Monitoring Report MY05

Stony Fork Restoration Site
Upper Neuse River Basin - 03020201
Monitoring Year 05
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: 2023
Date Submitted: January 2024

Monitoring and Design Firm

Prepared by:

KCI Associates of North Carolina
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Suite 400
Raleigh, NC 27609
(919) 783-9214

Project Contact: Adam Spiller
Email: adam.spiller@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 26, 2024
To: Danielle Mir, DMS Project Manager
From: Adam Spiller, Project Manager
KCI Associates of North Carolina, PA
Subject: MY-05 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-05 Monitoring Report comments from NCDMS received on February 14, 2024 for the Stony Fork Restoration Site.

1. Table 1 - Please display credits to 3-decimal places.
   KCI Response: This error has been corrected.

2. CCPV – DMS recommends showing the non-credited streams inside the easement with a symbology of a grey /black line labeled "non-credited stream." Below is a rough sketch of the estimated locations of these streams.
   KCI Response: At the start of the project, the features in question were determined to not constitute streams. These ephemeral drains were stabilized as part of the project and have been added to the CCPV and labeled "Stabilized Drainages."

3. A thick patch of pines is starting to grow downstream of the external crossing (Sherill Farm Dr) on SF2. Please keep an eye on it and thin it if necessary.
   KCI Response: KCI will monitor the pine and other nuisance vegetation on site and treat as necessary.

4. Mature privet was found sparsely throughout the project. Please continue treatment.
   KCI Response: KCI will continue to monitor and treat invasives as necessary.

Sincerely,

Adam Spiller
Project Manager

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Appendix D – Stream Measurement and Geomorphology Data

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 automatic 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 automatic 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 in MY00-03 and were discontinued starting in MY05. 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 fifth-year vegetation monitoring was conducted between August 16 and 17, 2023. The site averaged 482 planted stems/acre across all 12 plots. All twelve of the plots had greater than 260 planted stems/acre. Including volunteers, the site averaged 1,143 total stems/acre. All the plots met the success criteria. In general, the site is well vegetated, with widespread herbaceous coverage and many healthy planted stems. Ongoing treatment of Chinese privet and kudzu continued in MY05. These treatments have been repeated several times during the growing season in each year since the site was constructed and will be continued throughout the monitoring period.

The stream gauge near the bottom of SF3 recorded three bankfull events in 2023. All four stream flow gauges recorded at least 30 consecutive days of flow. The gauge on T1 recorded flow for a maximum of 140 days. The gauge on T1A recorded flow for a maximum of 174 days and the gauges on T2 and T3 recorded flow for a maximum of 85 days and 157 consecutive days, respectively. The data from the flow gauges was further backed up by the cameras on site. The cameras on T1 and T1A showed flow for a maximum of 40 and 167 days, respectively. The cameras on T2 and T3 showed flow for a maximum of 74 days and 104 days respectively. Differences in the number of days recorded by the cameras and the gauges are largely due to periods of time when the cameras become obscured by vegetation during the growing season or low flow that was not picked up by the gauges.

The fifth-year cross-section survey was completed between July 19 and 24, 2023 and found that for the majority of the site, the dimensions of the stream are as designed, with some small variation as is typical for stream restoration projects. Both of the cross-sections on T3 (XS9 and 10) show significant levels of aggradation. Since only the bottom 129 feet of this stream are located within the bounds of the project, there is a large sediment source in the form of heavily eroding banks and headcuts just upstream from the project reach. This issue is further compounded by the small size of this reach compared to SF1, which it flows into. When SF1 experiences an overbank event, sediment that is deposited on the floodplain is also deposited in T3. This combined with the upstream sediment source has led to large amounts of sediment

being processed through this small reach and has caused the channel alignment to shift slightly. Despite this shift, the stream is still functioning as a stream with a defined bed and bank and has been processing the accumulated sediment. Please see Appendix B – Visual Assessment Data for photos of this reach and Appendix E – Hydrologic Data for a detailed record of the flow in this reach in 2023.

At a site visit on November 18, 2021, it was noted that an outlet from a sediment retention pond had been dug through the site easement and to the project stream. This encroachment occurred on the right bank, approximately 150 feet upstream of the crossing on Reach SF2. Upon noticing this encroachment, KCI immediately notified the developer responsible as well as the responsible agencies. The outlet and sediment pond were filled in and on May 5, 2022 the area inside the easement that had been impacted was planted with 29 one-gallon containerized trees. Please see Appendix C – Vegetation Data for a list of the species and quantity planted in this area. In addition to the above violation, several property owners in the Sherrill Farms Phase 1 subdivision have stored vehicles and a trampoline within the easement. Sherrill Farms LLC was contacted about these encroachments in 2018, 2019, and 2021. In early 2022, a fence was installed along the easement boundary where these encroachments were occurring.

KCI has been monitoring the encroachment area since it was first noted in MY03. This area was replanted in 2022 with gallon size containerized trees and has been revegetating well since then. No further signs of encroachment have been noted in this area. This area, as well as the rest of the boundary will continue to be monitored for any signs of encroachment. The site boundaries were inspected on December 7, 2023. During this inspection, several signs that had come off their posts were noted. Two areas of scalloping were also noted. The first of these is located just downstream of the confluence of T1 and the main stem and was 0.006 acres in size. The second is located at the very end of the project and was 0.059 acres in size. KCI is in contact with the landowners about these encroachments and will be installing additional easement markings in these areas, as well as repairing the other damaged signs.

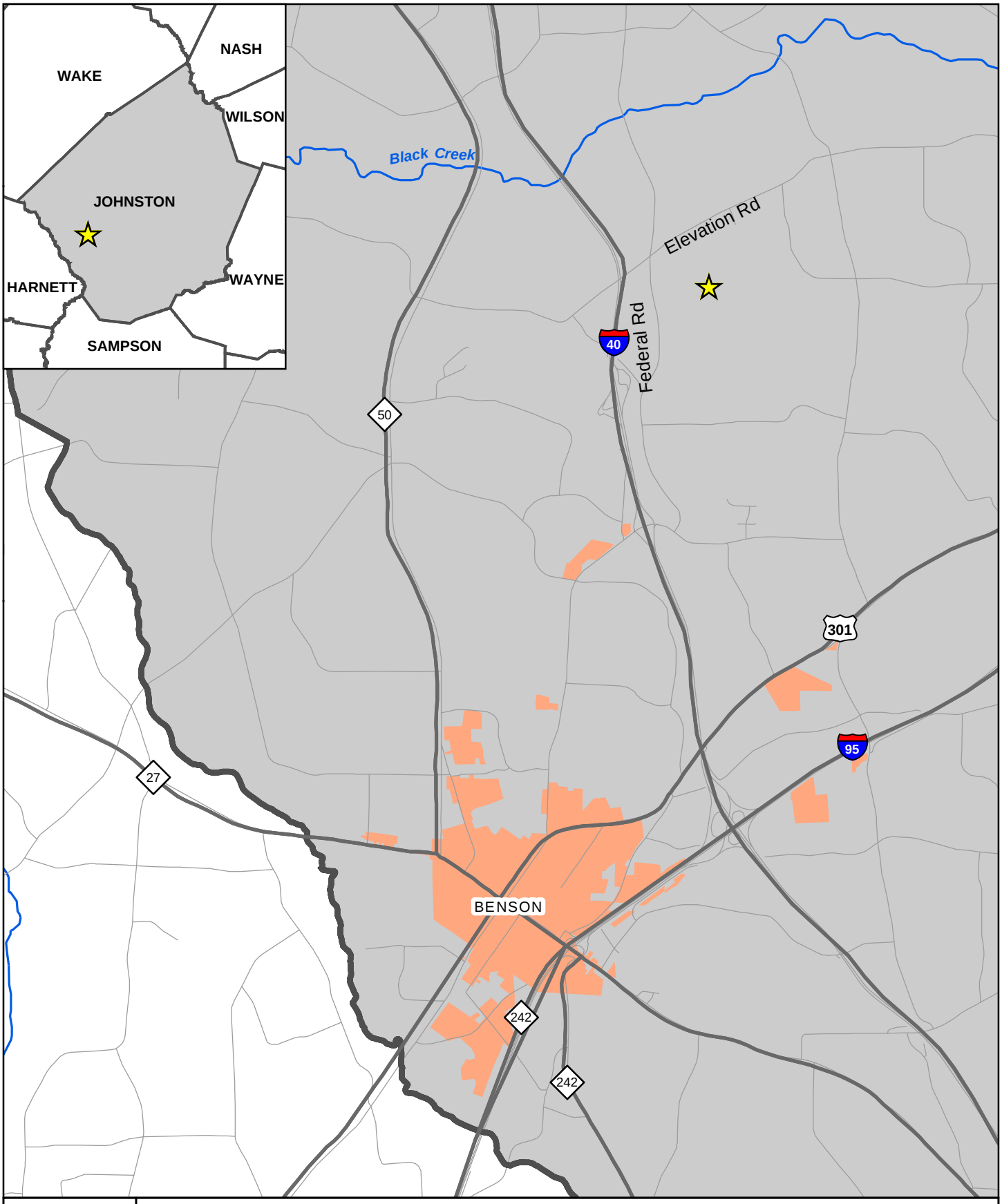

FIGURE 1. VICINITY MAP, STONY FORK RESTORATION SITE, JOHNSTON COUNTY, NC

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

NCDEQ, Division of Mitigation Services. March 2015. 2015 Neuse 03020201 Priorities. Last accessed at: http://portal.ncdenr.org/c/document_library/get_file?uuid=340a3f58-336b-42bf-bab2-fb663cbfd78d&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 Johnston County, North Carolina*. 1994

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	**6,585.933**						**480,337.942**			

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	6,585.933				480,337.942

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*	
Invasive Treatment		Summer 2019
Year 1 Monitoring	November 2019	January 2020
Vegetation Monitoring	*November 5, 2019*	
Stream Survey	*November 11, 2019*	
Invasive Treatment		Summer 2020
Year 2 Monitoring	November 2020	January 2021
Vegetation Monitoring	*September 4, 2020*	
Stream Survey	*June 29, 2020*	
Invasive Treatment		Summer 2021
Year 3 Monitoring	November 2021	December 2021
Vegetation Monitoring	*August 30, 2021*	
Stream Survey	*August 30, 2021*	
Year 4 Monitoring	December 2022	January 2023
Year 5 Monitoring	December 2023	January 2024
Vegetation Monitoring	*August 17, 2023*	
Stream Survey	*July 24, 2021*	

Table 3. Project Contacts **Stony Fork Restoration Site, DMS Project #97085**	
Design Firm	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
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. Kevin O'Briant Phone: (919) 278-2516
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 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

Project Easement

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)*

Stabilized Drainages
Easement Encroachment
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

