MONITORING YEAR 3 ANNUAL REPORT

Final

MANEY FARM MITIGATION PROJECT

Chatham County, NC
NCDEQ Contract 005793
DMS ID No. 96314

Data Collection Period: January - October 2018
Draft Submission Date: November 12, 2018
Final Submission Date: December 10, 2018

PREPARED FOR:

NC Department of Environmental Quality
Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

Mitigation Project Name	Maney Farm Stream Mitigation Site	County	Chatham	USACE Action ID	2014-01825
DMS ID	96314	Date Project Instituted	2/21/2014	NCDWR Permit No	2014-0338
River Basin	Cape Fear	Date Prepared	5/22/2018		
Cataloging Unit	03030002				

Credit Release Milestone	Stream Credits						Wetland Credits							
	Scheduled Releases (Stream)	Warm	Cool	Cold	Anticipated Release Year (Stream)	Actual Release Date (Stream)	Scheduled Releases (Forested)	Riparian Riverine	Riparian Non-riverine	Non-riparian	Scheduled Releases (Coastal)	Coastal	Anticipated Release Year (Wetland)	Actual Release Date (Wetland)
Potential Credits (Mitigation Plan)		4,921.600												
Potential Credits (As-Built Survey)		4,947.930												
Potential Credits (IRT Approved)		4,921.600												
1 (Site Establishment)	N/A				N/A	N/A	N/A				N/A		N/A	N/A
2 (Year 0 / As-Built)	30%	1,484.379			2016	5/16/2016	30%				30%		N/A	N/A
3 (Year 1 Monitoring)	10%	494.793			2017	4/3/2017	10%				10%		N/A	N/A
4 (Year 2 Monitoring)*	10%	481.630			2018	4/25/2018	10%				15%		N/A	N/A
5 (Year 3 Monitoring)	10%				2019		15%				20%		N/A	N/A
6 (Year 4 Monitoring)	5%				2020		5%				10%		N/A	N/A
7 (Year 5 Monitoring)	10%				2021		15%				15%		N/A	N/A
8 (Year 6 Monitoring)	5%				2022		5%				N/A		N/A	N/A
9 (Year 7 Monitoring)	10%				2023		10%				N/A		N/A	N/A
Stream Bankfull Standard	10%	492.160			2018	4/25/2018	N/A				N/A		N/A	N/A
Total Credits Released to Date		2,952.962												

*NOTE: Year 2 Monitoring (or 10%) credits were 492.16. Adjustment required due to IRT concerns on how the as-built credits were calculated (-10.53)

DEBITS (released credits only)

			Ratios	1	1.5	2.5	5	1	3	2	5	1	3	2	5	1	3	2	5
				Stream Restoration	Stream Enhancment I	Stream Enhancement II	Stream Preservation	Riparian Restoration	Riparian Creation	Riparian Enhancement	Riparian Preservation	Nonriparian Restoration	Nonriparian Creation	Nonriparian Enhancement	Nonriparian Preservation	Coastal Marsh Restoration	Coastal Marsh Creation	Coastal Marsh Enhancement	Coastal Marsh Preservation
As-Built Amounts (feet and acres)				3,860.000	633.000	1,599.000													
As-Built Amounts (mitigation credits)				3,860.000	422.000	639.600													
Percentage Released				60%	60%	60%													
Released Amounts (feet / acres)				2,316.000	379.800	959.400													
Released Amounts (credits)				2,316.000	253.200	383.760													
NCDWR Permit	USACE Action ID	Project Name																	
2013-0517	2013-00557	NCDOT TIP R-2413A/B - NC 68 Connector, Guilford County		1,169.700	184.200	479.700													
	2015-02641	SR 1007 - Bridge 42 - Division 7		44.800															
	2015-01907	SR 1110 - Bridge 200 - Division 7		66.000															
	2016-01091	SR 1522 - Bridge 207 - Division 7		154.000															
2016-0438	2016-01081	SR 1552 - Bridge 270 - Division 7		125.100	61.400	64.930													
2015-0819	2015-01791	SR 2158 - Bridge 85 - Division 7				94.970													
2013-0918	2005-21386	NCDOT TIP U-2525B / C - Greensboro Eastern Loop		756.400	134.200	319.800													
Remaining Amounts (feet / acres)				0.000	0.000	0.000													
Remaining Amounts (credits)				0.000	0.000	0.000													

Contingencies (if any): None

Signature of Wilmington District Official Approving Credit Release

9/6/18
Date

1 - For NCDMS, no credits are released during the first milestone

2 - For NCDMS projects, the second credit release milestone occurs automatically when the as-built report (baseline monitoring report) has been made available to the NCIRT by posting it to the NCDMS Portal, provided the following criteria have been met:

1) Approval of the final Mitigation Plan
2) Recordation of the preservation mechanism, as well as a title opinion acceptable to the USACE covering the property
3) Completion of all physical and biological improvements to the mitigation site pursuant to the mitigation plan
4) Reciept of necessary DA permit authorization or written DA approval for porjects where DA permit issuance is not required

3 - A 10% reserve of credits is to be held back until the bankfull event performance standard has been met

PREPARED BY:

WILDLANDS
ENGINEERING

312 West Millbrook Road, Suite 225
Raleigh, NC 27609

Phone: 919.851.9986

EXECUTIVE SUMMARY

Wildlands Engineering Inc. (Wildlands) implemented a full delivery project at the Maney Farm Mitigation Project (Site) for the North Carolina Division of Mitigation Services (DMS) to restore and enhance a total of 6,092 linear feet (LF) of perennial and intermittent streams in Chatham County, NC. The Site is expected to generate 4,922 stream mitigation units (SMUs) by closeout. The Site is located northwest of Pittsboro, NC and north of Silk Hope, NC in the Cape Fear River Basin 8-Digit Hydrologic Unit Code (HUC) 03030002 (Figure 1). The Site is also within the Cane Creek Targeted Local Watershed (HUC 03030002050050), which flows into Cane Creek and eventually into the Haw River. The streams are all unnamed tributaries (UT) to South Fork Cane Creek (SF) and are referred to herein as UTSF, UT1, UT2, UT3, UT4, and UT5.

The Site is located within the Cane Creek Targeted Local Watershed (TLW) which is discussed in DMS's 2009 Cape Fear River Basin Restoration Priorities (RBRP). The RBRP identifies the need to improve aquatic conditions and habitats as well as promoting good riparian conditions in the Cane Creek watershed. Prior to the restoration activities, the Site was maintained as cattle pasture and is one of the 51 animal operations referenced in the RBRP. The Site drains to the Haw River, which flows to B. Everett Jordan Lake (Jordan Lake). The 2005 NCDWR Cape Fear River Basinwide Water Quality Plan indicates that Jordan Lake is a drinking water supply (WS-IV), a primary area for recreation, and a designated Nutrient Sensitive Water which calls for reduction of non-point source pollution. The water supply watershed boundary for Jordan Lake is just six miles downstream from the Site. The Cape Fear watershed is also discussed in the 2005 North Carolina Wildlife Resource Commission's Wildlife Action Plan where sedimentation is noted as a major issue in the basin. Maps within the Wildlife Action Plan indicate that Priority Species are present along Cane Creek. Restoration activities at the Site directly addressed non-point source stressors by removing cattle from the streams, creating stable stream banks, restoring a riparian corridor, and placing 16.69 acres of land under permanent conservation easement.

The project goals established in the mitigation plan (Wildlands, 2015) were developed with careful consideration of goals and objectives that were described in the Cape Fear RBRP plan. The project goals included:

- Exclude cattle from project streams resulting in reduced pollutant inputs including fecal coliform, nitrogen, and phosphorous;
- Stabilize eroding stream banks resulting in reduced inputs of sediment into streams;
- Construct stream channels that are laterally and vertically stable resulting in a network of streams capable of supporting hydrologic, biologic, and water quality functions;
- Improve instream habitat resulting in improved aquatic communities within the streams;
- Reconnect channels with floodplains so that floodplains are inundated relatively frequently resulting in groundwater recharge, floodplain wetland and vernal pool inundation, and reduced shear stress on channels during larger flow events;
- Restore and enhance native floodplain forest resulting in stream shading, reduced thermal loads, woody input sources, and reduced flood flow velocities allowing for pollutants and sediments to settle; and
- Permanently protect the project site from harmful uses therefore ensuring that development and agricultural damage is prevented.

The project is helping meet the goals for the watershed and providing numerous ecological benefits within the Cape Fear River Basin. While many of these benefits are limited to the project area; others, such as pollutant removal and reduced sediment loading have farther-reaching effects. In addition, protected parcels downstream of the Site promote cumulative project benefits within the watershed.

The Site construction and as-built surveys were completed between October 2015 and February 2016. A conservation easement is in place on 16.69 acres of the riparian corridors to protect them in perpetuity.

Monitoring Year3 (MY3) assessments and site visits were completed between January and October 2018 to assess the conditions of the project. Overall, the Site has met the required vegetation and stream success criteria for MY3. The overall average stem density for the standard planting zones at the Site is 361 stems per acre, meeting the MY3 requirement of 320 stems per acre. Chinese privet has been encroaching from outside the conservation easement and was treated in October 2018. All restored and enhanced streams are stable and functioning as designed. Hydrologic monitoring stations with crest gages and pressure transducers were installed on the Site to document bankfull events on the restoration reaches. Multiple bankfull events have been recorded since project construction and therefor the Site has met the MY7 hydrology success criteria in which two or more bankfull events must have occurred in separate years within the restoration reaches. Additionally, a flow gage was established on the upstream, intermittent reach of UTSF Reach 1 to document flow during the annual monitoring period. The flow gage on UTSF Reach 1 recorded baseflow for 261 consecutive days during MY3 and therefor met the established hydrologic criteria.

MANEY FARM MITIGATION PROJECT
Monitoring Year 3 Annual Report

TABLE OF CONTENTS

APPENDICES

Section 1: PROJECT OVERVIEW

The Maney Farm Mitigation Project (Site) is located in northwestern Chatham County within the Cape Fear River Basin (USGS Hydrologic Unit 03030002). The Site is located off Center Church Road northwest of Pittsoboro, and north of Silk Hope, North Carolina. 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 project site is 211 acres (0.33 square miles).

The project streams consist of six unnamed tributaries to South Fork Cane Creek. Stream restoration reaches included UTSF (Reach 1 and 2) and UT5. Stream enhancement I (EI) and enhancement II (EII) reaches included UT1 (Reach A and B), EII; UT1 (Reach C), EI; UT2 (Reach A), EII; U2 (Reach B), EI; UT3 (Reach A), EII; UT3 (Reach B), EI; and UT4 (Reach A), EII; UT4 (Reach B), EI. Mitigation work within the Site included restoration and enhancement of 6,092 linear feet (LF) of perennial and intermittent stream channels. The riparian areas were planted with native vegetation to improve habitat and protect water quality. Construction activities were completed by Land Mechanic Designs, Inc. in January 2016. Planting and seeding activities were completed by Bruton Natural Systems, Inc. in February 2016. A conservation easement (16.69 ac; Deed Book 1537, Page 876) has been recorded and is in place along the stream and riparian corridors to protect them in perpetuity within a tract owned by the M. Darryl Lindley Revocable Trust. The project is expected to provide 4,922 stream mitigation units (SMU's) by closeout.

Directions and a map of the Site are provided in Figure 1 and project components are illustrated for the Site in Figure 2.

1.1 Project Goals and Objectives

Prior to construction activities, the streams and vegetative communities on the Site had been severely impacted due to livestock having direct access to the streams and riparian zones. Table 4 in Appendix 1 and Tables 10a through 10d in Appendix 4 present the pre-restoration conditions in detail.

This Site is intended to provide numerous ecological benefits within the Cape Fear River Basin. While many of these benefits are limited to the Maney Farm Mitigation Project area, others such as pollutant removal and reduced sediment loading have more far-reaching effects. Expected improvements to water quality and ecological processes are outlined below as project goals and objectives. These project goals were established and completed with careful consideration of goals and objectives that were described in the RBRP and to meet the DMS mitigation needs while maximizing the ecological and water quality uplift within the watershed.

The following project goals and related objectives established in the mitigation plan (Wildlands, 2015) included:

Goal	Objective	Expected Outcomes
Exclude cattle from project streams	Install fencing around conservation easements adjacent to cattle pastures.	Reduce pollutant inputs including fecal coliform, nitrogen, and phosphorous.
Stabilize eroding stream banks	Reconstruct stream channels with stable dimensions. Add bank revetments and in-stream structures to protect restored/enhanced streams.	Reduce inputs of sediment into streams.
Construct stream channels that are laterally and vertical stable	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.	Return a network of streams to a stable form that is capable of supporting hydrologic, biologic, and water quality functions.
Improve instream habitat	Install habitat features such as constructed riffles 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 so that floodplains are inundated relatively frequently	Reconstructing stream channels with appropriate bankfull dimensions and depth relative to the existing floodplain.	Raise local groundwater elevations. Inundate floodplain wetlands and vernal pools. Reduce shear stress on channels during larger flow events.
Restore and enhance native floodplain forest	Plant native tree and understory species in riparian zone.	Create and improve forested riparian habitats. Provide a canopy to shade streams and reduce thermal loadings. Create a source of woody inputs for streams. Reduce flood flow velocities on floodplain and allow pollutants and sediment to settle.
Permanently protect the project site from harmful uses	Establish a conservation easement on the site.	Ensure that development and agricultural uses that would damage the site or reduce the benefits of the project are prevented.

The design streams were restored to the appropriate type based on the surrounding landscape, climate, and natural vegetation communities but also with strong consideration to existing watershed conditions and trajectory. The final mitigation plan was submitted and accepted by the DMS in August 2015. Construction activities were completed by Land Mechanic Designs, Inc. in January 2016. Planting and seeding activities were completed by Bruton Natural Systems, Inc. in February 2016. Baseline monitoring (MY0) was conducted between January 2016 and February 2016. Annual monitoring will be conducted for seven years with the close-out anticipated to commence in 2023 given the success criteria are met. Appendix 1 provides more detailed project activity, history, contact information, and watershed/site background information for the Site.

