MONITORING YEAR 7 ANNUAL REPORT
Final

FOUST CREEK MITIGATION SITE
Alamance County, NC
NCDEQ Contract 004954
DMS Project Number 95715
USACE Action ID Number 2012-01908
NCDWR Project Number 13-1295

Data Collection Period: March 2021 - November 2021
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EXECUTIVE SUMMARY

Wildlands Engineering (Wildlands) completed a full delivery project for the North Carolina Department of Environmental Quality, Division of Mitigation Services (DMS) to restore and enhance a total of 5,500 linear feet (LF) of stream and rehabilitate and re-establish 4.79 acres of wetlands in Alamance County, NC. The Foust Creek Mitigation Site (Site) proposes to provide 4,769.6 Stream Mitigation Units (SMUs) and 3.738 Wetland Mitigation Units (WMUs). The project consists of Foust Creek, a second order perennial stream, and an unnamed, intermittent first order tributary to Foust Creek (UT1). At the downstream limits of the project the drainage area is 1,259 acres (1.97 square miles).

The Site is located in the southern portion of Alamance County, east of Snow Camp and approximately 15 miles southeast of the City of Burlington (Figure 1). It is located in the Carolina Slate Belt of the Piedmont Physiographic Province (USGS, 1998). The Site is in the Jordan Lake Water Supply Watershed within the North Carolina Division of Water Resources (NCDWR) subbasin 03-06-04 of the Cape Fear River Basin and United States Geological Survey (USGS) Hydrologic Unit 03030002050050.

Prior to construction activities, both streams had been degraded by livestock access and agricultural practices. The primary objectives of the project were to promote wetland hydrology, restore a stream and wetland complex to the condition of a naturally occurring community, restore a stream system to promote hydrologic connectivity with the floodplains and wetlands, stabilize stream banks, promote instream habitat and aeration, restore riparian buffers, and further improve water quality through removing agricultural practices. Figure 2 and Table 1 present the restoration and enhancement components of the Site.

The following project goals were established to address the effects listed above from watershed and project site stressors:

- Reduce sediment inputs by removing cattle from streams and restoring degraded and eroding stream channels;
- Return a network of streams to a stable form that is capable of supporting biological functions;
- Reduce fecal coliform, nitrogen, and phosphorus inputs through removing cattle from streams and establishing and augmenting a forested riparian corridor; and
- Protect existing high-quality streams and forested buffers.

Stream and wetland restoration and enhancement construction efforts were completed in February 2015. Baseline as-built monitoring activities (MY0) were completed in February 2015. A conservation easement is in place on 22.11 acres of the stream and wetland riparian corridors to protect them in perpetuity.

Monitoring Year 7 (MY7) assessment and site visits were completed between the months of March and November 2021 to assess the conditions of the project. Overall, the Site has met the required vegetation, stream, and hydrology success criteria for MY7. All streams within the Site are stable and functioning as designed. Planted vegetation has generally performed successfully and volunteer stems have supplemented the riparian buffer. Bankfull events were recorded on both streams, and persistent flow was recorded on UT1 for 140 consecutive days. Eight out of ten groundwater wells recorded hydroperiods satisfying the wetland hydrology criterion. A small wetland credit area at risk area was removed from credit due to hydrology not meeting criterion. GW3 did not meet the wetland hydrology criterion during the abnormally dry springs of MY6 or MY7, but achieved the criterion during MY1-MY5, suggesting it is generally representative of successful wetland re-establishment.

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APPENDICES

Section 1: PROJECT OVERVIEW

The Foust Creek Mitigation Site; hereafter referred to as the Site, is located in southern Alamance County within the Cape Fear River Basin (USGS Hydrologic Unit 03030002) approximately 15 miles southeast of the City of Burlington. The Site is located upstream and downstream of the Snow Camp Road stream crossing immediately east of the town of Snow Camp. The Site is located in the Carolina Slate Belt of the Piedmont Physiographic Province (USGS, 1998). The project watershed consists primarily of agricultural lands and forest. The drainage area for the project site is 1,259 acres (1.97 square miles) at the lower end of Foust Creek.

The project stream reaches include Foust Creek and UT1 and were improved through stream restoration and enhancement level II approaches. Mitigation work within the Site included restoration and enhancement of 5,500 linear feet (LF) of perennial and intermittent stream channel and rehabilitation and re-establishment of 4.79 acres (ac) of riparian wetland. The stream and wetland areas were also planted with native vegetation to improve habitat and protect water quality. The Site proposes to provide 4,769.6 Stream Mitigation Units (SMUs) and 3.738 Wetland Mitigation Units (WMUs). The final mitigation plan was submitted and accepted by the North Carolina Department of Environmental Quality, Division of Mitigation Services (DMS) in February of 2014. Construction activities were completed by Fluvial Solutions in February 2015. The planting was completed by Bruton Natural Systems, Inc. in February 2015 and baseline monitoring (MY0) was conducted in January and February 2015. Annual monitoring will be conducted for seven years with the close-out anticipated to commence in 2022 given the success criteria are met. Appendix 1 provides more detailed project activity, history, contact information, and watershed/site background information for this project.

A conservation easement has been recorded and is in place along the stream and wetland riparian corridors to protect them in perpetuity; 22.11 ac (Deed Book 3278, Pages 935-944) within four parcels. Directions and a map of the Site are provided in Figure 1 and project components are illustrated in Figure 2.

1.1 Project Goals and Objectives

Prior to construction activities, both streams had been degraded by livestock access and agricultural practices. Impacts to the stream included direct access by livestock, trampling of the riparian vegetation and stream banks, channelization, eroding banks, floodplain ditching, and a lack of stabilizing riparian vegetation. The adjacent floodplain had been cleared for pasture and was grazed by livestock. The riparian vegetation was either absent, limited to the streambanks, or periodically disturbed. Table 4 in Appendix 1 and Tables 10a and 10b in Appendix 4 present the pre-restoration conditions in detail.

The Site was designed to meet the over-arching goals as described in the Mitigation Plan (Wildlands, 2014). The project is intended to provide numerous ecological benefits within the Cape Fear River Basin. While many of these benefits are limited to the Foust Creek Mitigation Site project area, others, such as pollutant removal and improved aquatic and terrestrial habitat, have more far-reaching effects. The following project specific goals established in the Mitigation Plan (Wildlands, 2014) include:

- Reduce sediment inputs by removing cattle from streams and restoring degraded and eroding stream channels;
- Return a network of streams to a stable form that is capable of supporting biological functions;

- Reduce fecal coliform, nitrogen, and phosphorus inputs through removing cattle from streams and establishing and augmenting a forested riparian corridor; and
- Protect existing high-quality streams and forested buffers.

The project goals were addressed through the following project objectives:

- On-site nutrient inputs were decreased by removing cattle from streams, re-establishing floodplain connectivity, and filtering on-site runoff through buffer zones and wetlands. Off-site nutrient input is absorbed on-site by filtering flood flows through restored floodplain areas and riparian wetlands, where flood flow spreads through native vegetation. Vegetation uptakes excess nutrients.
- Stream bank erosion which contributes sediment load to the creeks was greatly reduced in the project area. Eroding stream banks were stabilized using bioengineering, natural channel design techniques, and grading to reduce bank angles and bank height. Storm flow containing grit and fine sediment is filtered through restored floodplain areas, where flow spreads through native vegetation. Spreading flood flows also reduce velocity and allow sediment to settle out. Sediment transport capacity of restored reaches was improved so that capacity balances more closely to load. Sediment load reduction will be monitored through assessing bank stability with cross section surveys and visual assessment through photo documentation which serves as an accepted surrogate for direct turbidity measurements.
- Restored riffle/pool sequences promote aeration of water and create deep water zones, helping to lower water temperature. Establishment and maintenance of riparian buffers creates long-term shading of the channel flow to minimize thermal heating. Lower water temperatures help maintain dissolved oxygen concentrations.
- In-stream structures were constructed to improve habitat diversity and trap detritus. Wood habitat structures were included in the stream as part of the restoration design. Such structures included log drops and rock structures that incorporate woody debris.
- Adjacent buffer and riparian habitats were restored with native vegetation as part of the project. Native vegetation provides cover and food for terrestrial creatures. Native plant species were planted and invasive species were treated. Eroding and unstable areas were also stabilized with vegetation as part of this project.
- The restored land is protected in perpetuity through a conservation easement.

The design streams and wetlands were restored to the appropriate type based on the surrounding landscape, climate, and natural vegetation communities but also with strong consideration to existing watershed conditions and trajectory. Specifically, the Site design was developed to restore a stream and wetland complex to the condition of a naturally occurring ecosystem creating riparian habitat and improving water quality.

1.2 Monitoring Year 7 Data Assessment

Annual monitoring and quarterly site visits were conducted during monitoring year 7 (MY7) to assess the condition of the project. The stream and wetland mitigation success criteria for the Site follow the approved success criteria presented in the Foust Creek Mitigation Plan (Wildlands, 2014).

1.2.1 Vegetation Assessment

A total of 17 10 meter by 10 meter vegetation plots were established during baseline monitoring within the project easement areas. The final vegetative success criteria will be the survival of 210 planted stems per acre averaging 10 feet in height within the conservation easement at the end of the seven-year monitoring period (MY7).

The MY7 vegetation survey was completed in August 2021. The 2021 vegetation monitoring indicated an average planted stem density of 402 planted stems per acre, which is greater than the requirement of 210 planted stems per acre required at the close of MY7. Fifteen of the 17 vegetation plots individually met the planted stem density success criterion for MY7 (Table 9). Planted stem densities in plots six and seven have 202 planted stems per acre. However, desirable volunteer stems have been present for at least two years in these plots and the target density is achieved when including these. Ten out of the 17 vegetation plots have an average tree height of 10 feet or greater (Table 7a). Vegetation plots two, three, five, seven, eight, ten, and eleven have average heights below 10 feet, probably due to factors including excess moisture stress, competing vegetation, and poor soil nutrition. Wildlands began addressing competing vegetation and poor soil nutrition during MY6 and continued these practices through MY7 (Figures 3.1-3.3). Soil amendment and fescue (*Festuca arundinacea*) competition control resulted in visually evident new, rapid tree growth in treated areas. At the close of MY7, it appears that all areas of the site have well established trees tall enough to become robust to the effects of competing vegetation and continue growing for the foreseeable future. Refer to Appendix 2 for vegetation plot photographs and the vegetation condition assessment table and Appendix 3 for vegetation data tables.

1.2.2 Vegetation Areas of Concern

Defined populations of Japanese honeysuckle (*Lonicera japonica*), Chinese privet (*Ligustrum sinense*), and tree of heaven (*Ailanthus altissima)* occurring in 2.2 acre, 1.0 acre, and 0.14 acre areas, respectively were treated during February and April of MY7 (Figures 3.1-3.3). The Chinese privet stem counted in vegetation plot 14 is an example of an isolated occurrence that was not included in a targeted treatment area this year (Table 9). Fescue was sprayed around the perimeter of trees within a 0.8 acre area in the northern portion of the easement adjacent to Foust Creek Reach 1. Soil Amendments were added to a total of 2.28 acres where relatively slower tree growth had been observed during previous monitoring years. Soil amendments and fescue ring sprays were conducted during April 2021 and resulted in noticeable new growth to planted and volunteer stems. Although some trees in these areas remain shorter, they appear to have become well established and accrued adequate biomass to survive and grow for the foreseeable future.

During MY7, vegetation was trimmed off of the fence to ensure fence integrity, cattle exclusion, and signage visibility.

1.2.3 Stream Assessment

Morphological surveys for MY7 were conducted in April 2021. All streams within the Site are stable and met success criteria for MY7. In general, cross sections for all streams showed little to no change in bankfull area, maximum depth ratio, or width-to-depth ratio. Cross section surveys show that the bank height ratios remain at or very near 1.0. Entrenchment ratios vary slightly from year to year due to minor changes in bankfull widths. Small adjustments in width occur due to vegetation, sediment deposition, and other factors. These minor changes do not indicate channel instability. Surveyed riffle cross sections fell within the parameters defined for channels of the appropriate Rosgen stream type. The inside of the meander bend surveyed in cross section 2 has experienced sediment deposition

associated with point bar development. This section of Foust Creek was designed with a low slope. Mean depth and cross-sectional area have decreased, but the channel has maintained width and maximum depth dimensions relative to as-built dimensions. Point bar development is not an indicator of channel instability.

Visual assessment indicated streams are laterally and vertically stable throughout the project. Refer to Appendix 2 for the visual stability assessment table, the CCPV, and reference photographs. Refer to Appendix 4 for the morphological data and plots.

1.2.4 Stream Areas of Concern

There are no stream areas of concern for MY7.

1.2.5 Hydrology Assessment

At the end of the seven-year monitoring period, two or more bankfull events must have occurred during separate years within the restoration reaches. Bankfull events were recorded on both Foust Creek and UT1 during MY7 data collection (Table 13). Both Foust Creek and UT1 recorded bankfull events during all previous monitoring years; therefore, the Site has met the required bankfull stream hydrology criterion for the duration of the monitoring period.

A flow gage was installed on UT1 to document jurisdictional status. Baseflow must be present for at least some portion of the year (most likely in the winter/early spring) during years with normal rainfall conditions. UT1 flowed continuously from January 1 until May 21 (140 consecutive days). UT1 then flowed intermittently through the remainder of the data collection period. UT1 attained the flow duration success criterion for MY7. A stream flow plot for UT1 is included in Appendix 5.

1.2.6 Wetland Assessment

Ten groundwater gages were monitored within the wetland rehabilitation and re-establishment zones. All gages were installed at appropriate locations so that the data collected provides an indication of groundwater levels throughout the Site. A soil temperature probe and barometric pressure gage was also installed to support wetland hydrology measurements. All monitoring gages were downloaded and maintained quarterly. The success criterion for wetland hydrology is a free groundwater surface within 12 inches of the soil surface for a consecutive 8.5% of the growing season. During MY1 NRCS WETS Data was used to determine the growing season for the Site. After discussions with the United States Army Corps of Engineers (USACE), it was agreed to use on-site soil temperature data to determine the beginning of the growing season and use NRCS WETS data to determine the end of the growing season. The growing season begins when soil temperature remains above 41 degrees Fahrenheit 12 inches below the soil surface but is not to begin prior to March 1. Bud burst of black willow (*Salix nigra*) was observed on February 23, 2021 at nearby project sites, further supporting the March 1 growing season start date. Refer to Appendix 2 for the groundwater gage locations and Appendix 5 for groundwater hydrology data and plots.

All groundwater wells (GW) attained the hydrology criterion except for GW3 and GW11. GW11 was located in an area identified as having questionable wetland hydrology during a MY5 IRT site visit and was considered credit at risk during MY6. MY6 and MY7 data for GW11 suggest this area is not functioning as a wetland so credit in this area was removed (Table 1, Figure 3.2). GW3 exceeded the 8.5% hydroperiod criterion during MY1-MY5, but exhibited hydroperiods of 2.4% and 2.0% during MY6 and MY7, respectively (Table 15). MY1-MY5 data for GW3 demonstrated that the water table was generally maintained between eight and 12 inches below the soil surface during the first five weeks of

the growing season. During MY6 and MY7, the water table was stable at 12 to 14 inches below the soil surface, with peaks well above the 12-inch threshold through the first week of April. While the MY6 and MY7 hydroperiods observed at GW3 were well below the 8.5% criterion, they only narrowly missed in terms of water table depth below the soil surface. Very low rainfall quantity during the first two weeks of March was probably a significant contributing factor to the short hydroperiods observed at GW3 during MY6 and MY7. Groundwater hydrology data is included in Appendix 5.

1.2.7 Maintenance Plan

Additional invasive vegetation treatment is scheduled for the winter of 2021 to continue treating new growth of Japanese honeysuckle.

1.3 Monitoring Year 7 Summary

All streams within the Site are stable and functioning as designed. Overall, planted vegetation has performed successfully and volunteer stems have supplemented the riparian buffer. Bankfull events were recorded on both streams, and persistent flow was recorded on UT1 for 140 consecutive days. Eight out of ten groundwater wells recorded hydroperiods satisfying the wetland hydrology criterion. A small wetland credit area at risk area was removed from credit due to hydrology not meeting criterion. GW3 did not meet the wetland hydrology criterion during the abnormally dry springs of MY6 or MY7, but achieved the criterion during MY1-MY5, suggesting it is generally representative of successful wetland re-establishment. The project successfully restored and enhanced 5,500 feet of stream and rehabilitated and re-established 4.79 acres of wetland to provide drastic ecological, water quality, and habitat benefits relative to the pre-restoration condition of the site.

Section 2: METHODOLOGY

Geomorphic data was collected following the standards outlined in The Stream Channel Reference Site: An Illustrated Guide to Field Techniques (Harrelson et al., 1994) and in the Stream Restoration: A Natural Channel Design Handbook (Doll et al., 2003). All data collected for the Integrated Current Condition Mapping was recorded using a Trimble handheld GPS with sub-meter accuracy and processed using Pathfinder and ArcGIS software. Crest gages and pressure transducers were installed in surveyed riffle cross sections and monitored quarterly. Hydrology attainment installation and monitoring methods are in accordance with the USACE (2003) standards. Vegetation monitoring protocols followed the Carolina Vegetation Survey-NCDMS Level 2 Protocol (Lee et al., 2008). Summary information and data related to the success of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the Mitigation Plan documents available on DMS's website. All raw data supporting the tables and figures in the appendices are available from DMS upon request.

Section 3: REFERENCES

Doll, B.A., Grabow, G.L., Hall, K.A., Halley, J., Harman, W.A., Jennings, G.D., and Wise, D.E. 2003. Stream Restoration A Natural Channel Design Handbook.

Harrelson, C.C., Rawlins, C.L., Potyondy, J.P. 1994. *Stream Channel Reference Sites: An Illustrated Guide to Field Technique.* Gen. Tech. Rep. RM-245. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 61 p.

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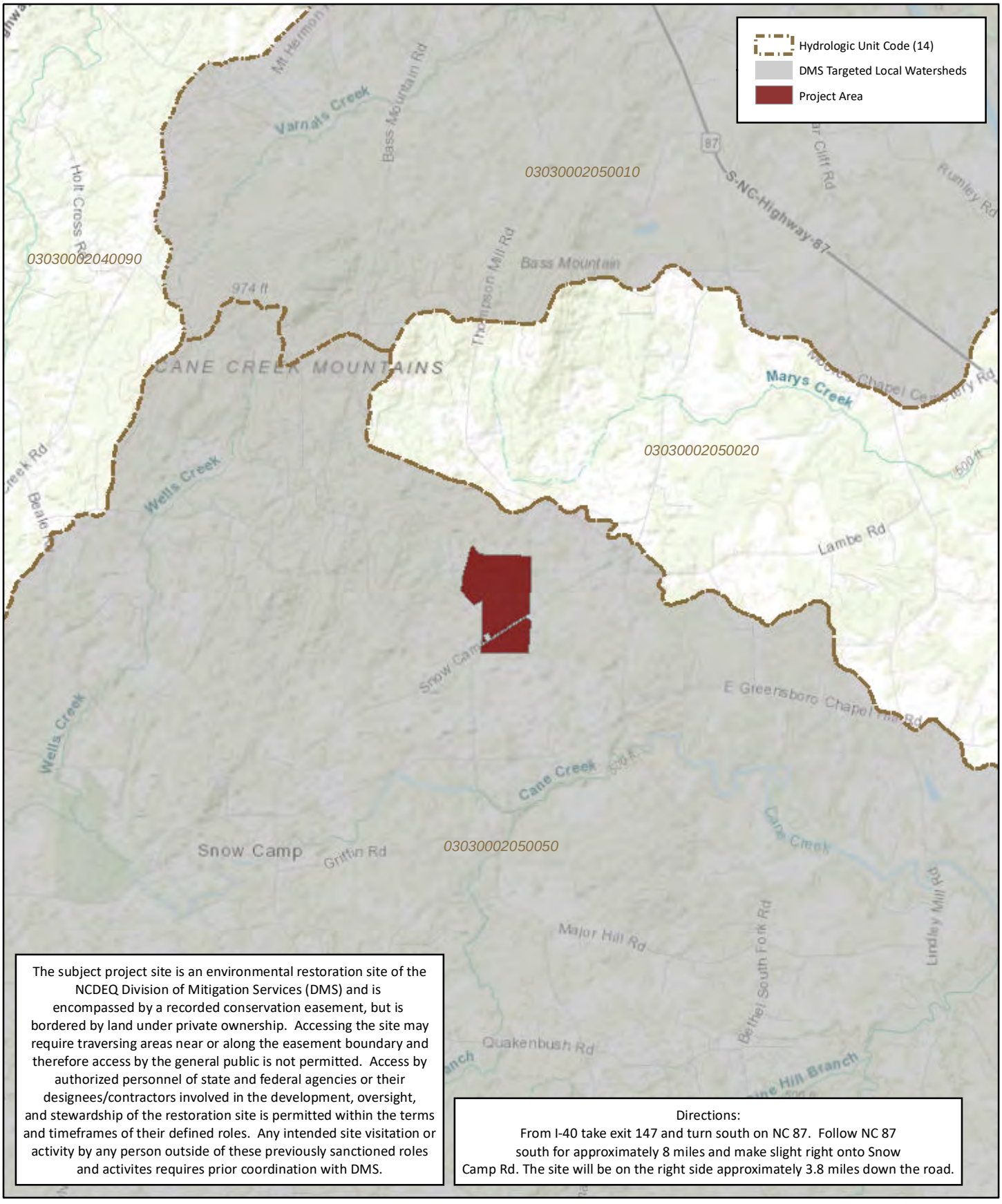
Wildlands Engineering, Inc. 2015. Foust Creek Mitigation Site Baseline Monitoring Document and As-Built Baseline Report. DMS, Raleigh, NC.

APPENDIX 1. General Tables and Figures

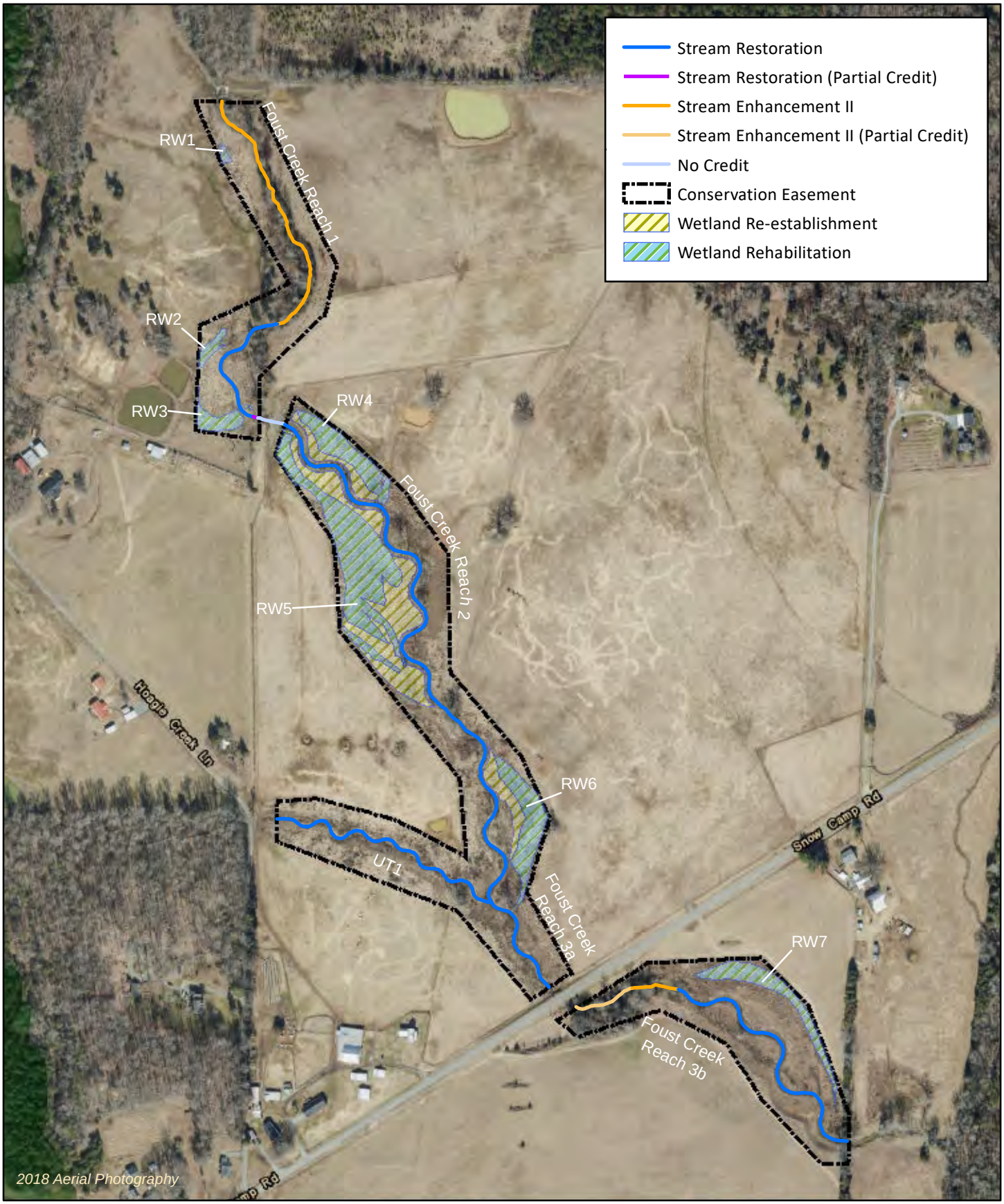


WILDLANDS ENGINEERING

0 0.5 1 Miles

N

Figure 1. Project Vicinity Map
Foust Creek Mitigation Site
DMS Project No. 95715
Monitoring Year 7 - 2021
Alamance County, NC



WILDLANDS ENGINEERING

0 200 400 Feet

N

Figure 2. Project Component/Asset Map
Foust Creek Mitigation Site
DMS Project No. 95715
Monitoring Year 7 - 2021
Alamance County, NC

Table 1. Project Components and Mitigation Credits
Foust Creek Mitigation Site (DMS Project No. 95715)
Monitoring Year 7 - 2021

Mitigation Credits

	Stream		Riparian Wetland		Non-Riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R-E[1]	RE[1]	R-E[1]	RE[1]			
Totals	4,769.6	N/A	1.631*	2.107	N/A	N/A			

Project Components

Reach ID	As-Built Stationing/ Location	Existing Footage/ Acreage	Approach	Restoration or Restoration Equivalent	Restoration Footage/ Acreage	Mitigation Ratio	Credits (SMU/ WMU)
Streams							
Foust Creek – Reach 1	101+83 to 109+96	814	EII	Enhancement	813	2.5	325.2
Foust Creek – Reach 2	109+96 to 114+21 & 115+19 to 134+84	2,356	P1	Restoration	2,390	1	2,390
Foust Creek – Reach 2	114+21 to 114+35	31	P1	Restoration (Partial Credit)	14	2[2]	7
Foust Creek – Reach 2 (Easement Break)	114+35 to 115+19	91	P1	Restoration (No Credit)	84	---	---
Foust Creek – Reach 3A	134+84 to 138+01	307	P1/2	Restoration	317	1	317
Foust Creek – Reach 3B	139+01 to 140+89	187	EII	Enhancement (Partial Credit)	188	5[2]	37.6
Foust Creek – Reach 3B	140+89 to 142+31	142	EII	Enhancement	142	2.5	56.8
Foust Creek – Reach 3B	142+31 to 150+74	684	P1/2	Restoration	843	1	843
UT1 to Foust Creek	200+94 to 208+87	713	P1	Restoration	793	1	793
Wetlands							
Riparian Wetland RW1	---	0.03	---	Rehabilitation	0.03	1.5	0.020
Riparian Wetland RW2	---	0.08	---	Rehabilitation	0.08	1.5	0.053
Riparian Wetland RW3	---	0.16	---	Rehabilitation	0.16	1.5	0.107
Riparian Wetland RW4	---	0.45	---	Rehabilitation	0.45	1.5	0.300
Riparian Wetland RW4	---	0.21	---	Re-Establishment	0.21	1.0	0.210
Riparian Wetland RW5	---	1.46	---	Rehabilitation	1.46	1.5	0.973
Riparian Wetland RW5	---	1.18	---	Re-Establishment	1.18	1.0	1.180
Riparian Wetland RW6	---	0.52	---	Rehabilitation	0.52	1.5	0.347
Riparian Wetland RW6	---	0.51	---	Re-Establishment	0.241*	1.0	0.241*
Riparian Wetland RW7	---	0.46	---	Rehabilitation	0.46	1.5	0.307

Component Summation

Restoration Level	Stream (LF)	Riparian Wetland (acres)		Non-Riparian Wetland (acres)	Buffer (acres)	Upland (acres)
		Riverine	Non-Riverine			
Restoration	4,357	-	-	-	-	-
Enhancement		-	-	-	-	-
Enhancement I	-					
Enhancement II	1,143					
Creation		-	-	-		
Preservation	-	-	-	-		-
High Quality Preservation	-	-	-	-		-
Re-Establishment		1.631*	-	-		
Rehabilitation		3.16	-	-		

N/A: not applicable

1. R-E = Wetland Re-Establishment and RE = Wetland Rehabilitation per NCDENR July 30, 2013 Memorandum titled: Consistency between Federal and State Wetland Mitigation Requirements

2. A portion of Foust Creek Reach 2 and Reach 3B does not have a full 50' buffer from top of bank to the conservation easement boundary on the river left side. Therefore, mitigation credit is only included at a rate of half the normal crediting giving the restoration or restoration equivalent type.

* Wetland RW6 Re-Establishment credit calculations were updated for Monitoring Year 3 and Monitoring Year 7 based on the performance of groundwater wells 9 and 11, respectively.

