.64
4.6	194.62
9.0	194.28
11.7	193.91
17.8	192.96
21.4	192.50
24.0	192.41
24.8	192.28
25.4	191.98
26.7	191.35
27.0	191.13
28.0	190.30
28.7	190.21
29.6	190.03
30.4	189.85
32.2	190.36
33.3	190.72
34.0	191.05
35.1	191.26
37.6	191.73
38.7	191.95
39.7	191.97
44.8	192.17
49.9	192.13
53.2	192.53
56.3	192.72
62.8	192.95
65.9	193.33
65.9	193.32

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	191.92
Bankfull Cross-Sectional Area:	13.6
Total Cross-Sectional Area:	14.5
Bankfull Width:	13.0
Flood Prone Area Elevation:	---
Flood Prone Width:	---
Max Depth at Bankfull:	2.1
Mean Depth at Bankfull:	1.1
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	189.9

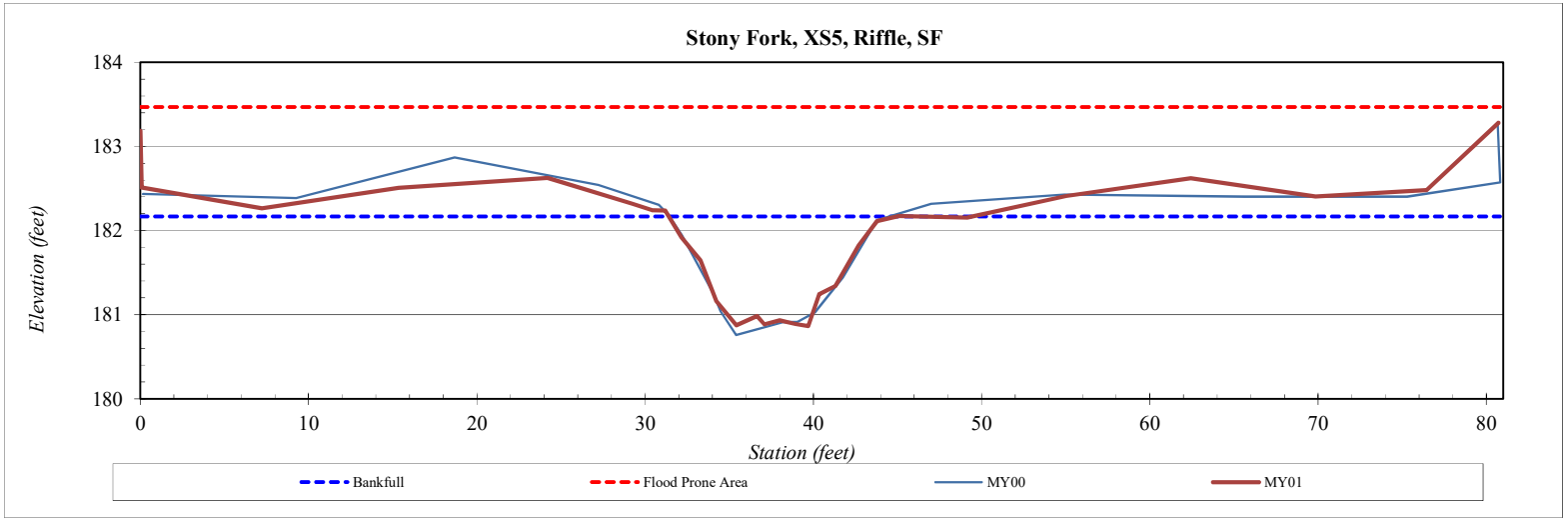


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS5
Drainage Area (sq mi):	0.46
Date:	11/8/2019
Field Crew:	T. Seelinger, A. Gutierrez

Station	Elevation
0.0	183.19
0.1	182.51
7.2	182.27
15.4	182.51
24.2	182.63
29.2	182.32
30.4	182.24
31.2	182.24
32.2	181.92
33.3	181.65
34.2	181.17
35.4	180.87
36.7	180.98
37.1	180.89
38.0	180.93
38.9	180.89
39.7	180.87
40.3	181.24
41.3	181.34
42.7	181.83
43.8	182.11
45.1	182.17
49.1	182.16
55.0	182.41
62.4	182.62
69.9	182.41
76.5	182.48
80.7	183.28

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	182.17
Bankfull Cross-Sectional Area:	10.6
Total Cross-Sectional Area:	10.1
Bankfull Width:	13.6
Flood Prone Area Elevation:	183.5
Flood Prone Width:	80.7
Max Depth at Bankfull:	1.3
Mean Depth at Bankfull:	0.8
W / D Ratio:	17.4
Entrenchment Ratio:	5.9
Bank Height Ratio:	1.0
Thalweg Elevation:	180.9

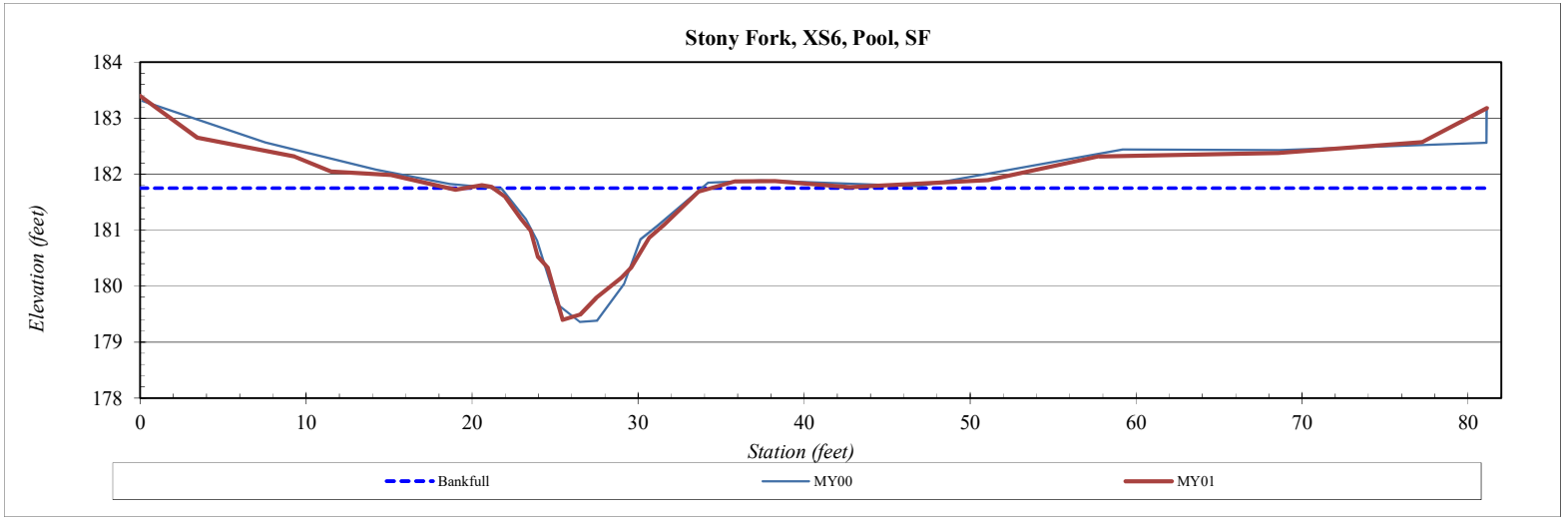


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS6
Drainage Area (sq mi):	0.46
Date:	11/8/2019
Field Crew:	T. Seelinger, A. Gutierrez

Station	Elevation
0.0	183.40
3.4	182.65
9.3	182.31
11.5	182.05
15.1	181.98
19.0	181.72
20.6	181.80
21.2	181.77
22.0	181.59
22.9	181.21
23.5	180.99
23.9	180.53
24.5	180.34
25.5	179.40
26.5	179.49
27.5	179.79
29.0	180.15
29.6	180.33
30.7	180.87
31.6	181.10
33.6	181.68
35.9	181.87
38.3	181.88
42.7	181.77
51.1	181.89
57.8	182.32
68.6	182.38
74.2	182.50
77.2	182.58
81.1	183.18

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	181.75
Bankfull Cross-Sectional Area:	14.5
Total Cross-Sectional Area:	14.3
Bankfull Width:	13.1
Flood Prone Area Elevation:	---
Flood Prone Width:	---
Max Depth at Bankfull:	2.4
Mean Depth at Bankfull:	1.1
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	179.4

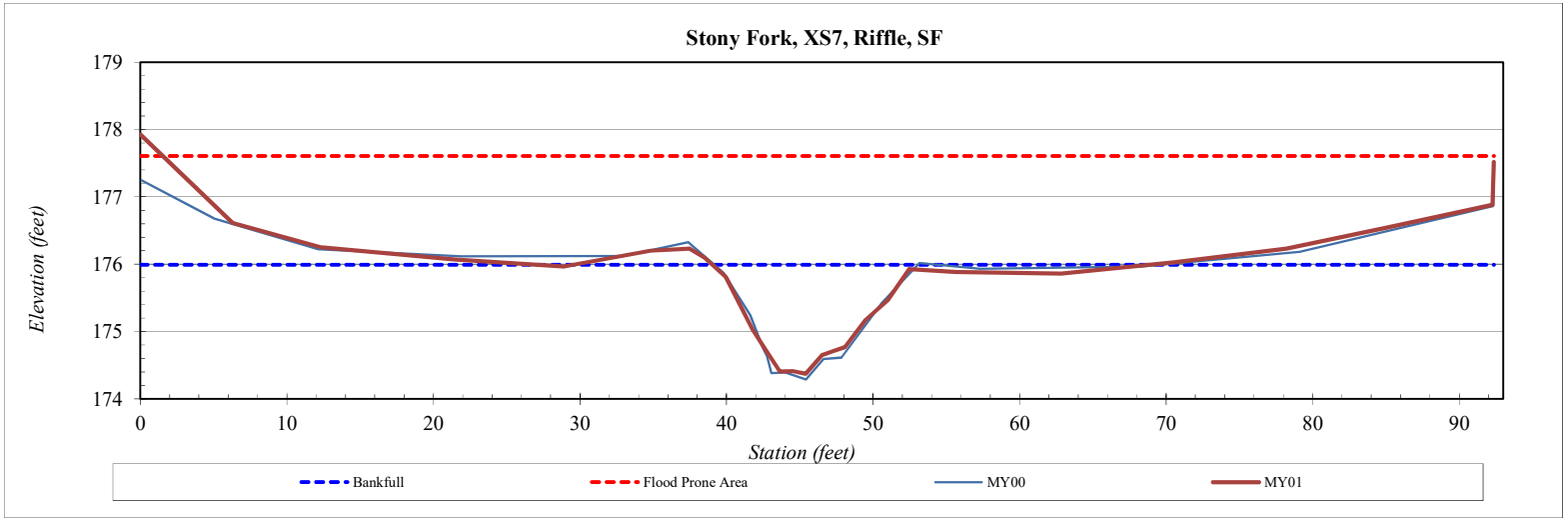


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS7
Drainage Area (sq mi):	0.83
Date:	11/8/2019
Field Crew:	T. Seelinger, A. Gutierrez

Station	Elevation
0.0	177.93
6.3	176.61
12.4	176.25
21.5	176.07
28.9	175.97
34.8	176.20
37.5	176.23
38.5	176.10
39.9	175.81
41.8	175.03
42.5	174.77
43.6	174.41
44.5	174.41
45.4	174.37
46.5	174.65
47.3	174.71
48.1	174.77
49.5	175.18
51.0	175.46
52.5	175.93
55.6	175.88
62.8	175.86
70.5	176.03
78.2	176.23
85.1	176.55
92.3	176.88
92.4	177.52

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	175.99
Bankfull Cross-Sectional Area:	12.8
Total Cross-Sectional Area:	13.2
Bankfull Width:	13.4
Flood Prone Area Elevation:	177.6
Flood Prone Width:	90.8
Max Depth at Bankfull:	1.6
Mean Depth at Bankfull:	1.0
W / D Ratio:	14.0
Entrenchment Ratio:	6.8
Bank Height Ratio:	1.0
Thalweg Elevation:	174.4