1.2 Monitoring Year 3 Data Assessment

Annual monitoring and quarterly site visits were conducted during MY3 to assess the condition of the project. The stream and vegetation success criteria for the Site follows the approved success criteria presented in the Maney Farm Mitigation Project Mitigation Plan (Wildlands, 2015).

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 13 standard 10-meter by 10-meter vegetation plots and one non-standard 5-meter by 20-meter plot were established during the baseline monitoring within the project easement area. Plots were established to monitor both the standard planting zones (11 plots) as well as the supplemental planting zones (3 plots).

The final vegetative success criteria will be the survival of 210 planted stems per acre in the standard planting zones at the end of the seven-year monitoring period (MY7). The interim measure of vegetative success within the standard planting zones will be the survival of at least 320 planted stems per acre at the end of year three of the monitoring period (MY3) and at least 260 stems per acre at the end of the fifth year of monitoring (MY5). Planted vegetation must average 10 feet in height in each standard planting zone plot at the end of the seventh year of monitoring. If this performance standard is met by MY5 and stem density is trending towards success (i.e., no less than 260 five-year-old stems per acre), monitoring of vegetation on the Site may be terminated provided written approval is provided by the United States Army Corps of Engineers in consultation with the NC Interagency Review Team.

While there are no performance criteria for the stems established within the supplemental planting zones, these areas are monitored to document survival rates of these species.

The MY3 vegetative survey was completed in August 2018. The 2018 vegetation monitoring resulted in an average stem density of 361 stems per acre within the standard planting zones, meeting the interim requirement of 320 stems per acre required at MY3 and approximately 56% less than the baseline density recorded (647 stems per acre). There was an average of 11 stems per plot as compared to an average of 16 stems per plot in MY0. All 11 of the plots are on track to meet the success criteria required for MY7 (Table 9a, Appendix 3).

Stem densities were monitored in the three supplemental planting zone plots to document annual survival rates within these zones. The overall average survival rate within these plots was 29% since establishment, indicating a significant mortality rate since MY0 (Table 7b, Appendix 3). The survival rates of the species selected for these supplemental planting zones ranged from 59% (*Carpinus caroliniana*) to 0% (*Viburnum prunifolium* and *Callicarpa americana*) in MY3 (Table 7c, Appendix 3).

Refer to Appendix 2 for vegetation plot photographs and the vegetation condition assessment table and Appendix 3 for vegetation data tables.

1.2.2 Vegetation Areas of Concern

Based on results from the supplemental planting zone plots, significant declines in survival rates occurred between MY0 and MY3 for the majority of these species. While these monitoring plots are not associated with the site success criteria, the high mortality rates are noted as an area of concern that will continue to be monitored and documented.

Chinese privet (*Ligustrum sinense*) is located immediately adjacent to the project; however, with the farm being certified organic the landowner will not allow Wildlands to remove this privet from his property. As a result, scattered populations of Chinese privet have become established along the perimeter of the conservation easement. In October 2018, the Chinese privet scattered within the

easement was treated using glyphosate and triclopyr respectively. A dense population of Chinese privet along UTSF (Figure 3.0) will be retreated during MY4. Privet will continue to be monitored and treated in subsequent monitoring years.

1.2.3 Stream Assessment

Morphological surveys for MY3 were conducted in April 2018. All streams within the site are stable.

In general, cross sections at the Site show little to no change in the bankfull area, maximum depth ratio, or width-to-depth ratio. The deposition noted in MY1 for the pools on UT1C, UT2B, UT3B, and UT4B have stabilized and cross-sectional areas fall within the range of the design parameters. Slight increases in bank height ratios for some cross-sections are likely the result of the established vegetation causing increased deposition along the bankfull benches. Bank height ratios fall within the success range stated in the mitigation plan.

A bank pin array was established on UTSF Reach 1 to monitor potential meander bend bank erosion at cross-section 4. No changes in exposed length of bank pins were observed during the MY3 assessments indicating bank stability .

Longitudinal profile surveys are not required on the project unless visual inspection indicates reach wide vertical instability. Refer to Appendix 2 for the visual stability assessment table, CCPV map, and reference photographs. Refer to Appendix 4 for the morphological data and plots.

In general, substrate materials in the restoration and enhancement reaches indicated maintenance of coarser materials in the riffle reaches and finer particles in the pools.

1.2.4 Stream Areas of Concern

No stream areas of concern were identified during MY3.

1.2.5 Hydrology Assessment

At the end of the seven-year monitoring period, two or more bankfull events must have occurred in separate years within the restoration reaches. Restoration reaches UTSF Reach 1 and UT5 had multiple bankfull events throughout the year. The crest gauge on UTSF Reach 2 malfunctioned and no data was collected. Bankfull events were also recorded on all restoration reaches during MY1 and MY2 resulting in attainment of the stream hydrology assessment criteria. In addition, the presence of baseflow must be documented within the intermittent reach of UTSF Reach 1 for a minimum of 30 days during a normal precipitation year. Results from the flow gage established on UTSF Reach 1 indicate the stream is maintaining baseflow as expected for an intermittent stream. Baseflow was recorded for 77% of the monitoring period (261 consecutive days and 284 total days). Refer to Appendix 5 for hydrologic data.

1.2.6 Maintenance Plan

The privet population described in Section 1.2.2 will continue to be monitored and treated as necessary.

1.3 Monitoring Year 3 Summary

All standard vegetation plots met the MY3 requirement of 320 stems per acre as noted in CCPV. Chinese privet was treated sporadically along the boundary of the conservation easement in October 2018. All streams within the Site are stable and functioning as designed. A malfunction occurred to the crest gauge on UTSF Reach 2, prohibiting data from being collected, but multiple bankfull events were recorded on UTSF Reach 1 and UT5. Multiple bankfull events have been documented within the restored stream reaches at the Site in both MY1 and MY2, therefor the Site has met the Monitoring Year 7 hydrology success criteria. Additionally, the flow gage on UTSF Reach 1 recorded baseflow for 261

consecutive days during the MY3 monitoring period and therefor met the established hydrological 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 documents 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

Geomorphic data was collected following the standards outlined in The Stream Channel Reference Site: An Illustrated Guide to Field Techniques (Harrelson et al., 1994) and in the Stream Restoration: A Natural Channel Design Handbook (Doll et al., 2003). All 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 surveyed 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 (USACE, 2003) standards. Vegetation monitoring protocols followed the Carolina Vegetation Survey-EEP Level 2 Protocol (Lee et al., 2008).

Section 3: REFERENCES

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

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

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.

North Carolina Department of Environment and Natural Resources. 2005. Division of Water Quality (NCDWR). Cape Fear River Basinwide Water Quality Plan. Accessed online at: http://portal.ncdenr.org/c/document_library/get_file?uuid=2eddbd59-b382-4b58-97ed-c4049bf4e8e4&groupId=38364

North Carolina Division of Mitigation Services (DMS). 2009. Cape Fear River Basin Restoration Priorities. Accessed online at: http://www.nceep.net/services/lwps/cape_fear/RBRP%20Cape%20Fear%202008.pdf

North Carolina Wildlife Resources Commission. 2005. Wildlife Action Plan. Accessed online at: http://www.ncwildlife.org/portals/0/Conserving/documents/ActionPlan/WAP_complete.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.

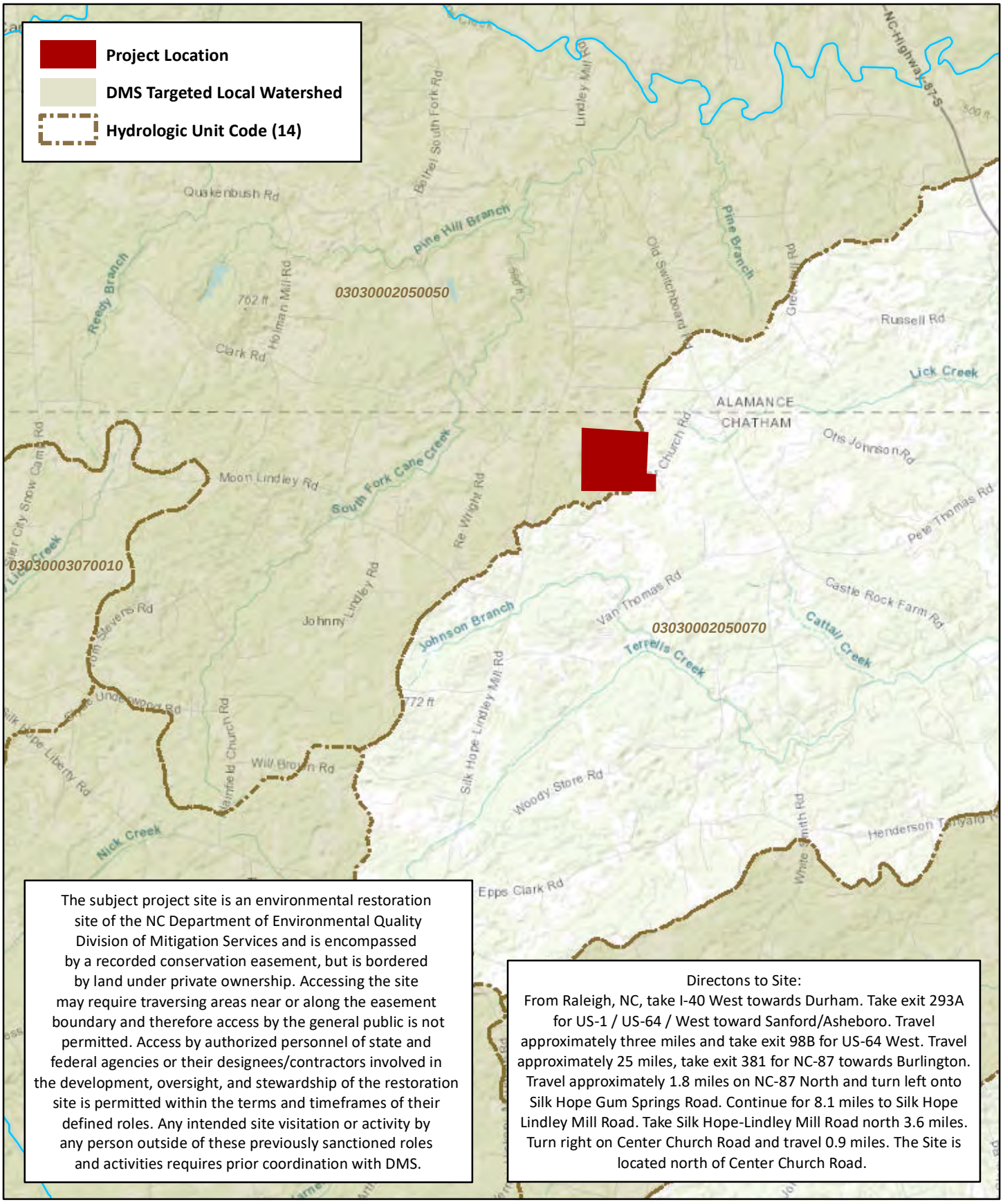
United States Army Corps of Engineers. 2003. Stream Mitigation Guidelines. USACE, NCDENR-DWQ, USEPA, NCWRC.

United States Geological Survey. 1998. North Carolina Geology. http://www.geology.enr.state.nc.us/usgs/carolina.htm

Wildlands Engineering, Inc. 2016. Maney Farm Mitigation Project Baseline Monitoring Document and As-Built Baseline Report. DMS, Raleigh, NC.

Wildlands Engineering, Inc. 2015. Maney Farm Mitigation Project Mitigation Plan. DMS, Raleigh, NC.

APPENDIX 1. General Figures and Tables



The subject project site is an environmental restoration site of the NC Department of Environmental Quality Division of Mitigation Services and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easement boundary and therefore access by the general public is not permitted. Access by authorized personnel of state and federal agencies or their designees/contractors involved in the development, oversight, and stewardship of the restoration site is permitted within the terms and timeframes of their defined roles. Any intended site visitation or activity by any person outside of these previously sanctioned roles and activities requires prior coordination with DMS.

Directons to Site:
From Raleigh, NC, take I-40 West towards Durham. Take exit 293A for US-1 / US-64 / West toward Sanford/Asheboro. Travel approximately three miles and take exit 98B for US-64 West. Travel approximately 25 miles, take exit 381 for NC-87 towards Burlington. Travel approximately 1.8 miles on NC-87 North and turn left onto Silk Hope Gum Springs Road. Continue for 8.1 miles to Silk Hope Lindley Mill Road. Take Silk Hope-Lindley Mill Road north 3.6 miles. Turn right on Center Church Road and travel 0.9 miles. The Site is located north of Center Church Road.

WILDLANDS ENGINEERING

0 0.5 1 Miles

Figure 1 Project Vicinity Map
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018
Chatham County, NC

WILDLANDS ENGINEERING

0 250 500 Feet

Figure 2 Project Component/Asset Map
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018
Chatham County, NC

Table 1. Project Components and Mitigation Credits
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Mitigation Credits									
	Stream		Riparian Wetland		Non-Riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	4,922	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Project Components							
Reach ID	As-Built Stationing / Location	Existing Footage / Acreage	Approach	Restoration or Restoration Equivalent	Restoration Footage / Acreage	Mitigation Ratio	Credits (SMU / WMU)
STREAMS							
UTSF - Reach 1	100+00 - 108+39 108+80 - 121+63	2,298	P1	Restoration	2,122	1:1	2,122
UTSF - Reach 2	121+63 - 132+24	1,209	P1	Restoration	1,061	1:1	1,061
UT1A	250+00 - 253+90	390	EII	Restoration	390	2.5:1	156
UT1B	199+08 - 200+00	101	EII	Restoration	92	2.5:1	37
UT1C	200+00 - 202+60	166	EI	Restoration	260	1.5:1	173
UT2A	295+15 - 300+00	485	EII	Restoration	484	2.5:1	194
UT2B	300+00 - 300+74	44	EI	Restoration	73	1.5:1	49
UT3A	395+79 - 400+00	418	EII	Restoration	421	2.5:1	168
UT3B	400+00 - 401+63	84	EI	Restoration	162	1.5:1	108
UT4A	497+87 - 500+00	217	EII	Restoration	212	2.5:1	85
UT4B	500+00 - 501+38	40	EI	Restoration	138	1.5:1	92
UT5	602+00 - 608+77	778	P1	Restoration	677	1:1	677

Component Summation						
Restoration Level	Stream (LF)	Riparian Wetland (acres)		Non-Riparian Wetland (acres)	Buffer (square feet)	Upland (acres)
		Riverine	Non-Riverine			
Restoration	3,860	-	-	-	-	-
Enhancement		-	-	-	-	-
Enhancement I	633					
Enhancement II	1,599					
Creation		-	-	-		
Preservation	-	-	-	-		-
High Quality Preservation	-	-	-	-		-

* Credit calculations were originally calculated along the as-built thalweg and updated to be calculated along stream centerlines for Monitoring Year 2 after discusions with NC IRT.