Table 2. Project Activity and Reporting History
Foust Creek Mitigation Site (DMS Project No. 95715)
Monitoring Year 7 - 2021

Activity or Report		Date Collection Complete	Completion or Scheduled Delivery
Mitigation Plan		October 2013-February 2014	February 2014
Final Design - Construction Plans		April 2014-August 2014	August 2014
Construction		October 2014-February 2015	February 2015
Temporary S&E mix applied to entire project area[1]		February 2015	February 2015
Permanent seed mix applied to reach/segments		February 2015	February 2015
Bare root and live stake plantings for reach/segments		February 2015	February 2015
Baseline Monitoring Document (Year 0)	Stream Survey	February 2015	May 2015
	Vegetation Survey	February 2015	
Year 1 Monitoring	Stream Survey	September 2015	December 2015
	Vegetation Survey	September 2015	
Year 2 Monitoring	Stream Survey	March 2016	December 2016
	Vegetation Survey	June 2016	
Supplemental Planting			March 2017
Year 3 Monitoring	Stream Survey	March 2017	December 2017
	Vegetation Survey	August 2017	
Invasive Vegetation Treatment			September 2018
Year 4 Monitoring	Stream Survey	N/A	December 2018
	Vegetation Survey	N/A	
Supplemental Planting			January 2019
Invasive Vegetation Treatment			May 2019
Invasive Vegetation Treatment			October 2019
Year 5 Monitoring	Stream Survey	March 2019	December 2019
	Vegetation Survey	August 2019	
Year 6 Monitoring	Stream Survey	N/A	December 2020
	Vegetation Survey	N/A	
Invasive Vegetation Treatment			February 2020
Tree Fertilization			April 2020
Tree Release			August 2020
Invasive Vegetation Treatment			February 2021
Soil Amendment, Invasive Vegetation Treatment, and Fescue Ring Spray			April 2021
Year 7 Monitoring	Stream Survey	April 2021	December 2021
	Vegetation Survey	August 2021	

[1]Seed and mulch is added as each section of construction is completed.

Table 3. Project Contacts Table
Foust Creek Mitigation Site (DMS Project No. 95715)
Monitoring Year 7 - 2021

Designer Angela Allen, PE	**Wildlands Engineering, Inc.** 312 West Millbrook Road, Suite 225 Raleigh, NC 27609 919.851.9986
Construction Contractor	**Fluvial Solutions** P.O. Box 28749 Raleigh, NC 27611
Planting Contractor	**Bruton Natural Systems, Inc** P.O. Box 1197 Fremont, NC 27830
Seeding Contractor	**Fluvial Solutions** P.O. Box 28749 Raleigh, NC 27611
Seed Mix Sources	**Green Resource, LLC**
Nursery Stock Suppliers	
Bare Roots	**Dykes and Son Nursery**
Live Stakes	**Bruton Natural Systems, Inc**
Monitoring Performers Monitoring, POC	**Wildlands Engineering, Inc.** Jason Lorch 919.851.9986, ext. 107

Table 4. Project Information and Attributes
Foust Creek Mitigation Site (DMS Project No. 95715)
Monitoring Year 7 - 2021

Project Information	
Project Name	Foust Creek Mitigation Site
County	Alamance County
Project Area	22.11 acres
Planted Area	22.11 acres
Project Coordinates (latitude and longitude)	35° 55' 0.12" N, 79° 24' 6.84" W
Project Watershed Summary Information	
Physiographic Province	Carolina Slate Belt of the Piedmont Physiographic Province
River Basin	Cape Fear River
USGS Hydrologic Unit 8-digit	03030002
USGS Hydrologic Unit 14-digit	03030002050050
DWR Sub-basin	03-06-04
Project Drainiage Area (acres)	1,259 acres
Project Drainage Area Percentage of Impervious Area	<1%
CGIA Land Use Classification	78% Forested/ Scrubland, 21% Agriculture/ Managed Herbaceous, <1% Open Water, <1% Watershed Impervious Cover, <1% Developed

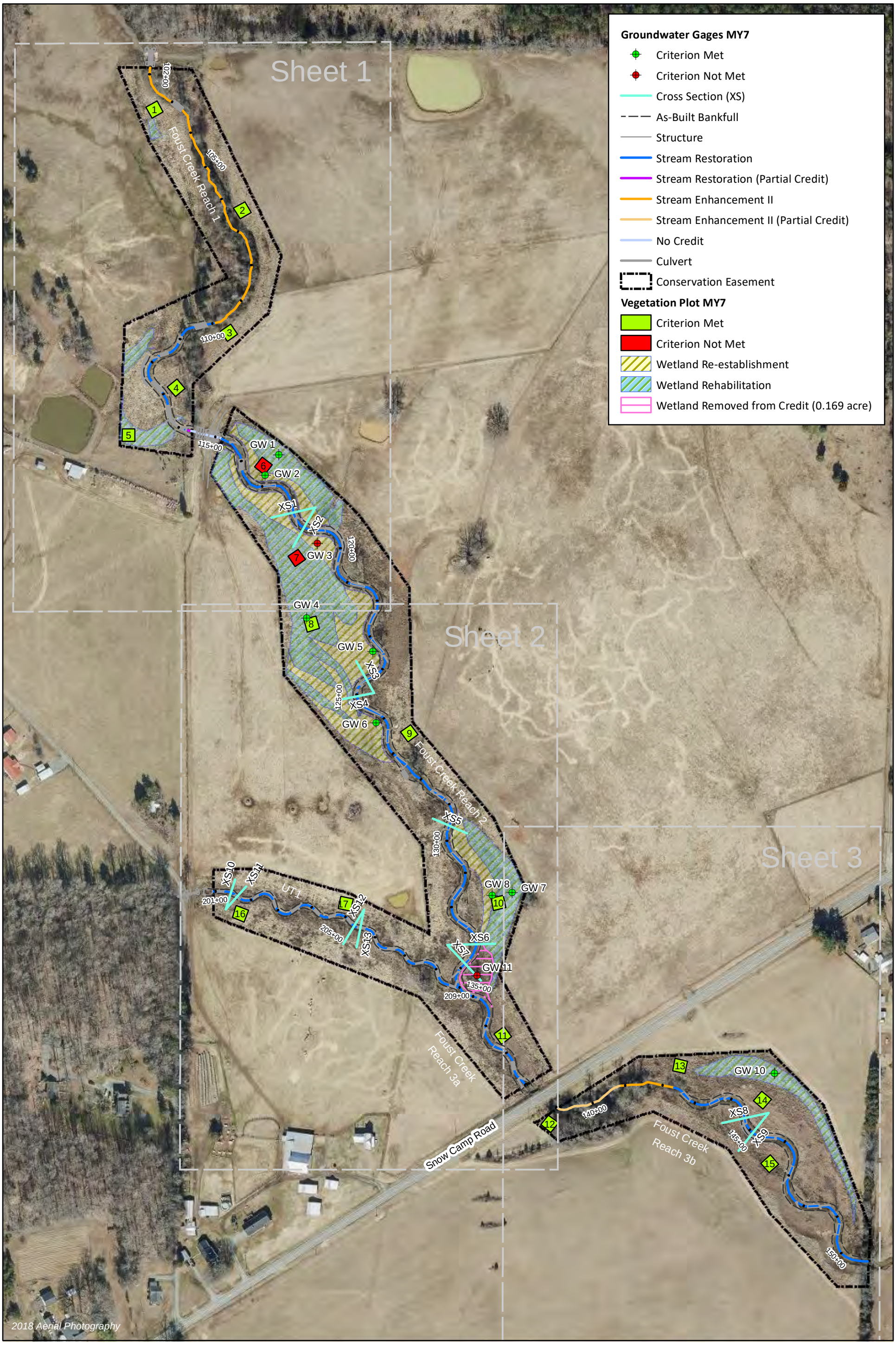
Reach Summary Informtation

Parameters	Foust Creek Reach 1	Foust Creek Reach 2	Foust Creek Reach 3	UT1
Length of reach (linear feet) - Post-Restoration	813	2,404	1,490	793
Drainage area (acres)	954	1,047	1,259	173
NCDWR stream identification score	41.5	41.5	44	28
NCDWR Water Quality Classification	WS-V	WS-V	WS-V	---
Morphological Desription (stream type)	P	P	P	I
Evolutionary trend (Simon's Model) - Pre- Restoration	III/IV	N/A	III/IV	III
Underlying mapped soils	Georgeville silty clay loam, Local alluvial land, Orange silt loam			
Drainage class	---	---	---	---
Soil Hydric status	---	---	---	---
Slope	---	---	---	---
FEMA classification	AE	AE	AE	---
Native vegetation community	Piedmont bottomland forest			
Percent composition exotic invasive vegetation - Post - Restoration	0%			

Regulatory Considerations

Regulation	Applicable?	Resolved?	Supporting Documentation
Waters of the United States - Section 404	Yes	Yes	USACE Nationwide Permit No.27 and DWQ 401 Water Quality Certification No. 3885.
Waters of the United States - Section 401	Yes	Yes	
Division of Land Quality (Dam Safety)	No	N/A	N/A
Endangered Species Act	Yes	Yes	Foust Creek Mitigation Plan(2013); Wildlands determined "no effect" on Alamance County listed endangered species.
Historic Preservation Act	Yes	Yes	No historic resources were found to be impacted (letter from SHPO dated 1/9/13).
Coastal Zone Management Act (CZMA)/Coastal Area Management Act (CAMA)	No	N/A	N/A
FEMA Floodplain Compliance	Yes	Yes	Foust Creek is located within the floodway and flood fringe (FEMA Zone AE, FIRM panels 8788 and 8879).
Essential Fisheries Habitat	No	N/A	N/A

APPENDIX 2. Visual Assessment Data



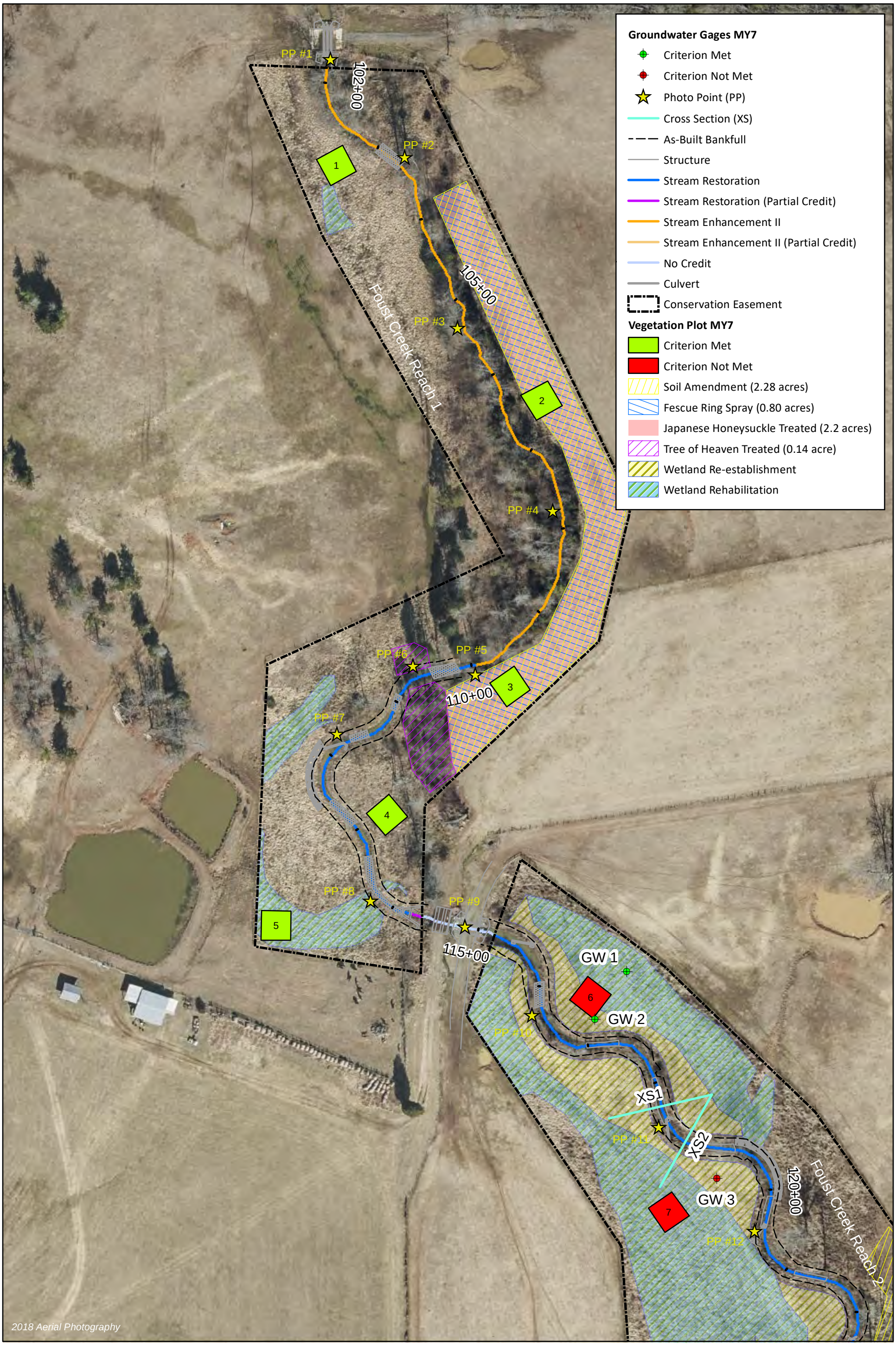
WILDLANDS ENGINEERING

0 125 250 375 500 Feet

N

Figure 3.0 Integrated Current Condition Plan View (Key)
Foust Creek Mitigation Site
DMS Project No. 95715
Monitoring Year 7 - 2021

Alamance County, NC



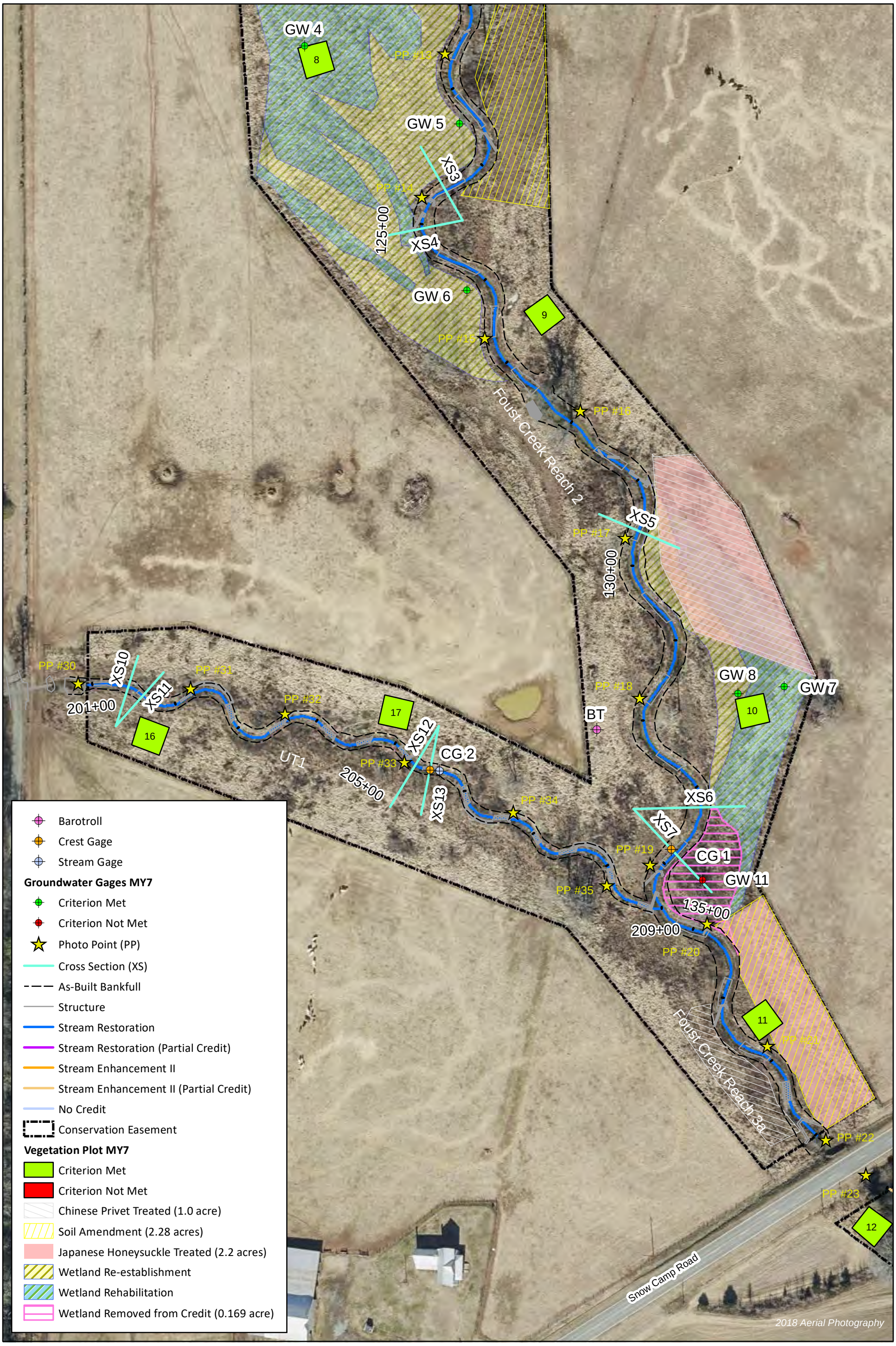
WILDLANDS ENGINEERING

0 50 100 150 200 Feet

N

Figure 3.1 Integrated Current Condition Plan View
(Sheet 1 of 3)
Foust Creek Mitigation Site
DMS Project No. 95715
Monitoring Year 7 - 2021

Alamance County, NC



WILDLANDS ENGINEERING

0 50 100 150 200 Feet

N

Figure 3.2 Integrated Current Condition Plan View
(Sheet 2 of 3)
Foust Creek Mitigation Site
DMS Project No. 95715
Monitoring Year 7 - 2021

Alamance County, NC

WILDLANDS ENGINEERING

0 50 100 150 200 Feet

Figure 3.3 Integrated Current Condition Plan View
(Sheet 3 of 3)
Foust Creek Mitigation Site
DMS Project No. 95715
Monitoring Year 7 - 2021

Alamance County, NC

Table 5a. Visual Stream Morphology Stability Assessment Table

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Foust Creek Reach 1 (813 LF)

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	n/a	n/a			n/a			
	3. Meander Pool Condition	Depth Sufficient	n/a	n/a			n/a			
		Length Appropriate	n/a	n/a			n/a			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	n/a	n/a			n/a			
		Thalweg centering at downstream of meander bend (Glide)	n/a	n/a			n/a			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	n/a	n/a	n/a
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	n/a	n/a	n/a
	3. Mass Wasting	Bank slumping, caving, or collapse			0	0	100%	n/a	n/a	n/a
				TOTALS	0	0	100%	n/a	n/a	n/a
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	n/a	n/a			n/a			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	n/a	n/a			n/a			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	n/a	n/a			n/a			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%	n/a	n/a			n/a			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow	n/a	n/a			n/a			

Table 5b. Visual Stream Morphology Stability Assessment Table

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Foust Creek Reach 2 (2,404 LF)

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	10	10			100%			
	3. Meander Pool Condition	Depth Sufficient	9	9			100%			
		Length Appropriate	9	9			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	9	9			100%			
		Thalweg centering at downstream of meander bend (Glide)	9	9			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	n/a	n/a	n/a
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	n/a	n/a	n/a
	3. Mass Wasting	Bank slumping, caving, or collapse			0	0	100%	n/a	n/a	n/a
				TOTALS	0	0	100%	n/a	n/a	n/a
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	2	2			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	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%	2	2			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow	1	1			100%			

Table 5c. Visual Stream Morphology Stability Assessment Table

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Foust Creek Reach 3 (1,490 LF)

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	11	11			100%			
	3. Meander Pool Condition	Depth Sufficient	11	11			100%			
		Length Appropriate	11	11			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	11	11			100%			
		Thalweg centering at downstream of meander bend (Glide)	11	11			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	n/a	n/a	n/a
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	n/a	n/a	n/a
	3. Mass Wasting	Bank slumping, caving, or collapse			0	0	100%	n/a	n/a	n/a
				TOTALS	0	0	100%	n/a	n/a	n/a
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	5	5			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	3	3			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	3	3			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%	3	3			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow	1	1			100%			

Table 5d. Visual Stream Morphology Stability Assessment Table

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

UT1 (793 LF)

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	15	15			100%			
	3. Meander Pool Condition	Depth Sufficient	14	14			100%			
		Length Appropriate	14	14			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	15	15			100%			
		Thalweg centering at downstream of meander bend (Glide)	14	14			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	n/a	n/a	n/a
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	n/a	n/a	n/a
	3. Mass Wasting	Bank slumping, caving, or collapse			0	0	100%	n/a	n/a	n/a
				TOTALS	0	0	100%	n/a	n/a	n/a
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	13	13			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	13	13			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	13	13			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%	13	13			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow	3	3			100%			

Table 6. Vegetation Condition Assessment Table
Foust Creek Mitigation Site (DMS Project No. 95715)
Monitoring Year 7 - 2021

Planted Acreage **22**

Vegetation Category	Definitions	Mapping Threshold (Ac)	Number of Polygons	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material	0.1	0	0	0.0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1	0	0.0	0.0%
		Total	**0**	**0.0**	**0.0%**
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 Ac	0	0	0%
		Cumulative Total	**0**	**0.0**	**0.0%**

Easement Acreage **22**

Vegetation Category	Definitions	Mapping Threshold (SF)	Number of Polygons	Combined Acreage	% of Planted Acreage
Invasive Areas of Concern [1]	Areas or points (if too small to render as polygons at map scale).	1,000	9	2.8	12.7%
Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	none	0	0	0%

[1] Overlapping polygons in which multiple invasive species were treated were counted as a single polygon and area such that combined acreage in this table is the true area of invasive species treatment.

STREAM PHOTOGRAPHS
Monitoring Year 7

PHOTO POINT 1 Foust Creek R1 – looking downstream (4/20/2021)

PHOTO POINT 2 Foust Creek R1 – looking upstream (4/20/2021)

PHOTO POINT 2 Foust Creek R1 – looking downstream (4/20/2021)

PHOTO POINT 3 Foust Creek R1 – looking upstream (4/20/2021)

PHOTO POINT 3 Foust Creek R1 – looking downstream (4/20/2021)

PHOTO POINT 4 Foust Creek R1 – looking upstream (4/20/2021)

PHOTO POINT 4 Foust Creek R1 – looking downstream (4/20/2021)

PHOTO POINT 5 Foust Creek R1 – looking upstream (4/20/2021)

PHOTO POINT 5 Foust Creek R1 – looking downstream (4/20/2021)

PHOTO POINT 6 Foust Creek R2 – looking upstream (4/20/2021)

PHOTO POINT 6 Foust Creek R2 – looking downstream (4/20/2021)

	
PHOTO POINT 7 Foust Creek R2 – looking upstream (4/20/2021)	**PHOTO POINT 7 Foust Creek R2 –** looking downstream (4/20/2021)
	
PHOTO POINT 8 Foust Creek R2 – looking upstream (4/20/2021)	**PHOTO POINT 8 Foust Creek R2 –** looking downstream (4/20/2021)
	
PHOTO POINT 9 Foust Creek R2 – looking upstream (4/20/2021)	**PHOTO POINT 9 Foust Creek R2 –** looking downstream (4/20/2021)

	
PHOTO POINT 10 Foust Creek R2 – looking upstream (4/20/2021)	**PHOTO POINT 10 Foust Creek R2 –** looking downstream (4/20/2021)
	
PHOTO POINT 11 Foust Creek R2 – looking upstream (4/20/2021)	**PHOTO POINT 11 Foust Creek R2 –** looking downstream (4/20/2021)
	
PHOTO POINT 12 Foust Creek R2 – looking upstream (4/20/2021)	**PHOTO POINT 12 Foust Creek R2 –** looking downstream (4/20/2021)

	
PHOTO POINT 13 Foust Creek R2 – looking upstream (4/20/2021)	**PHOTO POINT 13 Foust Creek R2 –** looking downstream (4/20/2021)
	
PHOTO POINT 14 Foust Creek R2 – looking upstream (4/20/2021)	**PHOTO POINT 14 Foust Creek R2 –** looking downstream (4/20/2021)
	
PHOTO POINT 15 Foust Creek R2 – looking upstream (4/20/2021)	**PHOTO POINT 15 Foust Creek R2 –** looking downstream (4/20/2021)

	
PHOTO POINT 16 Foust Creek R2 – looking upstream (4/20/2021)	**PHOTO POINT 16 Foust Creek R2 –** looking downstream (4/20/2021)
	
PHOTO POINT 17 Foust Creek R2 – looking upstream (4/20/2021)	**PHOTO POINT 17 Foust Creek R2 –** looking downstream (4/20/2021)
	
PHOTO POINT 18 Foust Creek R2 – looking upstream (4/20/2021)	**PHOTO POINT 18 Foust Creek R2 –** looking downstream (4/20/2021)

	
PHOTO POINT 19 Foust Creek R2 – looking upstream (4/19/2021)	**PHOTO POINT 19 Foust Creek R2 –** looking downstream (4/19/2021)
	
PHOTO POINT 20 Foust Creek R3a – looking upstream (4/19/2021)	**PHOTO POINT 20 Foust Creek R3a –** looking downstream (4/19/2021)
	
PHOTO POINT 21 Foust Creek R3a – looking upstream (4/19/2021)	**PHOTO POINT 21 Foust Creek R3a –** looking downstream (4/19/2021)

PHOTO POINT 22 Foust Creek R3a – looking upstream (4/19/2021)

PHOTO POINT 23 Foust Creek R3b – looking downstream (4/19/2021)

PHOTO POINT 24 Foust Creek R3b – looking upstream (4/19/2021)

PHOTO POINT 24 Foust Creek R3b – looking downstream (4/19/2021)

PHOTO POINT 25 Foust Creek R3b – looking upstream (4/19/2021)

PHOTO POINT 25 Foust Creek R3b – looking downstream (4/19/2021)

	
PHOTO POINT 26 Foust Creek R3b – looking upstream (4/19/2021)	**PHOTO POINT 26 Foust Creek R3b –** looking downstream (4/19/2021)
	
PHOTO POINT 27 Foust Creek R3b – looking upstream (4/19/2021)	**PHOTO POINT 27 Foust Creek R3b –** looking downstream (4/19/2021)
	
PHOTO POINT 28 Foust Creek R3b – looking upstream (4/19/2021)	**PHOTO POINT 28 Foust Creek R3b –** looking downstream (4/19/2021)

PHOTO POINT 29 Foust Creek R3b – looking upstream (4/19/2021)

PHOTO POINT 29 Foust Creek R3b – looking downstream (4/19/2021)

PHOTO POINT 30 UT1 – looking downstream (4/19/2021)

PHOTO POINT 31 UT1– looking upstream (4/19/2021)

PHOTO POINT 31 UT1 – looking downstream (4/19/2021)

	
PHOTO POINT 32 UT1 – looking upstream (4/19/2021)	**PHOTO POINT 32 UT1 –** looking downstream (4/19/2021)
	
PHOTO POINT 33 UT1 – looking upstream (4/19/2021)	**PHOTO POINT 33 UT1 –** looking downstream (4/19/2021)
	
PHOTO POINT 34 UT1 – looking upstream (4/19/2021)	**PHOTO POINT 34 UT1 –** looking downstream (4/19/2021)

	
PHOTO POINT 35 UT1 – looking upstream (4/19/2021)	**PHOTO POINT 35 UT1 –** looking downstream (4/19/2021)

VEGETATION PHOTOGRAPHS
Monitoring Year 7

VEG PLOT 1 *(8/17/2021)*

VEG PLOT 2 *(8/17/2021)*

VEG PLOT 3 *(8/17/2021)*

VEG PLOT 4 *(8/17/2021)*

VEG PLOT 5 *(8/17/2021)*

VEG PLOT 6 *(8/17/2021)*

VEG PLOT 7 *(8/17/2021)*

VEG PLOT 8 *(8/17/2021)*

VEG PLOT 9 *(8/17/2021)*

VEG PLOT 10 *(8/17/2021)*

VEG PLOT 11 *(8/17/2021)*

VEG PLOT 12 *(8/17/2021)*

VEG PLOT 13 *(8/17/2021)*

VEG PLOT 14 *(8/17/2021)*

VEG PLOT 15 *(8/17/2021)*

VEG PLOT 16 *(8/17/2021)*

VEG PLOT 17 (*8/17/2021)*

APPENDIX 3. Vegetation Plot Data

Table 7. Vegetation Plot Criteria Attainment

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Plot	Planted Stem Density Success Criterion Met (Y/N)	Tract Mean
1	Y	88%
2	Y	
3	Y	
4	Y	
5	Y	
6	N	
7	N	
8	Y	
9	Y	
10	Y	
11	Y	
12	Y	
13	Y	
14	Y	
15	Y	
16	Y	
17	Y	

Table 7a. Vegetation Plot Crieria Attainment: Average Height by Plot

Foust Creek Mitigation Site (DMS Project No 95715)