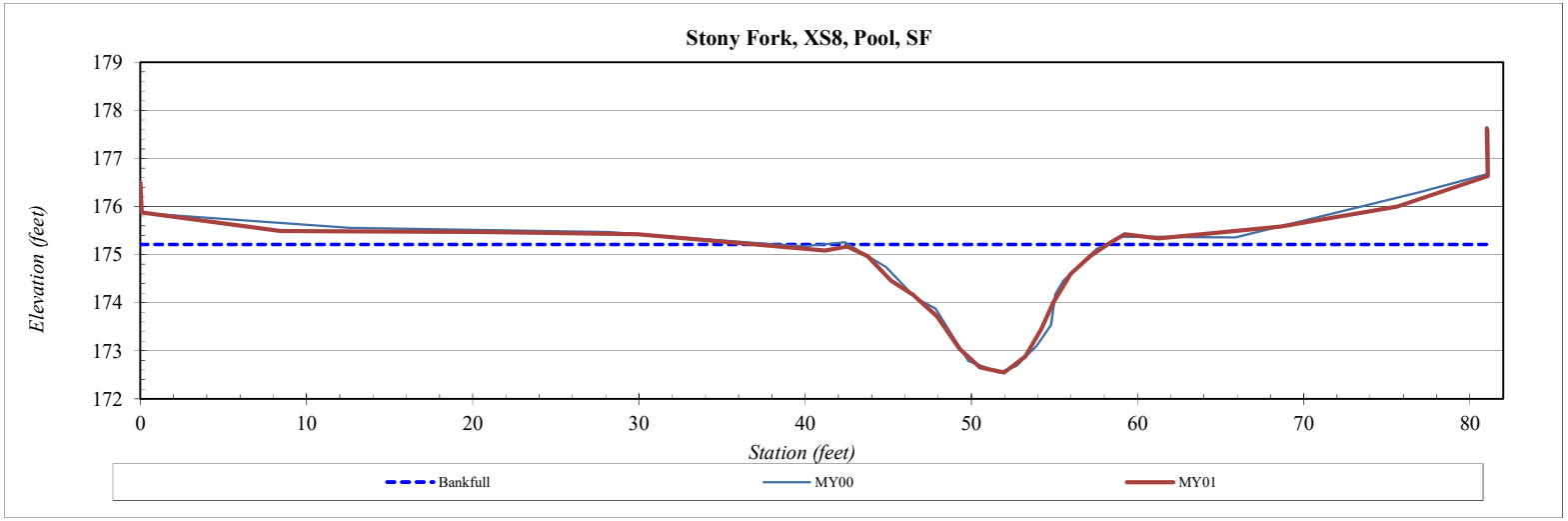


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS8
Drainage Area (sq mi):	0.83
Date:	11/8/2019
Field Crew:	T. Seelinger, A. Gutierrez

Station	Elevation
0.0	176.50
0.1	175.87
8.4	175.49
20.6	175.47
29.9	175.43
41.2	175.09
42.5	175.17
43.7	174.97
45.2	174.46
46.6	174.14
47.9	173.72
49.3	173.04
50.5	172.66
52.0	172.55
53.3	172.88
54.2	173.44
55.0	174.02
56.0	174.60
57.2	174.98
58.4	175.26
59.2	175.43
61.3	175.34
68.6	175.58
75.6	175.99
81.1	176.63
81.0	177.63

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	175.21
Bankfull Cross-Sectional Area:	20.7
Total Cross-Sectional Area:	21.4
Bankfull Width:	14.5
Flood Prone Area Elevation:	---
Flood Prone Width:	---
Max Depth at Bankfull:	2.7
Mean Depth at Bankfull:	1.4
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	172.5

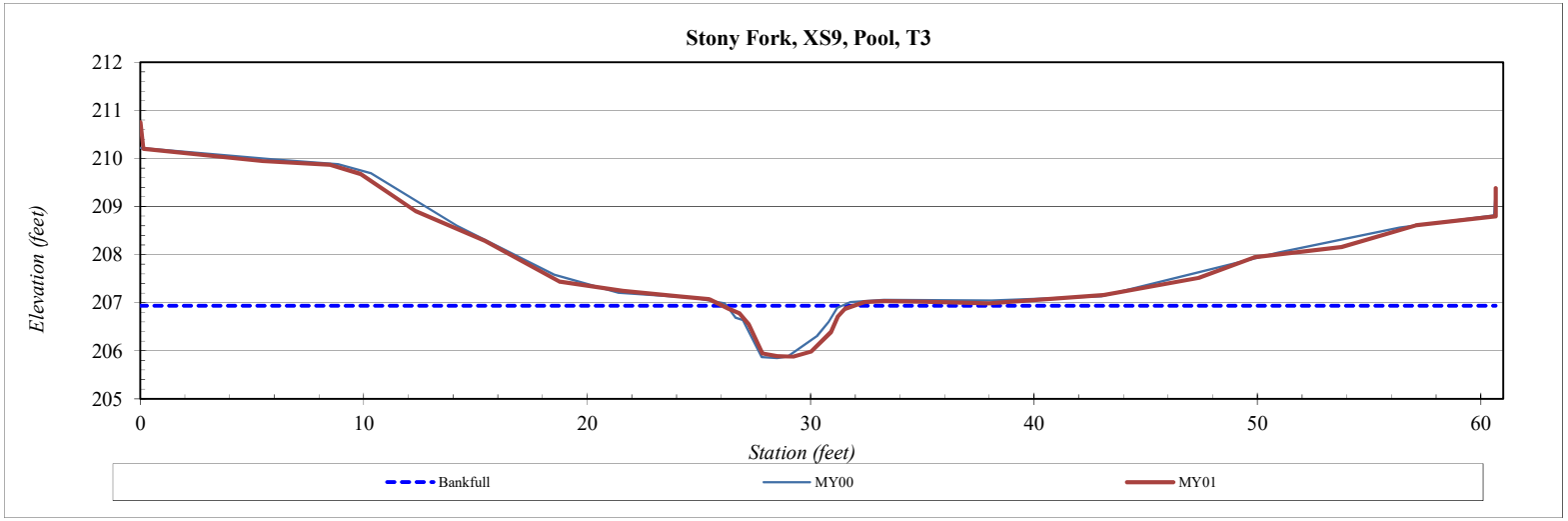


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS9
Drainage Area (sq mi):	0.04
Date:	11/8/2019
Field Crew:	T. Seelinger, A. Gutierrez

Station	Elevation
0.0	210.75
0.1	210.20
5.5	209.95
8.5	209.87
9.9	209.68
12.3	208.91
15.4	208.29
18.8	207.44
21.6	207.25
24.1	207.13
25.5	207.07
26.3	206.88
26.8	206.78
27.2	206.55
27.8	205.94
28.5	205.89
29.2	205.88
30.0	205.99
30.9	206.39
31.2	206.71
31.5	206.87
32.4	207.01
33.3	207.03
35.2	207.02
38.0	206.99
43.1	207.16
47.4	207.52
49.8	207.94
53.8	208.16
57.1	208.61
60.7	208.80
60.7	209.38

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	206.94
Bankfull Cross-Sectional Area:	3.7
Total Cross-Sectional Area:	4.0
Bankfull Width:	5.9
Flood Prone Area Elevation:	---
Flood Prone Width:	---
Max Depth at Bankfull:	1.1
Mean Depth at Bankfull:	0.6
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	205.9

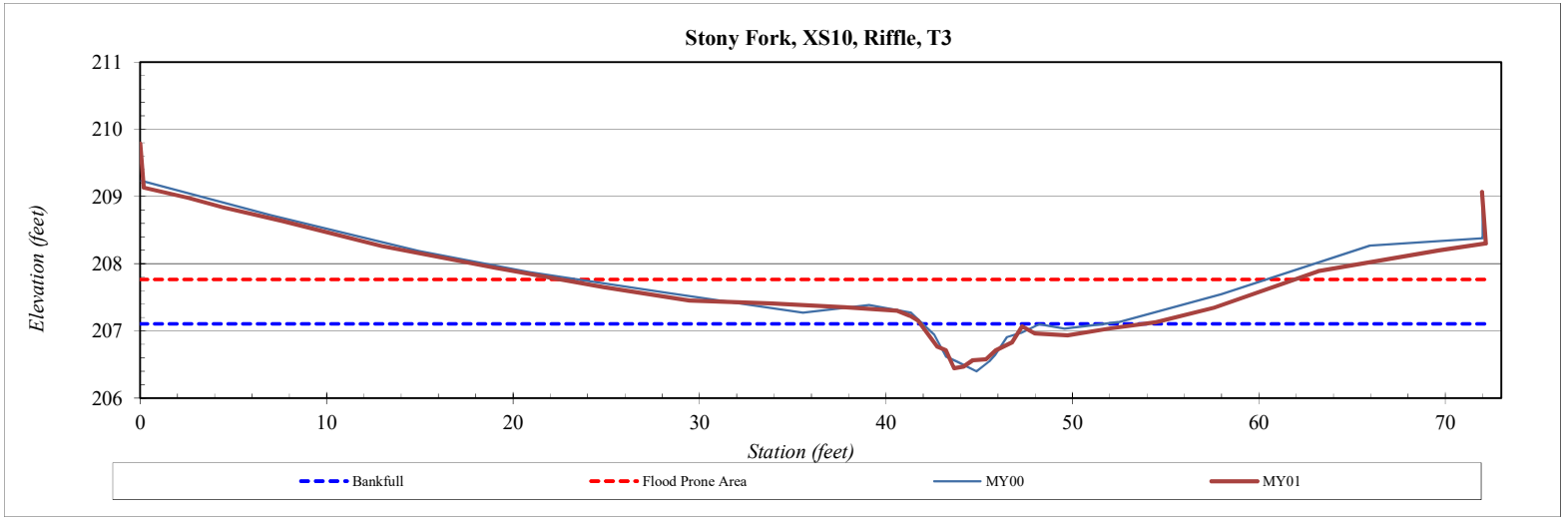


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS10
Drainage Area (sq mi):	0.04
Date:	11/8/2019
Field Crew:	T. Seelinger, A. Gutierrez

Station	Elevation
0.0	209.79
0.2	209.13
2.6	208.98
4.5	208.84
7.6	208.64
13.0	208.26
19.1	207.94
24.8	207.65
29.5	207.45
33.8	207.41
37.8	207.35
40.6	207.30
41.3	207.22
41.7	207.15
42.8	206.76
43.2	206.71
43.7	206.44
44.2	206.47
44.7	206.56
45.4	206.58
45.9	206.71
46.7	206.83
47.3	207.07
48.0	206.97
49.7	206.93
52.0	207.04
54.5	207.13
57.6	207.34
63.2	207.89
69.7	208.20
72.2	208.30
72.0	209.07

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	207.10
Bankfull Cross-Sectional Area:	2.2
Total Cross-Sectional Area:	2.1
Bankfull Width:	5.5
Flood Prone Area Elevation:	207.8
Flood Prone Width:	39.4
Max Depth at Bankfull:	0.7
Mean Depth at Bankfull:	0.4
W / D Ratio:	13.7
Entrenchment Ratio:	7.2
Bank Height Ratio:	0.9
Thalweg Elevation:	206.4

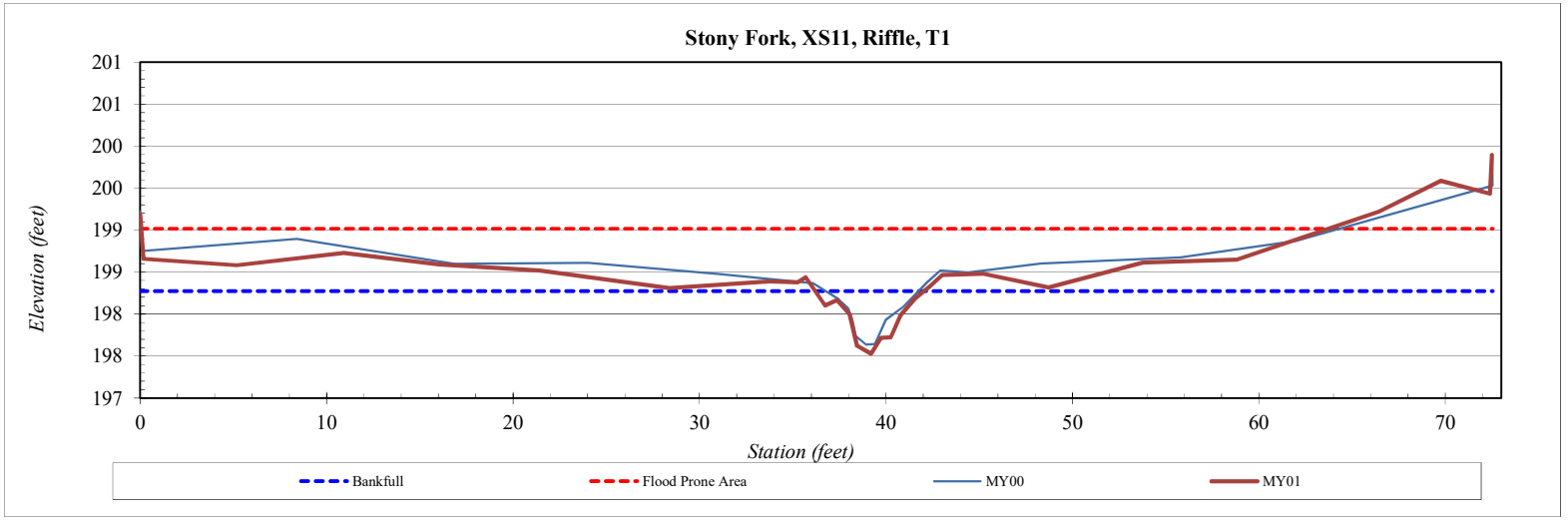


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS11
Drainage Area (sq mi):	0.02
Date:	11/8/2019
Field Crew:	T. Seelinger, A. Gutierrez