T1
T1A
T2-1
T2-2
T2-3
T3-1
T3-2
SF1
SF2
SF3

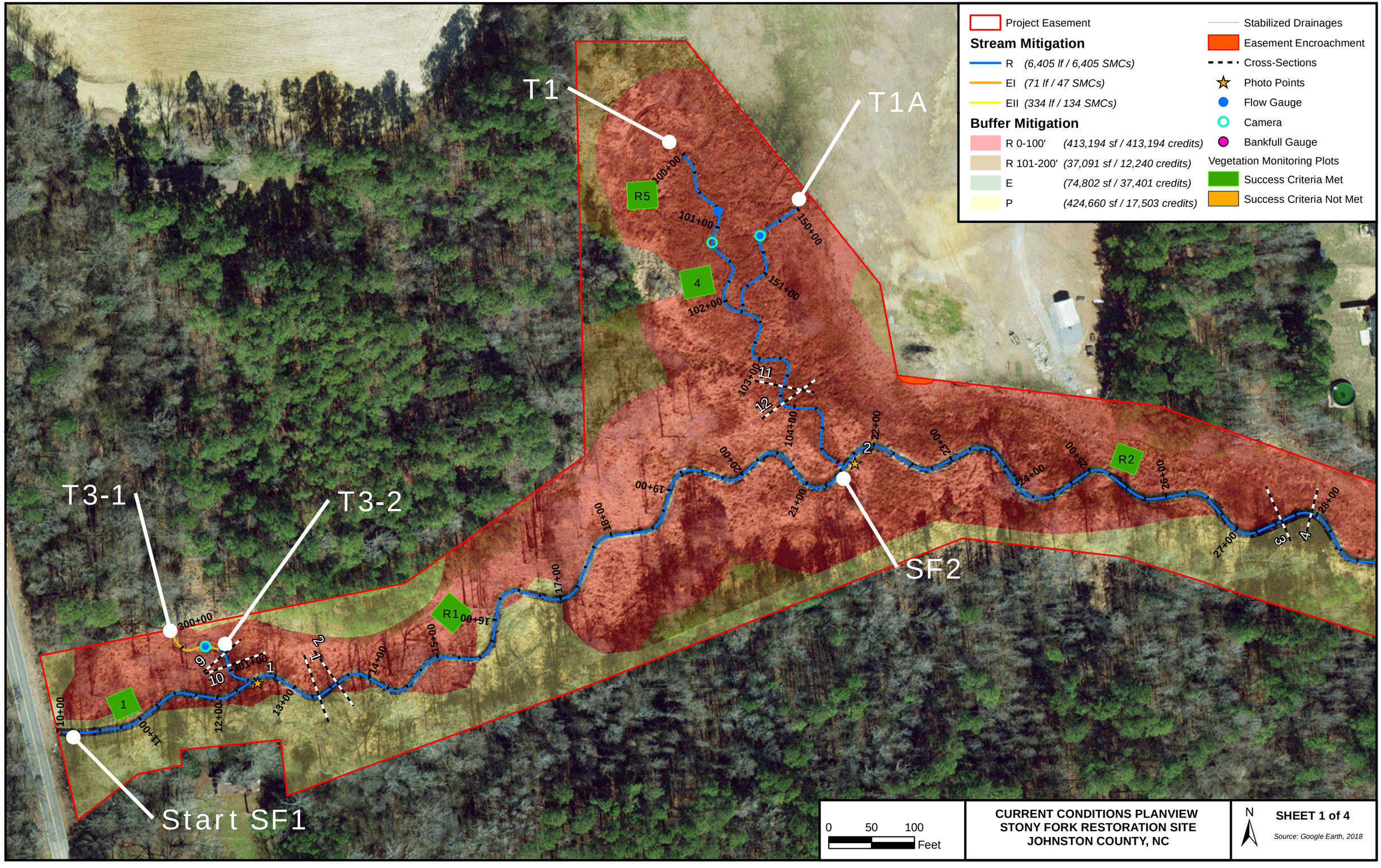
0 150 300 Feet

CURRENT CONDITIONS PLANVIEW
STONY FORK RESTORATION SITE
JOHNSTON COUNTY, NC

N

Overview

Source: Google Earth, 2018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STONY FORK RESTORATION SITE
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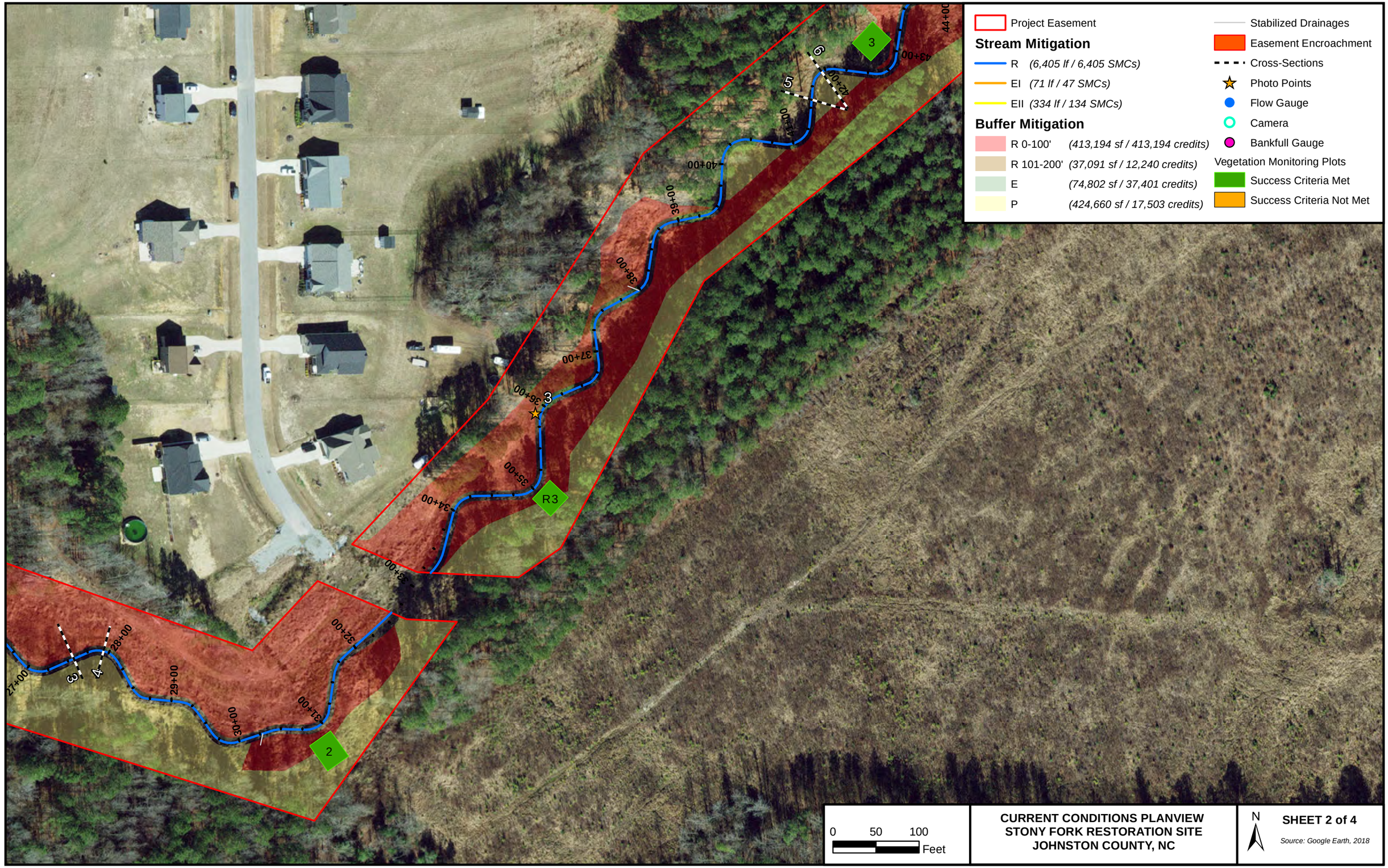
Source: Google Earth, 2018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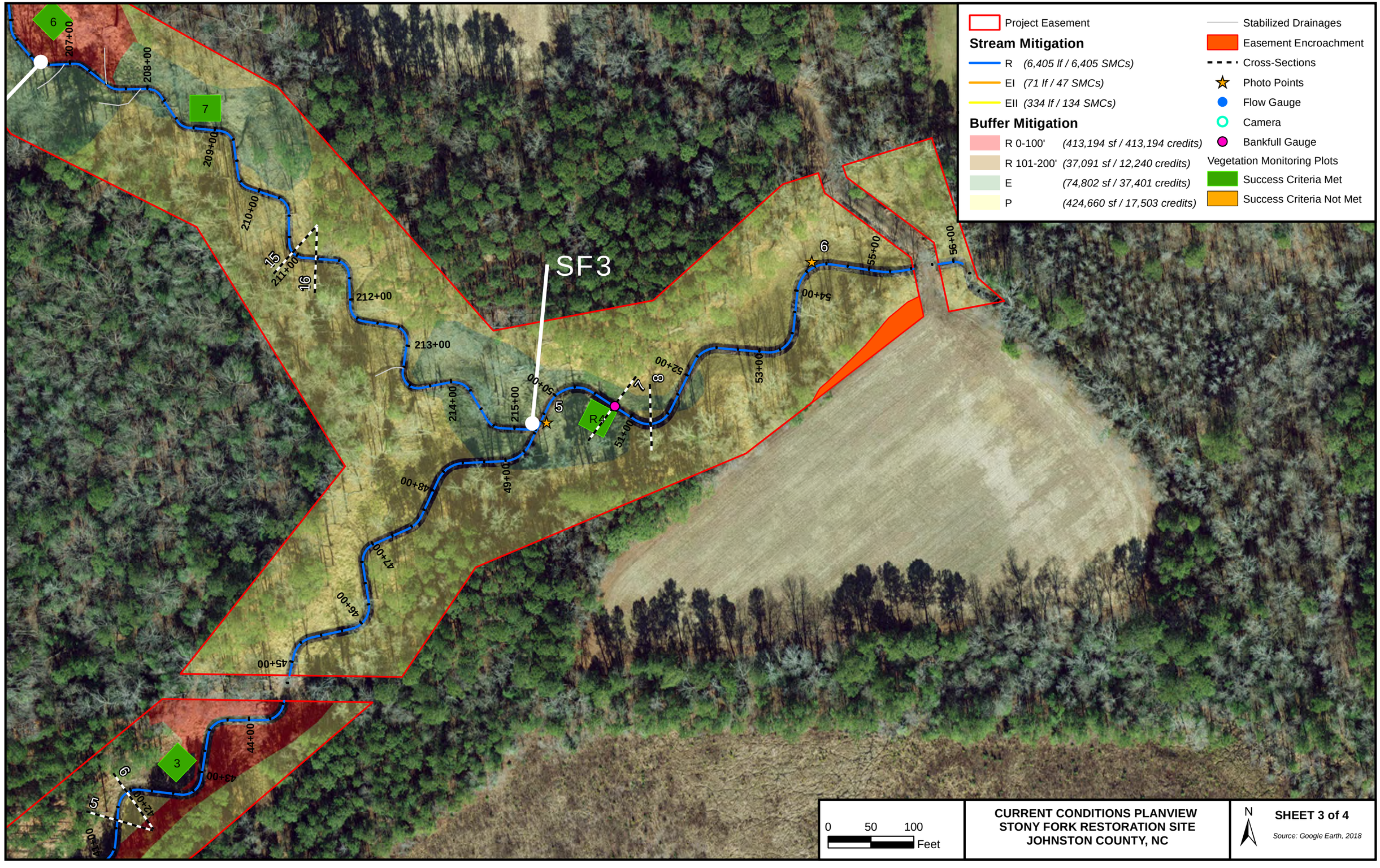
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CURRENT CONDITIONS PLANVIEW
STONY FORK RESTORATION SITE
JOHNSTON COUNTY, NC
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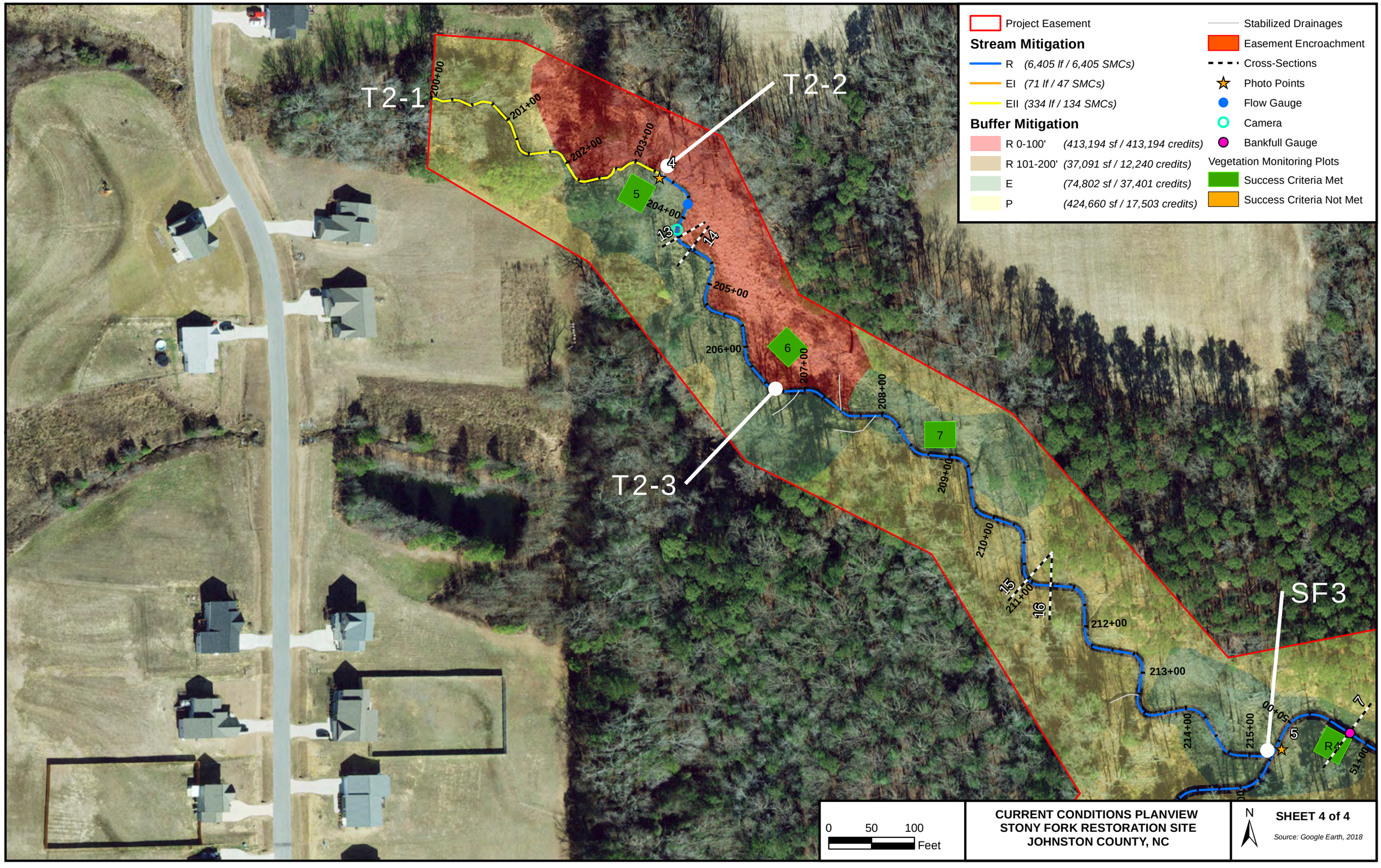
Source: Google Earth, 2018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Buffer Mitigation
R 0-100' (413,194 sf / 413,194 credits)
R 101-200' (37,091 sf / 12,240 credits)
E (74,802 sf / 37,401 credits)
P (424,660 sf / 17,503 credits)
Stabilized Drainages
Easement Encroachment
Cross-Sections
Photo Points
Flow Gauge
Camera
Bankfull Gauge
Vegetation Monitoring Plots
Success Criteria Met
Success Criteria Not Met
0 50 100
Feet
CURRENT CONDITIONS PLANVIEW
STONY FORK RESTORATION SITE
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)			1	93	40%
		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)	0	2			0%
		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	2	0.07	0.7%

Photo Reference Photos

PP1U – MY-00 – 5/15/19

PP1U – MY-05 – 12/7/23

PP1D – MY-00 – 5/15/19

PP1D – MY-05 – 12/7/23

PP2U – MY-00 – 5/15/19

PP2U – MY-05 – 12/7/23

PP2D – MY-00 – 5/15/19

PP2D – MY-05 – 12/7/23

PP3U – MY-00 – 5/15/19

PP3U – MY-05 – 12/7/23

PP3D – MY-00 – 5/15/19

PP3D – MY-05 – 12/7/23

PP4U – MY-00 – 5/15/19

PP4U – MY-05 – 12/7/23

PP4D – MY-00 – 5/15/19

PP4D – MY-05 – 12/7/23

PP5U – MY-00 – 5/15/19

PP5U – MY-05 – 12/7/23

PP5D – MY-00 – 5/15/19

PP5D – MY-05 – 12/7/23

PP6U – MY-00 – 5/15/19

PP6U – MY-05 – 12/7/23

PP6D – MY-00 – 5/15/19

PP6D – MY-05 – 12/7/23

Permanent Vegetation Monitoring Plot Photos

Vegetation Plot 1 – MY-00 – 5/15/19

Vegetation Plot 1 – MY-05 – 8/16/23

Vegetation Plot 2 – MY-00 – 5/15/19

Vegetation Plot 2 – MY-05 – 8/16/23

Vegetation Plot 3 – MY-00 – 5/15/19

Vegetation Plot 3 – MY-05 – 8/17/23

Vegetation Plot 4 – MY-00 – 5/15/19

Vegetation Plot 4 – MY-05 – 8/16/23

Vegetation Plot 5 – MY-00 – 5/15/19

Vegetation Plot 5 – MY-05 – 8/17/23

Vegetation Plot 6 – MY-00 – 5/15/19

Vegetation Plot 6 – MY-05 – 8/17/23

Vegetation Plot 7 – MY-00 – 5/15/19

Vegetation Plot 7 – MY-05 – 8/17/23

Random Vegetation Monitoring Plot Photos

Vegetation Plot R1 – MY-05 – 8/16/23

Vegetation Plot R2 – MY-05 – 8/16/23

Vegetation Plot R3 – MY-05 – 8/17/23

Vegetation Plot R4 – MY-05 – 8/17/23

Vegetation Plot R5 – MY-05 – 8/16/23

Easement Encroachment Area Photos

Scalloping near the bottom of the site, with approximate easement line – 12/7/23

APPENDIX C

Vegetation Plot Data

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

	Current Plot Data (MY05 2023)													
	Plot 01		Plot 02		Plot 03		Plot 04		Plot 05		Plot 06		Plot 7	
Species	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**
American Elm (*Ulmus americana*)								2						
American Holly (*Illex opaca*)														
American Persimmon (*Diospyros virginiana*)														
American Sycamore (*Platanus occidentalis*)	4	4	4	4	1	1	2	2	1	1	3	3	1	1
Bald Cypress (*Taxodium distichum*)							1	1					5	5
Black Willow (*Salix nigra*)		4									3	3	1	1
Eastern Baccharis (*Baccharis halimifolia*)								1						
Elderberry (*Sambucus canadensis*)									4	4				
Green Ash (*Fraxinus pennsylvanica*)	2	2	4	4	4	4								
Loblolly Pine (*Pinus taeda*)		40		7		1		11						4
Oak (*Quercus sp.*)														
Pawpaw (*Asimina triloba*)														
Pin Oak (*Quercus palustris*)	3	3	2	2			1	1			1	1		
Red Maple (*Acer rubrum*)		1						1		2				
Red Oak (*Quercus rubra*)														
River Birch (*Betula nigra*)		2	1	1	1	1	1	1	1	1	2	2	1	1
Silky Dogwood (*Cornus amomum*)							5	5	1	1			1	1
Spicebush (*Lindera benzoin*)														
Sugar Berry (*Celtis laevigata*)														
Swamp Chestnut Oak (*Quercus michauxii*)	2	2									1	1	1	1
Sweet Bay (*Magnolia virginiana*)										1				
Sweetgum (*Liquidambar styraciflua*)		8		4		13		2						6
Tulip Poplar (*Liriodendron tulipifera*)		10		1	1	1					1	1		
Water Oak (*Quercus nigra*)					1	1								
Wax Myrtle (*Myrica cerifera*)		1		1										
White Oak (*Quercus alba*)									3	3			1	1
Winged Sumac (*Rhus copallinum*)				7										
Willow Oak (*Quercus phellos*)	1	3	1	1	3	3	6	6			1	1	1	1
Unknown														
Stem count	12	80	12	32	11	25	16	33	10	13	12	12	12	22
size (ares)	1		1		1		1		1		1		1	
size (ACRES)	0.02		0.02		0.02		0.02		0.02		0.02		0.02	
Species count	5	12	5	10	6	8	6	11	5	7	7	7	8	10
Stems per ACRE	486	3,237	486	1,295	445	1,012	647	1,335	405	526	486	486	486	890

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

	Current Plot Data (MY05 2023)									
	Plot R1		Plot R2		Plot R3		Plot R4		Plot R5	
Species	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**
American Elm (*Ulmus americana*)								2		2
American Holly (*Illex opaca*)										1
American Persimmon (*Diospyros virginiana*)									3	3
American Sycamore (*Platanus occidentalis*)	4	4	3	3	6	6	5	5		
Bald Cypress (*Taxodium distichum*)									1	1
Black Willow (*Salix nigra*)			3	3	3	3	1	1		
Eastern Baccharis (*Baccharis halimifolia*)										
Elderberry (*Sambucus canadensis*)							1	1	2	2
Green Ash (*Fraxinus pennsylvanica*)	2	2	5	5	5	5	4	4		
Loblolly Pine (*Pinus taeda*)				18		1				3
Oak (*Quercus sp.*)										
Pawpaw (*Asimina triloba*)										
Pin Oak (*Quercus palustris*)	1	1			1	1			1	1
Red Maple (*Acer rubrum*)						2				2
Red Oak (*Quercus rubra*)										
River Birch (*Betula nigra*)	1	1	5	5	1	1	9	9		
Silky Dogwood (*Cornus amomum*)									1	1
Spicebush (*Lindera benzoin*)										
Sugar Berry (*Celtis laevigata*)										
Swamp Chestnut Oak (*Quercus michauxii*)	1	1					1	1		
Sweet Bay (*Magnolia virginiana*)										
Sweetgum (*Liquidambar styraciflua*)		1		12		1		1		3
Tulip Poplar (*Liriodendron tulipifera*)										
Water Oak (*Quercus nigra*)										
Wax Myrtle (*Myrica cerifera*)										
White Oak (*Quercus alba*)									1	1
Winged Sumac (*Rhus copallinum*)										
Willow Oak (*Quercus phellos*)			1	1					1	1
Unknown										
Stem count	9	10	17	47	16	20	21	24	10	21
size (ares)	1		1		1		1		1	
size (ACRES)	0.02		0.02		0.02		0.02		0.02	
Species count	5	6	5	7	5	8	6	8	7	12
Stems per ACRE	364	405	688	1,902	647	809	850	971	405	850