Monitoring Year 7 - 2021

Average Height by Plot (feet)					
Plot	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
1	3.0	3.2	3.9	7.3	11.1
2	2.5	2.6	2.8	4.0	5.9
3	2.6	2.9	2.8	5.1	6.9
4	2.8	2.8	3.6	8.8	13.4
5	3.1	3.4	4.3	5.7	7.6
6	2.7	2.9	3.3	6.2	10.6
7	2.4	3.5	3.2	5.0	7.6
8	3.1	3.3	3.8	4.2	6.7
9	2.7	2.6	3.3	9.0	14.6
10	3.4	3.4	3.2	4.7	7.9
11	2.8	3.2	3.1	5.2	9.1
12	2.9	3.4	5.8	10.9	26.2
13	2.9	3.7	6.3	12.6	25.5
14	2.6	3.0	3.6	7.4	17.5
15	2.4	3.1	5.2	12.4	24.0
16	2.9	3.1	5.7	10.9	23.5
17	3.2	3.8	7.5	14.9	29.2

Table 8. CVS Vegetation Plot Metadata

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Database name	Foust- Creek MY7- v2.3.1.mdb
Database location	F:\Projects\005-02135 Foust Creek\Monitoring\Monitoring Year 7\Vegetation Assessment
Computer name	JASON-PC
File size	71004160
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY	
Project Code	95715
project Name	Foust Creek Mitigation Site
Description	Stream and Wetland Mitigation
River Basin	Cape Fear
Sampled Plots	17

Table 9. Planted and Total Stem Counts
Foust Creek Mitigation Site (DMS Project No. 95715)
Monitoring Year 7 - 2021

			Current Plot Data (MY7 2021)																	
			VP 1			VP 2			VP 3			VP 4			VP 5			VP 6		
Scientific Name	**Common Name**	**Species Type**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**
Acer negundo	boxelder	Tree																		
Acer rubrum	red maple	Tree																		
Alnus serrulata	hazel alder	Shrub																		
Baccharis	baccharis	Shrub																		
Betula nigra	river birch	Tree				1	1	1	1	1	1	2	2	2						1
Cephalanthus occidentalis	common buttonbush	Shrub															1			5
Cornus amomum	silky dogwood	Shrub													1	1	1			
Diospyros virginiana	common persimmon	Tree												2						
Elaeagnus umbellata	autumn olive	Exotic																		
Fraxinus pennsylvanica	green ash	Tree				1	1	1				1	1	1	7	7	7	5	5	5
Juniperus virginiana	eastern redcedar	Tree																		
Ligustrum sinense	Chinese privet	Exotic																		
Liquidambar styraciflua	sweetgum	Tree						15			13									
Liriodendron tulipifera	tuliptree	Tree										1	1	1						
Nyssa sylvatica	blackgum	Tree																		
Pinus taeda	loblolly pine	Tree						2												
Platanus occidentalis	American sycamore	Tree							2	2	2									
Quercus michauxii	swamp chestnut oak	Tree	8	8	8	3	3	3	2	2	2	3	3	3	2	2	2			
Quercus phellos	willow oak	Tree	2	2	2	2	2	3	3	3	3									
Quercus rubra	northern red oak	Tree				4	4	4	1	1	1	2	2	2						
Rhus copallinum	flameleaf sumac	shrub									5									
Salix nigra	black willow	Tree															1			
Sambucus nigra	elderberry	Shrub																		
Ulmus	elm	Tree						3												
		Stem count	10	10	10	11	11	30	9	9	27	9	9	11	10	10	12	5	5	11
		size (ares)	1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	2	2	2	5	5	8	5	5	7	5	5	6	3	3	5	1	1	3
		Stems per ACRE	405	405	405	445	445	1,214	364	364	1,093	364	364	445	405	405	486	202	202	445

Color Coding for Table

Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes
P-all: Number of planted stems including live stakes,
T: Total Stems

Table 9. Planted and Total Stem Counts
Foust Creek Mitigation Site (DMS Project No. 95715)
Monitoring Year 7 - 2021

			Current Plot Data (MY7 2021)																	
			VP 7			VP 8			VP 9			VP 10			VP 11			VP 12		
Scientific Name	**Common Name**	**Species Type**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**
Acer negundo	boxelder	Tree																		
Acer rubrum	red maple	Tree						1												
Alnus serrulata	hazel alder	Shrub															13			
Baccharis	baccharis	Shrub																		
Betula nigra	river birch	Tree							4	4	4				2	2	2			
Cephalanthus occidentalis	common buttonbush	Shrub																		
Cornus amomum	silky dogwood	Shrub	3	3	7	2	2	2				5	5	5						
Diospyros virginiana	common persimmon	Tree																		
Elaeagnus umbellata	autumn olive	Exotic																		
Fraxinus pennsylvanica	green ash	Tree	1	1	1	1	1	26						9	4	4	4	2	2	5
Juniperus virginiana	eastern redcedar	Tree																		
Ligustrum sinense	Chinese privet	Exotic																		
Liquidambar styraciflua	sweetgum	Tree						1			13			3			30			19
Liriodendron tulipifera	tuliptree	Tree													1	1	1	3	3	3
Nyssa sylvatica	blackgum	Tree				1	1	1				1	1	1						
Pinus taeda	loblolly pine	Tree															3			
Platanus occidentalis	American sycamore	Tree													5	5	5	6	6	6
Quercus michauxii	swamp chestnut oak	Tree	1	1	1	2	2	2	2	2	2									
Quercus phellos	willow oak	Tree							1	1	1	1	1	2						
Quercus rubra	northern red oak	Tree							4	4	4				1	1	1	1	1	1
Rhus copallinum	flameleaf sumac	shrub																		
Salix nigra	black willow	Tree																		
Sambucus nigra	elderberry	Shrub																		
Ulmus	elm	Tree																		
		Stem count	5	5	9	6	6	33	11	11	24	7	7	20	13	13	56	12	12	34
		size (ares)	1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	3	3	3	4	4	6	4	4	5	3	3	5	5	5	8	4	4	5
		Stems per ACRE	202	202	364	243	243	1,335	445	445	971	283	283	809	526	526	2,266	486	486	1,376

Color Coding for Table

Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes
P-all: Number of planted stems including live stakes,
T: Total Stems

Table 9. Planted and Total Stem Counts
Foust Creek Mitigation Site (DMS Project No. 95715)
Monitoring Year 7 - 2021

			Current Plot Data (MY7 2021)														
			VP 13			VP 14			VP 15			VP 16			VP 17		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	Tree															
Acer rubrum	red maple	Tree															
Alnus serrulata	hazel alder	Shrub						2			2						
Baccharis	baccharis	Shrub															
Betula nigra	river birch	Tree				1	1	1				2	2	2	2	2	2
Cephalanthus occidentalis	common buttonbush	Shrub															
Cornus amomum	silky dogwood	Shrub															
Diospyros virginiana	common persimmon	Tree															
Elaeagnus umbellata	autumn olive	Exotic															
Fraxinus pennsylvanica	green ash	Tree	6	6	6	7	7	8	6	6	6	2	2	5	2	2	2
Juniperus virginiana	eastern redcedar	Tree															
Ligustrum sinense	Chinese privet	Exotic						1									
Liquidambar styraciflua	sweetgum	Tree						18			25			9			
Liriodendron tulipifera	tuliptree	Tree				2	2	2				1	1	1	1	1	1
Nyssa sylvatica	blackgum	Tree													1	1	1
Pinus taeda	loblolly pine	Tree															
Platanus occidentalis	American sycamore	Tree	7	7	7	4	4	4	5	5	5	3	3	3	3	3	3
Quercus michauxii	swamp chestnut oak	Tree													1	1	1
Quercus phellos	willow oak	Tree										2	2	2	1	1	1
Quercus rubra	northern red oak	Tree										2	2	2			
Rhus copallinum	flameleaf sumac	shrub															
Salix nigra	black willow	Tree															
Sambucus nigra	elderberry	Shrub															
Ulmus	elm	Tree									1						
		Stem count	13	13	13	14	14	35	11	11	39	12	12	24	11	11	11
		size (ares)	1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02		
		Species count	2	2	2	4	4	7	2	2	5	6	6	7	7	7	7
		Stems per ACRE	526	526	526	567	567	1,416	445	445	1,578	486	486	971	445	445	445

Color Coding for Table

Exceeds requirements by 10%

Exceeds requirements, but by less than 10%

Fails to meet requirements, by less than 10%

Fails to meet requirements by more than 10%

Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes

P-all: Number of planted stems including live stakes,

T: Total Stems

Table 9. Planted and Total Stem Counts
Foust Creek Mitigation Site (DMS Project No. 95715)
Monitoring Year 7 - 2021

			Annual Means																	
			MY7 (2021)			MY5 (2019)			MY3 (2017)			MY2 (2016)			MY1 (2015)			MY0 (2015)		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	Tree									2									
Acer rubrum	red maple	Tree			1						2			1			1			
Alnus serrulata	hazel alder	Shrub			17			5	1	1	17	2	2	3	3	3	3	6	6	6
Baccharis	baccharis	Shrub						2												
Betula nigra	river birch	Tree	15	15	16	16	16	16	16	16	16	20	20	20	28	28	31	35	35	35
Cephalanthus occidentalis	common buttonbush	Shrub			6			6			8									
Cornus amomum	silky dogwood	Shrub	11	11	15	11	11	12	12	12	12	13	13	13	12	12	16	15	15	15
Diospyros virginiana	common persimmon	Tree			2															
Elaeagnus umbellata	autumn olive	Exotic						1												
Fraxinus pennsylvanica	green ash	Tree	45	45	86	49	49	177	51	51	131	51	51	51	53	53	90	53	53	53
Juniperus virginiana	eastern redcedar	Tree						3			2									
Ligustrum sinense	Chinese privet	Exotic			1			12												
Liquidambar styraciflua	sweetgum	Tree			146			73			72			20			8			
Liriodendron tulipifera	tuliptree	Tree	9	9	9	9	9	9	9	9	9	9	9	9	10	10	10	24	24	24
Nyssa sylvatica	blackgum	Tree	3	3	3	3	3	4	4	4	4	6	6	7	10	10	10	10	10	10
Pinus taeda	loblolly pine	Tree			5			1			1									
Platanus occidentalis	American sycamore	Tree	35	35	35	36	36	36	36	36	41	36	36	36	36	36	36	36	36	36
Quercus michauxii	swamp chestnut oak	Tree	24	24	24	24	24	24	28	28	28	35	35	35	36	36	36	37	37	37
Quercus phellos	willow oak	Tree	12	12	14	10	10	10	14	14	17	21	21	21	33	33	33	35	35	35
Quercus rubra	northern red oak	Tree	15	15	15	17	17	17	18	18	18	21	21	21	21	21	21	21	21	21
Rhus copallinum	flameleaf sumac	shrub			5															
Salix nigra	black willow	Tree			1															
Sambucus nigra	elderberry	Shrub						1												
Ulmus	elm	Tree			4						1									
		Stem count	169	169	399	175	175	395	189	189	380	214	214	237	242	242	295	272	272	272
		size (ares)		17			17			17			17			17			17	
		size (ACRES)		0.42			0.42			0.42			0.42			0.42			0.42	
		Species count	9	9	19	9	9	18	10	10	17	10	10	12	10	10	12	10	10	10
		Stems per ACRE	402	402	950	417	417	940	450	450	905	509	509	564	576	576	702	647	647	647

Color Coding for Table

Exceeds requirements by 10%

Exceeds requirements, but by less than 10%

Fails to meet requirements, by less than 10%

Fails to meet requirements by more than 10%

Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes

P-all: Number of planted stems including live stakes,

T: Total Stems

APPENDIX 4. Morphological Summary Data and Plots

Table 10a. Baseline Stream Data Summary
Foust Creek Mitigation Site (DMS Project No. 95715)
Monitoring Year 7 - 2021

Foust Creek

		PRE-RESTORATION CONDITION						REFERENCE REACH DATA												DESIGN						AS-BUILT/BASELINE					
Parameter	**Gage**	**Foust Creek-Reach 2**		**Foust Creek-Reach 3A**		**Foust Creek-Reach 3B**		**Onsite Reference Reach - Foust Creek**		**Spencer Creek 1**		**Spencer Creek 2**		**UT to Richland Creek- Reach 1**		**UT to Richland Creek- Reach 2**		**Dutchman's Creek**		**UT to Cane Creek**		**Foust Creek-Reach 2**		**Foust Creek-Reach 3A**		**Foust Creek-Reach 3B**		**Foust Creek-Reach 2**		**Foust Creek-Reach 3A**		**Foust Creek-Reach 3B**	
		Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Dimension and Substrate - Riffle																															
Bankfull Width (ft)		24.7		17.5		22.4		18.5	19.4	10.7	11.2	6.3	9.3	8.8	10.4	13.3	15.2	24.8	26.6	11.5	12.3	20.0		20.0		20.0		18.5	22.5	18.5	22.5	23.6	
Floodprone Width (ft)		180		114.2		276.1		49	62.5	60	>114	14	125	27.6	31.4	>50		4.4	49.7	311		50	400	50	400	50	400	150		150		150	
Bankfull Mean Depth		1.2		1.4		1.5		1.3	1.4	1.6	1.8	0.8	1.0	0.8	0.9	1.1	1.3	1.3	1.5	0.8	1.0	1.3		1.3		1.5		1.1	1.3	1.1	1.3	1.5	
Bankfull Max Depth		1.8		2.5		3		1.8	2.1	2.1	2.6	1	1.2	1.1	1.3	1.8	2.1	1.8	2.0	1.2	1.6	2.1		2.1		2.3		1.9	2.3	1.9	2.3	2.7	
Bankfull Cross Sectional Area (ft^2)	N/A	30		25.3		34.6		23.9	24.1	17.8	19.7	6.6	8.7	7.8	8.5	16.5	17.5	34.2	36.9	8.9	12.2	26.4		25.8		29.2		21.5	30.2	21.5	30.2	36.5	
Width/Depth Ratio		20.3		12.2		14.6		13.9	14.2	5.8	7.1	7.9	9.3	10	12.8	10.1	13.9	17.9	19.4	12.3	14.4	15.2		15.5		13.3		15.5	18.8	15.5	18.8	15.2	
Entrenchment Ratio[1]		7.3		6.5		12.3		2.6	3.4	5.5	>10.2	1.7	4.3	2.4	4.0	>2.5		1.9	1.9	>2.5		2.5	20.0	2.5	20.0	2.5	20.0	6.7	8.1	6.7	8.1	6.4	
Bank Height Ratio[2]		1.4		1.1		1.4		1.0		1.0		1.0	1.0	1.4	2.1	1.0		1.0	1.2	---		1.0		1.0		1.0		1.0		1.0		1.0	
D50 (mm)		1.20		7.60		11.00																						7.3	51.8	7.3	51.8	52.3	
Profile																															
Riffle Length (ft)								---		---		---		---		---		---		---		---		---		---		19.0	``	19.0	52.2	24.2	34.4
Riffle Slope (ft/ft)		0.01		0.023		0.0151		0.015	0.035	0.013		0.0184	0.0343	0.0183	0.0355	0.0183	0.0355	---		0.0188	0.0704	0.0039	0.0329	0.0117	0.0423	0.0065	0.0752	0.0028	0.0530	0.0028	0.0530	0.0096	0.0300
Pool Length (ft)								---		---		---		---		---		---		---		---		---		---		42.5	96.1	42.5	96.1	56.3	101.2
Pool Max Depth (ft)	N/A	4.4		2.9		4		2.5	2.9	3.3		1.2	1.8	14.7	16	1.8	1.8	---		2.6		2.6	5.3	2.6	5.3	3.0	6.0	2.0	4.3	2.0	4.3	2.3	4.0
Pool Spacing (ft)		212.55		2.8	2.96	3.0	4.9	48.8	91.3	71		9	46	2.5	6.1	2.5	6.1	---		2.3	6.1	50	140	50	140	50	140	70	164	70	164	34	137
Pool Volume (ft^3)																																	
Pattern																															
Channel Beltwidth (ft)		N/A		N/A		N/A		N/A		38	41	10	50	N/A		N/A		N/A		102		32	178	32	178	32	178	38	110	38	110	72	128
Radius of Curvature (ft)		N/A		N/A		N/A		N/A		11	15	12	85	N/A		N/A		N/A		23	38	41	58	41	58	43	57	51	69	51	69	55	67
Rc:Bankfull Width (ft/ft)	N/A	N/A		N/A		N/A		N/A		1.3	1.4	1.9	9.1	N/A		N/A		N/A		2.0	3.1	2.1	2.9	2.1	2.9	2.2	2.9	2.8	3.1	2.8	3.1	2.3	2.8
Meander Length (ft)		N/A		N/A		N/A		N/A		--	--	53	178	N/A		N/A		N/A		45.0	81.0	100	280	100	280	100	280	135	216	135	216	166	234
Meander Width Ratio		N/A		N/A		N/A		N/A		3.4	3.6	1.6	5.4	N/A		N/A		N/A		8.3	8.9	1.6	8.9	1.6	8.9	1.6	8.9	2.1	4.9	2.1	4.9	3.1	5.4
Substrate, Bed and Transport Parameters																															
Ri%/Ru%/P%/G%/S%																															
SC%/Sa%/G%/C%/B%/Be%																															
d16/d35/d50/d84/d95/d100	N/A	0.2/0.5/1.2/11/65		0.3/3.2/7.6/110/160		0.1/4.4/11/19/47		---		---		---		---		---		---		---								SC/ 0.14/0.2/ 45.0/90.0/128.0		SC/ 0.14/0.2/ 45.0/90.0/128.0		SC/0.10/0.3 66.2/101.2/180.0	
Reach Shear Stress (Competency) lb/ft^2		0.53		0.83		0.26																0.4		0.71		0.86		0.39	0.47	0.39	0.47	0.70	
Max part size (mm) mobilized at bankfull																																	
Stream Power (Capacity) W/m^2																																	
Additional Reach Parameters																															
Drainage Area (SM)		1.60		1.90		2.00		1.38		0.96		0.37		0.28		0.97		2.90		0.29		1.60		1.90		2.00		1.60		1.90		2.00	
Watershed Impervious Cover Estimate (%)		<1%		<1%		<1%		---		---		---		---		---		---		---		<1%		<1%		<1%		<1%		<1%		<1%	
Rosgen Classification		C5		C/E4		C/E4		C4		E4		E4		C/E4		C/E4		B4c		C/E4		C4		C4		C/E4		C5		C4		C/E4	
Bankfull Velocity (fps)		3.4		4.5		3.3		2.9	3.7	4.9	5.4	5.0	5.6	4.1	5.2	4.2	4.5	4.2	4.5	3.8		3.6		4.6		4.5		3.0	3.4	4.0		4.0	
Bankfull Discharge (cfs)		101		112		115		69.4	88.0	97		35		29.1	32.0	68.9	78.6	140.0	165.0	40		100.0		110.0		110.0		66.0	102.1	90.5		90.5	
Q-NFF regression		---		---		---																											
Q-USGS extrapolation	N/A	---		---		---																											
Q-Mannings		---		---		---																											
Valley Length (ft)		---		---		---		---		---		---		---		---		---		---		2,133		300		1,030							
Channel Thalweg Length (ft)		2,478		307		1,013		---		---		---		---		---		---		---		2,523		321		1,186		2,404		317		1,173	
Sinuosity		1.09		1.11		1.05		1.05		2.3		1.0	1.3	1.1		2.3		1.0		1.3		1.18		1.07		1.15		1.1		1.1		1.1	
Water Surface Slope ($ft/ft)^2$		---		---		---		---		---		---		---		---		---		---		---		---		---		---		0.0058		0.0105		0.0056	
Bankfull Slope (ft/ft)		---		---		---		---		0.0047		0.019	0.022	0.013		0.018		0.009		0.015		0.007		0.008		0.005		0.0053		0.0085		0.0071	

(---): Data was not provided
N/A: Not Applicable
[1]Entrenchment Ratio was calculated by the method specified in the Industry Technical Workgroup Memorandum.
[2]Bank Height Ratio was calculated by the method specified in the Industry Technical Workgroup Memorandum.

Table 10b. Baseline Stream Data Summary
Foust Creek Mitigation Site (DMS Project No. 95715)
Monitoring Year 7 - 2021

UT1

		PRE-RESTORATION		REFERENCE REACH DATA														DESIGN		AS-BUILT/ BASELINE	
Parameter	**Gage**	**UT1**		**Onsite Reference Reach - Foust Creek**		**Spencer Creek 1**		**Spencer Creek 2**		**UT to Richland Creek- Reach 1**		**UT to Richland Creek- Reach 2**		**Dutchman's Creek**		**UT to Cane Creek**		**UT1**		**UT1**	
		Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Dimension and Substrate - Riffle																					
Bankfull Width (ft)		8.6		18.5	19.4	10.7	11.2	6.3	9.3	8.8	10.4	13.3	15.2	24.8	26.6	11.5	12.3	11.0		10.8	12.6
Floodprone Width (ft)		104.3		49	62.5	60	>114	14	125	27.6	31.4	>50		4.4	49.7	311		27.5	220	150	150
Bankfull Mean Depth		1.0		1.3	1.4	1.6	1.8	0.8	1.0	0.8	0.9	1.1	1.3	1.3	1.5	0.8	1.0	0.8		0.6	0.8
Bankfull Max Depth		1.8		1.8	2.1	2.1	2.6	1.0	1.2	1.1	1.3	1.8	2.1	1.8	2.0	1.2	1.6	1.3		1.3	1.5
Bankfull Cross Sectional Area (ft^2)	N/A	8.7		23.9	24.1	17.8	19.7	6.6	8.7	7.8	8.5	16.5	17.5	34.2	36.9	8.9	12.2	8.8		7.7	8.1
Width/Depth Ratio		8.5		13.9	14.2	5.8	7.1	7.9	9.3	10.0	12.8	10.1	13.9	17.9	19.4	12.3	14.4	13.8		14.2	20.4
Entrenchment Ratio[1]		12.2		2.6	3.4	5.5	>10.2	1.7	4.3	2.4	4.0	>2.5		1.9	1.9	>2.5		2.5	20.0	11.9	13.9
Bank Height Ratio[2]		1.4		1.0		1.0		1.0	1.0	1.4	2.1	1.0		1.0	1.2	---		1.0		1.0	1.0
D50 (mm)		0.40																		18.2	35.7
Profile																					
Riffle Length (ft)				---		---		---		---		---		---		---		---		11.5	21.6
Riffle Slope (ft/ft)		---		0.015	0.035	0.013		0.0184	0.0343	0.0183	0.0355	0.0183	0.0355	---		0.0188	0.0704	0.0065	0.0799	0.0088	0.0583
Pool Length (ft)				---		---		---		---		---		---		---		---		18.5	51.0
Pool Max Depth (ft)	N/A	2.6		2.5	2.9	3.3		1.2	1.8	14.7	16.0	1.8	1.8	---		2.6		1.6	3.2	1.9	2.0
Pool Spacing (ft)		---		48.8	91.3	71		9	46	2.5	6.1	2.5	6.1	---		2.3	6.1	28	77	33	82
Pool Volume (ft^3)																					
Pattern																					
Channel Beltwidth (ft)		N/A		N/A		38	41	10	50	N/A		N/A		N/A		102		17.6	97.9	21	44
Radius of Curvature (ft)		N/A		N/A		11	15	12	85	N/A		N/A		N/A		23	38	21	34	30	36
Rc:Bankfull Width (ft/ft)	N/A	N/A		N/A		1.3	1.4	1.9	9.1	N/A		N/A		N/A		2.0	3.1	1.9	3.1	2.7	2.8
Meander Length (ft)		N/A		N/A		--	--	53	178	N/A		N/A		N/A		45.0	81.0	55	154	79	120
Meander Width Ratio		N/A		N/A		3.4	3.6	1.6	5.4	N/A		N/A		N/A		8.3	8.9	1.6	8.9	1.9	3.5
Substrate, Bed and Transport Parameters																					
Ri%/Ru%/P%/G%/S%																					
SC%/Sa%/G%/C%/B%/Be%																					
d16/d35/d50/d84/d95/d100	N/A	0.1/0.1/0.4/14/24		---		---		---		---		---		---		---				0.07/0.39/11.4/ 55.6/90.0/256.0	
Reach Shear Stress (Competency) lb/ft^2		0.42																0.58		0.29	0.36
Max part size (mm) mobilized at bankfull																					
Stream Power (Capacity) W/m^2																					
Additional Reach Parameters																					
Drainage Area (SM)		0.30		1.38		0.96		0.37		0.28		0.97		2.90		0.29		0.30		0.30	
Watershed Impervious Cover Estimate (%)		<1%		---		---		---		---		---		---		---		<1%		<1%	
Rosgen Classification		E5		C4		E4		E4		C/E4		C/E4		B4c		C/E4		C/E4		C/E4	
Bankfull Velocity (fps)		3.6		2.9	3.7	4.9	5.4	5.0	5.6	4.1	5.2	4.2	4.5	4.2	4.5	3.8		3.5		2.3	2.7
Bankfull Discharge (cfs)		31		69.4	88.0	97		35		29.1	32.0	68.9	78.6	140.0	165.0	40		30.0		18.1	21.8
Q-NFF regression		---																			
Q-USGS extrapolation	N/A	---																			
Q-Mannings		---																			
Valley Length (ft)		---		---		---		---		---		---		---		---		702			
Channel Thalweg Length (ft)		713		---		---		---		---		---		---		---		788		793	
Sinuosity		1.11		1.05		2.3		1.0	1.3	1.1		2.3		1.0		1.3		1.15		1.13	
Water Surface Slope (ft/ft)[2]		---		---		---		---		---		---		---		---		---		0.0079	
Bankfull Slope (ft/ft)		---		---		0.0047		0.019		0.013		0.018		0.009		0.015		0.005	0.011	0.006	0.0125

(---): Data was not provided
N/A: Not Applicable
1Entrenchment Ratio was calculated by the method specified in the Industry Technical Workgroup Memorandum.
[2]Bank Height Ratio was calculated by the method specified in the Industry Technical Workgroup Memorandum.