Station	Elevation
0.0	199.19
0.2	198.66
5.2	198.58
10.9	198.73
16.0	198.59
21.4	198.52
28.4	198.31
33.8	198.39
35.3	198.38
36.7	198.10
37.4	198.17
38.1	198.00
38.4	197.62
39.2	197.53
39.7	197.72
40.3	197.72
40.8	197.99
41.6	198.19
42.4	198.33
43.0	198.47
45.2	198.48
48.7	198.32
53.8	198.61
58.8	198.65
66.4	199.22
69.7	199.59
72.4	199.43
72.5	199.90

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	198.27
Bankfull Cross-Sectional Area:	2.0
Total Cross-Sectional Area:	2.6
Bankfull Width:	5.8
Flood Prone Area Elevation:	199.0
Flood Prone Width:	63.7
Max Depth at Bankfull:	0.7
Mean Depth at Bankfull:	0.3
W / D Ratio:	17.1
Entrenchment Ratio:	10.9
Bank Height Ratio:	1.1
Thalweg Elevation:	197.5

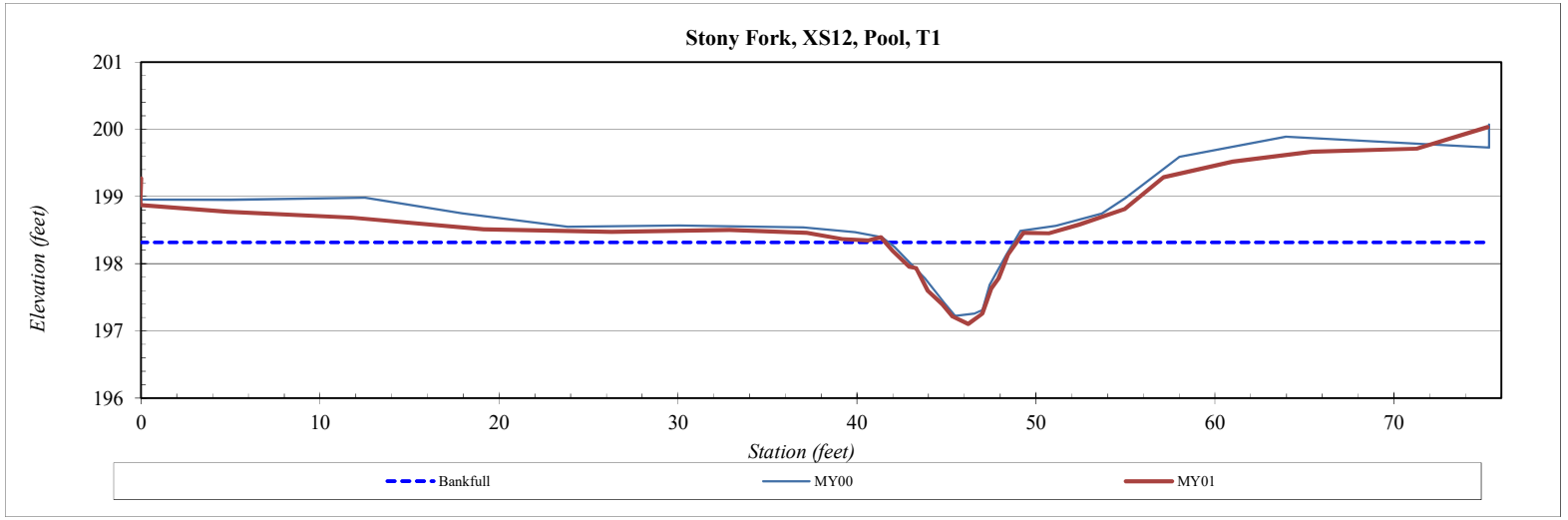


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS12
Drainage Area (sq mi):	0.02
Date:	11/8/2019
Field Crew:	T. Seelinger, A. Gutierrez

Station	Elevation
0.0	199.27
-0.1	198.87
4.8	198.77
11.8	198.69
19.1	198.51
26.3	198.47
32.9	198.50
37.2	198.46
39.2	198.37
40.7	198.35
41.3	198.39
42.0	198.19
42.9	197.96
43.3	197.94
44.0	197.60
44.8	197.40
45.3	197.22
46.2	197.10
47.0	197.25
47.5	197.63
47.9	197.78
48.4	198.13
49.3	198.46
50.7	198.45
52.4	198.58
55.0	198.82
57.1	199.29
61.0	199.52
65.4	199.67
71.3	199.71
75.2	200.03

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	198.32
Bankfull Cross-Sectional Area:	4.8
Total Cross-Sectional Area:	5.5
Bankfull Width:	7.3
Flood Prone Area Elevation:	---
Flood Prone Width:	---
Max Depth at Bankfull:	1.2
Mean Depth at Bankfull:	0.7
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	197.1

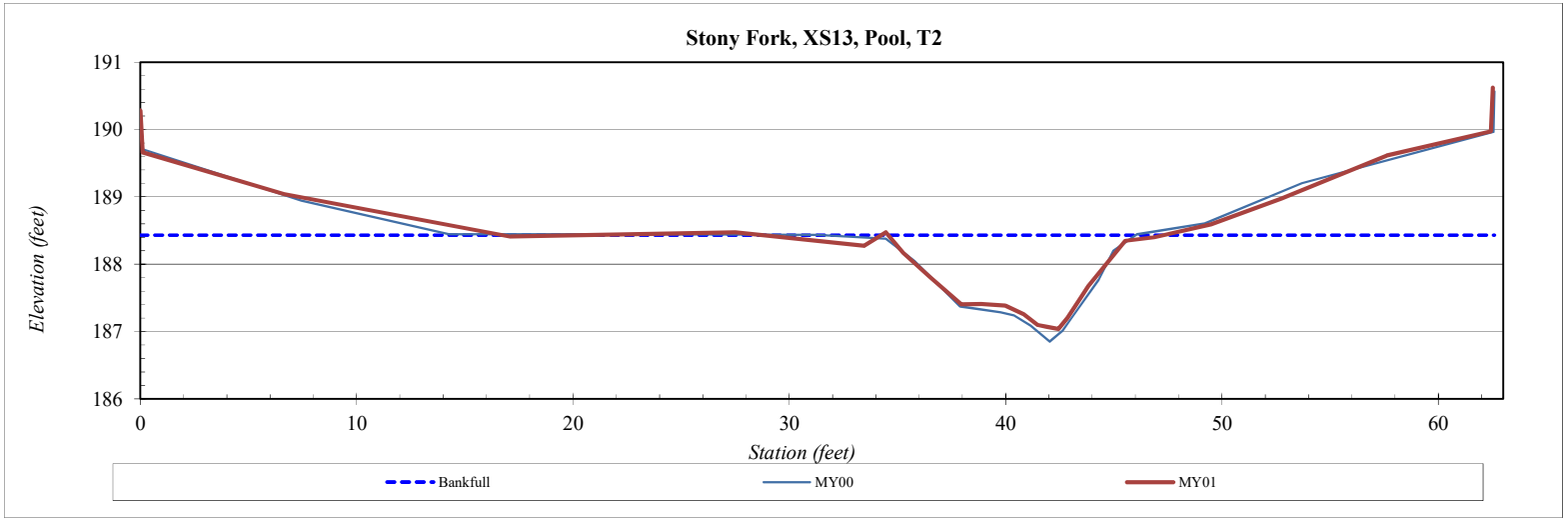


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS13
Drainage Area (sq mi):	0.14
Date:	11/11/2019
Field Crew:	T. Seelinger, A. Gutierrez

Station	Elevation
0.0	190.29
0.1	189.66
6.6	189.04
17.1	188.41
27.5	188.47
33.5	188.27
34.5	188.48
35.3	188.17
36.5	187.81
38.0	187.40
38.9	187.41
40.0	187.39
40.8	187.26
41.5	187.10
41.9	187.07
42.4	187.04
42.9	187.20
43.4	187.45
43.8	187.68
45.5	188.35
46.9	188.40
49.5	188.59
52.7	188.98
57.6	189.61
62.4	189.98
62.5	190.62

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	188.43
Bankfull Cross-Sectional Area:	9.3
Total Cross-Sectional Area:	8.7
Bankfull Width:	12.7
Flood Prone Area Elevation:	---
Flood Prone Width:	---
Max Depth at Bankfull:	1.4
Mean Depth at Bankfull:	0.7
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	187.0

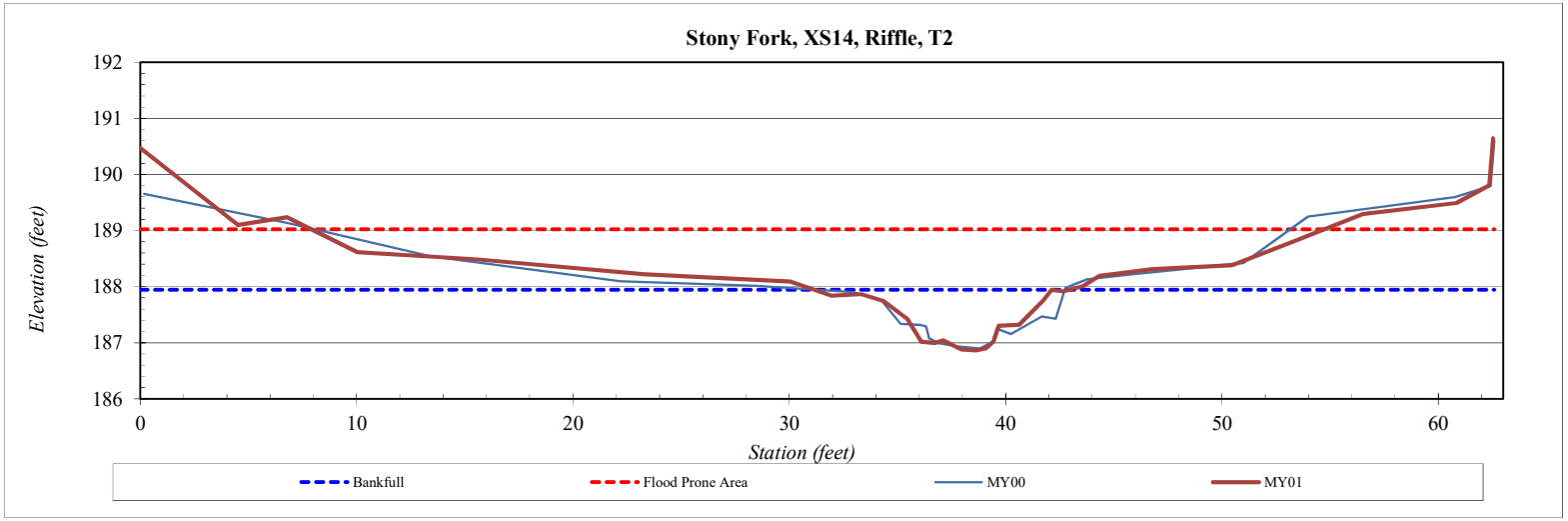


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS14
Drainage Area (sq mi):	0.14
Date:	11/11/2019
Field Crew:	T. Seelinger, A. Gutierrez

