



# MONITORING YEAR 2 ANNUAL REPORT

Final

## DRY CREEK MITIGATION SITE

Durham County, NC

NCDEQ Contract No. 6827

DMS Project No. 97082

USACE Action ID No. SAW-2016-00880

NCDWR Project No. 2016-0369

Data Collection Period: January-October 2021

Draft Submission Date: November 3, 2021

Final Submission Date: November 19, 2021

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### PREPARED FOR:



**NC Department of Environmental Quality  
Division of Mitigation Services**

1652 Mail Service Center  
Raleigh, NC 27699-1652



November 19, 2021

**Lindsay Crocker**

NC Department of Environmental Quality, Division of Mitigation Services  
217 W. Jones Street, Suite 3000  
Raleigh, NC 27609-1652

Subject: DMS Comments on Dry Creek MY2  
Dry Creek, Project ID #97082, DMS Contract #6827

Dear Ms. Crocker,

We have reviewed the comments on the MY1 Report for the above referenced project dated November 18, 2021 and have revised the report based on these comments. The revised documents are submitted with this letter. Below are responses to each of your comments. For your convenience, the comments are reprinted with our response in italics.

Report Comments:

1. In future reports, you may omit the substrate monitoring per IRT/DMS clarification.  
*This is noted for future monitoring reports.*
2. The mortality between MY1 and 2 on parts of the project and lack of species diversity needs to be considered. It is understood that Wildlands believes that volunteers matching planted species will result in all plots being considered successful for the stream credit. The riparian buffer credit success requirement can be satisfied with appropriate volunteers currently in MY2. Please consider that in the narrative in the Monitoring Year 2 summary of the buffer report. Please also consider that DWR expects the site to have a minimum of four native hardwood and many of your plots are showing 3 species. This was discussed at length in the field and DMS understands that Wildlands is planning to look closely at this in MY3.  
*The lack of species diversity will be assessed in future monitoring years.*

Digital Comments:

1. Please submit the CVS mdb associated with the MY2 veg data for stream and buffer.  
*The CVS mdb is now submitted with the final digital files.*
2. Note that the total % stable performing as intended in Table 5a is listed as 99%, but it should be 100% based on the reported values.  
*Table 5 has been updated.*





If you have any questions, please contact me by phone (919) 851-9986, or by email (jlorch@wildlandseng.com).

Sincerely,

A handwritten signature in black ink, appearing to read "Jason Lorch".

**Jason Lorch**, *Monitoring Coordinator*

**PREPARED BY:**

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Raleigh, NC 27609

**Jason Lorch**  
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Phone: 919.851.9986



## EXECUTIVE SUMMARY

Wildlands Engineering, Inc. (Wildlands) implemented a full delivery project at the Dry Creek Mitigation Site (Site) for the North Carolina Department of Environmental Quality Division of Mitigation Services (DMS) to restore a total of 9,811 linear feet of perennial and intermittent streams in Durham County, NC. The Site will generate 8,457.934 stream credits. All stream lengths were measured along the stream centerline for credit calculations. UT1 Reach 2 crediting changed after the Mitigation Plan was approved due to the revised break in the conservation easement associated with a utility line relocation. The Site is located approximately three miles northwest of Butner, NC and approximately 2 miles west of the Granville County/Durham County line (Figure 1) in the Neuse River Basin 8-Digit Hydrologic Unit Code (HUC) 03020201. The Site is located within the Neuse River Targeted Local Watershed (TLW) as presented in the 2010 Neuse River Basin Restoration Priorities (RBRP) which highlights the importance of riparian buffers for stream restoration projects (Breeding, 2010). The Site is located in the Neuse River Basin HUC 03020201010050 and NC Division of Water Resources (NCDWR) Subbasin 03-04-01. The Site contains Dry Creek and eight unnamed tributaries (UT1-UT7; UT1a) which flow to Lake Michie on the Flat River and then into Falls Lake. The Flat River is classified as Water Supply Waters (WS-III), and Nutrient Sensitive Waters (NSW). The downstream drainage area of the Site is 807 acres. The 29.764-acre Site is protected with a permanent conservation easement.

The project goals established in the Mitigation Plan (Wildlands, 2018) were completed with careful consideration of goals and objectives described in the Neuse River RBRP. The project goals include:

- Exclude cattle from project streams;
- Stabilize eroding stream banks;
- Improve the stability of stream channels;
- Improve instream habitat;
- Reconnect channels with floodplains and riparian wetlands to allow a natural flooding regime;
- Restore and enhance native floodplain and streambank vegetation; and
- Permanently protect the Site from harmful land uses.

The project will contribute to achieving the goals for the watershed listed in the Neuse River RBRP and provide ecological benefits within the Neuse River Basin. While benefits such as habitat improvement and geomorphic stability are limited to the Site, others, such as reduced pollutant and sediment loading, have farther reaching effects.

Site construction, planting, and as-built surveys were completed in April 2020. Monitoring Year 2 (MY2) assessments and site visits were completed between January and October 2021. Overall, the Site has fulfilled the required stream success criteria for MY2. All restored streams are stable and functioning as designed and the isolated area of bank scour directly downstream of the culvert crossing on Dry Creek Reach 4 was repaired in March 2021. This area has remained stable since the repairs were made. Native herbaceous wetland vegetation has established on the Site creating excellent groundcover. This herbaceous vegetation has hindered some of the planted tree growth, but volunteers are establishing across the Site and supplementing planted trees. Eight of twelve vegetation monitoring plots met the interim success criteria with an average stem density of 349 planted stems per acre. Next year volunteer trees species will be included in the vegetation data and should boost stem density across the Site. Multiple bankfull events were recorded on each restoration reach during the 2021 annual monitoring period. Additionally, the flow gages on UT1A, UT2, and UT5 Reach 1 easily exceeded the minimum requirement of 30 consecutive days of baseflow. Overall, the Site is succeeding with reducing sediment and nutrient inputs into Neuse River tributaries.



**DRY CREEK MITIGATION SITE**  
Monitoring Year 2 Annual Report

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Recorded In-Stream Flow Events Plots



## Section 1: PROJECT OVERVIEW

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The Dry Creek Mitigation Site (Site) is located in northeastern Durham County, approximately three miles northwest of Butner, NC and approximately 2 miles west of the Granville County/Durham County line (Figure 1). The Site contains tributaries to Lake Michie on the Flat River, which flows directly into Falls Lake. Flat River is classified as Water Supply Waters (WS-III) and Nutrient Sensitive Waters (NSW). The Site is within Hydrologic Unit Code (HUC) 03020201010050, Subbasin 03-04-01 and is located within the Neuse River Targeted Local Watershed (Figure 1) and is identified in the 2010 Neuse River Basin Restoration Priorities (RBRP) (Breeding, 2010). The Site is located in the Carolina Slate Belt of the Piedmont Physiographic Province (USGS, 1998). The project watershed consists primarily of agricultural and wooded land. The drainage area for the Site is 807 acres (1.26 square miles).

The project streams consist of Dry Creek and eight unnamed tributaries. Mitigation work within the Site included restoration, enhancement I, enhancement II, and preservation of 9,810 linear feet of perennial and intermittent stream channels. The riparian areas were planted with native vegetation to improve habitat and protect water quality. The final Mitigation Plan (Wildlands, 2018) was submitted to and accepted by DMS in October 2018. Construction activities were completed by Land Mechanic Designs, Inc. in April 2020. Planting and seeding activities were completed by Bruton Natural Systems, Inc. in April 2020. Baseline monitoring (MY0) was conducted between March and April 2020. Annual monitoring will occur for seven years with the close-out anticipated to commence in 2027 provided the success criteria are met. Appendix 1 provides additional details on project activity, history, contact information, and watershed background information for the Site.

Prior to construction activities, cattle were rotationally grazed along UT1, UT1a, and Dry Creek to the UT3 confluence. Cattle access to these streams resulted in significant ecological impacts. Table 4 in Appendix 1 and Tables 10a-d in Appendix 4 present the pre-restoration conditions data.

The Site is located on 9 parcels under 6 different landowners and a conservation easement was recorded on 29.764 acres. The project is expected to provide 8,457.934 stream credits at closeout. A Project Vicinity Map and directions are provided in Figure 1, and Project Components / Asset Map are illustrated in Figure 2.

### 1.1 Project Goals and Objectives

The project is intended to provide numerous ecological benefits. While benefits such as habitat improvement and geomorphic stability are limited to the Site, reduced nutrient and sediment loading have farther reaching effects. Table 1 below describes expected outcomes to water quality and ecological processes and provides project goals and objectives. These goals were established and completed with careful consideration of goals and objectives described in the RBRP and to meet the DMS mitigation needs while maximizing the ecological and water quality uplift within the watershed.





**Table 1: Mitigation Goals and Objectives – Dry Creek Mitigation Site**

Goals	Objectives	Expected Outcomes
Exclude cattle from project streams.	Install fencing around project areas adjacent to cattle pastures or remove cattle from the Site.	Reduce and control sediment inputs. Reduce and manage nutrient inputs. Contribute to protection of or improvement to a Water Supply Waterbody.
Stabilize eroding stream banks.	Reconstruct stream channels slated for restoration with stable dimensions. Create stable tie-ins for tributaries joining restored channels. Add bank revetments and in-stream structures to reaches to protect restored/enhanced streams.	Reduce sediment inputs. Contribute to protection of or improvement to a Water Supply Waterbody.
Improve the stability of stream channels.	Construct stream channels that will maintain a stable pattern and profile considering the hydrologic and sediment inputs to the system, the landscape setting, and the watershed conditions.	Reduce and control sediment inputs. Contribute to protection of or improvement to a Water Supply Waterbody.
Improve instream habitat.	Install habitat features such as constructed riffles, cover logs, and brush toes into restored/enhanced streams. Add woody materials to channel beds. Construct pools of varying depth.	Improve aquatic communities in project streams.
Reconnect channels with floodplains.	Reconstruct stream channels with appropriate bankfull dimensions and depth relative to the existing floodplain.	Reduce and control sediment inputs. Reduce and manage nutrient inputs. Contribute to protection of or improvement to a Water Supply Waterbody. Enhance hydration of riparian wetlands.
Restore and enhance native floodplain vegetation.	Plant native tree species in riparian zone where currently insufficient.	Reduce and control sediment inputs. Reduce and manage nutrient inputs. Provide a canopy to shade streams and reduce thermal loadings. Contribute to protection of or improvement to a Water Supply Waterbody.
Permanently protect the project Site from harmful uses.	Establish conservation easements on the Site.	Ensure that development and agricultural uses that would damage the Site or reduce the benefits of the project are prevented.

## 1.2 Monitoring Year 2 Data Assessment

Annual monitoring and site visits were conducted during MY2 to assess the condition of the project. The vegetation and stream success criteria for the Site follow the approved success criteria presented in the Mitigation Plan (Wildlands, 2018).

### 1.2.1 Vegetative Assessment

Planted woody vegetation is being monitored in accordance with the guidelines and procedures developed by the Carolina Vegetation Survey-EEP Level 2 Protocol (Lee et al., 2008). A total of eleven standard 10 meter by 10 meter and one, 5 meter by 20 meter vegetation plots were established during



baseline monitoring. Four of the twelve vegetation plots will be relocated randomly on an annual basis to monitor vegetation health across the Site.

The final vegetation success criteria at the end of MY7 are the survival of 210 planted stems per acre averaging 10 feet in height. Interim success criteria are the survival of 320 planted stems per acre at the end of MY3 and 260 planted stems per acre with an average stem height of 7 feet at the end of MY5.

The MY2 vegetative survey was completed in September 2021. Vegetation monitoring resulted in an average stem density of 349 planted stems per acre, which is above the interim requirement of 320 stems per acre required at MY3 and approximately 34% less than the recorded baseline density (533 planted stems per acre). There is an average of 8 stems per plot as compared to 13 stems per plot in MY0. Of the 12 vegetation plots, 8 plots individually met the interim success criteria and are on track to meet the final success criteria required for MY7. Fixed vegetation plots (VP) 5, 6, 7, and 8 do not meet the interim success criteria of 320 stems per acre. However, fixed vegetation plots 5, 7, and 8 are on track to meet the final success criteria of 210 stems per acres. Sycamore (*Platanus occidentalis*) volunteers were noted in fixed vegetation plots 5, 7, and 8 but will not be counted towards success criteria until MY3. Due to the high number of volunteers already germinating throughout the Site, no remedial action is needed at this time. These vegetation plots will continue to be monitored to determine if remedial action is warranted. Refer to Appendix 2 for Vegetation Plot Photographs and the Vegetation Condition Assessment Table and Appendix 3 for Vegetation Plot Data.

### **1.2.2 Vegetation Areas of Concern**

The MY2 visual assessment did indicate the vegetation plots are representative of planted trees throughout the Site, however there are a healthy number of volunteers germinating throughout the Site. It was assessed that herbaceous vegetation is dense throughout most of the Site hindering planted tree establishment. The herbaceous vegetation includes native pollinator species and wetland species indicating a healthy riparian habitat. The riparian habitat is helping to reduce nutrient runoff from the cattle fields outside the easement and stabilizing the stream banks. Vegetation near fixed plots 5-8 will be assessed throughout the future monitoring years to determine if replanting is necessary.

### **1.2.3 Stream Assessment**

Morphological surveys for MY2 were conducted in June 2021. All streams within the Site are stable and functioning as designed. All 19 cross-sections at the Site show little to no change in the bankfull area and width-to-depth ratio, and bank height ratios are less than 1.2. Substrate measurements indicate the maintenance of coarser materials in the riffle reaches and finer particles in the pools. Longitudinal profile surveys are not required on the project unless visual inspection indicates reach wide vertical instability. Refer to Appendix 2 for the Visual Stream Morphology Stability Assessment Table, Integrated Current Condition Plan View (CCPV), and Stream Photographs. Refer to Appendix 4 for the Morphological Summary Data and Plots.

### **1.2.4 Stream Areas of Concern**

Localized bank erosion on the outside bend of a pool directly downstream of the culvert crossing along Dry Creek Reach 4, was identified during MY1. This area was repaired in March 2021. The stream bank repair included reshaping the stream bank and installing sod mats and live stakes. After more than six months and several storm events, the repair is stable, and vegetation is establishing. See before and after photos of the area in Appendix 2. This area will continue to be monitored to determine the success of the repair work.



### **1.2.5 Hydrology Assessment**

By the end of MY7, four bankfull events must have occurred in separate years within the restoration and enhancement I reaches. Bankfull events were recorded on Dry Creek Reach 2 and 3 along with UT1 Reach 2, UT5 Reach 1 and UT6 Reach 1. Dry Creek Reach 2 and 3, UT1 Reach 2 and UT5 Reach 1 have partially met the hydrologic success criteria for bankfull events.

In addition, the presence of baseflow must be documented on restored intermittent reaches (UT1A, UT2 and UT5 Reach 1) for a minimum of 30 consecutive days during a normal precipitation year. In-stream flow gages equipped with pressure transducers were installed to monitor continuity of baseflow. UT1A, UT2, and UT5 Reach 1 easily exceeded baseflow success criterion for intermittent streams. The maximum consecutive days ranged from 140 days to 284 days. Refer to Appendix 5 for hydrologic data.

### **1.2.6 Wetland Assessment**

One groundwater gage was installed and monitored within an existing wetland zone at a location requested by North Carolina Division of Water Resources. The gage was downloaded and maintained quarterly. The purpose of the gauge is to assess potential effects to wetland hydrology from the construction of the restored stream channel through this area. The results of this monitoring are not tied to a success criterion. The measured hydroperiod was 3.5% of the growing season consecutively. Hydrology associated with the existing wetland currently being monitored was largely the result of the backwater effect of an impoundment on Dry Creek. By removing the impoundment during stream restoration activities, Wildlands anticipates an effect on hydrology and the associated gage results. While the gage results may indicate hydrological impairment, the overall ecological uplift associated with removal of the man-made impoundment outweighs the potential reduction in groundwater hydrology.

### **1.2.7 Adaptive Management Plan**

Vegetation around fixed vegetation plots 5-8 will be assessed in future monitoring years to determine if remedial actions are necessary. Currently no remedial action is needed at this time.

## **1.3 Monitoring Year 2 Summary**

Of the 12 vegetation plots, 8 are on track to meet the MY3 interim requirement of 320 planted stems per acre. A dense herbaceous layer including wetland and pollinator species has established across the Site. This layer is great for ground cover and diversity but has hindered planted tree establishment on parts of the Site. Sycamore and other volunteer woody stems have began establishing throughout the Site and will be included in MY3 vegetation data. All streams within the Site are stable and functioning as designed. The localized erosion identified in MY1 on Dry Creek Reach 4 was repaired and is stable. Multiple bankfull events were documented on all stream reaches partially fulfilling the final bankfull hydrologic success requirement. Greater than 30 days of consecutive flow were recorded on monitored intermittent stream reaches UT1a, UT2, and UT5 Reach 1 fulfilling MY2 success requirement. Overall, the Site is meeting its goals of preventing excess nutrients and sediment from entering the Neuse River tributaries and is on track to meet final success criteria.

Summary information and data related to the performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the Mitigation Plan (Wildlands, 2018) available on DMS's website. All raw data supporting the tables and figures in the appendices are available from DMS upon request.



## Section 2: METHODOLOGY

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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 Stream Restoration: A Natural Channel Design Handbook (Doll et al., 2003). All Integrated Current Condition Mapping was recorded using a Trimble handheld GPS with sub-meter accuracy and processed using Pathfinder and ArcGIS. Crest gages and pressure transducers were installed in riffle cross-sections and monitored throughout the year. Hydrologic monitoring instrument installation and monitoring methods are in accordance with the United States Army Corps of Engineers standards (USACE, 2003). Vegetation monitoring protocols followed the Carolina Vegetation Survey-EEP Level 2 Protocol (Lee et al., 2008).



## Section 3: REFERENCES

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- Breeding, R. 2010. Neuse River Basin Restoration Priorities 2010. NCEEP, NC
- 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.
- Lee, M.T., Peet, R.K., S.D., Wentworth, T.R. 2008. CVS-EEP Protocol for Recording Vegetation Version 4.2. Retrieved from <http://cvs.bio.unc.edu/protocol/cvs-eep-protocol-v4.2-lev1-5.pdf>.
- Rosgen, D. L. 1994. A classification of natural rivers. *Catena* 22:169-199.
- Rosgen, D.L. 1996. Applied River Morphology. Pagosa Springs, CO: Wildland Hydrology Books.
- Rosgen, D.L. 1997. A Geomorphological Approach to Restoration of Incised Rivers. Proceedings of the Conference on Management of Landscapes Disturbed by Channel Incision. Center For Computational Hydroscience and Bioengineering, Oxford Campus, University of Mississippi, Pages 12-22.
- United States Army Corps of Engineers. 2003. Stream Mitigation Guidelines. USACE, NCDENR-DWQ, USEPA, NCWRC.
- United States Geological Survey. 1998. North Carolina Geology. <http://www.geology.enr.state.nc.us/usgs/carolina.htm>
- Wildlands Engineering, Inc. (2018). Dry Creek Mitigation Project Mitigation Plan. DMS, Raleigh, NC.

## **APPENDIX 1. General Figures and Tables**

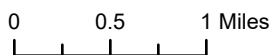
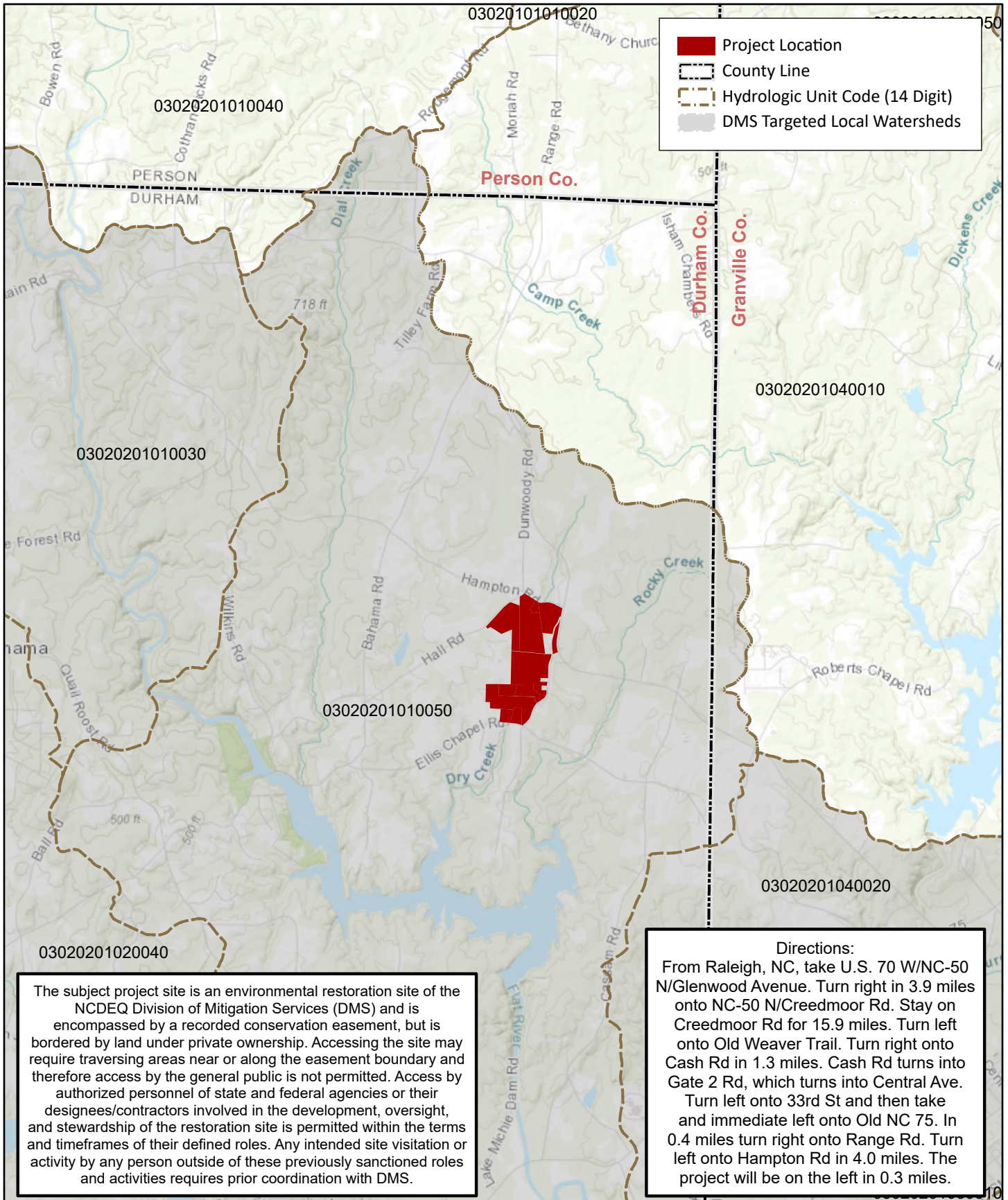
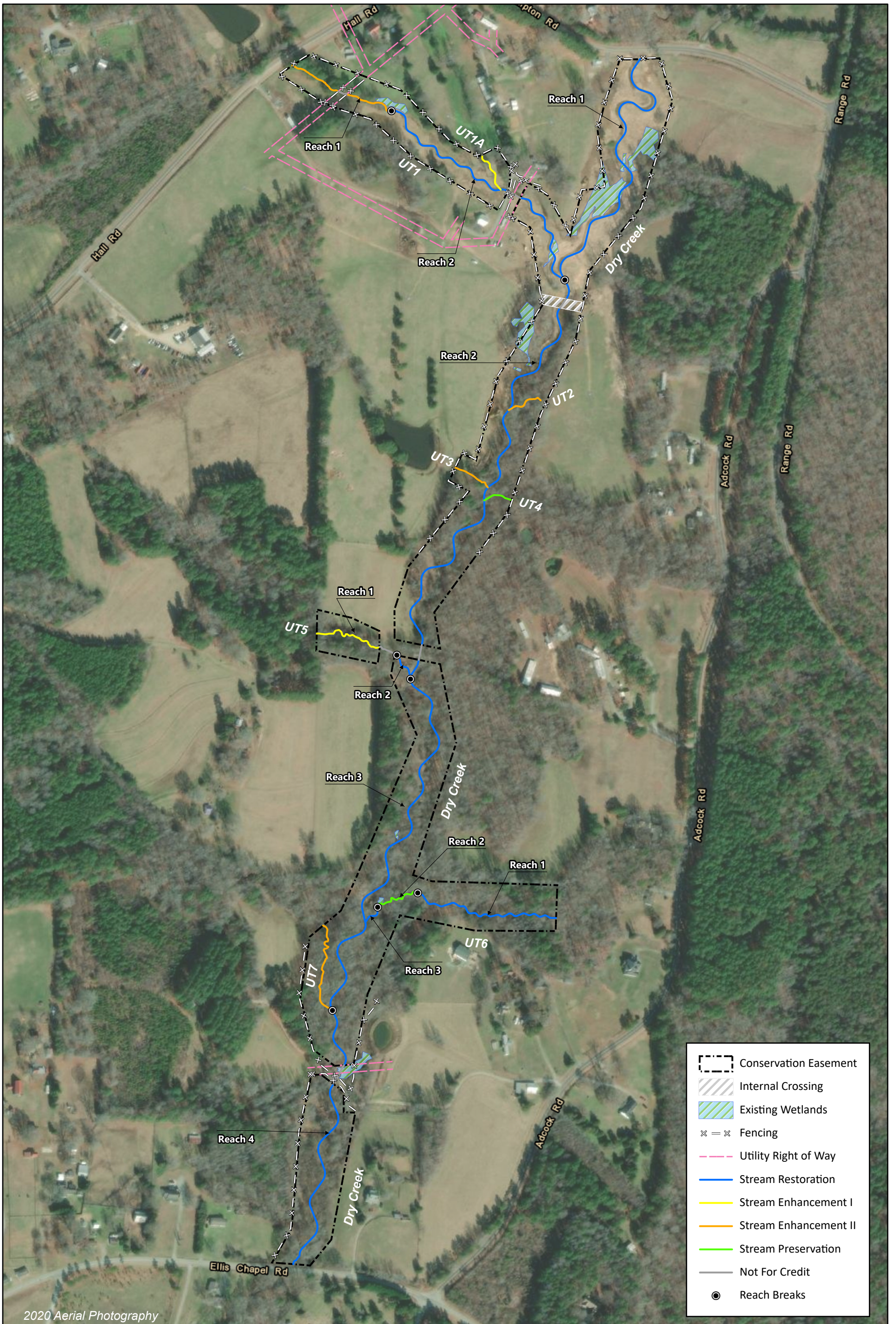


Figure 1. Project Vicinity Map  
 Dry Creek Mitigation Site  
 DMS Project No. 97082  
 Monitoring Year 2 - 2021