Table 11. Morphology and Hydraulic Summary (Dimensional Parameters - Cross Section)
Foust Creek Mitigation Site (DMS Project No. 95715)
Monitoring Year 7 - 2021

	Foust Creek - Reach 2																							
	Cross Section 1 (Riffle)						Cross Section 2 (Pool)						Cross Section 3 (Riffle)						Cross Section 4 (Pool)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation (ft)	561.7	561.7	561.7	561.7	561.9	562.0	561.6	561.6	561.6	561.6	561.7	561.8	558.4	558.4	558.4	558.4	558.8	558.8	558.2	558.2	558.2	558.2	558.5	558.4
Low Bank Elevation (ft)	561.7	561.7	561.7	561.7	561.9	562.0	561.6	561.6	561.6	561.6	561.7	561.8	558.4	558.4	558.4	558.4	558.8	558.8	558.2	558.2	558.2	558.2	558.5	558.4
Bankfull Width (ft)	20.6	19.7	20.0	19.1	17.0	19.5	21.5	20.8	20.8	20.5	21.2	14.6	18.5	17.7	17.6	16.7	19.8	19.3	24.9	23.6	23.5	21.5	21.8	23.6
Floodprone Width (ft)	150	150	150	150	150	150	N/A	N/A	N/A	N/A	N/A	N/A	150	150	150	150	150	150	N/A	N/A	N/A	N/A	N/A	N/A
Bankfull Mean Depth (ft)	1.1	1.0	1.0	0.9	1.0	1.0	1.2	0.9	0.9	0.9	0.8	1.1	1.2	1.0	1.0	0.9	1.0	1.1	1.0	0.9	0.9	0.9	1.0	0.9
Bankfull Max Depth (ft)	1.9	1.8	1.8	1.7	2.0	2.1	2.5	1.9	2.4	2.4	2.4	2.6	1.9	1.9	1.9	1.8	2.1	2.2	2.1	2.0	2.0	2.0	2.3	2.4
Bankfull Cross Sectional Area (ft^2)	22.7	20.5	20.5	17.5	17.6	20.1	26.7	18.5	19.0	18.0	17.3	16.7	21.5	17.7	16.8	15.1	20.4	20.8	24.4	20.7	20.2	18.7	21.8	21.2
Width/Depth Ratio	18.8	19.0	19.4	20.8	16.5	18.9	17.4	23.4	22.7	23.2	26.0	12.8	16.0	17.7	18.5	18.4	19.2	18.0	25.4	26.8	27.2	24.9	21.8	26.2
Entrenchment Ratio[1]	7.3	7.6	7.5	7.9	8.8	7.7	N/A	N/A	N/A	N/A	N/A	N/A	8.1	8.5	8.5	9.0	7.6	7.8	N/A	N/A	N/A	N/A	N/A	N/A
Bankfull Bank Height Ratio[2]	1.0	1.0	1.0	1.0	<1.0	<1.0	N/A	N/A	N/A	N/A	N/A	N/A	1.0	1.0	1.0	1.0	<1.0	1.0	N/A	N/A	N/A	N/A	N/A	N/A

	Foust Creek - Reach 2																		Foust Creek - Reach 3					
	Cross Section 5 (Riffle)						Cross Section 6 (Pool)						Cross Section 7 (Riffle)						Cross Section 8 (Riffle)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation (ft)	555.7	555.7	555.7	555.7	556.1	556.0	553.5	553.5	553.5	553.5	553.4	553.5	552.9	552.9	552.9	552.9	553.0	553.0	547.9	547.9	547.9	547.9	547.7	548.0
Low Bank Elevation (ft)	555.7	555.7	555.7	555.7	556.1	556.0	553.5	553.5	553.5	553.5	553.4	553.5	552.9	552.9	552.9	552.9	553.0	553.0	547.9	547.9	547.9	547.9	547.7	548.0
Bankfull Width (ft)	20.7	22.0	22.0	22.0	26.1	24.7	25.8	25.7	26.5	26.0	25.0	28.4	22.5	22.2	22.1	22.1	22.9	23.1	23.6	22.7	23.2	22.3	20.9	24.2
Floodprone Width (ft)	150	150	150	150	150	150	N/A	N/A	N/A	N/A	N/A	N/A	150	150	150	150	150	150	150	150	150	150	150	150
Bankfull Mean Depth (ft)	1.3	1.2	1.2	1.2	1.5	1.5	1.6	1.5	1.4	1.4	1.5	1.4	1.3	1.3	1.3	1.2	1.1	1.1	1.5	1.4	1.4	1.4	1.4	1.5
Bankfull Max Depth (ft)	2.1	2.3	2.2	2.2	2.6	2.9	3.0	3.0	3.4	3.4	3.5	3.5	2.3	2.1	2.2	2.1	2.2	2.3	2.7	2.5	2.5	2.4	2.4	2.8
Bankfull Cross Sectional Area (ft^2)	27.6	27.0	26.6	26.2	38.4	37.7	41.7	37.4	37.6	37.6	38.3	38.5	30.2	28.8	28.2	26.4	26.1	26.1	36.5	32.1	31.9	30.5	29.3	35.5
Width/Depth Ratio	15.5	17.9	18.2	18.4	17.8	16.1	15.9	17.7	18.7	18.0	16.3	20.9	16.8	17.0	17.3	18.5	20.0	20.5	15.2	16.0	16.9	16.3	14.9	16.5
Entrenchment Ratio[1]	7.2	6.8	6.8	6.8	5.7	6.1	N/A	N/A	N/A	N/A	N/A	N/A	6.7	6.8	6.8	6.8	6.6	6.5	6.4	6.6	6.5	6.7	7.2	6.2
Bankfull Bank Height Ratio[2]	1.0	1.0	1.0	1.0	1.2	1.2	N/A	N/A	N/A	N/A	N/A	N/A	1.0	1.0	1.0	1.0	<1.0	<1.0	1.0	1.0	1.0	1.0	<1.0	1.0

	Foust Creek - Reach 3						UT1																	
	Cross Section 9 (Pool)						Cross Section 10 (Pool)						Cross Section 11 (Riffle)						Cross Section 12 (Pool)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation (ft)	547.4	547.4	547.4	547.4	547.5	547.7	562.4	562.4	562.4	562.4	562.4	562.5	562.1	562.1	562.1	562.1	562.3	562.3	557.5	557.5	557.5	557.5	557.5	557.5
Low Bank Elevation (ft)	547.4	547.4	547.4	547.4	547.5	547.7	562.4	562.4	562.4	562.4	562.4	562.5	562.1	562.1	562.1	562.1	562.3	562.3	557.5	557.5	557.5	557.5	557.5	557.5
Bankfull Width (ft)	25.6	25.0	24.9	24.4	23.4	26.2	18.0	15.9	15.7	15.6	14.8	15.6	10.8	10.2	10.2	10.2	11.6	11.4	14.5	14.6	14.1	14.0	14.4	14.5
Floodprone Width (ft)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	150	150	150	150	150	150	N/A	N/A	N/A	N/A	N/A	N/A
Bankfull Mean Depth (ft)	2.1	1.8	2.1	2.1	2.2	2.3	1.1	1.1	1.1	1.1	1.1	1.1	0.8	0.7	0.7	0.7	0.7	0.8	0.8	0.7	0.8	0.7	0.8	0.8
Bankfull Max Depth (ft)	3.6	3.7	3.9	3.9	4.1	4.3	2.3	2.1	2.1	2.2	2.2	2.2	1.3	1.3	1.4	1.4	1.5	1.3	1.6	1.5	1.7	1.7	1.8	1.9
Bankfull Cross Sectional Area (ft^2)	53.5	46.1	51.9	50.5	50.9	59.4	20.0	17.0	17.2	16.9	15.8	16.9	8.1	7.4	7.6	7.5	8.4	8.6	11.5	10.6	10.7	10.5	11.1	11.1
Width/Depth Ratio	12.3	13.5	11.9	11.8	10.8	11.5	16.2	14.8	14.4	14.5	13.9	14.3	14.2	14.1	13.6	13.8	16.0	15.0	18.4	19.9	18.6	18.7	18.8	18.9
Entrenchment Ratio[1]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13.9	14.6	14.8	14.8	12.9	13.2	N/A	N/A	N/A	N/A	N/A	N/A
Bankfull Bank Height Ratio[2]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.0	1.0	1.0	1.0	1.0	1.0	N/A	N/A	N/A	N/A	N/A	N/A

	UT1						
	Cross Section 13 (Riffle)						
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	
Bankfull Elevation (ft)	557.4	557.4	557.4	557.4	557.4	557.4	
Low Bank Elevation (ft)	557.4	557.4	557.4	557.4	557.4	557.4	
Bankfull Width (ft)	12.6	12.0	11.7	11.6	11.0	11.4	
Floodprone Width (ft)	150	150	150	150	150	150	
Bankfull Mean Depth (ft)	0.6	0.6	0.6	0.6	0.6	0.6	
Bankfull Max Depth (ft)	1.5	1.1	1.2	1.1	1.2	1.3	
Bankfull Cross Sectional Area (ft^2)	7.7	7.0	6.8	6.4	6.6	7.0	
Width/Depth Ratio	20.4	20.6	20.2	20.8	18.2	18.8	
Entrenchment Ratio[1]	11.9	12.5	12.8	12.9	13.7	13.1	
Bankfull Bank Height Ratio[2]	1.0	1.0	1.0	1.0	<1.0	<1.0	

[1]Entrenchment Ratio was calculated by the method specified in the Industry Technical Workgroup Memorandum.
[2]Bank Height Ratio was calculated by the method specified in the Industry Technical Workgroup Memorandum.

Table 12a. Monitoring Data - Stream Reach Data Summary

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Foust Creek - Reach 2

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle												
Bankfull Width (ft)	18.5	22.5	17.7	22.2	17.6	22.1	16.7	22.1	17.0	26.1	19.3	24.7
Floodprone Width (ft)	150		150		150		150		150		150	
Bankfull Mean Depth	1.1	1.3	1.0	1.3	1.0	1.3	0.9	1.2	1.0	1.5	1.0	1.5
Bankfull Max Depth	1.9	2.3	1.8	2.3	1.8	2.2	1.7	2.2	2.0	2.6	2.1	2.9
Bankfull Cross Sectional Area (ft^2)	21.5	30.2	17.7	28.8	16.8	28.2	15.1	26.4	17.6	38.4	20.1	37.7
Width/Depth Ratio	15.5	18.8	17.0	19.0	17.3	19.4	18.4	20.8	16.5	20.0	16.1	18.9
Entrenchment Ratio[1]	6.7	8.1	6.8	8.5	6.8	8.5	6.8	9.0	7.6	8.8	6.1	7.8
Bank Height Ratio [2]	1.0		1.0		1.0		1.0		<1.0		<1.0	1.2
D50 (mm)	7.3	51.8	7.7	41.3	13.5	49.9	27.6	73.4	11	22.6	16	69.2
Profile												
Riffle Length (ft)	19.0	52.2										
Riffle Slope (ft/ft)	0.0028	0.0530										
Pool Length (ft)	42.5	96.1										
Pool Max Depth (ft)	2.0	4.3										
Pool Spacing (ft)	70	164										
Pool Volume (ft^3)												
Pattern												
Channel Beltwidth (ft)	38	110										
Radius of Curvature (ft)	51	69										
Rc:Bankfull Width (ft/ft)	2.8	3.1										
Meander Wave Length (ft)	135	216										
Meander Width Ratio	2.1	4.9										
Additional Reach Parameters												
Rosgen Classification	C5											
Channel Thalweg Length (ft)	2,404											
Sinuosity (ft)	1.1											
Water Surface Slope (ft/ft)	0.0058											
Bankfull Slope (ft/ft)	0.0053											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	SC/0.14/0.2/45.0/90.0/128.0		SC/0.71/5.6/101.2/362/>2048		SC/1.47/11.0/75.9/146.7/512.0		0.13/0.71/13.3/109.1/160.7/256		0.30/0.57/1.0/53.7/113.8/362.0		0.39/4.0/27.8/132.9/234.4/2048	
% of Reach with Eroding Banks	0%		0%		0%		0%		0%		0%	

[1]Entrenchment Ratio was calculated by the method specified in the Industry Technical Workgroup Memorandum.

[2]Bank Height Ratio was calculated by the method specified in the Industry Technical Workgroup Memorandum.

Table 12b. Monitoring Data - Stream Reach Data Summary

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Foust Creek - Reach 3A

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle												
Bankfull Width (ft)	18.5	22.5	17.7	22.2	17.6	22.1	16.7	22.1	17.0	26.1	19.3	24.7
Floodprone Width (ft)	150		150		150		150		150		150	
Bankfull Mean Depth	1.1	1.3	1.0	1.3	1.0	1.3	0.9	1.2	1.0	1.5	1.0	1.5
Bankfull Max Depth	1.9	2.3	1.8	2.3	1.8	2.2	1.7	2.2	2.0	2.6	2.1	2.9
Bankfull Cross Sectional Area (ft^2)	21.5	30.2	17.7	28.8	16.8	28.2	15.1	26.4	17.6	38.4	20.1	37.7
Width/Depth Ratio	15.5	18.8	17.0	19.0	17.3	19.4	18.4	20.8	16.5	20.0	16.1	18.9
Entrenchment Ratio[1]	6.7	8.1	6.8	8.5	6.8	8.5	6.8	9.0	7.6	8.8	6.1	7.8
Bank Height Ratio [2]	1.0		1.0		1.0		1.0		<1.0		<1.0	1.2
D50 (mm)	7.3	51.8	7.7	41.3	13.5	49.9	27.6	73.4	11	22.6	16	69.2
Profile												
Riffle Length (ft)	19.0	52.2										
Riffle Slope (ft/ft)	0.0028	0.0530										
Pool Length (ft)	42.5	96.1										
Pool Max Depth (ft)	2.0	4.3										
Pool Spacing (ft)	70	164										
Pool Volume (ft^3)												
Pattern												
Channel Beltwidth (ft)	38	110										
Radius of Curvature (ft)	51	69										
Rc:Bankfull Width (ft/ft)	2.8	3.1										
Meander Wave Length (ft)	135	216										
Meander Width Ratio	2.1	4.9										
Additional Reach Parameters												
Rosgen Classification	C4											
Channel Thalweg Length (ft)	317											
Sinuosity (ft)	1.1											
Water Surface Slope (ft/ft)	0.0105											
Bankfull Slope (ft/ft)	0.0085											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	SC/0.14/0.2/45.0/90.0/128.0		SC/0.71/5.6/101.2/362/>2048		SC/1.47/11.0/75.9/146.7/512.0		0.13/0.71/13.3/109.1/160.7/256		0.30/0.57/1.0/53.7/113.8/362.0		0.39/4.0/27.8/132.9/234.4/2048	
% of Reach with Eroding Banks	0%		0%		0%		0%		0%		0%	

[1]Entrenchment Ratio was calculated by the method specified in the Industry Technical Workgroup Memorandum.

[2]Bank Height Ratio was calculated by the method specified in the Industry Technical Workgroup Memorandum.

Table 12c. Monitoring Data - Stream Reach Data Summary

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Foust Creek - Reach 3B

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle												
Bankfull Width (ft)	23.6		22.7		23.2		22.3		20.9		24.2	
Floodprone Width (ft)	150		150		150		150		150		150	
Bankfull Mean Depth	1.5		1.4		1.4		1.4		1.4		1.5	
Bankfull Max Depth	2.7		2.5		2.5		2.4		2.4		2.8	
Bankfull Cross Sectional Area (ft^2)	36.5		32.1		31.9		30.5		29.3		16.5	
Width/Depth Ratio	15.2		16.0		16.9		16.3		14.9		35.5	
Entrenchment Ratio[1]	6.4		6.6		6.5		6.7		7.2		6.2	
Bank Height Ratio [2]	1.0		1.0		1.0		1.0		<1.0		1.0	
D50 (mm)	52.3		28.1		32.0		48.3		22.6		49.8	
Profile												
Riffle Length (ft)	24.24	34.42										
Riffle Slope (ft/ft)	0.0096	0.0300										
Pool Length (ft)	56.3	101.2										
Pool Max Depth (ft)	2.3	4.0										
Pool Spacing (ft)	34	137										
Pool Volume (ft^3)												
Pattern												
Channel Beltwidth (ft)	72	128										
Radius of Curvature (ft)	55	67										
Rc:Bankfull Width (ft/ft)	2.3	2.8										
Meander Wave Length (ft)	166	234										
Meander Width Ratio	3.1	5.4										
Additional Reach Parameters												
Rosgen Classification	C/E4											
Channel Thalweg Length (ft)	1,173											
Sinuosity (ft)	1.1											
Water Surface Slope (ft/ft)	0.0056											
Bankfull Slope (ft/ft)	0.0071											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	SC/0.10/0.3/66.2/101.2/180.0		SC/SC/5.6/69.7/120.7/256.0		0.63/2.50/7.4/55.6/90.0/512.0		0.17/1.41/15.3/120.1/180/>2048		SC/4.47/25.4/124.0/214.7/362.0		0.42/6.2/34.3/153.5/1149.4/2048	
% of Reach with Eroding Banks	0%		0%		0%		0%		0%		0%	

[1]Entrenchment Ratio was calculated by the method specified in the Industry Technical Workgroup Memorandum.

[2]Bank Height Ratio was calculated by the method specified in the Industry Technical Workgroup Memorandum.

Table 12d. Monitoring Data - Stream Reach Data Summary

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

UT1

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle												
Bankfull Width (ft)	10.8	12.6	10.2	12.0	10.2	11.7	10.2	11.6	11.0	11.6	11.4	
Floodprone Width (ft)	150		150		150		150		150		150	
Bankfull Mean Depth	0.6	0.8	0.6	0.7	0.6	0.7	0.6	0.7	0.6	0.7	0.6	0.8
Bankfull Max Depth	1.3	1.5	1.1	1.3	1.2	1.4	1.1	1.4	1.2	1.5	0.8	1.3
Bankfull Cross Sectional Area (ft^2)	7.7	8.1	7.0	7.4	6.8	7.6	6.4	7.5	6.6	8.4	7.0	8.6
Width/Depth Ratio	14.2	20.4	14.1	20.6	13.6	20.2	13.8	20.8	16.0	18.2	15.0	18.8
Entrenchment Ratio[1]	11.9	13.9	12.5	14.6	12.8	14.8	12.9	14.8	12.9	13.7	13.1	13.2
Bank Height Ratio [2]	1.0		1.0		1.0		1.0		1.0		<1.0	1.0
D50 (mm)	18.2	35.7	17.6	21.3	15.0	30.9	32.0	37.9	19	29.3	43.9	47.5
Profile												
Riffle Length (ft)	11.5	21.6										
Riffle Slope (ft/ft)	0.0088	0.0583										
Pool Length (ft)	18.5	51.0										
Pool Max Depth (ft)	1.9	2.0										
Pool Spacing (ft)	33	82										
Pool Volume (ft^3)												
Pattern												
Channel Beltwidth (ft)	21	44										
Radius of Curvature (ft)	30	36										
Rc:Bankfull Width (ft/ft)	2.7	2.8										
Meander Wave Length (ft)	79	120										
Meander Width Ratio	1.9	3.5										
Additional Reach Parameters												
Rosgen Classification	C/E4											
Channel Thalweg Length (ft)	793											
Sinuosity (ft)	1.1											
Water Surface Slope (ft/ft)	0.0079											
Bankfull Slope (ft/ft)	0.006											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	0.07/0.39/11.4/55.6/90.0/256.0		0.16/3.26/6.7/45.0/143.4/512.0		SC\SC\12.2\66.5\107.3\180.0		SC\SC\0.4\59.2\104.7\180.0		SC/0.81/12.5/80.3/151.8/362.0		SC/11.0/36.7/102.7/171.4/1024	
% of Reach with Eroding Banks	0%		0%		0%		0%		0%		0%	

[1]Entrenchment Ratio was calculated by the method specified in the Industry Technical Workgroup Memorandum.

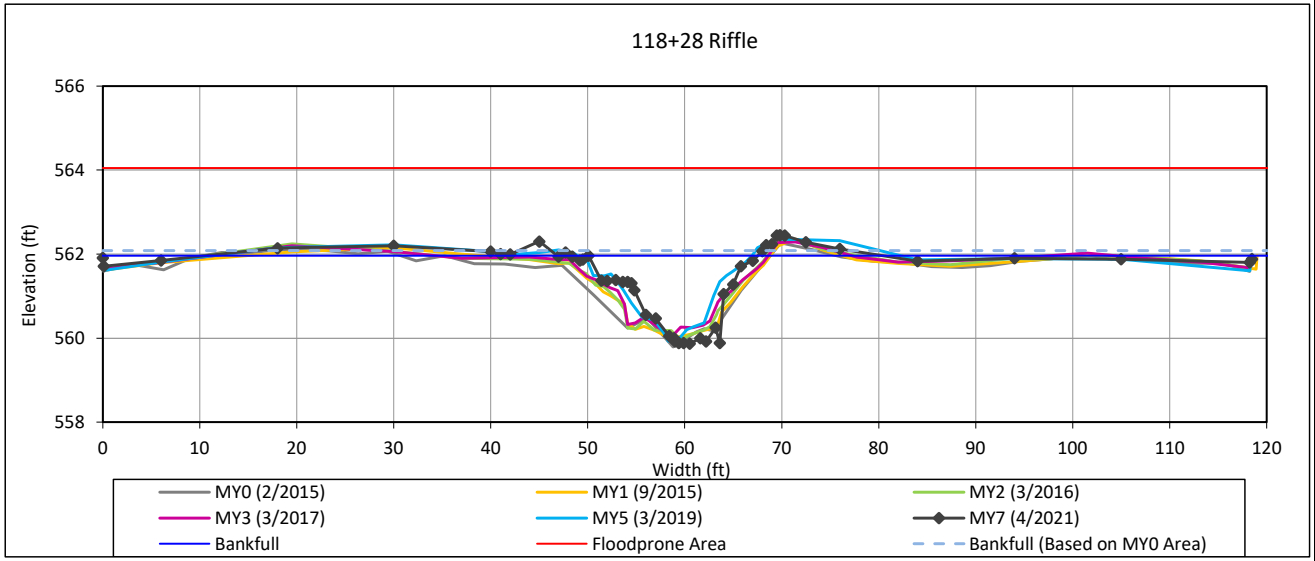
[2]Bank Height Ratio was calculated by the method specified in the Industry Technical Workgroup Memorandum.

Cross Section Plots

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Cross Section 1- Foust Creek Reach 2



Bankfull Dimensions	
20.1	x-section area (ft.sq.)
19.5	width (ft)
1.0	mean depth (ft)
2.1	max depth (ft)
21.1	wetted parimeter (ft)
1.0	hyd radi (ft)
18.9	width-depth ratio
150.0	W flood prone area (ft)
7.7	entrenchment ratio
< 1.0	low bank height ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering

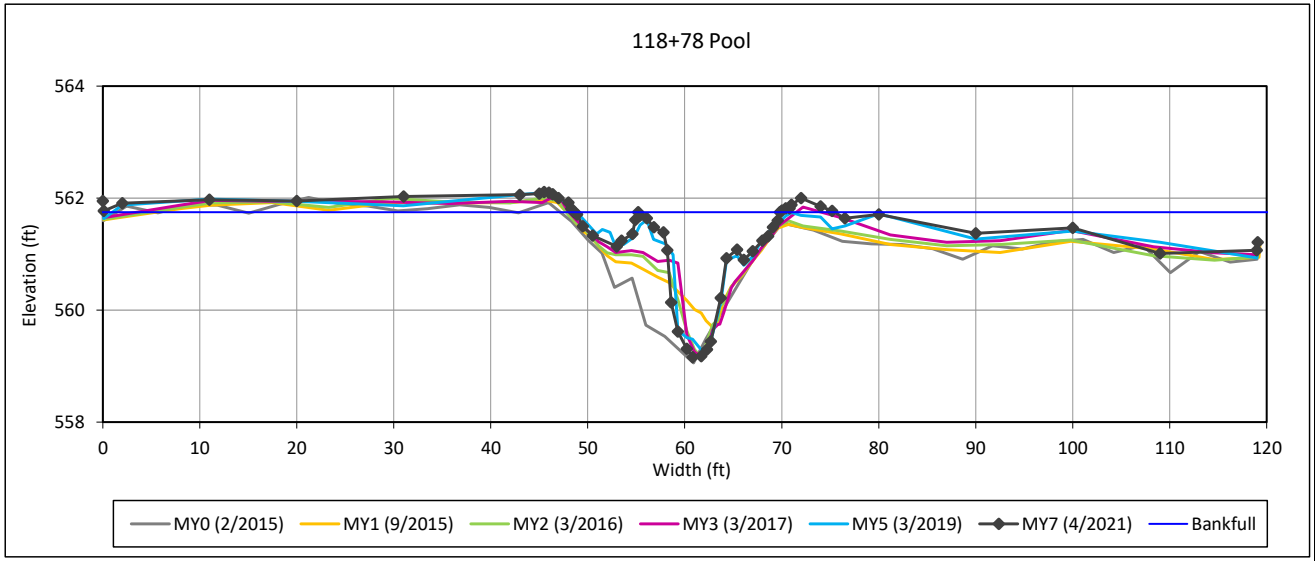
View Downstream

Cross Section Plots

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Cross Section 2- Foust Creek Reach 2



Bankfull Dimensions	
16.7	x-section area (ft.sq.)
14.6	width (ft)
1.1	mean depth (ft)
2.6	max depth (ft)
16.4	wetted parimeter (ft)
1.0	hyd radi (ft)
12.8	width-depth ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering

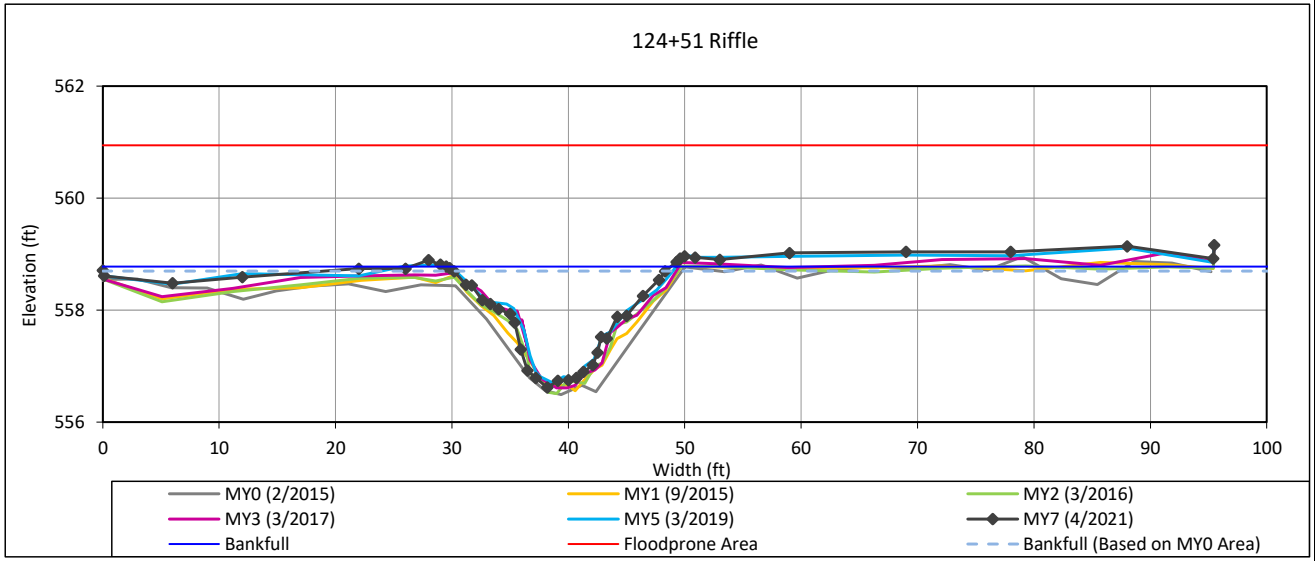
View Downstream

Cross Section Plots

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Cross Section 3- Foust Creek Reach 2



Bankfull Dimensions	
20.8	x-section area (ft.sq.)
19.3	width (ft)
1.1	mean depth (ft)
2.2	max depth (ft)
20.2	wetted parimeter (ft)
1.0	hyd radi (ft)
18.0	width-depth ratio
150.0	W flood prone area (ft)
7.8	entrenchment ratio
1.0	low bank height ratio

Survey Date: 4/2021
Field Crew: Wildlands Engineering

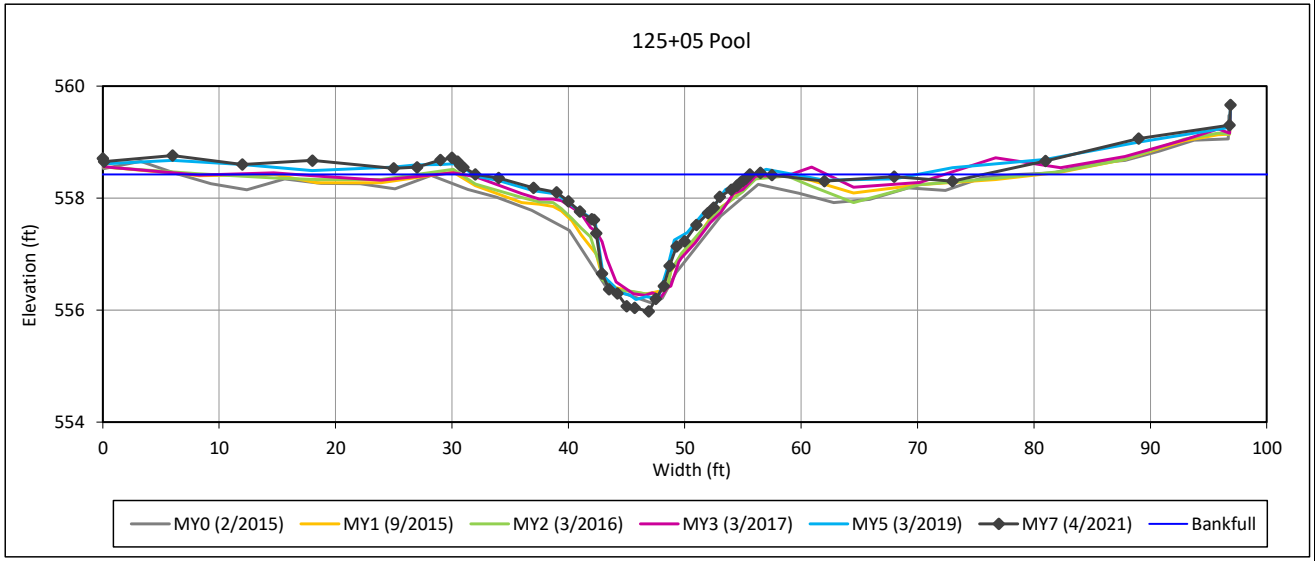
View Downstream

Cross Section Plots

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Cross Section 4- Foust Creek Reach 2



Bankfull Dimensions	
21.2	x-section area (ft.sq.)
23.6	width (ft)
0.9	mean depth (ft)
2.4	max depth (ft)
24.7	wetted parimeter (ft)
0.9	hyd radi (ft)
26.2	width-depth ratio

Survey Date: 4/2021
Field Crew: Wildlands Engineering

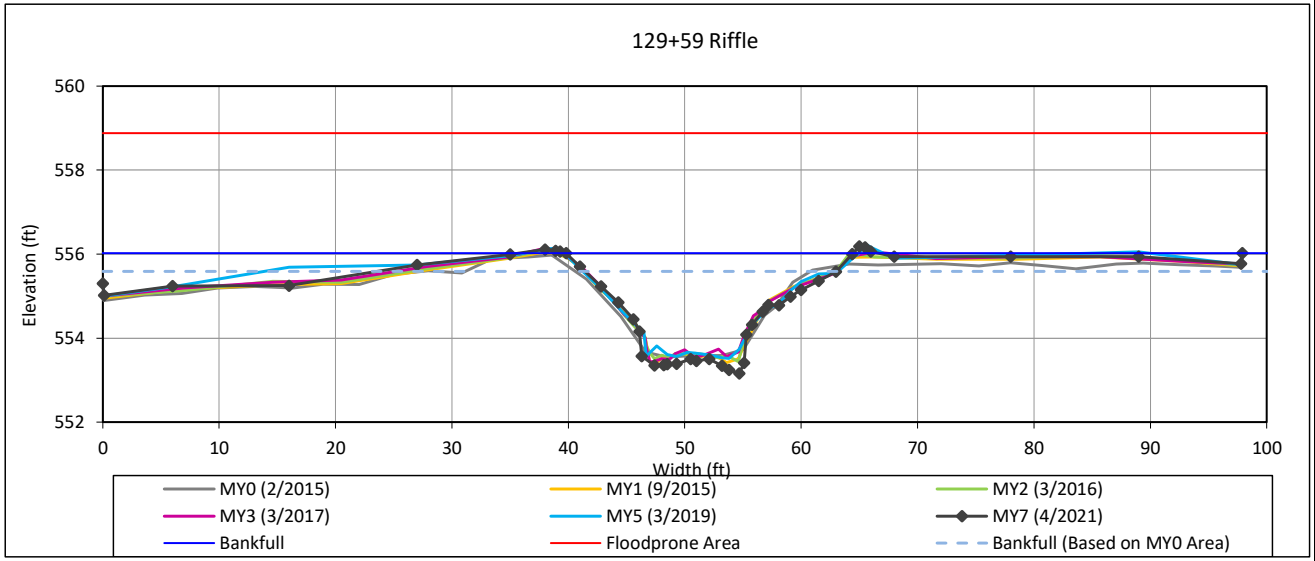
View Downstream

Cross Section Plots

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Cross Section 5- Foust Creek Reach 2