Table 2. Project Activity and Reporting History
Maney Farm Mitigation Project
DMS Project No.96314
Monitoring Year 3 - 2018

Activity or Report		Data Collection Complete	Completion or Scheduled Delivery
Mitigation Plan		July 2014	August 2015
Final Design - Construction Plans		July 2014	August 2015
Construction		October 2015 - January 2016	January 2016
Temporary S&E mix applied to entire project area [1]		October 2015 - January 2016	January 2016
Permanent seed mix applied to reach/segments [1]		October 2015 - January 2016	January 2016
Bare root and live stake plantings for reach/segments		February 2016	February 2016
Baseline Monitoring Document (Year 0)	Stream Survey	February 2016	April 2016
	Vegetation Survey	February 2016	
Year 1 Monitoring	Stream Survey	September 2016	December 2016
	Vegetation Survey	September 2016	
Year 2 Monitoring	Stream Survey	March 2017	December 2017
	Vegetation Survey	August 2017	
Year 3 Monitoring	Stream Survey	April 2018	December 2018
	Vegetation Survey	August 2018	
Invasive Vegetation Treatment			October 2018
Year 4 Monitoring	Stream Survey	2019	December 2019
	Vegetation Survey	2019	
Year 5 Monitoring	Stream Survey	2020	December 2020
	Vegetation Survey	2020	
Year 6 Monitoring	Stream Survey	2021	December 2021
	Vegetation Survey	2021	
Year 7 Monitoring	Stream Survey	2022	December 2022
	Vegetation Survey	2022	

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

Table 3. Project Contact Table
Maney Farm Mitigation Site
DMS Project No. 96314
Monitoring Year 3 - 2018

Designer Jeff Keaton, PE	**Wildlands Engineering, Inc.** 312 West Millbrook Road, Suite 225 Raleigh, NC 27609 919.851.9986
Construction Contractor	**Land Mechanic Designs, Inc.** 126 Circle G Lane Willow Spring, NC 27592
Planting Contractor	**Bruton Natural Systems, Inc** P.O. Box 1197 Fremont, NC 27830
Seeding Contractor	**Land Mechanic Designs, Inc.** 126 Circle G Lane Willow Spring, NC 27592
Seed Mix Sources	**Green Resource, LLC**
Nursery Stock Suppliers **Bare Roots** **Live Stakes**	**Bruton Natural Systems, Inc**
Monitoring Performers	**Wildlands Engineering, Inc.**
Monitoring, POC	Jason Lorch 919-851-9986

Table 4. Project Information and Attributes

Maney Farm Mitigation Project

DMS Project No. 96314

Monitoring Year 3 - 2018

Project Information	
Project Name	Maney Farm Mitigation Site
County	Chatham County
Project Area (acres)	16.69
Project Coordinates (latitude and longitude)	35°50'18.00" N, 79° 20'38.00" W

Project Watershed Summary Information	
Physiographic Province	Carolina Slate Belt of the Piedmont Physiographic Province
River Basin	Cape Fear
USGS Hydrologic Unit 8-digit	03030002
USGS Hydrologic Unit 14-digit	03030002050050
DWR Sub-basin	03-06-04
Project Drainiage Area (acres)	211
Project Drainage Area Percentage of Impervious Area	3%
CGIA Land Use Classification	69% – Agriculture/Managed Herbaceous; 28% – Forested/Scrubland; 3% - Developed

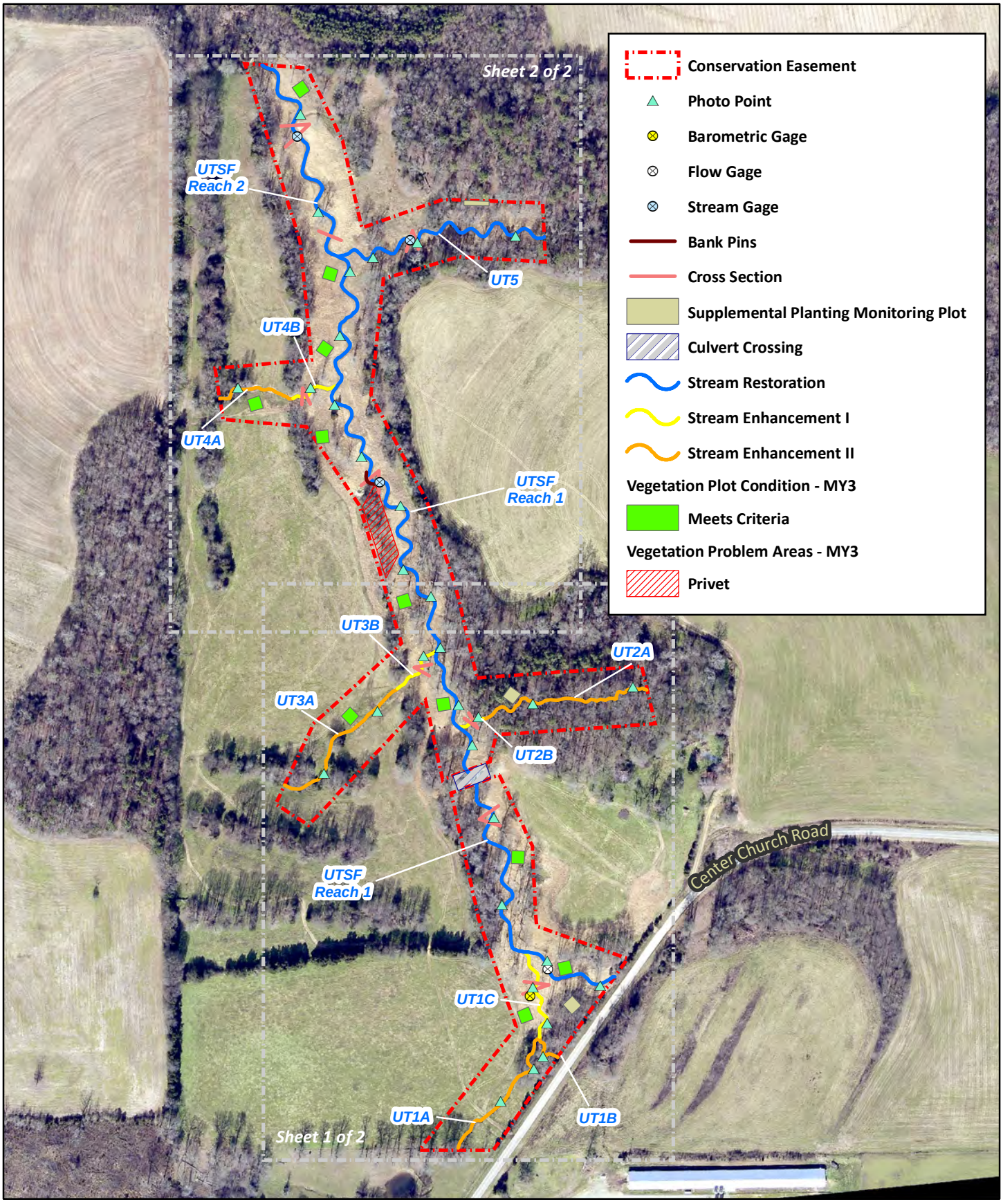
Reach Summary Information

Parameters	UTSF-R1	UTSF-R2	UT1A	UT1B	UT1C	UT2A/B	UT3A/B	UT4A/B	UT5
Length of Reach (linear feet) - Post-Restoration	2,122	1,061	390	92	260	557	583	350	677
Drainage Area (acres)	115	211	16	4	19	11	10	20	76
NCDWR Stream Identification Score	27/37	37	21	25.5	28	26/30	20.75	22.5	32.5
NCDWR Water Quality Classification	N/A								
Morphological Desription (stream type)	I/P	P	I	I	I	I/P	I	I	P
Evolutionary Trend (Simon's Model) - Pre-Restoration	II/IV	II/IV	III	V	II/IV	II/V	V/VI	II/V	II/III
Underlying Mapped Soils	Cid Silt Loam, Cid-Lignum Complex, Nanford-Badin Complex, Georgeville Silty Clay Loam								
Drainage Class	Well Drained - Moderately Well Drained								
Soil Hydric Status	Cid-Lignum Complex 2 to 6 percent slopes - Hydric								
Slope	0.0131	0.0086	0.0187	0.0396	0.0187	0.0366	0.0377	0.0232	0.0139
FEMA Classification	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	X	X	USACE Nationwide Permit No.27 and DWR 401 Water Quality Certification No. 3885.
Waters of the United States - Section 401	X	X	
Division of Land Quality (Dam Safety)	N/A	N/A	N/A
Endangered Species Act	X	X	Maney Farm Mitigation Plan; Wildlands determined "no effect" on Chatham County listed endangered species. The USFWS responded on April 4, 2014 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	X	X	Correspondence from SHPO on March 24, 2014 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	X	X	Correspondence from Chatham County Public Works Director on January 12, 2015 stated that a floodplain development permit is not required since work is not occurring is not located in a Special Flood Hazard Area.
Essential Fisheries Habitat	N/A	N/A	N/A