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

	Annual Means									
	MY05 (2023)		MY03 (2021)		MY02 (2020)		MY01 (2019)		MY00 (2019)	
Species	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**	**Planted**	**Total**
American Elm (*Ulmus americana*)		6				3				
American Holly (*Illex opaca*)		1		1						
American Persimmon (*Diospyros virginiana*)	3	3			2	2	4	4		
American Sycamore (*Platanus occidentalis*)	34	34	37	37	43	44	40	40	9	9
Bald Cypress (*Taxodium distichum*)	7	7	5	5	5	5	7	7	1	1
Black Willow (*Salix nigra*)	11	15	1	7	2	6		2		
Eastern Baccharis (*Baccharis halimifolia*)		1								
Elderberry (*Sambucus canadensis*)	7	7		4		3	1	1	2	2
Green Ash (*Fraxinus pennsylvanica*)	26	26	37	37	31	31	25	25	29	29
Loblolly Pine (*Pinus taeda*)		85		13		30	2	2		
Oak (*Quercus sp.*)							1	1	18	18
Pawpaw (*Asimina triloba*)				2						
Pin Oak (*Quercus palustris*)	10	10	9	9	11	11	7	7	3	3
Red Maple (*Acer rubrum*)		8		6		5	4	11		2
Red Oak (*Quercus rubra*)							2	2		
River Birch (*Betula nigra*)	23	25	13	14	27	27	17	17	2	2
Silky Dogwood (*Cornus amomum*)	8	8	7	7	10	10	8	8	10	10
Spicebush (*Lindera benzoin*)				1						
Sugar Berry (*Celtis laevigata*)									2	2
Swamp Chestnut Oak (*Quercus michauxii*)	6	6	6	6	5	5	7	7	7	7
Sweet Bay (*Magnolia virginiana*)		1		1		1		1		1
Sweetgum (*Liquidambar styraciflua*)		51		20		11	2	8		
Tulip Poplar (*Liriodendron tulipifera*)	2	13	11	12	6	8	14	20	14	14
Water Oak (*Quercus nigra*)	1	1							1	1
Wax Myrtle (*Myrica cerifera*)		2		2		1				
White Oak (*Quercus alba*)	5	5	4	5	5	6	12	15	1	4
Winged Sumac (*Rhus copallinum*)		7								
Willow Oak (*Quercus phellos*)	15	17	19	19	23	23	30	30	3	3
Unknown							4	4	199	199
Stem count	158	339	149	208	170	232	187	212	301	307
size (ares)	12		12		12		12		12	
size (ACRES)	0.30		0.30		0.30		0.30		0.30	
Species count	14	23	11	20	12	19	18	20	15	17
Stems per ACRE	533	1,143	502	701	573	782	631	715	1,015	1,035

APPENDIX D

Stream Measurement and Geomorphology Data

Table 8. 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	MY5	MY7	MY+	Base	MY1	MY2	MY3	MY5	MY7	MY+	Base	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) based on AB BKF area	206.8	206.7	206.7	206.6	206.8			206.6	206.6	206.6	206.6	206.6			192.5	192.5	192.4	192.6	192.5		
Bankfull Width (ft)	12.6	11.7	11.6	8.0	10.8			9.3	11.0	10.2	11.3	10.2			12.6	11.9	12.5	12.5	13.0		
Floodprone Width (ft)	-	-	-	-	-			>80	>80	>80	>80	>80			53.3	53.2	50.1	52.7	55.4		
Bankfull Mean Depth (ft)	0.9	1.0	1.0	1.4	1.1			0.8	0.6	0.7	0.6	0.7			1.0	1.0	1.0	1.0	1.0		
Bankfull Max Depth (ft)	1.9	2.0	2.1	2.3	2.2			1.2	1.1	1.3	1.3	1.3			1.6	1.7	1.5	1.5	1.6		
Cross-Sectional Area (ft^2) based on AB BKF area	11.5	11.5	11.5	11.5	11.5			7.0	7.0	7.0	7.0	7.0			12.5	12.5	12.5	12.5	12.5		
Cross-Sectional Area (ft^2) based on AB BKF elevation	11.5	11.9	12.1	12.9	11.1			7.0	7.1	6.8	6.4	6.5			12.5	13.2	13.8	11.6	12.9		
Bankfull Width/Depth Ratio	-	-	-	-	-			12.2	17.3	14.8	18.3	14.9			12.8	11.4	12.6	12.5	13.5		
Bankfull Entrenchment Ratio	-	-	-	-	-			8.7	7.2	8.0	7.2	7.9			4.2	4.5	4.0	4.2	4.3		
Bankfull Bank Height Ratio	-	-	-	-	-			1.0	0.9	1.0	0.8	0.8			1.0	1.0	1.0	0.9	1.0		
d50 (mm)	-	-	-	-	-			22	32	24	48	-			38	46	20	69	-		
	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	MY5	MY7	MY+	Base	MY1	MY2	MY3	MY5	MY7	MY+	Base	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) based on AB BKF area	192.0	191.9	191.9	191.9	192.0			182.1	182.2	182.2	182.3	182.2			181.7	181.8	181.7	181.7	181.6		
Bankfull Width (ft)	12.5	13.0	12.4	12.7	14.2			12.2	13.6	13.2	14.2	13.2			12.0	13.1	11.5	11.2	10.3		
Floodprone Width (ft)	-	-	-	-	-			>80	>80	>80	>80	>80			-	-	-	-	-		
Bankfull Mean Depth (ft)	1.1	1.1	1.1	1.1	1.0			0.9	0.8	0.8	0.7	0.8			1.2	1.1	1.3	1.3	1.4		
Bankfull Max Depth (ft)	1.9	2.1	2.1	2.2	2.0			1.4	1.3	1.3	1.4	1.4			2.4	2.4	2.5	2.4	2.4		
Cross-Sectional Area (ft^2) based on AB BKF area	13.6	13.6	13.6	13.6	13.6			10.6	10.6	10.6	10.6	10.6			14.5	14.5	14.5	14.5	14.5		
Cross-Sectional Area (ft^2) based on AB BKF elevation	13.6	14.5	15.2	14.6	13.8			10.6	10.1	9.3	8.2	9.8			14.5	14.3	15.2	15.0	16.2		
Bankfull Width/Depth Ratio	-	-	-	-	-			14.1	17.4	16.4	19.1	16.5			-	-	-	-	-		
Bankfull Entrenchment Ratio	-	-	-	-	-			6.6	5.9	6.1	5.7	6.1			-	-	-	-	-		
Bankfull Bank Height Ratio	-	-	-	-	-			1.0	1.0	1.0	0.9	1.0			-	-	-	-	-		
d50 (mm)	-	-	-	-	-			52	44	25	36	-			-	-	-	-	-		

Table 8. 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	MY5	MY7	MY+	Base	MY1	MY2	MY3	MY5	MY7	MY+	Base	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) based on AB BKF area	176.0	176.0	176.0	176.0	176.0			175.3	175.2	175.2	175.3	175.1			207.0	206.9	207.3	207.8	207.8		
Bankfull Width (ft)	11.6	13.4	14.2	13.9	15.3			13.5	14.5	15.7	11.4	13.6			5.5	5.9	8.2	5.5	8.5		
Floodprone Width (ft)	>90	>90	>90	>90	>90			-	-	-	-	-			-	-	-	-	-		
Bankfull Mean Depth (ft)	1.1	1.0	0.9	0.9	0.8			1.5	1.4	1.3	1.8	1.5			0.7	0.6	0.4	0.7	0.4		
Bankfull Max Depth (ft)	1.7	1.6	1.8	1.6	1.6			2.7	2.7	2.5	2.8	2.6			1.1	1.1	0.8	0.8	0.7		
Cross-Sectional Area (ft^2) based on AB BKF area	12.8	12.8	12.8	12.8	12.8			20.7	20.7	20.7	20.7	20.7			3.7	3.7	3.7	3.7	3..7		
Cross-Sectional Area (ft^2) based on AB BKF elevation	12.8	13.2	13.3	13.0	12.7			20.7	21.4	21.5	20.0	22.9			3.7	4.0	2.0	0.0	0.0		
Bankfull Width/Depth Ratio	10.4	14.0	15.7	15.0	18.3			-	-	-	-	-			-	-	-	-	-		
Bankfull Entrenchment Ratio	8.0	6.8	6.5	6.6	5.9			-	-	-	-	-			-	-	-	-	-		
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.0	0.9			-	-	-	-	-			-	-	-	-	-		
d50 (mm)	16	29	41	65	-			-	-	-	-				-	-	-	-	-		

	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	MY5	MY7	MY+	Base	MY1	MY2	MY3	MY5	MY7	MY+	Base	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) based on AB BKF area	207.1	207.1	207.2	207.3	207.4			198.4	198.3	198.3	198.3	198.3			198.4	198.3	198.3	198.4	198.5		
Bankfull Width (ft)	6.2	5.5	5.4	6.8	7.1			6.0	5.8	5.7	6.1	5.9			7.5	7.3	7.4	7.3	7.4		
Floodprone Width (ft)	38.0	39.4	41.5	34.1	41.5			>60	>60	>60	>60	>60			-	-	-	-	-		
Bankfull Mean Depth (ft)	0.4	0.4	0.4	0.3	0.3			0.3	0.3	0.4	0.3	0.3			0.6	0.7	0.7	0.7	0.7		
Bankfull Max Depth (ft)	0.7	0.7	0.7	0.4	0.5			0.7	0.7	0.6	0.7	0.6			1.2	1.2	1.1	1.2	1.1		
Cross-Sectional Area (ft^2) based on AB BKF area	2.2	2.2	2.2	2.2	2.2			2.0	2.0	2.0	2.0	2.0			4.8	4.8	4.8	4.8	4.8		
Cross-Sectional Area (ft^2) based on AB BKF elevation	2.2	2.1	1.8	1.1	0.5			2.0	2.6	2.6	2.2	2.3			4.8	5.5	5.3	5.0	4.3		
Bankfull Width/Depth Ratio	17.7	13.7	13.4	20.9	22.9			18.3	17.1	16.0	18.5	17.6			-	-	-	-	-		
Bankfull Entrenchment Ratio	6.1	7.2	7.7	5.0	5.9			10.9	10.9	11.2	10.7	10.8			-	-	-	-	-		
Bankfull Bank Height Ratio	1.0	0.9	0.8	1.2	1.0			1.0	1.1	1.2	1.1	1.0			-	-	-	-	-		
d50 (mm)	18	20	2.5	0.062	-			78	75	57	66	-			-	-	-	-	-		

Table 8. Cross Section Dimensional Morphology Summary
Stony Fork Stream Restoration Site, DMS Project #97085

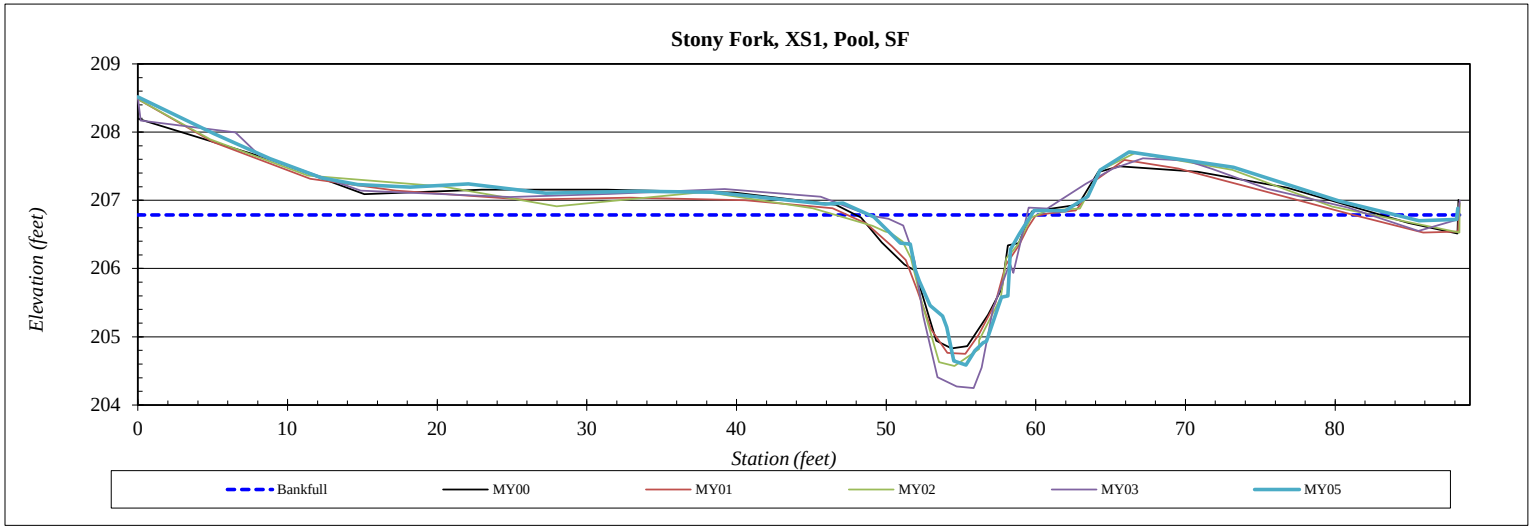
	Cross-Section 13 (Pool) Station 252+25, T2							Cross-Section 14 (Riffle) Station 225+97, T2							Cross-Section 15 (Pool) Station 226+04, T2						
	Base	MY1	MY2	MY3	MY5	MY7	MY+	Base	MY1	MY2	MY3	MY5	MY7	MY+	Base	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) based on AB BKF area	188.4	188.4	188.2	188.4	188.4			187.9	187.9	188.0	188.0	188.0			180.9	180.8	180.7	180.6	180.9		
Bankfull Width (ft)	11.3	12.7	9.5	8.1	11.5			9.7	11.8	11.1	11.5	12.7			11.8	11.7	10.9	10.4	11.8		
Floodprone Width (ft)	-	-	-	-	-			43.4	46.8	47.2	48.9	50.7			-	-	-	-	-		
Bankfull Mean Depth (ft)	0.8	0.7	1.0	1.2	0.8			0.6	0.5	0.5	0.5	0.5			1.0	1.0	1.0	1.1	1.0		
Bankfull Max Depth (ft)	1.5	1.4	1.7	2.1	1.9			1.0	1.1	1.1	1.2	1.2			1.8	1.9	1.8	1.9	1.9		
Cross-Sectional Area (ft^2) based on AB BKF area	9.3	9.3	9.3	9.3	9.3			5.8	5.8	5.8	5.8	5.8			11.2	11.2	11.2	11.2	11.2		
Cross-Sectional Area (ft^2) based on AB BKF elevation	9.3	8.7	11.0	9.0	9.6			5.8	5.3	4.4	4.6	4.8			11.2	11.8	12.8	14.0	11.3		
Bankfull Width/Depth Ratio	-	-	-	-	-			16.4	24.0	21.4	22.9	28.0			-	-	-	-	-		
Bankfull Entrenchment Ratio	-	-	-	-	-			4.5	4.0	4.2	4.3	4.0			-	-	-	-	-		
Bankfull Bank Height Ratio	-	-	-	-	-			1.0	0.8	0.9	0.8	0.8			-	-	-	-	-		
d50 (mm)	-	-	-	-	-			42	16	1.4	2	-			-	-	-	-	-		

	Cross-Section 16 (Riffle) Station 252+25, T2						
	Base	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) based on AB BKF area	180.7	180.7	180.8	180.8	180.8		
Bankfull Width (ft)	8.6	9.9	10.0	9.9	9.2		
Floodprone Width (ft)	>80	>80	>80	>80	>80		
Bankfull Mean Depth (ft)	0.7	0.6	0.6	0.6	0.7		
Bankfull Max Depth (ft)	1.2	1.1	1.0	1.0	1.1		
Cross-Sectional Area (ft^2) based on AB BKF area	6.0	6.0	6.0	6.0	6.0		
Cross-Sectional Area (ft^2) based on AB BKF elevation	6.0	5.8	5.2	5.1	5.6		
Bankfull Width/Depth Ratio	12.3	16.3	16.6	16.4	14.1		
Bankfull Entrenchment Ratio	9.4	8.3	7.6	8.1	8.8		
Bankfull Bank Height Ratio	1.0	1.0	0.9	0.9	0.9		
d50 (mm)	45	44	37	11	-		

Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS1
Drainage Area (sq mi):	0.28
Date:	7/24/2023
Field Crew:	T. Seelinger/E. Teague/ C. Kleven

Station	Elevation			SUMMARY DATA	
0.0	208.52	85.6	206.70	**Bankfull Elevation (ft) - Based on AB-Bankfull Area**	206.79
5.1	207.98	88.1	206.72	**Bankfull Cross-Sectional Area:**	11.5
8.8	207.61	88.2	206.88	**Total Cross-Sectional Area:**	11.1
12.3	207.33			**Bankfull Width:**	10.8
14.7	207.23			**Flood Prone Area Elevation:**	---
18.2	207.19			**Flood Prone Width:**	---
22.1	207.24			**Max Depth at Bankfull:**	2.2
27.3	207.11			**Mean Depth at Bankfull:**	1.1
33.4	207.13			**W / D Ratio:**	---
38.4	207.12			**Entrenchment Ratio:**	---
45.9	206.95			**Bank Height Ratio:**	---
47.1	206.96			**Thalweg Elevation:**	204.6
49.2	206.76				
51.0	206.37				
51.6	206.36				
51.9	205.98				
52.2	205.82				
52.9	205.46				
53.8	205.31				
54.1	205.14				
54.5	204.65				
55.3	204.59				
55.9	204.80				
56.5	204.91				
56.7	204.93				
57.7	205.58				
58.1	205.60				
58.3	206.28				
58.9	206.51				
59.9	206.85				
62.0	206.85				
63.5	207.06				
64.3	207.44				
66.2	207.71				
73.2	207.49				
80.2	206.99				

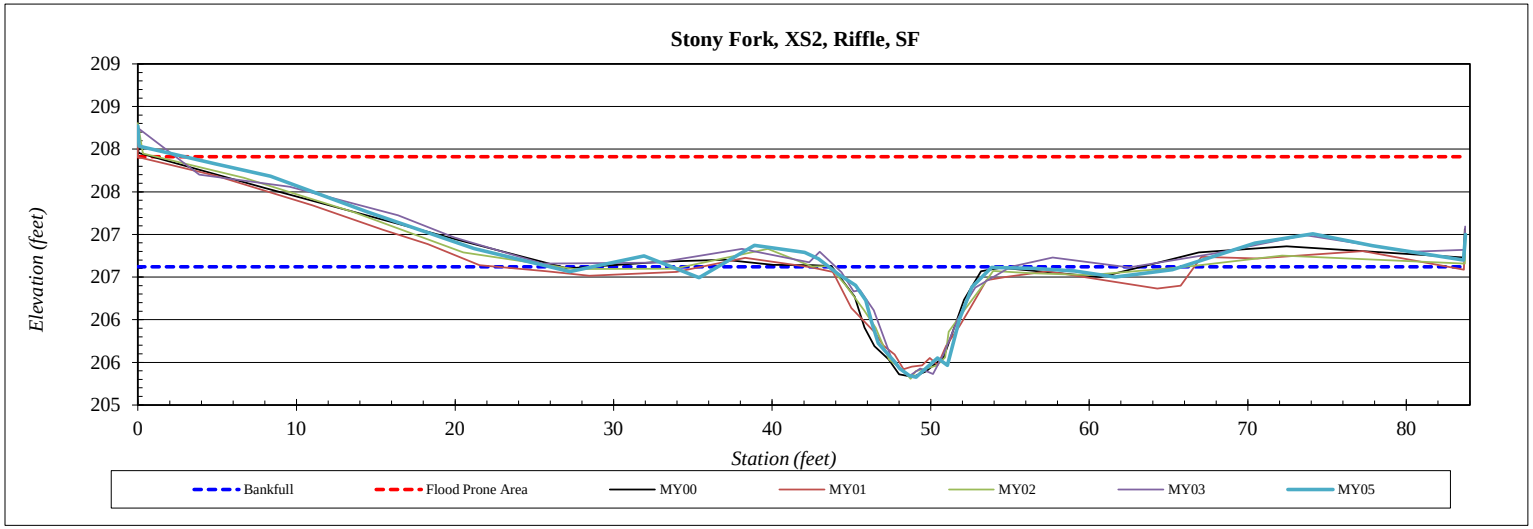


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS2
Drainage Area (sq mi):	0.28
Date:	7/24/2023
Field Crew:	T. Seelinger/E. Teague/ C. Kleven

Station	Elevation
0.0000	208.2690
0.0677	208.0340
4.8614	207.8300
8.3538	207.6810
14.4387	207.2670
21.2078	206.8330
27.2292	206.5630
31.9171	206.7470
35.3864	206.4910
38.8833	206.8720
42.0408	206.7890
42.9235	206.7160
44.1759	206.5350
45.2628	206.4030
45.9116	206.2250
46.2732	205.9740
46.7009	205.7230
47.7917	205.4950
48.0540	205.4280
48.6447	205.3440
49.0837	205.3250
50.4301	205.5520
51.0532	205.4660
51.8120	206.0080
52.6052	206.3830
53.8286	206.6120
56.5000	206.6030
59.0637	206.5730
61.6345	206.4990
65.2497	206.5870
70.4505	206.8980
74.1058	207.0060
77.8656	206.8680
83.6099	206.7000
83.7147	206.9980

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	206.62
Bankfull Cross-Sectional Area:	7.0
Total Cross-Sectional Area:	6.5
Bankfull Width:	10.2
Flood Prone Area Elevation:	207.9
Flood Prone Width:	80.8
Max Depth at Bankfull:	1.3
Mean Depth at Bankfull:	0.7
W / D Ratio:	14.9
Entrenchment Ratio:	7.9
Bank Height Ratio:	0.8
Thalweg Elevation:	205.3

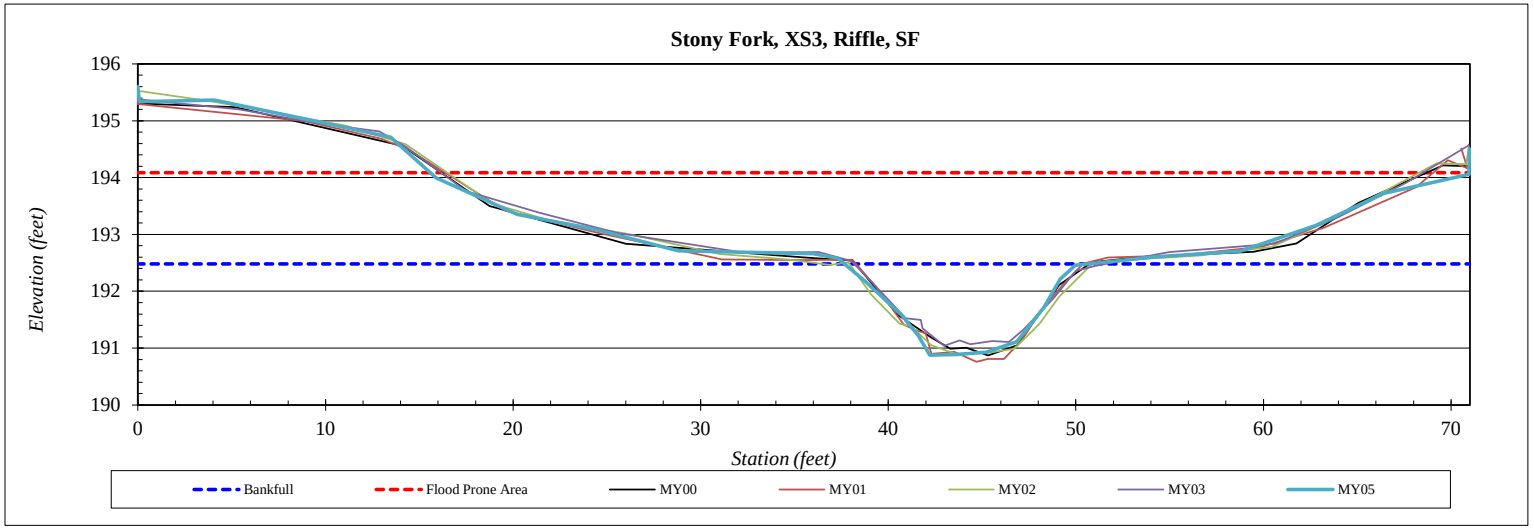


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS3
Drainage Area (sq mi):	0.46
Date:	7/24/2023
Field Crew:	T. Seelinger/E. Teague/ C. Kleven

Station	Elevation
0.0	195.60
0.1	195.34
4.1	195.37
8.7	195.05
13.5	194.71
15.9	194.00
20.2	193.35
24.4	193.08
28.8	192.71
32.7	192.69
36.0	192.66
37.3	192.58
38.8	192.17
40.7	191.59
41.6	191.22
42.2	190.88
43.7	190.89
45.2	190.93
46.9	191.11
48.3	191.71
49.2	192.22
50.0	192.46
54.0	192.60
58.8	192.70
62.8	193.16
66.4	193.72
71.0	194.06
71.0	194.51

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	192.48
Bankfull Cross-Sectional Area:	12.5
Total Cross-Sectional Area:	12.9
Bankfull Width:	13.0
Flood Prone Area Elevation:	194.1
Flood Prone Width:	55.4
Max Depth at Bankfull:	1.6
Mean Depth at Bankfull:	1.0
W / D Ratio:	13.5
Entrenchment Ratio:	4.3
Bank Height Ratio:	1.0
Thalweg Elevation:	190.9

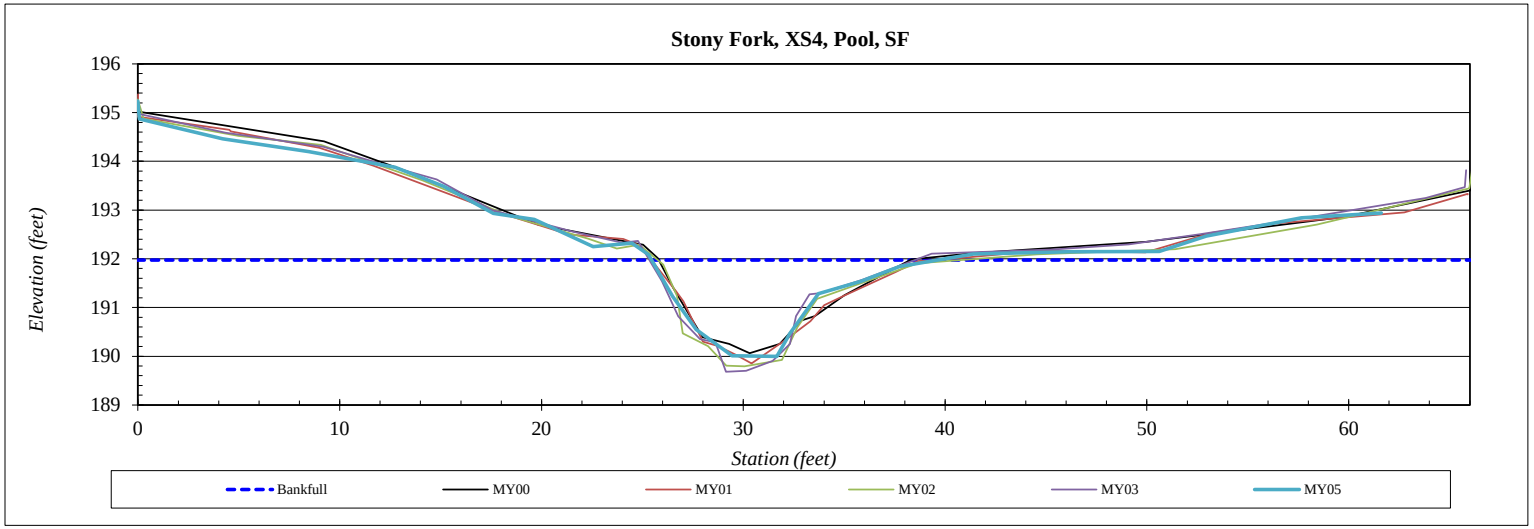


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS4
Drainage Area (sq mi):	0.46
Date:	7/24/2023
Field Crew:	T. Seelinger/E. Teague/ C. Kleven

Station	Elevation
0.0	195.23
0.1	194.87
4.2	194.46
8.5	194.20
12.7	193.88
15.2	193.48
17.6	192.94
19.6	192.81
22.6	192.25
24.5	192.32
25.3	192.08
26.5	191.23
27.7	190.55
29.4	190.01
31.7	190.00
32.3	190.47
33.7	191.28
35.8	191.54
37.8	191.85
41.4	192.10
46.1	192.14
50.6	192.15
52.9	192.47
57.6	192.84
61.6	192.94

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	191.98
Bankfull Cross-Sectional Area:	13.6
Total Cross-Sectional Area:	13.8
Bankfull Width:	14.2
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:	190.0

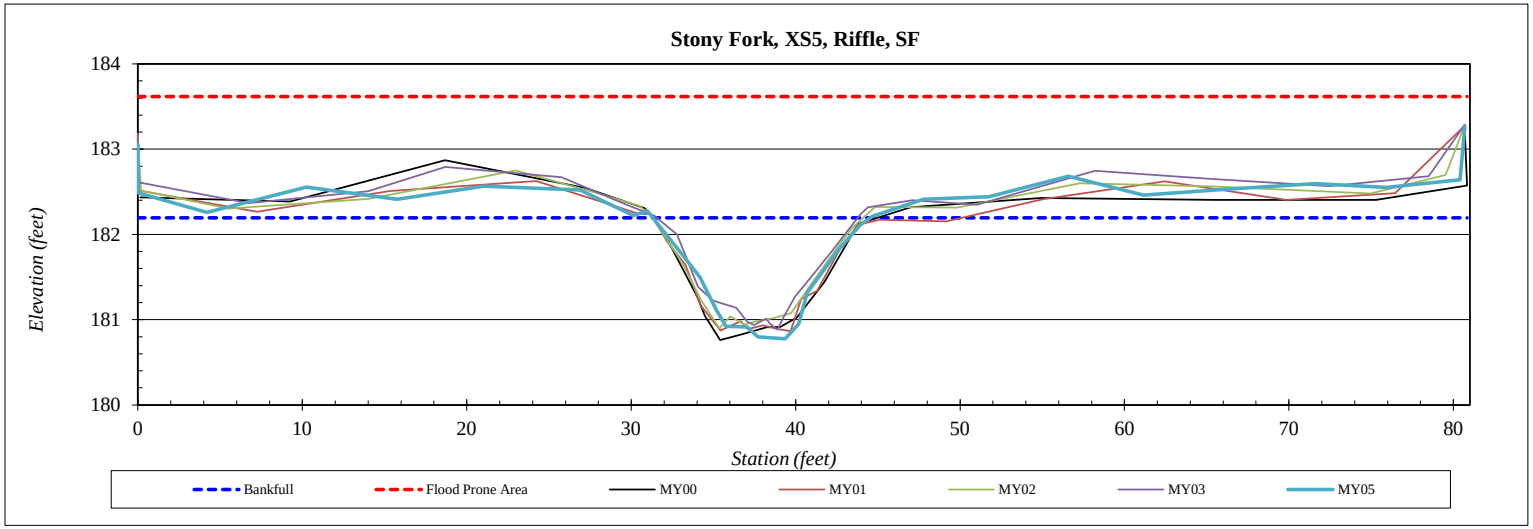


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS5
Drainage Area (sq mi):	0.46
Date:	7/24/2023
Field Crew:	T. Seelinger/E. Teague/ C. Kleven

Station	Elevation
0.0	183.06
0.0	182.49
4.2	182.26
10.3	182.55
15.8	182.41
21.0	182.57
26.9	182.52
30.1	182.22
31.0	182.28
33.2	181.75
34.2	181.50
35.2	181.11
35.8	180.92
37.0	180.92
37.7	180.80
39.4	180.78
40.2	180.95
40.7	181.32
42.6	181.82
43.9	182.11
44.7	182.21
47.8	182.41
51.8	182.44
56.6	182.68
61.2	182.46
66.1	182.53
71.6	182.60
75.9	182.55
80.4	182.64
80.7	183.27

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	182.20
Bankfull Cross-Sectional Area:	10.6
Total Cross-Sectional Area:	9.8
Bankfull Width:	13.2
Flood Prone Area Elevation:	183.6
Flood Prone Width:	80.7
Max Depth at Bankfull:	1.4
Mean Depth at Bankfull:	0.8
W / D Ratio:	16.5
Entrenchment Ratio:	6.1
Bank Height Ratio:	1.0
Thalweg Elevation:	180.8