Station	Elevation
0.0	190.47
4.5	189.10
6.8	189.24
10.0	188.62
15.6	188.49
23.3	188.22
30.1	188.09
32.0	187.84
33.3	187.86
34.4	187.75
35.4	187.43
36.1	187.02
36.7	186.99
37.1	187.04
37.9	186.88
38.6	186.87
39.1	186.91
39.4	187.02
39.7	187.30
40.6	187.32
41.8	187.77
42.1	187.94
42.7	187.92
43.6	188.01
44.3	188.19
46.8	188.32
50.4	188.38
53.3	188.81
56.5	189.30
60.8	189.49
62.4	189.80
62.5	190.64

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	187.94
Bankfull Cross-Sectional Area:	5.8
Total Cross-Sectional Area:	5.3
Bankfull Width:	11.8
Flood Prone Area Elevation:	189.0
Flood Prone Width:	46.8
Max Depth at Bankfull:	1.1
Mean Depth at Bankfull:	0.5
W / D Ratio:	24.0
Entrenchment Ratio:	4.0
Bank Height Ratio:	0.8
Thalweg Elevation:	186.9

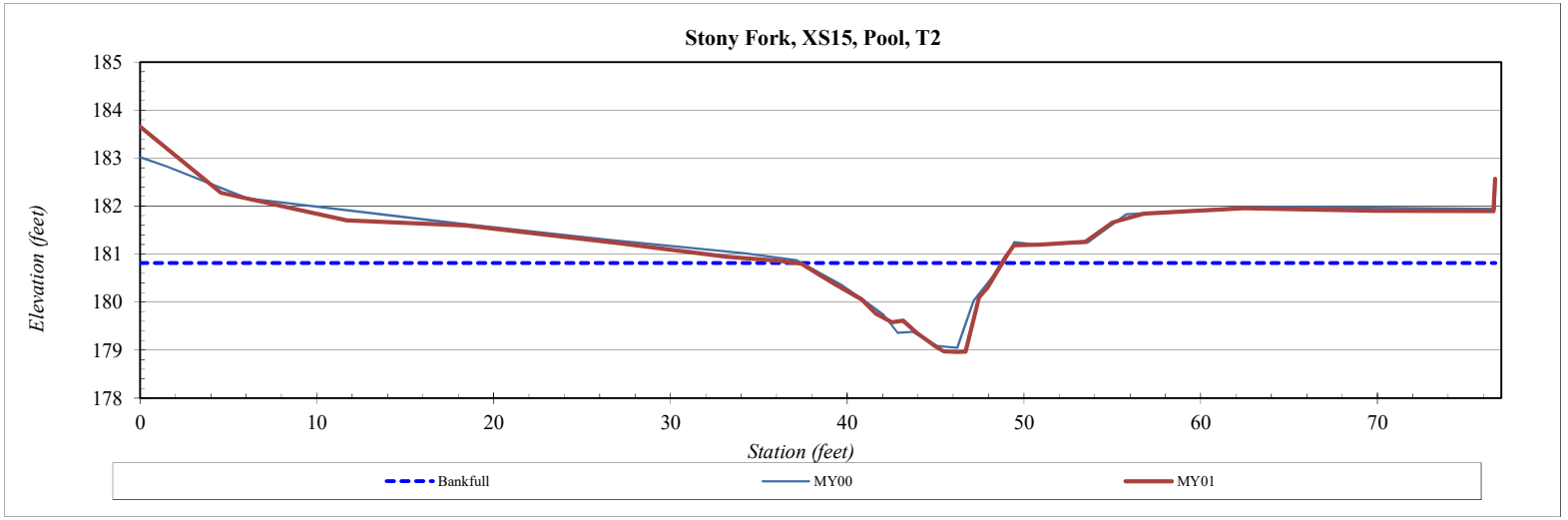


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS15
Drainage Area (sq mi):	0.22
Date:	11/11/2019
Field Crew:	T. Seelinger, A. Gutierrez

Station	Elevation
0.0	183.66
4.6	182.28
11.7	181.70
18.4	181.60
27.2	181.22
33.2	180.95
36.2	180.86
37.4	180.80
38.4	180.58
39.2	180.39
40.8	180.06
41.6	179.76
42.5	179.58
43.2	179.62
43.9	179.36
45.0	179.07
45.5	178.98
46.2	178.96
46.7	178.97
47.5	180.10
47.9	180.29
49.0	180.94
49.4	181.19
50.9	181.20
53.5	181.26
55.0	181.66
56.8	181.84
62.4	181.96
69.8	181.90
76.6	181.90
76.7	182.57

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	180.82
Bankfull Cross-Sectional Area:	11.2
Total Cross-Sectional Area:	11.8
Bankfull Width:	11.7
Flood Prone Area Elevation:	---
Flood Prone Width:	---
Max Depth at Bankfull:	1.9
Mean Depth at Bankfull:	1.0
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	179.0

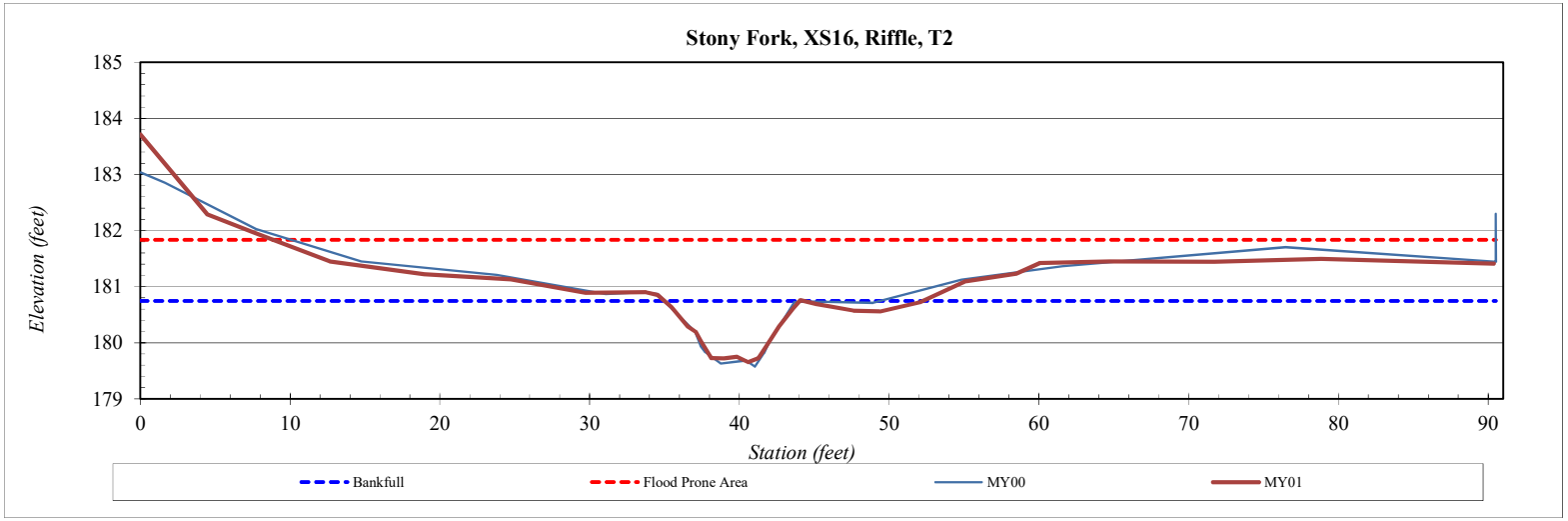


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS16
Drainage Area (sq mi):	0.22
Date:	11/11/2019
Field Crew:	T. Seelinger, A. Gutierrez

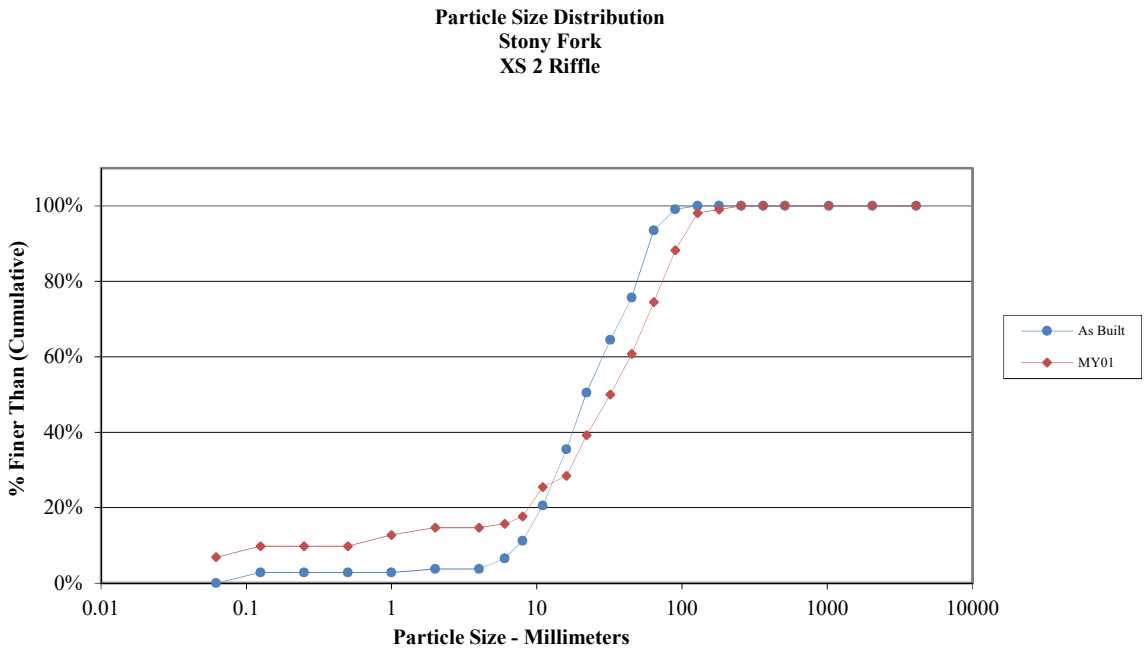
Station	Elevation
0.0	183.72
4.5	182.29
7.5	181.97
12.6	181.45
19.0	181.22
24.7	181.13
29.7	180.89
33.8	180.90
34.6	180.85
35.5	180.64
36.5	180.29
37.1	180.19
37.4	180.03
38.1	179.73
39.0	179.72
39.8	179.75
40.6	179.65
41.3	179.72
41.8	179.94
42.7	180.30
43.6	180.61
44.1	180.76
45.1	180.69
47.6	180.58
49.4	180.56
52.1	180.73
55.1	181.10
58.5	181.23
60.0	181.42
64.7	181.45
71.7	181.45
78.8	181.49
90.4	181.41

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	180.74
Bankfull Cross-Sectional Area:	6.0
Total Cross-Sectional Area:	5.8
Bankfull Width:	9.9
Flood Prone Area Elevation:	181.8
Flood Prone Width:	81.6
Max Depth at Bankfull:	1.1
Mean Depth at Bankfull:	0.6
W / D Ratio:	16.3
Entrenchment Ratio:	8.3
Bank Height Ratio:	1.0
Thalweg Elevation:	179.7



Cross-Section 1 Riffle - MY-01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	7
Very Fine	.062 - .125	S	3
Fine	.125 - .25	A	
Medium	.25 - .50	N	
Coarse	.50 - 1	D	3
Very Coarse	1 - 2	S	2
Very Fine	2 - 4		
Fine	4 - 5.7	G	1
Fine	5.7 - 8	R	2
Medium	8 - 11.3	A	8
Medium	11.3 - 16	V	3
Coarse	16 - 22.6	E	11
Coarse	22.6 - 32	L	11
Very Coarse	32 - 45	S	11
Very Coarse	45 - 64		14
Small	64 - 90	C	14
Small	90 - 128	O	10
Large	128 - 180	B	1
Large	180 - 256	L	1
Small	256 - 362	B	
Small	362 - 512	L	
Medium	512 - 1024	D	
Lrg- Very Lrg	1024 - 2048	R	
Bedrock	>2048	BDRK	
		Total	102

Note:



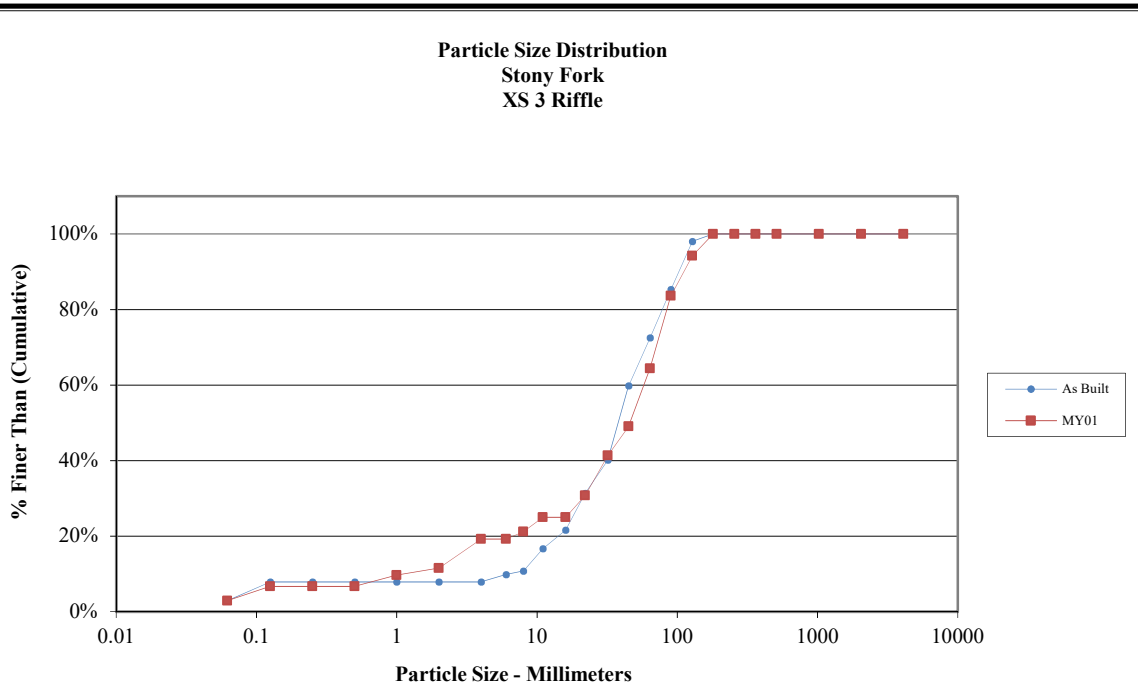
Size (mm)	
D16	6.3
D35	19
D50	32
D65	50
D84	81
D95	110

Size Distribution	
mean	22.6
dispersion	3.8
skewness	-0.14

Type	
silt/clay	7%
sand	8%
gravel	60%
cobble	24%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

Cross-Section 3 Riffle - MY-01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	3
Very Fine	.062 - .125	S	4
Fine	.125 - .25	A	
Medium	.25 - .50	N	
Coarse	.50 - 1	D	3
Very Coarse	1 - 2	S	2
Very Fine	2 - 4		8
Fine	4 - 5.7	G	
Fine	5.7 - 8	R	2
Medium	8 - 11.3	A	4
Medium	11.3 - 16	V	
Coarse	16 - 22.6	E	6
Coarse	22.6 - 32	L	11
Very Coarse	32 - 45	S	8
Very Coarse	45 - 64		16
Small	64 - 90	C	20
Small	90 - 128	O	11
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	
		Total	104

Note:



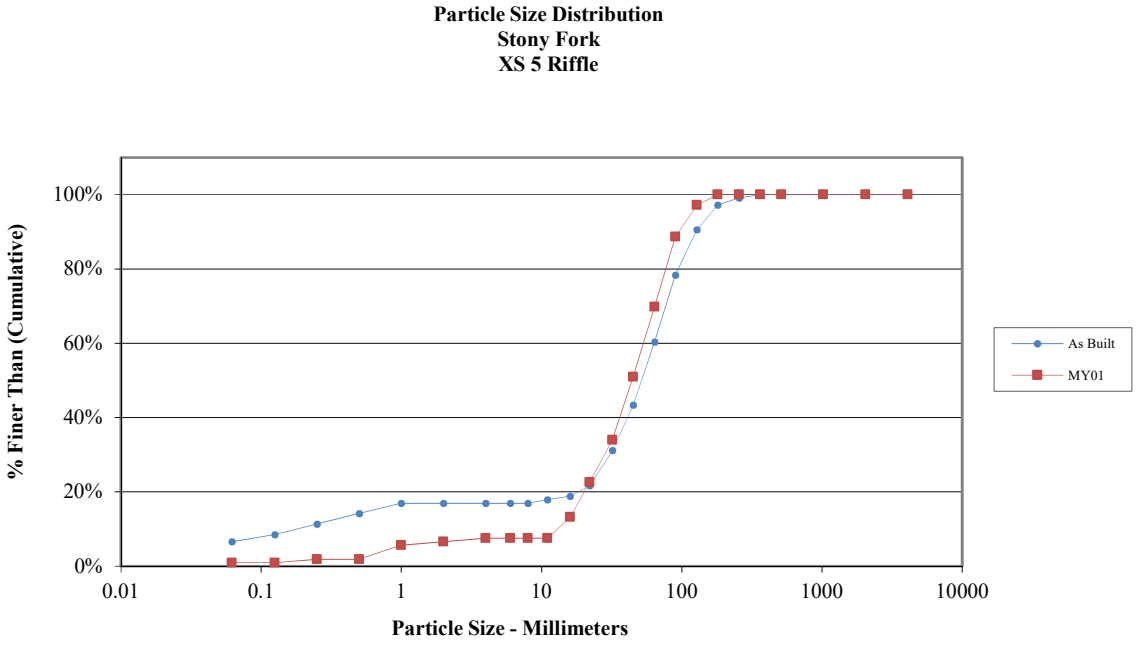
Size (mm)	
D16	3
D35	26
D50	46
D65	65
D84	91
D95	130

Size Distribution	
mean	16.5
dispersion	8.7
skewness	-0.37

Type	
silt/clay	3%
sand	9%
gravel	53%
cobble	36%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

Cross-Section 5 Riffle - MY-01			
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	4
Very Coarse	1 - 2	S	1
Very Fine	2 - 4		1
Fine	4 - 5.7	G	
Fine	5.7 - 8	R	
Medium	8 - 11.3	A	
Medium	11.3 - 16	V	6
Coarse	16 - 22.6	E	10
Coarse	22.6 - 32	L	12
Very Coarse	32 - 45	S	18
Very Coarse	45 - 64		20
Small	64 - 90	C	20
Small	90 - 128	O	9
Large	128 - 180	B	3
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	
		Total	106

Note:



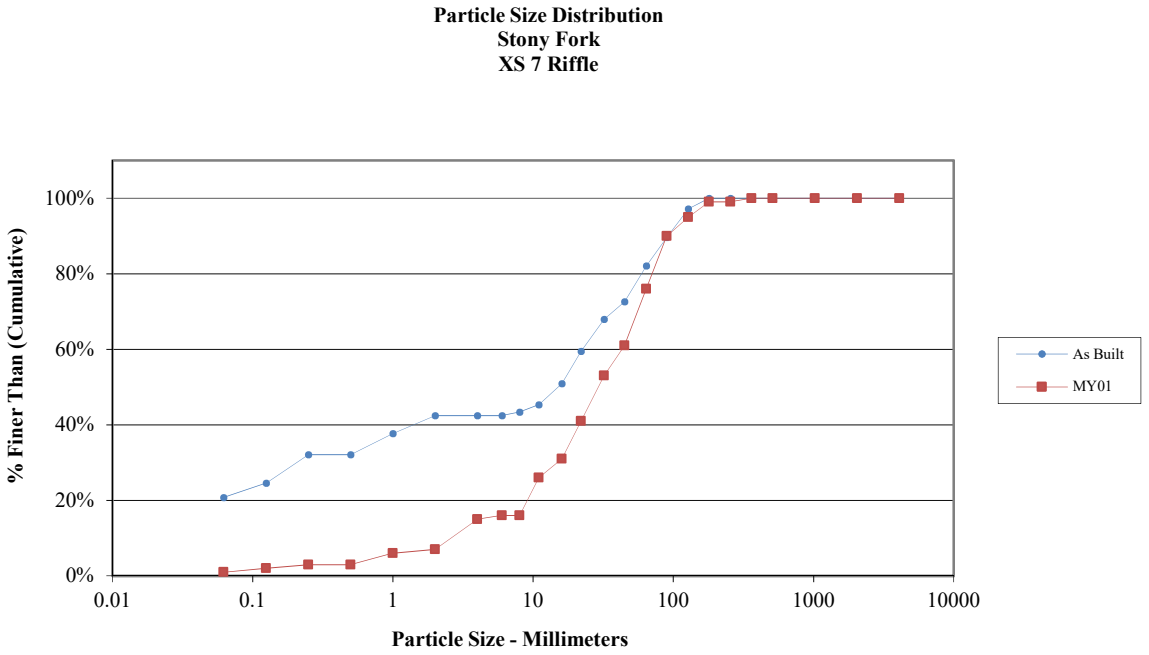
Size (mm)	
D16	18
D35	33
D50	44
D65	59
D84	83
D95	120

Size Distribution	
mean	38.7
dispersion	2.2
skewness	-0.07

Type	
silt/clay	1%
sand	6%
gravel	63%
cobble	30%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

Cross-Section 7 Riffle -MY-01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	1
Very Fine	.062 - .125	S	1
Fine	.125 - .25	A	1
Medium	.25 - .50	N	
Coarse	.50 - 1	D	3
Very Coarse	1 - 2	S	1
Very Fine	2 - 4		8
Fine	4 - 5.7	G	1
Fine	5.7 - 8	R	
Medium	8 - 11.3	A	10
Medium	11.3 - 16	V	5
Coarse	16 - 22.6	E	10
Coarse	22.6 - 32	L	12
Very Coarse	32 - 45	S	8
Very Coarse	45 - 64		15
Small	64 - 90	C	14
Small	90 - 128	O	5
Large	128 - 180	B	4
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	
		Total	100

Note:

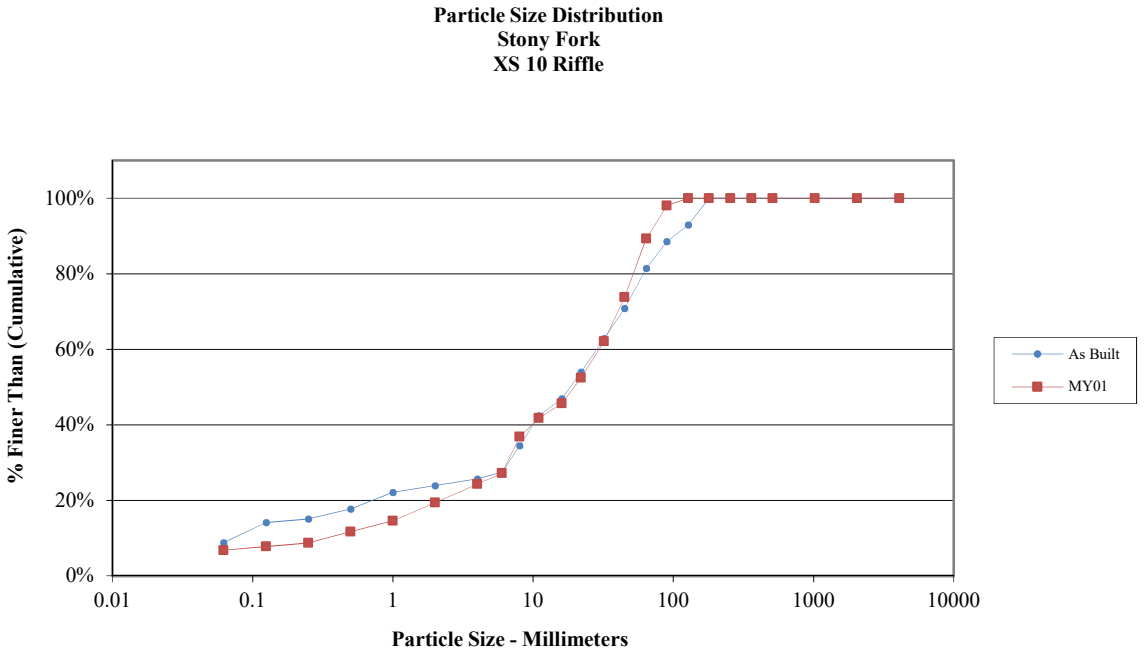


Size (mm)	
D16	8
D35	18
D50	29
D65	49
D84	78
D95	130

Size Distribution	
mean	25.0
dispersion	3.2
skewness	-0.07

Type	
silt/clay	1%
sand	6%
gravel	69%
cobble	23%
boulder	1%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