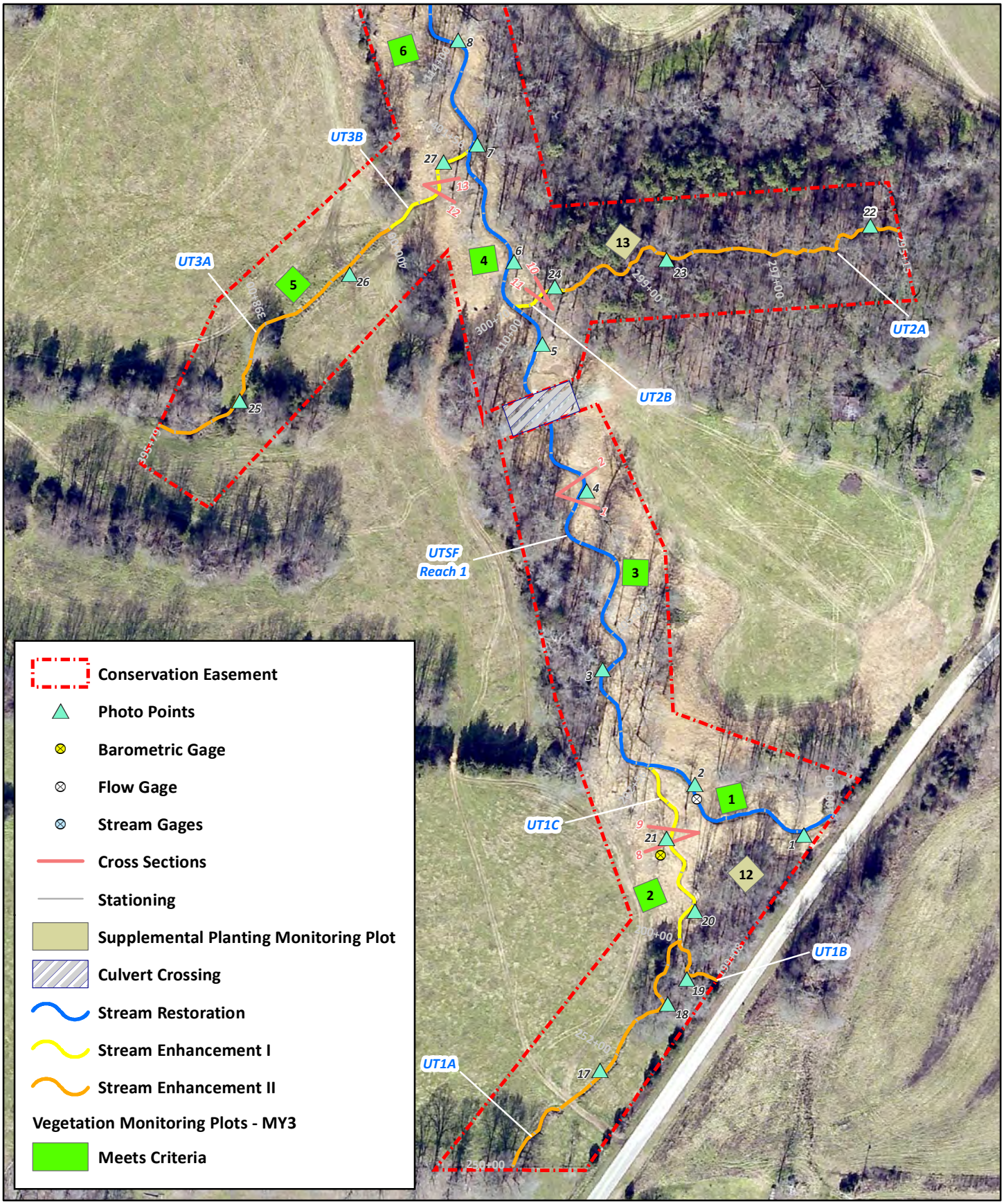
APPENDIX 2. Visual Assessment Data



WILDLANDS ENGINEERING

0 250 500 Feet

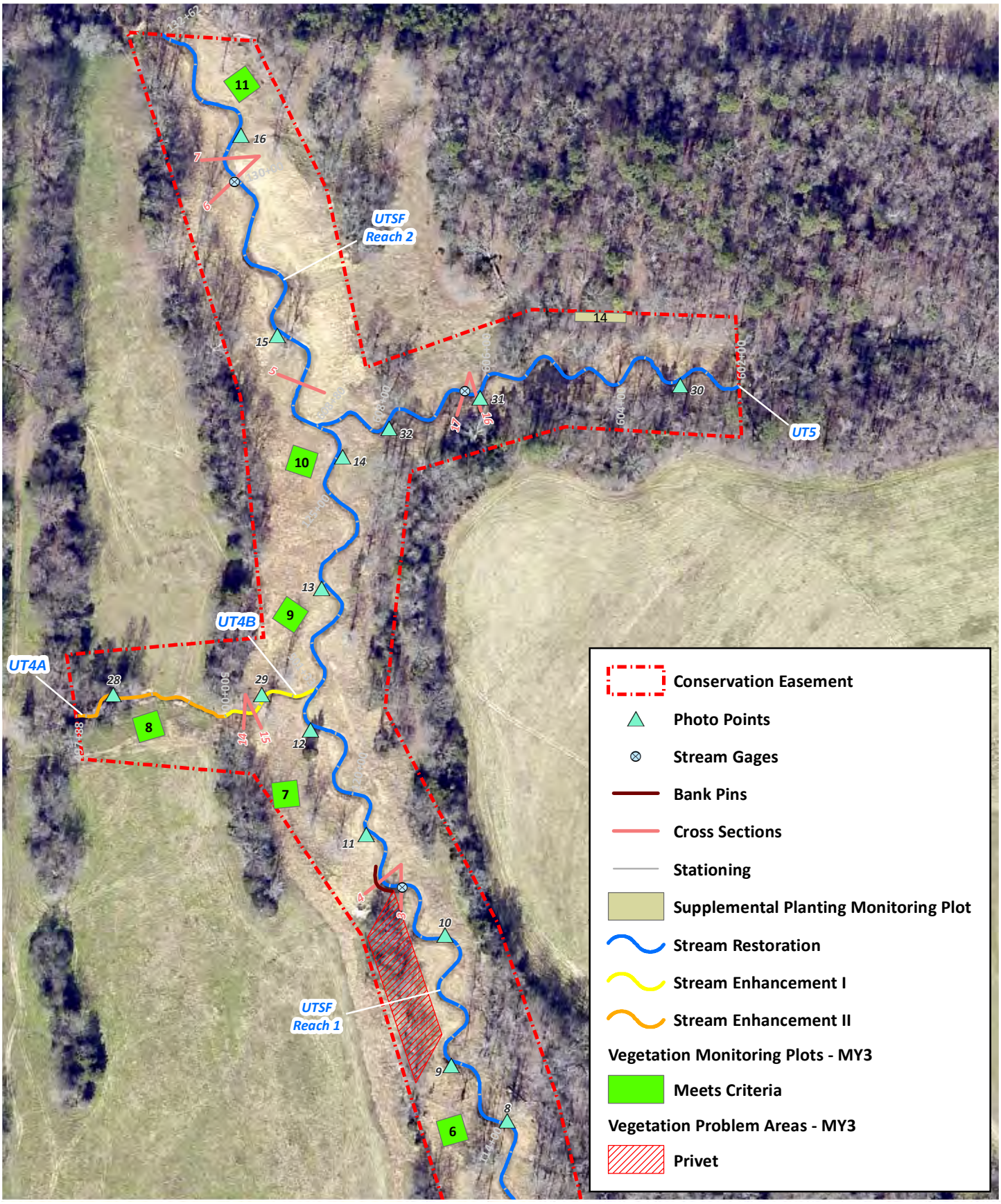
Figure 3.0 Integrated Current Condition Plan View (Key)
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018
Chatham County, NC
2017 Aerial Photography



WILDLANDS ENGINEERING

0 50 100 Feet

Figure 3.1 Integrated Current Condition Plan View
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018
Chatham County, NC
2017 Aerial Photography



WILDLANDS ENGINEERING

0 50 100 Feet

Figure 3.2 Integrated Current Condition Plan View
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018
Chatham County, NC
2017 Aerial Photography

Table 5a. Visual Stream Morphology Stability Assessment Table
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UTSF Reach 1 (2,122 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	38	38			100%			
	3. Meander Pool Condition	Depth Sufficient	38	38			100%			
		Length Appropriate	38	38			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	37	37			100%			
		Thalweg centering at downstream of meander bend (Glide)	38	38			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	n/a	n/a	n/a
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	n/a	n/a	n/a
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	n/a	n/a	n/a
				Totals	0	0	100%	n/a	n/a	n/a
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	30	30			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	16	16			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	16	16			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	14	14			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	14	14			100%			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 5b. Visual Stream Morphology Stability Assessment Table
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UTSF Reach 2 (1,077 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	17	17			100%			
	3. Meander Pool Condition	Depth Sufficient	16	16			100%			
		Length Appropriate	16	16			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	16	16			100%			
		Thalweg centering at downstream of meander bend (Glide)	16	16			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	n/a	n/a	n/a
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	n/a	n/a	n/a
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	n/a	n/a	n/a
				Totals	0	0	100%	n/a	n/a	n/a
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	10	10			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	7	7			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	7	7			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	3	3			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	3	3			100%			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 5c. Visual Stream Morphology Stability Assessment Table
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UT1C (256 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	9	9			100%			
	3. Meander Pool Condition	Depth Sufficient	8	8			100%			
		Length Appropriate	8	8			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	8	8			100%			
		Thalweg centering at downstream of meander bend (Glide)	8	8			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	n/a	n/a	n/a
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	n/a	n/a	n/a
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	n/a	n/a	n/a
				Totals	0	0	100%	n/a	n/a	n/a
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	n/a	n/a			n/a			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	n/a	n/a			n/a			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	n/a	n/a			n/a			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	n/a	n/a			n/a			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	n/a	n/a			n/a			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 5d. Visual Stream Morphology Stability Assessment Table
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UT2B (70 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	3	3			100%			
	3. Meander Pool Condition	Depth Sufficient	2	2			100%			
		Length Appropriate	2	2			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	2	2			100%			
		Thalweg centering at downstream of meander bend (Glide)	2	2			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	n/a	n/a	n/a
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	n/a	n/a	n/a
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	n/a	n/a	n/a
				Totals	0	0	100%	n/a	n/a	n/a
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	n/a	n/a			n/a			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	n/a	n/a			n/a			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	n/a	n/a			n/a			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	n/a	n/a			n/a			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	n/a	n/a			n/a			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 5e. Visual Stream Morphology Stability Assessment Table
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UT3B (155 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	4	4			100%			
		Length Appropriate	4	4			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	4	4			100%			
		Thalweg centering at downstream of meander bend (Glide)	4	4			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	n/a	n/a	n/a
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	n/a	n/a	n/a
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	n/a	n/a	n/a
				Totals	0	0	100%	n/a	n/a	n/a
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	n/a	n/a			n/a			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	n/a	n/a			n/a			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	n/a	n/a			n/a			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	n/a	n/a			n/a			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	n/a	n/a			n/a			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 5f. Visual Stream Morphology Stability Assessment Table
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UT4B (133 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	4	4			100%			
		Length Appropriate	4	4			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	4	4			100%			
		Thalweg centering at downstream of meander bend (Glide)	4	4			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	n/a	n/a	n/a
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	n/a	n/a	n/a
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	n/a	n/a	n/a
				Totals	0	0	100%	n/a	n/a	n/a
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	n/a	n/a			n/a			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	n/a	n/a			n/a			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	n/a	n/a			n/a			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	n/a	n/a			n/a			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	n/a	n/a			n/a			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 5g. Visual Stream Morphology Stability Assessment Table
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UT5 (680 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	17	17			100%			
	3. Meander Pool Condition	Depth Sufficient	16	16			100%			
		Length Appropriate	16	16			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	16	16			100%			
		Thalweg centering at downstream of meander bend (Glide)	16	16			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	n/a	n/a	n/a
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	n/a	n/a	n/a
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	n/a	n/a	n/a
				Totals	0	0	100%	n/a	n/a	n/a
3. Engineered Structures[1]	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	9	9			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	9	9			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	9	9			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	n/a	n/a			n/a			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	n/a	n/a			n/a			

[1]Excludes constructed riffles since they are evaluated in section 1.

Table 6. Vegetation Condition Assessment Table

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Planted Acreage **16**

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

Easement Acreage **17**

Vegetation Category	Definitions	Mapping Threshold (SF)	Number of Polygons	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern	Areas of points (if too small to render as polygons at map scale).	1,000	1	0.2	1.2%
Easement Encroachment Areas	Areas of points (if too small to render as polygons at map scale).	none	0	0	0%

STREAM PHOTOGRAPHS
UT to South Fork Reach 1

	
PHOTO POINT 1 – looking upstream *(04/10/2018)*	**PHOTO POINT 1 – looking downstream *(04/10/2018)***
	
PHOTO POINT 2 – looking upstream *(04/10/2018)*	**PHOTO POINT 2 – looking downstream *(04/10/2018)***
	
PHOTO POINT 3 – looking upstream *(04/10/2018)*	**PHOTO POINT 3 – looking downstream *(04/10/2018)***

PHOTO POINT 4 – looking upstream *(04/10/2018)*

PHOTO POINT 4 – looking downstream *(04/10/2018)*

PHOTO POINT 5 – looking upstream *(04/10/2018)*

PHOTO POINT 5 – looking downstream *(04/10/2018)*

PHOTO POINT 6 – looking upstream *(04/10/2018)*

PHOTO POINT 6 – looking downstream *(04/10/2018)*

PHOTO POINT 7 – looking upstream *(04/10/2018)*

PHOTO POINT 7 – looking downstream *(04/10/2018)*

PHOTO POINT 8 – looking upstream *(04/10/2018)*

PHOTO POINT 8 – looking downstream *(04/10/2018)*

PHOTO POINT 9 – looking upstream *(04/10/2018)*

PHOTO POINT 9 – looking downstream *(04/10/2018)*

	
PHOTO POINT 10 – looking upstream *(04/10/2018)*	**PHOTO POINT 10 – looking downstream *(04/10/2018)***
	
PHOTO POINT 11 – looking upstream *(04/10/2018)*	**PHOTO POINT 11 – looking downstream *(04/10/2018)***
	
PHOTO POINT 12 – looking upstream *(04/10/2018)*	**PHOTO POINT 12 – looking downstream *(04/10/2018)***

STREAM PHOTOGRAPHS
UT to South Fork Reach 2

	
PHOTO POINT 13 – looking upstream *(04/10/2018)*	**PHOTO POINT 13 – looking downstream *(04/10/2018)***
	
PHOTO POINT 14 – looking upstream *(04/10/2018)*	**PHOTO POINT 14 – looking downstream *(04/10/2018)***
	
PHOTO POINT 15 – looking upstream *(04/10/2018)*	**PHOTO POINT 15 – looking downstream *(04/10/2018)***

	
PHOTO POINT 16 – looking upstream *(04/10/2018)*	**PHOTO POINT 16 – looking downstream *(04/10/2018)***

STREAM PHOTOGRAPHS
UT1C

	
PHOTO POINT 17 – looking upstream *(04/10/2018)*	**PHOTO POINT 17 – looking downstream *(04/10/2018)***
	
PHOTO POINT 18 – looking upstream *(04/10/2018)*	**PHOTO POINT 18 – looking downstream *(04/10/2018)***
	
PHOTO POINT 19 – looking upstream *(04/10/2018)*	**PHOTO POINT 19 – looking downstream *(04/10/2018)***

	
PHOTO POINT 20 – looking upstream *(04/10/2018)*	**PHOTO POINT 20 – looking downstream *(04/10/2018)***
	
PHOTO POINT 21 – looking upstream *(04/10/2018)*	**PHOTO POINT 21 – looking downstream *(04/10/2018)***

STREAM PHOTOGRAPHS
UT2

	
PHOTO POINT 22 – looking upstream *(04/10/2018)*	**PHOTO POINT 22 – looking downstream *(04/10/2018)***
	
PHOTO POINT 23 – looking upstream *(04/10/2018)*	**PHOTO POINT 23 – looking downstream *(04/10/2018)***
	
PHOTO POINT 24 – looking upstream *(04/10/2018)*	**PHOTO POINT 24 – looking downstream *(04/10/2018)***

STREAM PHOTOGRAPHS
UT3

	
PHOTO POINT 25 – looking upstream *(04/10/2018)*	**PHOTO POINT 25 – looking downstream *(04/10/2018)***
	
PHOTO POINT 26 – looking upstream *(04/10/2018)*	**PHOTO POINT 26 – looking downstream *(04/10/2018)***
	
PHOTO POINT 27 – looking upstream *(04/10/2018)*	**PHOTO POINT 27 – looking downstream *(04/10/2018)***

STREAM PHOTOGRAPHS
UT4

	
PHOTO POINT 28 – looking upstream *(04/10/2018)*	**PHOTO POINT 28 – looking downstream *(04/10/2018)***
	
PHOTO POINT 29 – looking upstream *(04/10/2018)*	**PHOTO POINT 29 – looking downstream *(04/10/2018)***

STREAM PHOTOGRAPHS
UT5

	
PHOTO POINT 30 – looking upstream *(04/10/2018)*	**PHOTO POINT 30 – looking downstream *(04/10/2018)***
	
PHOTO POINT 31 – looking upstream *(04/10/2018)*	**PHOTO POINT 31 – looking downstream *(04/10/2018)***
	
PHOTO POINT 32 – looking upstream *(04/10/2018)*	**PHOTO POINT 32 – looking downstream *(04/10/2018)***

VEGETATION PHOTOGRAPHS

VEGETATION PLOT 1 – (*08/1/2018*)

VEGETATION PLOT 2 – (*08/1/2018*)

VEGETATION PLOT 3 – (*08/1/2018*)

VEGETATION PLOT 4 – (*08/1/2018*)

VEGETATION PLOT 5 – (*08/1/2018*)