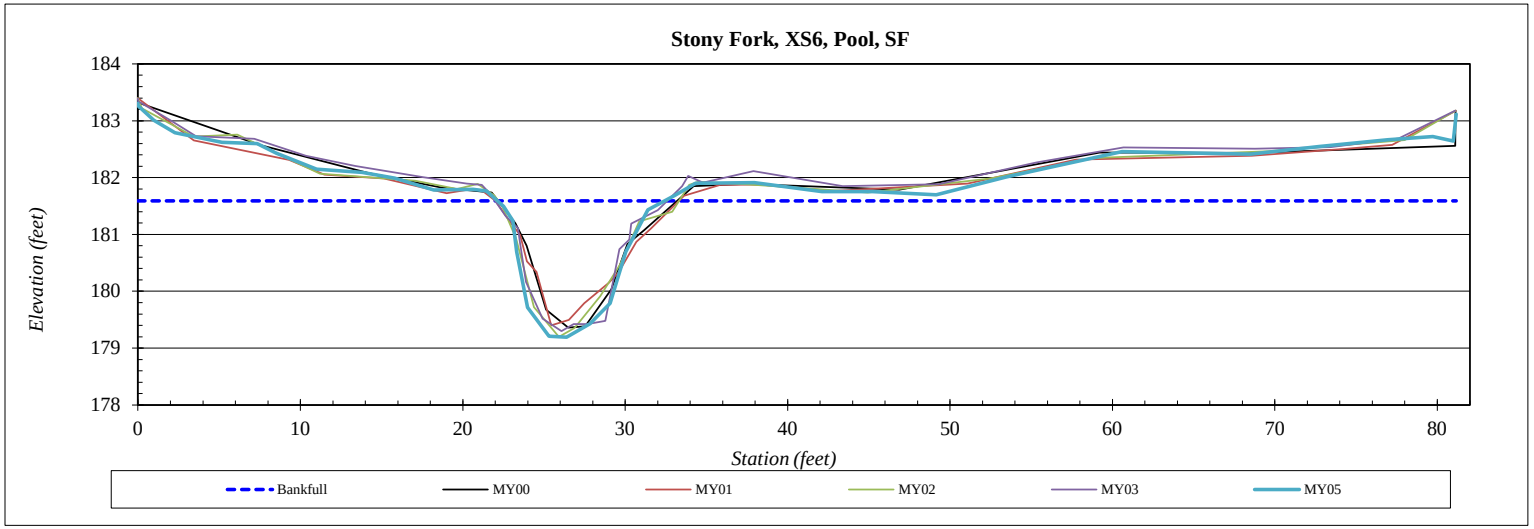


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS6
Drainage Area (sq mi):	0.46
Date:	7/24/2023
Field Crew:	T. Seelinger/E. Teague/ C. Kleven

Station	Elevation		
0.0	183.31	79.7	182.72
0.0	183.26	81.0	182.64
1.0	183.01	81.1	183.12
2.3	182.79		
5.2	182.62		
7.3	182.60		
8.5	182.43		
11.0	182.15		
13.8	182.09		
15.8	181.99		
18.2	181.78		
20.6	181.79		
21.4	181.77		
22.5	181.49		
23.1	181.24		
23.3	180.69		
24.0	179.71		
25.3	179.21		
26.4	179.19		
27.8	179.43		
29.1	179.79		
29.5	180.20		
30.0	180.70		
31.4	181.43		
33.1	181.69		
34.3	181.90		
38.0	181.91		
42.1	181.75		
45.2	181.75		
49.2	181.70		
53.5	182.01		
56.4	182.20		
60.6	182.46		
68.5	182.41		
72.8	182.55		
76.9	182.67		

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	181.59
Bankfull Cross-Sectional Area:	14.5
Total Cross-Sectional Area:	16.2
Bankfull Width:	10.3
Flood Prone Area Elevation:	---
Flood Prone Width:	---
Max Depth at Bankfull:	2.4
Mean Depth at Bankfull:	1.4
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	179.2

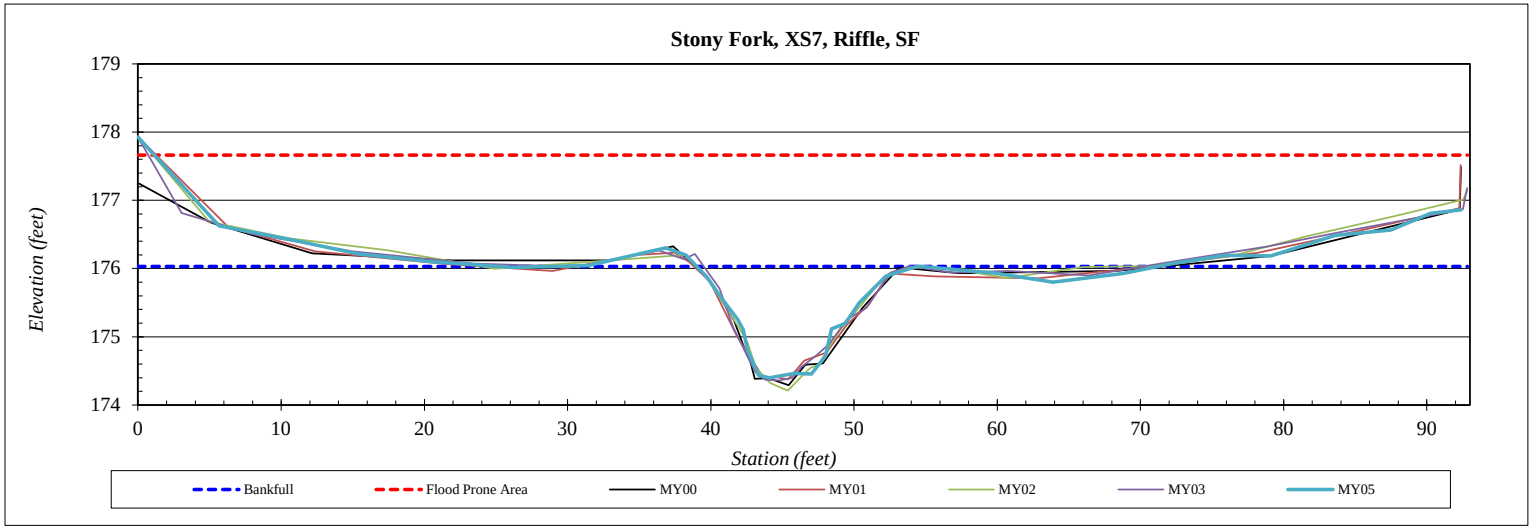


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS7
Drainage Area (sq mi):	0.83
Date:	7/24/2023
Field Crew:	T. Seelinger/E. Teague/ C. Kleven

Station	Elevation
0.0	177.93
5.7	176.63
10.7	176.42
15.4	176.21
20.5	176.10
26.2	176.02
31.5	176.04
36.8	176.30
38.2	176.20
39.7	175.89
40.8	175.54
41.9	175.25
42.3	175.10
42.6	174.80
43.3	174.43
44.1	174.40
45.8	174.47
47.0	174.46
48.0	174.72
48.4	175.12
49.4	175.19
50.3	175.49
52.2	175.89
54.5	176.04
59.9	175.93
63.9	175.80
68.8	175.93
72.1	176.07
75.9	176.20
79.1	176.18
83.6	176.49
87.5	176.57
90.3	176.81
92.4	176.86

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	176.03
Bankfull Cross-Sectional Area:	12.8
Total Cross-Sectional Area:	12.7
Bankfull Width:	15.3
Flood Prone Area Elevation:	177.7
Flood Prone Width:	91.2
Max Depth at Bankfull:	1.6
Mean Depth at Bankfull:	0.8
W / D Ratio:	18.3
Entrenchment Ratio:	5.9
Bank Height Ratio:	0.9
Thalweg Elevation:	174.4

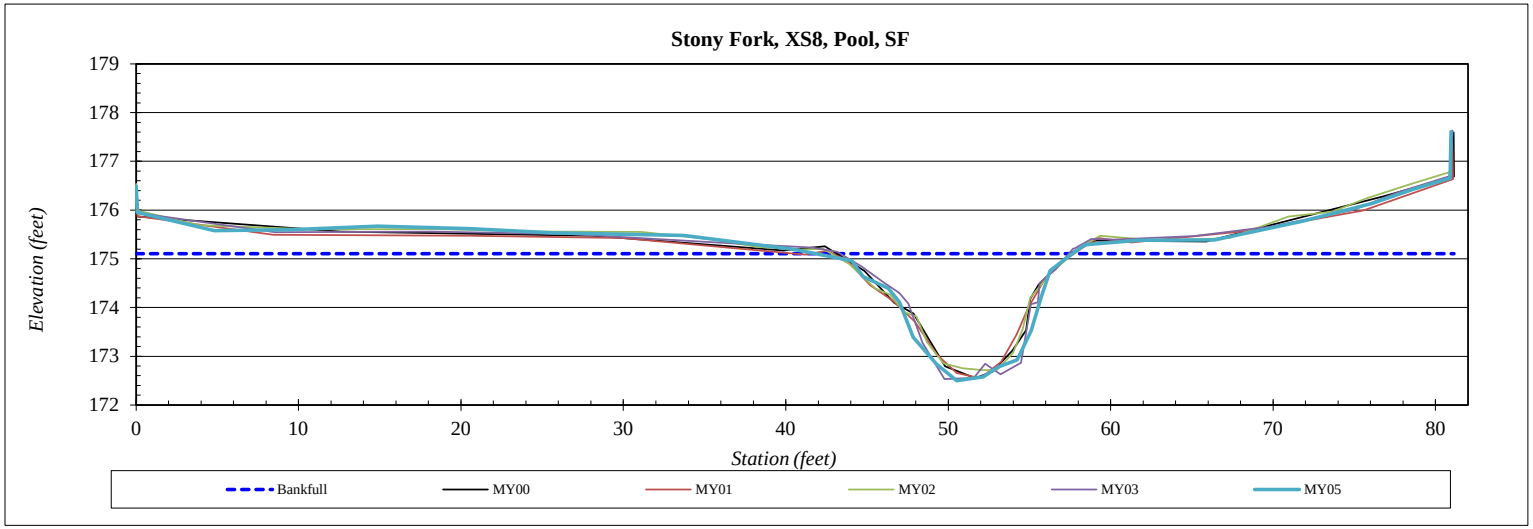


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS8
Drainage Area (sq mi):	0.83
Date:	7/24/2023
Field Crew:	T. Seelinger/E. Teague/ C. Kleven

Station	Elevation
0.0	176.49
0.1	175.95
4.8	175.58
9.6	175.60
14.9	175.67
20.6	175.61
25.7	175.53
33.7	175.48
40.4	175.20
44.1	174.96
44.8	174.64
46.3	174.40
47.0	174.12
47.8	173.39
49.3	172.84
50.5	172.50
52.2	172.58
53.1	172.78
54.3	172.92
55.1	173.53
55.7	174.21
56.3	174.75
57.7	175.12
58.4	175.29
61.7	175.38
66.4	175.39
71.9	175.78
76.1	176.13
78.6	176.43
80.9	176.66
80.9	177.61

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	175.10
Bankfull Cross-Sectional Area:	20.7
Total Cross-Sectional Area:	22.9
Bankfull Width:	13.6
Flood Prone Area Elevation:	---
Flood Prone Width:	---
Max Depth at Bankfull:	2.6
Mean Depth at Bankfull:	1.5
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	172.5

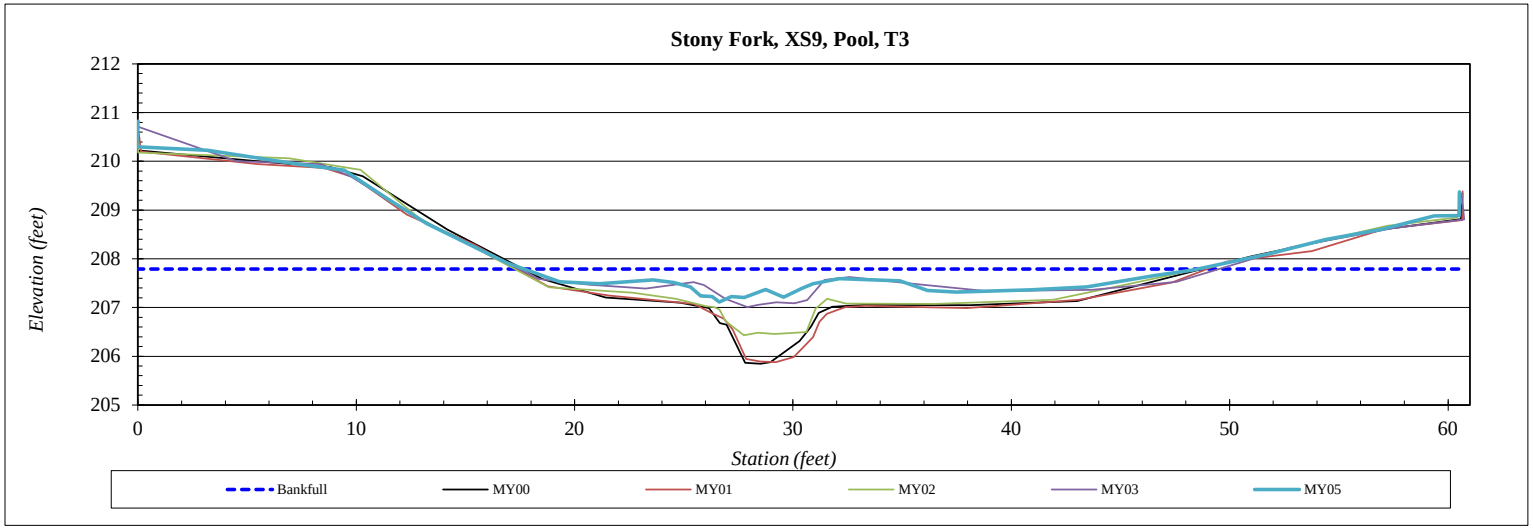


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS9
Drainage Area (sq mi):	0.04
Date:	7/24/2023
Field Crew:	T. Seelinger/E. Teague/ C. Kleven

Station	Elevation		
0.0	210.82	60.5	209.3750
-0.1	210.30		
3.2	210.23		
7.3	209.95		
9.4	209.82		
11.4	209.23		
13.2	208.72		
16.9	207.92		
19.3	207.53		
21.1	207.49		
23.6	207.57		
24.5	207.51		
25.3	207.42		
25.8	207.24		
26.3	207.23		
26.6	207.11		
27.2	207.22		
27.8	207.21		
28.7	207.37		
29.6	207.21		
30.4	207.39		
30.9	207.49		
32.1	207.59		
33.3	207.57		
34.9	207.54		
36.2	207.35		
37.5	207.32		
40.9	207.36		
43.4	207.42		
46.6	207.66		
48.3	207.77		
51.9	208.11		
54.4	208.39		
57.0	208.60		
59.4	208.88		
60.5	208.89		

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	207.79
Bankfull Cross-Sectional Area:	3.7
Total Cross-Sectional Area:	0.0
Bankfull Width:	8.5
Flood Prone Area Elevation:	---
Flood Prone Width:	---
Max Depth at Bankfull:	0.7
Mean Depth at Bankfull:	0.4
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	207.1

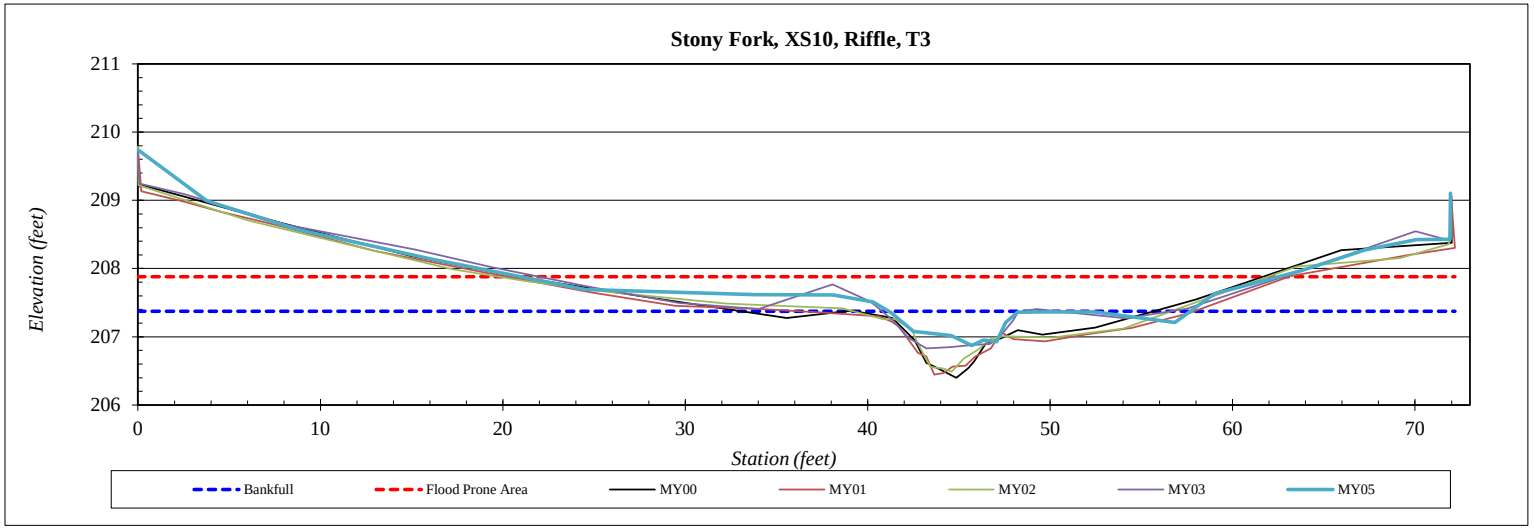


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS10
Drainage Area (sq mi):	0.04
Date:	7/24/2023
Field Crew:	T. Seelinger/E. Teague/ C. Kleven