Bankfull Dimensions	
37.7	x-section area (ft.sq.)
24.7	width (ft)
1.5	mean depth (ft)
2.9	max depth (ft)
26.3	wetted parimeter (ft)
1.4	hyd radi (ft)
16.1	width-depth ratio
150.0	W flood prone area (ft)
6.1	entrenchment ratio
1.2	low bank height ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering

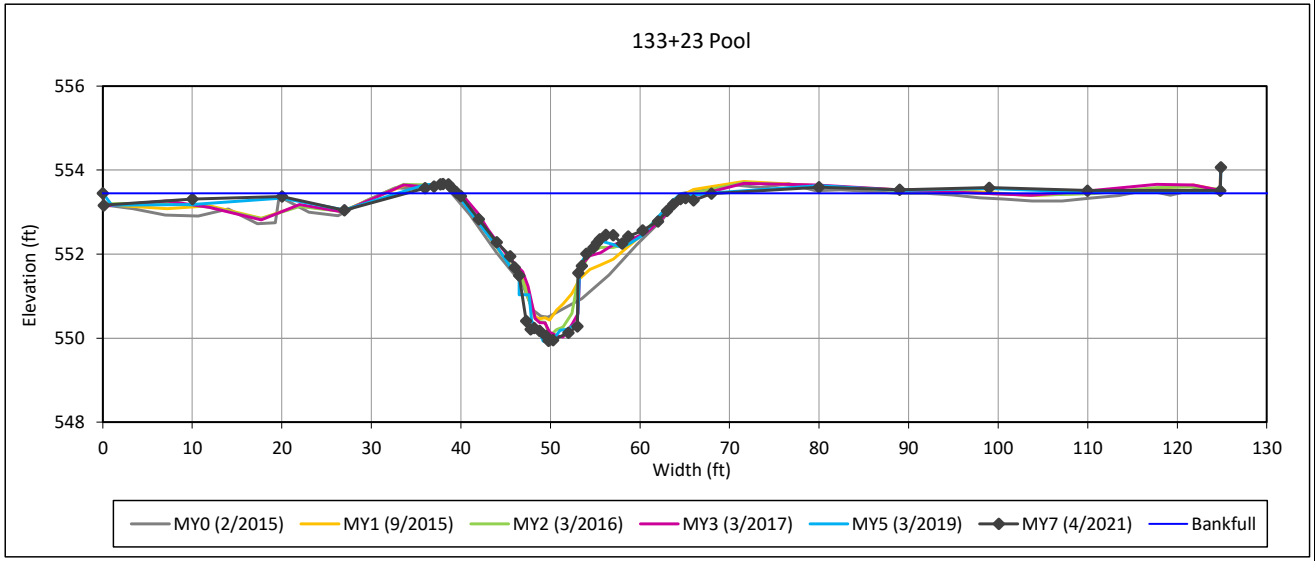
View Downstream

Cross Section Plots

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Cross Section 6- Foust Creek Reach 2



Bankfull Dimensions	
38.5	x-section area (ft.sq.)
28.4	width (ft)
1.4	mean depth (ft)
3.5	max depth (ft)
30.8	wetted parimeter (ft)
1.3	hyd radi (ft)
20.9	width-depth ratio

Survey Date: 4/2021
Field Crew: Wildlands Engineering

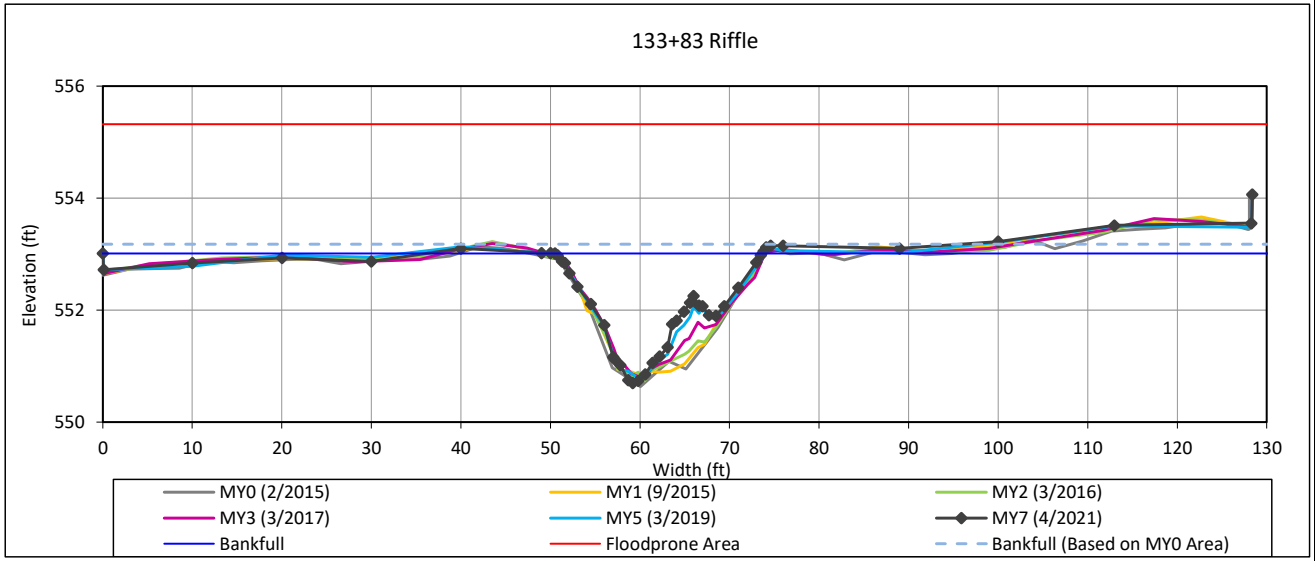
View Downstream

Cross Section Plots

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Cross Section 7- Foust Creek Reach 2



Bankfull Dimensions	
26.1	x-section area (ft.sq.)
23.1	width (ft)
1.1	mean depth (ft)
2.3	max depth (ft)
23.9	wetted parimeter (ft)
1.1	hyd radi (ft)
20.5	width-depth ratio
150.0	W flood prone area (ft)
6.5	entrenchment ratio
< 1.0	low bank height ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering

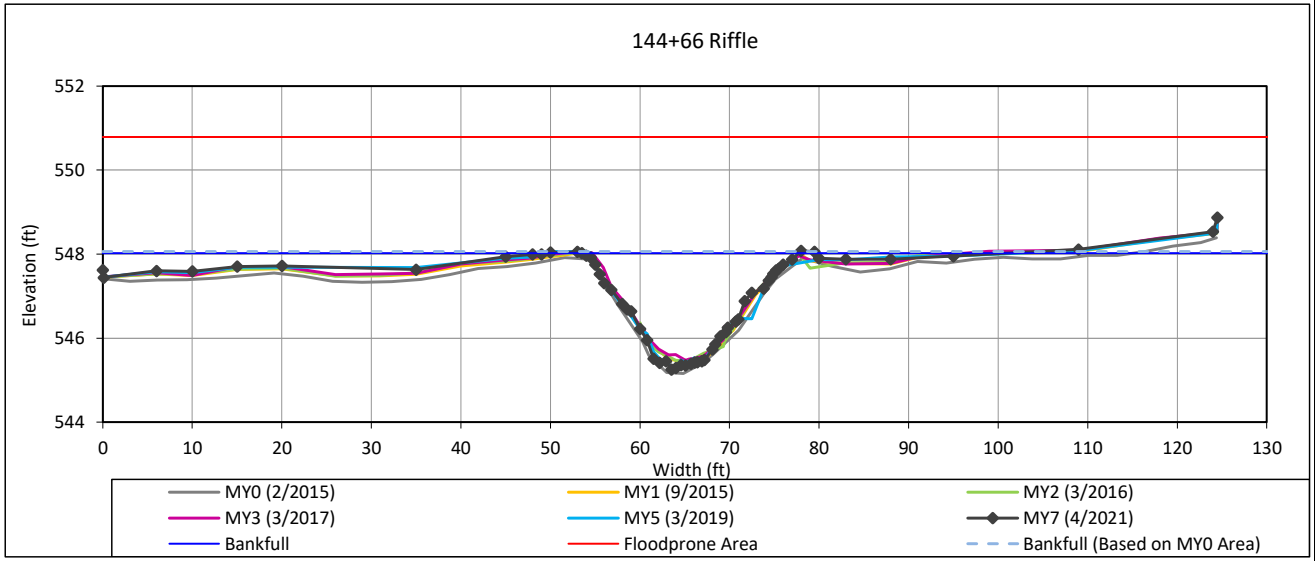
View Downstream

Cross Section Plots

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Cross Section 8- Foust Creek Reach 3B



Bankfull Dimensions	
35.5	x-section area (ft.sq.)
24.2	width (ft)
1.5	mean depth (ft)
2.8	max depth (ft)
25.1	wetted parimeter (ft)
1.4	hyd radi (ft)
16.5	width-depth ratio
150.0	W flood prone area (ft)
6.2	entrenchment ratio
1.0	low bank height ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering

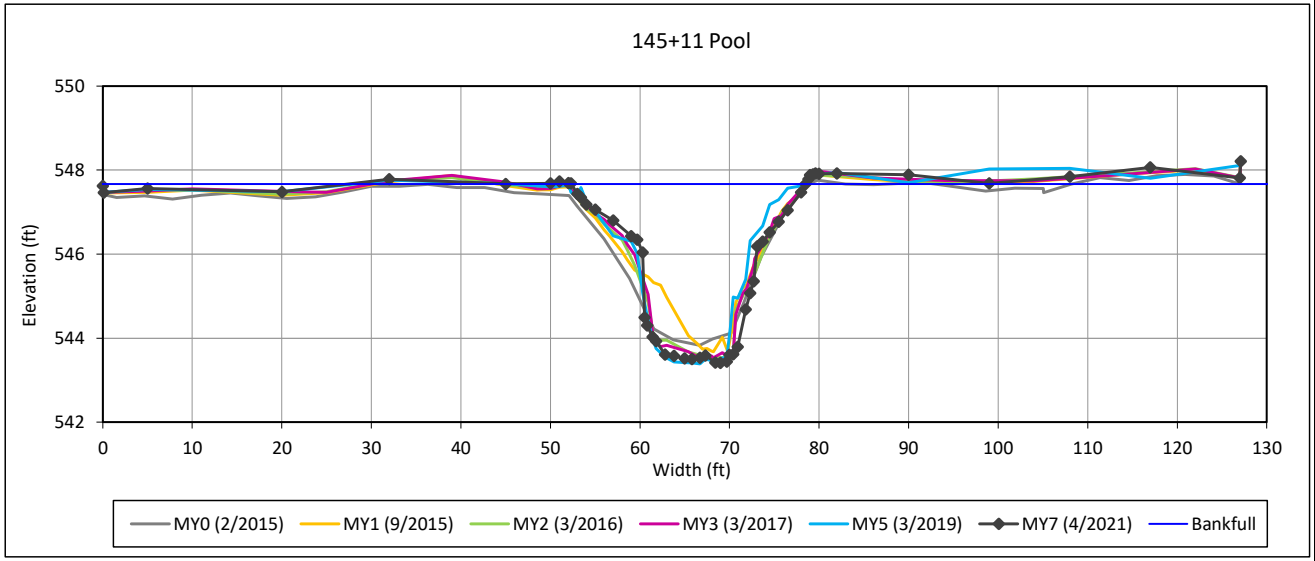
View Downstream

Cross Section Plots

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Cross Section 9- Foust Creek Reach 3B



Bankfull Dimensions	
59.4	x-section area (ft.sq.)
26.2	width (ft)
2.3	mean depth (ft)
4.3	max depth (ft)
29.3	wetted parimeter (ft)
2.0	hyd radi (ft)
11.5	width-depth ratio

Survey Date: 4/2021
Field Crew: Wildlands Engineering

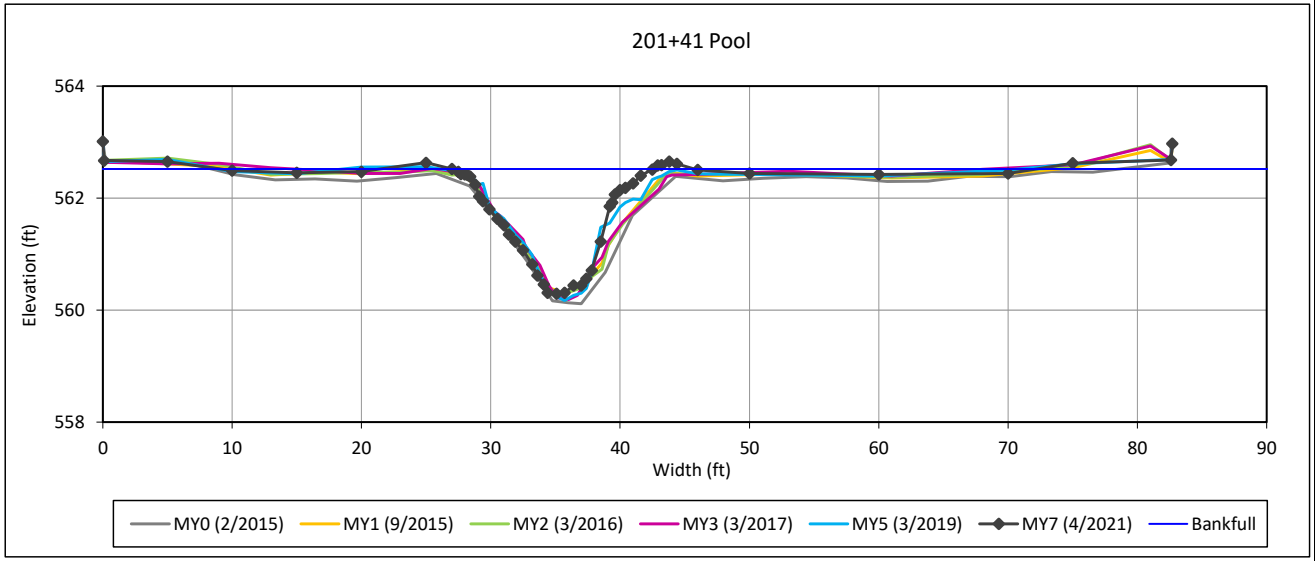
View Downstream

Cross Section Plots

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Cross Section 10-UT1



Bankfull Dimensions	
16.9	x-section area (ft.sq.)
15.6	width (ft)
1.1	mean depth (ft)
2.2	max depth (ft)
16.5	wetted parimeter (ft)
1.0	hyd radi (ft)
14.3	width-depth ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering

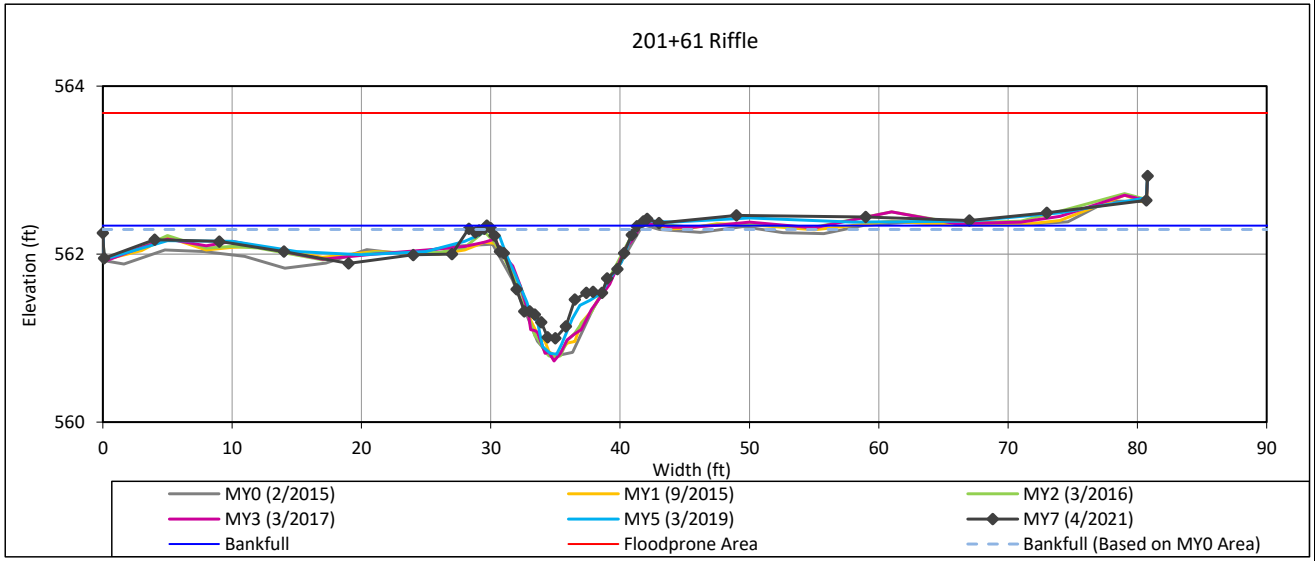
View Downstream

Cross Section Plots

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Cross Section 11-UT1



Bankfull Dimensions	
8.6	x-section area (ft.sq.)
11.4	width (ft)
0.8	mean depth (ft)
1.3	max depth (ft)
11.8	wetted parimeter (ft)
0.7	hyd radi (ft)
15.0	width-depth ratio
150.0	W flood prone area (ft)
13.2	entrenchment ratio
1.0	low bank height ratio

Survey Date: 4/2021
Field Crew: Wildlands Engineering

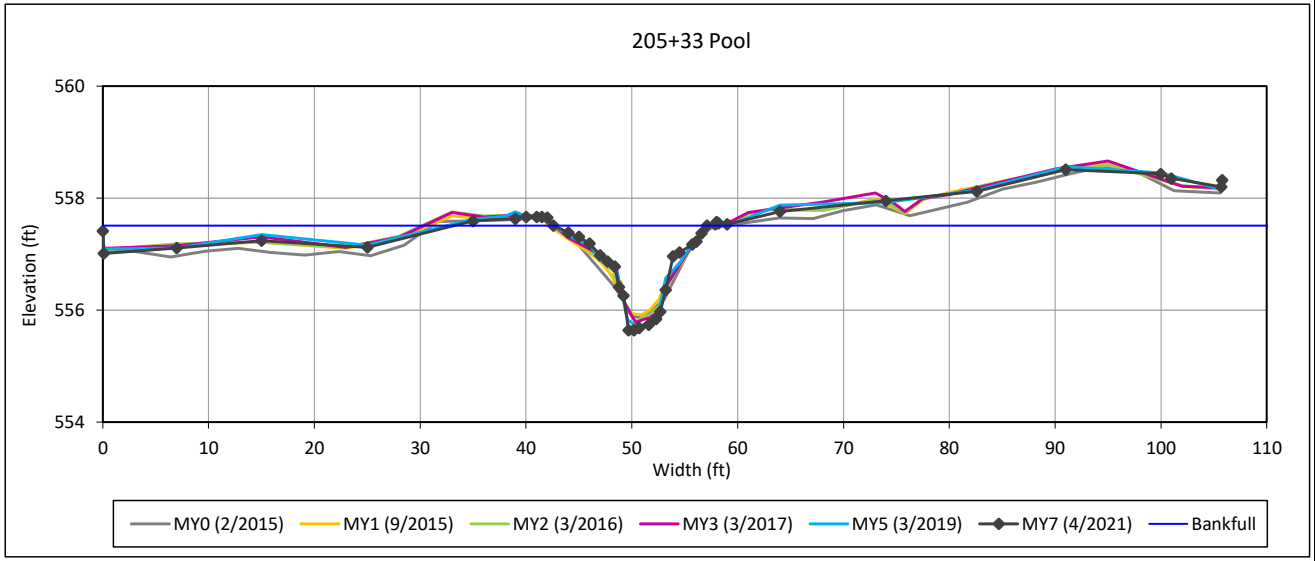
View Downstream

Cross Section Plots

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Cross Section 12-UT1



Bankfull Dimensions	
11.1	x-section area (ft.sq.)
14.5	width (ft)
0.8	mean depth (ft)
1.9	max depth (ft)
15.5	wetted parimeter (ft)
0.7	hyd radi (ft)
18.9	width-depth ratio

Survey Date: 4/2021
Field Crew: Wildlands Engineering

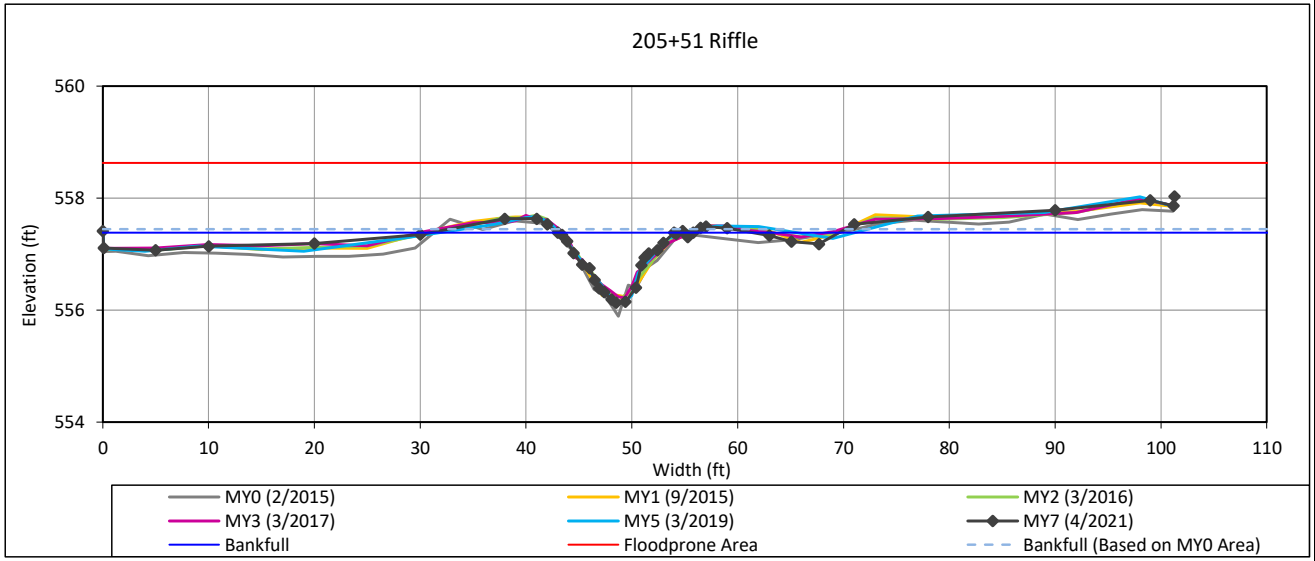
View Downstream

Cross Section Plots

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Cross Section 13-UT1



Bankfull Dimensions	
7.0	x-section area (ft.sq.)
11.4	width (ft)
0.6	mean depth (ft)
1.3	max depth (ft)
11.9	wetted parimeter (ft)
0.6	hyd radi (ft)
18.8	width-depth ratio
150.0	W flood prone area (ft)
13.1	entrenchment ratio
< 1.0	low bank height ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering

View Downstream

Reachwide and Cross Section Pebble Count Plots

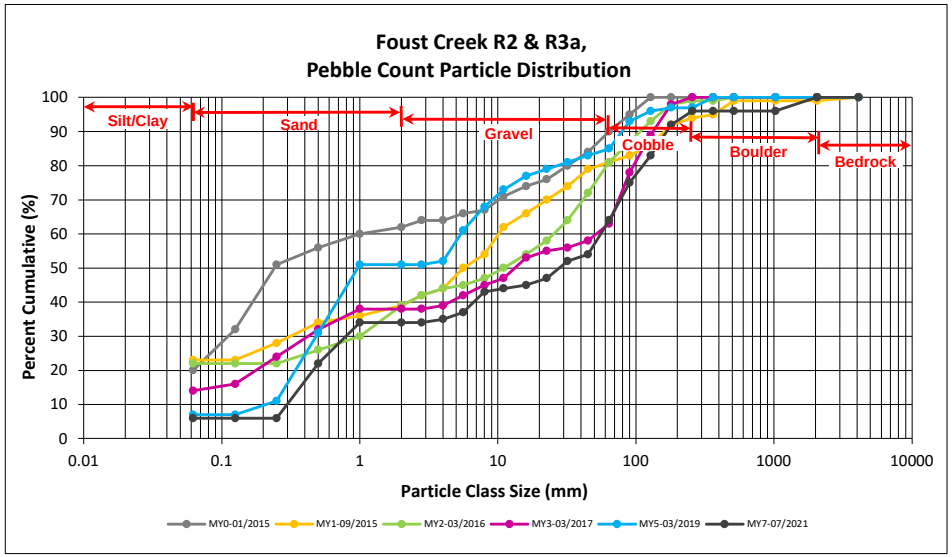
Foust Creek Mitigation Site (DMS Project No. 95715)

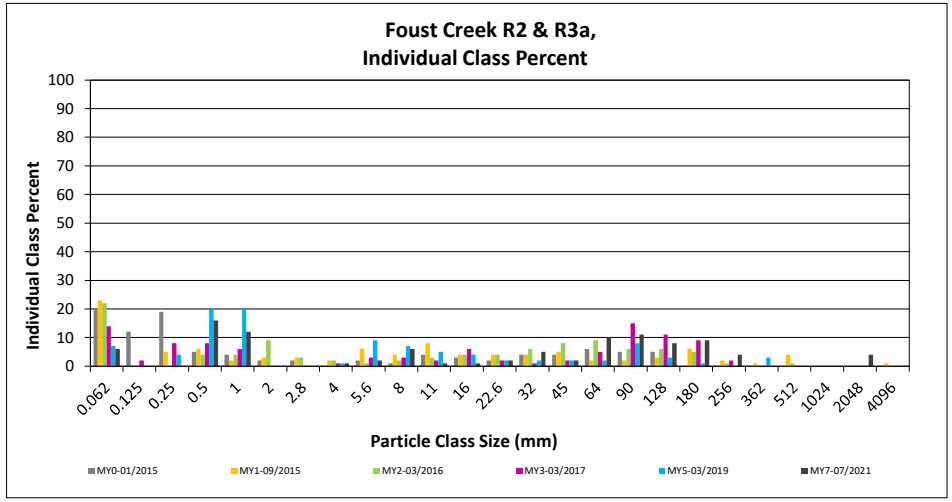
Monitoring Year 7 - 2021

Foust Creek R2 & R3a, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062		6	6	6	6
SAND	Very fine	0.062	0.125					6
	Fine	0.125	0.250					6
	Medium	0.25	0.50	3	13	16	16	22
	Coarse	0.5	1.0	3	9	12	12	34
	Very Coarse	1.0	2.0					34
GRAVEL	Very Fine	2.0	2.8					34
	Very Fine	2.8	4.0		1	1	1	35
	Fine	4.0	5.6	1	1	2	2	37
	Fine	5.6	8.0	3	3	6	6	43
	Medium	8.0	11.0		1	1	1	44
	Medium	11.0	16.0		1	1	1	45
	Coarse	16.0	22.6		2	2	2	47
	Coarse	22.6	32	2	3	5	5	52
	Very Coarse	32	45		2	2	2	54
	Very Coarse	45	64	7	3	10	10	64
COBBLE	Small	64	90	5	6	11	11	75
	Small	90	128	6	2	8	8	83
	Large	128	180	6	3	9	9	92
	Large	180	256	3	1	4	4	96
BOULDER	Small	256	362					96
	Small	362	512					96
	Medium	512	1024					96
	Large/Very Large	1024	2048	1	3	4	4	100
BEDROCK	Bedrock	2048	>2048					100
			Total	**40**	**60**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	0.39
D_{35} =	4.00
D_{50} =	27.8
D_{84} =	132.9
D_{95} =	234.4
D_{100} =	2048.0





Reachwide and Cross Section Pebble Count Plots

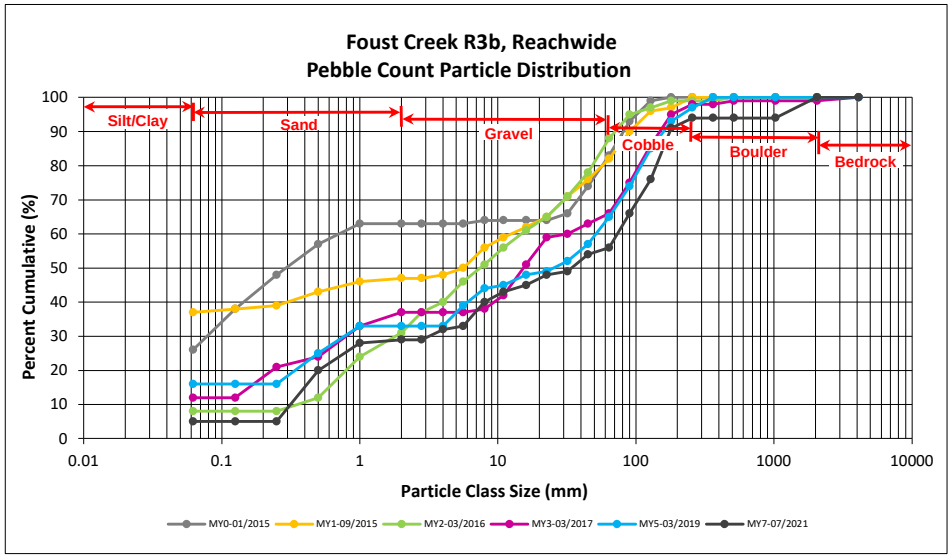
Foust Creek Mitigation Site (DMS Project No. 95715)