VEGETATION PLOT 6 – (*08/1/2018*)

VEGETATION PLOT 7 – (*08/1/2018*)

VEGETATION PLOT 8 – (*08/1/2018*)

VEGETATION PLOT 9 – (*08/1/2018*)

VEGETATION PLOT 10 – (*08/1/2018*)

VEGETATION PLOT 11 – (*08/1/2018*)

VEGETATION PLOT 12 – (*08/1/2018*)

	
VEGETATION PLOT 13 – (*08/1/2018*)	**VEGETATION PLOT 14 – (*08/1/2018*)**

APPENDIX 3. Vegetation Plot Data

Table 7a. Vegetation Plot Criteria Attainment Table (Standard Planting Zones)

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Plot	Success Criteria Met (Y/N)	Tract Mean
1	Y	100%
2	Y	
3	Y	
4	Y	
5	Y	
6	Y	
7	Y	
8	Y	
9	Y	
10	Y	
11	Y	

Table 7b. Percent Survival by Plot Table (Supplemental Planting Zones)

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Plot	MY0 Stems/Plot	MY1 Stems/Plot	MY2 Stems/Plot	MY3 Stems/Plot	MY1 Survival (%)	MY2 Survival (%)	MY3 Survival (%)	MY1 Mean Survival (%)	MY2 Mean Survival (%)	MY3 Mean Survival (%)
12	16	13	5	3	81%	31%	19%	83%	46%	29%
13	16	15	10	8	94%	63%	50%			
14	16	12	7	3	75%	44%	19%			

Table 7c. Percent Survival by Species Table (Supplemental Planting Zones)

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Scientific Name	Common Name	MY0 Stems	MY1 Stems	MY2 Stems	MY3 Stems	MY1 Survival (%)	MY2 Survival (%)	MY3 Survival (%)
Aesculus pavia	Red buckeye	3	3	1	1	100%	33%	33%
Callicarpa americana	American beautyberry	11	9	1	0	82%	9%	0%
Calycanthus floridus	Sweet-shrub	6	4	2	1	67%	33%	17%
Carpinus caroliniana	American hornbeam	17	16	13	10	94%	76%	59%
Symphoricarpos orbiculatus	Coralberry	10	7	5	2	70%	50%	20%
Viburnum prunifolium	Black haw	1	1	0	0	100%	0%	0%

Table 8. CVS Vegetation Tables - Metadata

Maney Farm Mitigation Project

DMS Project No. 96314

Monitoring Year 3 - 2018

Report Prepared By	Carolyn Lanza
Date Prepared	8/3/2018
Database Name	Maney Farm MY2- cvs-eep-entrytool-v2.5.0.mdb
Database Location	F:\Projects\005-02144 Maney Farm\Monitoring\Monitoring Year 3\Vegetation Assessment
Computer Name	JOELOVENSHIMER
File Size	94806016
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Project Planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Project Total Stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and Spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY----------	
Project Code	96314
Project Name	Maney Farm
Description	Stream Mitigation
Sampled Plots	14

Table 9a. Planted and Total Stems (Standard Planting Zones)

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Scientific Name	Common Name	Species Type	Current Plot Data (MY3 2018)																	
			96314-WEI-0001			96314-WEI-0002			96314-WEI-0003			96314-WEI-0004			96314-WEI-0005			96314-WEI-0006		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	Boxelder Maple	Tree																		
Acer rubrum	Red Maple	Tree																		
Alnus serrulata	Tag Alder	Shrub Tree																		
Betula nigra	River Birch	Tree	2	2	2	3	3	3	1	1	1	1	1	1	1	1	1	3	3	3
Calycanthus floridus	Sweet-shrub	Shrub										1	1	1						
Carpinus caroliniana	American Hornbeam	Shrub Tree							2	2	2									
Fraxinus pennsylvanica	Green Ash	Tree	3	3	83	3	3	55	6	6	21			15	3	3	3	3	3	27
Juglans nigra	Black Walnut	Tree																		
Liquidambar styraciflua	Sweet Gum	Tree						2			2									
Liriodendron tulipifera	Tulip Poplar	Tree													1	1	1	1	1	1
Pinus taeda	Loblolly Pine	Tree																		
Platanus occidentalis	Sycamore	Tree	2	2	2	1	1	1	1	1	1	5	5	5	1	1	1	2	2	2
Populus heterophylla	Swamp Cottonwood	Tree																		
Quercus palustris	Pin Oak	Tree	1	1	1	1	1	1				1	1	1	1	1	1			
Quercus phellos	Willow Oak	Tree				4	4	15	1	1	1	1	1	1	4	4	4	2	2	2
Salix nigra	Black Willow	Tree																		
Symphoricarpos orbiculatus	Coralberry	Shrub						12			9									
Ulmus alata	Winged Elm	Tree																		
Ulmus americana	American Elm	Tree																		7
Ulmus rubra	Slippery Elm	Tree																		
Viburnum prunifolium	Black Haw	Shrub Tree																		
Stem count			8	8	88	12	12	89	11	11	37	9	9	24	11	11	11	11	11	42
size (ares)			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			4	4	4	5	5	7	5	5	7	5	5	6	6	6	6	5	5	6
Stems per ACRE			324	324	3561	486	486	3602	445	445	1497	364	364	971	445	445	445	445	445	1700

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%
Volunteers

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

Table 9a. Planted and Total Stems (Standard Planting Zones)

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Scientific Name	Common Name	Species Type	Current Plot Data (MY3 2018)														
			96314-WEI-0007			96314-WEI-0008			96314-WEI-0009			96314-WEI-0010			96314-WEI-0011		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	Boxelder Maple	Tree															1
Acer rubrum	Red Maple	Tree			1									17			
Alnus serrulata	Tag Alder	Shrub Tree													1	1	1
Betula nigra	River Birch	Tree				3	3	3	1	1	1						
Calycanthus floridus	Sweet-shrub	Shrub				1	1	1									
Carpinus caroliniana	American Hornbeam	Shrub Tree				1	1	1				1	1	1			
Fraxinus pennsylvanica	Green Ash	Tree	6	6	7	4	4	5	3	3	15	5	5	40	4	4	22
Juglans nigra	Black Walnut	Tree						1									
Liquidambar styraciflua	Sweet Gum	Tree						1									
Liriodendron tulipifera	Tulip Poplar	Tree															
Pinus taeda	Loblolly Pine	Tree															1
Platanus occidentalis	Sycamore	Tree	3	3	3	3	3	3	8	8	8	5	5	7	6	6	12
Populus heterophylla	Swamp Cottonwood	Tree												1			
Quercus palustris	Pin Oak	Tree				1	1	1	1	1	1						
Quercus phellos	Willow Oak	Tree	1	1	1							3	3	3			
Salix nigra	Black Willow	Tree															
Symphoricarpos orbiculatus	Coralberry	Shrub						33									2
Ulmus alata	Winged Elm	Tree						2									
Ulmus americana	American Elm	Tree												8			1
Ulmus rubra	Slippery Elm	Tree												9			
Viburnum prunifolium	Black Haw	Shrub Tree	1	1	1	1	1	1									
		Stem count	11	11	13	14	14	52	13	13	25	14	14	86	11	11	40
		size (ares)	1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02		
		Species count	4	4	5	7	7	11	4	4	4	4	4	8	3	3	7
		Stems per ACRE	445	445	526	567	567	2104	526	526	1012	567	567	3480	445	445	1619

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%
Volunteers

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

Table 9a. Planted and Total Stems (Standard Planting Zones)

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Scientific Name	Common Name	Species Type	Annual Means											
			MY3 (2018)			MY2 (2017)			MY1 (2016)			MY0 (2016)		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	Boxelder Maple	Tree			1									
Acer rubrum	Red Maple	Tree			18									
Alnus serrulata	Tag Alder	Shrub Tree	1	1	1	4	4	4	7	7	7	13	13	13
Betula nigra	River Birch	Tree	15	15	15	13	13	13	19	19	19	25	25	25
Calycanthus floridus	Sweet-shrub	Shrub	2	2	2									
Carpinus caroliniana	American Hornbeam	Shrub Tree	4	4	4	7	7	7	10	10	10	13	13	13
Fraxinus pennsylvanica	Green Ash	Tree	40	40	293	36	36	139	35	35	35	36	36	36
Juglans nigra	Black Walnut	Tree			1									
Liquidambar styraciflua	Sweet Gum	Tree			5									
Liriodendron tulipifera	Tulip Poplar	Tree	2	2	2	2	2	2	7	7	7	16	16	16
Pinus taeda	Loblolly Pine	Tree			1									
Platanus occidentalis	Sycamore	Tree	37	37	45	38	38	44	37	37	37	37	37	37
Populus heterophylla	Swamp Cottonwood	Tree			1									
Quercus palustris	Pin Oak	Tree	6	6	6	6	6	6	15	15	15	16	16	16
Quercus phellos	Willow Oak	Tree	16	16	27	15	15	21	15	15	15	16	16	16
Salix nigra	Black Willow	Tree						1						
Symphoricarpos orbiculatus	Coralberry	Shrub			56				7	7	7	10	10	10
Ulmus alata	Winged Elm	Tree			2			2						
Ulmus americana	American Elm	Tree			16									
Ulmus rubra	Slippery Elm	Tree			9			13						
Viburnum prunifolium	Black Haw	Shrub Tree	2	2	2	2	2	2	5	5	5	5	5	5
Stem count			125	125	507	123	123	254	157	157	157	187	187	187
size (ares)			14			14			14			14		
size (ACRES)			0.35			0.35			0.35			0.35		
Species count			10	10	20	9	9	12	10	10	10	10	10	10
Stems per ACRE			361	361	1466	356	356	734	454	454	454	541	541	541

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%
Volunteers

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

Table 9b. Planted and Total Stems (Supplemental Planting Zones)

Maney Farm Mitigation Project

DMS Project No. 96314

Monitoring Year 3 - 2018

Scientific Name	Common Name	Species Type	Current Plot Data (MY3 2018)									Annual Summaries											
			Vegetation Plot 12			Vegetation Plot 13			Vegetation Plot 14			MY3 (8/2018)			MY2 (8/2017)			MY1 (9/2016)			MY0 (2/2016)		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Aesculus pavia	Red buckeye	Shrub/Tree				1	1	1				1	1	1	1	1	1	3	3	3	3	3	3
Callicarpa americana	American beautyberry	Shrub										0	0	0	1	1	1	9	9	9	11	11	11
Calycanthus floridus	Sweet-shrub	Shrub	1	1	1							1	1	1	2	2	2	4	4	4	6	6	6
Carpinus caroliniana	American hornbeam	Shrub Tree	2	2	2	5	5	5	3	3	3	10	10	10	13	13	13	16	16	16	17	17	17
Symphoricarpos orbiculatus	Coralberry	Shrub				2	2	2				2	2	2	5	5	5	7	7	7	10	10	10
Viburnum prunifolium	Black haw	Shrub Tree										0	0	0	0	0	0	1	1	1	1	1	1
Stem count			3	3	3	8	8	8	3	3	3	14	14	14	22	22	22	40	40	40	48	48	48
Size (ares)			1			1			1			3			3			3			3		
Size (ACRES)			0.02			0.02			0.02			0.07			0.07			0.07			0.07		
Species count			2	2	2	3	3	3	1	1	1	6	6	6	6	6	6	6	6	6	6	6	6
Stems per ACRE			121	121	121	324	324	324	121	121	121	189	189	189	297	297	297	540	540	540	647	647	647

Supplemental planting zones are monitored to determine survival rates of these species but the results will not be tied to project success.