**Table 1. Mitigation Assets and Components**

Dry Creek Mitigation Site  
 DMS Project No. 97082  
 Monitoring Year 2 - 2021

PROJECT COMPONENTS										
Reach ID	Existing Footage	Mitigation Plan Footage	Mitigation Category	Restoration Level	Priority Level	Mitigation Ratio (X:1)	Project Credits	As-Built Footage	Comments	
<b>STREAMS</b>										
Dry Creek Reach 1	999	1,278	Warm	R	P1	1	1,278.000	1,247	Pond Removal, Full Channel Restoration, Planted Buffer, Fencing Out Livestock	
Dry Creek Reach 2	2,104	81	Warm	R	P1	1	81.000	84	Full Channel Restoration, Planted Buffer, Fencing Out Livestock	
		44	Warm	N/A	N/A	N/A	N/A	43	Internal Easement Culvert Crossing	
		1,681	Warm	R			1	1,681.000	1,656	Full Channel Restoration, Planted Buffer, Fencing Out Livestock
		60	Warm	N/A	N/A	N/A	N/A	N/A	60	Bridge Crossing, Easement Break
		85	Warm	R	P1	1	85.000	75	Full Channel Restoration, Planted Buffer, Fencing Out Livestock	
Dry Creek Reach 3	1,955	1,603	Warm	R	P1	1	1,603.000	1,583	Full Channel Restoration, Invasive Removal	
Dry Creek Reach 4	1,495	241	Warm	R	P1	1	241.000	243	Full Channel Restoration, Invasive Removal	
		85	Warm	N/A	N/A	N/A	N/A	85	Culvert Crossing, Easement Break	
		813	Warm	R	P1	1	813.000	807	Full Channel Restoration, Invasive Removal	
UT1 Reach 1	456	216	Warm	EII	N/A	2.5	86.400	215	Bank Repairs, Fencing Out Livestock, Planted Buffer	
		35	Warm	N/A	N/A	N/A	N/A	36	Utility Crossing	
		205	Warm	EII	N/A	2.5	82.000	202	Bank Repairs, Fencing Out Livestock, Planted Buffer	
UT1 Reach 2	945	631	Warm	R	P1	1	631.000	627	Pond Removal, Full Channel Restoration, Planted Buffer, Fencing Out Livestock	
		52	Warm	N/A	N/A	N/A	N/A	53	Culvert Crossing, Utility Relocation, Easement Break	
		436	Warm	R	P1	1	436.000	426	Full Channel Restoration, Planted Buffer, Fencing Out Livestock	
UT1A	90	166	Warm	EI	N/A	1.5	110.667	165	Grade Control Structures, Fencing	
UT2	72	151	Warm	EII	N/A	2.5	60.400	135	Bank Repairs, Fencing Out Livestock	
UT3	153	156	Warm	EII	N/A	2.5	62.400	160	Bank Repairs, Fencing Out Livestock	
UT4	110	115	Warm	P	N/A	10	11.500	114	Conservation Easement	
UT5 Reach 1	371	298	Warm	EI	N/A	1.5	198.667	285	Grade Control Structures, Invasive Removal, Planted Buffer	
		80	Warm	N/A	N/A	N/A	N/A	79	Culvert Crossing, Easement Break	
UT5 Reach 2 <sup>1</sup>	135	119	Warm	R	P1	1	104.000	112	Full Channel Restoration	
UT6 Reach 1	582	617	Warm	R	P1	1	617.000	612	Full Channel Restoration, Invasive Removal	
UT6 Reach 2	209	209	Warm	P	N/A	10	20.900	209	Conservation Easement	
UT6 Reach 3	58	89	Warm	R	P1	1	89.000	89	Full Channel Restoration, Invasive Removal	
UT7	367	415	Warm	EII	N/A	2.5	166.000	408	Bank Repairs	

1. No credit proposed for UT5 Reach 2 Station 705+61 to 705+76 due to easement width being less than 15 feet wide.

PROJECT CREDITS							
Restoration Level	Stream			Riparian Wetland		Non-Riparian Wetland	Coastal Marsh
	Warm	Cool	Cold	Riverine	Non-Riverine		
Restoration	7,659.000						
Enhancement I	309.334						
Enhancement II	457.200						
Preservation	32.400						
Re-Establishment							
Rehabilitation							
Enhancement							
Creation							
<b>Totals</b>	<b>8,457.934</b>						

**Table 2. Project Activity and Reporting History**

Dry Creek Mitigation Site  
 DMS Project No. 97082  
**Monitoring Year 2 - 2021**

Activity or Report	Data Collection Complete	Completion or Scheduled Delivery
Mitigation Plan	October 2018	October 2018
Final Design - Construction Plans	November 2019	November 2019
Construction	October 2019 - April 2020	April 20, 2020
Temporary S&E mix applied to entire project area <sup>1</sup>	October 2019 - April 2020	April 20, 2020
Permanent seed mix applied to reach/segments <sup>1</sup>	October 2019 - April 2020	April 20, 2020
Bare root and live stake plantings for reach/segments	April 2020	April 24, 2020
Baseline Monitoring Document (Year 0)	Stream Survey	April 30, 2020
	Vegetation Survey	April 27, 2020
Year 1 Monitoring	Stream Survey	November 4, 2020
	Vegetation Survey	November 4, 2020
Manual Bank Repair		March 2021
Year 2 Monitoring	Stream Survey	June 10, 2021
	Vegetation Survey	September 16, 2021
Year 3 Monitoring	Stream Survey	2022
	Vegetation Survey	2022
Year 4 Monitoring		December 2023
Year 5 Monitoring	Stream Survey	2024
	Vegetation Survey	2024
Year 6 Monitoring		December 2025
Year 7 Monitoring	Stream Survey	2026
	Vegetation Survey	2026

<sup>1</sup>Seed and mulch is added as each section of construction is completed.

**Table 3. Project Contact Table**

Dry Creek Mitigation Site  
 DMS Project No. 97082  
**Monitoring Year 2 - 2021**

<b>Designer</b> Nicole Macaluso Millns, PE	<b>Wildlands Engineering, Inc.</b> 312 West Millbrook Road, Suite 225 Raleigh, NC 27609 919.851.9986
<b>Construction Contractor</b>	<b>Land Mechanic Designs, Inc.</b> 126 Circle G Lane Willow Spring, NC 27592
<b>Planting Contractor</b>	<b>Bruton Natural Systems, Inc</b> P.O. Box 1197 Fremont, NC 27830
<b>Seeding Contractor</b>	<b>Land Mechanic Designs, Inc.</b> 126 Circle G Lane Willow Spring, NC 27592
<b>Seed Mix Sources</b>	<b>Garrett Wildflower Seed Company</b>
<b>Nursery Stock Suppliers</b> Bare Roots	<b>Dykes and Sons Nursery and Greenhouse</b>
<b>Live Stakes</b>	<b>Bruton Natural Systems, Inc</b>
<b>Monitoring Performers</b> Monitoring, POC	<b>Wildlands Engineering, Inc.</b> Jason Lorch 919.851.9986

**Table 4. Project Information and Attributes**

Dry Creek Mitigation Site  
 DMS Project No. 97082  
**Monitoring Year 2 - 2021**

PROJECT INFORMATION										
Project Name	Dry Creek Mitigation Site									
County	Durham County									
Project Area (acres)	29.764									
Planted (acres)	14.040									
Project Coordinates (latitude and longitude)	36° 11' 07.92" N, 78° 49' 39.00" W									
PROJECT WATERSHED SUMMARY INFORMATION										
Physiographic Province	Carolina Slate Belt of the Piedmont Physiographic Province									
River Basin	Neuse River									
USGS Hydrologic Unit 8-digit	03020201									
USGS Hydrologic Unit 14-digit	03020201010050									
DWR Sub-basin	03-04-01									
Project Drainage Area (acres)	807									
Project Drainage Area Percentage of Impervious Area	<1%									
CGIA Land Use Classification	50% Forested, 40% Cultivated, 9% Residential Area									
REACH SUMMARY INFORMATION										
Parameters	Dry Creek	UT1	UT1a	UT2	UT3	UT4	UT5	UT6	UT7	
Length of Reach (linear feet) - Post-Restoration	5,883	1,559	165	135	160	114	397	910	408	
Drainage Area (acres)	807	85	22	4	17	33	40	17	64	
NCDWR Stream Identification Score	50.5	32.25	27.5	24.5	26	24	25.5	36	35.5	
NCDWR Water Quality Classification	WS-III (NSW)									
Morphological Description (stream type)	Perennial		Intermittent				Perennial			
Evolutionary Trend (Simon's Model) - Pre-Restoration	IV: Degradation and Widening				III Channelized	I Premodified	IV Degradation and Widening			
Underlying Mapped Soils	Chewacla loam, Herndon silt loam, Tatum silt loam									
Drainage Class	-									
Soil Hydric Status	-									
Slope	-									
FEMA Classification	Zone X									
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. 4134.							
Waters of the United States - Section 401	Yes	Yes								
Division of Land Quality (Dam Safety)	N/A	N/A								
Endangered Species Act	Yes	Yes	Dry Creek Mitigation Plan; Wildlands determined "no effect" on Orange County listed endangered species. The USFWS responded on May 5, 2016 and concurred with NCWRC stating that "the proposed action is not likely to adversely affect any federally-listed endangered or threatened species, their formally designated critical habitat, or species currently proposed for listing under the Act."							
Historic Preservation Act	Yes	Yes	Correspondence from SHPO on April 26, 2016 indicating they were not aware of any historic resources that would be affected by the project.							
Coastal Zone Management Act (CZMA)/Coastal Area Management Act (CAMA)	N/A	N/A	N/A							
FEMA Floodplain Compliance	Yes	Yes	Durham County Floodplain Development Permit No. 19800028 was obtained on August 1, 2019							
Essential Fisheries Habitat	N/A	N/A	N/A							

## **APPENDIX 2. Visual Assessment Data**



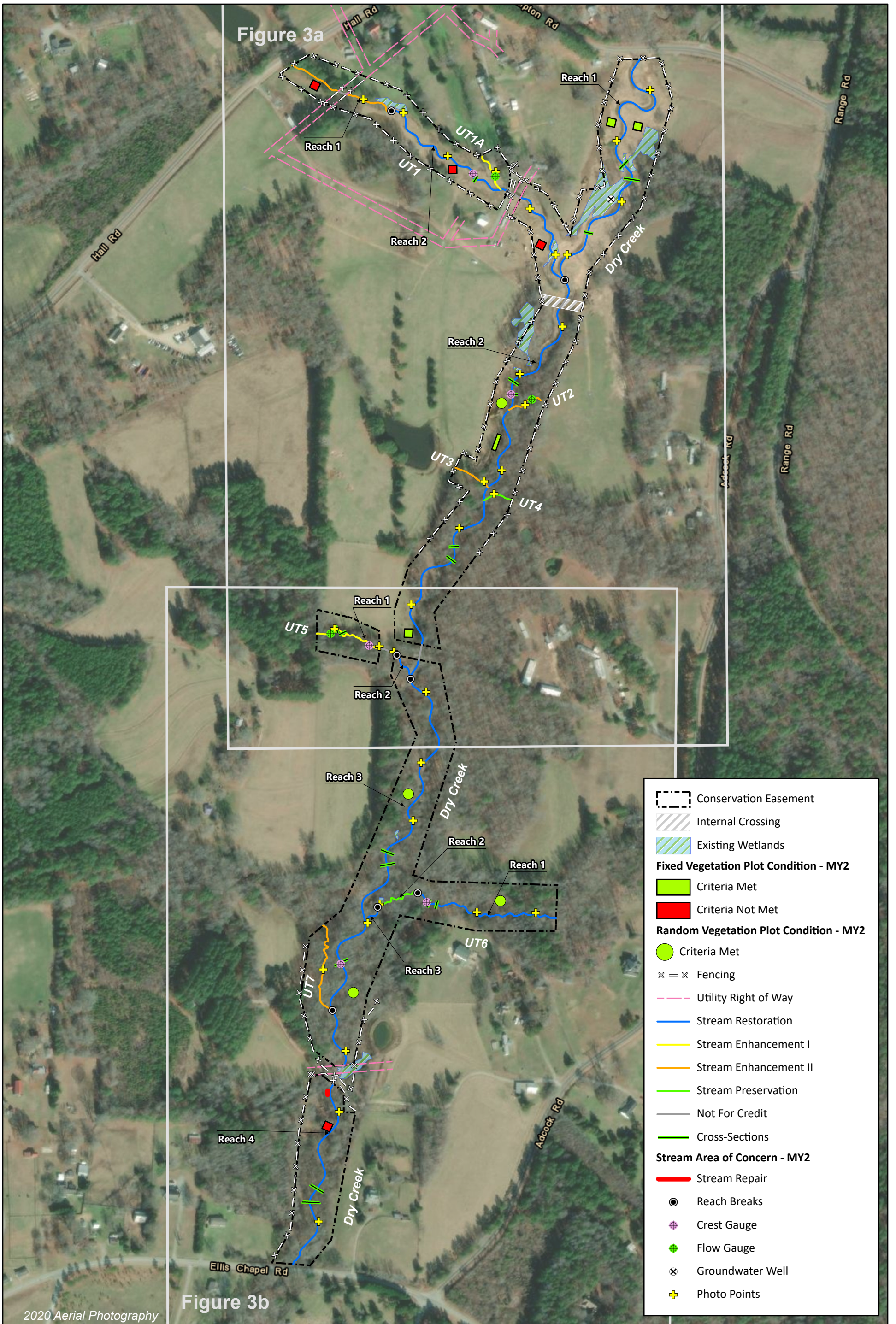
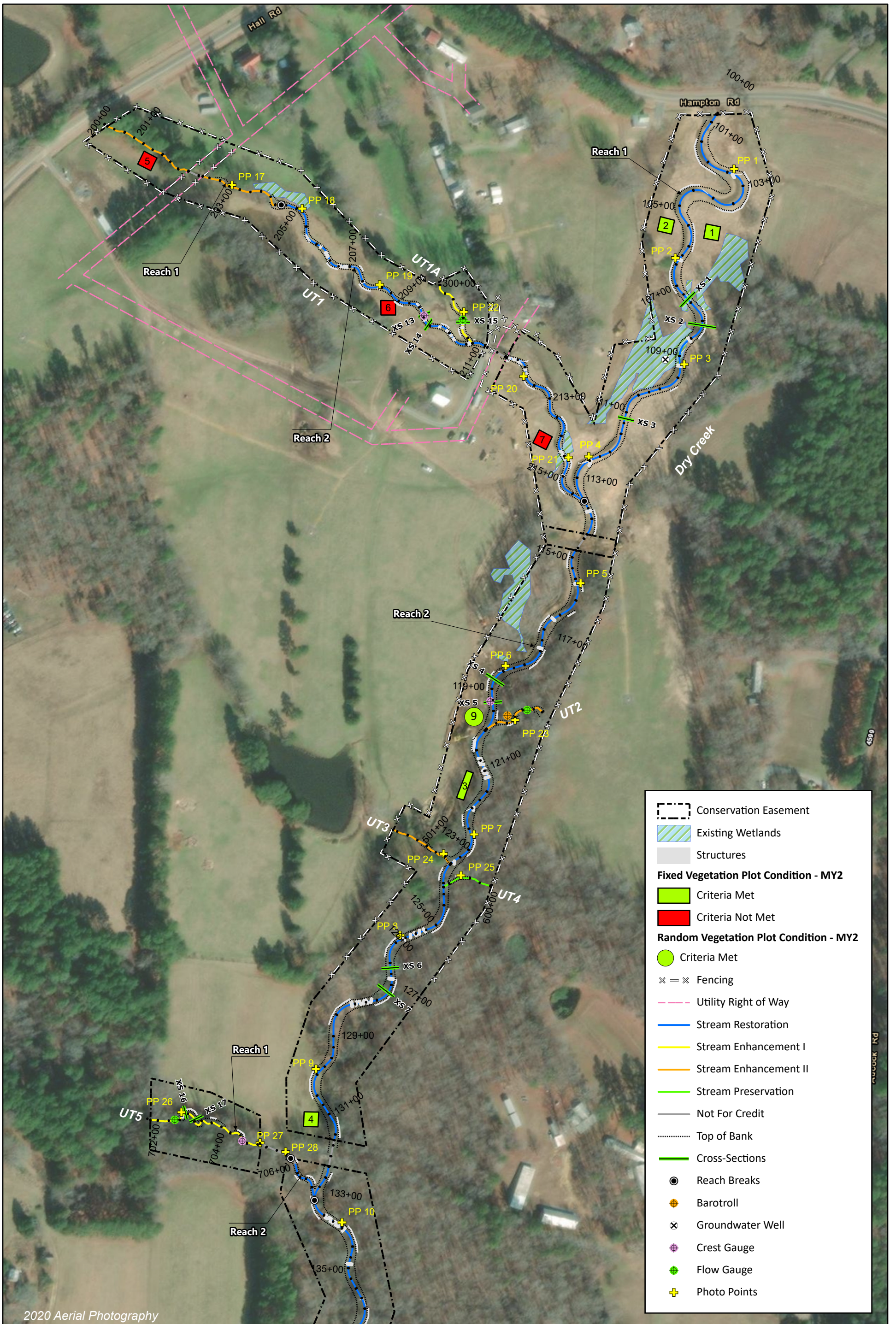


Figure 3a

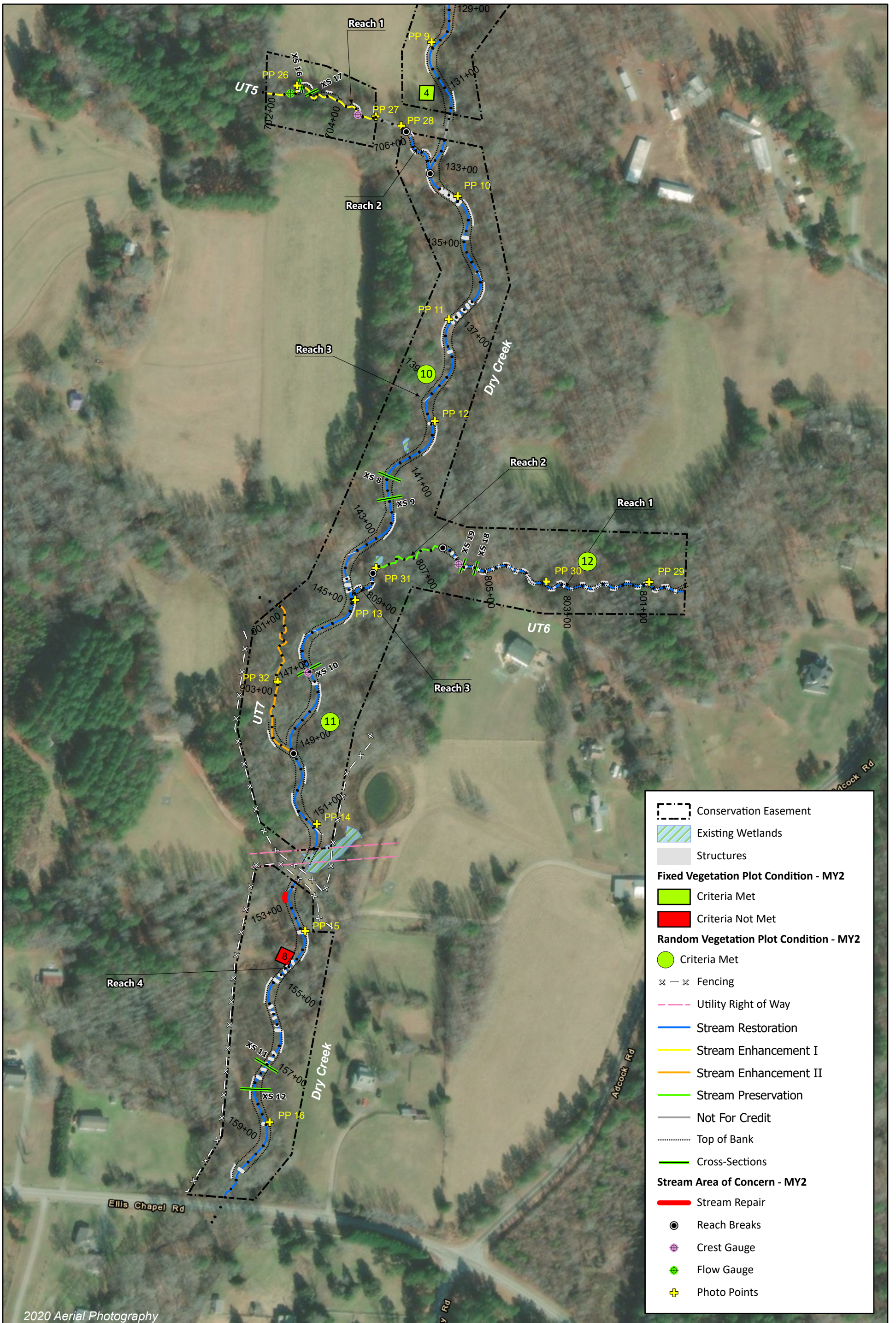
Figure 3b

Figure 3. Integrated Current Condition Plan View (Key)  
 Dry Creek Mitigation Site  
 DMS Project No. 97082  
 Monitoring Year 2 - 2021  
 Durham County, NC











**Table 5a. Visual Stream Morphology Stability Assessment Table**

Dry Creek Mitigation Site  
 DMS Project No. 97082  
 Monitoring Year 2 - 2021

**Dry Creek Reach 1-4: 5,883 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
<b>1. Bed</b>	<b>1. Vertical Stability (Riffle and Run Units)</b>	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	<b>2. Riffle Condition</b>	Texture/Substrate	55	55			100%			
	<b>3. Meander Pool Condition</b>	Depth Sufficient	58	58			100%			
		Length Appropriate	58	58			100%			
	<b>4. Thalweg Position</b>	Thalweg centering at upstream of meander bend (Run)	55	55			100%			
		Thalweg centering at downstream of meander bend (Glide)	55	55			100%			
<b>Totals</b>					<b>0</b>	<b>0</b>	<b>100%</b>	<b>n/a</b>	<b>n/a</b>	<b>n/a</b>
<b>2. Bank</b>	<b>1. Scoured/Eroded</b>	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	n/a	n/a	n/a
	<b>2. Undercut</b>	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
	<b>3. Mass Wasting</b>	Bank slumping, caving, or collapse.			0	0	100%	n/a	n/a	n/a
<b>3. Engineered Structures<sup>1</sup></b>	<b>1. Overall Integrity</b>	Structures physically intact with no dislodged boulders or logs.	12	12			100%			
	<b>2. Grade Control</b>	Grade control structures exhibiting maintenance of grade across the sill.	12	12			100%			
	<b>2a. Piping</b>	Structures lacking any substantial flow underneath sills or arms.	12	12			100%			
	<b>3. Bank Protection</b>	Bank erosion within the structures extent of influence does not exceed 15%.	36	36			100%			
	<b>4. Habitat</b>	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	36	36			100%			

<sup>1</sup>Excludes constructed riffles since they are evaluated in section 1.

**Table 5b. Visual Stream Morphology Stability Assessment Table**

Dry Creek Mitigation Site  
 DMS Project No. 97082  
 Monitoring Year 2 - 2021

**UT1 Reach 2: 1,053 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
<b>1. Bed</b>	<b>1. Vertical Stability (Riffle and Run Units)</b>	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	<b>2. Riffle Condition</b>	Texture/Substrate	22	22			100%			
	<b>3. Meander Pool Condition</b>	Depth Sufficient	21	21			100%			
		Length Appropriate	21	21			100%			
	<b>4. Thalweg Position</b>	Thalweg centering at upstream of meander bend (Run)	22	22			100%			
		Thalweg centering at downstream of meander bend (Glide)	22	22			100%			
<b>Totals</b>					0	0	100%	n/a	n/a	n/a
<b>2. Bank</b>	<b>1. Scoured/Eroded</b>	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	n/a	n/a	n/a
	<b>2. Undercut</b>	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
	<b>3. Mass Wasting</b>	Bank slumping, calving, or collapse			0	0	100%	n/a	n/a	n/a
<b>Totals</b>					0	0	100%	n/a	n/a	n/a
<b>3. Engineered Structures<sup>1</sup></b>	<b>1. Overall Integrity</b>	Structures physically intact with no dislodged boulders or logs.	3	3			100%			
	<b>2. Grade Control</b>	Grade control structures exhibiting maintenance of grade across the sill.	3	3			100%			
	<b>2a. Piping</b>	Structures lacking any substantial flow underneath sills or arms.	3	3			100%			
	<b>3. Bank Protection</b>	Bank erosion within the structures extent of influence does not exceed 15%.	10	10			100%			
	<b>4. Habitat</b>	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	10	10			100%			

<sup>1</sup>Excludes constructed riffles since they are evaluated in section 1.

**Table 5c. Visual Stream Morphology Stability Assessment Table**

Dry Creek Mitigation Site  
 DMS Project No. 97082  
 Monitoring Year 2 - 2021

UTIA: 165 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	5	5			100%			
	3. Meander Pool Condition	Depth Sufficient	5	5			100%			
		Length Appropriate	5	5			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	5	5			100%			
		Thalweg centering at downstream of meander bend (Glide)	5	5			100%			
<b>Totals</b>					0	0	100%	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, calving, or collapse			0	0	100%	n/a	n/a	n/a
<b>Totals</b>					0	0	100%	n/a	n/a	n/a
3. Engineered Structures <sup>1</sup>	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	0	0			N/A			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	0	0			N/A			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	0	0			N/A			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	1	1			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	1	1			100%			

<sup>1</sup>Excludes constructed riffles since they are evaluated in section 1.

**Table 5d. Visual Stream Morphology Stability Assessment Table**

Dry Creek Mitigation Site  
 DMS Project No. 97082  
 Monitoring Year 2 - 2021

**UT5 Reach 1-2: 397 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
<b>1. Bed</b>	<b>1. Vertical Stability (Riffle and Run Units)</b>	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	<b>2. Riffle Condition</b>	Texture/Substrate	10	10			100%			
	<b>3. Meander Pool Condition</b>	Depth Sufficient	11	11			100%			
		Length Appropriate	11	11			100%			
	<b>4. Thalweg Position</b>	Thalweg centering at upstream of meander bend (Run)	10	10			100%			
		Thalweg centering at downstream of meander bend (Glide)	10	10			100%			
<b>Totals</b>					0	0	100%	n/a	n/a	n/a
<b>2. Bank</b>	<b>1. Scoured/Eroded</b>	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	n/a	n/a	n/a
	<b>2. Undercut</b>	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
	<b>3. Mass Wasting</b>	Bank slumping, calving, or collapse			0	0	100%	n/a	n/a	n/a
<b>Totals</b>					0	0	100%	n/a	n/a	n/a
<b>3. Engineered Structures<sup>1</sup></b>	<b>1. Overall Integrity</b>	Structures physically intact with no dislodged boulders or logs.	0	0			N/A			
	<b>2. Grade Control</b>	Grade control structures exhibiting maintenance of grade across the sill.	0	0			N/A			
	<b>2a. Piping</b>	Structures lacking any substantial flow underneath sills or arms.	0	0			N/A			
	<b>3. Bank Protection</b>	Bank erosion within the structures extent of influence does not exceed 15%.	6	6			100%			
	<b>4. Habitat</b>	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	6	6			100%			

<sup>1</sup>Excludes constructed riffles since they are evaluated in section 1.

**Table 5e. Visual Stream Morphology Stability Assessment Table**

Dry Creek Mitigation Site  
 DMS Project No. 97082  
 Monitoring Year 2 - 2021

**UT6 Reach 1 & 3: 701 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
<b>1. Bed</b>	<b>1. Vertical Stability (Riffle and Run Units)</b>	Aggradation			0	0	100%			
		Degradation			0	0	100%			
	<b>2. Riffle Condition</b>	Texture/Substrate	34	34			100%			
	<b>3. Meander Pool Condition</b>	Depth Sufficient	32	32			100%			
		Length Appropriate	32	32			100%			
	<b>4. Thalweg Position</b>	Thalweg centering at upstream of meander bend (Run)	34	34			100%			
		Thalweg centering at downstream of meander bend (Glide)	34	34			100%			
<b>Totals</b>										
					0	0	100%	n/a	n/a	n/a
<b>2. Bank</b>	<b>1. Scoured/Eroded</b>	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	n/a	n/a	n/a
	<b>2. Undercut</b>	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
	<b>3. Mass Wasting</b>	Bank slumping, calving, or collapse			0	0	100%	n/a	n/a	n/a
<b>Totals</b>										
					0	0	100%	n/a	n/a	n/a
<b>3. Engineered Structures<sup>1</sup></b>	<b>1. Overall Integrity</b>	Structures physically intact with no dislodged boulders or logs.	0	0			N/A			
	<b>2. Grade Control</b>	Grade control structures exhibiting maintenance of grade across the sill.	0	0			N/A			
	<b>2a. Piping</b>	Structures lacking any substantial flow underneath sills or arms.	0	0			N/A			
	<b>3. Bank Protection</b>	Bank erosion within the structures extent of influence does not exceed 15%.	17	17			100%			
	<b>4. Habitat</b>	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	17	17			100%			

<sup>1</sup>Excludes constructed riffles since they are evaluated in section 1.