Station	Elevation
0.0	209.74
3.8	208.99
8.6	208.58
16.1	208.14
24.5	207.69
33.8	207.62
38.1	207.62
40.3	207.51
41.3	207.35
42.5	207.08
43.2	207.06
43.8	207.04
44.6	207.02
45.7	206.87
46.4	206.95
47.1	206.93
47.6	207.21
48.2	207.36
49.5	207.36
52.4	207.37
56.8	207.21
59.0	207.63
63.7	207.96
67.3	208.27
70.1	208.43
71.9	208.43
71.9	209.11

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	207.37
Bankfull Cross-Sectional Area:	2.2
Total Cross-Sectional Area:	0.5
Bankfull Width:	7.1
Flood Prone Area Elevation:	207.9
Flood Prone Width:	41.5
Max Depth at Bankfull:	0.5
Mean Depth at Bankfull:	0.3
W / D Ratio:	22.9
Entrenchment Ratio:	5.9
Bank Height Ratio:	1.0
Thalweg Elevation:	206.9

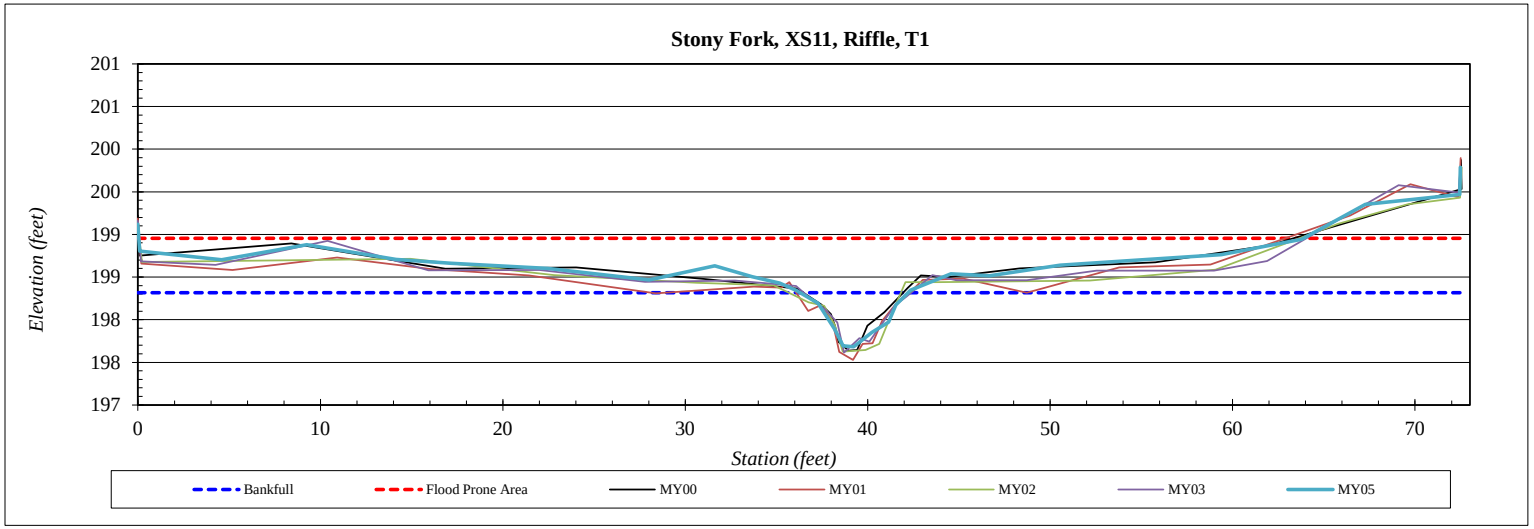


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS11
Drainage Area (sq mi):	0.02
Date:	7/24/2023
Field Crew:	T. Seelinger/E. Teague/ C. Kleven

Station	Elevation
0.0	199.12
0.1	198.81
4.6	198.70
9.3	198.88
14.1	198.71
17.2	198.66
22.4	198.60
28.0	198.47
31.6	198.63
33.7	198.50
35.2	198.43
36.1	198.34
37.3	198.19
38.2	197.89
38.6	197.69
39.2	197.68
40.2	197.85
41.1	197.97
41.5	198.17
42.3	198.35
44.6	198.54
46.7	198.52
50.5	198.64
54.8	198.70
59.4	198.76
63.8	198.94
67.3	199.35
72.4	199.47
72.5	199.79

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	198.32
Bankfull Cross-Sectional Area:	2.0
Total Cross-Sectional Area:	2.3
Bankfull Width:	5.9
Flood Prone Area Elevation:	199.0
Flood Prone Width:	63.8
Max Depth at Bankfull:	0.6
Mean Depth at Bankfull:	0.3
W / D Ratio:	17.6
Entrenchment Ratio:	10.8
Bank Height Ratio:	1.0
Thalweg Elevation:	197.7

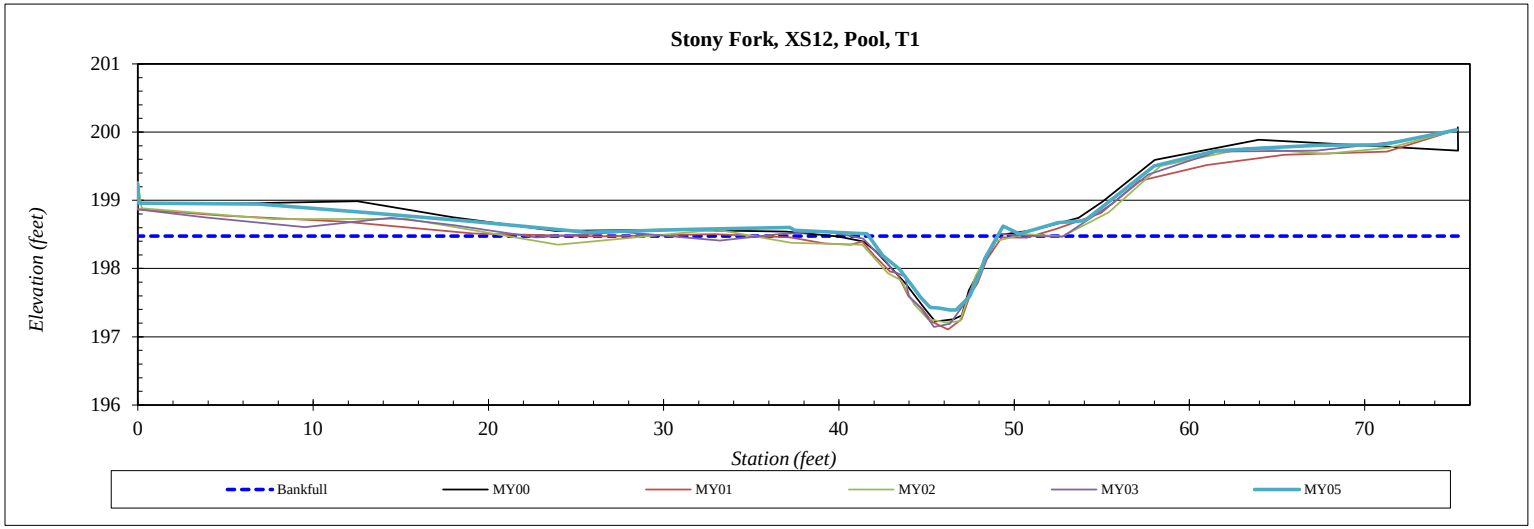


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS12
Drainage Area (sq mi):	0.02
Date:	7/24/2023
Field Crew:	T. Seelinger/E. Teague/ C. Kleven

Station	Elevation
0.0	199.24
0.0	198.96
6.9	198.95
12.9	198.82
19.0	198.69
25.6	198.53
31.5	198.58
37.2	198.60
37.5	198.56
41.6	198.51
42.5	198.19
43.5	197.99
44.1	197.76
44.7	197.58
45.2	197.43
45.7	197.42
46.3	197.39
46.7	197.39
47.4	197.59
48.1	197.96
48.3	198.15
49.4	198.62
50.3	198.51
52.5	198.67
54.0	198.70
55.5	199.01
58.0	199.51
61.5	199.72
64.1	199.77
67.5	199.81
71.0	199.81
75.2	200.03

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	198.47
Bankfull Cross-Sectional Area:	4.8
Total Cross-Sectional Area:	4.3
Bankfull Width:	7.4
Flood Prone Area Elevation:	---
Flood Prone Width:	---
Max Depth at Bankfull:	1.1
Mean Depth at Bankfull:	0.7
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	197.4

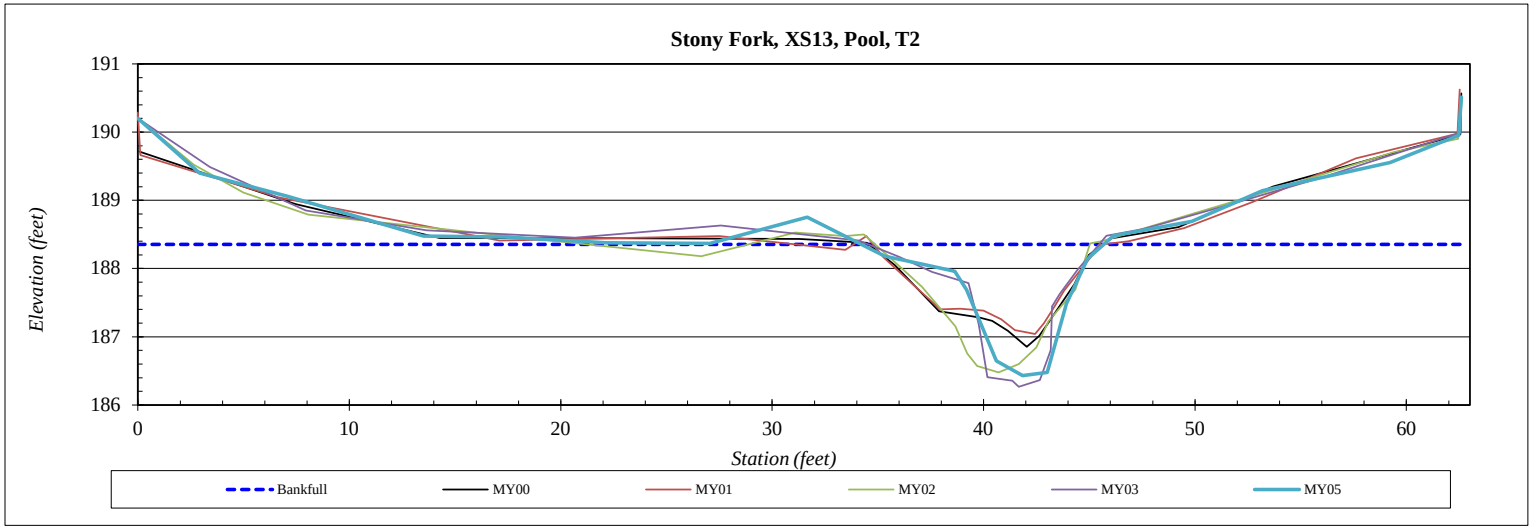


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS13
Drainage Area (sq mi):	0.14
Date:	7/24/2023
Field Crew:	T. Seelinger/E. Teague/ C. Kleven

Station	Elevation
0.0	190.20
2.9	189.40
7.1	189.06
13.5	188.48
17.4	188.46
22.2	188.38
27.1	188.37
31.7	188.75
35.3	188.18
37.1	188.07
38.6	187.96
39.2	187.69
40.1	187.05
40.6	186.65
41.8	186.43
43.0	186.48
43.9	187.49
44.9	188.14
46.1	188.48
49.9	188.69
53.2	189.14
59.2	189.56
62.5	189.95
62.6	190.51

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	188.35
Bankfull Cross-Sectional Area:	9.3
Total Cross-Sectional Area:	9.6
Bankfull Width:	11.5
Flood Prone Area Elevation:	---
Flood Prone Width:	---
Max Depth at Bankfull:	1.9
Mean Depth at Bankfull:	0.8
W / D Ratio:	---
Entrenchment Ratio:	---
Bank Height Ratio:	---
Thalweg Elevation:	186.4

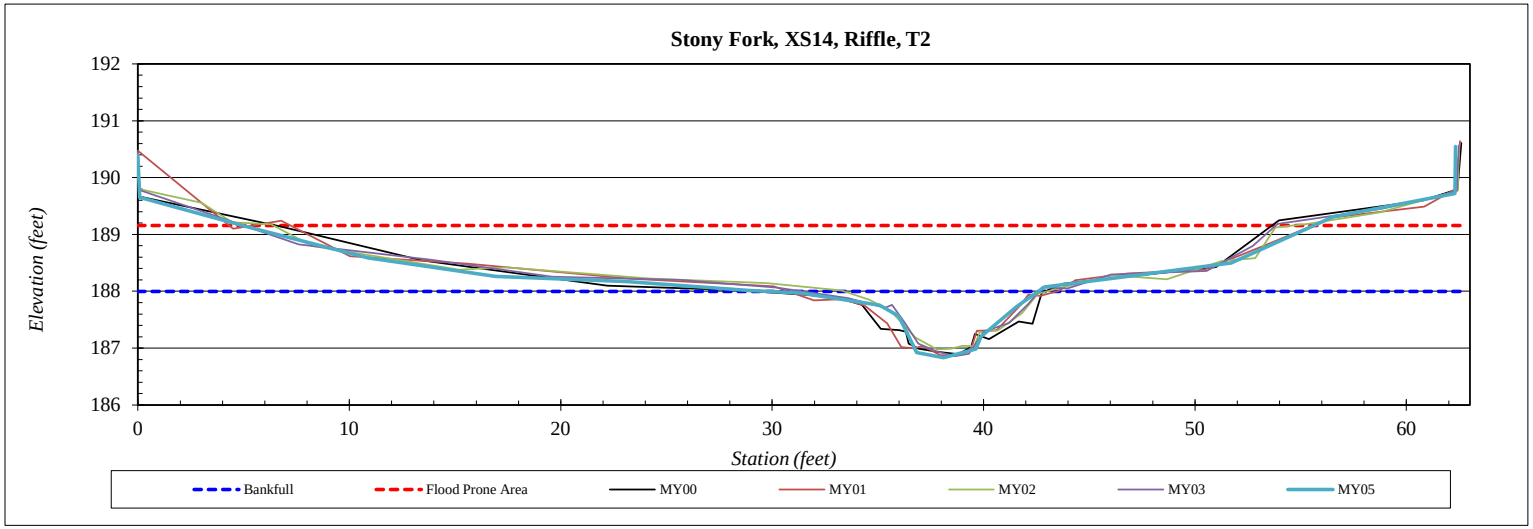


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS14
Drainage Area (sq mi):	0.14
Date:	7/24/2023
Field Crew:	T. Seelinger/E. Teague/ C. Kleven

Station	Elevation
0.0	190.40
0.1	189.65
5.2	189.14
10.9	188.59
16.9	188.26
23.1	188.17
28.9	188.01
31.3	187.97
35.1	187.76
36.0	187.56
36.8	186.92
38.1	186.83
39.6	186.99
39.9	187.21
41.6	187.73
42.9	188.08
46.9	188.27
51.7	188.50
56.5	189.31
62.3	189.72
62.3	190.54

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	187.99
Bankfull Cross-Sectional Area:	5.8
Total Cross-Sectional Area:	4.8
Bankfull Width:	12.7
Flood Prone Area Elevation:	189.2
Flood Prone Width:	50.7
Max Depth at Bankfull:	1.2
Mean Depth at Bankfull:	0.5
W / D Ratio:	28.0
Entrenchment Ratio:	4.0
Bank Height Ratio:	0.8
Thalweg Elevation:	186.8