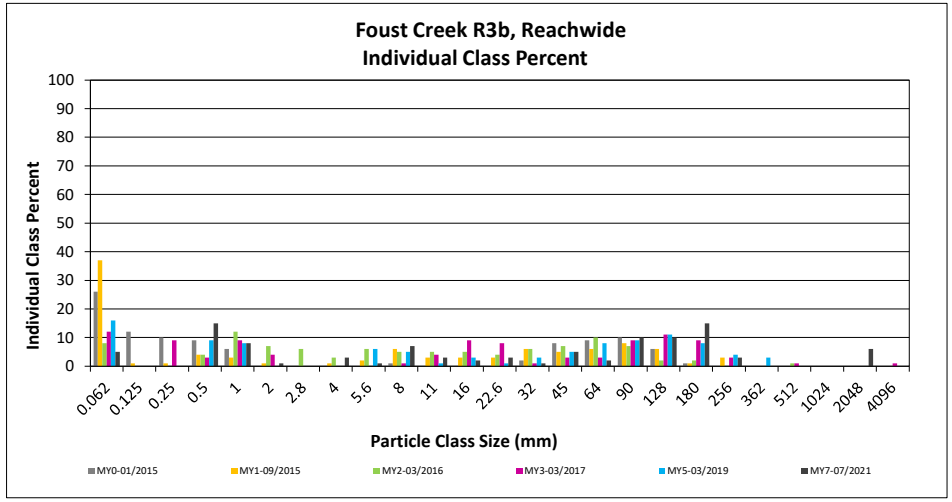
Monitoring Year 7 - 2021

Foust Creek R3b, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062		5	5	5	5
SAND	Very fine	0.062	0.125					5
	Fine	0.125	0.250					5
	Medium	0.25	0.50	1	14	15	15	20
	Coarse	0.5	1.0	3	5	8	8	28
	Very Coarse	1.0	2.0		1	1	1	29
GRAVEL	Very Fine	2.0	2.8					29
	Very Fine	2.8	4.0		3	3	3	32
	Fine	4.0	5.6	1		1	1	33
	Fine	5.6	8.0	3	4	7	7	40
	Medium	8.0	11.0	2	1	3	3	43
	Medium	11.0	16.0	2		2	2	45
	Coarse	16.0	22.6	3		3	3	48
	Coarse	22.6	32		1	1	1	49
	Very Coarse	32	45	2	3	5	5	54
	Very Coarse	45	64	1	1	2	2	56
COBBLE	Small	64	90	4	6	10	10	66
	Small	90	128	6	4	10	10	76
	Large	128	180	9	6	15	15	91
	Large	180	256	3		3	3	94
BOULDER	Small	256	362					94
	Small	362	512					94
	Medium	512	1024					94
	Large/Very Large	1024	2048		6	6	6	100
BEDROCK	Bedrock	2048	>2048					100
			Total	**40**	**60**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	0.42
D_{35} =	6.20
D_{50} =	34.3
D_{84} =	153.5
D_{95} =	1149.4
D_{100} =	2048.0





Reachwide and Cross Section Pebble Count Plots

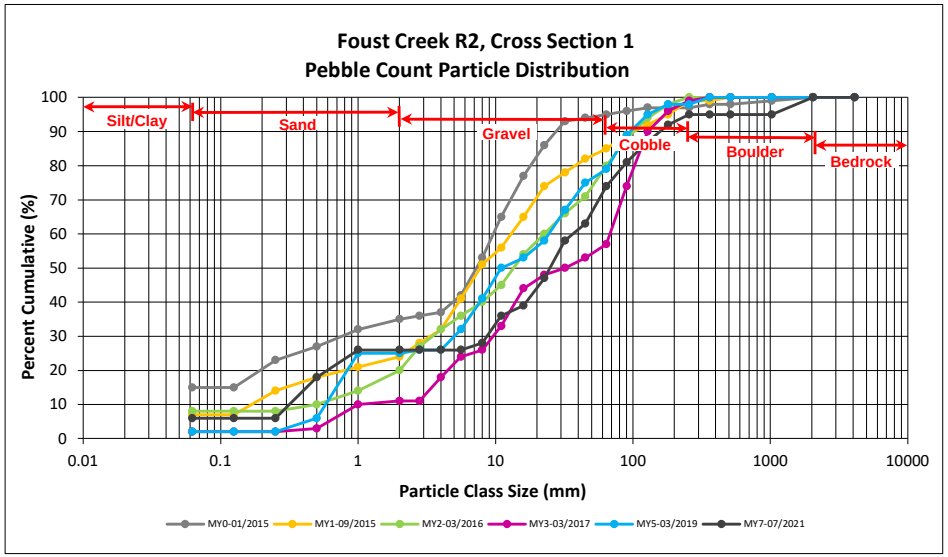
Foust Creek Mitigation Site (DMS Project No. 95715)

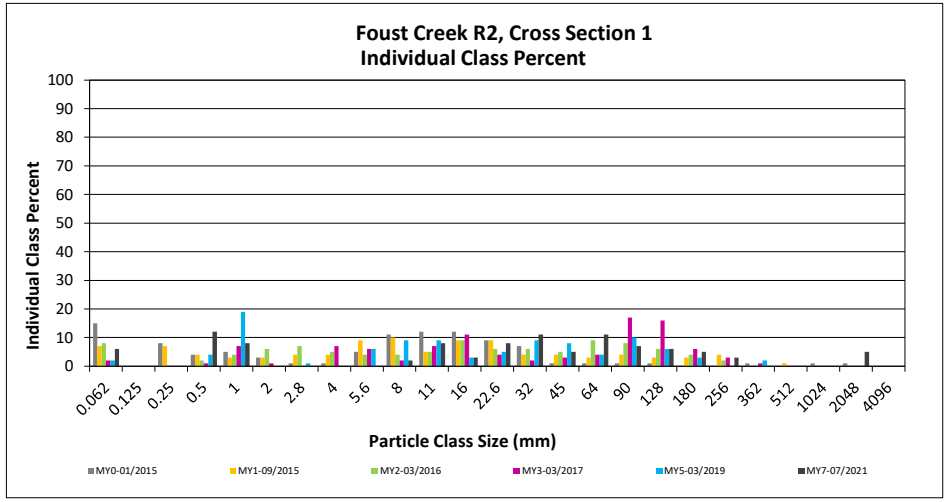
Monitoring Year 7 - 2021

Foust Creek R2, Cross Section 1

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	6	6	6
SAND	Very fine	0.062	0.125			6
	Fine	0.125	0.250			6
	Medium	0.25	0.50	12	12	18
	Coarse	0.5	1.0	8	8	26
	Very Coarse	1.0	2.0			26
GRAVEL	Very Fine	2.0	2.8			26
	Very Fine	2.8	4.0			26
	Fine	4.0	5.6			26
	Fine	5.6	8.0	2	2	28
	Medium	8.0	11.0	8	8	36
	Medium	11.0	16.0	3	3	39
	Coarse	16.0	22.6	8	8	47
	Coarse	22.6	32	11	11	58
	Very Coarse	32	45	5	5	63
	Very Coarse	45	64	11	11	74
COBBLE	Small	64	90	7	7	81
	Small	90	128	6	6	87
	Large	128	180	5	5	92
	Large	180	256	3	3	95
BOULDER	Small	256	362			95
	Small	362	512			95
	Medium	512	1024			95
	Large/Very Large	1024	2048	5	5	100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross Section 1	
Channel materials (mm)	
D_{16} =	0.45
D_{35} =	10.57
D_{50} =	24.8
D_{84} =	107.3
D_{95} =	256.0
D_{100} =	2048.0





Reachwide and Cross Section Pebble Count Plots

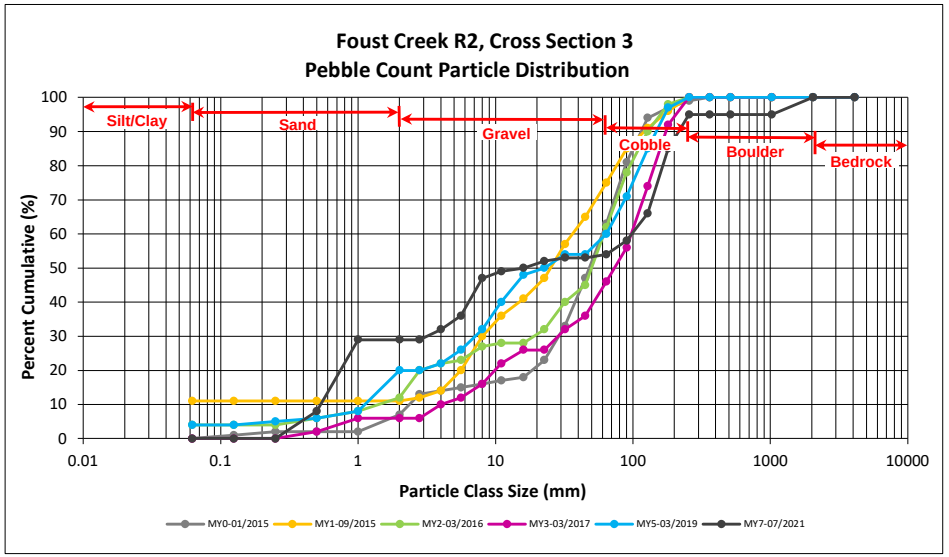
Foust Creek Mitigation Site (DMS Project No. 95715)

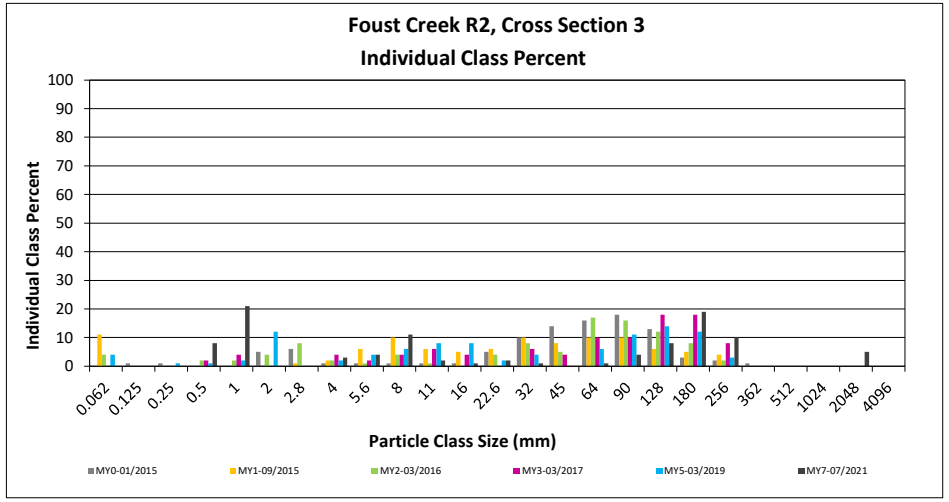
Monitoring Year 7 - 2021

Foust Creek R2, Cross Section 3

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062			0
SAND	Very fine	0.062	0.125			0
	Fine	0.125	0.250			0
	Medium	0.25	0.50	8	8	8
	Coarse	0.5	1.0	21	21	29
	Very Coarse	1.0	2.0			29
GRAVEL	Very Fine	2.0	2.8			29
	Very Fine	2.8	4.0	3	3	32
	Fine	4.0	5.6	4	4	36
	Fine	5.6	8.0	11	11	47
	Medium	8.0	11.0	2	2	49
	Medium	11.0	16.0	1	1	50
	Coarse	16.0	22.6	2	2	52
	Coarse	22.6	32	1	1	53
	Very Coarse	32	45			53
	Very Coarse	45	64	1	1	54
COBBLE	Small	64	90	4	4	58
	Small	90	128	8	8	66
	Large	128	180	19	19	85
	Large	180	256	10	10	95
BOULDER	Small	256	362			95
	Small	362	512			95
	Medium	512	1024			95
	Large/Very Large	1024	2048	5	5	100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross Section 3	
Channel materials (mm)	
D_{16} =	0.65
D_{35} =	5.15
D_{50} =	16.0
D_{84} =	176.8
D_{95} =	256.0
D_{100} =	2048.0





Reachwide and Cross Section Pebble Count Plots

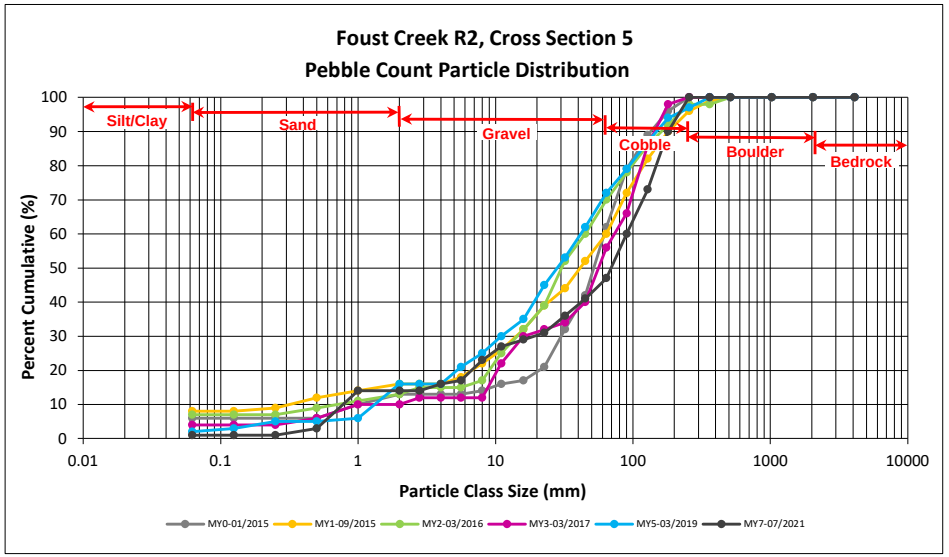
Foust Creek Mitigation Site (DMS Project No. 95715)

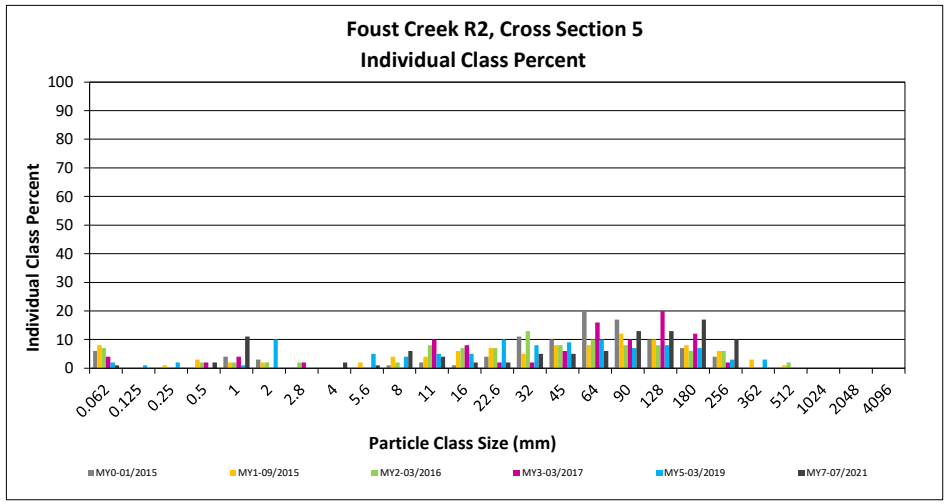
Monitoring Year 7 - 2021

Foust Creek R2, Cross Section 5

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	1	1
SAND	Very fine	0.062	0.125			1
	Fine	0.125	0.250			1
	Medium	0.25	0.50	2	2	3
	Coarse	0.5	1.0	11	11	14
	Very Coarse	1.0	2.0			14
GRAVEL	Very Fine	2.0	2.8			14
	Very Fine	2.8	4.0	2	2	16
	Fine	4.0	5.6	1	1	17
	Fine	5.6	8.0	6	6	23
	Medium	8.0	11.0	4	4	27
	Medium	11.0	16.0	2	2	29
	Coarse	16.0	22.6	2	2	31
	Coarse	22.6	32	5	5	36
	Very Coarse	32	45	5	5	41
	Very Coarse	45	64	6	6	47
COBBLE	Small	64	90	13	13	60
	Small	90	128	13	13	73
	Large	128	180	17	17	90
	Large	180	256	10	10	100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross Section 5	
Channel materials (mm)	
D_{16} =	4.00
D_{35} =	29.85
D_{50} =	69.2
D_{84} =	159.6
D_{95} =	214.7
D_{100} =	256.0





Reachwide and Cross Section Pebble Count Plots

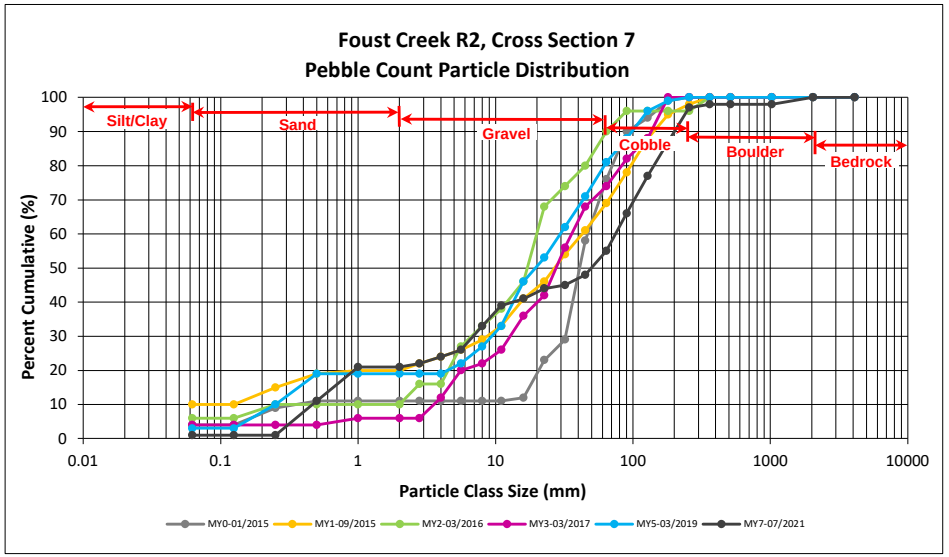
Foust Creek Mitigation Site (DMS Project No. 95715)

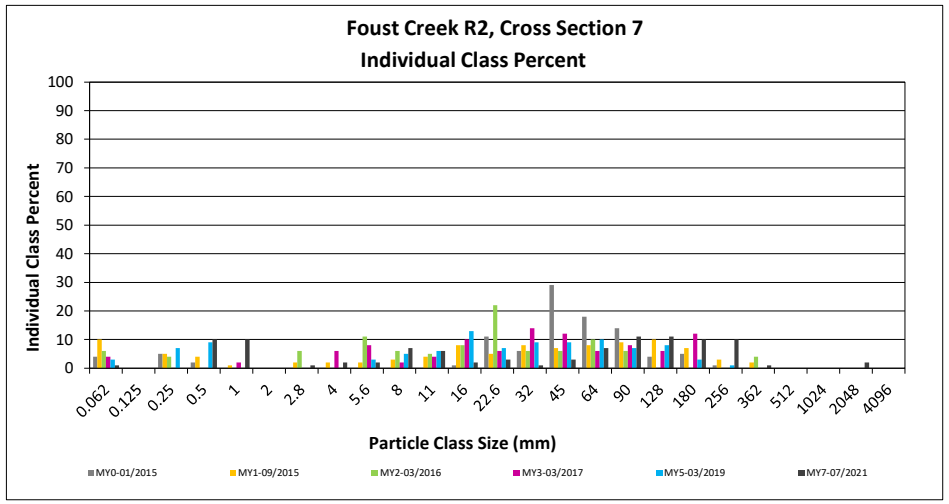
Monitoring Year 7 - 2021

Foust Creek R2, Cross Section 7

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	1	1
SAND	Very fine	0.062	0.125			1
	Fine	0.125	0.250			1
	Medium	0.25	0.50	10	10	11
	Coarse	0.5	1.0	10	10	21
	Very Coarse	1.0	2.0			21
GRAVEL	Very Fine	2.0	2.8	1	1	22
	Very Fine	2.8	4.0	2	2	24
	Fine	4.0	5.6	2	2	26
	Fine	5.6	8.0	7	7	33
	Medium	8.0	11.0	6	6	39
	Medium	11.0	16.0	2	2	41
	Coarse	16.0	22.6	3	3	44
	Coarse	22.6	32	1	1	45
	Very Coarse	32	45	3	3	48
	Very Coarse	45	64	7	7	55
COBBLE	Small	64	90	11	11	66
	Small	90	128	11	11	77
	Large	128	180	10	10	87
	Large	180	256	10	10	97
BOULDER	Small	256	362	1	1	98
	Small	362	512			98
	Medium	512	1024			98
	Large/Very Large	1024	2048	2	2	100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross Section 7	
Channel materials (mm)	
D_{16} =	0.71
D_{35} =	8.90
D_{50} =	49.8
D_{84} =	162.5
D_{95} =	238.6
D_{100} =	2048.0





Reachwide and Cross Section Pebble Count Plots

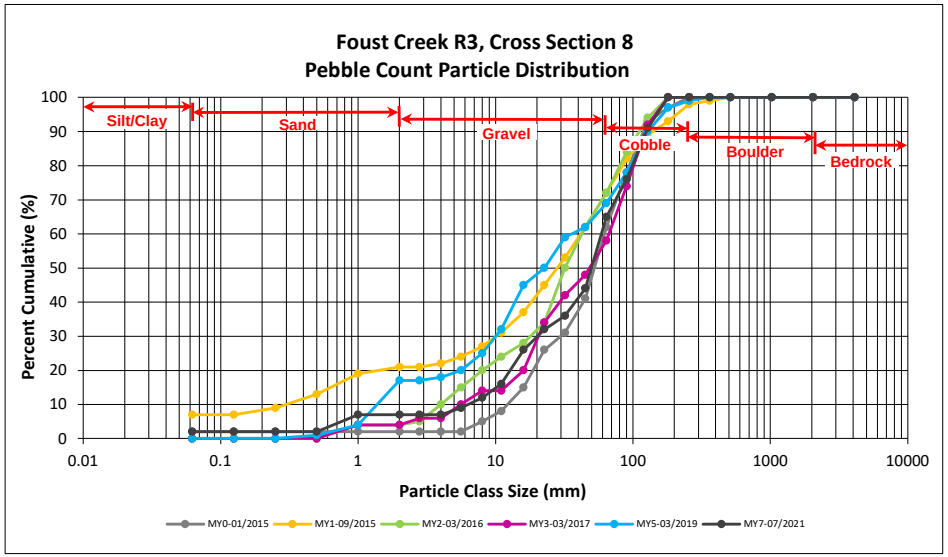
Foust Creek Mitigation Site (DMS Project No. 95715)

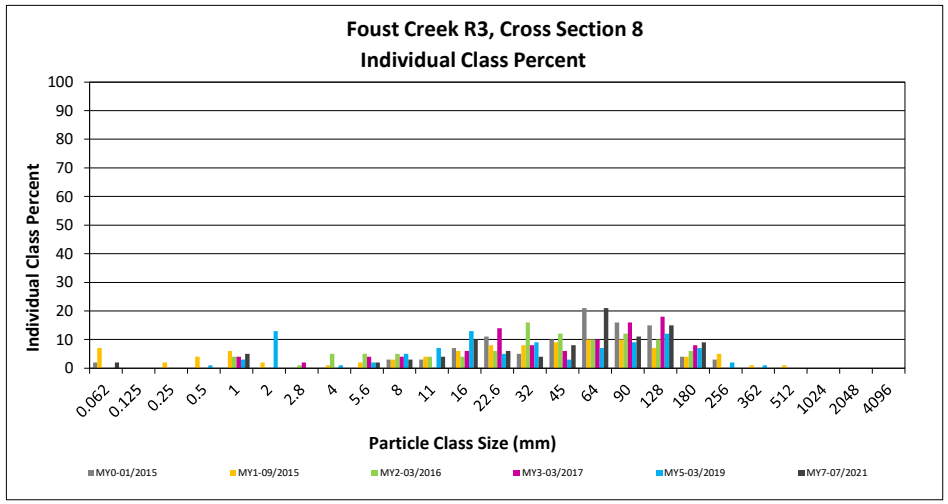
Monitoring Year 7 - 2021

Foust Creek R3, Cross Section 8

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	2	2	2
SAND	Very fine	0.062	0.125			2
	Fine	0.125	0.250			2
	Medium	0.25	0.50			2
	Coarse	0.5	1.0	5	5	7
	Very Coarse	1.0	2.0			7
GRAVEL	Very Fine	2.0	2.8			7
	Very Fine	2.8	4.0			7
	Fine	4.0	5.6	2	2	9
	Fine	5.6	8.0	3	3	12
	Medium	8.0	11.0	4	4	16
	Medium	11.0	16.0	10	10	26
	Coarse	16.0	22.6	6	6	32
	Coarse	22.6	32	4	4	36
	Very Coarse	32	45	8	8	44
	Very Coarse	45	64	21	21	65
COBBLE	Small	64	90	11	11	76
	Small	90	128	15	15	91
	Large	128	180	9	9	100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross Section 8	
Channel materials (mm)	
D_{16} =	11.00
D_{35} =	29.34
D_{50} =	49.8
D_{84} =	108.6
D_{95} =	148.9
D_{100} =	180.0





Reachwide and Cross Section Pebble Count Plots

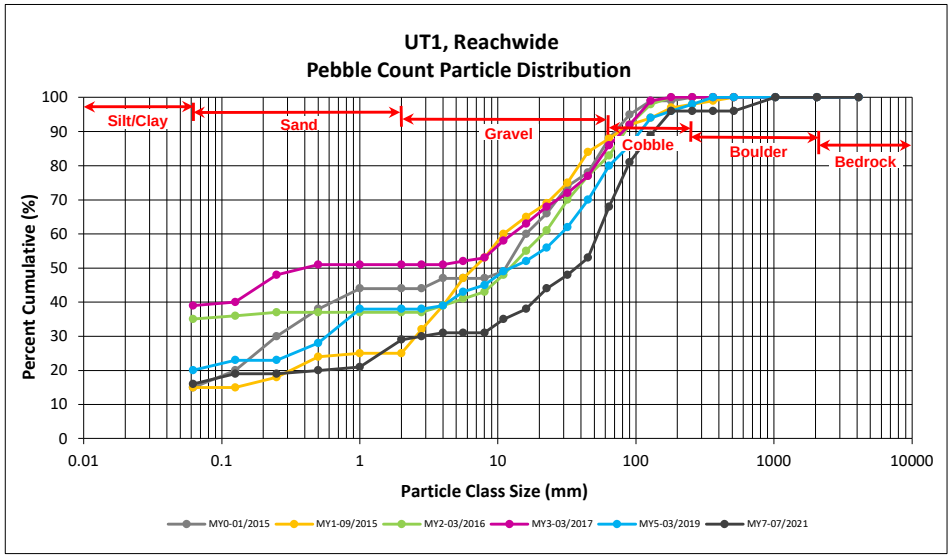
Foust Creek Mitigation Site (DMS Project No. 95715)

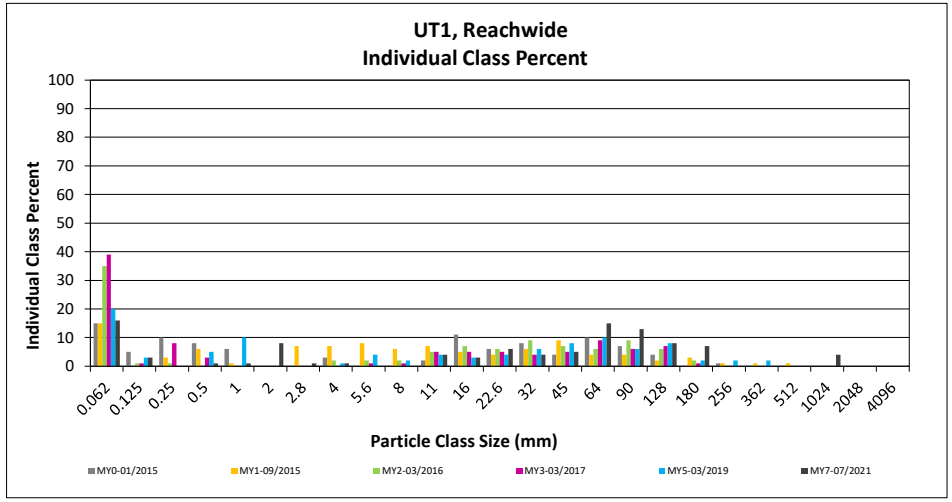
Monitoring Year 7 - 2021

UT1, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	2	14	16	16	16
SAND	Very fine	0.062	0.125		3	3	3	19
	Fine	0.125	0.250					19
	Medium	0.25	0.50		1	1	1	20
	Coarse	0.5	1.0		1	1	1	21
	Very Coarse	1.0	2.0	6	2	8	8	29
GRAVEL	Very Fine	2.0	2.8	1		1	1	30
	Very Fine	2.8	4.0		1	1	1	31
	Fine	4.0	5.6					31
	Fine	5.6	8.0					31
	Medium	8.0	11.0	1	3	4	4	35
	Medium	11.0	16.0	2	1	3	3	38
	Coarse	16.0	22.6	1	5	6	6	44
	Coarse	22.6	32	1	3	4	4	48
	Very Coarse	32	45	2	3	5	5	53
	Very Coarse	45	64	7	8	15	15	68
COBBLE	Small	64	90	10	3	13	13	81
	Small	90	128	7	1	8	8	89
	Large	128	180	7		7	7	96
	Large	180	256					96
BOULDER	Small	256	362					96
	Small	362	512					96
	Medium	512	1024	3	1	4	4	100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	11.00
D_{50} =	36.7
D_{84} =	102.7
D_{95} =	171.4
D_{100} =	1024.0