**Table 6. Vegetation Condition Assessment Table**

Dry Creek Mitigation Site  
 DMS Project No. 97082  
**Monitoring Year 2 - 2021**

**Planted Acreage 14.04**

Vegetation Category	Definitions	Mapping Threshold (Ac)	Number of Polygons	Combined Acreage	% of Planted Acreage
<b>Bare Areas</b>	Very limited cover of both woody and herbaceous material.	0.1	0	0	0%
<b>Low Stem Density Areas</b>	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1	0	0	0%
<b>Total</b>			<b>0</b>	<b>0</b>	<b>0%</b>
<b>Areas of Poor Growth Rates or Vigor</b>	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 Ac	0	0	0%
<b>Cumulative Total</b>			<b>0</b>	<b>0.0</b>	<b>0%</b>

**Easement Acreage 29.76**

Vegetation Category	Definitions	Mapping Threshold (SF)	Number of Polygons	Combined Acreage	% of Easement Acreage
<b>Invasive Areas of Concern</b>	Areas of points (if too small to render as polygons at map scale).	1,000	0	0	0%
<b>Easement Encroachment Areas</b>	Areas of points (if too small to render as polygons at map scale).	none	0	0	0%

## **STREAM PHOTOGRAPHS**





**PHOTO POINT 1 Dry Creek R1 – upstream (4/2/2021)**



**PHOTO POINT 1 Dry Creek R1 – downstream (4/2/2021)**



**PHOTO POINT 2 Dry Creek R1 – upstream (4/2/2021)**



**PHOTO POINT 2 Dry Creek R1 – downstream (4/2/2021)**



**PHOTO POINT 3 Dry Creek R1 – upstream (4/2/2021)**



**PHOTO POINT 3 Dry Creek R1 – downstream (4/2/2021)**







**PHOTO POINT 4 Dry Creek R1 – upstream (4/2/2021)**



**PHOTO POINT 4 Dry Creek R1 – downstream (4/2/2021)**



**PHOTO POINT 5 Dry Creek R2 – upstream (4/2/2021)**



**PHOTO POINT 5 Dry Creek R2 – downstream (4/2/2021)**



**PHOTO POINT 6 Dry Creek R2 – upstream (4/2/2021)**



**PHOTO POINT 6 Dry Creek R2 – downstream (4/2/2021)**







**PHOTO POINT 7 Dry Creek R2 – upstream (4/2/2021)**



**PHOTO POINT 7 Dry Creek R2 – downstream (4/2/2021)**



**PHOTO POINT 8 Dry Creek R2 – upstream (4/2/2021)**



**PHOTO POINT 8 Dry Creek R2 – downstream (4/2/2021)**



**PHOTO POINT 9 Dry Creek R2 – upstream (4/2/2021)**



**PHOTO POINT 9 Dry Creek R2 – downstream (4/2/2021)**







**PHOTO POINT 10 Dry Creek R3 – upstream (4/2/2021)**



**PHOTO POINT 10 Dry Creek R3 – downstream (4/2/2021)**



**PHOTO POINT 11 Dry Creek R3 – upstream (4/2/2021)**



**PHOTO POINT 11 Dry Creek R3 – downstream (4/2/2021)**



**PHOTO POINT 12 Dry Creek R3 – upstream (4/2/2021)**



**PHOTO POINT 12 Dry Creek R3 – downstream (4/2/2021)**







**PHOTO POINT 13 Dry Creek R3 – upstream (4/2/2021)**



**PHOTO POINT 13 Dry Creek R3 – downstream (4/2/2021)**



**PHOTO POINT 14 Dry Creek R3 – upstream (4/2/2021)**



**PHOTO POINT 14 Dry Creek R3 – downstream (4/2/2021)**



**PHOTO POINT 15 Dry Creek R4 – upstream (4/2/2021)**



**PHOTO POINT 15 Dry Creek R4 – downstream (4/2/2021)**







**PHOTO POINT 16 Dry Creek R4 – upstream (4/2/2021)**



**PHOTO POINT 16 Dry Creek R4 – downstream (4/2/2021)**



**PHOTO POINT 17 UT1 R1 – upstream (4/2/2021)**



**PHOTO POINT 17 UT1 R1 – downstream (4/2/2021)**



**PHOTO POINT 18 UT1 R2 – upstream (4/2/2021)**



**PHOTO POINT 18 UT1 R2 – downstream (4/2/2021)**







**PHOTO POINT 19 UT1 R2 – upstream (4/2/2021)**



**PHOTO POINT 19 UT1 R2 – downstream (4/2/2021)**



**PHOTO POINT 20 UT1 R2 – upstream (4/2/2021)**



**PHOTO POINT 20 UT1 R2 – downstream (4/2/2021)**



**PHOTO POINT 21 UT1 R2 – upstream (4/2/2021)**



**PHOTO POINT 21 UT1 R2 – downstream (4/2/2021)**







**PHOTO POINT 22 UT1a – upstream (4/2/2021)**



**PHOTO POINT 22 UT1a – downstream (4/2/2021)**



**PHOTO POINT 23 UT2 – upstream (4/2/2021)**



**PHOTO POINT 23 UT2 – downstream (4/2/2021)**



**PHOTO POINT 24 UT3 – upstream (4/2/2021)**



**PHOTO POINT 24 UT3 – downstream (4/2/2021)**







**PHOTO POINT 25 UT4 – upstream (4/2/2021)**



**PHOTO POINT 25 UT4 – downstream (4/2/2021)**



**PHOTO POINT 26 UT5 R1 – upstream (4/2/2021)**



**PHOTO POINT 26 UT5 R1 – downstream (4/2/2021)**



**PHOTO POINT 27 UT5 R1 – upstream (4/2/2021)**



**PHOTO POINT 28 UT5 R2 – downstream (4/2/2021)**







**PHOTO POINT 29 UT6 R1 – upstream (4/2/2021)**



**PHOTO POINT 29 UT6 R1 – downstream (4/2/2021)**



**PHOTO POINT 30 UT6 R1 – upstream (4/2/2021)**



**PHOTO POINT 30 UT6 R1 – downstream (4/2/2021)**



**PHOTO POINT 31 UT6 R2 – upstream (4/2/2021)**



**PHOTO POINT 31 UT6 R2 – downstream (4/2/2021)**







**PHOTO POINT 32 UT7 – upstream (4/2/2021)**



**PHOTO POINT 32 UT7 – downstream (4/2/2021)**





**Stream Area of Concern Photographs**  
**Dry Creek Reach 4**





**Before – Localized Erosion (11/4/2020)**



**Before – Localized Erosion (11/4/2020)**



**After – Repaired Localized Erosion (04/2/2021)**



**After – Repaired Localized Erosion (04/2/2021)**



**After – Repaired Localized Erosion (09/16/2021)**



**After – Repaired Localized Erosion (09/16/2021)**



**STREAM CROSSING PHOTOGRAPHS**





**Dry Creek Reach 2 – Looking Upstream (10/12/2021)**



**Dry Creek Reach 2 – Looking Downstream (10/12/2021)**



**Dry Creek Reach 2 – Looking Upstream (10/12/2021)**



**Dry Creek Reach 2 – Looking Downstream (10/12/2021)**



**Dry Creek Reach 4 – Looking Upstream (10/12/2021)**



**Dry Creek Reach 4 – Looking Downstream (10/12/2021)**







**UT1 Reach 1 – Looking Upstream (10/12/2021)**



**UT1 Reach 1 – Looking Downstream (10/12/2021)**



**UT1 Reach 2 – Looking Upstream (10/12/2021)**



**UT1 Reach 2 – Looking Downstream (10/12/2021)**



**UT5 – Looking Upstream (10/12/2021)**



**UT5 – Looking Downstream (10/12/2021)**





**VEGETATION PLOT PHOTOGRAPHS**





**FIXED VEG PLOT 1 (9/16/2021)**



**FIXED VEG PLOT 2 (9/16/2021)**



**FIXED VEG PLOT 3 (9/16/2021)**



**FIXED VEG PLOT 4 (9/16/2021)**



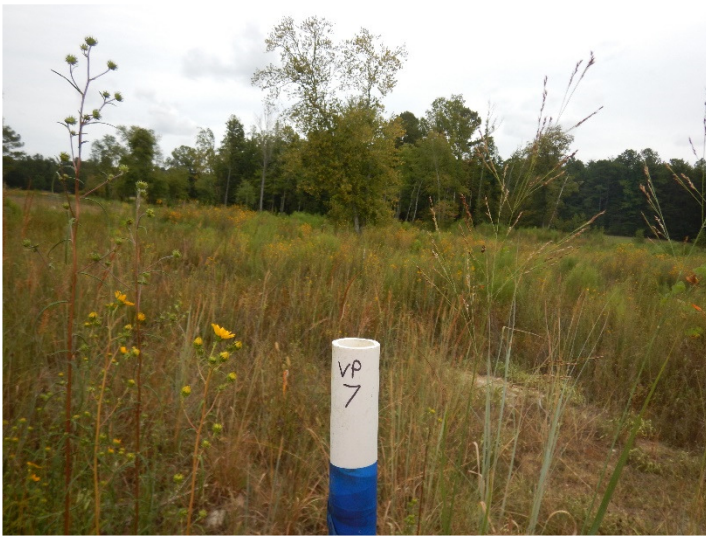
**FIXED VEG PLOT 5 (9/16/2021)**



**FIXED VEG PLOT 6 (10/12/2021)**







**FIXED VEG PLOT 7 (9/16/2021)**



**FIXED VEG PLOT 8 (9/16/2021)**



**RANDOM VEG PLOT 9 (9/16/2021)**



**RANDOM VEG PLOT 10 (9/16/2021)**



**RANDOM VEG PLOT 11 (9/16/2021)**



**RANDOM VEG PLOT 12 (9/16/2021)**





### **APPENDIX 3. Vegetation Plot Data**



**Table 7. Vegetation Plot Criteria Attainment Table**

Dry Creek Mitigation Site

DMS Project No. 97082

**Monitoring Year 2 - 2021**

Plot	Success Criteria Met *	Tract Mean
Fixed Vegetation Plot 1	Yes	67%
Fixed Vegetation Plot 2	Yes	
Fixed Vegetation Plot 3	Yes	
Fixed Vegetation Plot 4	Yes	
Fixed Vegetation Plot 5	No**	
Fixed Vegetation Plot 6	No	
Fixed Vegetation Plot 7	No**	
Fixed Vegetation Plot 8	No**	
Random Vegetation Plot 9	Yes	
Random Vegetation Plot 10	Yes	
Random Vegetation Plot 11	Yes	
Random Vegetation Plot 12	Yes	

\*Success Criteria Met is based on the interim success criteria for MY3 of 320 planted stems per acre.

\*\*Fixed Vegetation Plot 5, 7, and 8 are on track to meet the final success criteria for MY7 of 210 planted stems per acre.



**Table 8. CVS Vegetation Tables - Metadata**

Dry Creek Mitigation Site  
DMS Project No. 97082  
**Monitoring Year 2 - 2021**

<b>Report Prepared By</b>	Madison LaSala
<b>Date Prepared</b>	9/17/2021 11:37
<b>Database Name</b>	Dry Creek MY2.mdb
<b>Database Location</b>	F:\Monitoring\Dry Creek\MY2
<b>Computer Name</b>	NICOLE-PC
<b>File Size</b>	74514432
<b>DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT-----</b>	
<b>Metadata</b>	Description of database file, the report worksheets, and a summary of project(s) and project data.
<b>Project Planted</b>	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
<b>Project Total Stems</b>	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.
<b>Plots</b>	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
<b>Vigor</b>	Frequency distribution of vigor classes for stems for all plots.
<b>Vigor by Spp</b>	Frequency distribution of vigor classes listed by species.
<b>Damage</b>	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
<b>Damage by Spp</b>	Damage values tallied by type for each species.
<b>Damage by Plot</b>	Damage values tallied by type for each plot.
<b>Planted Stems by Plot and Spp</b>	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
<b>ALL Stems by Plot and Spp</b>	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.
<b>PROJECT SUMMARY-----</b>	
<b>Project Code</b>	97082
<b>Project Name</b>	Dry Creek
<b>Description</b>	
<b>Sampled Plots</b>	8



**Table 9a. Fixed Plots: Planted and Total Stem Counts**

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

Scientific Name	Common Name	Species Type	Current Plot Data (MY2 2021)											
			VP 1			VP 2			VP 3			VP 4		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
<i>Betula nigra</i>	River Birch	Tree	6	6	6	2	2	2						
<i>Fraxinus pennsylvanica</i>	Green Ash	Tree							3	3	3	1	1	1
<i>Liquidambar styraciflua</i>	Sweet Gum	Tree												
<i>Liriodendron tulipifera</i>	Tulip-poplar	Tree												
<i>Platanus occidentalis</i>	Sycamore	Tree	1	1	1	6	6	6	5	5	5	2	2	2
<i>Populus deltoides</i>	Eastern Cottonwood	Tree	2	2	2									
<i>Quercus michauxii</i>	Swamp Chestnut Oak	Tree							2	2	2	5	5	5
<i>Quercus pagoda</i>	Cherrybark Oak	Tree				1	1	1				1	1	1
<i>Quercus phellos</i>	Willow Oak	Tree				1	1	1				1	1	1
<i>Salix nigra</i>	Black Willow	Tree												
<b>Stem count</b>			9	9	9	10	10	10	10	10	10	10	10	10
<b>size (ares)</b>			1			1			1			1		
<b>size (ACRES)</b>			0.02			0.02			0.02			0.02		
<b>Species count</b>			3	3	3	4	4	4	3	3	3	5	5	5
<b>Stems per ACRE</b>			364	364	364	405	405	405	405	405	405	405	405	405

**Color for Density**

- Exceeds requirements by 10%
- Exceeds requirements, but by less than 10%
- Fails to meet requirements, by less than 10%
- Fails to meet requirements by more than 10%
- 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 9a. Fixed Plots: Planted and Total Stem Counts**

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

Scientific Name	Common Name	Species Type	Current Plot Data (MY2 2021)											
			VP 5			VP 6			VP 7			VP 8		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
<i>Betula nigra</i>	River Birch	Tree	3	3	3	2	2	2						
<i>Fraxinus pennsylvanica</i>	Green Ash	Tree	1	1	1	1	1	1				1	1	1
<i>Liquidambar styraciflua</i>	Sweet Gum	Tree												
<i>Liriodendron tulipifera</i>	Tulip-poplar	Tree												
<i>Platanus occidentalis</i>	Sycamore	Tree				2	2	2	3	3	3	4	4	4
<i>Populus deltoides</i>	Eastern Cottonwood	Tree							1	1	1			
<i>Quercus michauxii</i>	Swamp Chestnut Oak	Tree							2	2	2			
<i>Quercus pagoda</i>	Cherrybark Oak	Tree	2	2	2							1	1	1
<i>Quercus phellos</i>	Willow Oak	Tree										1	1	1
<i>Salix nigra</i>	Black Willow	Tree												
<b>Stem count</b>			6	6	6	5	5	5	6	6	6	7	7	7
<b>size (ares)</b>			1			1			1			1		
<b>size (ACRES)</b>			0.02			0.02			0.02			0.02		
<b>Species count</b>			3	3	3	3	3	3	3	3	3	4	4	4
<b>Stems per ACRE</b>			243	243	243	202	202	202	243	243	243	283	283	283

**Color for Density**

- Exceeds requirements by 10%
- Exceeds requirements, but by less than 10%
- Fails to meet requirements, by less than 10%
- Fails to meet requirements by more than 10%
- 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 9a. Fixed Plots: Planted and Total Stem Counts**

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

Scientific Name	Common Name	Species Type	Annual Means								
			MY2 (2021)			MY1 (2020)			MY0 (2020)		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
<i>Betula nigra</i>	River Birch	Tree	13	13	13	19	19	19	26	26	26
<i>Fraxinus pennsylvanica</i>	Green Ash	Tree	7	7	7	7	7	7	7	7	7
<i>Liquidambar styraciflua</i>	Sweet Gum	Tree									
<i>Liriodendron tulipifera</i>	Tulip-poplar	Tree				3	3	3	10	10	10
<i>Platanus occidentalis</i>	Sycamore	Tree	23	23	23	26	26	26	26	26	26
<i>Populus deltoides</i>	Eastern Cottonwood	Tree	3	3	3	5	5	5	9	9	9
<i>Quercus michauxii</i>	Swamp Chestnut Oak	Tree	9	9	9	11	11	11	10	10	10
<i>Quercus pagoda</i>	Cherrybark Oak	Tree	5	5	5	9	9	9	9	9	9
<i>Quercus phellos</i>	Willow Oak	Tree	3	3	3	8	8	8	10	10	10
<i>Salix nigra</i>	Black Willow	Tree									
<b>Stem count</b>			<b>63</b>	<b>63</b>	<b>63</b>	<b>88</b>	<b>88</b>	<b>88</b>	<b>107</b>	<b>107</b>	<b>107</b>
<b>size (ares)</b>			<b>8</b>			<b>8</b>			<b>8</b>		
<b>size (ACRES)</b>			<b>0.20</b>			<b>0.20</b>			<b>0.20</b>		
<b>Species count</b>			<b>7</b>	<b>7</b>	<b>7</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>8</b>
<b>Stems per ACRE</b>			<b>319</b>	<b>319</b>	<b>319</b>	<b>445</b>	<b>445</b>	<b>445</b>	<b>541</b>	<b>541</b>	<b>541</b>

**Color for Density**

- Exceeds requirements by 10%
- Exceeds requirements, but by less than 10%
- Fails to meet requirements, by less than 10%
- Fails to meet requirements by more than 10%
- 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 9b. Random Plots: Planted and Total Stem Counts**

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

Scientific Name	Common Name	Species Type	Current Plot Data (MY2 2021)							
			VP 9		VP 10		VP 11		VP 12	
			Te	Total	Te	Total	Te	Total	Te	Total
<i>Asimina Triloba</i>	Paw Paw	Tree					1	1		
<i>Betula nigra</i>	River Birch	Tree	1	1	1	1				
<i>Fraxinus pennsylvanica</i>	Green Ash	Tree	1	1	1	1	2	2	2	2
<i>Liriodendron tulipifera</i>	Tulip Poplar	Tree	1	1						
<i>Platanus occidentalis</i>	Sycamore	Tree	4	4	6	6	6	6	7	7
<i>Populus deltoides</i>	Eastern Cottonwood	Tree	1	1						
<i>Quercus pagoda</i>	Cherrybark Oak	Tree								
<i>Quercus michauxii</i>	Swamp Chestnut Oak	Tree	2	2	1	1				
<i>Quercus phellos</i>	Willow Oak	Tree								
<i>Ulmus alata</i>	Winged Elm	Tree					1	1		
<i>Salix nigra</i>	Black Willow	Tree								
<b>Stem count</b>			10	10	9	9	10	10	9	9
<b>size (ares)</b>			1		1		1		1	
<b>size (ACRES)</b>			0.02		0.02		0.02		0.02	
<b>Species count</b>			6	6	4	4	4	4	2	2
<b>Stems per ACRE</b>			405	405	364	364	405	405	364	364

**Color for Density**

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

**Te** - Number of stems including exotic species

**Total** - Number of stems excluding exotic species



**Table 9b. Random Plots: Planted and Total Stem Counts**

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

Scientific Name	Common Name	Species Type	Annual Means		Annual Means		Annual Means	
			MY2 (2021)		MY1 (2020)		MY0 (2020)	
			Te	Total	Te	Total	Te	Total
<i>Asimina Triloba</i>	Paw Paw	Tree	1	1	3	3		
<i>Betula nigra</i>	River Birch	Tree	2	2	16	16	16	16
<i>Fraxinus pennsylvanica</i>	Green Ash	Tree	6	6	3	3	3	3
<i>Liriodendron tulipifera</i>	Tulip Poplar	Tree	1	1	1	1	6	6
<i>Platanus occidentalis</i>	Sycamore	Tree	23	23	11	11	10	10
<i>Populus deltoides</i>	Eastern Cottonwood	Tree	1	1			2	2
<i>Quercus pagoda</i>	Cherrybark Oak	Tree			7	7	3	3
<i>Quercus michauxii</i>	Swamp Chestnut Oak	Tree	3	3			5	5
<i>Quercus phellos</i>	Willow Oak	Tree			4	4	6	6
<i>Ulmus alata</i>	Winged Elm	Tree	1	1				
<i>Salix nigra</i>	Black Willow	Tree			1	1		
<b>Stem count</b>			38	38	46	46	51	51
<b>size (ares)</b>			2		2		2	
<b>size (ACRES)</b>			0.10		0.10		0.10	
<b>Species count</b>			8	8	8	8	8	8
<b>Stems per ACRE</b>			384	384	465	465	516	516

**Color for Density**

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

**Te** - Number of stems including exotic species

**Total** - Number of stems excluding exotic species



## **APPENDIX 4. Morphological Summary Data and Plots**



Table 10a. Baseline Stream Data Summary

Dry Creek Mitigation Site  
 DMS Project No. 97082  
 Monitoring Year 2 - 2021

Dry Creek Reach 1 & 2

Parameter	Gage	PRE-RESTORATION CONDITION				REFERENCE REACH DATA						DESIGN				AS-BUILT/BASELINE				
		Dry Creek Reach 1		Dry Creek Reach 2		Long Branch		Spencer Creek 2		UT to Varnals		Dry Creek Reach 1		Dry Creek Reach 2		Dry Creek Reach 1		Dry Creek Reach 2		
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
<b>Dimension and Substrate - Riffle</b>																				
Bankfull Width (ft)	N/A	16		13.5		14.8	18.6	10.7	11.2	9.3	10.5	17.8		17.8		14.6	18.2	15.9	18.2	
Floodprone Width (ft)		140		15		50		60	114	60	100	39	89	39	89	70	152	126	155	
Bankfull Mean Depth		0.7		0.9		1.3	2.1	1.6	1.8	1.1	1.2	1.3		1.3		1.0	1.1	1.0	1.2	
Bankfull Max Depth		2.5		1.3		1.9	2.9	2.1	2.6	1.5	1.7	1.6	2.0	1.6	2.0	1.6	1.8	1.8	2.1	
Bankfull Cross Sectional Area (ft <sup>2</sup> )		11.0		12.8		25.0	34.6	17.8	19.7	10.3	12.3	23.6		23.6		14.2	19.4	16.5	22.4	
Width/Depth Ratio		23.0		14.2		7.9	13.8	5.8	7.1	8.1	9.3	13.0		13.0		14.9	17.1	14.7	15.3	
Entrenchment Ratio		8.9		1.1		3.4		5.5	10.2	5.7	10.0	2.2	5.0	2.2	5.0	3.9	10.4	7.9	8.5	
Bank Height Ratio		1.3		2.6		1.2	1.5	1.0		1.0		1.0		1.0		1.0		1.0		
D50 (mm)		---		---		---	---	---	---	---	---	---	---	---	---	33.9	36.7	30.0	47.7	
<b>Profile</b>																				
Riffle Length (ft)	N/A																			
Riffle Slope (ft/ft)		---		---		0.0130	0.0120	0.0130		0.0240	0.0570	0.0056	0.0214	0.0087	0.0328	0.0034	0.0126	0.0056	0.0262	
Pool Length (ft)		---		---																
Pool Max Depth (ft)		---		---		2.2		3.3		2.5	2.6	4.0	5.3	4.0	5.3	3.3	5.4	3.4	4.8	
Pool Spacing (ft)		---		---		50	105	71		8	82	28	126	28	126	67	137	46	121	
Pool Volume (ft <sup>3</sup> )																				
<b>Pattern</b>																				
Channel Beltwidth (ft)	N/A	27	57	41	89	60		38	41	15	45	45	142	36	117	45	142	36	117	
Radius of Curvature (ft)		16	33	19	69	16	87	11	15	8.3	47	36	89	36	53	36	89	36	53	
Rc:Bankfull Width (ft/ft)		1	2.1	1.4	5	1.1	4.7	1.3	1.4	0.57	3.2	2.0	5.0	2.0	3.0	2.0	5.0	2.0	3.0	
Meander Length (ft)		5.7	13	98	346	66.0	191	46.0	48.0	---		53	303	134	267	53	303	134	267	
Meander Width Ratio		1.7	3.6	3.1	7.0	3.2	4.1	3.4	3.6	---		2.5	8.0	2.0	6.6	2.5	8.0	2.0	6.6	
<b>Substrate, Bed and Transport Parameters</b>																				
Ri%/Ru%/P%/G%/S%	N/A																			
SC%/Sa%/G%/C%/B%/Be%																				
d16/d35/d50/d84/d95/d100		---		1.1, 4.5, 11.3, 47.3, 126.9, --		8.1, 26.6, 41.6, 124.8, 225.5, --, --		<0.062, 3, 8.8, 42.90, --		---		---		---		SC, 0.63, 3.8, 46.3, 64.0, 128		SC, 9.38, 20.4, 78.1, 128, 362		
Reach Shear Stress (Competency) lb/ft <sup>2</sup>		---		0.47												0.26	0.29	0.42	0.50	
Max part size (mm) mobilized at bankfull																				
Stream Power (Capacity) W/m <sup>2</sup>																				
<b>Additional Reach Parameters</b>																				
Drainage Area (SM)	N/A	0.67		0.95		1.49		0.96		0.41		0.67		0.95		0.67		0.95		
Watershed Impervious Cover Estimate (%)		0.8%		0.7%		---		---		---		0.8%		0.7%		0.8%		0.7%		
Rosgen Classification		C4		F4		C4/E4		E4		C4/E4		C4		C4		C4		C4		
Bankfull Velocity (fps)		3.4		4		3.6	4	4.9	5.4	4.5	5.4	2.5		3.4		2.4	2.5	3.1	3.4	
Bankfull Discharge (cfs)		58		75		101	124		97		54		58		75		34	49	50	77
Q-NFF regression																				
Q-USGS extrapolation																				
Q-Mannings																				
Valley Length (ft)		---		---		---		---		---		---		---		---		---		
Channel Thalweg Length (ft)		999		2,014		---		---		---		1,278		1,950		1,247		1,918		
Sinuosity		1.19		1.07		1.30		2.30		1.20		1.20	1.30	1.20	1.30	1.30		1.20		
Water Surface Slope (ft/ft) <sup>2</sup>		0.006		0.005		0.004		0.0047		0.0017		0.0059		0.0059		0.0034		0.0069		
Bankfull Slope (ft/ft)		---		---		---		---		---		0.0059		0.0059		0.0044		0.0067		