Cross-Section 10 Riffle - MY-01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	7
Very Fine	.062 - .125	S	1
Fine	.125 - .25	A	1
Medium	.25 - .50	N	3
Coarse	.50 - 1	D	3
Very Coarse	1 - 2	S	5
Very Fine	2 - 4		5
Fine	4 - 5.7	G	3
Fine	5.7 - 8	R	10
Medium	8 - 11.3	A	5
Medium	11.3 - 16	V	4
Coarse	16 - 22.6	E	7
Coarse	22.6 - 32	L	10
Very Coarse	32 - 45	S	12
Very Coarse	45 - 64		16
Small	64 - 90	C	9
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	
		Total	103
Note:			



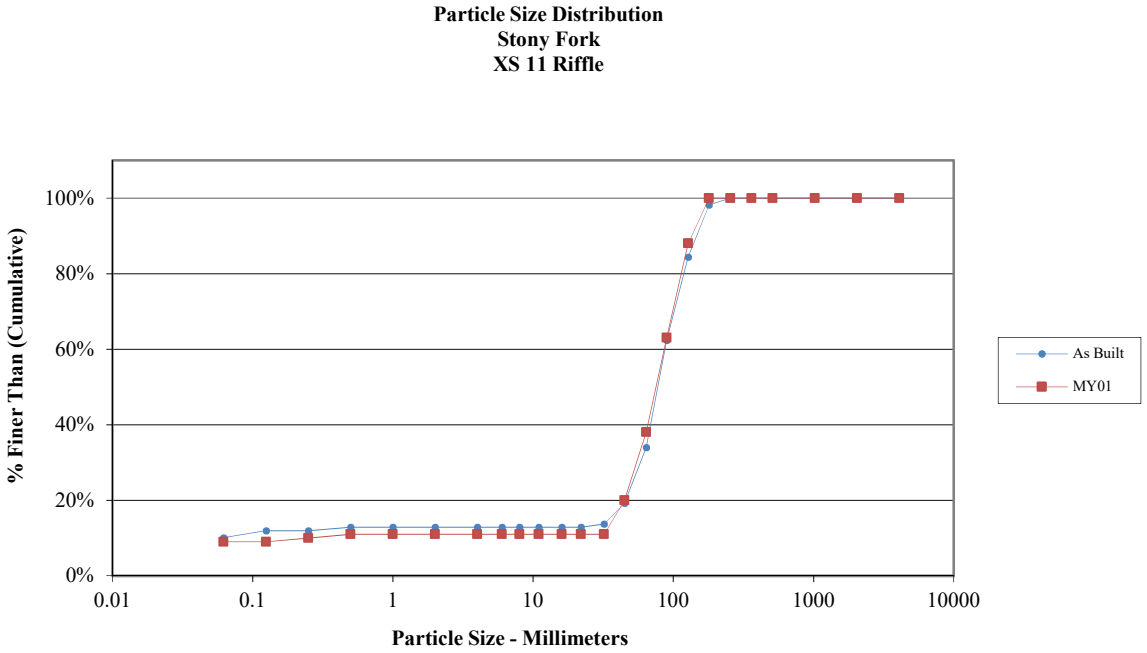
Size (mm)	
D16	1.2
D35	7.6
D50	20
D65	35
D84	57
D95	80

Size Distribution	
mean	8.3
dispersion	9.8
skewness	-0.30

Type	
silt/clay	7%
sand	13%
gravel	70%
cobble	11%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

Cross-Section 11 Riffle -MY-01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	9
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	1
Medium	.25 - .50	N	1
Coarse	.50 - 1	D	
Very Coarse	1 - 2	S	
Very Fine	2 - 4		
Fine	4 - 5.7	G	
Fine	5.7 - 8	R	
Medium	8 - 11.3	A	
Medium	11.3 - 16	V	
Coarse	16 - 22.6	E	
Coarse	22.6 - 32	L	
Very Coarse	32 - 45	S	9
Very Coarse	45 - 64		18
Small	64 - 90	C	25
Small	90 - 128	O	25
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	
		Total	100

Note:

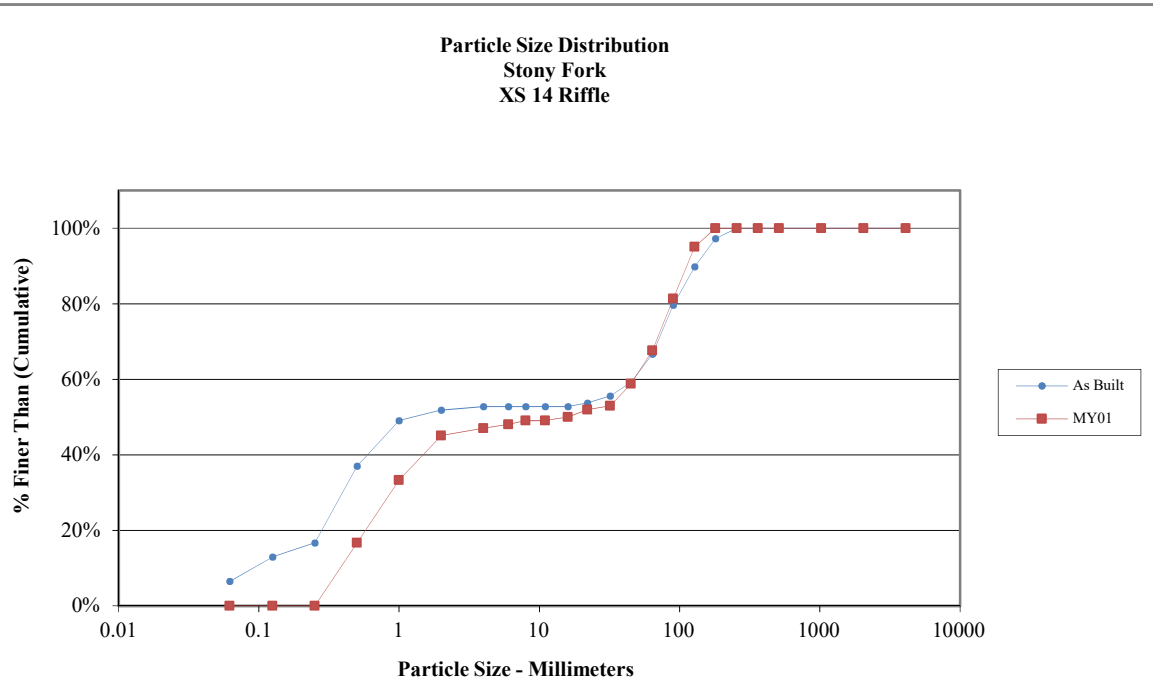


Size (mm)	
D16	39
D35	60
D50	75
D65	93
D84	120
D95	160

Size Distribution	
mean	68.4
dispersion	1.8
skewness	-0.06

Type	
silt/clay	9%
sand	2%
gravel	27%
cobble	62%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

Cross-Section 14 Riffle - MY-01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	
Very Fine	.062 - .125	S	
Fine	.125 - .25	A	
Medium	.25 - .50	N	17
Coarse	.50 - 1	D	17
Very Coarse	1 - 2	S	12
Very Fine	2 - 4		2
Fine	4 - 5.7	G	1
Fine	5.7 - 8	R	1
Medium	8 - 11.3	A	
Medium	11.3 - 16	V	1
Coarse	16 - 22.6	E	2
Coarse	22.6 - 32	L	1
Very Coarse	32 - 45	S	6
Very Coarse	45 - 64		9
Small	64 - 90	C	14
Small	90 - 128	O	14
Large	128 - 180	B	5
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	
		Total	102
Note:			

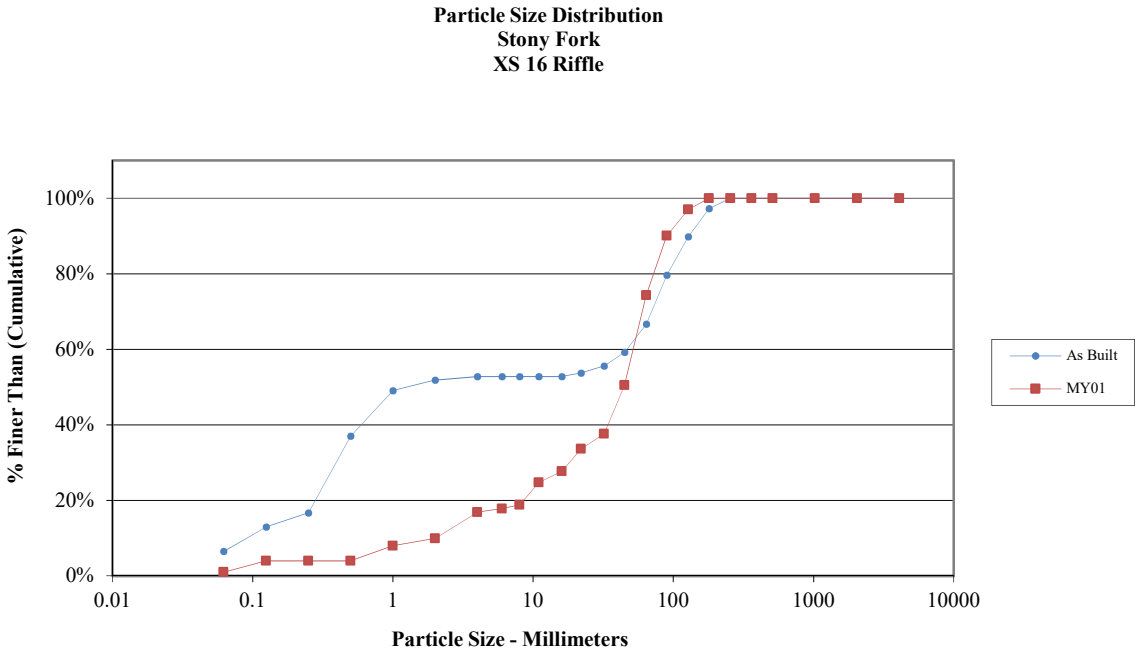


Size (mm)	
D16	0.49
D35	1.1
D50	16
D65	58
D84	96
D95	130

Size Distribution	
mean	6.9
dispersion	19.3
skewness	-0.24

Type	
silt/clay	0%
sand	45%
gravel	23%
cobble	32%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

Cross-Section 16 Riffle - MY-01			
Particle	Millimeter		Count
Silt/Clay	< 0.062	S/C	1
Very Fine	.062 - .125	S	3
Fine	.125 - .25	A	
Medium	.25 - .50	N	
Coarse	.50 - 1	D	4
Very Coarse	1 - 2	S	2
Very Fine	2 - 4		7
Fine	4 - 5.7	G	1
Fine	5.7 - 8	R	1
Medium	8 - 11.3	A	6
Medium	11.3 - 16	V	3
Coarse	16 - 22.6	E	6
Coarse	22.6 - 32	L	4
Very Coarse	32 - 45	S	13
Very Coarse	45 - 64		24
Small	64 - 90	C	16
Small	90 - 128	O	7
Large	128 - 180	B	3
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	
		Total	101
Note:			



Size (mm)	
D16	3.7
D35	25
D50	44
D65	56
D84	79
D95	120

Size Distribution	
mean	17.1
dispersion	6.8
skewness	-0.36

Type	
silt/clay	1%
sand	9%
gravel	64%
cobble	26%
boulder	0%
bedrock	0%
hardpan	0%
wood/det	0%
artificial	0%