Reachwide and Cross Section Pebble Count Plots

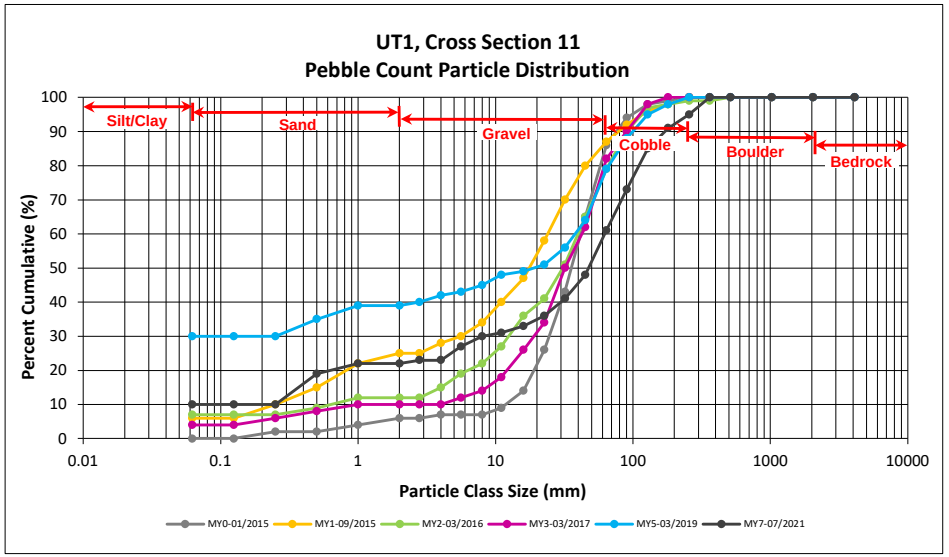
Foust Creek Mitigation Site (DMS Project No. 95715)

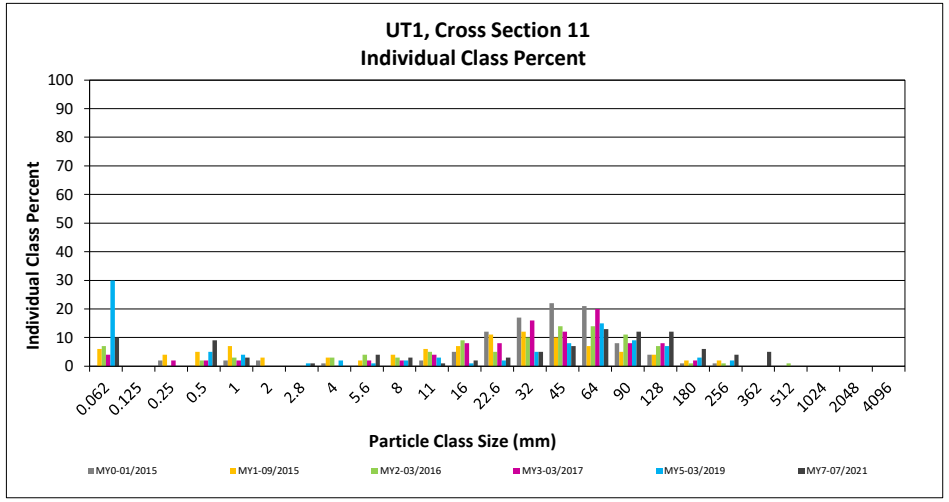
Monitoring Year 7 - 2021

UT1, Cross Section 11

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	10	10	10
SAND	Very fine	0.062	0.125			10
	Fine	0.125	0.250			10
	Medium	0.25	0.50	9	9	19
	Coarse	0.5	1.0	3	3	22
	Very Coarse	1.0	2.0			22
GRAVEL	Very Fine	2.0	2.8	1	1	23
	Very Fine	2.8	4.0			23
	Fine	4.0	5.6	4	4	27
	Fine	5.6	8.0	3	3	30
	Medium	8.0	11.0	1	1	31
	Medium	11.0	16.0	2	2	33
	Coarse	16.0	22.6	3	3	36
	Coarse	22.6	32	5	5	41
	Very Coarse	32	45	7	7	48
	Very Coarse	45	64	13	13	61
COBBLE	Small	64	90	12	12	73
	Small	90	128	12	12	85
	Large	128	180	6	6	91
	Large	180	256	4	4	95
BOULDER	Small	256	362	5	5	100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross Section 11	
Channel materials (mm)	
D_{16} =	0.40
D_{35} =	20.14
D_{50} =	47.5
D_{84} =	124.3
D_{95} =	256.0
D_{100} =	362.0





Reachwide and Cross Section Pebble Count Plots

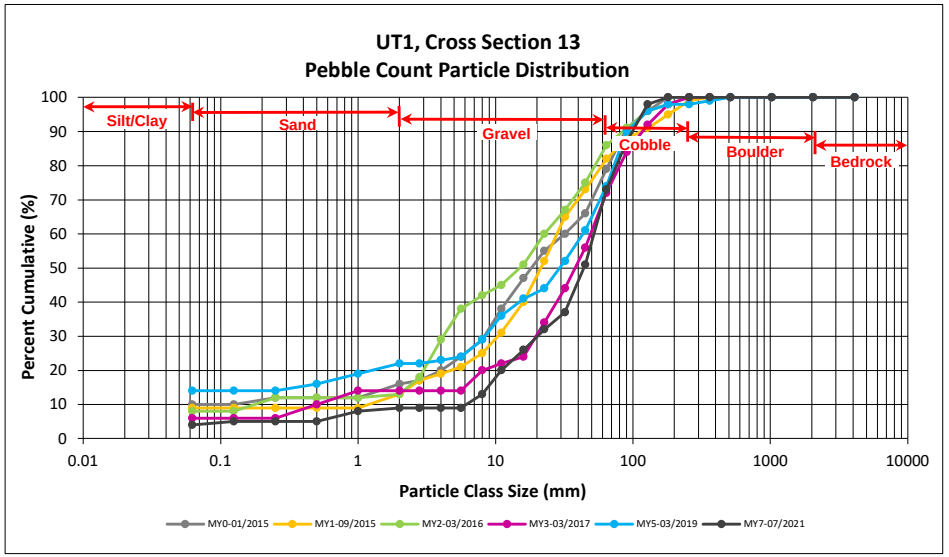
Foust Creek Mitigation Site (DMS Project No. 95715)

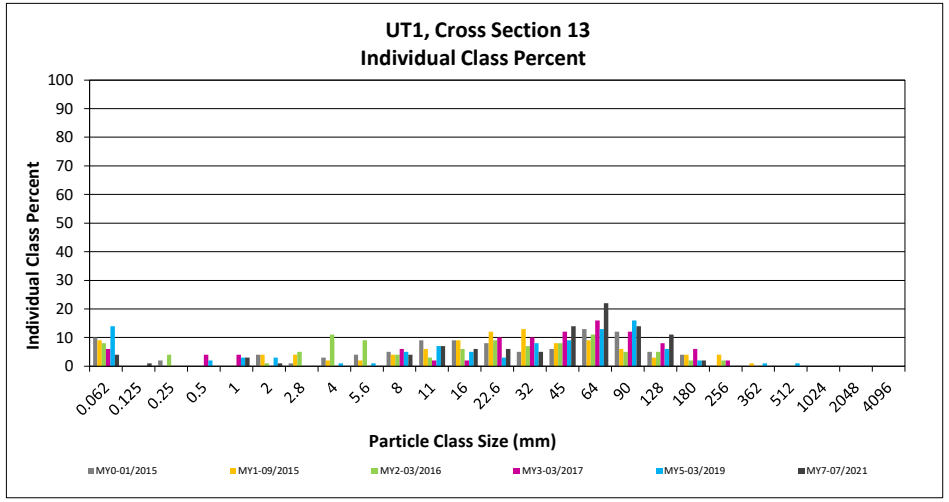
Monitoring Year 7 - 2021

UT1, Cross Section 13

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	4	4	4
SAND	Very fine	0.062	0.125	1	1	5
	Fine	0.125	0.250			5
	Medium	0.25	0.50			5
	Coarse	0.5	1.0	3	3	8
	Very Coarse	1.0	2.0	1	1	9
GRAVEL	Very Fine	2.0	2.8			9
	Very Fine	2.8	4.0			9
	Fine	4.0	5.6			9
	Fine	5.6	8.0	4	4	13
	Medium	8.0	11.0	7	7	20
	Medium	11.0	16.0	6	6	26
	Coarse	16.0	22.6	6	6	32
	Coarse	22.6	32	5	5	37
	Very Coarse	32	45	14	14	51
	Very Coarse	45	64	22	22	73
COBBLE	Small	64	90	14	14	87
	Small	90	128	11	11	98
	Large	128	180	2	2	100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross Section 13	
Channel materials (mm)	
D_{16} =	9.17
D_{35} =	27.84
D_{50} =	43.9
D_{84} =	83.7
D_{95} =	116.3
D_{100} =	180.0





APPENDIX 5. Hydrology Summary Data and Plots

Table 13. Verification of Bankfull Events

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Reach	Monitoring Year	Date of Data Collection	Date of Occurrence	Method
Foust Creek	MY1	10/6/2015	7/2015-10/2015	Cork Crest Gage
	MY2	3/8/2016	1/2016-3/2016	
		8/2/2016	6/7/2016	Crest Gage/Pressure Transducer
		10/10/2016	10/8/2016	
	MY3	6/27/2017	4/24/2017	
			6/20/2017	
	MY4	7/6/2018	4/25/2018	
		10/23/2018	8/20/2018	
			9/18/2018	
		1/30/2019	10/11/2018	
			11/5/2018	
			11/12/2018	
			12/20/2018	
	MY5	5/2/2019	2/23/2019	
			4/12/2019	
			4/17/2019	
	MY6	3/2/2020	1/24/2020	
			2/6/2020	
		8/6/2020	5/21/2020	
	MY7	2/16/2021	1/3/2021	
UT1	MY1	10/6/2015	7/2015-10/2015	Cork Crest Gage
		12/4/2015	10/2015-12/2015	
	MY2	3/8/2016	1/2016-3/2016	
	MY3	6/27/2017	4/24/2017	Crest Gage/Pressure Transducer
			6/20/2017	
	MY4	3/20/2018	4/25/2018	
		10/23/2018	9/17/2018	
		1/30/2019	11/12/2018	
			12/20/2018	
	MY5	1/30/2019	1/16/2019	
		5/2/2019	4/13/2019	
	MY 6	3/2/2020	1/24/2020	
			2/6/2020	
			2/15/2020	
		4/28/2020	4/13/2020	
		8/6/2020	5/21/2020	
		8/6/2020	6/11/2020	
	MY7	2/16/2021	1/3/2021	
			1/30/2021	
		4/20/2021	2/21/2021	

Table 14. In-Stream Flow Gage Attainment Summary

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Summary of In-Stream Flow Gage Results for Monitoring Years 1 through 7							
Reach	**Max Consecutive Days/Total Days Meeting Success Criteria**						
	Year 1 (2015)	**Year 2(2016)**	**Year 3(2017)**	**Year 4 (2018)**	**Year 5 (2019)**	**Year 6 (2020)**	**Year 7 (2021)***
UT1	342 Days/ 343 Days	106 Days/ 249 Days	56 Days/ 165 Days	77 Days/ 264 Days	109 Days/ 209 Days	184 Days/ 324 Days	140 Days/ 225 Days

*Data collected through 11/11/2021 for MY7.

Table 15. Wetland Gage Attainment Summary

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021

Summary of Groundwater Gage Results for Monitoring Years 1 through 7							
Gage	**Success Criteria Achieved/Max Consecutive Days During Growing Season (Percentage)**						
	Year 1 (2015)	**Year 2 (2016)**	**Year 3 (2017)**	**Year 4 (2018)**	**Year 5 (2019)**	**Year 6 (2020)**	**Year 7 (2021)**
1	Yes/93 Days (40.2%)	Yes/143 Days (57.0%)	Yes/134 Days (53.0%)	Yes/132 Days (52.0%)	Yes/121 Days (47.6%)	Yes/138 Days (54.3%)	Yes/88 Days (34.6%)
2	Yes/46 Days (20.0%)	Yes/49 Days (19.5%)	Yes/44 Days (17.4%)	Yes/35 Days (12.8%)	Yes/61 Days (24.0%)	Yes/31 Days (12.2%)	Yes/38 Days (15.0%)
3	Yes/57 Days (24.6%)	Yes/91 Days (36.3%)	Yes/23 Days (9.1%)	Yes/94 Days (37.0%)	Yes/62 Days (24.4%)	No/6 Days (2.4%)	No/5 Days (2.0%)
4	Yes/63 Days (27.2%)	Yes/86 Days (34.3%)	Yes/132 Days (52.2%)	Yes/74 Days (29.1%)	Yes/78 Days (30.7%)	Yes/28 Days (11.0%)	Yes/80 Days (31.5%)
5	Yes/124 Days (53.7%)	Yes/196 Days (78.1%)	Yes/153 Days (60.5%)	Yes/39 Days (15.4%)	Yes/97 Days (38.2%)	Yes/48 Days (18.9%)	Yes/47 Days (18.5%)
6	Yes/47 Days (20.2%)	Yes/49 Days (19.5%)	Yes/45 Days (17.8%)	Yes/84 Days (33.1%)	Yes/64 Days (25.2%)	Yes/46 Days (18.1%)	Yes/29 Days (15.4%)
7	Yes/152 Days (66.1%)	Yes/218 Days (86.9%)	Yes/202 Days (79.8%)	Yes/237 Days (93.3%)	Yes/187 Days (73.6%)	Yes/254 Days (100%)	Yes/152 Days (59.8%)
8	Yes/51 Days (22.0%)	Yes/74 Days (29.5%)	Yes/23 Days (9.1%)	Yes/37 Days (14.6%)	Yes/63 Days (24.8%)	Yes/33 Days (13.0%)	Yes/51 Days (20.1%)
10	Yes/ 119 Days (51.7%)	Yes/179 Days (71.3%)	Yes/144 Days (56.9%)	Yes/124 Days (48.8%)	Yes/123 Days (48.4%)	Yes/189 Days 74.4%)	Yes/89 Days 35.0%)
11 [2]						No/4 Days (1.6%)	No/5 Days (2.0%)

[1]Wetland Re-establishment area surrounding groundwater well 9 eliminated during MY3

[2]Well 11 installed during MY6

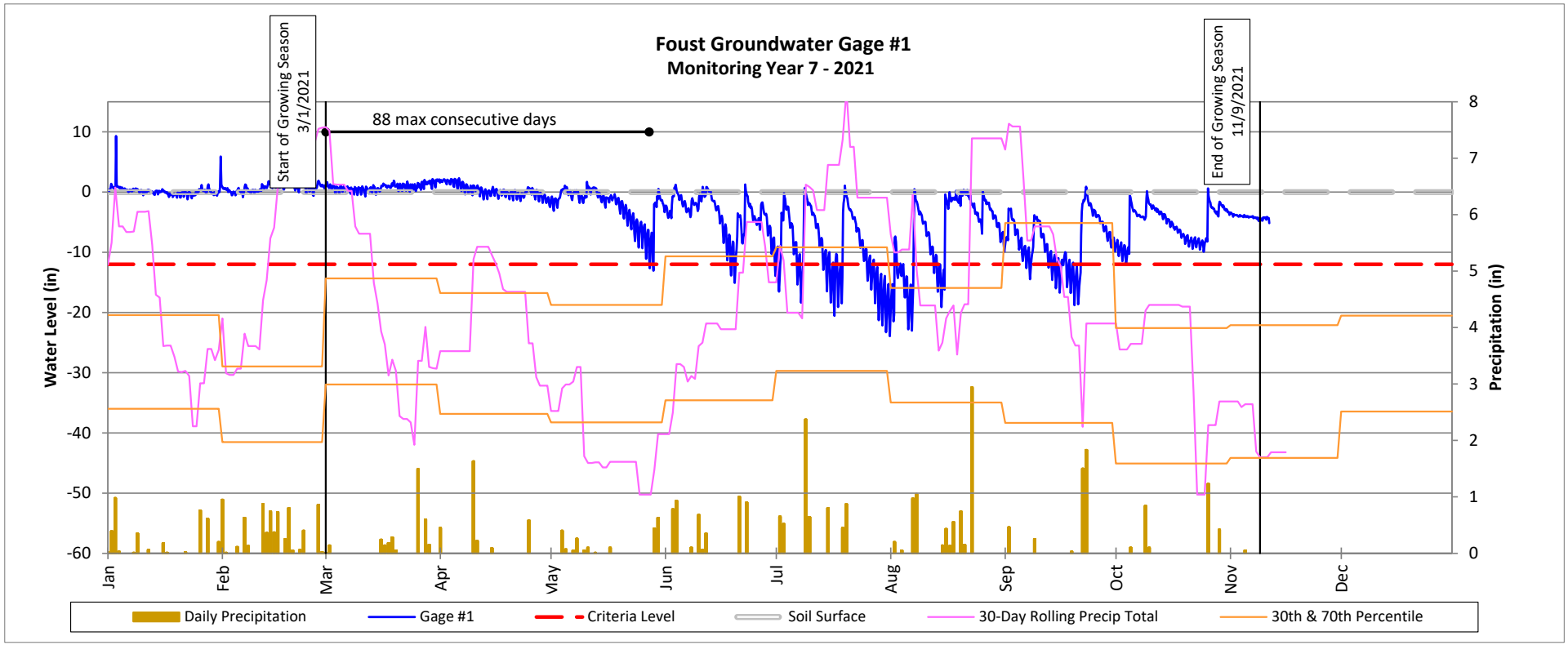
Criterion is that a free groundwater must be present within 12 inches of the soil surface for a consecutive 8.5% of the growing season.