(---): Data was not provided

Table 10b. Baseline Stream Data Summary

Dry Creek Mitigation Site  
 DMS Project No. 97082  
 Monitoring Year 2 - 2021

Dry Creek Reach 3 & 4

Parameter	Gage	PRE-RESTORATION CONDITION				REFERENCE REACH DATA						DESIGN				AS-BUILT/BASELINE			
		Dry Creek Reach 3		Dry Creek Reach 4		Long Branch		Spencer Creek 2		UT to Varnals		Dry Creek Reach 3		Dry Creek Reach 4		Dry Creek Reach 3		Dry Creek Reach 4	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
<b>Dimension and Substrate - Riffle</b>																			
Bankfull Width (ft)	N/A	1.9	1.4	1.9	1.4	14.8	18.6	10.7	11.2	9.3	10.5	17.8		17.8		16.9	17.6	16.7	
Floodprone Width (ft)		18	26	18	26	50		60	114	60	100	39	89	39	89	175	219	190	
Bankfull Mean Depth		1.2	1.5	1.2	1.5	1.3	2.1	1.6	1.8	1.1	1.2	1.3		1.3		1.1	1.3	1.2	
Bankfull Max Depth		1.6	2.5	1.6	2.5	1.9	2.9	2.1	2.6	1.5	1.7	1.5		1.5		2.0		2.1	
Bankfull Cross Sectional Area (ft <sup>2</sup> )		15.0	27.9	15.0	27.9	25.0	34.6	17.8	19.7	10.3	12.3	23.6		23.6		18.1	22.4	20.5	
Width/Depth Ratio		11.2	12.7	11.2	12.7	7.9	13.8	5.8	7.1	8.1	9.3	13.0		13.0		13.9	15.9	13.5	
Entrenchment Ratio		1.4		1.4		3		5.5	10.2	5.7	10.0	2.2	5.0	2.2	5.0	9.9	12.9	11.4	
Bank Height Ratio		2.1		2.1		1.2	1.5	1.0		1.0		1.0		1.0		1.0		1.0	
D50 (mm)		---		---		---		---		---		---		---		30.4	32.0	42.6	
<b>Profile</b>																			
Riffle Length (ft)	N/A	---		---		0.0130	0.0120	0.0130		0.0240	0.0570	0.0071	0.0268	0.0045	0.0050	0.0070	0.0166	0.0096	0.0236
Riffle Slope (ft/ft)		---		---		---		---		---		---		---		---		---	
Pool Length (ft)		---		---		---		---		---		---		---		---		---	
Pool Max Depth (ft)		2.2	2.4	2.2	2.4	2.2		3.3		2.5	2.6	4.0	5.3	4.0	5.3	3.4	5.2	4.6	6.0
Pool Spacing (ft)		22	127	22	127	50	105	71		8	82	28	126	28	126	75	128	61	119
Pool Volume (ft <sup>3</sup> )	---		---		---		---		---		---		---		---		---		
<b>Pattern</b>																			
Channel Beltwidth (ft)	N/A	45	107	45	107	60		38	41	15	45	36	117	36	117	36	117	36	117
Radius of Curvature (ft)		24	78	24	78	16	87	11	15	8.3	47	36	53	36	53	36	53	36	53
Rc:Bankfull Width (ft/ft)		1.87	6	1.87	6	1.1	4.7	1.3	1.4	0.6	3.2	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0
Meander Length (ft)		108	422	108	422	66.0	191	46.0	48.0	---		134	267	134	267	134	267	134	267
Meander Width Ratio		2.4	8.3	2.4	8.3	3.2	4.1	3.4	3.6	---		2.0	6.6	2.0	6.6	2.0	6.6	2.0	6.6
<b>Substrate, Bed and Transport Parameters</b>																			
Ri%/Ru%/P%/G%/S%	N/A	---		---		---		---		---		---		---		---		---	
SC%/Sa%/G%/C%/B%/Be%		---		---		---		---		---		---		---		---		---	
d16/d35/d50/d84/d95/d100		0.9, 5.0, 9.5, 27.2, 55.4, -, -		---		---		---		---		---		---		0.28, 2.24, 21.5,		0.28, 2.80, 16.8,	
Reach Shear Stress (Competency) lb/ft <sup>2</sup>		0.43		---		---		---		---		---		---		0.32		0.37	
Max part size (mm) mobilized at bankfull		---		---		---		---		---		---		---		---		---	
Stream Power (Capacity) W/m <sup>2</sup>	---		---		---		---		---		---		---		---		---		
<b>Additional Reach Parameters</b>																			
Drainage Area (SM)	N/A	1.09		1.26		1.49		0.96		0.41		1.09		1.26		1.09		1.26	
Watershed Impervious Cover Estimate (%)		0.8%		0.8%		---		---		---		0.8%		0.8%		0.8%		0.8%	
Rosgen Classification		F4		F4		C4/E4		E4		C4/E4		C4		C4		C4		C4	
Bankfull Velocity (fps)		1.9	4.1	1.9	4.1	3.6	4	4.9	5.4	4.5	5.4	3.2		3.8		2.7	3.0	3.0	
Bankfull Discharge (cfs)		83		92		101	124	97		54		83		92		48	67	62	
Q-NFF regression		---		---		---		---		---		---		---		---		---	
Q-USGS extrapolation		---		---		---		---		---		---		---		---		---	
Q-Mannings		---		---		---		---		---		---		---		---		---	
Valley Length (ft)		---		---		---		---		---		---		---		---		---	
Channel Thalweg Length (ft)		1,955		1,495		---		---		---		1,603		1,140		1,593		1,135	
Sinuosity		1.39		1.39		1.30		2.30		1.20		1.20		1.20		1.20		1.20	
Water Surface Slope (ft/ft) <sup>2</sup>		0.0040		0.0040		---		---		0.0017		0.0054		0.0075		0.0049		0.0087	
Bankfull Slope (ft/ft)		---		---		0.004		0.005		---		0.0054		0.0075		0.0049		0.0053	

(---): Data was not provided



Table 10c. Baseline Stream Data Summary  
 Dry Creek Mitigation Site  
 DMS Project No. 97082  
 Monitoring Year 2 - 2021

UT1 Reach 2 & UT1A

Parameter	Gage	PRE-RESTORATION CONDITION				REFERENCE REACH DATA						DESIGN				AS-BUILT/BASELINE			
		UT1 Reach 2		UT1A		UT to Wells		UT to Cane Creek		UT4 (UT to Cedar)		UT1 Reach 2		UT1A		UT1 Reach 2		UT1A	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
<b>Dimension and Substrate - Riffle</b>																			
Bankfull Width (ft)		14		---		6.2	8.6	9.3		7.3		8.4		7.5		9.1		10.6	
Floodprone Width (ft)		18		---		15	25	>30		20		18	42	17	38		116		78
Bankfull Mean Depth		0.4		---		0.6	1	0.9		0.6		0.6		0.7		0.4		0.8	
Bankfull Max Depth		1		---		0.6	1.4	1.5		1.1		1.0		1.0		0.8		1.4	
Bankfull Cross Sectional Area (ft <sup>2</sup> )	N/A	5.1		---		3.9	6.3	8.6		4.2		5.4		5.2		3.6		8.3	
Width/Depth Ratio		38		---		6.1	12.6	10.1		12.6		13.0		11.0		23.0		13.5	
Entrenchment Ratio		1.3		---		1.9	4.1	>3.2		2.7		2.2	5.0	2.2	5.0		12.8		7.4
Bank Height Ratio		2.7		---		1.0	1.8	1.0		1.0		1.0		1.0		1.0		1.0	
D50 (mm)		---		---		---	---	---		---		---		---		36.9		30.8	
<b>Profile</b>																			
Riffle Length (ft)																			
Riffle Slope (ft/ft)		---		---		0.0280		0.0057		0.0173		0.0148	0.0573	0.0102	0.0394	0.0107	0.0519	0.0198	0.0230
Pool Length (ft)																			
Pool Max Depth (ft)	N/A	---		1.1		---		2.2	1.4	1.5	1.9	2.6	2.1	2.8	1.4	2.9	2.0	2.7	
Pool Spacing (ft)		48	112	23		17	63	14.8	87	18	24	13	52	12	47	33	58	28	42
Pool Volume (ft <sup>3</sup> )																			
<b>Pattern</b>																			
Channel Beltwidth (ft)		23	25	---		10	35	15	50	3	6	17	45	15	41	17	45	15	41
Radius of Curvature (ft)		6	13	---		2	32	9	26	5	13	17	25	15	23	17	25	15	23
Rc:Bankfull Width (ft/ft)	N/A	0.4	1	---		0.3	4.5	0.9	2.8	0.7	1.7	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0
Meander Length (ft)		93	145	---		---	---	---	---	---	---	63	126	56	113	63	126	56	113
Meander Width Ratio		1.6	1.8	---		---	---	---	---	---	---	2.0	5.4	2.0	5.4	2.0	5.4	2.0	5.4
<b>Substrate, Bed and Transport Parameters</b>																			
Ri%/Ru%/P%/G%/S%																			
SC%/Sa%/G%/C%/B%/Be%																			
d16/d35/d50/d84/d95/d100	N/A	---		---		---		---		---		---		---		SC, 5.94, 12.7, 58.1, 90, 362		0.11, 4.0, 7.1, 60.4, 11.2, 256	
Reach Shear Stress (Competency) lb/ft <sup>2</sup>		0.69		---		---		---		---		---		---		0.40		1.08	
Max part size (mm) mobilized at bankfull																			
Stream Power (Capacity) W/m <sup>2</sup>																			
<b>Additional Reach Parameters</b>																			
Drainage Area (SM)		0.14		0.03		0.13		0.28		0.11		0.14		0.03		0.14		0.03	
Watershed Impervious Cover Estimate (%)		1.4%		2.2%		---		---		---		1.4%		2.2%		1.4%		2.2%	
Rosgen Classification		---		---		C4/1		C4/E4		C4		C4		C4		C4		C4	
Bankfull Velocity (fps)		2.7		---		3.8		2.2		5.2	6.1	3.6		4.1		2.6		4.7	
Bankfull Discharge (cfs)		20		---		15		19		22	26	20		8		9		39	
Q-NFF regression																			
Q-USGS extrapolation	N/A																		
Q-Mannings																			
Valley Length (ft)		---		---		---		---		---		---		---		---		---	
Channel Thalweg Length (ft)		945		90		---		---		---		1,118		166		1,106		165	
Sinuosity		1.1		1.1		1.4		1.2		1.1		1.2		1.2		1.2		1.2	
Water Surface Slope (ft/ft) <sup>2</sup>		0.0160		0.0100		0.0199		0.0046		0.0156		0.0180		0.0210		0.0179		0.0119	
Bankfull Slope (ft/ft)		---		---		0.0199		0.0046		0.0156		0.0180		0.0210		0.0168		0.0230	

(---): Data was not provided

Table 10d. Baseline Stream Data Summary  
 Dry Creek Mitigation Site  
 DMS Project No. 97082  
 Monitoring Year 2 - 2021

UT5 Reach 1 & UT6 Reach 1

Parameter	Gage	PRE-RESTORATION CONDITION				REFERENCE REACH DATA						DESIGN				AS-BUILT/BASELINE			
		UT5 Reach 1		UT6 Reach 1		UT to Wells		UT to Cane Creek		UT4 (UT to Cedar)		UT5 Reach 1		UT6 Reach 1		UT5 Reach 1		UT6 Reach 1	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
<b>Dimension and Substrate - Riffle</b>																			
Bankfull Width (ft)		3.4	3	4.6	6.2	8.6	9.3	7.3	6.8	5.2	8.3	5.5							
Floodprone Width (ft)		5	4	150	15	25	>30	20	15	34	11	25	20	55					
Bankfull Mean Depth		0.6	0.4	0.5	0.6	1	0.9	0.6	0.5	0.4	0.8	0.5							
Bankfull Max Depth		0.9		0.6	0.6	1.4	1.5	1.1	0.8	0.6	1.3	1.0							
Bankfull Cross Sectional Area (ft <sup>2</sup> )	N/A	1.9	1.4	1.9	3.9	6.3	8.6	4.2	3.7	2.0	7.0	2.9							
Width/Depth Ratio		5.9	6.3	11.5	6.1	12.6	10.1	12.6	13.0	13.0	9.8	10.4							
Entrenchment Ratio		1.4	1.2	32.4	1.9	4.1	>3.2	2.7	2.2	5.0	2.2	5.0	2.4	10.0					
Bank Height Ratio		3.0	1.2	6.9	1.0	1.8	1.0	1.0	1.0	1.0	1.0	1.0							
D50 (mm)		---		---		---		---		---		---		---		16.0			25.4
<b>Profile</b>																			
Riffle Length (ft)																			
Riffle Slope (ft/ft)		---		---	0.0280		0.0057	0.0173	0.0309	0.1201	0.0310	0.1205	0.0110	0.0670	0.0175	0.1073			
Pool Length (ft)																			
Pool Max Depth (ft)	N/A	---		0.4	0.8	---	2.2	1.4	1.5	1.6	2.1	1.2	1.5	2.4	3.2	C4b	2.3		
Pool Spacing (ft)		23	116	17	283	17	63	14.8	87	18	24	11	42	8	31	19	74	10	25
Pool Volume (ft <sup>3</sup> )																			
<b>Pattern</b>																			
Channel Beltwidth (ft)		22	33	13	30	10	35	15	50	3	6	14	37	10	27	14	37	10	27
Radius of Curvature (ft)		9	25	5	47	2	32	9	26	5	13	14	20	10	15	14	20	10	15
Rc:Bankfull Width (ft/ft)	N/A	2.5	7	0.4	15.7	0.3	4.5	0.9	2.8	0.7	1.7	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0
Meander Length (ft)		47	175	25	141	---	---	---	---	---	---	51	102	38	75	51	102	38	75
Meander Width Ratio		14.0	51.0	2.8	10.0	---	---	---	---	---	---	2.0	5.4	2.0	5.4	2.0	5.4	2.0	5.4
<b>Substrate, Bed and Transport Parameters</b>																			
Ri%/Ru%/P%/G%/S%																			
SC%/Sa%/G%/C%/B%/Be%																			
d16/d35/d50/d84/d95/d100	N/A	---		1.2, 6.2, 10.6, 64, 119.3, -, -	---	---	---	---	---	---	---	---	---	---	---	0.16, 4.0, 11.0, 41.3, 90.0, 180	1.0, 1.87, 8.7, 55.6, 120.7, 180		
Reach Shear Stress (Competency) lb/ft <sup>2</sup>		---		0.62	---	---	---	---	---	---	---	---	---	---	---	1.14	0.96		
Max part size (mm) mobilized at bankfull																			
Stream Power (Capacity) W/m <sup>2</sup>																			
<b>Additional Reach Parameters</b>																			
Drainage Area (SM)		0.06		0.03	0.13	0.28	0.11	0.06	0.03	0.06	0.03								
Watershed Impervious Cover Estimate (%)		0.0%		0.0%	---	---	---	0.0%	0.0%	0.0%									
Rosgen Classification		---		E4	C4/1	C4/E4	C4	C4b	C4b	C4b									
Bankfull Velocity (fps)		3.7	1.9	2.4	3.8	2.2	5.2	6.1	3.2	3.2	4.8	4.1							
Bankfull Discharge (cfs)		11.5		6.4	15.0	19.4	21.7	25.8	11.5	6.4	33.7	12.0							
Q-NFF regression																			
Q-USGS extrapolation	N/A																		
Q-Mannings																			
Valley Length (ft)		---		---	---	---	---	---	---	---	---	---							
Channel Thalweg Length (ft)		137		582	---	---	---	---	378	617	365	612							
Sinuosity		1.2		1.2	1.4	1.2	1.1	1.2	1.2	1.2	1.2	1.2							
Water Surface Slope (ft/ft) <sup>2</sup>		0.0330		0.0260	0.0199	0.0046	0.0156	0.0180	0.0270	0.0268	0.0324								
Bankfull Slope (ft/ft)		---		---	0.0199	0.0046	0.0156	0.0180	0.0270	0.0236	0.0310								

(---): Data was not provided





**Table 11b. Morphology and Hydraulic Summary (Dimensional Parameters - Cross-Section)**

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

Dimension and Substrate	UT1 Reach 2												UT1A						UT5 Reach 1					
	Cross-Section 13 (Riffle)						Cross-Section 14 (Pool)						Cross-Section 15 (Riffle)						Cross-Section 16 (Pool)					
	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)	433.07	433.02	433.05				432.64	432.64	432.68				431.67	431.68	431.66				417.85	417.63	417.77			
Low Bank Elevation (ft)	433.07	433.02	433.05				432.64	432.64	432.68				431.67	431.68	431.66				417.85	417.63	417.77			
Bankfull Width (ft)	9.1	7.3	8.0				11.4	11.6	11.9				10.6	11.1	10.9				6.8	6.4	6.7			
Floodprone Width (ft)	116	116	116				N/A	N/A	N/A				78	78	78				N/A	N/A	N/A			
Bankfull Mean Depth (ft)	0.4	0.4	0.4				0.9	0.9	1.0				0.8	0.8	0.7				1.4	1.0	1.2			
Bankfull Max Depth (ft)	0.8	0.7	0.8				1.8	1.9	2.0				1.4	1.4	1.4				2.0	1.6	1.8			
Bankfull Cross-Sectional Area (ft <sup>2</sup> )	3.6	3.1	3.3				10.7	11.0	11.5				8.3	8.5	7.8				9.4	6.6	8.2			
Bankfull Width/Depth Ratio	23.0	17.3	13.9				12.1	12.3	12.3				13.5	14.5	15.2				5.0	6.3	5.5			
Entrenchment Ratio <sup>1</sup>	12.8	15.9	14.5				N/A	N/A	N/A				7.4	7.0	7.2				N/A	N/A	N/A			
Bankfull Bank Height Ratio <sup>2</sup>	1.0	<1.0	1.0				N/A	N/A	N/A				1.0	1.0	1.0				N/A	N/A	N/A			
Dimension and Substrate	UT5 Reach 1						UT6 Reach 1																	
	Cross-Section 17 (Riffle)						Cross-Section 18 (Riffle)						Cross-Section 19 (Pool)											
	Base	MY1	MY2	MY3	MY5	MY7	Base	MY1	MY2	MY3	MY5	MY7	Base	MY1	MY2	MY3	MY5	MY7						
Bankfull Elevation (ft)	417.15	417.11	417.09				410.70	410.80	410.71				409.60	409.60	409.63									
Low Bank Elevation (ft)	417.15	417.11	417.09				410.70	410.80	410.71				409.60	409.60	409.63									
Bankfull Width (ft)	8.3	8.9	8.8				5.5	6.5	5.9				6.7	6.5	6.0									
Floodprone Width (ft)	20	20	20				55	55	55				N/A	N/A	N/A									
Bankfull Mean Depth (ft)	0.8	0.6	0.6				0.5	0.5	0.5				0.8	0.6	0.6									
Bankfull Max Depth (ft)	1.3	1.3	1.2				1.0	0.9	1.0				1.9	1.1	1.1									
Bankfull Cross-Sectional Area (ft <sup>2</sup> )	7.0	5.7	5.7				2.9	3.0	2.8				5.2	3.7	3.6									
Bankfull Width/Depth Ratio	9.8	14.1	13.5				10.4	13.8	12.6				8.6	11.3	10.0									
Entrenchment Ratio <sup>1</sup>	2.4	2.2	2.3				10.0	8.5	9.3				N/A	N/A	N/A									
Bankfull Bank Height Ratio <sup>2</sup>	1.0	<1.0	<1.0				1.0	1.0	1.0				N/A	N/A	N/A									

<sup>1</sup>Entrenchment Ratio is calculated using the method specified in the Industry Technical Workgroup Memorandum.

<sup>2</sup>Bank Height Ratio is calculated using the method specified in the Industry Technical Workgroup Memorandum.



**Table 12a. Monitoring Data - Stream Reach Data Summary**

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

**Dry Creek Reach 1**

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
<b>Dimension and Substrate - Riffle</b>												
Bankfull Width (ft)	14.6	18.2	13.4	18.0	14.6	17.7						
Floodprone Width (ft)	70	152	70	152	70	152						
Bankfull Mean Depth	1.0	1.1	0.9	1.1	0.9	1.1						
Bankfull Max Depth	1.6	1.8	1.5	1.7	1.6	1.8						
Bankfull Cross-Sectional Area (ft <sup>2</sup> )	14.2	19.4	12.3	19.0	13.5	19.1						
Width/Depth Ratio	14.9	17.1	14.6	17.1	15.8	16.4						
Entrenchment Ratio	3.9	10.4	3.9	11.4	4	10.4						
Bank Height Ratio	1.0		<1.0	1.0	1.0							
<b>Profile</b>												
Riffle Length (ft)												
Riffle Slope (ft/ft)	0.0034	0.0126										
Pool Length (ft)												
Pool Max Depth (ft)	3.3	5.4										
Pool Spacing (ft)	67	137										
Pool Volume (ft <sup>3</sup> )												
<b>Pattern</b>												
Channel Beltwidth (ft)	45	142										
Radius of Curvature (ft)	36	89										
Rc:Bankfull Width (ft/ft)	2.0	5.0										
Meander Wave Length (ft)	53	303										
Meander Width Ratio	2.5	8.0										
<b>Additional Reach Parameters</b>												
Rosgen Classification	C4											
Channel Thalweg Length (ft)	1,247											
Sinuosity (ft)	1.30											
Water Surface Slope (ft/ft)	0.0034											
Bankfull Slope (ft/ft)	0.0044											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	SC, 0.63, 3.8, 46.3, 64.0, 128		SC, 0.41, 2.8, 48.7, 84.1, 128		0.35, 1.32, 3.7, 52.8, 90, 256							
% of Reach with Eroding Banks	0%		0%		0%							

**Table 12b. Monitoring Data - Stream Reach Data Summary**

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

**Dry Creek Reach 2**

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
<b>Dimension and Substrate - Riffle</b>												
Bankfull Width (ft)	15.9	18.2	16.6	16.7	16.3	16.6						
Floodprone Width (ft)	126	155	126	155	126	155						
Bankfull Mean Depth	1.0	1.2	1.1	1.2	1.2							
Bankfull Max Depth	1.8	2.1	1.9	2.0	2.0	2.1						
Bankfull Cross-Sectional Area (ft <sup>2</sup> )	16.5	22.4	18.2	20.0	18.7	20.1						
Width/Depth Ratio	14.7	15.3	13.8	15.3	14.1							
Entrenchment Ratio	7.9	8.5	7.6	9.3	7.8	9.2						
Bank Height Ratio	1.0		<1.0	1.1	<1.0	1.1						
<b>Profile</b>												
Riffle Length (ft)												
Riffle Slope (ft/ft)	0.0056	0.0262										
Pool Length (ft)												
Pool Max Depth (ft)	3.4	4.8										
Pool Spacing (ft)	46	121										
Pool Volume (ft <sup>3</sup> )												
<b>Pattern</b>												
Channel Beltwidth (ft)	36	117										
Radius of Curvature (ft)	36	53										
Rc:Bankfull Width (ft/ft)	2.0	3.0										
Meander Wave Length (ft)	134	267										
Meander Width Ratio	2.0	6.6										
<b>Additional Reach Parameters</b>												
Rosgen Classification	C4											
Channel Thalweg Length (ft)	1,918											
Sinuosity (ft)	1.20											
Water Surface Slope (ft/ft)	0.0069											
Bankfull Slope (ft/ft)	0.0067											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	SC, 9.38, 20.4, 78.1, 128, 362		SC, 1.15, 5.6, 34.5, 59.6, 90		0.12, 1.41, 12.8, 59.2, 103.6, 256							
% of Reach with Eroding Banks	0%		0%		0%							



**Table 12c. Monitoring Data - Stream Reach Data Summary**

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

**Dry Creek Reach 3**

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
<b>Dimension and Substrate - Riffle</b>												
Bankfull Width (ft)	16.9	17.6	15.8	17.3	15.3	18.0						
Floodprone Width (ft)	175	219	175	219	175	219						
Bankfull Mean Depth	1.1	1.3	1.0	1.3	1.0	1.2						
Bankfull Max Depth	2.0		1.8	2.0	1.7	2.1						
Bankfull Cross-Sectional Area (ft <sup>2</sup> )	18.1	22.4	16.0	22.0	15.7	21.8						
Width/Depth Ratio	13.9	15.9	13.6	15.6	14.8	16.5						
Entrenchment Ratio	99.9	12.9	10.1	13.9	9.7	13.6						
Bank Height Ratio	1.0		<1.0	1.0	<1.0	1.0						
<b>Profile</b>												
Riffle Length (ft)												
Riffle Slope (ft/ft)	0.0070	0.0166										
Pool Length (ft)												
Pool Max Depth (ft)	3.4	5.2										
Pool Spacing (ft)	75	128										
Pool Volume (ft <sup>3</sup> )												
<b>Pattern</b>												
Channel Beltwidth (ft)	36	117										
Radius of Curvature (ft)	36	53										
Rc:Bankfull Width (ft/ft)	2.0	3.0										
Meander Wave Length (ft)	134	267										
Meander Width Ratio	2.0	6.6										
<b>Additional Reach Parameters</b>												
Rosgen Classification	C4											
Channel Thalweg Length (ft)	1,593											
Sinuosity (ft)	1.2											
Water Surface Slope (ft/ft)	0.0049											
Bankfull Slope (ft/ft)	0.0049											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	0.28, 2.24, 21.5, 68.5, 256, 512		0.55, 5.01, 13.5, 67.2, 128, 362		0.34, 1.22, 16.0, 52.1, 98.3, 256							
% of Reach with Eroding Banks	0%		0%		0%							

**Table 12d. Monitoring Data - Stream Reach Data Summary**

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

**Dry Creek Reach 4**

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
<b>Dimension and Substrate - Riffle</b>												
Bankfull Width (ft)	16.7		15.7		15.3							
Floodprone Width (ft)	190		190		190							
Bankfull Mean Depth	1.2		1.2		1.3							
Bankfull Max Depth	2.1		2.0		2.2							
Bankfull Cross-Sectional Area (ft <sup>2</sup> )	20.5		19.4		19.3							
Width/Depth Ratio	13.5		12.8		12.1							
Entrenchment Ratio	11.4		12.1		12.5							
Bank Height Ratio	1.0		1.0		1.0							
<b>Profile</b>												
Riffle Length (ft)												
Riffle Slope (ft/ft)	0.0096	0.0236										
Pool Length (ft)												
Pool Max Depth (ft)	4.6	6.0										
Pool Spacing (ft)	61	119										
Pool Volume (ft <sup>3</sup> )												
<b>Pattern</b>												
Channel Beltwidth (ft)	36	117										
Radius of Curvature (ft)	36	53										
Rc:Bankfull Width (ft/ft)	2.0	3.0										
Meander Wave Length (ft)	134	267										
Meander Width Ratio	2.0	6.6										
<b>Additional Reach Parameters</b>												
Rosgen Classification	C4											
Channel Thalweg Length (ft)	1,135											
Sinuosity (ft)	1.20											
Water Surface Slope (ft/ft)	0.0087											
Bankfull Slope (ft/ft)	0.0053											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	0.28, 2.80, 16.8, 78.5, 168.1, 512		SC, 0.79, 17.1, 99.1, 151.8, 362		0.72, 1.54, 8.0, 66.8, 113.8, 256							
% of Reach with Eroding Banks	0%		1%		0%							



**Table 12e. Monitoring Data - Stream Reach Data Summary**

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

**UT1 Reach 2**

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
<b>Dimension and Substrate - Riffle</b>												
Bankfull Width (ft)	9.1		7.3		8.0							
Floodprone Width (ft)	116		116		116							
Bankfull Mean Depth	0.4		0.4		0.4							
Bankfull Max Depth	0.8		0.7		0.8							
Bankfull Cross-Sectional Area (ft <sup>2</sup> )	3.6		3.1		3.3							
Width/Depth Ratio	23.0		17.3		13.9							
Entrenchment Ratio	12.8		15.9		14.5							
Bank Height Ratio	1.0		<1.0		1.0							
<b>Profile</b>												
Riffle Length (ft)												
Riffle Slope (ft/ft)	0.0107	0.0519										
Pool Length (ft)												
Pool Max Depth (ft)	1.4	2.9										
Pool Spacing (ft)	33	58										
Pool Volume (ft <sup>3</sup> )												
<b>Pattern</b>												
Channel Beltwidth (ft)	17	45										
Radius of Curvature (ft)	17	25										
Rc:Bankfull Width (ft/ft)	2.0	3.0										
Meander Wave Length (ft)	63	126										
Meander Width Ratio	2.0	5.4										
<b>Additional Reach Parameters</b>												
Rosgen Classification	C4											
Channel Thalweg Length (ft)	1,106											
Sinuosity (ft)	1.2											
Water Surface Slope (ft/ft)	0.0179											
Bankfull Slope (ft/ft)	0.0168											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	SC, 5.94, 12.7, 58.1, 90, 362		SC, 2.0, 16.0, 52.3, 90, 180		0.13, 1.41, 19.9, 81, 118.4, 180							
% of Reach with Eroding Banks	0%		0%		0%							