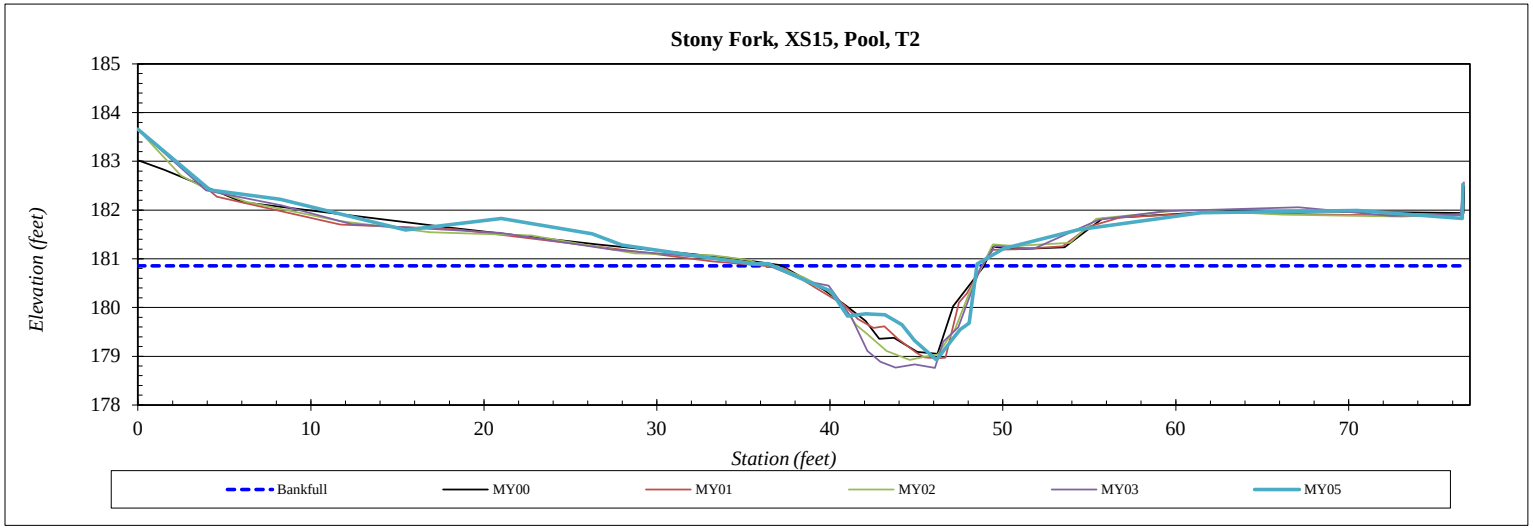


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS15
Drainage Area (sq mi):	0.22
Date:	7/24/2023
Field Crew:	T. Seelinger/E. Teague/ C. Kleven

Station	Elevation
0.0	183.66
4.2	182.41
8.2	182.22
15.5	181.59
21.0	181.83
26.3	181.51
28.0	181.28
32.7	181.04
35.6	180.90
36.4	180.90
38.6	180.55
40.1	180.34
41.0	179.82
42.1	179.87
43.2	179.85
44.2	179.65
44.9	179.33
46.2	178.93
47.2	179.38
47.5	179.55
48.1	179.68
48.5	180.90
50.1	181.21
54.4	181.60
61.5	181.95
70.5	181.99
76.6	181.83
76.6	182.53

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	180.86
Bankfull Cross-Sectional Area:	11.2
Total Cross-Sectional Area:	11.3
Bankfull Width:	11.8
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:	178.9

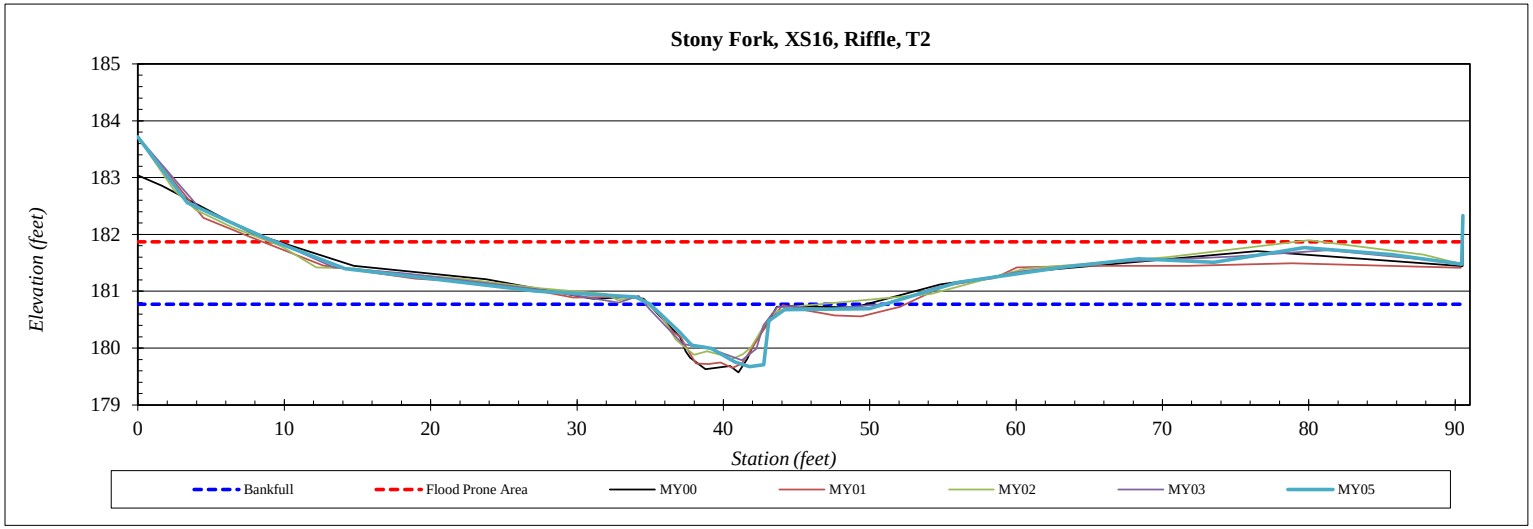


Cross-Section Plots

River Basin:	Neuse River
Site:	Stony Fork
XS ID	XS16
Drainage Area (sq mi):	0.22
Date:	7/24/2023
Field Crew:	T. Seelinger/E. Teague/ C. Kleven

Station	Elevation
0.0	183.72
3.4	182.56
8.6	181.95
14.2	181.40
21.1	181.19
27.2	181.00
34.0	180.90
35.0	180.78
37.0	180.29
37.8	180.05
39.2	179.99
40.8	179.75
41.8	179.68
42.7	179.71
43.1	180.48
44.2	180.68
50.0	180.69
56.0	181.16
63.2	181.42
68.4	181.57
73.5	181.51
79.7	181.77
85.7	181.65
90.4	181.48
90.5	182.33

SUMMARY DATA	
Bankfull Elevation (ft) - Based on AB-Bankfull Area	180.77
Bankfull Cross-Sectional Area:	6.0
Total Cross-Sectional Area:	5.6
Bankfull Width:	9.2
Flood Prone Area Elevation:	181.9
Flood Prone Width:	81.1
Max Depth at Bankfull:	1.1
Mean Depth at Bankfull:	0.7
W / D Ratio:	14.1
Entrenchment Ratio:	8.8
Bank Height Ratio:	0.9
Thalweg Elevation:	179.7



APPENDIX E

Hydrologic Data

Table 9. Verification of Bankfull Events Stony Fork Restoration Site, DMS Project #97085		
Monitoring Year	**Date of Occurrence**	**Method**
MY01	July 12, 2019	Onsite stream gauge
	July 23, 2019	Onsite stream gauge
	August 14, 2019	Onsite stream gauge
	September 5, 2019	Onsite stream gauge
	October 13, 2019	Onsite stream gauge
	October 20, 2019	Onsite stream gauge
MY02	February 6, 2020	Onsite stream gauge
	February 22, 2020	Onsite stream gauge
	July 23, 2020	Onsite stream gauge
	August 4, 2020	Onsite stream gauge
	August 15, 2020	Onsite stream gauge
	August 31, 2020	Onsite stream gauge
	September 25, 2020	Onsite stream gauge
	September 29, 2020	Onsite stream gauge
MY03	February 16, 2021	Onsite stream gauge
	June 9, 2021	Onsite stream gauge
	July 8, 2021	Onsite stream gauge
	July 19, 2021	Onsite stream gauge
	July 27, 2021	Onsite stream gauge
MY04	January 23, 2022	Onsite stream gauge
	January 30, 2022	Onsite stream gauge
	September 10, 2022	Onsite stream gauge
MY05	April 30, 2023	Onsite stream gauge
	July 7, 2023	Onsite stream gauge
	July 14, 2023	Onsite stream gauge

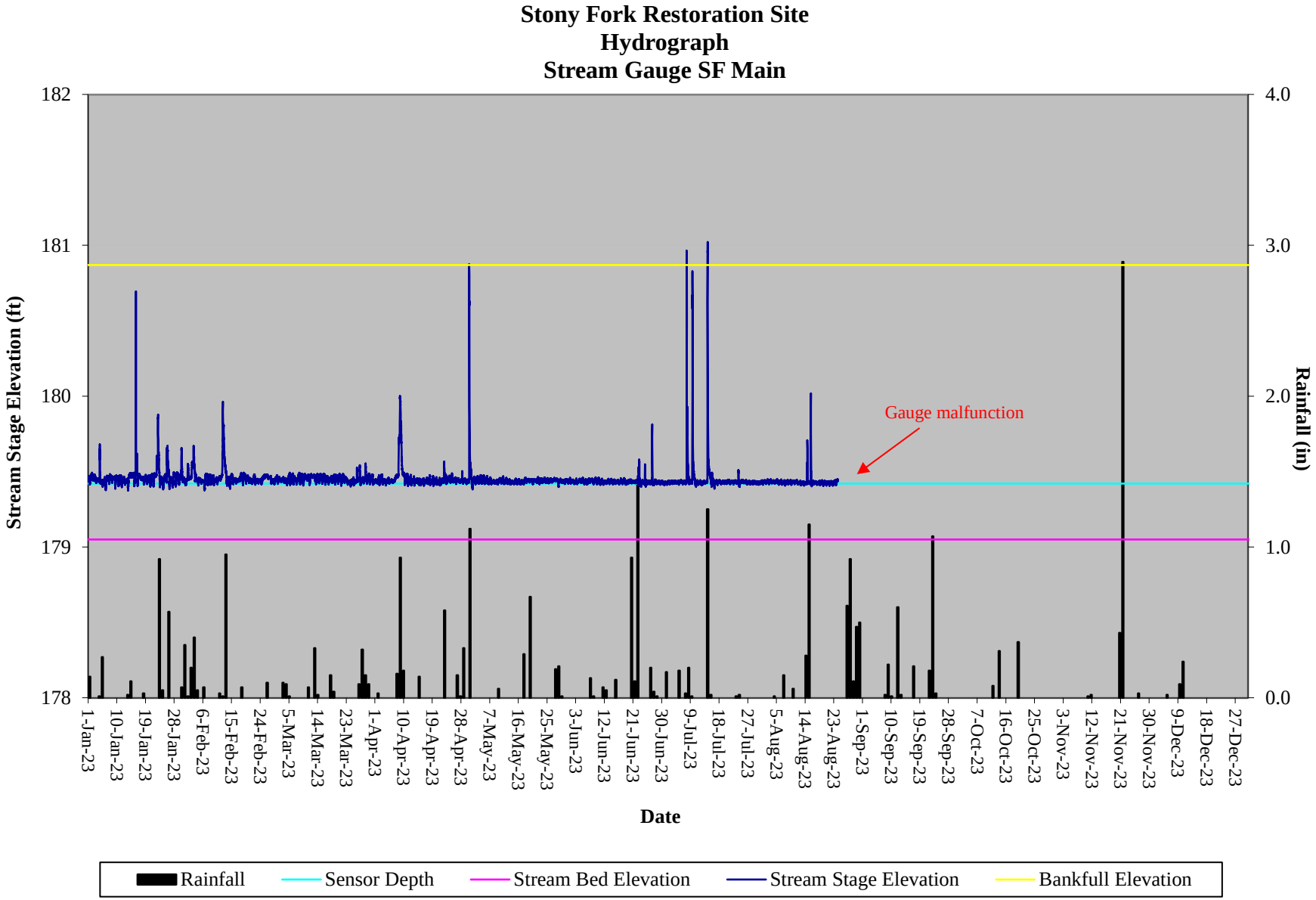
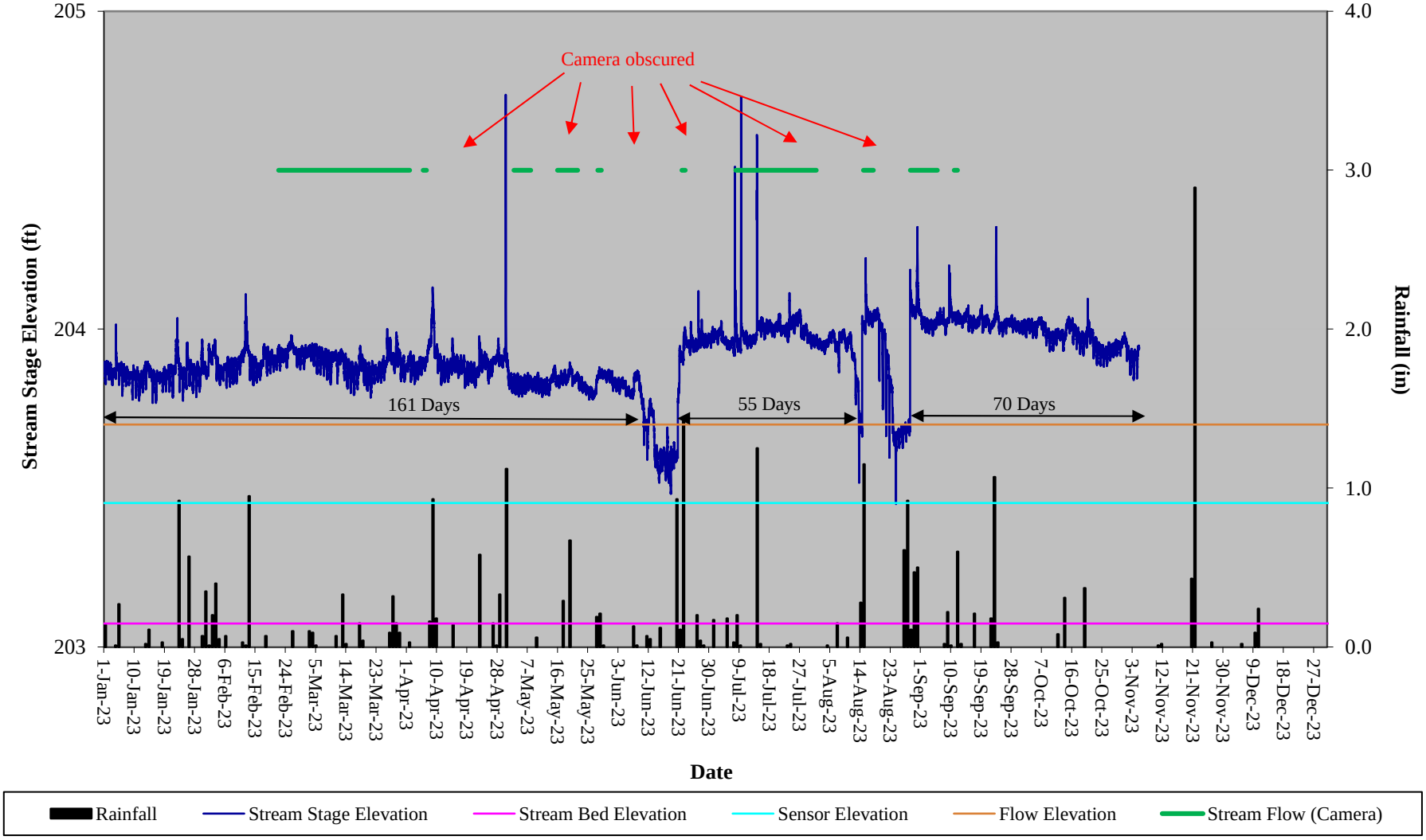