Groundwater Gage Plots

Foust Creek Mitigation Site

DMS Project No. 95715

Monitoring Year 7 - 2021

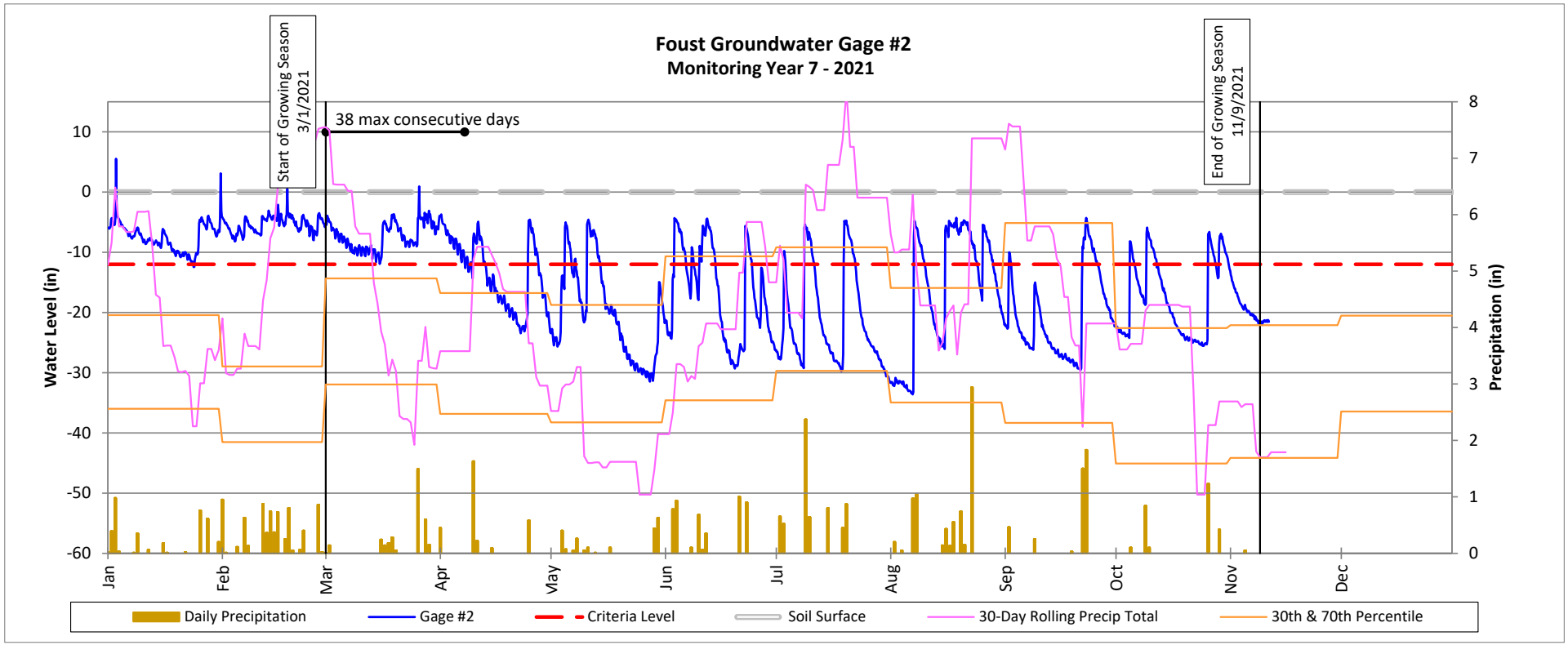


Groundwater Gage Plots

Foust Creek Mitigation Site

DMS Project No. 95715

Monitoring Year 7 - 2021

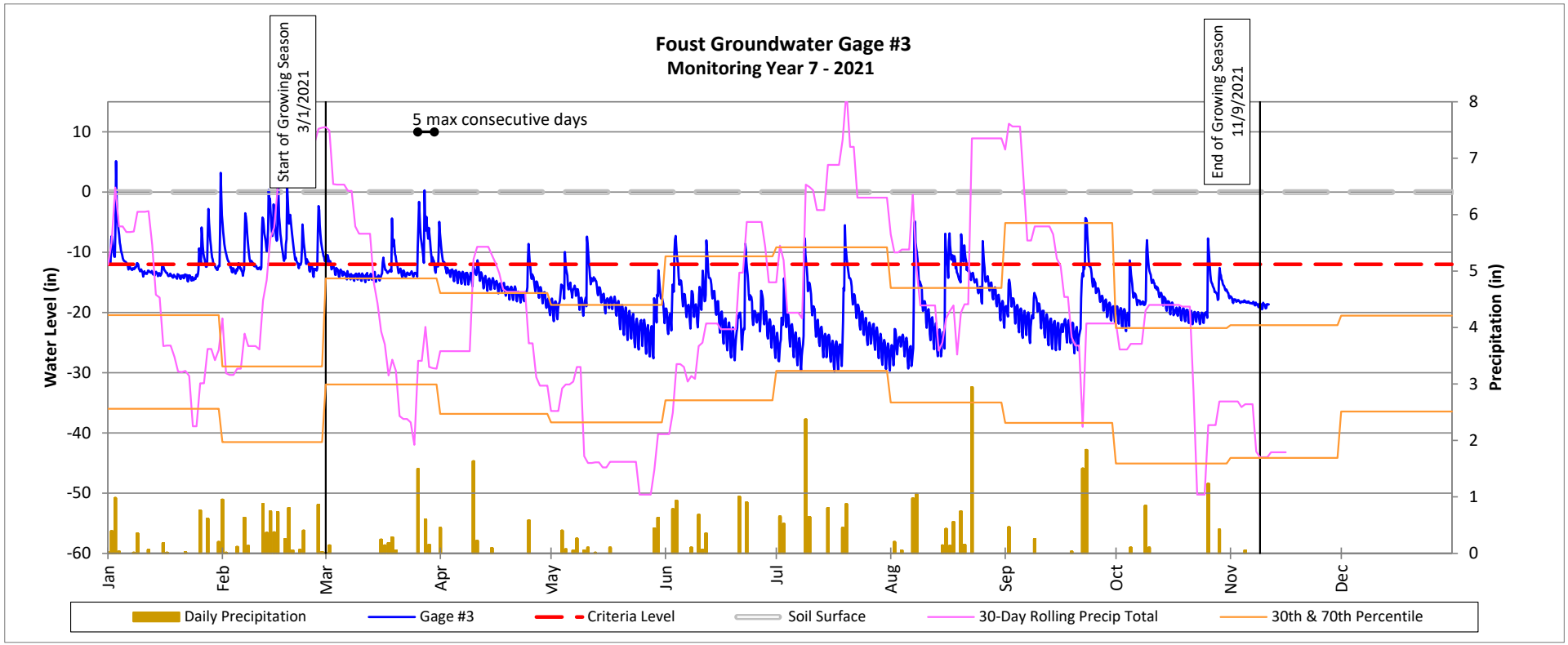


Groundwater Gage Plots

Foust Creek Mitigation Site

DMS Project No. 95715

Monitoring Year 7 - 2021

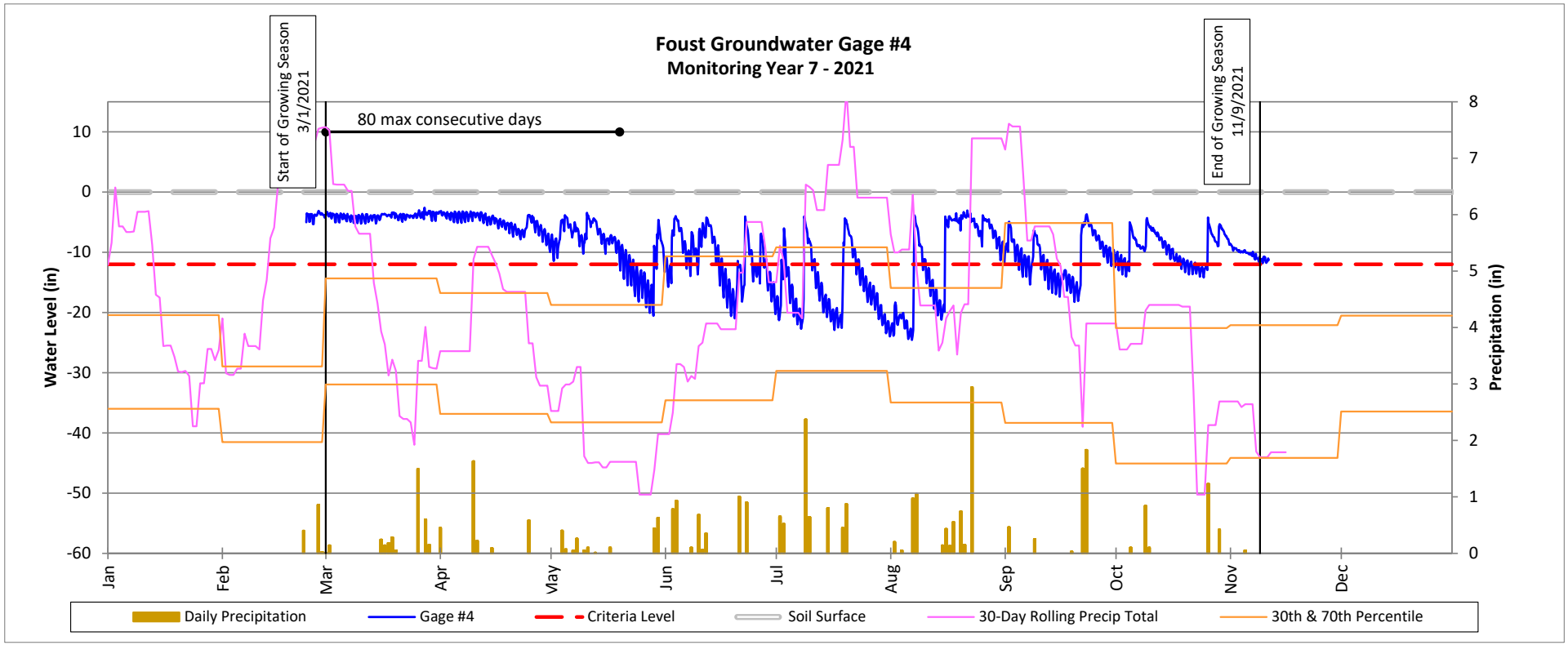


Groundwater Gage Plots

Foust Creek Mitigation Site

DMS Project No. 95715

Monitoring Year 7 - 2021

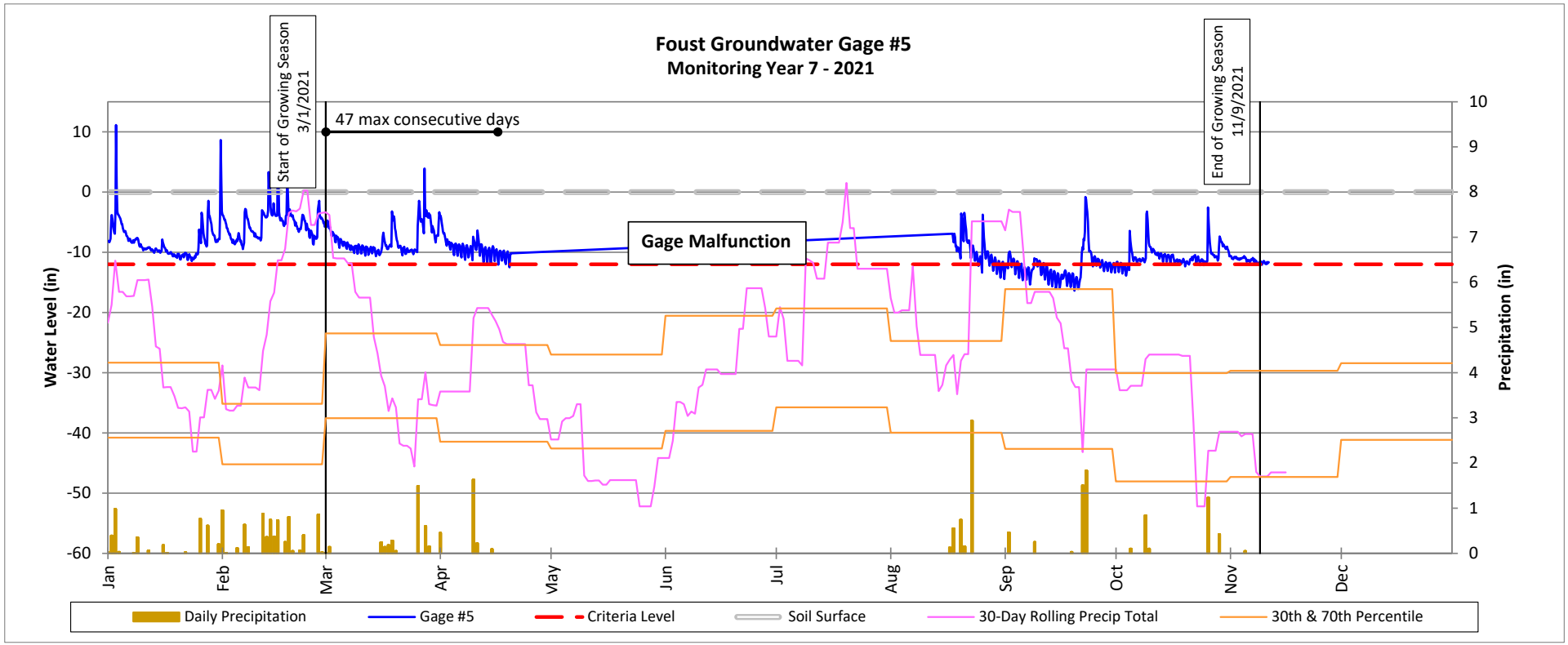


Groundwater Gage Plots

Foust Creek Mitigation Site

DMS Project No. 95715

Monitoring Year 7 - 2021

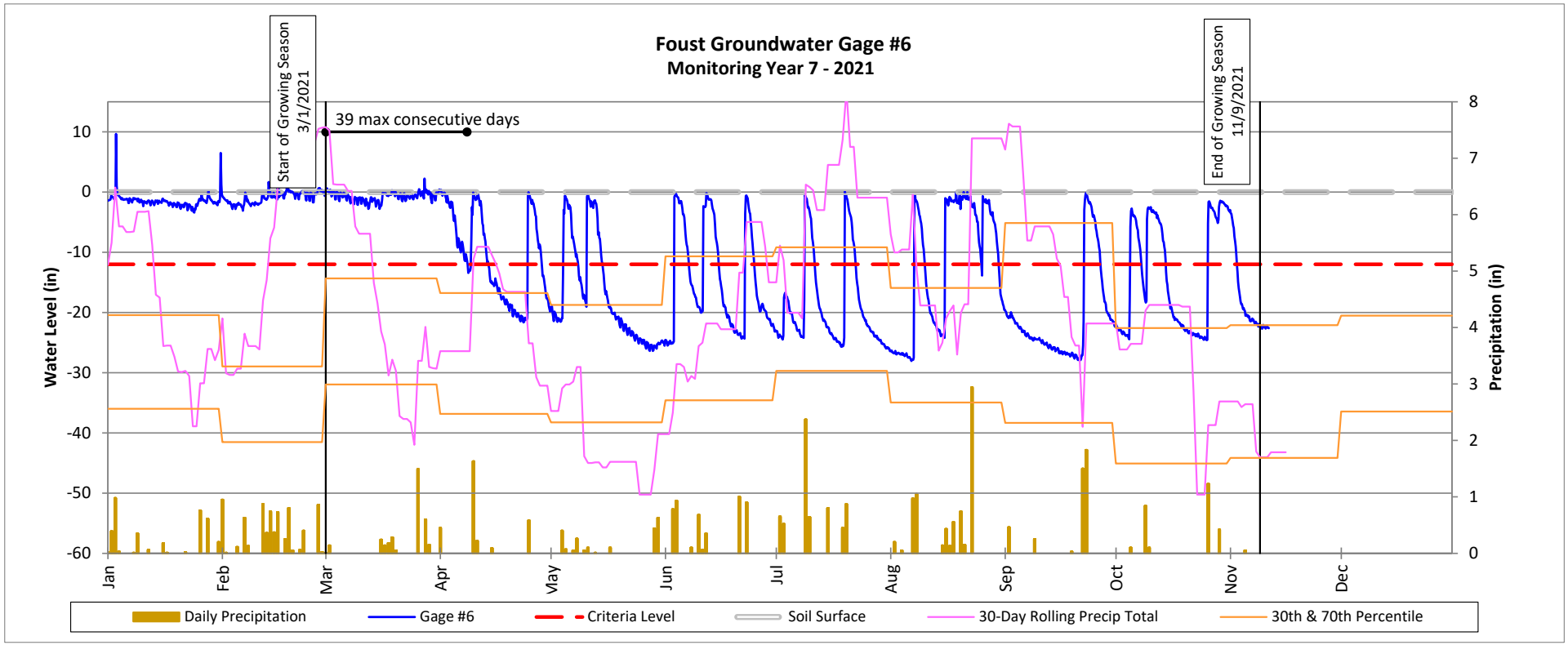


Groundwater Gage Plots

Foust Creek Mitigation Site

DMS Project No. 95715

Monitoring Year 7 - 2021

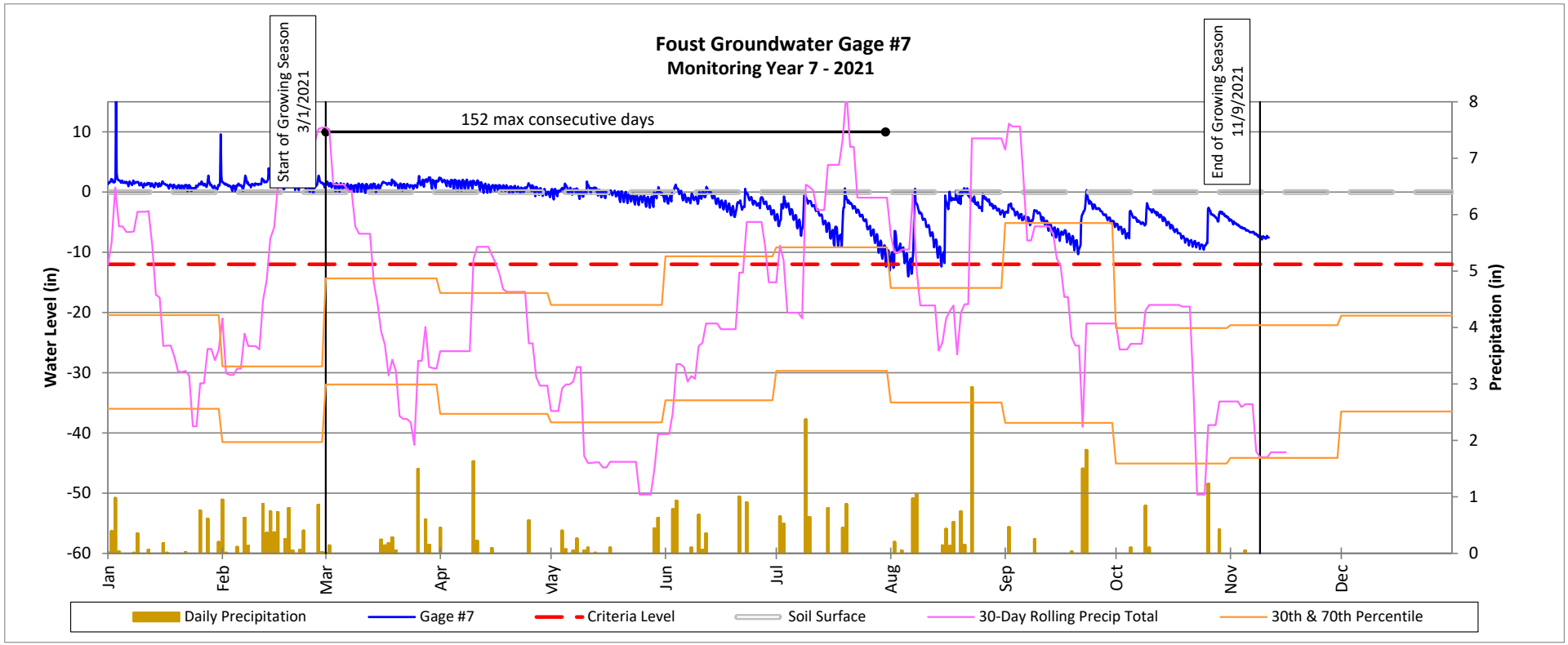


Groundwater Gage Plots

Foust Creek Mitigation Site

DMS Project No. 95715

Monitoring Year 7 - 2021

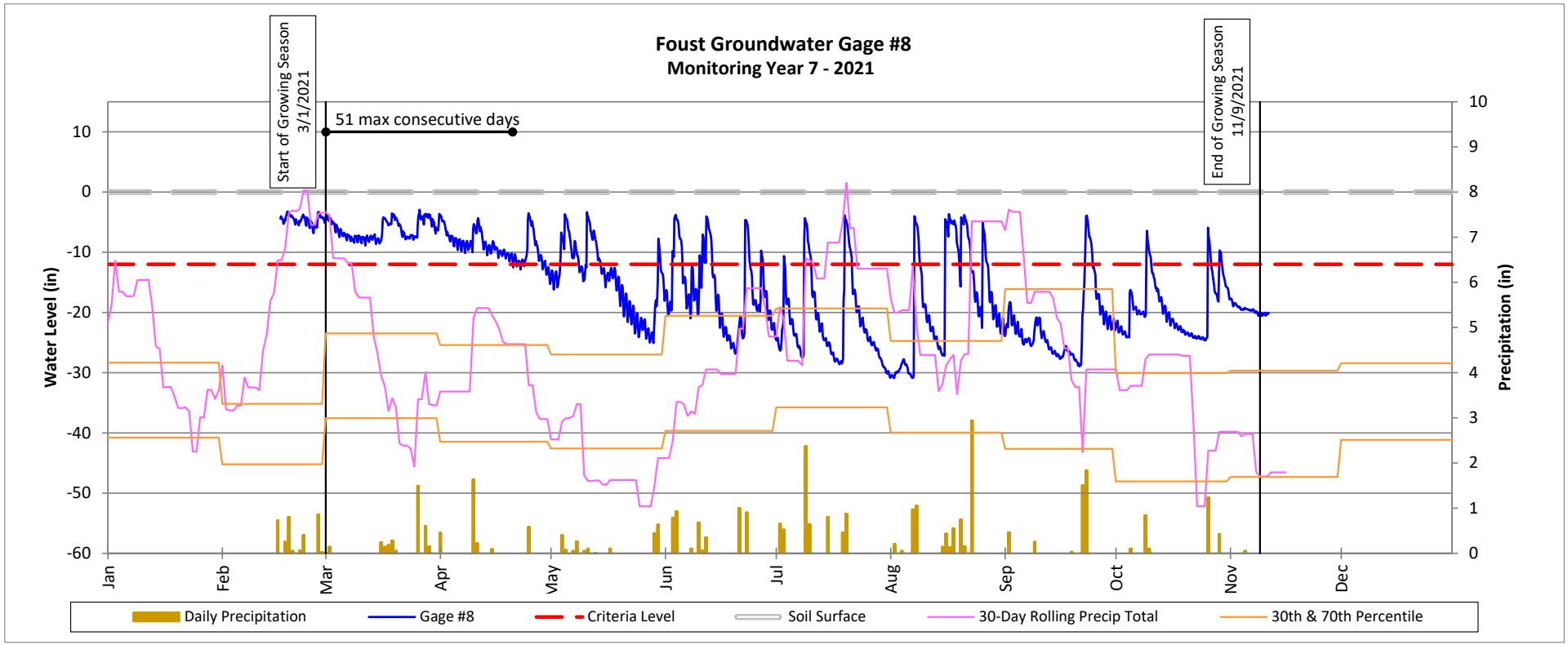


Groundwater Gage Plots

Foust Creek Mitigation Site

DMS Project No. 95715

Monitoring Year 7 - 2021

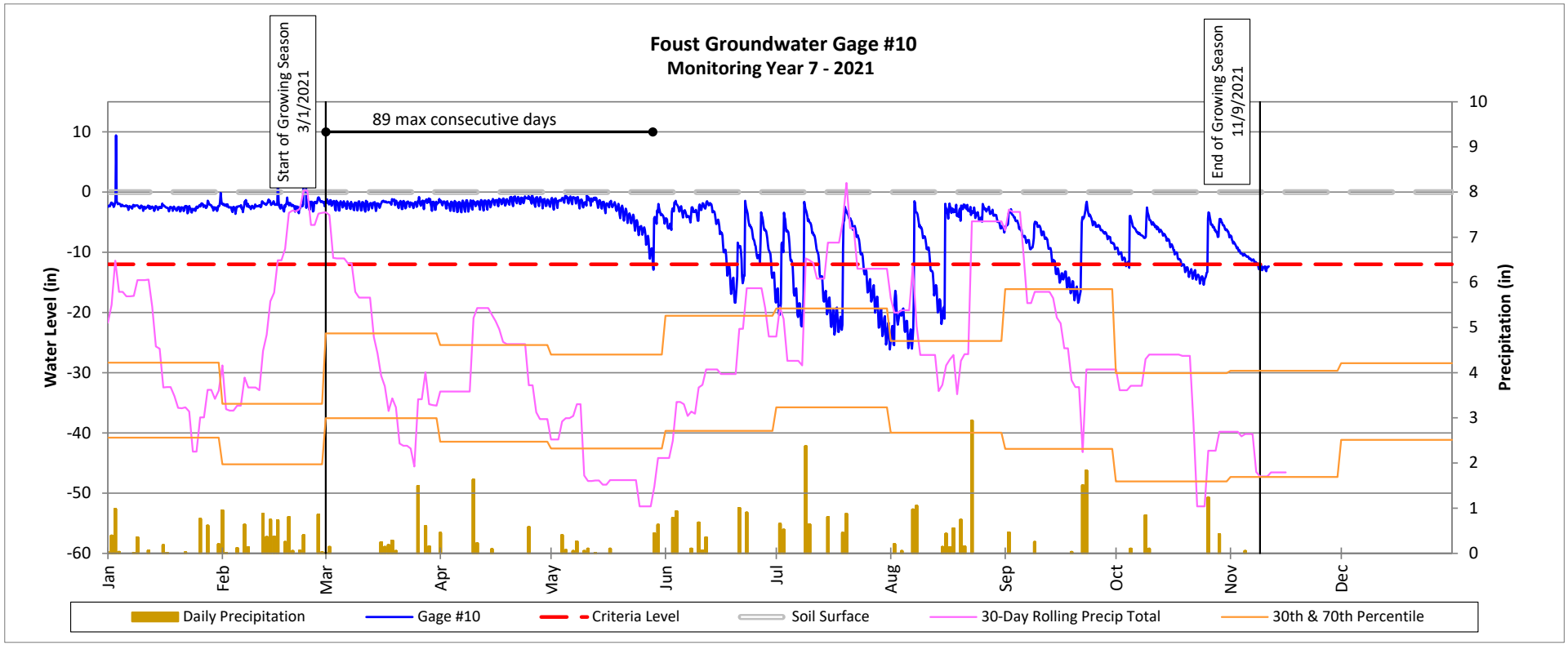


Groundwater Gage Plots

Foust Creek Mitigation Site

DMS Project No. 95715

Monitoring Year 7 - 2021

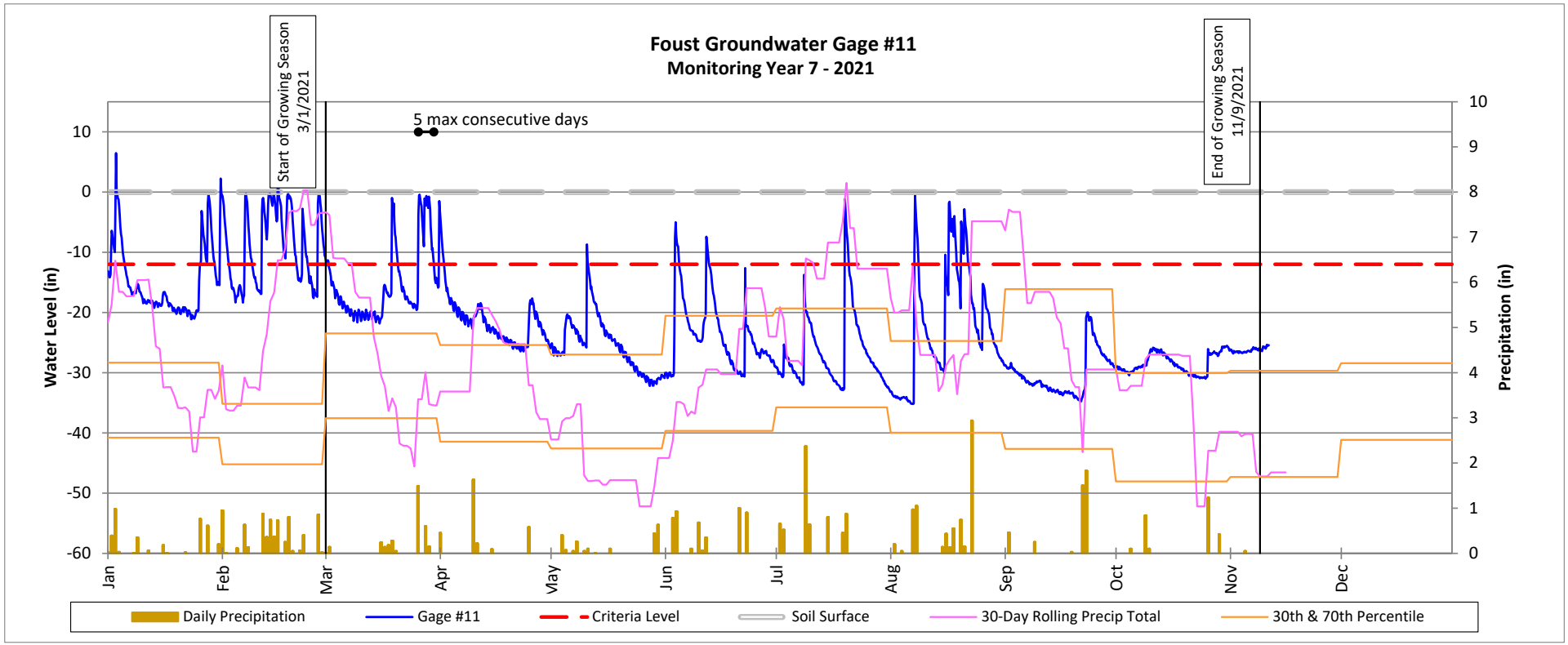


Groundwater Gage Plots

Foust Creek Mitigation Site

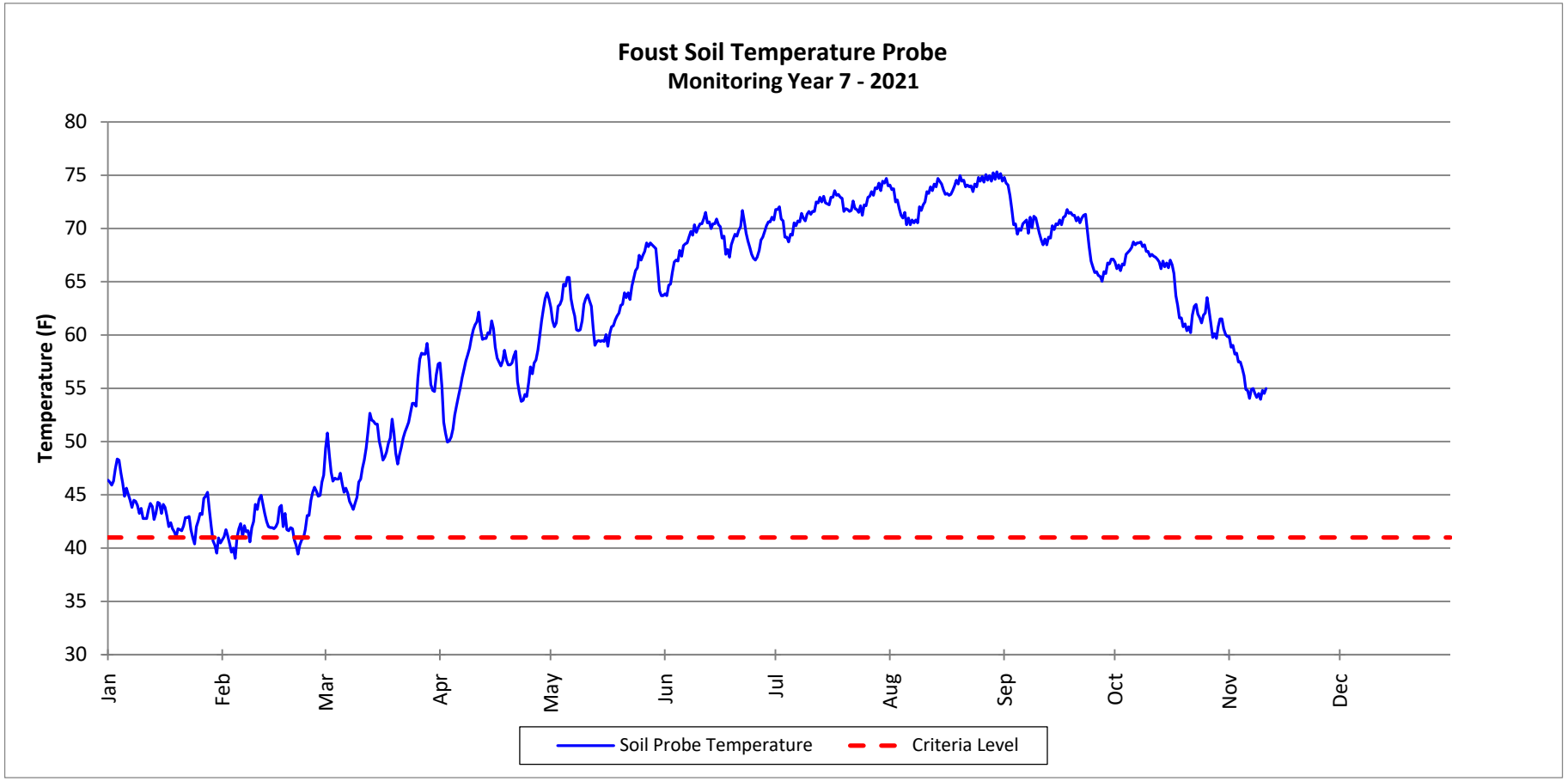
DMS Project No. 95715

Monitoring Year 7 - 2021



Soil Temperature Probe Plot

Foust Creek Mitigation Site
(DMS Project No. 95715)
Monitoring Year 7 - 2021

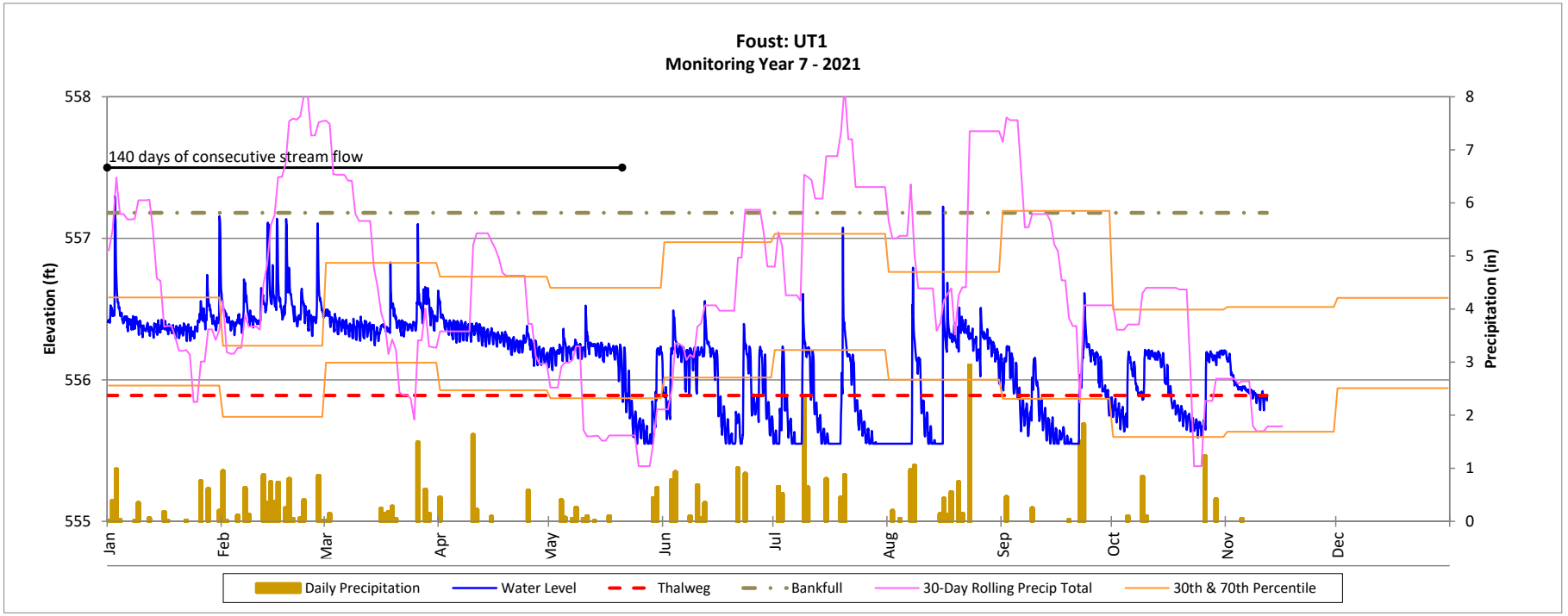


Recorded In-Stream Flow Events Plot

Foust Creek Mitigation Site

DMS Project No. 95715

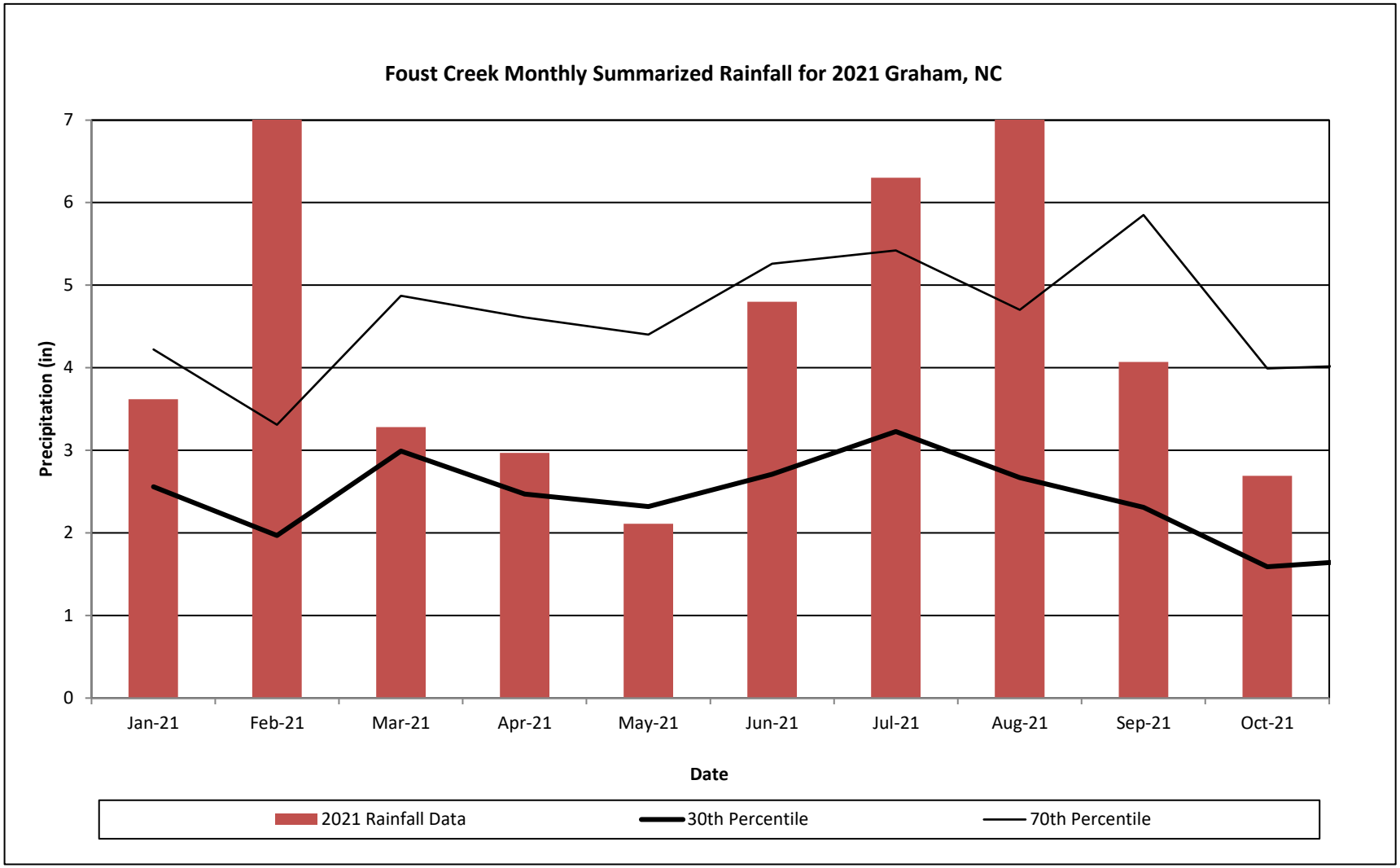
Monitoring Year 7 - 2021



Monthly Summarized Rainfall Data

Foust Creek Mitigation Site (DMS Project No. 95715)

Monitoring Year 7 - 2021



[1] 2021 monthly rainfall collected from weather station 3135555, Graham 2 ENE, NC

[2] 30th and 70th percentile rainfall data collected from weather station 313555, Graham 2 ENE, NC.