**Table 12f. Monitoring Data - Stream Reach Data Summary**

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

**UT1A**

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
<b>Dimension and Substrate - Riffle</b>												
Bankfull Width (ft)	10.6		11.1		10.9							
Floodprone Width (ft)	78		78		78							
Bankfull Mean Depth	0.8		0.8		0.7							
Bankfull Max Depth	1.4		1.4		1.4							
Bankfull Cross-Sectional Area (ft <sup>2</sup> )	8.3		8.5		7.8							
Width/Depth Ratio	13.5		14.5		15.2							
Entrenchment Ratio	7.4		7.0		7.2							
Bank Height Ratio	1.0		1.0		1.0							
<b>Profile</b>												
Riffle Length (ft)												
Riffle Slope (ft/ft)	0.0198	0.0230										
Pool Length (ft)												
Pool Max Depth (ft)	2.0	2.7										
Pool Spacing (ft)	28	42										
Pool Volume (ft <sup>3</sup> )												
<b>Pattern</b>												
Channel Beltwidth (ft)	15	41										
Radius of Curvature (ft)	15	23										
Rc:Bankfull Width (ft/ft)	2.0	3.0										
Meander Wave Length (ft)	56	113										
Meander Width Ratio	2.0	5.4										
<b>Additional Reach Parameters</b>												
Rosgen Classification	C4											
Channel Thalweg Length (ft)	165											
Sinuosity (ft)	1.2											
Water Surface Slope (ft/ft)	0.0119											
Bankfull Slope (ft/ft)	0.0230											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	0.11, 4.0, 7.1, 60.4, 11.2, 256		SC, 1.15, 5.6, 34.5, 59.6, 90		0.07, 1.00, 20.7, 60.1, 80.3, 128							
% of Reach with Eroding Banks	0%		0%		0%							



**Table 12g. Monitoring Data - Stream Reach Data Summary**

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

**UT5 Reach 1 - 2**

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
<b>Dimension and Substrate - Riffle</b>												
Bankfull Width (ft)	8.3		8.9		8.8							
Floodprone Width (ft)	20		20		20							
Bankfull Mean Depth	0.8		0.6		0.6							
Bankfull Max Depth	1.3		1.3		1.2							
Bankfull Cross-Sectional Area (ft <sup>2</sup> )	7.0		5.7		5.7							
Width/Depth Ratio	9.8		14.1		13.5							
Entrenchment Ratio	2.4		2.2		2.3							
Bank Height Ratio	1.0		<1.0		<1.0							
<b>Profile</b>												
Riffle Length (ft)												
Riffle Slope (ft/ft)	0.0110	0.0670										
Pool Length (ft)												
Pool Max Depth (ft)	2.4	3.2										
Pool Spacing (ft)	19	74										
Pool Volume (ft <sup>3</sup> )												
<b>Pattern</b>												
Channel Beltwidth (ft)	14	37										
Radius of Curvature (ft)	14	20										
Rc:Bankfull Width (ft/ft)	2.0	3.0										
Meander Wave Length (ft)	51	102										
Meander Width Ratio	2.0	5.4										
<b>Additional Reach Parameters</b>												
Rosgen Classification	C4b											
Channel Thalweg Length (ft)	365											
Sinuosity (ft)	1.2											
Water Surface Slope (ft/ft)	0.0268											
Bankfull Slope (ft/ft)	0.0236											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	0.16, 4.0, 11.0, 41.3, 90.0, 180	0.25, 6.31, 21.5, 74.1, 128, 256	1.03, 1.83, 7.0, 59.6, 128, 180									
% of Reach with Eroding Banks	0%		0%		0%							

**Table 12h. Monitoring Data - Stream Reach Data Summary**

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

**UT6 Reach 1 & 3**

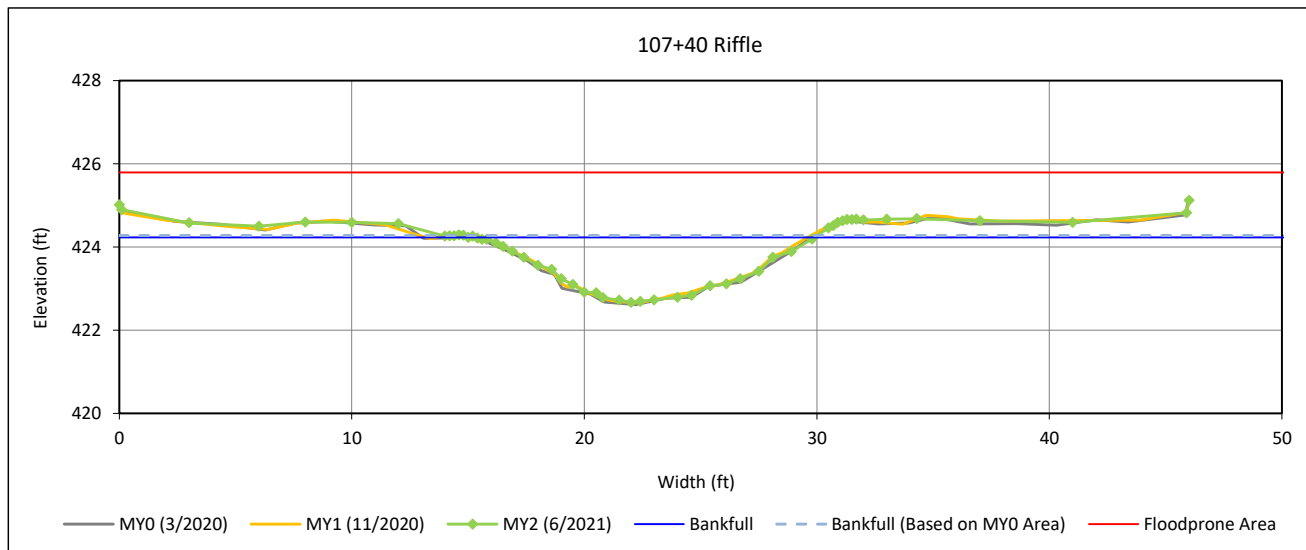
Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
<b>Dimension and Substrate - Riffle</b>												
Bankfull Width (ft)	5.5		6.5		5.9							
Floodprone Width (ft)	55		55		55							
Bankfull Mean Depth	0.5		0.5		0.5							
Bankfull Max Depth	1.0		0.9		1.0							
Bankfull Cross-Sectional Area (ft <sup>2</sup> )	2.9		3.0		2.8							
Width/Depth Ratio	10.4		13.8		12.6							
Entrenchment Ratio	10.0		8.5		9.3							
Bank Height Ratio	1.0		1.0		1.0							
<b>Profile</b>												
Riffle Length (ft)												
Riffle Slope (ft/ft)	0.0175	0.1073										
Pool Length (ft)												
Pool Max Depth (ft)	C4b	2.3										
Pool Spacing (ft)	10	25										
Pool Volume (ft <sup>3</sup> )												
<b>Pattern</b>												
Channel Beltwidth (ft)	10	27										
Radius of Curvature (ft)	10	15										
Rc:Bankfull Width (ft/ft)	2.0	3.0										
Meander Wave Length (ft)	38	75										
Meander Width Ratio	2.0	5.4										
<b>Additional Reach Parameters</b>												
Rosgen Classification	C4b											
Channel Thalweg Length (ft)	612											
Sinuosity (ft)	1.2											
Water Surface Slope (ft/ft)	0.0324											
Bankfull Slope (ft/ft)	0.0310											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	1.0, 1.87, 8.7, 55.6, 120.7, 180		0.42, 5.24, 11.0, 54.7, 86.2, 180		0.44, 7.45, 18.2, 81.3, 113.8, 180							
% of Reach with Eroding Banks	0%		0%		0%							



### Cross-Section Plots

Dry Creek Mitigation Site  
DMS Project No. 97082  
Monitoring Year 2 - 2021

#### Cross-Section 1 - Dry Creek Reach 1



#### Bankfull Dimensions

13.5	x-section area (ft.sq.)
14.6	width (ft)
0.9	mean depth (ft)
1.6	max depth (ft)
15.1	wetted perimeter (ft)
0.9	hydraulic radius (ft)
15.8	width-depth ratio
152.0	W flood prone area (ft)
10.4	entrenchment ratio
1.0	low bank height ratio

Survey Date: 6/2021

Field Crew: Wildlands Engineering



View Downstream

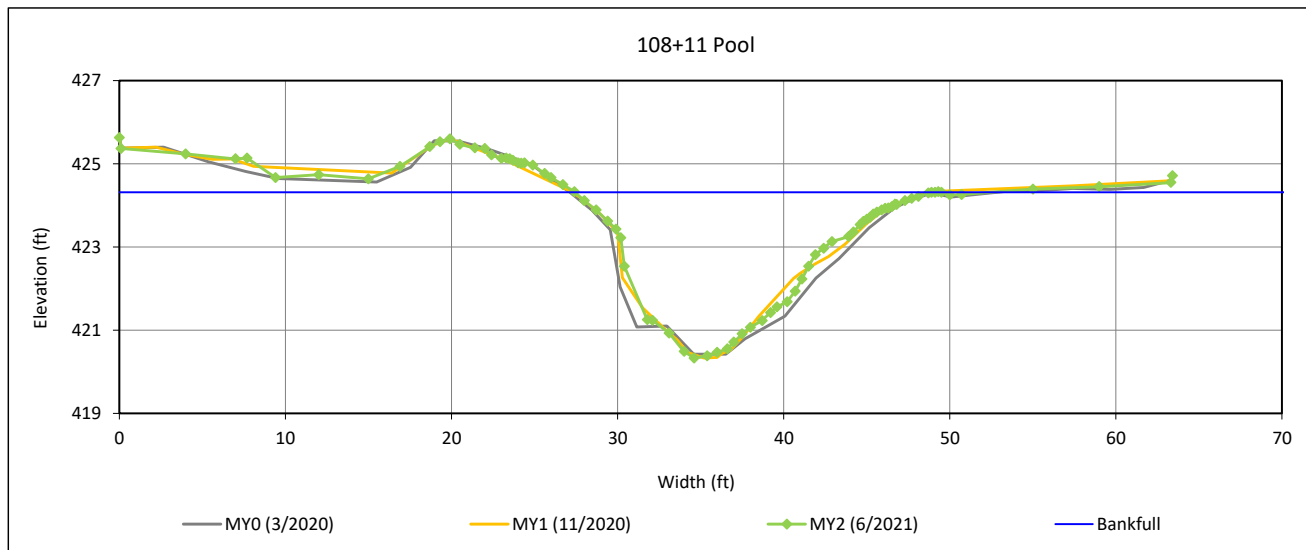
### Cross-Section Plots

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

#### Cross-Section 2 - Dry Creek Reach 1



#### Bankfull Dimensions

41.9	x-section area (ft.sq.)
21.4	width (ft)
2.0	mean depth (ft)
4.0	max depth (ft)
23.6	wetted perimeter (ft)
1.8	hydraulic radius (ft)
11.0	width-depth ratio

Survey Date: 6/2021

Field Crew: Wildlands Engineering



View Downstream



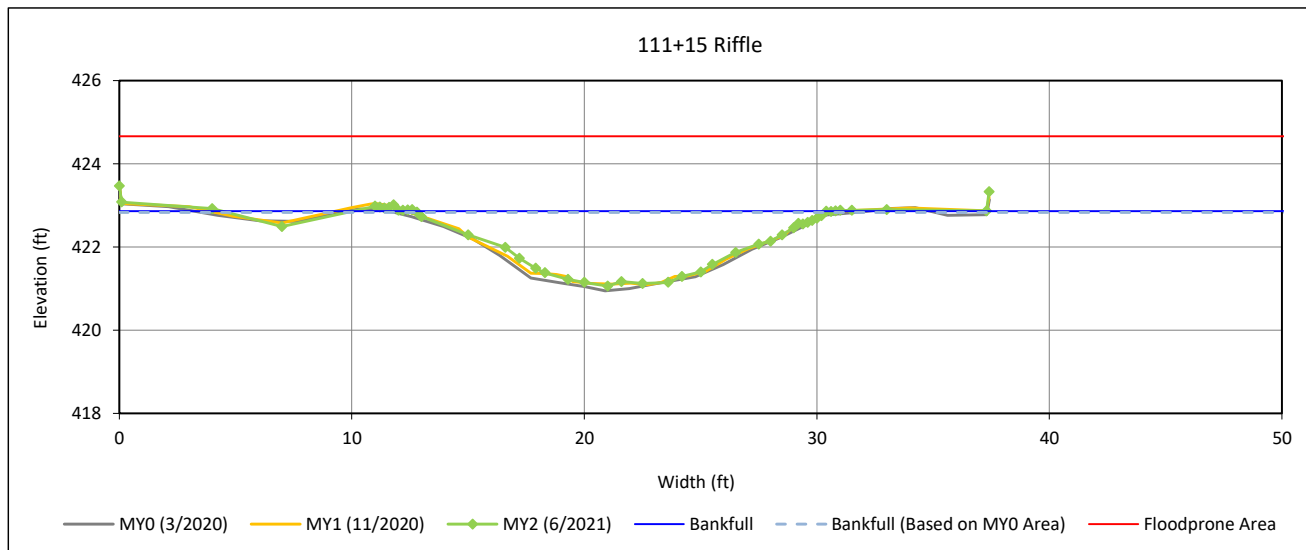
### Cross-Section Plots

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

#### Cross-Section 3 - Dry Creek Reach 1



#### Bankfull Dimensions

19.1	x-section area (ft.sq.)
17.7	width (ft)
1.1	mean depth (ft)
1.8	max depth (ft)
18.2	wetted perimeter (ft)
1.0	hydraulic radius (ft)
16.4	width-depth ratio
70.0	W flood prone area (ft)
4.0	entrenchment ratio
1.0	low bank height ratio

Survey Date: 6/2021

Field Crew: Wildlands Engineering



View Downstream

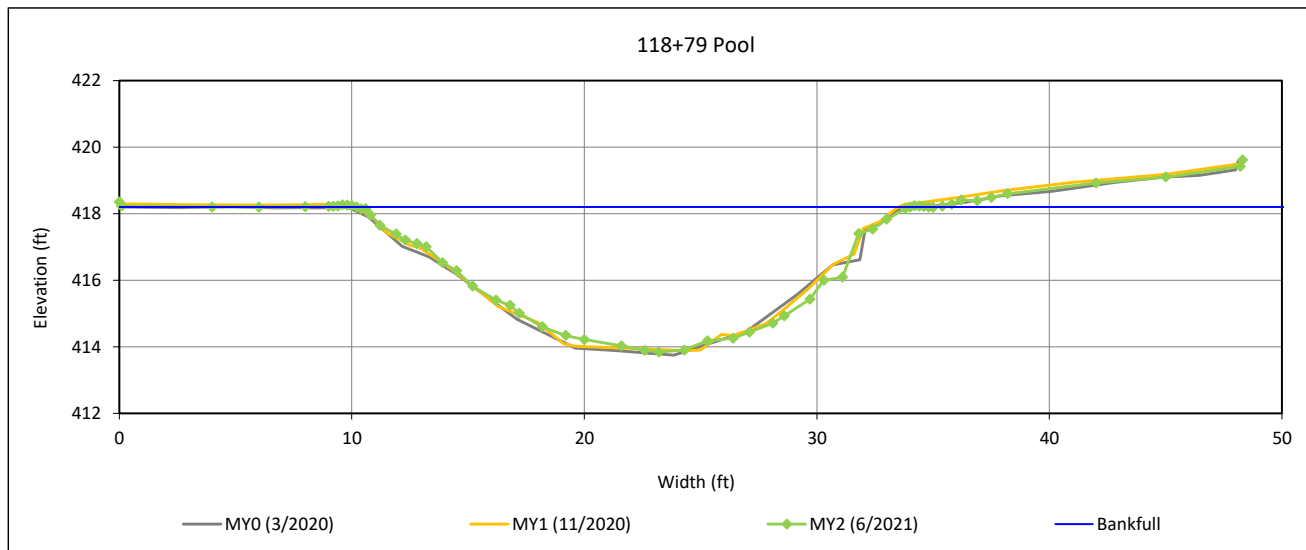
### Cross-Section Plots

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

#### Cross-Section 4 - Dry Creek Reach 2



#### Bankfull Dimensions

64.5	x-section area (ft.sq.)
23.8	width (ft)
2.7	mean depth (ft)
4.4	max depth (ft)
26.2	wetted perimeter (ft)
2.5	hydraulic radius (ft)
8.8	width-depth ratio

Survey Date: 6/2021

Field Crew: Wildlands Engineering



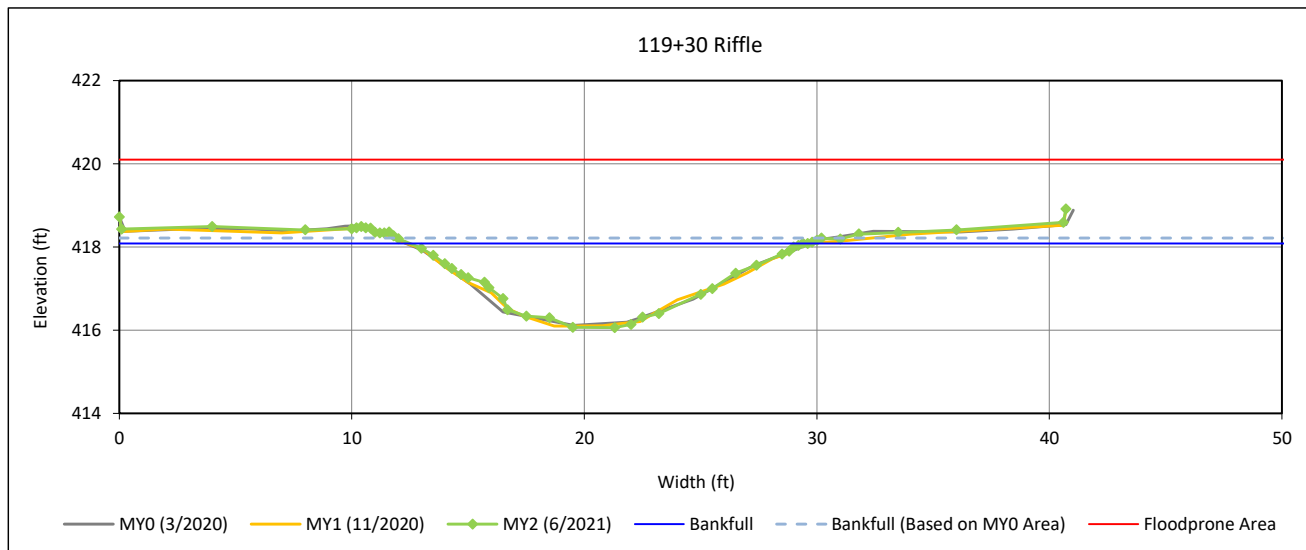
View Downstream



### Cross-Section Plots

Dry Creek Mitigation Site  
DMS Project No. 97082  
Monitoring Year 2 - 2021

#### Cross-Section 5 - Dry Creek Reach 2



#### Bankfull Dimensions

20.1	x-section area (ft.sq.)
16.8	width (ft)
1.2	mean depth (ft)
2.0	max depth (ft)
17.5	wetted perimeter (ft)
1.1	hydraulic radius (ft)
14.1	width-depth ratio
155.0	W flood prone area (ft)
9.2	entrenchment ratio
< 1.0	low bank height ratio

Survey Date: 6/2021  
Field Crew: Wildlands Engineering

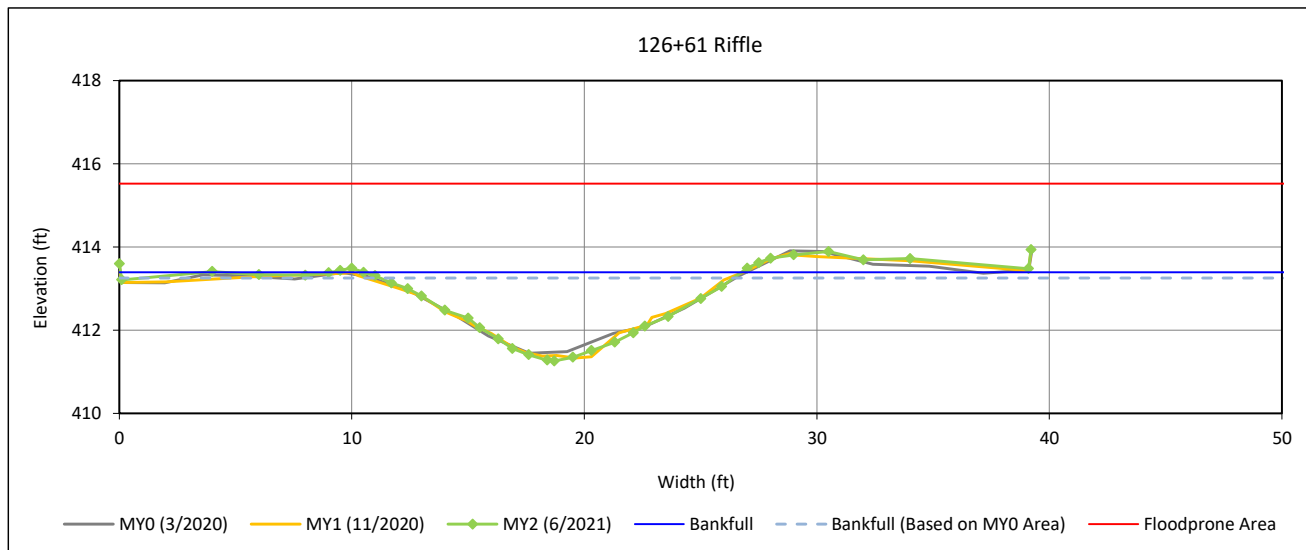


View Downstream

**Cross-Section Plots**

Dry Creek Mitigation Site  
 DMS Project No. 97082  
**Monitoring Year 2 - 2021**

**Cross-Section 6 - Dry Creek Reach 2**



**Bankfull Dimensions**

18.7	x-section area (ft.sq.)
16.3	width (ft)
1.2	mean depth (ft)
2.1	max depth (ft)
16.9	wetted perimeter (ft)
1.1	hydraulic radius (ft)
14.1	width-depth ratio
126.0	W flood prone area (ft)
7.8	entrenchment ratio
1.1	low bank height ratio

Survey Date: 6/2021  
 Field Crew: Wildlands Engineering



View Downstream



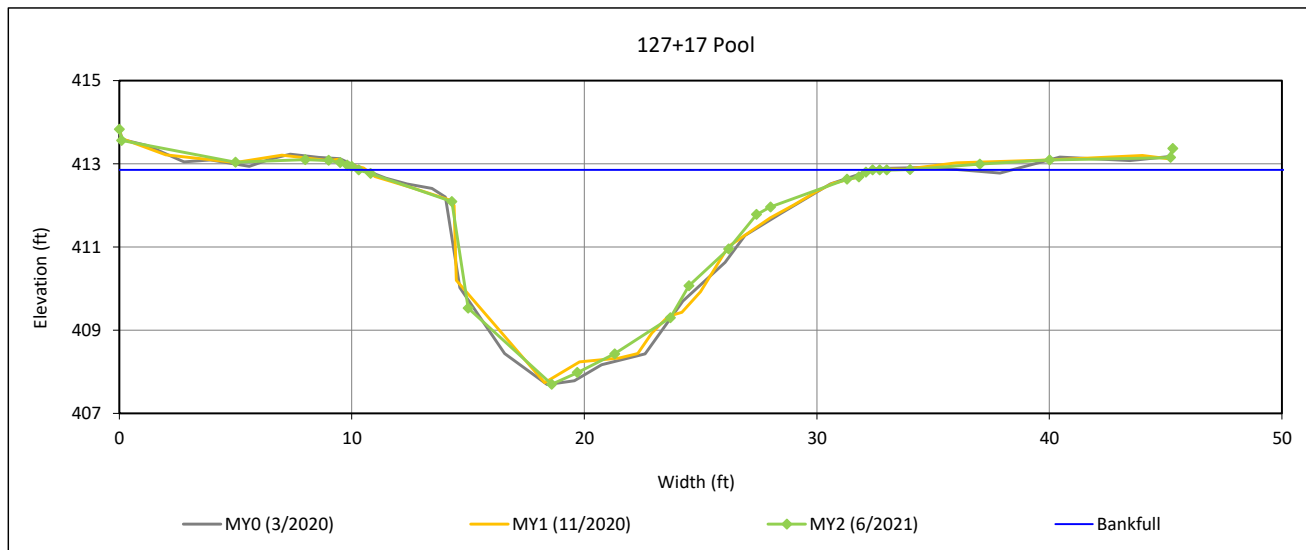
### Cross-Section Plots

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

#### Cross-Section 7 - Dry Creek Reach 2



#### Bankfull Dimensions

51.5	x-section area (ft.sq.)
22.1	width (ft)
2.3	mean depth (ft)
5.2	max depth (ft)
25.7	wetted perimeter (ft)
2.0	hydraulic radius (ft)
9.5	width-depth ratio

Survey Date: 6/2021

Field Crew: Wildlands Engineering



View Downstream

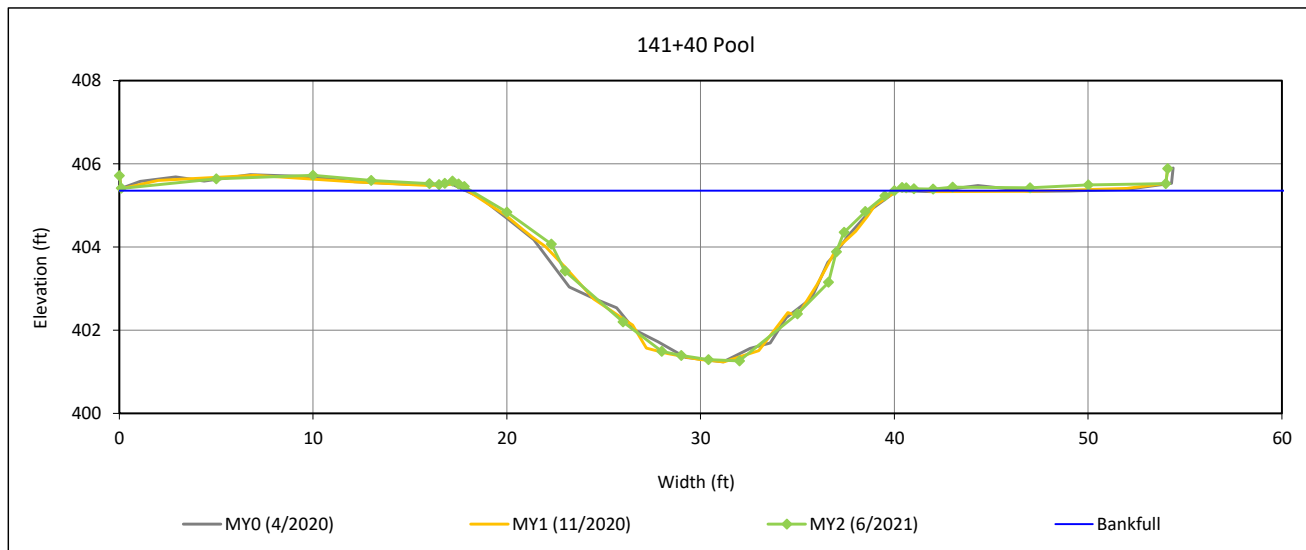
### Cross-Section Plots

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

#### Cross-Section 8 - Dry Creek Reach 3



#### Bankfull Dimensions

51.4	x-section area (ft.sq.)
21.8	width (ft)
2.4	mean depth (ft)
4.1	max depth (ft)
23.9	wetted perimeter (ft)
2.2	hydraulic radius (ft)
9.3	width-depth ratio