APPENDIX E

Hydrologic Data

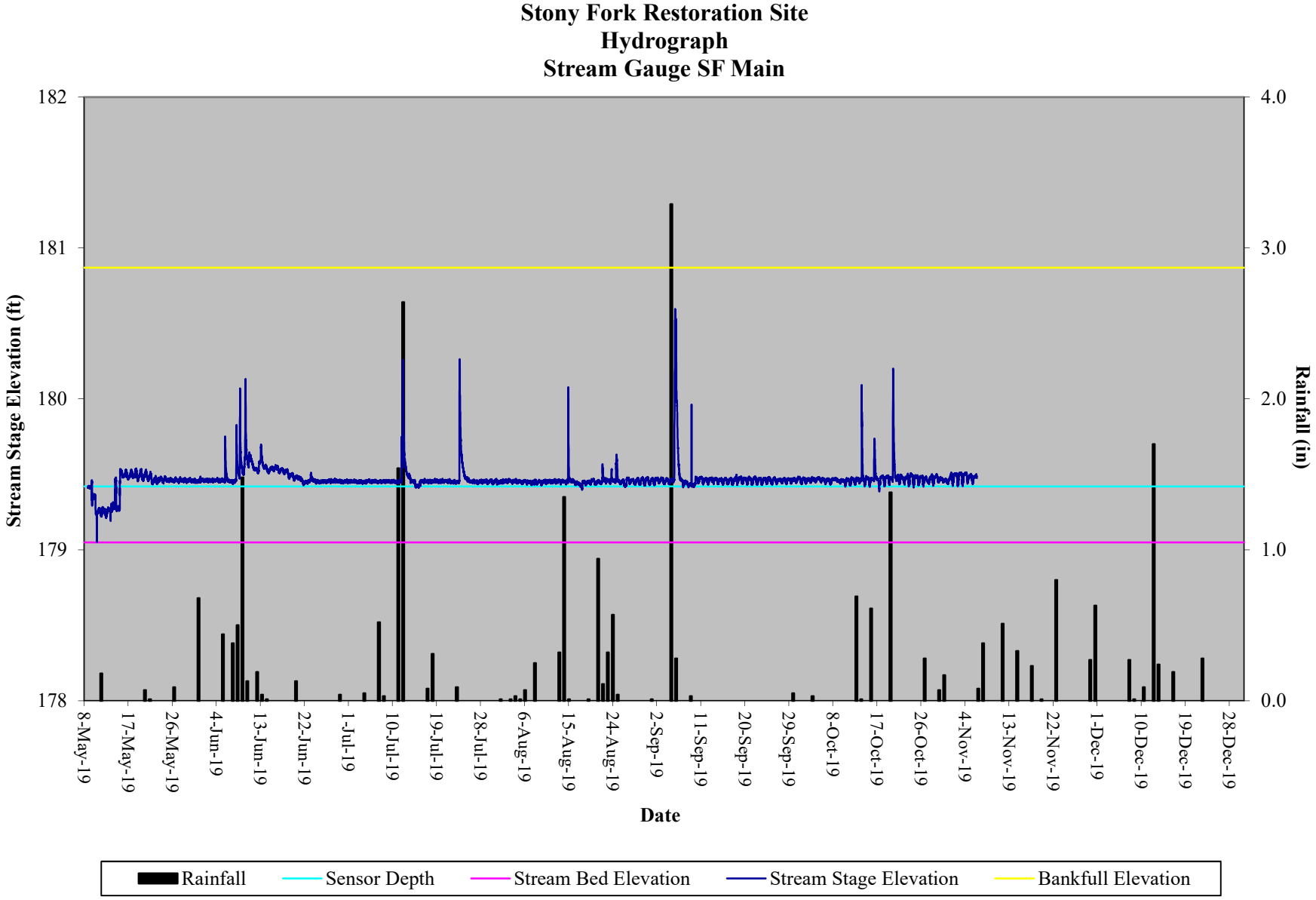

Stony Fork Restoration Site
Hydrograph
Stream Gauge SF Main
Stream Stage Elevation (ft)
Rainfall (in)
182
181
180
179
178
4.0
3.0
2.0
1.0
0.0
8-May-19
17-May-19
26-May-19
4-Jun-19
13-Jun-19
22-Jun-19
1-Jul-19
10-Jul-19
19-Jul-19
28-Jul-19
6-Aug-19
15-Aug-19
24-Aug-19
2-Sep-19
11-Sep-19
20-Sep-19
29-Sep-19
8-Oct-19
17-Oct-19
26-Oct-19
4-Nov-19
13-Nov-19
22-Nov-19
1-Dec-19
10-Dec-19
19-Dec-19
28-Dec-19
Date
Rainfall
Sensor Depth
Stream Bed Elevation
Stream Stage Elevation
Bankfull Elevation

Table 10. Verification of Stream Flow Stony Fork Restoration Site, DMS Project #97085				
	Gauge		Camera	
Reach	Dates Achieving	Maximum Consecutive Days	Dates Achieving	Maximum Consecutive Days
T1	Aug. 14 – Oct. 12	60	Camera obscured by vegetation for most of the year	5
T1A	May 9 – Nov. 6	182	Sept. 21 – Nov. 5	46
T2	Aug. 14 – Nov. 6	85	Aug. 14 – Nov. 5	84
T3	May 31 – June 29, Aug. 14 – Oct. 7	55	May 8 – July 2	55

Table 11. Stream Flow Criteria Attainment Cedar Branch Restoration Site, DMS Project #97085							
	Greater than 30 Days of Flow/Max Consecutive Days						
Reach	MY-01 2019	MY-02 2019	MY-03 2020	MY-04 2021	MY-05 2022	MY-06 2023	MY-07 2024
T1 (Gauge)	Yes/60						
T1 (Camera)	No/5*						
T1A (Gauge)	Yes/182						
T1A (Camera)	Yes/46						
T2 (Gauge)	Yes/85						
T2 (Camera)	Yes/84						
T3 (Gauge)	Yes/55						
T3 (Camera)	Yes/55						