PnoLS: Number of Planted stems excluding live stakes

P-all: Number of planted stems including live stakes

T: Total Stems

APPENDIX 4. Morphological Summary Data and Plots

Table 10a. Baseline Stream Data Summary

Maney Farm Mitigation Project

DMS Project No. 96314

Monitoring Year 3 - 2018

UT South Fork Reaches 1 and 2

		Pre-Restoration Condition				Reference Reach Data				Design				As-Built/Baseline			
Parameter	**Gage**	**UTSF Reach 1**		**UTSF Reach 2**		**Agony Acres UT1A-Reach 1**		**UT to Cane Creek**		**UTSF Reach 1**		**UTSF Reach 2**		**UTSF Reach 1**		**UTSF Reach 2**	
		Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Dimension and Substrate - Riffle																	
Bankfull Width (ft)		3.2	12.0	4.7	8.2	9.1	10.4	11.5	12.3	9.5		12.1		8.8	9.3	12.7	13.7
Floodprone Width (ft)		15	50	70	82	>36		31		21	48	27	61	85		150	
Bankfull Mean Depth		0.6	1.3	0.7	1.2	1.0	1.2	0.8	1.0	0.7		0.8		0.6	0.7	0.8	0.9
Bankfull Max Depth		1.2	2.0	1.5		1.8		1.2	1.6	1.0	1.2	1.2	1.5	1.0	1.2	1.3	1.4
Bankfull Cross Sectional Area (ft^2)	N/A	4.1	7.1	5.4	5.6	10.7	11.3	8.9	12.2	6.5		10.2		5.3	6.8	10.9	11.0
Width/Depth Ratio		2.5	20.4	4.0	12.3	7.3	10.1	12.3	14.4	14.0		14.0		9.1	9.7	14.5	17.3
Entrenchment Ratio		1.4	12.5	10.0	14.8	>3.9		2.5	2.7	2.2	5.0	2.2	5.0	6.2	9.5	10.9	11.8
Bank Height Ratio		1.3	2.2	1.4	1.9	---		---		0.9	1.1	0.9	1.1	1.0		1.0	
D50 (mm)		Medium Sand		Silt/Clay										8.4		10.4	
Riffle Length (ft)						---		---		---		---		9	50	9	40
Riffle Slope (ft/ft)		0.0036	0.0274	0.0062	0.0258	---		0.0188	0.0704	0.0120	0.0505	0.0106	0.0447	0.0058	0.0432	0.0055	0.0326
Pool Length (ft)	N/A					---		---		---		---		12	47	23	50
Pool Max Depth (ft)		1.5	1.8	1.8	2	2.5		1.8	2.3	1.1	2.1	1.3	2.6	2.4	2.6	2.1	
Pool Spacing (ft)		23	239	44	145	---		27	73	3	67	4	85	29	85	45	78
Pool Volume (ft^3)																	
Pattern																	
Channel Beltwidth (ft)		5	42	10	37	21	93	102		15	85	19	108	24	56	37	54
Radius of Curvature (ft)		4	25	5	13	14	60	23	38	17	55	22	70	9	36	17	28
Rc:Bankfull Width (ft/ft)	N/A	1.3	2.1	1.1	1.6	1.5	5.8	2.0	3.1	1.8	5.8	1.8	5.8	1.0	4.1	1.6	2.6
Meander Length (ft)		18	100	21	59	---		---		29	156	36	198	68	151	110	144
Meander Width Ratio		1.6	3.5	2.1	4.5	2.3	8.9	8.3	8.9	1.6	8.9	1.6	8.9	2.7	6.5	3.4	5.0
Substrate, Bed and Transport Parameters																	
Ri%/Ru%/P%/G%/S%																	
SC%/Sa%/G%/C%/B%/Be%														21/13/64/2/0/0		28/10/56/6/0/0	
d16/d35/d50/d84/d95/d100	N/A	SC/VFS/MS/11.1/15.4/22.6		SC/SC/SC/6.1/28.5/180		---		---						SC/2.37/8.4/34.5/55/180		SC/0.40/10.4/37.9/71.7/180	
Reach Shear Stress (Competency) lb/ft^2		0.39		0.45						0.42		0.44		0.32	0.34	0.35	0.37
Max part size (mm) mobilized at bankfull		28.9		34.2						31.7		33.0					
Stream Power (Capacity) W/m^2										---		---		---		---	
Additional Reach Parameters																	
Drainage Area (SM)		0.18		0.33		0.30		0.29		0.18		0.33		0.18		0.33	
Watershed Impervious Cover Estimate (%)		5%		3%		---		---		5%		3%		5%		3%	
Rosgen Classification		E5		E5		E4		E4		C		C		C		C	
Bankfull Velocity (fps)		2.8	4.8	3.4	3.6	2.2	2.4	3.8		3.0		2.8		2.8	3.6	2.6	2.7
Bankfull Discharge (cfs)		19.6		19.3		25.3		40.0		19.0		29.0		19.0		29.0	
Q-NFF regression (2-yr)										43		67					
Q-USGS extrapolation (1.2-yr)	N/A									22		34					
Q-Mannings										4.8	8.0	6.9	11.0				
Valley Length (ft)		1,720		910		---		---		1,720		910		1,720		910	
Channel Thalweg Length (ft)		2,298		1,209		---		---		2,163		1,061		2,185		1,077	
Sinuosity		1.34		1.33		1.35		1.40		1.20	1.40	1.20	1.40	1.27		1.18	
Water Surface Slope ($ft/ft)^2$		0.0084		0.0075		---		---		0.0095		0.0113		0.0103		0.0078	
Bankfull Slope (ft/ft)		---		---		---		---		0.0129		0.0114		0.0102	0.0104	0.0077	0.0078

SC: Silt/Clay <0.062 mm diameter particles

(---): Data was not provided

N/A: Not Applicable

Table 10b. Baseline Stream Data Summary

Maney Farm Mitigation Project

DMS Project No. 96314

Monitoring Year 3 - 2018

UT1C and UT2B

		Pre-Restoration Condition				Reference Reach Data		Design				As-Built/Baseline			
Parameter	**Gage**	**UT1C**		**UT2B**		**UT to Varnals Creek**		**UT1C**		**UT2B**		**UT1C**		**UT2B**	
		Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Dimension and Substrate - Riffle															
Bankfull Width (ft)		4.1		2.6		9.3	10.5	8.1		4.0		9.8		5.5	
Floodprone Width (ft)		5.3		4.4		20	64	18	41	9	20	60		60	
Bankfull Mean Depth		0.5		0.4		1.1	1.2	0.6		0.4		0.5		0.4	
Bankfull Max Depth		0.8		0.5		1.5	1.7	0.9	1.2	0.5	0.7	0.7		0.7	
Bankfull Cross Sectional Area (ft^2)	N/A	2.1		1.1		10.3	12.3	5.2		1.5		4.9		2.3	
Width/Depth Ratio		8.1		6.2		8.1	9.3	13.0		11.0		19.4		13.2	
Entrenchment Ratio		1.3		1.7		1.9	6.1	2.2	5.0	2.2	5.0	6.1		10.8	
Bank Height Ratio		2.3		5.4		0.9	1.0	0.9	1.1			1.0		1.0	
D50 (mm)		---		---								3.3		0.1	
Riffle Length (ft)						---		---		---		8	22	11	19
Riffle Slope (ft/ft)		---		---		0.0240	0.0570	0.0086	0.0355	0.0083	0.0342	0.0011	0.0110	0.0073	0.0106
Pool Length (ft)						---		---		---		6	22	13	19
Pool Max Depth (ft)	N/A	---		---		2.5	2.6	0.9	1.8	0.6	1.2	2.0		1.5	
Pool Spacing (ft)		34	44	---		8	82	2	44	1	24	22	38	22	
Pool Volume (ft^3)															
Channel Beltwidth (ft)		10	18	1	2	15	45	13	72	6	36	16	26	---	
Radius of Curvature (ft)		9	16	1	3	8	47	11	47	5	23	9	15	13	25
Rc:Bankfull Width (ft/ft)	N/A	2.2	3.9	0.4	1.2	0.6	3.2	1.3	5.8	1.3	5.8	1.0	1.6	1.8	3.3
Meander Length (ft)		54	63	12		---		24	133	12	66	55	73	---	
Meander Width Ratio		2.4	4.4	0.4	0.8	1.0	3.0	1.6	8.9	1.6	8.9	1.7	2.8	---	
Ri%/Ru%/P%/G%/S%															
SC%/Sa%/G%/C%/B%/Be%												24/17/58/1/0/0		47/13/37/3/0/0	
d16/d35/d50/d84/d95/d100	N/A	---		---		---						SC/0.21/3.3/22.6/34.8/128		SC/SC/0.1/22.6/50.6/128	
Reach Shear Stress (Competency) lb/ft^2		---		---				---		---		0.15		0.23	
Max part size (mm) mobilized at bankfull		---		---				---		---					
Stream Power (Capacity) W/m^2								---		---		---		---	
Additional Reach Parameters															
Drainage Area (SM)		0.03		0.02		0.41		0.03		0.02		0.03		0.02	
Watershed Impervious Cover Estimate (%)		13%		0%		---		13%		0%		13%		0%	
Rosgen Classification		B5		B5		E4		C		C		C		C	
Bankfull Velocity (fps)		3.0		3.4		4.4	5.2	1.1		3.1		1.1		1.6	
Bankfull Discharge (cfs)		---		---		54.0		5.6		3.6		5.6		3.6	
Q-NFF regression (2-yr)								13		8					
Q-USGS extrapolation (1.2-yr)	N/A							6		4					
Q-Mannings								4.1	5.7	6.9	7.3				
Valley Length (ft)		142		42		---		220		62		231		67	
Channel Thalweg Length (ft)		166		44		---		260		74		256		70	
Sinuosity		1.17		1.04		1.20		1.10	1.25	1.10	1.25	1.11		1.04	
Water Surface Slope ($ft/ft)^2$		---		---		---		---		---		0.0053		0.0101	
Bankfull Slope (ft/ft)		---		---		---		0.0083		0.0080		0.0078	0.0080	0.0070	0.0084

SC: Silt/Clay <0.062 mm diameter particles

(---): Data was not provided

N/A: Not Applicable

Table 10c. Baseline Stream Data Summary

Maney Farm Mitigation Project

DMS Project No. 96314

Monitoring Year 3 - 2018

UT3B and UT4B

		Pre-Restoration Condition				Reference Reach Data		Design				As-Built/Baseline			
Parameter	**Gage**	**UT3B**		**UT4B**		**UT to Varnals Creek**		**UT3B**		**UT4B**		**UT3B**		**UT4B**	
		Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Dimension and Substrate - Riffle															
Bankfull Width (ft)		2.2		4.4		9.3	10.5	4.0		5.0		4.2		5.7	
Floodprone Width (ft)		11.4		23.3		20	64	9	20	11	25	60		25	
Bankfull Mean Depth		0.5		0.4		1.1	1.2	0.4		0.4		0.4		0.6	
Bankfull Max Depth		0.8		1.0		1.5	1.7	0.5	0.7	0.5	0.7	0.6		0.9	
Bankfull Cross Sectional Area (ft^2)	N/A	1.1		1.9		10.3	12.3	1.5		1.9		1.6		3.6	
Width/Depth Ratio		4.6		9.9		8.1	9.3	11.0		13.0		11.6		9.1	
Entrenchment Ratio		5.1		5.3		1.9	6.1	2.2	5.0	2.2	5.0	14.1		4.3	
Bank Height Ratio		2.2		1.4		0.9	1.0	0.9	1.1	0.9	1.1	1.0		1.0	
D50 (mm)		---		---								5.6		4.0	
Riffle Length (ft)						---		---		---		12	23	8	19
Riffle Slope (ft/ft)		---		---		0.0240	0.0570	0.0191	0.0786	0.0088	0.0312	0.0112	0.0419	0.0035	0.0113
Pool Length (ft)	N/A					---		---		---		10	22	10	21
Pool Max Depth (ft)		---		---		2.5	2.6	0.6	1.2	0.6	1.2	1.3		1.4	
Pool Spacing (ft)		56	157	---		8	82	1	24	3	31	30	36	31	
Pool Volume (ft^3)															
Channel Beltwidth (ft)		---		2	3	15	45	6	36	8	45	12	23	19	23
Radius of Curvature (ft)		---		2	3	8	47	5	23	7	29	11	47	10	20
Rc:Bankfull Width (ft/ft)	N/A	---		0.5	0.7	0.6	3.2	1.3	5.8	1.3	5.8	1.7	7.6	1.8	3.6
Meander Length (ft)		---		11	22	---		12	66	15	82	55	68	59	69
Meander Width Ratio		---		0.5	0.7	1.0	3.0	1.6	8.9	1.6	8.9	1.9	3.7	3.3	4.1
Ri%/Ru%/P%/G%/S%															
SC%/Sa%/G%/C%/B%/Be%												32/14/51/3/0/0		22/20/57/1/0/0	
d16/d35/d50/d84/d95/d100	N/A	---		---		---						SC/0.08/5.6/33.4/56.9/90		SC/0.25/4.0/20.1/45/90	
Reach Shear Stress (Competency) lb/ft^2		---		---				---		---		0.33		0.14	
Max part size (mm) mobilized at bankfull		---		---				---		---					
Stream Power (Capacity) W/m^2								---		---		---		---	
Additional Reach Parameters															
Drainage Area (SM)		0.02		0.03		0.41		0.02		0.03		0.02		0.03	
Watershed Impervious Cover Estimate (%)		0%		0%		---		0%		0%		0%		0%	
Rosgen Classification		E5b		E5b		E4		C		C		C		E	
Bankfull Velocity (fps)		3.2		3.0		4.4	5.2	3.3		3.3		2.2		1.5	
Bankfull Discharge (cfs)		---		---		54.0		3.5		5.3		3.5		5.3	
Q-NFF regression (2-yr)								8		12					
Q-USGS extrapolation (1.2-yr)	N/A							4		6					
Q-Mannings								7.8	12.0	4.1	5.5				
Valley Length (ft)		84		38		---		138		117		148		124	
Channel Thalweg Length (ft)		84		40		---		163		138		155		212	
Sinuosity		1.00		1.06		1.20		1.10	1.25	1.10	1.25	1.05		1.71	
Water Surface Slope ($ft/ft)^2$		---		---		---		---		---		0.0164		0.0043	
Bankfull Slope (ft/ft)		---		---		---		0.0170		0.0073		0.0127	0.0161	0.0059	0.0067

SC: Silt/Clay <0.062 mm diameter particles

(---): Data was not provided

N/A: Not Applicable

Table 10d. Baseline Stream Data Summary

Maney Farm Mitigation Project

DMS Project No. 96314

Monitoring Year 3 - 2018

UT5

		Pre-Restoration		Reference Reach Data				Design		As-Built/Baseline	
Parameter	**Gage**	**UT5**		**Agony Acres UT1A-Reach 1**		**UT to Cane Creek**		**UT5**		**UT5**	
		Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Dimension and Substrate - Riffle											
Bankfull Width (ft)	N/A	5.7		9.1	10.4	11.5	12.3	7.2		8.1	
Floodprone Width (ft)		40		>36		31		16	36	100	
Bankfull Mean Depth		0.6		1.0	1.2	0.8	1.0	0.6		0.5	
Bankfull Max Depth		1.2		1.8		1.2	1.6	0.8	1.0	0.9	
Bankfull Cross Sectional Area (ft^2)		3.5		10.7	11.3	8.9	12.2	4.1		4.0	
Width/Depth Ratio		9.1		7.3	10.1	12.3	14.4	13.0		16.6	
Entrenchment Ratio		7.1		>3.9		2.5	2.7	2.2	5.0	12.3	
Bank Height Ratio		1.4		---		---		0.9	1.1	1.0	
D50 (mm)		Silt/Clay								5.9	
Riffle Length (ft)	N/A			---		---		---		5	21
Riffle Slope (ft/ft)		0.0028	0.0638	---		0.0188	0.0704	0.0128	0.0541	0.0081	0.0374
Pool Length (ft)				---		---		---		18	42
Pool Max Depth (ft)		1.4		2.5		1.8	2.3	0.9	1.8	1.7	
Pool Spacing (ft)		9	197	---		27	73	2	44	31	51
Pool Volume (ft^3)											
Pattern											
Channel Beltwidth (ft)	N/A	3	18	21	93	102		12	64	22	40
Radius of Curvature (ft)		3	14	14	60	23	38	13	42	10	37
Rc:Bankfull Width (ft/ft)		0.5	2.5	1.5	5.8	2.0	3.1	1.3	5.8	1.0	3.7
Meander Length (ft)		16	58	---		---		22	118	63	97
Meander Width Ratio		0.5	3.2	2.3	8.9	8.3	8.9	1.6	8.9	2.3	4.0
Substrate, Bed and Transport Parameters											
Ri%/Ru%/P%/G%/S%	N/A										
SC%/Sa%/G%/C%/B%/Be%										34/11/54/1/0/0	
d16/d35/d50/d84/d95/d100		SC/SC/SC/8.9/22.6/64		---		---				SC/0.08/5.9/29.8/53.7/90	
Reach Shear Stress (Competency) lb/ft^2		0.19						0.37		0.31	
Max part size (mm) mobilized at bankfull		14.0						27.5			
Stream Power (Capacity) W/m^2								---		---	
Additional Reach Parameters											
Drainage Area (SM)	N/A	0.12		0.30		0.29		0.12		0.12	
Watershed Impervious Cover Estimate (%)		0%		---		---		0%		0%	
Rosgen Classification		E5		E4		E4		C		C	
Bankfull Velocity (fps)		2.1		2.2	2.4	3.8		2.9		3.5	
Bankfull Discharge (cfs)		7.4		25.3		40.0		14.0		14.0	
Q-NFF regression (2-yr)								32			
Q-USGS extrapolation (1.2-yr)								16			
Q-Mannings								5.4	11.0		
Valley Length (ft)		580		---		---		520		515	
Channel Thalweg Length (ft)		778		---		---		677		680	
Sinuosity		1.34		1.35		1.40		1.20	1.40	1.3	
Water Surface Slope ($ft/ft)^2$		0.0111		---		---		---		0.0114	
Bankfull Slope (ft/ft)		---		---		---		0.0138		0.0110	0.0114