Survey Date: 6/2021

Field Crew: Wildlands Engineering



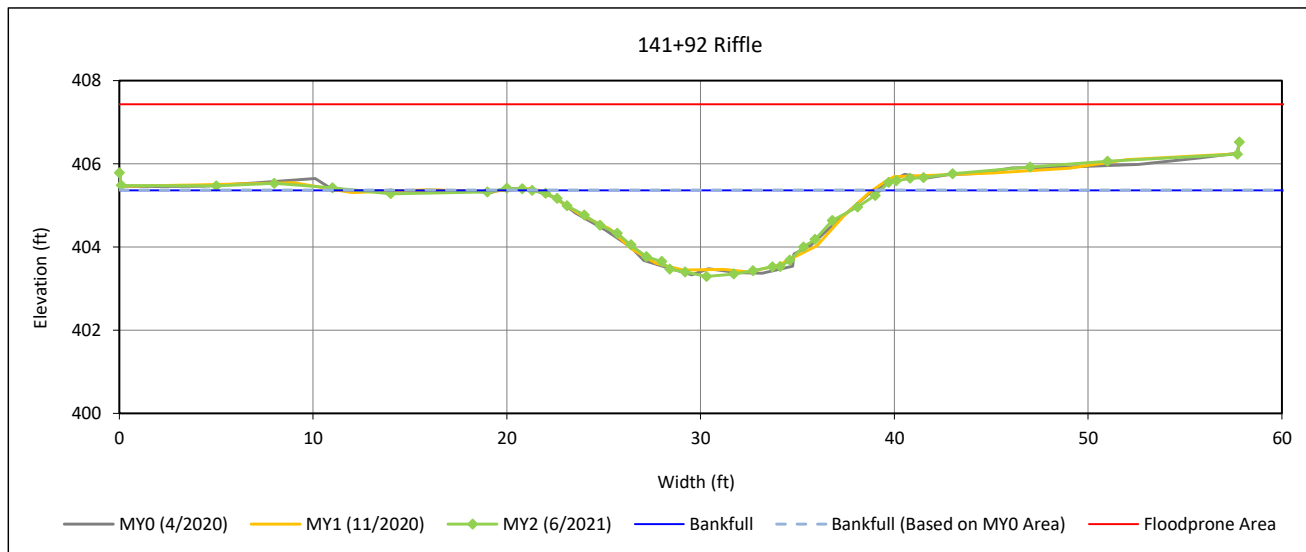
View Downstream



### Cross-Section Plots

Dry Creek Mitigation Site  
DMS Project No. 97082  
Monitoring Year 2 - 2021

#### Cross-Section 9 - Dry Creek Reach 3



#### Bankfull Dimensions

21.8	x-section area (ft.sq.)
18.0	width (ft)
1.2	mean depth (ft)
2.1	max depth (ft)
18.6	wetted perimeter (ft)
1.2	hydraulic radius (ft)
14.8	width-depth ratio
175.0	W flood prone area (ft)
9.7	entrenchment ratio
1.0	low bank height ratio

Survey Date: 6/2021  
Field Crew: Wildlands Engineering

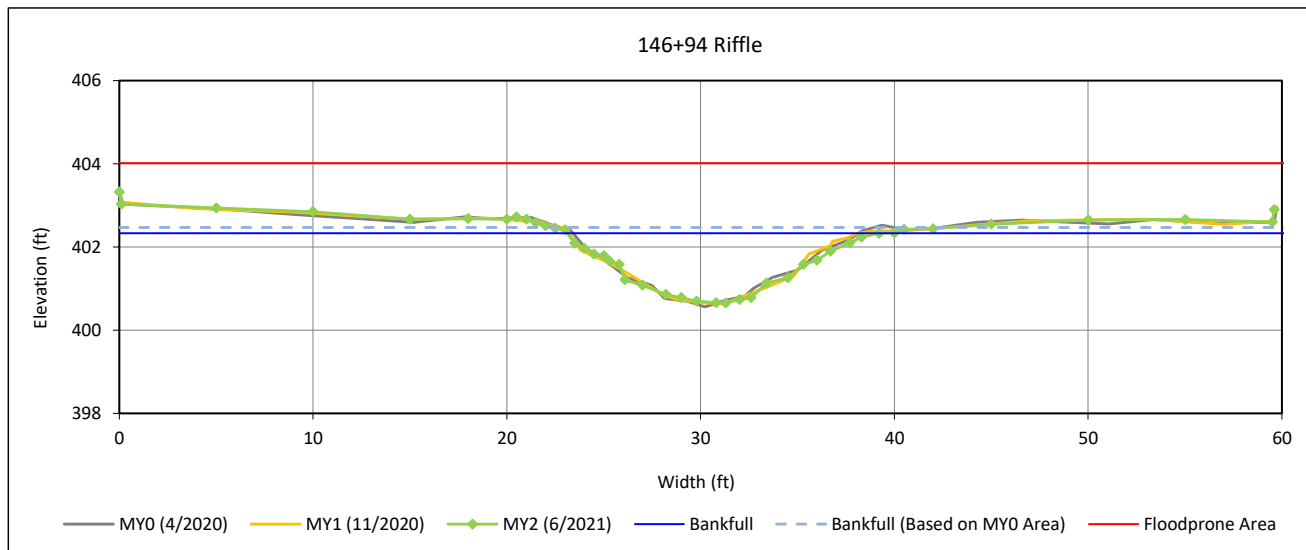


View Downstream

### Cross-Section Plots

Dry Creek Mitigation Site  
DMS Project No. 97082  
Monitoring Year 2 - 2021

#### Cross-Section 10 - Dry Creek Reach 3



#### Bankfull Dimensions

15.7	x-section area (ft.sq.)
16.1	width (ft)
1.0	mean depth (ft)
1.7	max depth (ft)
16.7	wetted perimeter (ft)
0.9	hydraulic radius (ft)
16.5	width-depth ratio
219.0	W flood prone area (ft)
13.6	entrenchment ratio
< 1.0	low bank height ratio

Survey Date: 6/2021

Field Crew: Wildlands Engineering



View Downstream



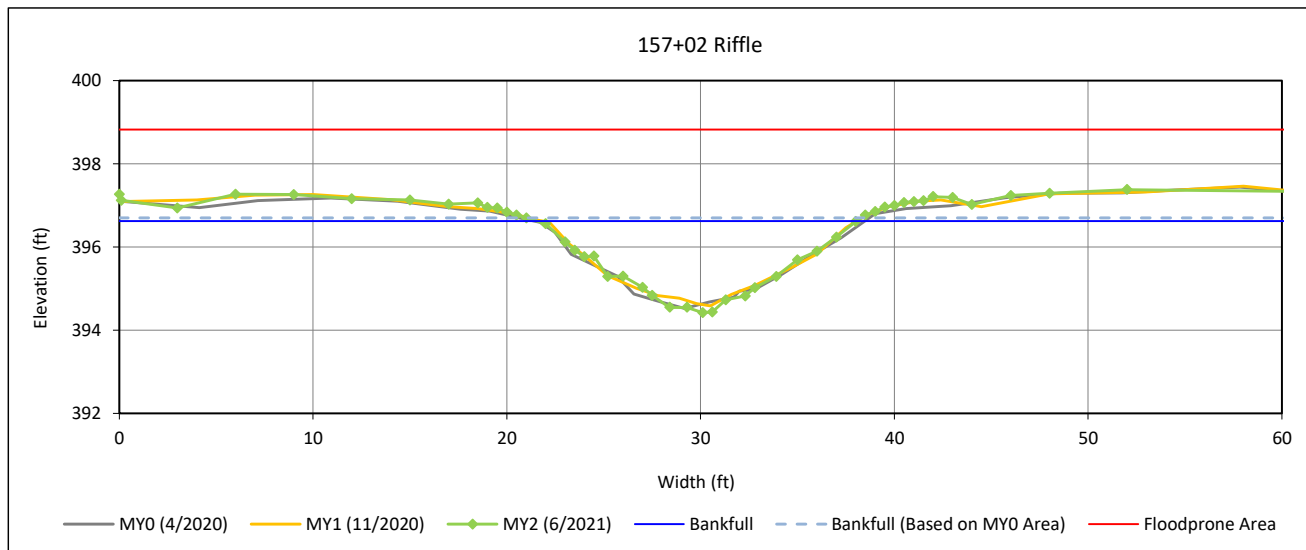
### Cross-Section Plots

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

#### Cross-Section 11 - Dry Creek Reach 4



#### Bankfull Dimensions

19.3	x-section area (ft.sq.)
15.3	width (ft)
1.3	mean depth (ft)
2.2	max depth (ft)
15.9	wetted perimeter (ft)
1.2	hydraulic radius (ft)
12.1	width-depth ratio
190.0	W flood prone area (ft)
12.5	entrenchment ratio
1.0	low bank height ratio

Survey Date: 6/2021

Field Crew: Wildlands Engineering



View Downstream

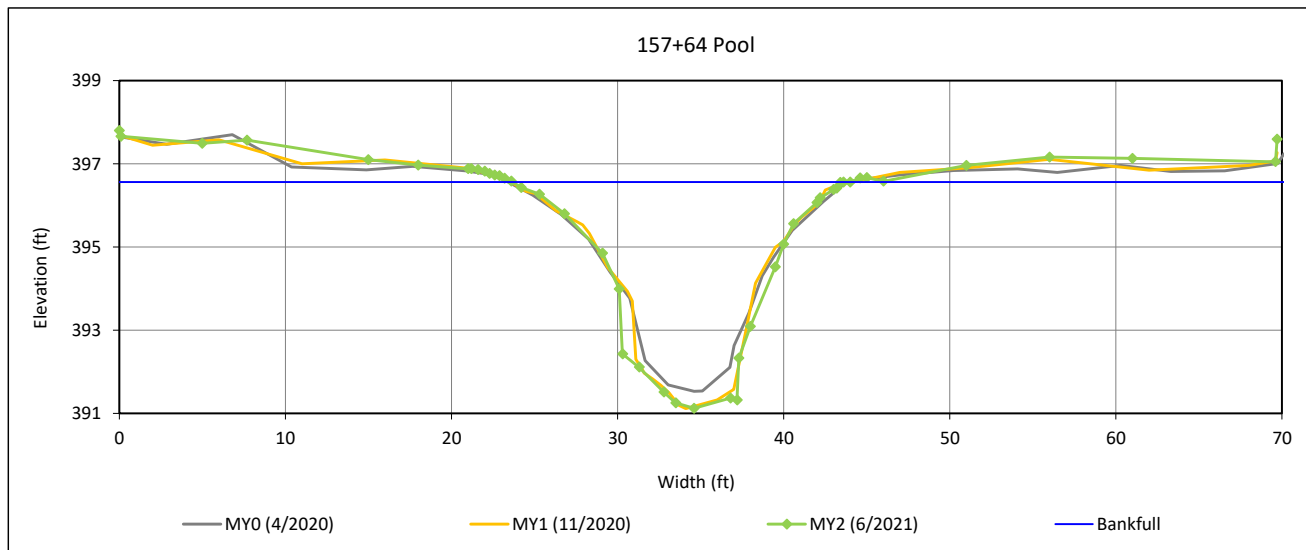
### Cross-Section Plots

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

#### Cross-Section 12 - Dry Creek Reach 4



#### Bankfull Dimensions

51.8	x-section area (ft.sq.)
19.9	width (ft)
2.6	mean depth (ft)
5.4	max depth (ft)
24.6	wetted perimeter (ft)
2.1	hydraulic radius (ft)
7.7	width-depth ratio

Survey Date: 6/2021

Field Crew: Wildlands Engineering



View Downstream



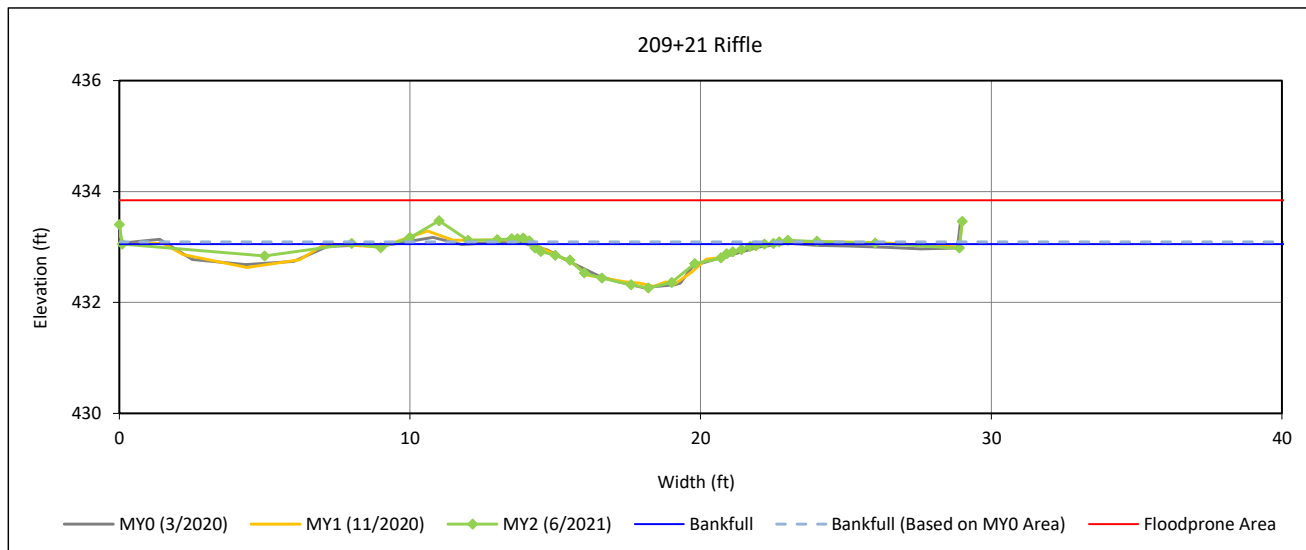
### Cross-Section Plots

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

#### Cross-Section 13 - UT1 Reach 2



#### Bankfull Dimensions

3.3	x-section area (ft.sq.)
8.0	width (ft)
0.4	mean depth (ft)
0.8	max depth (ft)
8.2	wetted perimeter (ft)
0.4	hydraulic radius (ft)
19.3	width-depth ratio
116.0	W flood prone area (ft)
14.5	entrenchment ratio
1.0	low bank height ratio

Survey Date: 6/2021

Field Crew: Wildlands Engineering



View Downstream

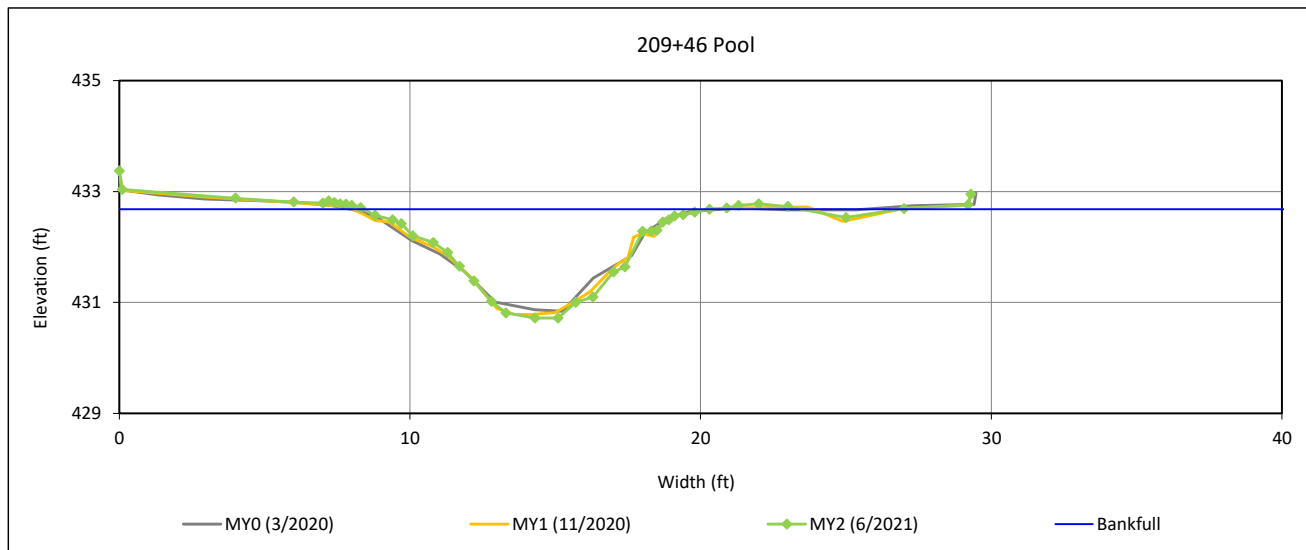
### Cross-Section Plots

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

#### Cross-Section 14 - UT1 Reach 2



#### Bankfull Dimensions

11.5	x-section area (ft.sq.)
11.9	width (ft)
1.0	mean depth (ft)
2.0	max depth (ft)
12.9	wetted perimeter (ft)
0.9	hydraulic radius (ft)
12.3	width-depth ratio

Survey Date: 6/2021

Field Crew: Wildlands Engineering



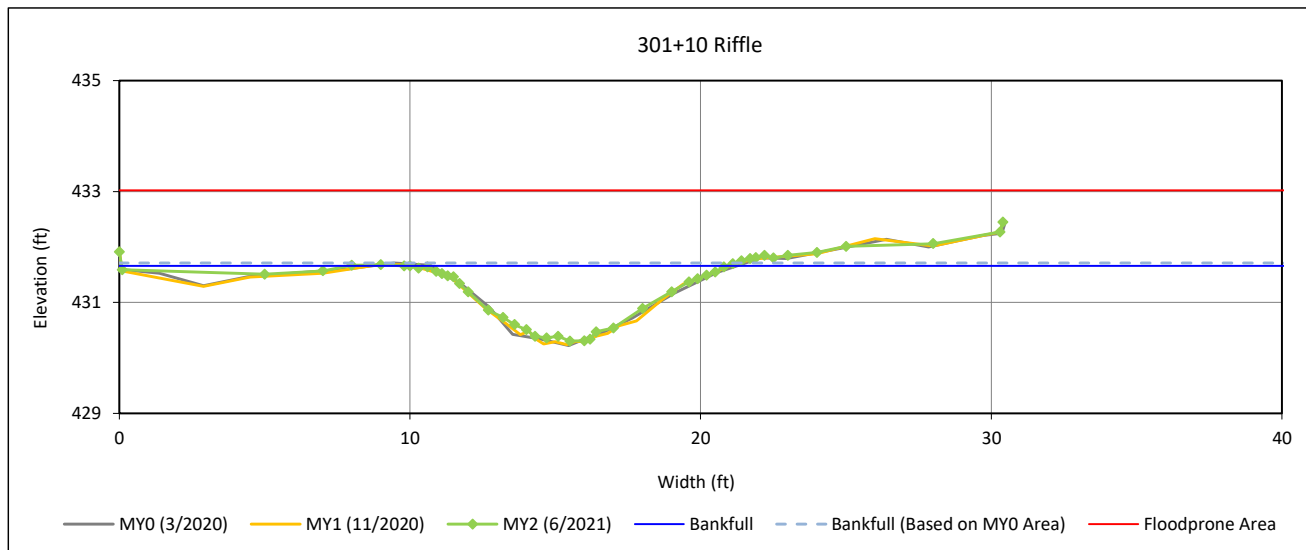
View Downstream



### Cross-Section Plots

Dry Creek Mitigation Site  
DMS Project No. 97082  
Monitoring Year 2 - 2021

#### Cross-Section 15 - UT1A



#### Bankfull Dimensions

7.8	x-section area (ft.sq.)
10.9	width (ft)
0.7	mean depth (ft)
1.4	max depth (ft)
11.4	wetted perimeter (ft)
0.7	hydraulic radius (ft)
15.2	width-depth ratio
78.0	W flood prone area (ft)
7.2	entrenchment ratio
1.0	low bank height ratio

Survey Date: 6/2021

Field Crew: Wildlands Engineering



View Downstream

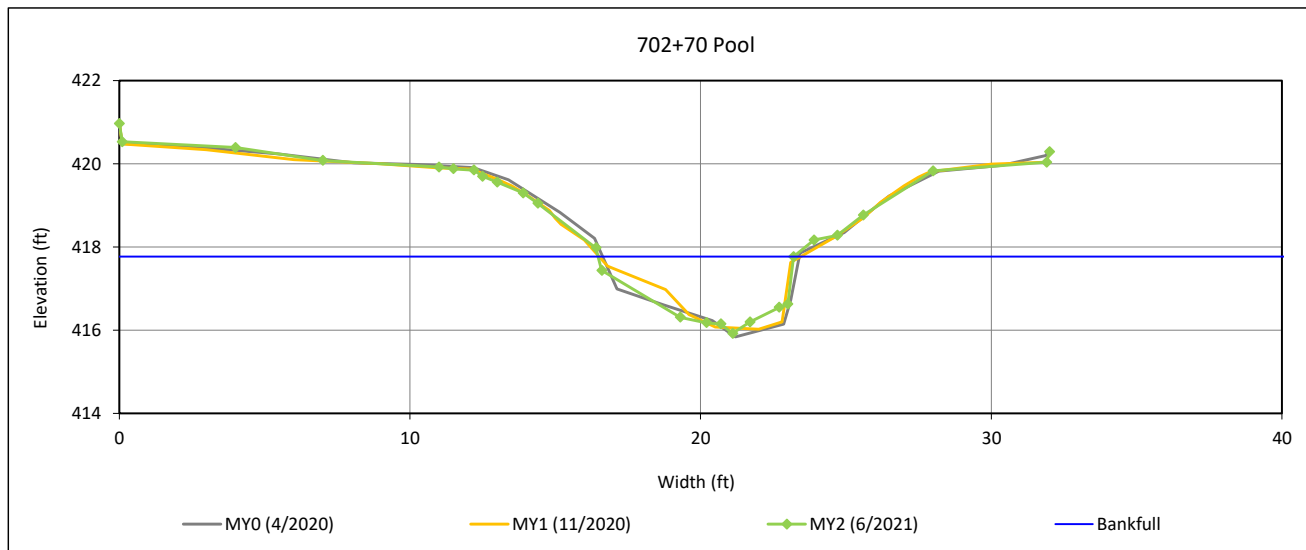
### Cross-Section Plots

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

#### Cross-Section 16 - UT5 Reach 1



#### Bankfull Dimensions

8.2	x-section area (ft.sq.)
6.7	width (ft)
1.2	mean depth (ft)
1.8	max depth (ft)
8.3	wetted perimeter (ft)
1.0	hydraulic radius (ft)
5.5	width-depth ratio

Survey Date: 6/2021

Field Crew: Wildlands Engineering



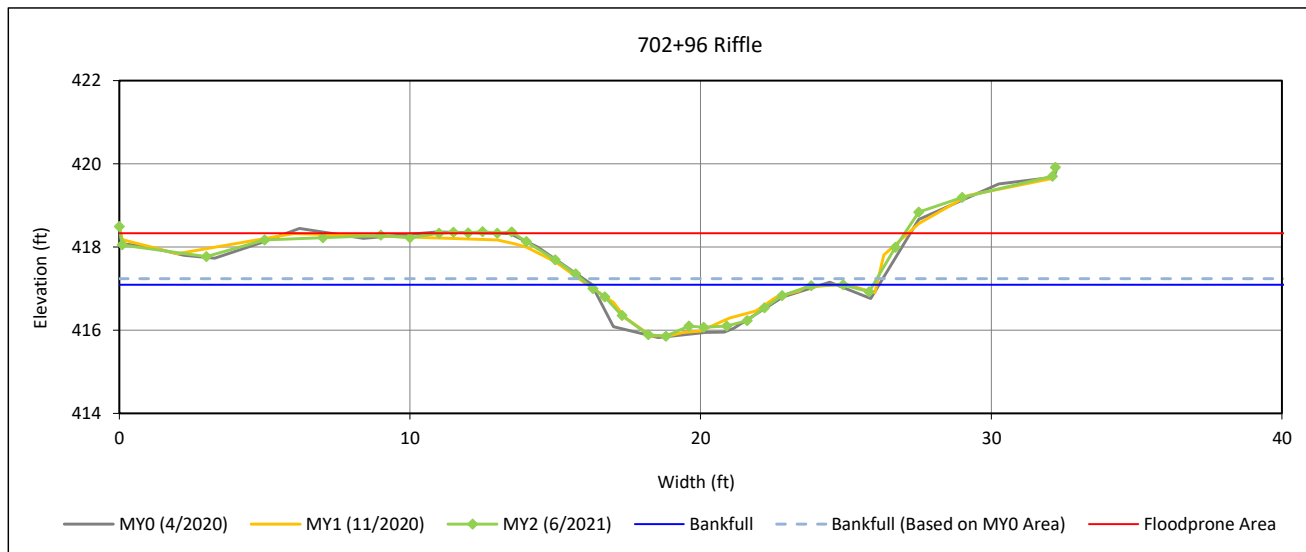
View Downstream



**Cross-Section Plots**

Dry Creek Mitigation Site  
 DMS Project No. 97082  
**Monitoring Year 2 - 2021**

**Cross-Section 17 - UT5 Reach 1**



**Bankfull Dimensions**

5.7	x-section area (ft.sq.)
8.8	width (ft)
0.6	mean depth (ft)
1.2	max depth (ft)
9.3	wetted perimeter (ft)
0.6	hydraulic radius (ft)
13.5	width-depth ratio
20.0	W flood prone area (ft)
2.3	entrenchment ratio
< 1.0	low bank height ratio

Survey Date: 6/2021  
 Field Crew: Wildlands Engineering

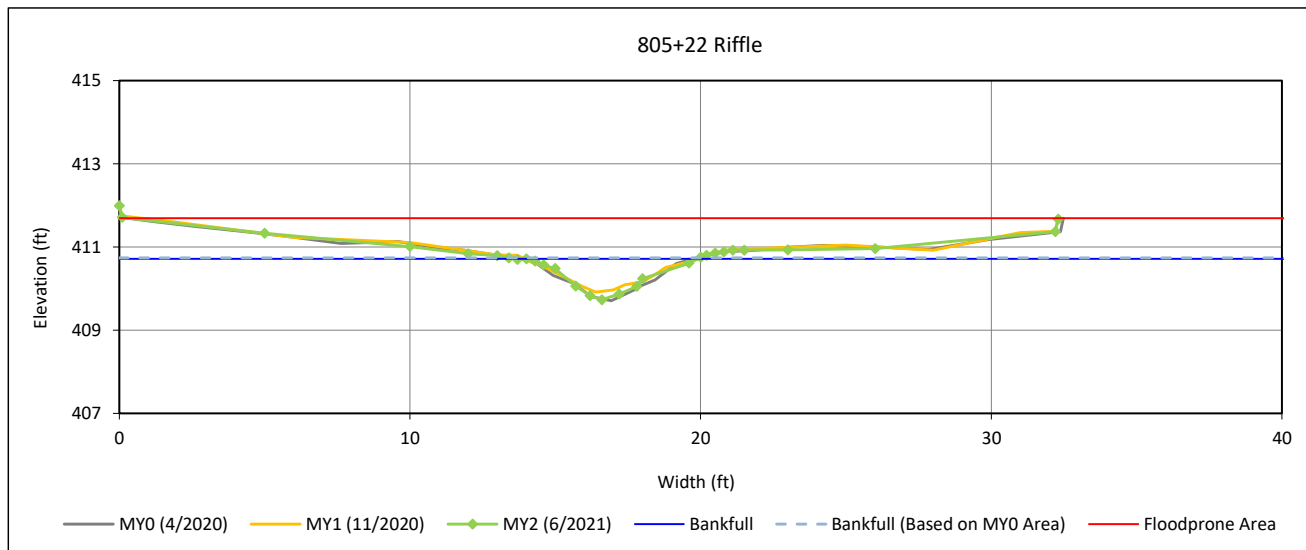


View Downstream

### Cross-Section Plots

Dry Creek Mitigation Site  
DMS Project No. 97082  
Monitoring Year 2 - 2021

#### Cross-Section 18 - UT6 Reach 1



#### Bankfull Dimensions

2.8	x-section area (ft.sq.)
5.9	width (ft)
0.5	mean depth (ft)
1.0	max depth (ft)
6.3	wetted perimeter (ft)
0.4	hydraulic radius (ft)
12.6	width-depth ratio
55.0	W flood prone area (ft)
9.3	entrenchment ratio
1.0	low bank height ratio