Stony Fork Restoration Site
Hydrograph
Stream Gauge SF Main
Stream Stage Elevation (ft)
Rainfall (in)
Date
Gauge malfunction
182
181
180
179
178
4.0
3.0
2.0
1.0
0.0
1-Jan-23
10-Jan-23
19-Jan-23
28-Jan-23
6-Feb-23
15-Feb-23
24-Feb-23
5-Mar-23
14-Mar-23
23-Mar-23
1-Apr-23
10-Apr-23
19-Apr-23
28-Apr-23
7-May-23
16-May-23
25-May-23
3-Jun-23
12-Jun-23
21-Jun-23
30-Jun-23
9-Jul-23
18-Jul-23
27-Jul-23
5-Aug-23
14-Aug-23
23-Aug-23
1-Sep-23
10-Sep-23
19-Sep-23
28-Sep-23
7-Oct-23
16-Oct-23
25-Oct-23
3-Nov-23
12-Nov-23
21-Nov-23
30-Nov-23
9-Dec-23
18-Dec-23
27-Dec-23
Rainfall
Sensor Depth
Stream Bed Elevation
Stream Stage Elevation
Bankfull Elevation

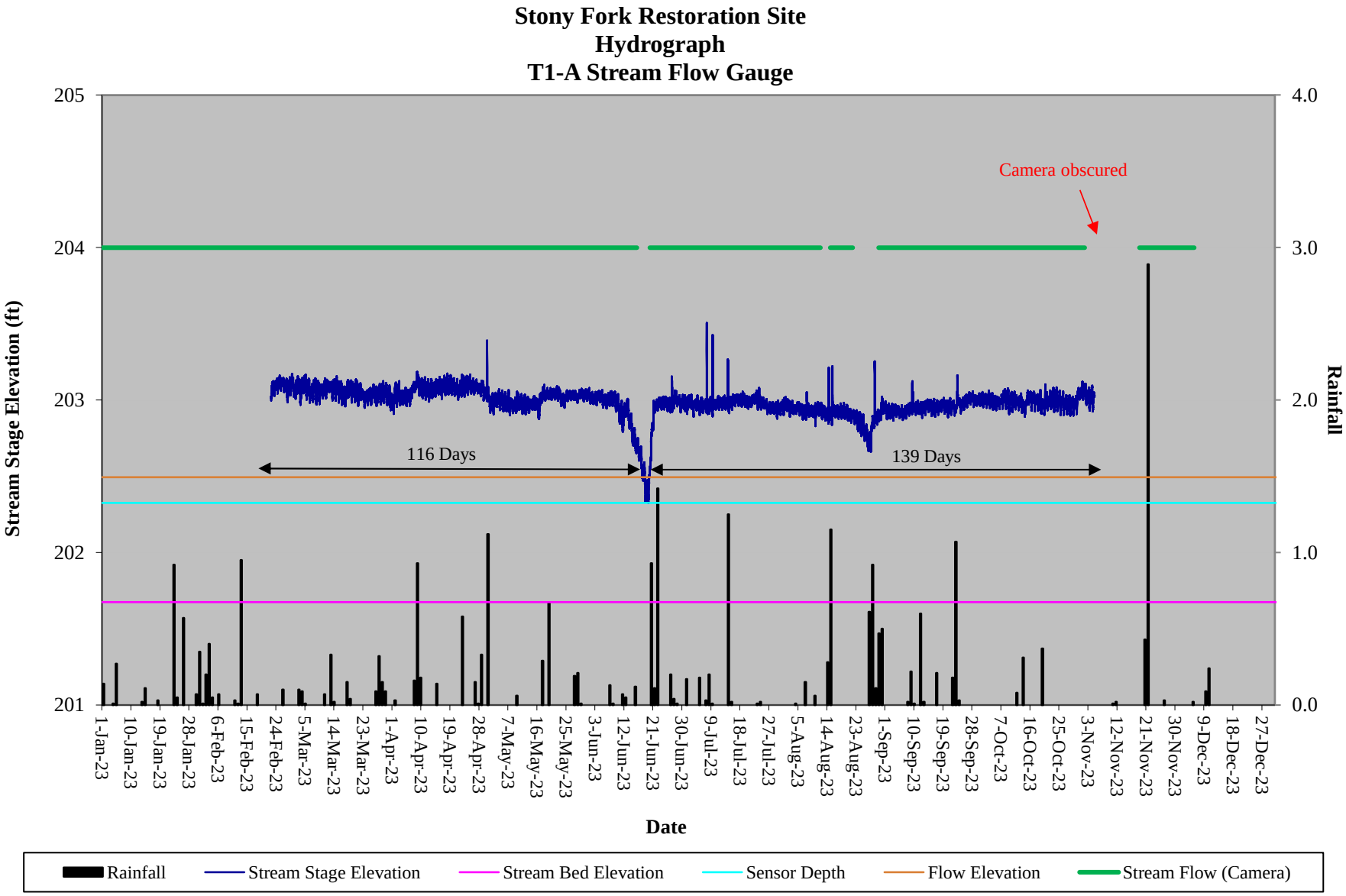
Table 10. Verification of Stream Flow Stony Fork Restoration Site, DMS Project #97085				
	Gauge		Camera	
Reach	Dates Achieving	Maximum Consecutive Days	Dates Achieving	Maximum Consecutive Days
T1	January 1 – June 10; June 20 – August 13; August 28 – November 5	161	February 22 – April 2	40
T1A	January 1 – June 17; June 20 – November 5	139	January 1 – June 16; June 20 – August 12; August 30 – November 2	167
T2	January 29 – March 15; March 21 – June 13; June 21 – August 1; August 14 – November 5	85	February 22 – May 6	74
T3	January 1 – June 7	157	February 22 – June 5; October 3 – December 7	104

Table 11. Stream Flow Criteria Attainment Stony Fork Restoration Site, DMS Project #97085							
	Greater than 30 Days of Flow/Max Consecutive Days						
Reach	MY-01 2019	MY-02 2020	MY-03 2021	MY-04 2022	MY-05 2023	MY-06 2024	MY-07 2025
T1 (Gauge)	Yes/60	Yes/152	Yes/147	Yes/158	Yes/161		
T1 (Camera)	*	*	Yes/76	Yes/56	Yes/40		
T1A (Gauge)	Yes/182	Yes/152	Yes/259	Yes/174	Yes/139		
T1A (Camera)	Yes/46	Yes/183	Yes/41	Yes/149	Yes/167		
T2 (Gauge)	Yes/85	Yes/152	Yes/115	Yes/155	Yes/85		
T2 (Camera)	Yes/84	Yes/53	Yes/75	Yes/118	Yes/74		
T3 (Gauge)	Yes/55	Yes/152	Yes/256	Yes/46	Yes/157		
T3 (Camera)	Yes/55	*	Yes/106	Yes/154	Yes/104		

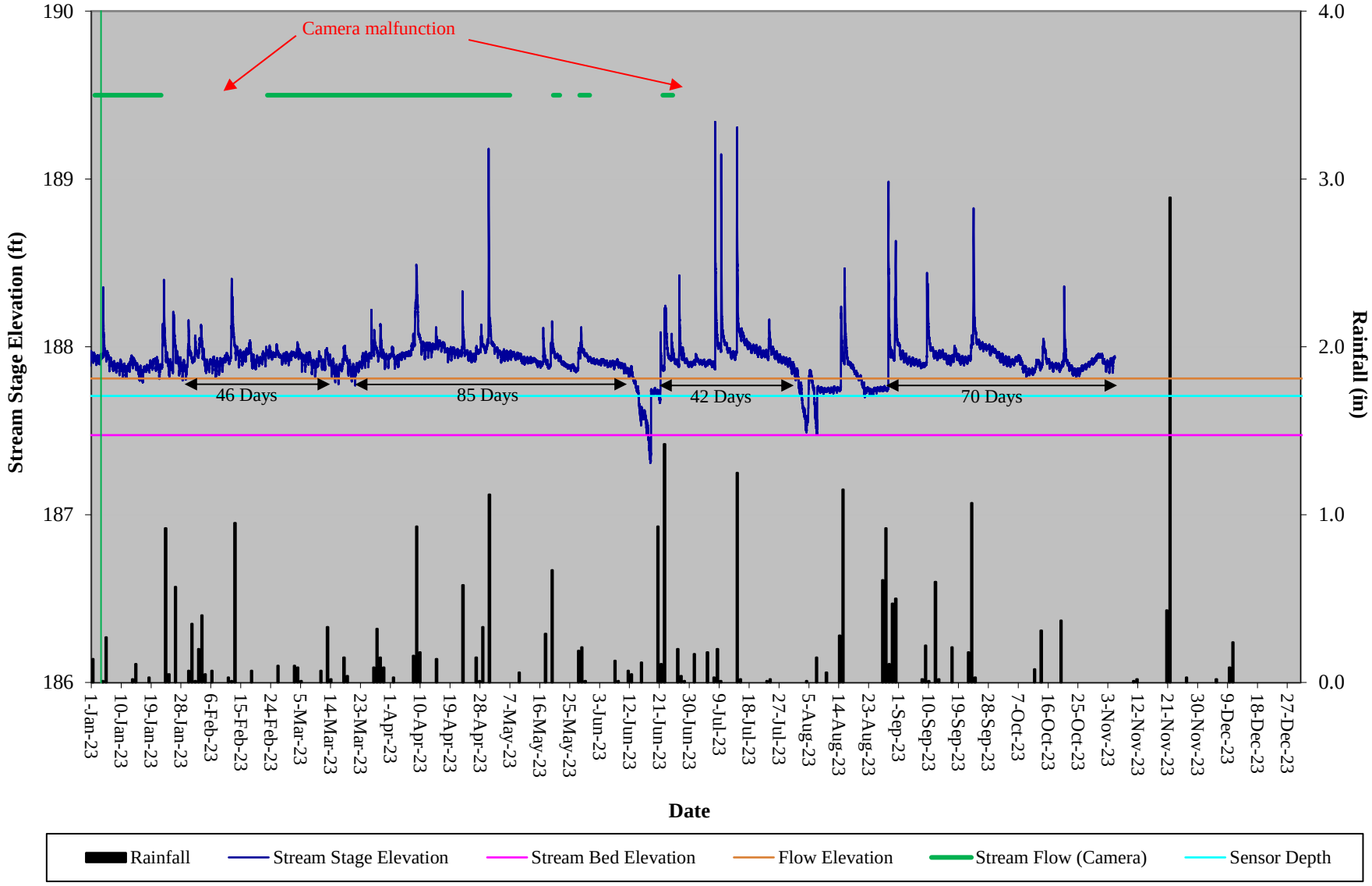
*Camera obscured or malfunctioned for most of the year

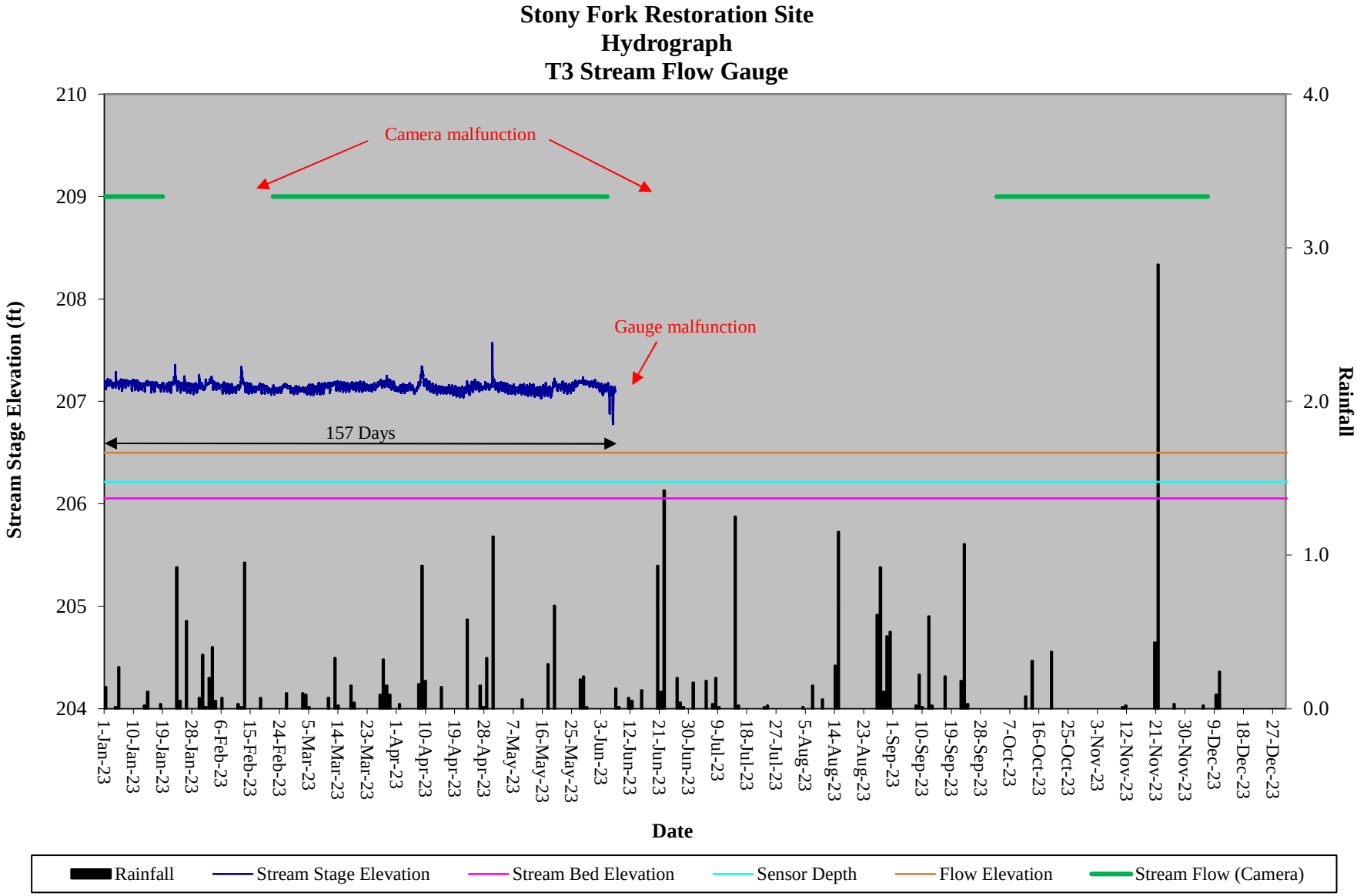
Stony Fork Restoration Site
Hydrograph
T1 Stream Flow Gauge




Stony Fork Restoration Site
Hydrograph
T1-A Stream Flow Gauge
Stream Stage Elevation (ft)
Rainfall
Date
205
204
203
202
201
4.0
3.0
2.0
1.0
0.0
Camera obscured
116 Days
139 Days
1-Jan-23
10-Jan-23
19-Jan-23
28-Jan-23
6-Feb-23
15-Feb-23
24-Feb-23
5-Mar-23
14-Mar-23
23-Mar-23
1-Apr-23
10-Apr-23
19-Apr-23
28-Apr-23
7-May-23
16-May-23
25-May-23
3-Jun-23
12-Jun-23
21-Jun-23
30-Jun-23
9-Jul-23
18-Jul-23
27-Jul-23
5-Aug-23
14-Aug-23
23-Aug-23
1-Sep-23
10-Sep-23
19-Sep-23
28-Sep-23
7-Oct-23
16-Oct-23
25-Oct-23
3-Nov-23
12-Nov-23
21-Nov-23
30-Nov-23
9-Dec-23
18-Dec-23
27-Dec-23
Rainfall
Stream Stage Elevation
Stream Bed Elevation
Sensor Depth
Flow Elevation
Stream Flow (Camera)

Stony Fork Restoration Site
Hydrograph
T2 Stream Flow Gauge




Stony Fork Restoration Site
Hydrograph
T3 Stream Flow Gauge
Camera malfunction
Gauge malfunction
157 Days
Stream Stage Elevation (ft)
Rainfall
Date
210
209
208
207
206
205
204
4.0
3.0
2.0
1.0
0.0
1-Jan-23
10-Jan-23
19-Jan-23
28-Jan-23
6-Feb-23
15-Feb-23
24-Feb-23
5-Mar-23
14-Mar-23
23-Mar-23
1-Apr-23
10-Apr-23
19-Apr-23
28-Apr-23
7-May-23
16-May-23
25-May-23
3-Jun-23
12-Jun-23
21-Jun-23
30-Jun-23
9-Jul-23
18-Jul-23
27-Jul-23
5-Aug-23
14-Aug-23
23-Aug-23
1-Sep-23
10-Sep-23
19-Sep-23
28-Sep-23
7-Oct-23
16-Oct-23
25-Oct-23
3-Nov-23
12-Nov-23
21-Nov-23
30-Nov-23
9-Dec-23
18-Dec-23
27-Dec-23
Rainfall
Stream Stage Elevation
Stream Bed Elevation
Sensor Depth
Flow Elevation
Stream Flow (Camera)