SC: Silt/Clay <0.062 mm diameter particles

(---): Data was not provided

N/A: Not Applicable

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

Maney Farm Mitigation Project

DMS Project No. 96314

Monitoring Year 3 - 2018

	Cross Section 1, UTSF Reach 1 (Riffle)								Cross Section 2, UTSF Reach 1 (Pool)								Cross Section 3, UTSF Reach 1 (Riffle)							
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**
Bankfull Elevation (ft)[1]	567.0	567.0	567.0	567.0					566.4	566.4	566.4	566.5					556.5	556.5	556.5	556.7				
Low Bank Elevation (ft)	567.0	567.0	567.0	567.0					566.4	566.4	566.4	566.5					556.5	556.5	556.5	556.5				
Bankfull Width (ft)	8.8	8.7	8.6	8.6					11.1	10.8	11.5	11.9					9.3	9.0	9.0	9.5				
Floodprone Width (ft)	85	85	85	85					---	---	---	---					85	85	85	85				
Bankfull Mean Depth (ft)	0.6	0.7	0.6	0.6					1.2	1.3	1.2	1.1					0.7	0.7	0.7	0.7				
Bankfull Max Depth (ft)	1.0	1.1	1.1	1.1					2.6	2.6	2.3	2.4					1.2	1.1	1.1	1.3				
Bankfull Cross Sectional Area (ft^2)	5.3	5.7	5.4	5.3					13.6	14.0	13.6	13.6					6.8	6.2	6.2	6.8				
Bankfull Width/Depth Ratio	14.6	13.3	13.5	13.8					9.1	8.3	9.7	10.4					12.8	13.1	13.0	13.3				
Entrenchment Ratio[2]	9.7	9.8	9.9	9.9					---	---	---	---					9.1	9.4	9.4	8.9				
Bankfull Bank Height Ratio[3]	1.0	1.0	1.0	1.0					---	---	---	---					1.0	1.0	1.0	<1.0				
	Cross Section 4, UTSF Reach 1 (Pool)								**Cross Section 5, UTSF Reach 2 (Riffle)**								**Cross Section 6, UTSF Reach 2 (Riffle)**							
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**
Bankfull Elevation (ft)[1]	556.0	556.0	556.0	556.2					549.9	549.9	549.9	549.9					547.9	547.9	547.9	547.9				
Low Bank Elevation (ft)	556.0	556.0	556.0	556.4					549.9	549.9	549.9	549.7					547.9	547.9	547.9	547.7				
Bankfull Width (ft)	14.8	13.9	14.1	15.6					11.6	12.3	12.2	13.6					13.7	13.9	13.9	15.3				
Floodprone Width (ft)	---	---	---	---					150	150	150	150					150	150	150	150				
Bankfull Mean Depth (ft)	1.2	1.1	1.2	1.1					0.9	0.9	0.9	0.8					0.8	0.7	0.7	0.7				
Bankfull Max Depth (ft)	2.4	2.3	2.5	2.5					1.4	1.4	1.4	1.5					1.3	1.3	1.3	1.4				
Bankfull Cross Sectional Area (ft^2)	17.5	15.7	16.3	17.5					10.9	11.0	10.5	10.9					10.9	10.2	10.4	10.9				
Bankfull Width/Depth Ratio	12.6	12.2	12.1	13.9					12.4	13.7	14.3	16.9					17.3	18.9	18.7	21.5				
Entrenchment Ratio[2]	---	---	---	---					12.9	12.2	12.3	11.0					10.9	10.8	10.8	9.8				
Bankfull Bank Height Ratio[3]	---	---	---	---					1.0	1.0	1.0	<1.0					1.0	1.0	1.0	<1.0				
	Cross Section 7, UTSF Reach 2 (Pool)								**Cross Section 8, UT1C (Pool)**								**Cross Section 9, UT1C (Riffle)**							
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**
Bankfull Elevation (ft)[1]	547.0	547.0	547.0	547.0					572.5	572.5	572.5	572.7					572.4	572.4	572.4	572.5				
Low Bank Elevation (ft)	547.0	547.0	547.0	547.3					572.5	572.5	572.5	572.7					572.4	572.4	572.4	572.5				
Bankfull Width (ft)	12.3	12.0	12.1	12.4					7.6	6.6	7.0	6.3					9.8	9.8	9.9	10.7				
Floodprone Width (ft)	---	---	---	---					---	---	---	---					60	60	60	60				
Bankfull Mean Depth (ft)	1.2	1.2	1.2	1.2					1.0	0.8	0.8	0.7					0.5	0.5	0.5	0.5				
Bankfull Max Depth (ft)	2.1	2.1	2.2	2.2					2.0	1.6	1.6	1.9					0.7	0.7	0.8	0.9				
Bankfull Cross Sectional Area (ft^2)	14.7	14.0	14.5	14.7					7.7	5.5	5.2	7.7					4.9	4.6	4.5	4.9				
Bankfull Width/Depth Ratio	10.3	10.3	10.0	10.4					7.6	7.9	9.3	13.9					19.4	20.7	21.8	23.2				
Entrenchment Ratio[2]	---	---	---	---					---	---	---	---					6.1	6.1	6.1	5.6				
Bankfull Bank Height Ratio[3]	---	---	---	---					---	---	---	---					1.0	1.1	1.0	<1.0				

[1]For MY3 through MY7 bankfull elevation was calculated using the Standard Measurement of the BHR Monitoring Parameter provided by NCIRT and NCDMS.

[2]Entrenchment Ratio is the flood prone width divided by the bankfull width.

[3]Bank Height Ratio is the bank height divided by the max depth of the bankfull channel.

Table 11b. Morphology and Hydraulic Summary (Dimensional Parameters - Cross Section)
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

	Cross Section 10, UT2B (Pool)								Cross Section 11, UT2B (Riffle)								Cross Section 12, UT3B (Pool)							
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**
Bankfull Elevation (ft)[1]	564.2	564.2	564.2	564.4					563.9	563.9	563.9	563.9					563.0	563.0	563.0	563.2				
Low Bank Elevation (ft)	564.2	564.2	564.2	564.2					563.9	563.9	563.9	563.9					563.0	563.0	563.0	563.1				
Bankfull Width (ft)	10.7	10.5	10.7	13.2					5.5	6.5	6.8	6.7					6.2	6.3	7.0	10.9				
Floodprone Width (ft)	---	---	---	---					60	60	60	60					---	---	---	---				
Bankfull Mean Depth (ft)	0.8	0.6	0.6	0.7					0.4	0.4	0.4	0.3					0.6	0.5	0.5	0.3				
Bankfull Max Depth (ft)	1.5	1.0	1.0	1.1					0.7	0.7	0.7	0.6					1.3	1.0	1.0	1.0				
Bankfull Cross Sectional Area (ft^2)	8.6	6.3	6.3	8.6					2.3	2.7	2.8	2.3					3.8	3.0	3.2	3.8				
Bankfull Width/Depth Ratio	13.3	17.4	17.9	20.2					13.2	15.7	16.5	19.3					10.1	13.4	15.5	31.2				
Entrenchment Ratio[2]	---	---	---	---					10.8	9.3	8.8	9.0					---	---	---	---				
Bankfull Bank Height Ratio[3]	---	---	---	---					1.0	1.0	1.0	1.1					---	---	---	---				
	Cross Section 13, UT3B (Riffle)								**Cross Section 14, UT4B (Riffle)**								**Cross Section 15, UT4B (Pool)**							
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**
Bankfull Elevation (ft)[1]	563.0	563.0	563.0	563.2					553.8	553.8	553.8	554.0					553.6	553.6	553.6	553.9				
Low Bank Elevation (ft)	563.0	563.1	563.1	563.1					553.8	553.8	553.8	553.8					553.6	553.6	553.6	553.7				
Bankfull Width (ft)	8.7	4.7	4.6	6.6					5.7	6.4	6.7	9.9					6.3	5.7	5.5	6.5				
Floodprone Width (ft)	60	60	60	60					25	25	25	25					---	---	---	---				
Bankfull Mean Depth (ft)	0.3	0.4	0.4	0.4					0.6	0.4	0.4	0.4					0.7	0.5	0.6	0.7				
Bankfull Max Depth (ft)	0.8	0.7	0.6	0.8					0.9	0.6	0.6	0.8					1.4	1.0	1.1	1.2				
Bankfull Cross Sectional Area (ft^2)	2.7	1.9	1.7	2.7					3.6	2.4	2.4	3.6					4.5	3.0	3.2	4.5				
Bankfull Width/Depth Ratio	11.6	11.5	12.4	16.5					9.1	17.3	19.2	27.4					8.7	11.0	9.4	9.8				
Entrenchment Ratio[2]	14.1	12.8	13.0	9.1					4.3	3.9	3.7	2.5					---	---	---	---				
Bankfull Bank Height Ratio[3]	1.0	1.1	1.1	<1.0					1.0	1.0	1.0	<1.0					---	---	---	---				
	Cross Section 16, UT5 (Pool)								**Cross Section 17, UT5 (Riffle)**															
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY6**	**MY7**								
Bankfull Elevation (ft)[1]	552.6	552.6	552.6	552.7					552.5	552.5	552.5	552.6												
Low Bank Elevation (ft)	552.6	552.6	552.6	552.8					552.5	552.5	552.5	552.4												
Bankfull Width (ft)	8.0	7.6	7.3	8.1					8.1	8.1	8.2	8.4												
Floodprone Width (ft)	---	---	---	---					100	100	100	100												
Bankfull Mean Depth (ft)	1.0	1.1	1.1	1.0					0.5	0.4	0.5	0.5												
Bankfull Max Depth (ft)	1.7	1.7	1.7	1.8					0.9	0.8	0.8	0.9												
Bankfull Cross Sectional Area (ft^2)	7.9	8.0	7.9	7.9					4.0	3.5	3.8	4.0												
Bankfull Width/Depth Ratio	8.0	7.2	6.8	8.3					16.6	18.7	17.8	17.7												
Entrenchment Ratio[2]	---	---	---	---					12.3	12.4	12.2	11.9												
Bankfull Bank Height Ratio[3]	---	---	---	---					1.0	1.0	1.0	<1.0												

*** Bankfull Stage Elevation Changed for Cross Section 13 due to poor baseline bankfull survey shots.**

[1]For MY3 through MY7 bankfull elevation was calculated using the Standard Measurement of the BHR Monitoring Parameter provided by NCIRT and NCDMS.

[2]Entrenchment Ratio is the flood prone width divided by the bankfull width.

[3]Bank Height Ratio is the bank height divided by the max depth of the bankfull channel.