Survey Date: 6/2021

Field Crew: Wildlands Engineering



View Downstream



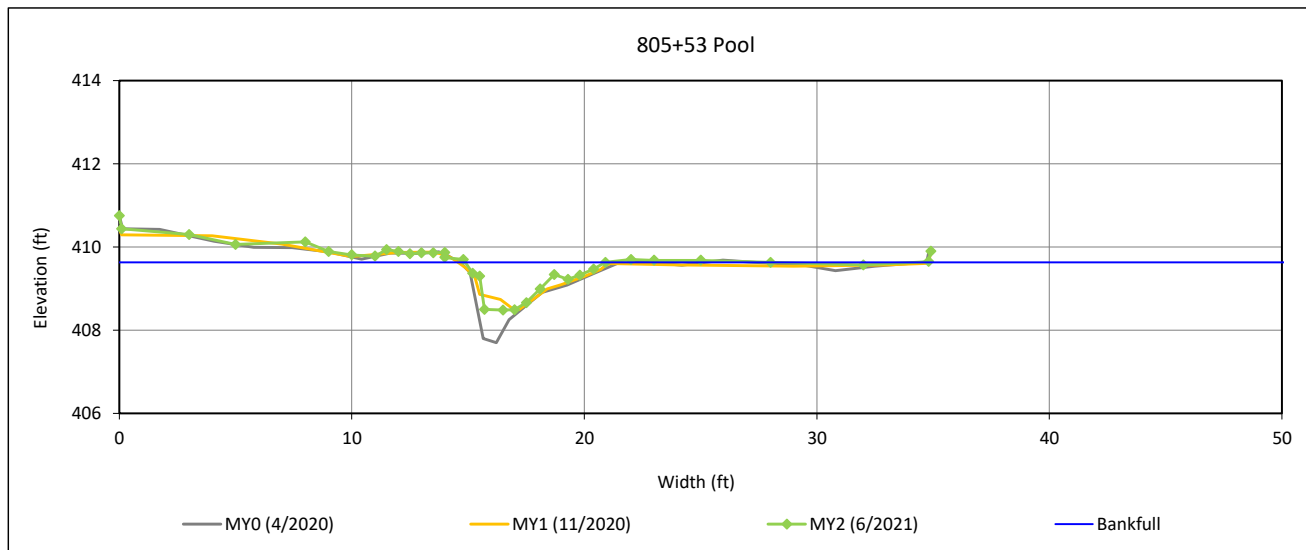
### Cross-Section Plots

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

#### Cross-Section 19 - UT6 Reach 1



#### Bankfull Dimensions

3.6	x-section area (ft.sq.)
6.0	width (ft)
0.6	mean depth (ft)
1.1	max depth (ft)
7.0	wetted perimeter (ft)
0.5	hydraulic radius (ft)
10.0	width-depth ratio

Survey Date: 6/2021

Field Crew: Wildlands Engineering



View Downstream

**Reachwide Pebble Count Plots**

Dry Creek Mitigation Site

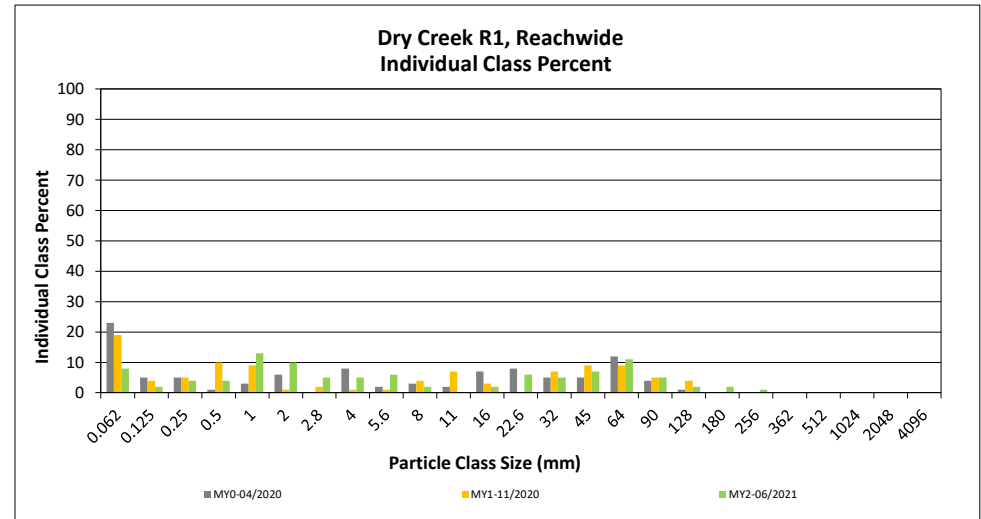
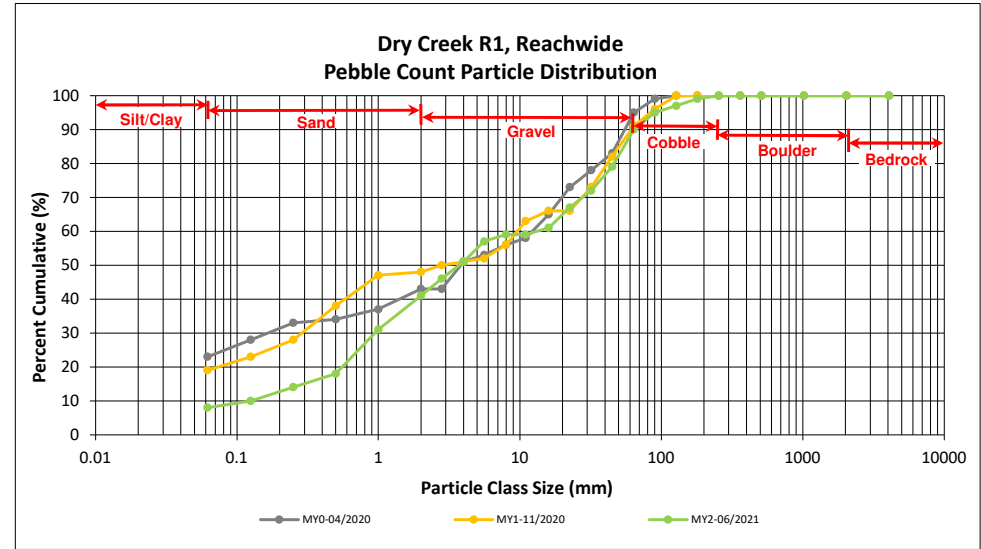
DMS Project No. 97082

**Monitoring Year 2 - 2021**

Dry Creek R1, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<b>SILT/CLAY</b>	Silt/Clay	0.000	0.062	1	7	8	8	8
<b>SAND</b>	Very fine	0.062	0.125		2	2	2	10
	Fine	0.125	0.250		4	4	4	14
	Medium	0.25	0.50		4	4	4	18
	Coarse	0.5	1.0	1	12	13	13	31
	Very Coarse	1.0	2.0		10	10	10	41
<b>GRAVEL</b>	Very Fine	2.0	2.8		5	5	5	46
	Very Fine	2.8	4.0	1	4	5	5	51
	Fine	4.0	5.6	1	5	6	6	57
	Fine	5.6	8.0	1	1	2	2	59
	Medium	8.0	11.0					59
	Medium	11.0	16.0		2	2	2	61
	Coarse	16.0	22.6	3	3	6	6	67
	Coarse	22.6	32	4	1	5	5	72
	Very Coarse	32	45	7		7	7	79
	Very Coarse	45	64	11		11	11	90
	<b>COBBLE</b>	Small	64	90	5		5	5
Small		90	128	2		2	2	97
Large		128	180	2		2	2	99
Large		180	256	1		1	1	100
<b>BOULDER</b>	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
<b>BEDROCK</b>	Bedrock	2048	>2048					100
<b>Total</b>				<b>40</b>	<b>60</b>	<b>100</b>	<b>100</b>	<b>100</b>

Reachwide Channel materials (mm)	
D <sub>16</sub> =	0.35
D <sub>35</sub> =	1.32
D <sub>50</sub> =	3.7
D <sub>84</sub> =	52.8
D <sub>95</sub> =	90.0
D <sub>100</sub> =	256.0





**Reachwide Pebble Count Plots**

Dry Creek Mitigation Site

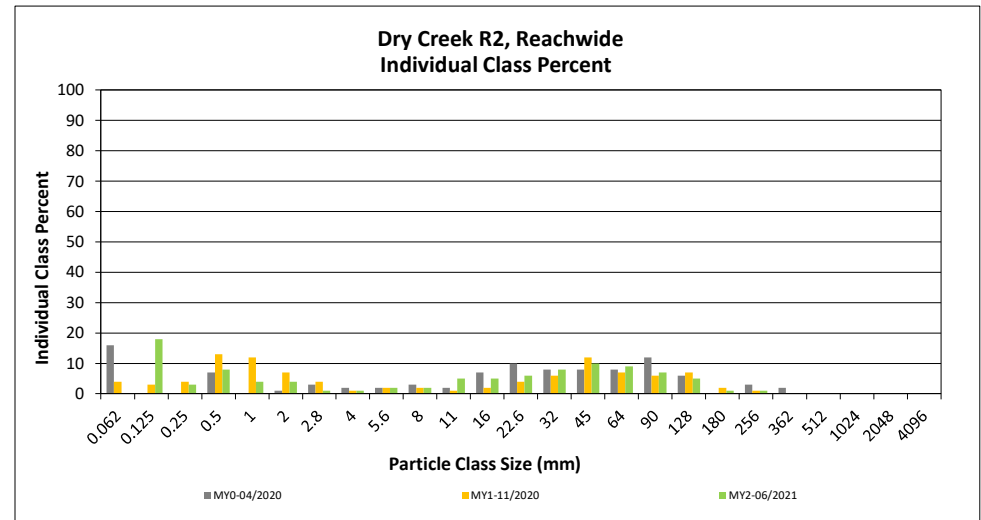
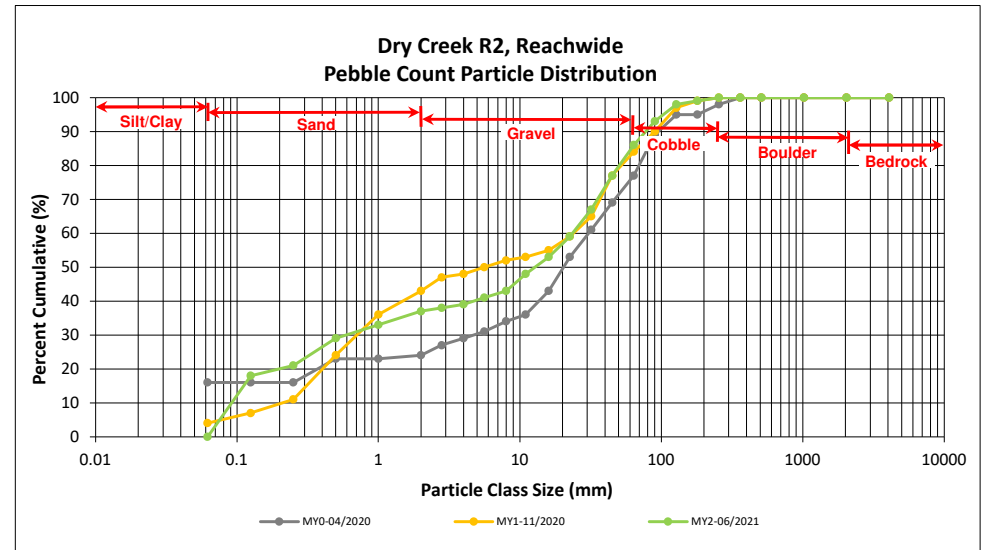
DMS Project No. 97082

**Monitoring Year 2 - 2021**

Dry Creek R2, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<b>SILT/CLAY</b>		Silt/Clay						0
<b>SAND</b>	Very fine	0.062	0.125		18	18	18	18
	Fine	0.125	0.250		3	3	3	21
	Medium	0.25	0.50		8	8	8	29
	Coarse	0.5	1.0		4	4	4	33
	Very Coarse	1.0	2.0		4	4	4	37
<b>GRAVEL</b>	Very Fine	2.0	2.8		1	1	1	38
	Very Fine	2.8	4.0	1		1	1	39
	Fine	4.0	5.6	2		2	2	41
	Fine	5.6	8.0	2		2	2	43
	Medium	8.0	11.0	2	3	5	5	48
	Medium	11.0	16.0	3	2	5	5	53
	Coarse	16.0	22.6	3	3	6	6	59
	Coarse	22.6	32	6	2	8	8	67
	Very Coarse	32	45	8	2	10	10	77
	Very Coarse	45	64	9		9	9	86
<b>COBBLE</b>	Small	64	90	7		7	7	93
	Small	90	128	5		5	5	98
	Large	128	180	1		1	1	99
	Large	180	256	1		1	1	100
<b>BOULDER</b>	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
<b>BEDROCK</b>	Bedrock	2048	>2048					100
<b>Total</b>				<b>50</b>	<b>50</b>	<b>100</b>	<b>100</b>	<b>100</b>

Reachwide Channel materials (mm)	
D <sub>16</sub> =	0.12
D <sub>35</sub> =	1.41
D <sub>50</sub> =	12.8
D <sub>84</sub> =	59.2
D <sub>95</sub> =	103.6
D <sub>100</sub> =	256.0



## Reachwide Pebble Count Plots

Dry Creek Mitigation Site

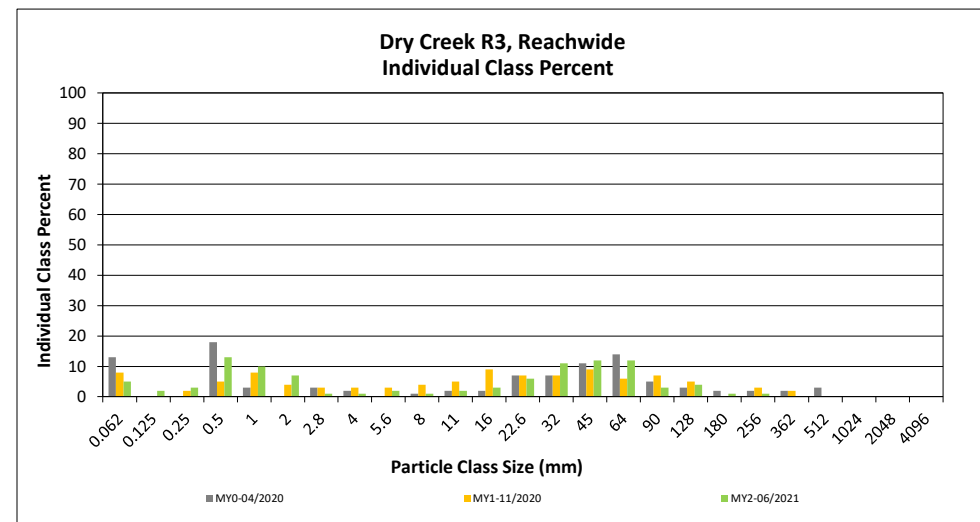
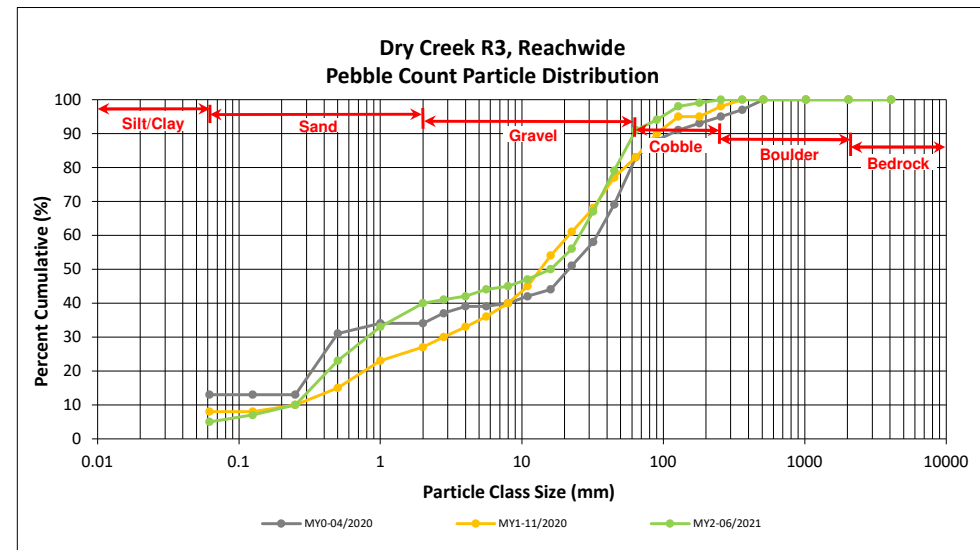
DMS Project No. 97082

Monitoring Year 2 - 2021

Dry Creek R3, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<b>SILT/CLAY</b>	Silt/Clay	0.000	0.062	1	4	5	5	5
<b>SAND</b>	Very fine	0.062	0.125		2	2	2	7
	Fine	0.125	0.250		3	3	3	10
	Medium	0.25	0.50		13	13	13	23
	Coarse	0.5	1.0	2	8	10	10	33
	Very Coarse	1.0	2.0	2	5	7	7	40
<b>GRAVEL</b>	Very Fine	2.0	2.8		1	1	1	41
	Very Fine	2.8	4.0		1	1	1	42
	Fine	4.0	5.6		2	2	2	44
	Fine	5.6	8.0		1	1	1	45
	Medium	8.0	11.0	2		2	2	47
	Medium	11.0	16.0	2	1	3	3	50
	Coarse	16.0	22.6	4	2	6	6	56
	Coarse	22.6	32	8	3	11	11	67
	Very Coarse	32	45	9	3	12	12	79
	Very Coarse	45	64	11	1	12	12	91
<b>COBBLE</b>	Small	64	90	3		3	3	94
	Small	90	128	4		4	4	98
	Large	128	180	1		1	1	99
	Large	180	256	1		1	1	100
<b>BOULDER</b>	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
<b>BEDROCK</b>	Bedrock	2048	>2048					100
<b>Total</b>				<b>50</b>	<b>50</b>	<b>100</b>	<b>100</b>	<b>100</b>

Reachwide Channel materials (mm)	
D <sub>16</sub> =	0.34
D <sub>35</sub> =	1.22
D <sub>50</sub> =	16.0
D <sub>84</sub> =	52.1
D <sub>95</sub> =	98.3
D <sub>100</sub> =	256.0





## Reachwide Pebble Count Plots

Dry Creek Mitigation Site

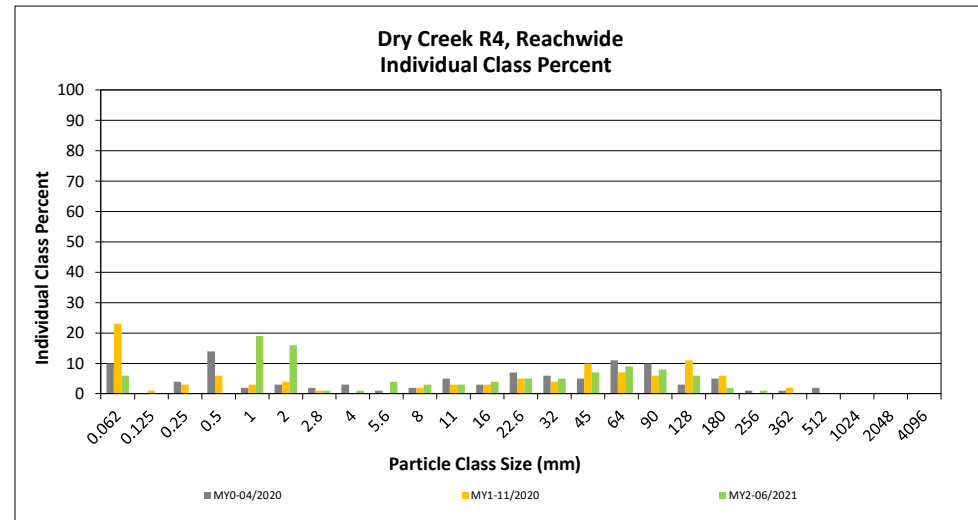
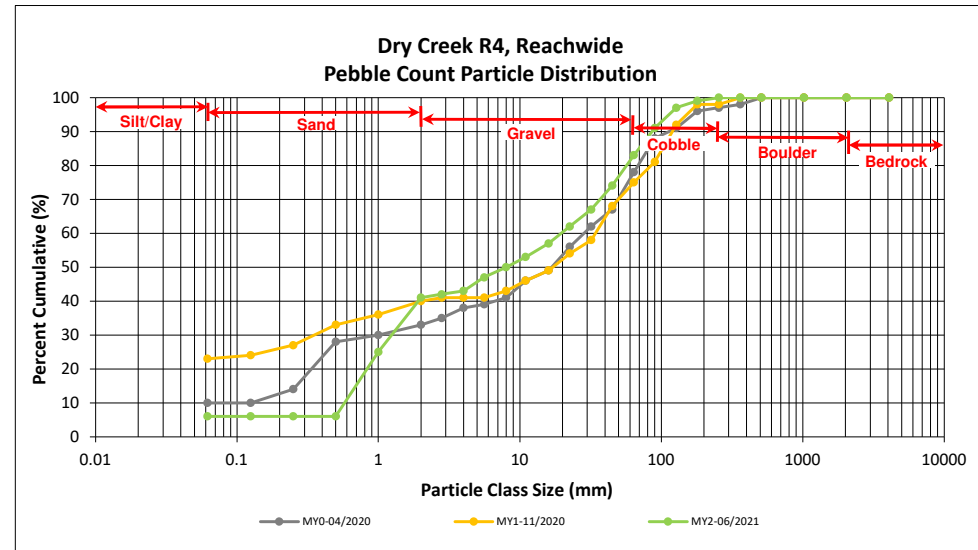
DMS Project No. 97082

Monitoring Year 2 - 2021

Dry Creek R4, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<b>SILT/CLAY</b>	Silt/Clay	0.000	0.062		6	6	6	6
<b>SAND</b>	Very fine	0.062	0.125					6
	Fine	0.125	0.250					6
	Medium	0.25	0.50					6
	Coarse	0.5	1.0	3	16	19	19	25
	Very Coarse	1.0	2.0		16	16	16	41
<b>GRAVEL</b>	Very Fine	2.0	2.8		1	1	1	42
	Very Fine	2.8	4.0		1	1	1	43
	Fine	4.0	5.6	1	3	4	4	47
	Fine	5.6	8.0	2	1	3	3	50
	Medium	8.0	11.0	1	2	3	3	53
	Medium	11.0	16.0	4		4	4	57
	Coarse	16.0	22.6	4	1	5	5	62
	Coarse	22.6	32	4	1	5	5	67
	Very Coarse	32	45	6	1	7	7	74
	Very Coarse	45	64	8	1	9	9	83
	<b>COBBLE</b>	Small	64	90	8		8	8
Small		90	128	6		6	6	97
Large		128	180	2		2	2	99
Large		180	256	1		1	1	100
<b>BOULDER</b>	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
<b>BEDROCK</b>	Bedrock	2048	>2048					100
<b>Total</b>				<b>50</b>	<b>50</b>	<b>100</b>	<b>100</b>	<b>100</b>

Reachwide Channel materials (mm)	
D <sub>16</sub> =	0.72
D <sub>35</sub> =	1.54
D <sub>50</sub> =	8.0
D <sub>84</sub> =	66.8
D <sub>95</sub> =	113.8
D <sub>100</sub> =	256.0



**Reachwide Pebble Count Plots**

Dry Creek Mitigation Site

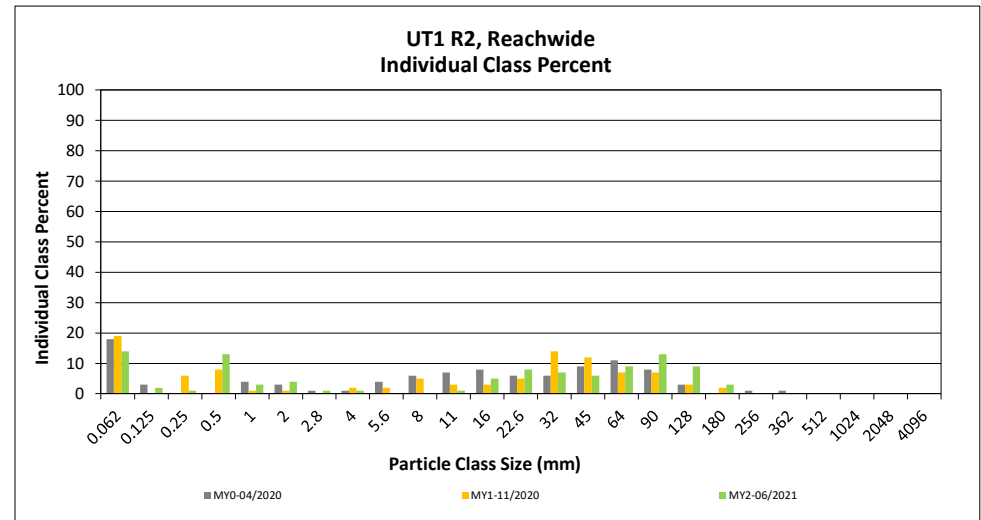
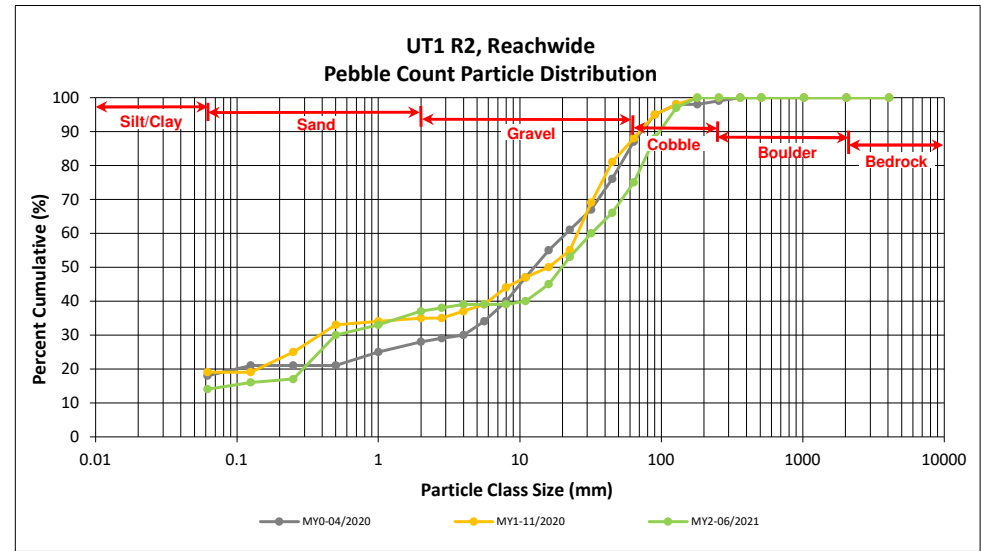
DMS Project No. 97082

Monitoring Year 2 - 2021

UT1 R2, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<b>SILT/CLAY</b>	Silt/Clay	0.000	0.062	1	13	14	14	14
<b>SAND</b>	Very fine	0.062	0.125		2	2	2	16
	Fine	0.125	0.250		1	1	1	17
	Medium	0.25	0.50		13	13	13	30
	Coarse	0.5	1.0		3	3	3	33
	Very Coarse	1.0	2.0		4	4	4	37
<b>GRAVEL</b>	Very Fine	2.0	2.8		1	1	1	38
	Very Fine	2.8	4.0		1	1	1	39
	Fine	4.0	5.6					39
	Fine	5.6	8.0					39
	Medium	8.0	11.0	1		1	1	40
	Medium	11.0	16.0	3	2	5	5	45
	Coarse	16.0	22.6	4	4	8	8	53
	Coarse	22.6	32	5	2	7	7	60
	Very Coarse	32	45	5	1	6	6	66
	Very Coarse	45	64	7	2	9	9	75
<b>COBBLE</b>	Small	64	90	12	1	13	13	88
	Small	90	128	9		9	9	97
	Large	128	180	3		3	3	100
	Large	180	256					100
<b>BOULDER</b>	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
<b>BEDROCK</b>	Bedrock	2048	>2048					100
<b>Total</b>				<b>50</b>	<b>50</b>	<b>100</b>	<b>100</b>	<b>100</b>