*Camera obscured for much of the year

Stream Flow Example Photos

T1 – 7/25/2019

T1 – 11/5/2019

T1A – 9/13/2019

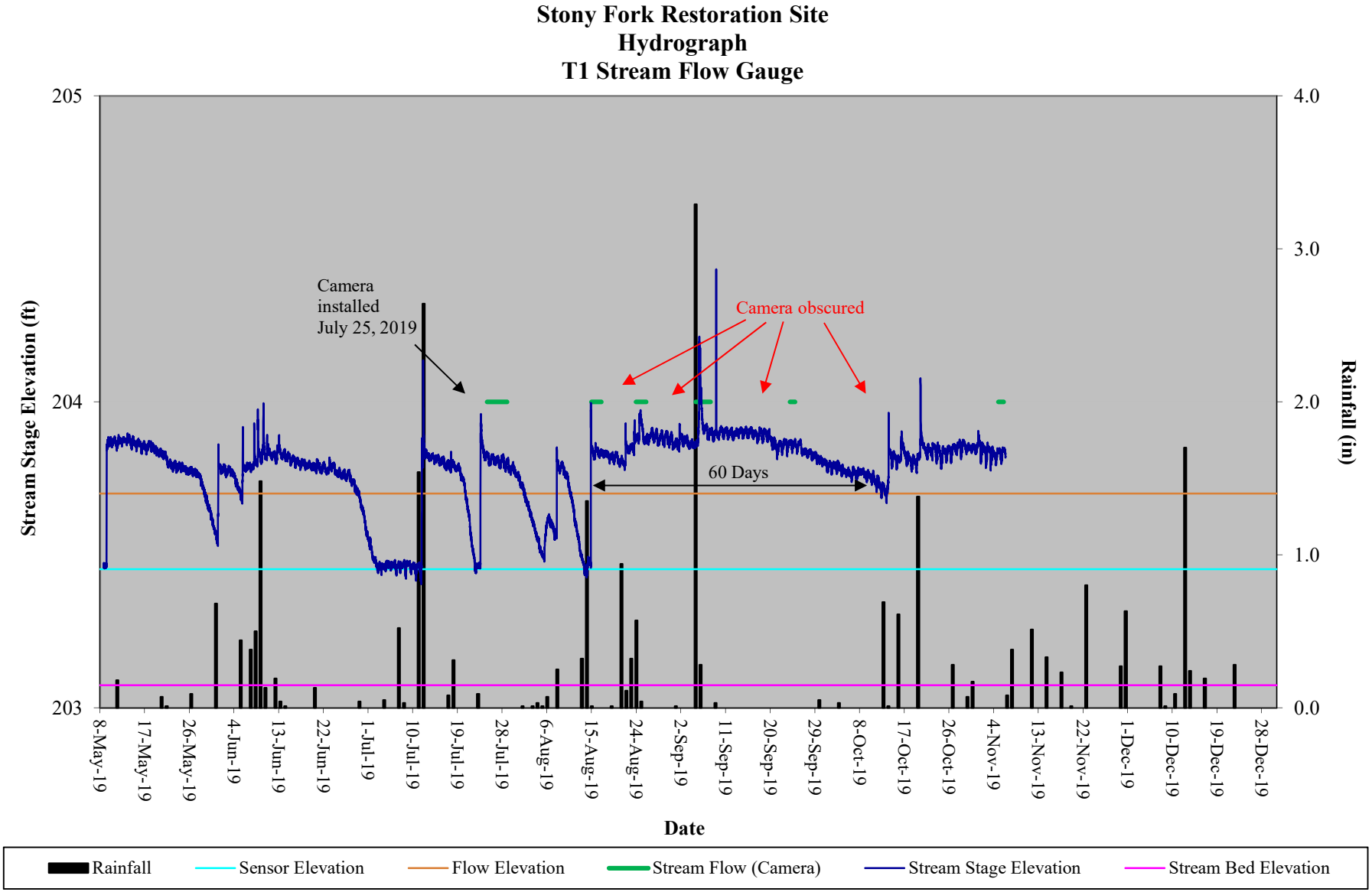
T1A – 10/24/2019

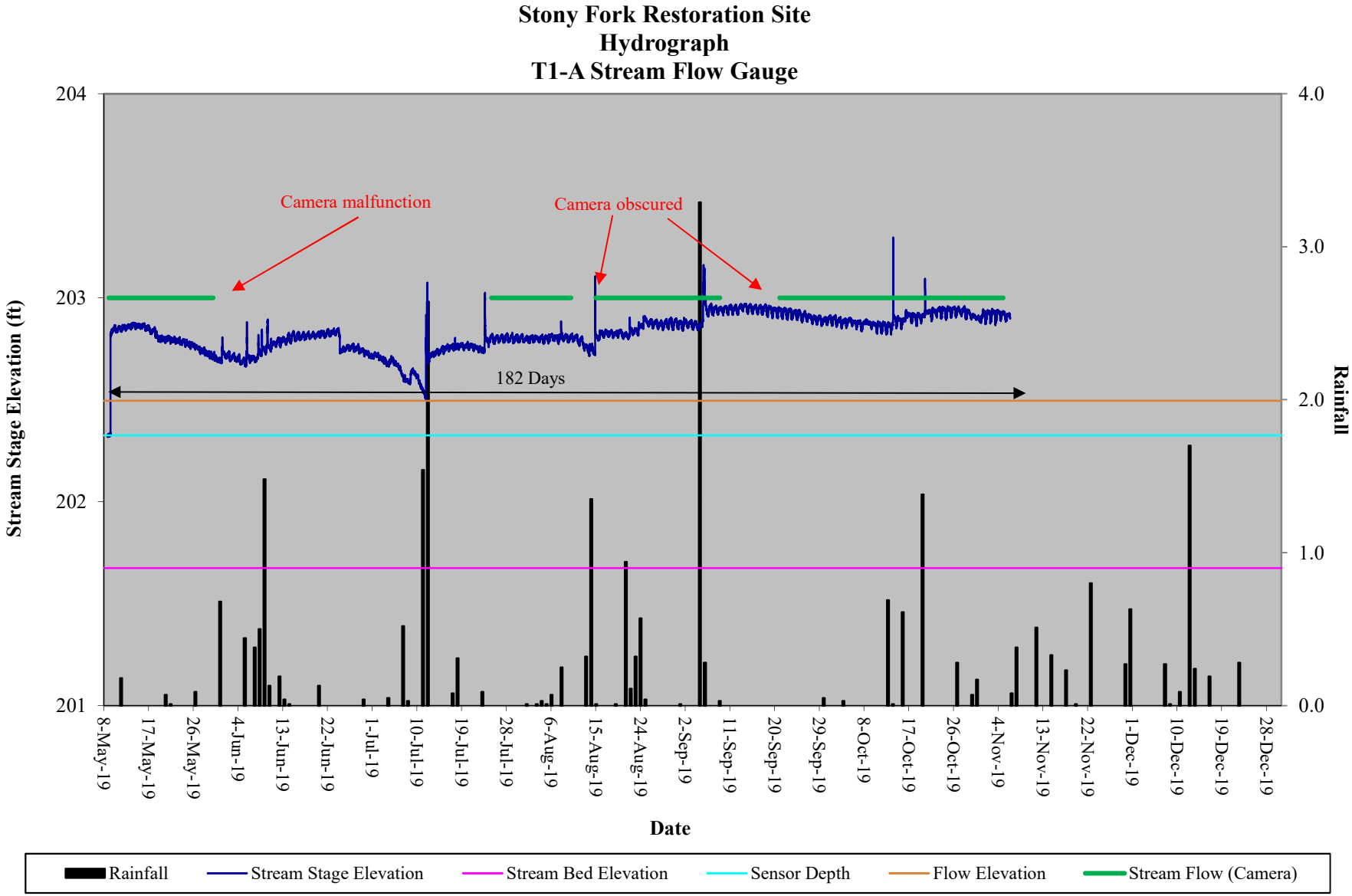
T2 – 8/30/2019

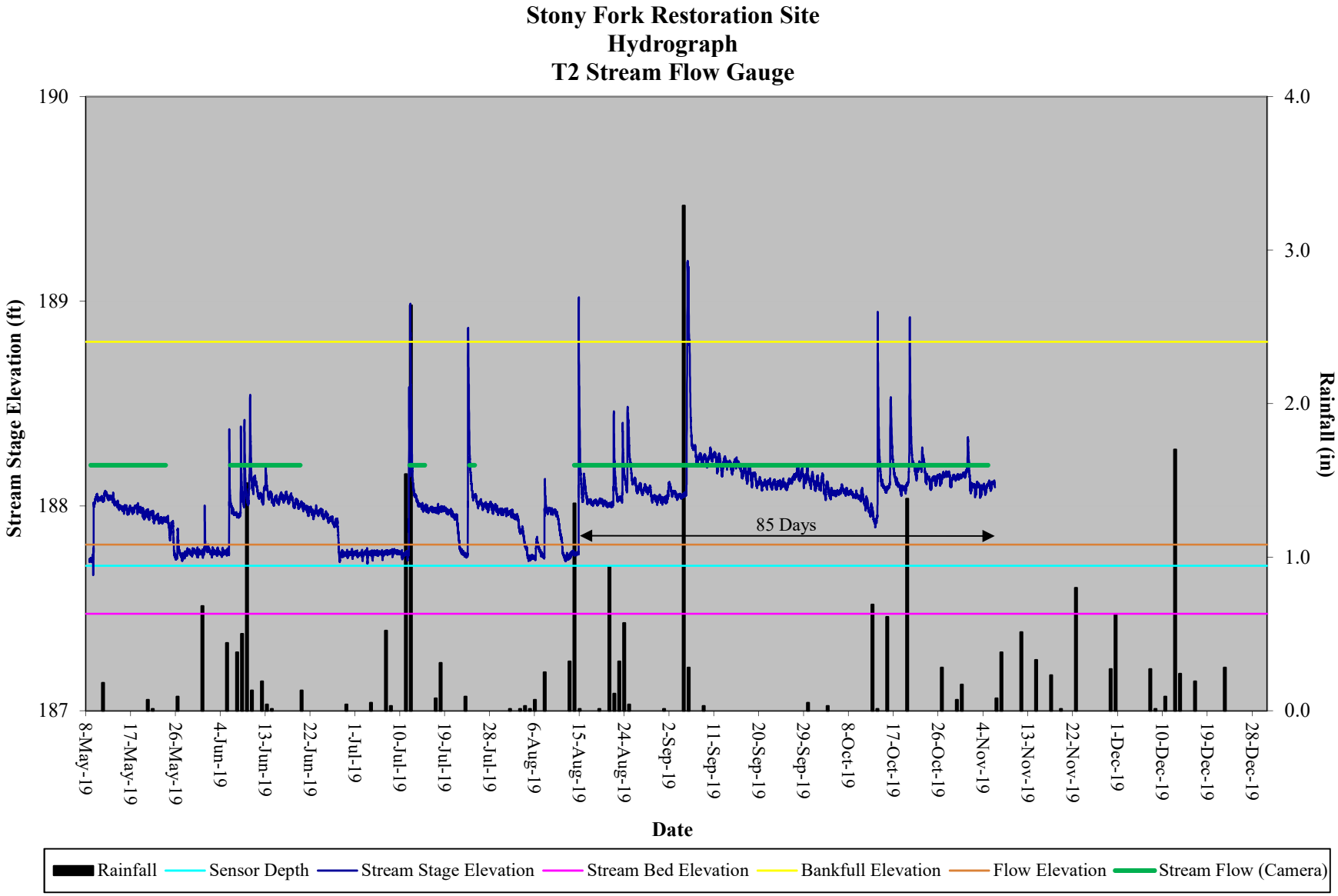
T2 – 10/16/2019

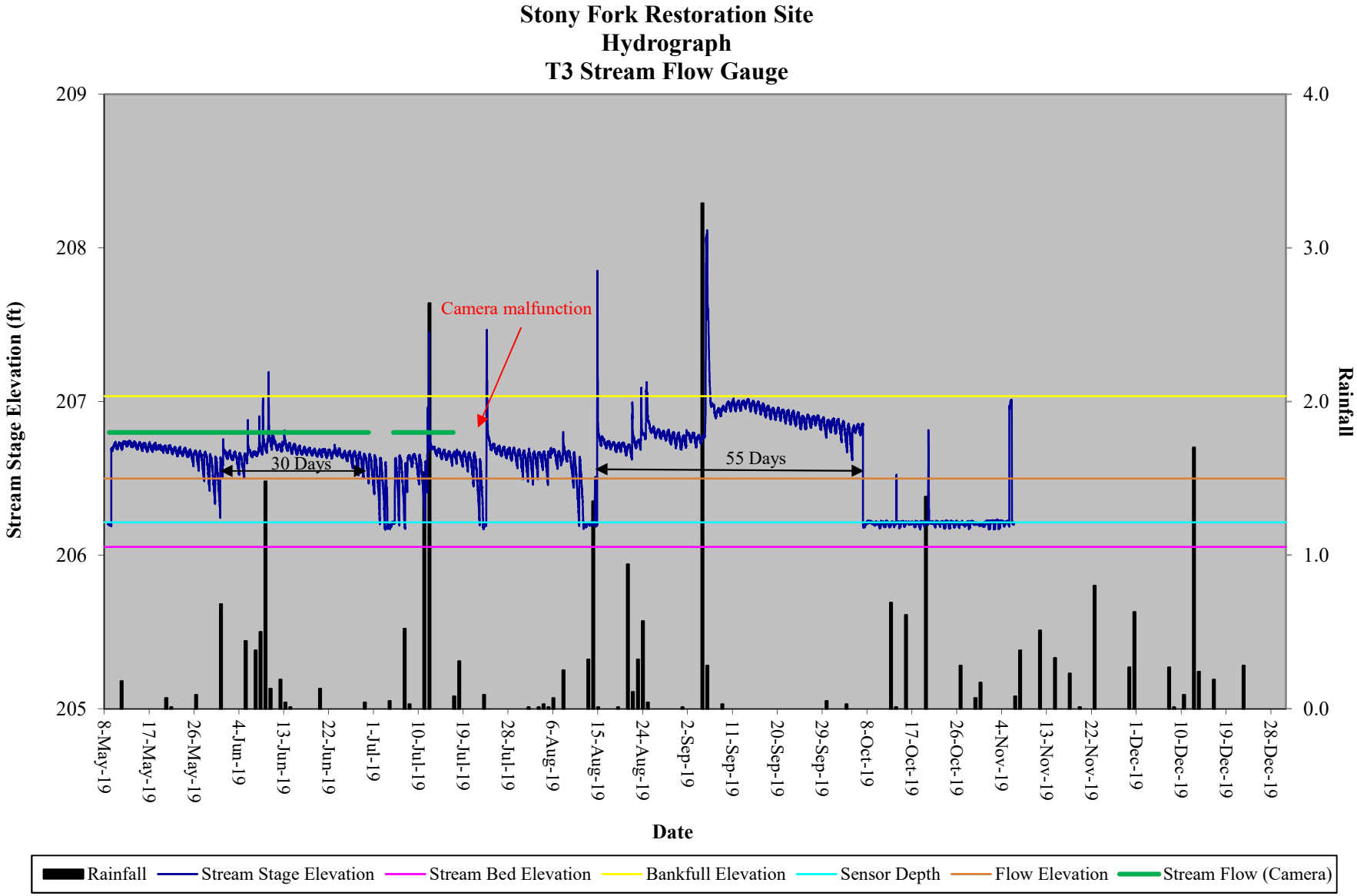
T3 – 5/9/2019

T3 – 6/30/2019


Stony Fork Restoration Site
Hydrograph
T1 Stream Flow Gauge
Stream Stage Elevation (ft)
Rainfall (in)
205
204
203
4.0
3.0
2.0
1.0
0.0
Camera
installed
July 25, 2019
Camera obscured
60 Days
8-May-19
17-May-19
26-May-19
4-Jun-19
13-Jun-19
22-Jun-19
1-Jul-19
10-Jul-19
19-Jul-19
28-Jul-19
6-Aug-19
15-Aug-19
24-Aug-19
2-Sep-19
11-Sep-19
20-Sep-19
29-Sep-19
8-Oct-19
17-Oct-19
26-Oct-19
4-Nov-19
13-Nov-19
22-Nov-19
1-Dec-19
10-Dec-19
19-Dec-19
28-Dec-19
Date
Rainfall
Sensor Elevation
Flow Elevation
Stream Flow (Camera)
Stream Stage Elevation
Stream Bed Elevation


Stony Fork Restoration Site
Hydrograph
T1-A Stream Flow Gauge
Stream Stage Elevation (ft)
Rainfall
Date
Camera malfunction
Camera obscured
182 Days
204
203
202
201
4.0
3.0
2.0
1.0
0.0
8-May-19
17-May-19
26-May-19
4-Jun-19
13-Jun-19
22-Jun-19
1-Jul-19
10-Jul-19
19-Jul-19
28-Jul-19
6-Aug-19
15-Aug-19
24-Aug-19
2-Sep-19
11-Sep-19
20-Sep-19
29-Sep-19
8-Oct-19
17-Oct-19
26-Oct-19
4-Nov-19
13-Nov-19
22-Nov-19
1-Dec-19
10-Dec-19
19-Dec-19
28-Dec-19
Rainfall
Stream Stage Elevation
Stream Bed Elevation
Sensor Depth
Flow Elevation
Stream Flow (Camera)


Stony Fork Restoration Site
Hydrograph
T2 Stream Flow Gauge
Stream Stage Elevation (ft)
Rainfall (in)
190
189
188
187
4.0
3.0
2.0
1.0
0.0
85 Days
8-May-19
17-May-19
26-May-19
4-Jun-19
13-Jun-19
22-Jun-19
1-Jul-19
10-Jul-19
19-Jul-19
28-Jul-19
6-Aug-19
15-Aug-19
24-Aug-19
2-Sep-19
11-Sep-19
20-Sep-19
29-Sep-19
8-Oct-19
17-Oct-19
26-Oct-19
4-Nov-19
13-Nov-19
22-Nov-19
1-Dec-19
10-Dec-19
19-Dec-19
28-Dec-19
Date
Rainfall
Sensor Depth
Stream Stage Elevation
Stream Bed Elevation
Bankfull Elevation
Flow Elevation
Stream Flow (Camera)


Stony Fork Restoration Site
Hydrograph
T3 Stream Flow Gauge
Stream Stage Elevation (ft)
Rainfall
Date
209
208
207
206
205
4.0
3.0
2.0
1.0
0.0
Camera malfunction
30 Days
55 Days
8-May-19
17-May-19
26-May-19
4-Jun-19
13-Jun-19
22-Jun-19
1-Jul-19
10-Jul-19
19-Jul-19
28-Jul-19
6-Aug-19
15-Aug-19
24-Aug-19
2-Sep-19
11-Sep-19
20-Sep-19
29-Sep-19
8-Oct-19
17-Oct-19
26-Oct-19
4-Nov-19
13-Nov-19
22-Nov-19
1-Dec-19
10-Dec-19
19-Dec-19
28-Dec-19
Rainfall
Stream Stage Elevation
Stream Bed Elevation
Bankfull Elevation
Sensor Depth
Flow Elevation
Stream Flow (Camera)