Reachwide Channel materials (mm)	
D <sub>16</sub> =	0.13
D <sub>35</sub> =	1.41
D <sub>50</sub> =	19.9
D <sub>84</sub> =	81.0
D <sub>95</sub> =	118.4
D <sub>100</sub> =	180.0





**Reachwide Pebble Count Plots**

Dry Creek Mitigation Site

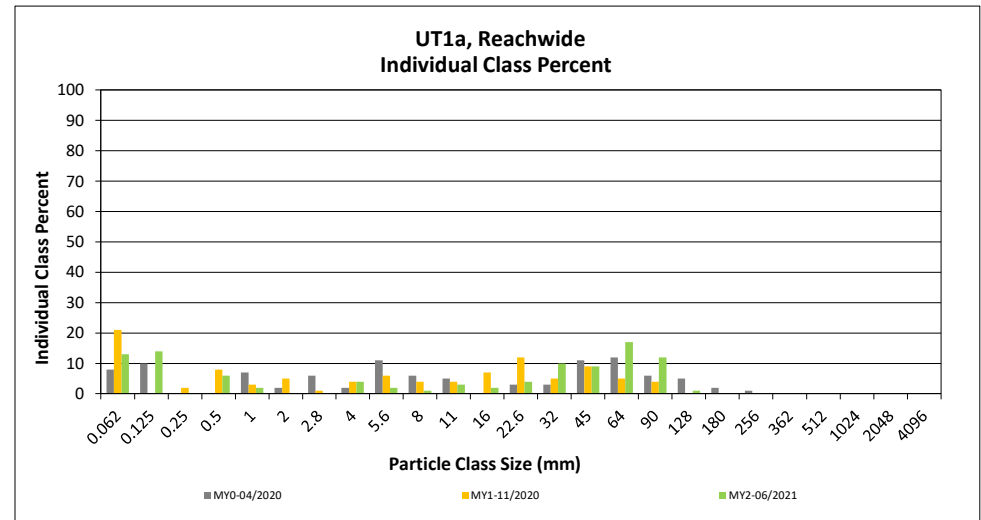
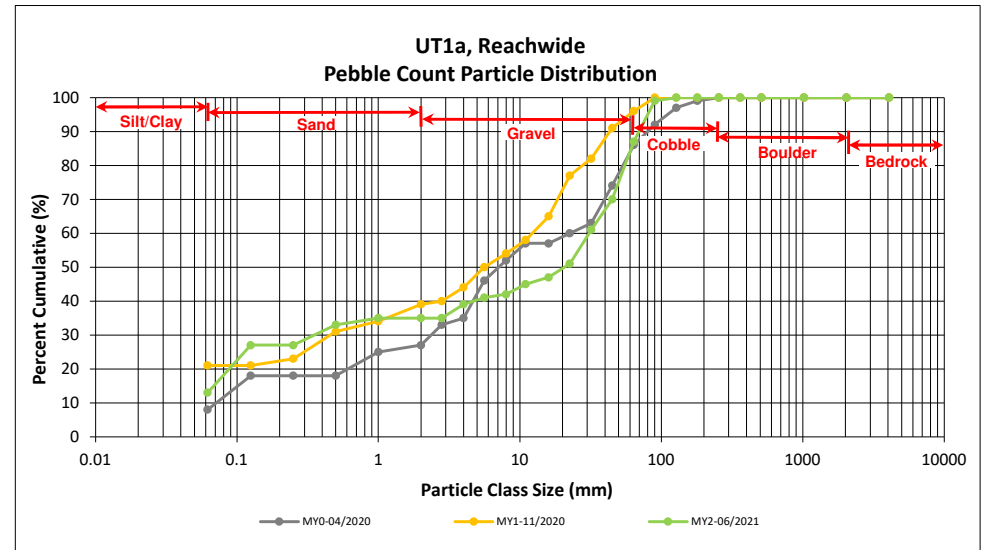
DMS Project No. 97082

**Monitoring Year 2 - 2021**

UT1a, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<b>SILT/CLAY</b>	Silt/Clay	0.000	0.062		13	13	13	13
<b>SAND</b>	Very fine	0.062	0.125		14	14	14	27
	Fine	0.125	0.250					27
	Medium	0.25	0.50	3	3	6	6	33
	Coarse	0.5	1.0		2	2	2	35
	Very Coarse	1.0	2.0					35
<b>GRAVEL</b>	Very Fine	2.0	2.8					35
	Very Fine	2.8	4.0		4	4	4	39
	Fine	4.0	5.6		2	2	2	41
	Fine	5.6	8.0		1	1	1	42
	Medium	8.0	11.0		3	3	3	45
	Medium	11.0	16.0		2	2	2	47
	Coarse	16.0	22.6		2	4	4	51
	Coarse	22.6	32	8	2	10	10	61
	Very Coarse	32	45	8	1	9	9	70
	Very Coarse	45	64	17		17	17	87
<b>COBBLE</b>	Small	64	90	11	1	12	12	99
	Small	90	128	1		1	1	100
	Large	128	180					100
	Large	180	256					100
<b>BOULDER</b>	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
<b>BEDROCK</b>	Bedrock	2048	>2048					100
<b>Total</b>				<b>50</b>	<b>50</b>	<b>100</b>	<b>100</b>	<b>100</b>

Reachwide Channel materials (mm)	
D <sub>16</sub> =	0.07
D <sub>35</sub> =	1.00
D <sub>50</sub> =	20.7
D <sub>84</sub> =	60.1
D <sub>95</sub> =	80.3
D <sub>100</sub> =	128.0



**Reachwide Pebble Count Plots**

Dry Creek Mitigation Site

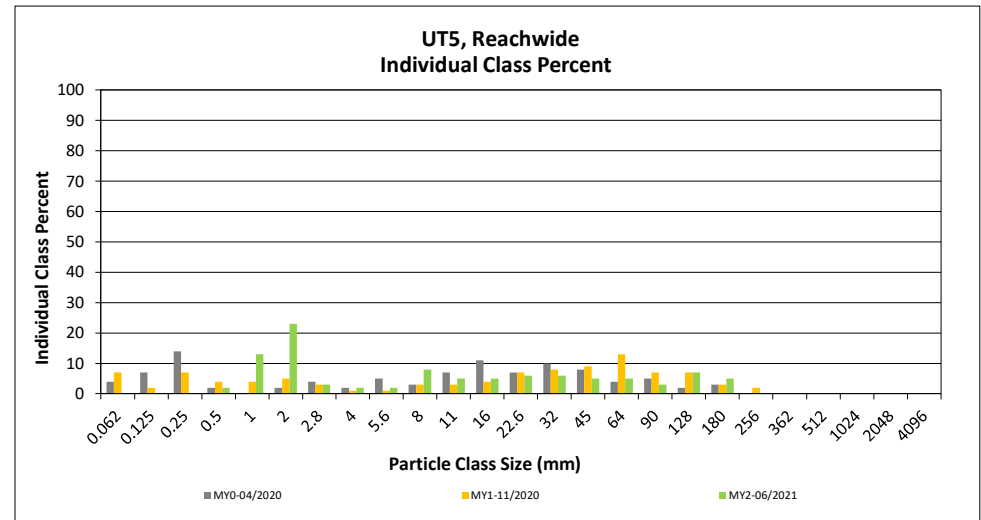
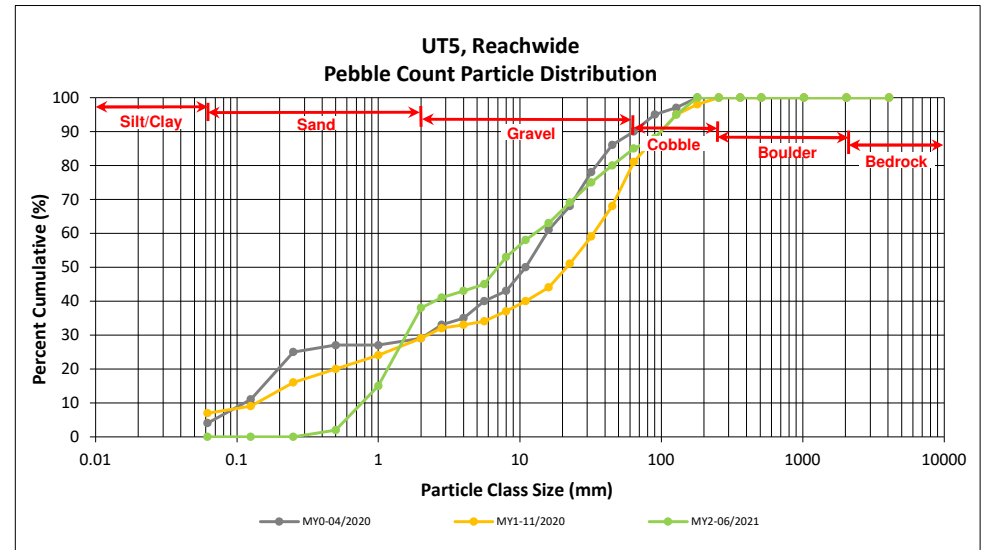
DMS Project No. 97082

**Monitoring Year 2 - 2021**

UT5, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<b>SILT/CLAY</b>		Silt/Clay		0.000	0.062			0
<b>SAND</b>	Very fine	0.062	0.125					0
	Fine	0.125	0.250					0
	Medium	0.25	0.50	2		2	2	2
	Coarse	0.5	1.0	13		13	13	15
	Very Coarse	1.0	2.0	17	6	23	23	38
<b>GRAVEL</b>	Very Fine	2.0	2.8	3		3	3	41
	Very Fine	2.8	4.0	2		2	2	43
	Fine	4.0	5.6	2		2	2	45
	Fine	5.6	8.0	3	5	8	8	53
	Medium	8.0	11.0		5	5	5	58
	Medium	11.0	16.0	1	4	5	5	63
	Coarse	16.0	22.6	2	4	6	6	69
	Coarse	22.6	32	3	3	6	6	75
	Very Coarse	32	45		5	5	5	80
	Very Coarse	45	64	2	3	5	5	85
	<b>COBBLE</b>	Small	64	90		3	3	3
Small		90	128		7	7	7	95
Large		128	180		5	5	5	100
Large		180	256					100
<b>BOULDER</b>	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
<b>BEDROCK</b>	Bedrock	2048	>2048					100
<b>Total</b>				<b>50</b>	<b>50</b>	<b>100</b>	<b>100</b>	<b>100</b>

Reachwide Channel materials (mm)	
D <sub>16</sub> =	1.03
D <sub>35</sub> =	1.83
D <sub>50</sub> =	7.0
D <sub>84</sub> =	59.6
D <sub>95</sub> =	128.0
D <sub>100</sub> =	180.0





**Reachwide Pebble Count Plots**

Dry Creek Mitigation Site

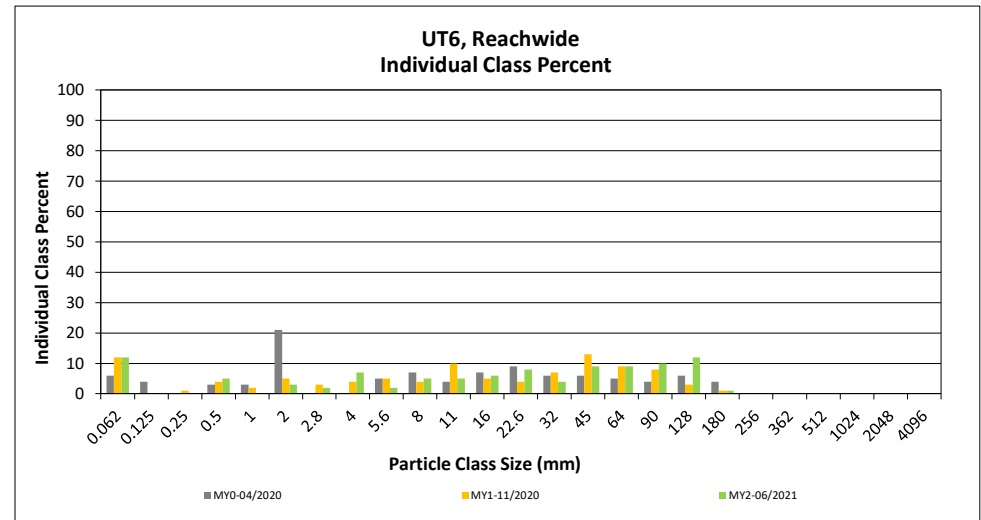
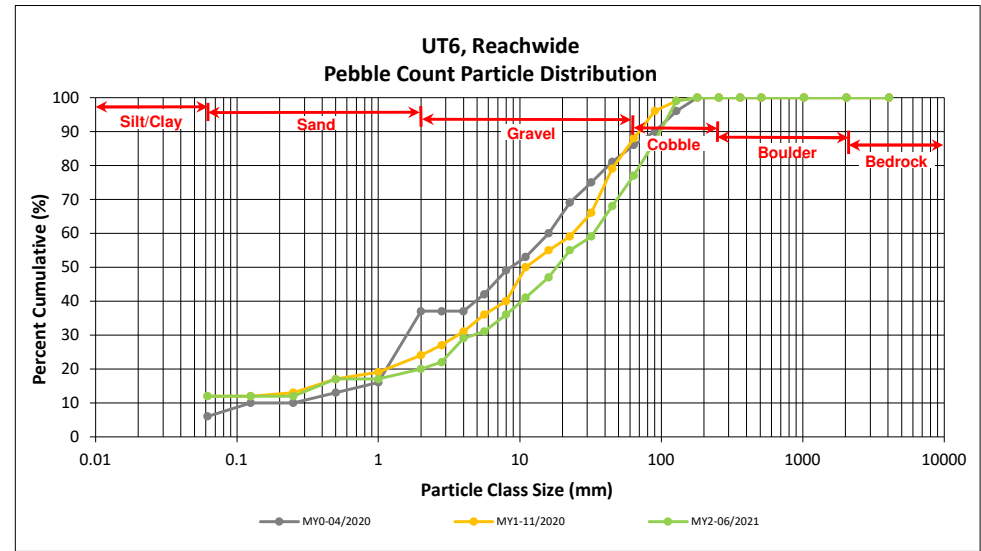
DMS Project No. 97082

**Monitoring Year 2 - 2021**

UT6, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
<b>SILT/CLAY</b>	Silt/Clay	0.000	0.062	3	9	12	12	12
<b>SAND</b>	Very fine	0.062	0.125					12
	Fine	0.125	0.250					12
	Medium	0.25	0.50	2	3	5	5	17
	Coarse	0.5	1.0					17
	Very Coarse	1.0	2.0					20
<b>GRAVEL</b>	Very Fine	2.0	2.8		2	2	2	22
	Very Fine	2.8	4.0	3	4	7	7	29
	Fine	4.0	5.6	1	1	2	2	31
	Fine	5.6	8.0	2	3	5	5	36
	Medium	8.0	11.0	2	3	5	5	41
	Medium	11.0	16.0	1	5	6	6	47
	Coarse	16.0	22.6	4	4	8	8	55
	Coarse	22.6	32	4	4	8	8	59
	Very Coarse	32	45	3	6	9	9	68
	Very Coarse	45	64	8	1	9	9	77
	<b>COBBLE</b>	Small	64	90	8	2	10	10
Small		90	128	8	4	12	12	99
Large		128	180	1		1	1	100
Large		180	256					100
<b>BOULDER</b>	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
<b>BEDROCK</b>	Bedrock	2048	>2048					100
<b>Total</b>				<b>50</b>	<b>50</b>	<b>100</b>	<b>100</b>	<b>100</b>

Reachwide Channel materials (mm)	
D <sub>16</sub> =	0.44
D <sub>35</sub> =	7.45
D <sub>50</sub> =	18.2
D <sub>84</sub> =	81.3
D <sub>95</sub> =	113.8
D <sub>100</sub> =	180.0



## **APPENDIX 5. Hydrology Summary Data**



**Table 13. Bankfull Events**

Dry Creek Mitigation Site  
DMS Project No. 97082  
**Monitoring Year 2 - 2021**

Reach	MY1 (2020)	MY2 (2021)	MY3 (2022)	MY4 (2023)	MY5 (2024)	MY6 (2025)	MY7 (2026)
Dry Creek Reach 2	4/13/2020 10/11/2020	1/3/2021 2/16/2021					
Dry Creek Reach 3	5/21/2020 10/11/2020	1/3/2021 2/16/2021					
UT1 Reach 2	4/13/2020 10/11/2020	1/3/2021 2/16/2021					
UT5 Reach 1	10/11/2020	2/16/2021 4/9/2021					
UT6 Reach 1	*	2/16/2021 4/9/2021					

\*Gage malfunction

**Table 14. Rainfall Summary**

Dry Creek Mitigation Site  
DMS Project No. 97082  
**Monitoring Year 2 - 2021**

	MY1 (2020)	MY2 (2021)	MY3 (2022)	MY4 (2023)	MY5 (2024)	MY6 (2025)	MY7 (2026)
Annual Precip Total	61.38	38.99*					
WETS 30th Percentile	43.73	43.75					
WETS 70th Percentile	50.88	51.13					
Normal	Y	*					

\*Annual precipitation total was collected up until 10/16/2021. Data will be updated in MY3.

**Table 15. Wetland Gage Summary**

Dry Creek Mitigation Site  
DMS Project No. 97082  
**Monitoring Year 2 - 2021**

Gage	Max. Consecutive Hydroperiod (Percentage)						
	MY1 (2020)	MY2 (2021)*	MY3 (2022)	MY4 (2023)	MY5 (2024)	MY6 (2025)	MY7 (2026)
1	7 Days (2.7%)	9 Days (3.5%)					

Performance Standard: **None**

WETS Station (Daily Rainfall): **Durham 8.0 NNE, NC**

WETS Station (30th & 70th Percentile): **Chapel Hill 2 W, NC**

Growing Season: **3/1/2021 to 11/11/2021 (255 Days)**

\*Data was collected from 3/1/2021 to 10/12/2021 (225 Days).

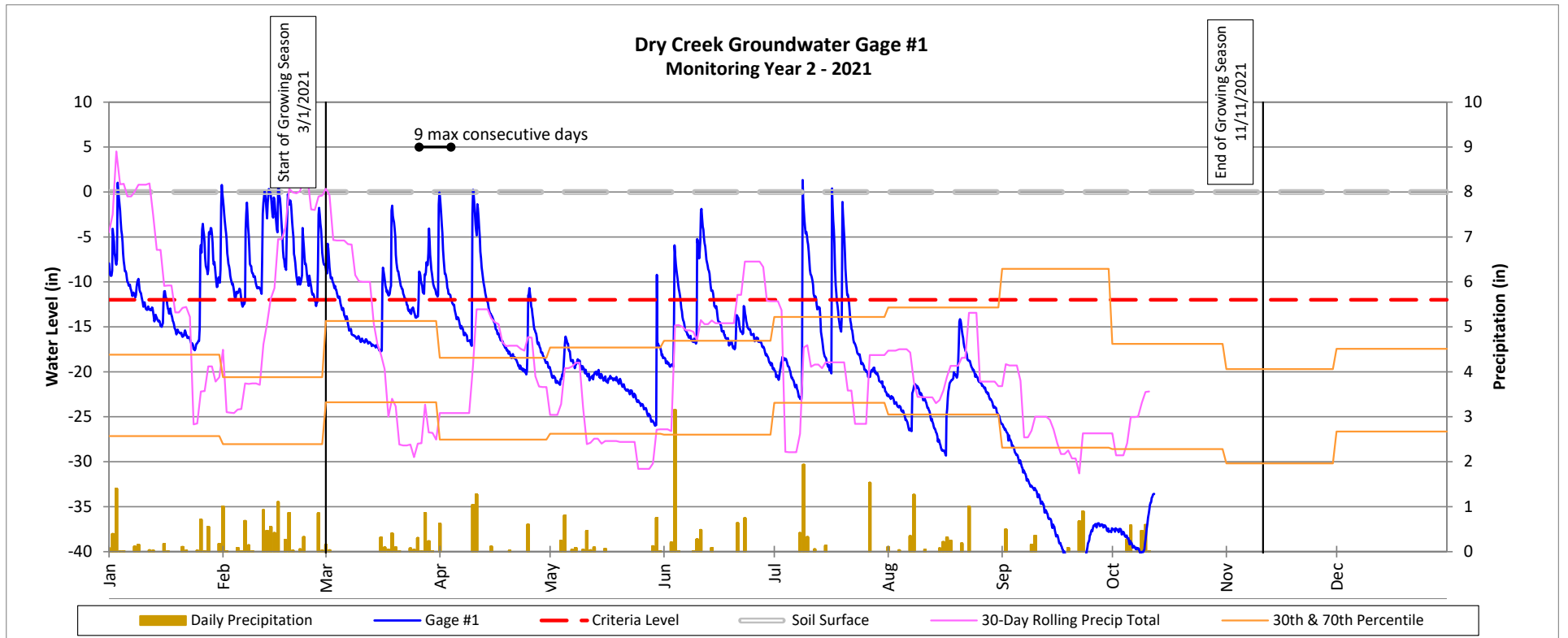


## Groundwater Gage Plots

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021



**Table 16. Recorded In-Stream Flow Events Summary**

Dry Creek Mitigation Site

DMS Project No. 97082

**Monitoring Year 2 - 2021**

Reach	Max Consecutive Days/Total Days Meeting Success Criteria*						
	MY1 (2020)	MY2 (2021)**	MY3 (2022)	MY5 (2023)	MY5 (2024)	MY6 (2025)	MY7 (2026)
UT1A	129 Days/ 251 Days	140 Days/ 162 Days					
UT2	295 Days/ 295 Days	284 Days/ 284 Days					
UT5 Reach 1	87 Days/ 155 Days	142 Days/ 157 Days					

\*Success criteria is 30 consecutive days of flow.

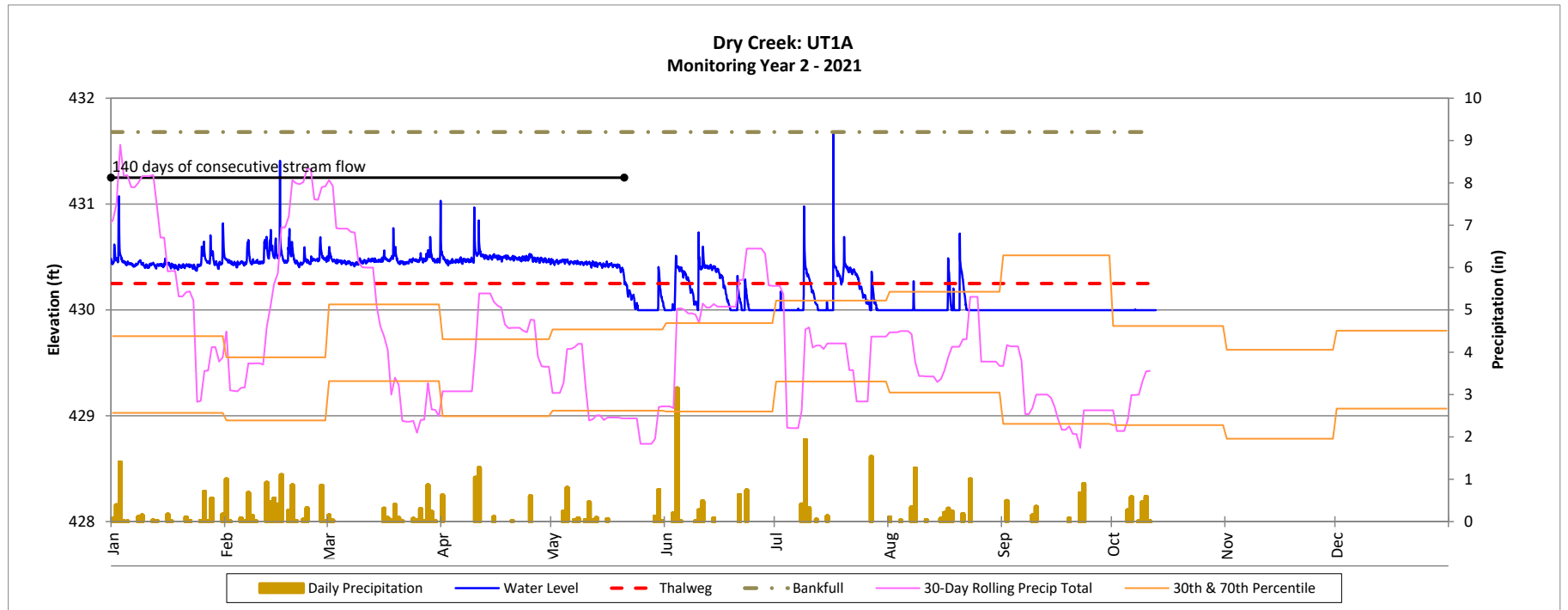
\*\*Data was collected through 10/12/2021. Data will be updated in MY3.

### Recorded In-Stream Flow Events Plots

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021



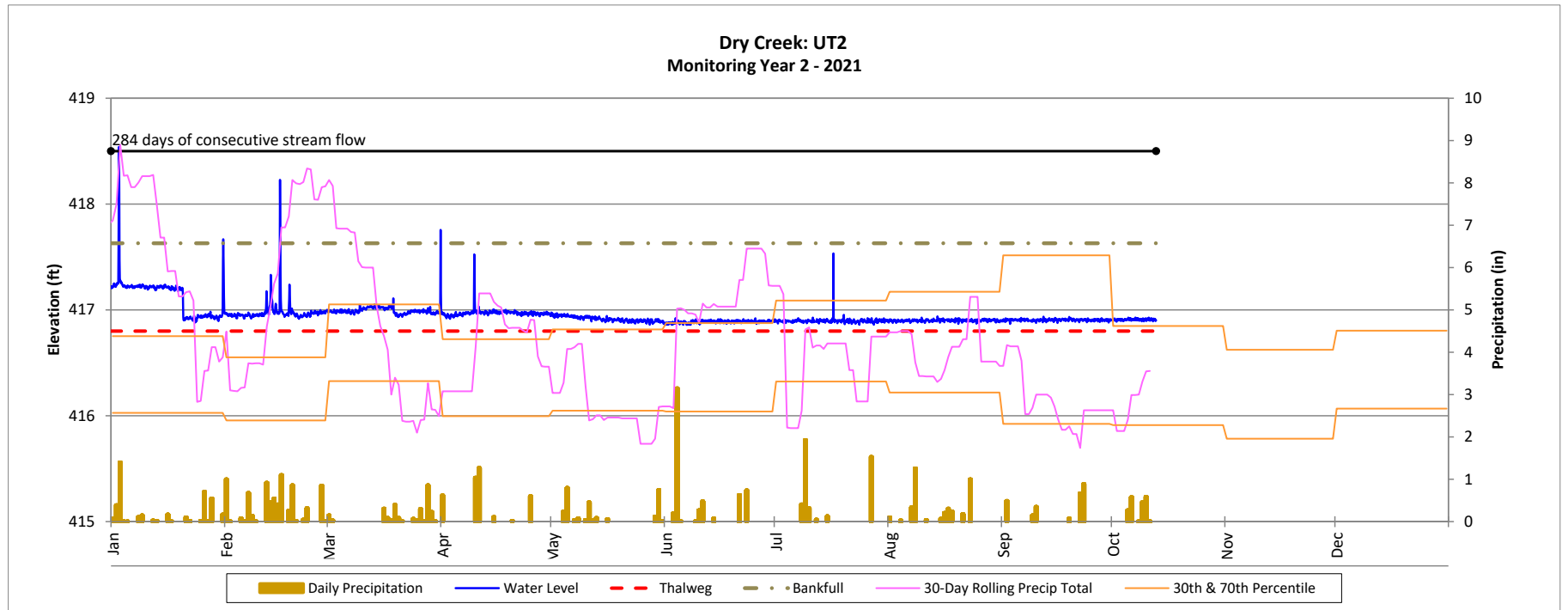


### Recorded In-Stream Flow Events Plots

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021



### Recorded In-Stream Flow Events Plots

Dry Creek Mitigation Site

DMS Project No. 97082

Monitoring Year 2 - 2021