Table 12a. Monitoring Data - Stream Reach Data Summary

Maney Farm Mitigation Project

DMS Project No. 96314

Monitoring Year 3 - 2018

UT South Fork Reach 1

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY4		MY5		MY6		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																
Bankfull Width (ft)	8.8	9.3	8.7	9.0	8.6	9.0	8.6	9.5								
Floodprone Width (ft)	85		85		85		85									
Bankfull Mean Depth	0.6	0.7	0.7		0.6	0.7	0.6	0.7								
Bankfull Max Depth	1.0	1.2	1.1		1.1		1.1	1.3								
Bankfull Cross Sectional Area (ft^2)	5.3	6.8	5.7	6.2	5.4	6.2	5.3	6.8								
Width/Depth Ratio	12.8	14.6	13.1	13.3	13.0	13.5	13.3	13.8								
Entrenchment Ratio	9.1	9.7	9.4	9.8	9.4	9.9	8.9	9.9								
Bank Height Ratio	1.0		1.0		1.0		<1.0	1.0								
D50 (mm)	8.4		14.1		3.3		2.4									
Profile																
Riffle Length (ft)	9	50														
Riffle Slope (ft/ft)	0.0058	0.0432														
Pool Length (ft)	12	47														
Pool Max Depth (ft)	2.4	2.6														
Pool Spacing (ft)	29	85														
Pool Volume (ft^3)																
Pattern																
Channel Beltwidth (ft)	24	56														
Radius of Curvature (ft)	9	36														
Rc:Bankfull Width (ft/ft)	1.0	4.1														
Meander Wave Length (ft)	68	151														
Meander Width Ratio	2.7	6.5														
Additional Reach Parameters																
Rosgen Classification	C4															
Channel Thalweg Length (ft)	2,185															
Sinuosity (ft)	1.27															
Water Surface Slope (ft/ft)	0.0103															
Bankfull Slope (ft/ft)	0.0102	0.0104														
Ri%/Ru%/P%/G%/S%	---															
SC%/Sa%/G%/C%/B%/Be%	21/13/64/2/0/0		25/9/52/14/0/0		27/22/33/18/0/0		27/20/46/7/0/0									
d16/d35/d50/d84/d95/d100	SC/2.37/8.4/34.5/55/180		SC/2.4/14.1/60/107/256		SC/0.14/3.3/70/121/256		SC/0.16/2.4/34.8/ 73.4/128									
% of Reach with Eroding Banks	0%		0%		0%		0%									

(---): Data was not provided

Table 12b. Monitoring Data - Stream Reach Data Summary

Maney Farm Mitigation Project

DMS Project No. 96314

Monitoring Year 3 - 2018

UT South Fork Reach 2

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY4		MY5		MY6		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																
Bankfull Width (ft)	12.7	13.7	12.3	13.9	12.2	13.9	13.6	15.3								
Floodprone Width (ft)	150		150		150		150									
Bankfull Mean Depth	0.8	0.9	0.7	0.9	0.7	0.9	0.7	0.8								
Bankfull Max Depth	1.3	1.4	1.3	1.4	1.3	1.4	1.4	1.5								
Bankfull Cross Sectional Area (ft^2)	10.9	11.0	10.2	11.0	10.4	10.5	10.9									
Width/Depth Ratio	14.5	17.3	13.7	18.9	14.3	18.7	16.9	21.5								
Entrenchment Ratio	10.9	11.8	10.8	12.2	10.8	12.3	9.8	11.0								
Bank Height Ratio	1.0		1.0		1.0		1.0									
D50 (mm)	10.4		14.6		7.3		8.0									
Profile																
Riffle Length (ft)	9	40														
Riffle Slope (ft/ft)	0.0055	0.0326														
Pool Length (ft)	23	50														
Pool Max Depth (ft)	2.1															
Pool Spacing (ft)	45	78														
Pool Volume (ft^3)																
Pattern																
Channel Beltwidth (ft)	37	54														
Radius of Curvature (ft)	17	28														
Rc:Bankfull Width (ft/ft)	1.6	2.6														
Meander Wave Length (ft)	110	144														
Meander Width Ratio	3.4	5.0														
Additional Reach Parameters																
Rosgen Classification	C4															
Channel Thalweg Length (ft)	1,077															
Sinuosity (ft)	1.18															
Water Surface Slope (ft/ft)	0.0078															
Bankfull Slope (ft/ft)	0.0077	0.0078														
Ri%/Ru%/P%/G%/S%	---															
SC%/Sa%/G%/C%/B%/Be%	28/10/56/6/0/0		15/16/43/26/0/1		23/21/44/11/1/0		14/15/67/4/0/0									
d16/d35/d50/d84/d95/d100	SC/0.4/10.4/37.9/72/180		0.13/4.7/15/85/124/256		SC/0.14/3.3/70/121/256		0.1/2.5/8/33/53.7/128									
% of Reach with Eroding Banks	0%		0%		0%		0%									

(---): Data was not provided

Table 12c. Monitoring Data - Stream Reach Data Summary

Maney Farm Mitigation Project

DMS Project No. 96314

Monitoring Year 3 - 2018

UT1C

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY4		MY5		MY6		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																
Bankfull Width (ft)	9.8		9.8		9.9		10.7									
Floodprone Width (ft)	60		60		60		60									
Bankfull Mean Depth	0.5		0.5		0.5		0.5									
Bankfull Max Depth	0.7		0.7		0.8		0.9									
Bankfull Cross Sectional Area (ft^2)	4.9		4.6		4.5		4.9									
Width/Depth Ratio	19.4		20.7		21.8		23.2									
Entrenchment Ratio	6.1		6.1		6.1		5.6									
Bank Height Ratio	1.0		1.1		1.0		<1.0									
D50 (mm)	3.3		12.9		8.9		5.3									
Profile																
Riffle Length (ft)	8	22														
Riffle Slope (ft/ft)	0.0011	0.0110														
Pool Length (ft)	6	22														
Pool Max Depth (ft)	2.0															
Pool Spacing (ft)	22	38														
Pool Volume (ft^3)																
Pattern																
Channel Beltwidth (ft)	16	26														
Radius of Curvature (ft)	9	15														
Rc:Bankfull Width (ft/ft)	1.0	1.6														
Meander Wave Length (ft)	55	73														
Meander Width Ratio	1.7	2.8														
Additional Reach Parameters																
Rosgen Classification	C4															
Channel Thalweg Length (ft)	256															
Sinuosity (ft)	1.11															
Water Surface Slope (ft/ft)	0.0053															
Bankfull Slope (ft/ft)	0.0078	0.0080														
Ri%/Ru%/P%/G%/S%	---															
SC%/Sa%/G%/C%/B%/Be%	24/17/58/1/0/0		15/10/67/8/0/0		27/10/47/16/0/0		29/13/55/3/0/0									
d16/d35/d50/d84/d95/d100	SC/0.21/3.3/22.6/35/128		0.15/5.1/12.9/41/79/180		SC/0.63/8.9/64/107/180		SC/0.19/5.3/35.4/ 56.9/128									
% of Reach with Eroding Banks	0%		0%		0%		0%									

(---): Data was not provided

Table 12d. Monitoring Data - Stream Reach Data Summary

Maney Farm Mitigation Project

DMS Project No. 96314

Monitoring Year 3 - 2018

UT2B

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY4		MY5		MY6		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																
Bankfull Width (ft)	5.5		6.5		6.8		6.7									
Floodprone Width (ft)	60		60		60		60									
Bankfull Mean Depth	0.4		0.4		0.4		0.3									
Bankfull Max Depth	0.7		0.7		0.7		0.6									
Bankfull Cross Sectional Area (ft^2)	2.3		2.7		2.8		2.3									
Width/Depth Ratio	13.2		15.7		16.5		19.3									
Entrenchment Ratio	10.8		9.3		8.8		9.0									
Bank Height Ratio	1.0		1.0		1.0		1.1									
D50 (mm)	0.1		0.2		0.2		SC									
Profile																
Riffle Length (ft)	11	19														
Riffle Slope (ft/ft)	0.0073	0.0106														
Pool Length (ft)	13	19														
Pool Max Depth (ft)	1.5															
Pool Spacing (ft)	22															
Pool Volume (ft^3)																
Pattern																
Channel Beltwidth (ft)	---															
Radius of Curvature (ft)	13	25														
Rc:Bankfull Width (ft/ft)	1.8	3.3														
Meander Wave Length (ft)	---															
Meander Width Ratio	---															
Additional Reach Parameters																
Rosgen Classification	C4															
Channel Thalweg Length (ft)	70															
Sinuosity (ft)	1.04															
Water Surface Slope (ft/ft)	0.0101															
Bankfull Slope (ft/ft)	0.0070	0.0084														
Ri%/Ru%/P%/G%/S%	---															
SC%/Sa%/G%/C%/B%/Be%	47/13/37/3/0/0		39/23/31/8/0/0		44/26/21/9/0/0		61/32/4/3/0/0									
d16/d35/d50/d84/d95/d100	SC/SC/0.1/22.6/50.6/128		SC/SC/0.2/33.9/81.9/180		SC/SC/0.2/36.3/95/128		SC/SC/SC/0.6/32/180									
% of Reach with Eroding Banks	0%		0%		0%		0%									

(---): Data was not provided

Table 12e. Monitoring Data - Stream Reach Data Summary

Maney Farm Mitigation Project

DMS Project No. 96314

Monitoring Year 3 - 2018

UT3B

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY4		MY5		MY6		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																
Bankfull Width (ft)	4.2		3.9		3.4		6.6									
Floodprone Width (ft)	60		60		60		60									
Bankfull Mean Depth	0.4		0.3		0.3		0.4									
Bankfull Max Depth	0.6		0.6		0.4		0.8									
Bankfull Cross Sectional Area (ft^2)	1.6		1.1		1.0		2.7									
Width/Depth Ratio	11.6		13.0		11.8		16.5									
Entrenchment Ratio	14.1		15.5		17.5		9.1									
Bank Height Ratio	1.0		1.2		1.3		<1.0									
D50 (mm)	5.6		2.8		0.2		0.2									
Profile																
Riffle Length (ft)	12	23														
Riffle Slope (ft/ft)	0.0112	0.0419														
Pool Length (ft)	10	22														
Pool Max Depth (ft)	1.3															
Pool Spacing (ft)	30	36														
Pool Volume (ft^3)																
Pattern																
Channel Beltwidth (ft)	12	23														
Radius of Curvature (ft)	11	47														
Rc:Bankfull Width (ft/ft)	1.7	7.6														
Meander Wave Length (ft)	55	68														
Meander Width Ratio	1.9	3.7														
Additional Reach Parameters																
Rosgen Classification	C4															
Channel Thalweg Length (ft)	155															
Sinuosity (ft)	1.05															
Water Surface Slope (ft/ft)	0.0164															
Bankfull Slope (ft/ft)	0.0127	0.0161														
Ri%/Ru%/P%/G%/S%	---															
SC%/Sa%/G%/C%/B%/Be%	32/14/51/3/0/0		33/14/43/10/0/0		29/39/20/12/0/0		45/17/26/12/0/0									
d16/d35/d50/d84/d95/d100	SC/0.08/5.6/33.4/57/90		SC/0.2/2.8/41.3/85/180		SC/0.1/0.2/53.7/83/128		SC/SC/0.2/48.3/ 104.7/180									
% of Reach with Eroding Banks	0%		0%		0%		0%									

(---): Data was not provided

Table 12f. Monitoring Data - Stream Reach Data Summary

Maney Farm Mitigation Project

DMS Project No. 96314

Monitoring Year 3 - 2018

UT4B

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY4		MY5		MY6		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																
Bankfull Width (ft)	5.7		6.4		6.7		9.9									
Floodprone Width (ft)	25		25		25		25									
Bankfull Mean Depth	0.6		0.4		0.4		0.4									
Bankfull Max Depth	0.9		0.6		0.6		0.8									
Bankfull Cross Sectional Area (ft^2)	3.6		2.4		2.4		3.6									
Width/Depth Ratio	9.1		17.3		19.2		27.4									
Entrenchment Ratio	4.3		3.9		3.7		2.5									
Bank Height Ratio	1.0		1.0		1.0		1.0									
D50 (mm)	4.0		6.9		0.4		0.5									
Profile																
Riffle Length (ft)	8	19														
Riffle Slope (ft/ft)	0.0035	0.0113														
Pool Length (ft)	10	21														
Pool Max Depth (ft)	1.4															
Pool Spacing (ft)	31															
Pool Volume (ft^3)																
Pattern																
Channel Beltwidth (ft)	19	23														
Radius of Curvature (ft)	10	20														
Rc:Bankfull Width (ft/ft)	1.8	3.6														
Meander Wave Length (ft)	59	69														
Meander Width Ratio	3.3	4.1														
Additional Reach Parameters																
Rosgen Classification	C4															
Channel Thalweg Length (ft)	212															
Sinuosity (ft)	1.71															
Water Surface Slope (ft/ft)	0.0043															
Bankfull Slope (ft/ft)	0.0059	0.0067														
Ri%/Ru%/P%/G%/S%	---															
SC%/Sa%/G%/C%/B%/Be%	22/20/57/1/0/0		31/12/43/14/0/0		18/43/34/5/0/0		38/16/29/17/0/0									
d16/d35/d50/d84/d95/d100	SC/0.25/4.0/20.1/45/90		SC/0.19/6.9/59.2/90/180		SC/0.2/0.4/34.8/64/128		SC/SC/0.5/66/98.3/180									
% of Reach with Eroding Banks	0%		0%		0%		0%									

(---): Data was not provided

Table 12g. Monitoring Data - Stream Reach Data Summary

Maney Farm Mitigation Project

DMS Project No. 96314

Monitoring Year 3 - 2018

UT5

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY4		MY5		MY6		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																
Bankfull Width (ft)	8.1		8.1		8.1		8.4									
Floodprone Width (ft)	100		100		100		100									
Bankfull Mean Depth	0.5		0.4		0.5		0.5									
Bankfull Max Depth	0.9		0.8		0.8		0.9									
Bankfull Cross Sectional Area (ft^2)	4.0		3.5		3.7		4.0									
Width/Depth Ratio	16.6		18.7		17.5		17.7									
Entrenchment Ratio	12.3		12.4		12.4		11.9									
Bank Height Ratio	1.0		1.0		1.0		<1.0									
D50 (mm)	5.9		19.0		4.7		0.7									
Profile																
Riffle Length (ft)	5	21														
Riffle Slope (ft/ft)	0.0081	0.0374														
Pool Length (ft)	18	42														
Pool Max Depth (ft)	1.7															
Pool Spacing (ft)	31	51														
Pool Volume (ft^3)																
Pattern																
Channel Beltwidth (ft)	22	40														
Radius of Curvature (ft)	10	37														
Rc:Bankfull Width (ft/ft)	1.0	3.7														
Meander Wave Length (ft)	63	97														
Meander Width Ratio	2.3	4.0														
Additional Reach Parameters																
Rosgen Classification	C4															
Channel Thalweg Length (ft)	680															
Sinuosity (ft)	1.32															
Water Surface Slope (ft/ft)	0.0114															
Bankfull Slope (ft/ft)	0.0110	0.0114														
Ri%/Ru%/P%/G%/S%	---															
SC%/Sa%/G%/C%/B%/Be%	34/11/54/1/0/0		30/10/46/14/0/0		31/16/40/13/0/0		34/22/25/8/0/0									
d16/d35/d50/d84/d95/d100	SC/0.08/5.9/29.8/54/90		SC/0.18/19/61/101/180		SC/0.17/4.7/57.8/87/180		SC/0.14/0.7/45/75.9/180									
% of Reach with Eroding Banks	0%		0%		0%		0%									

(---): Data was not provided

Table 13. Bank Pin Table

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

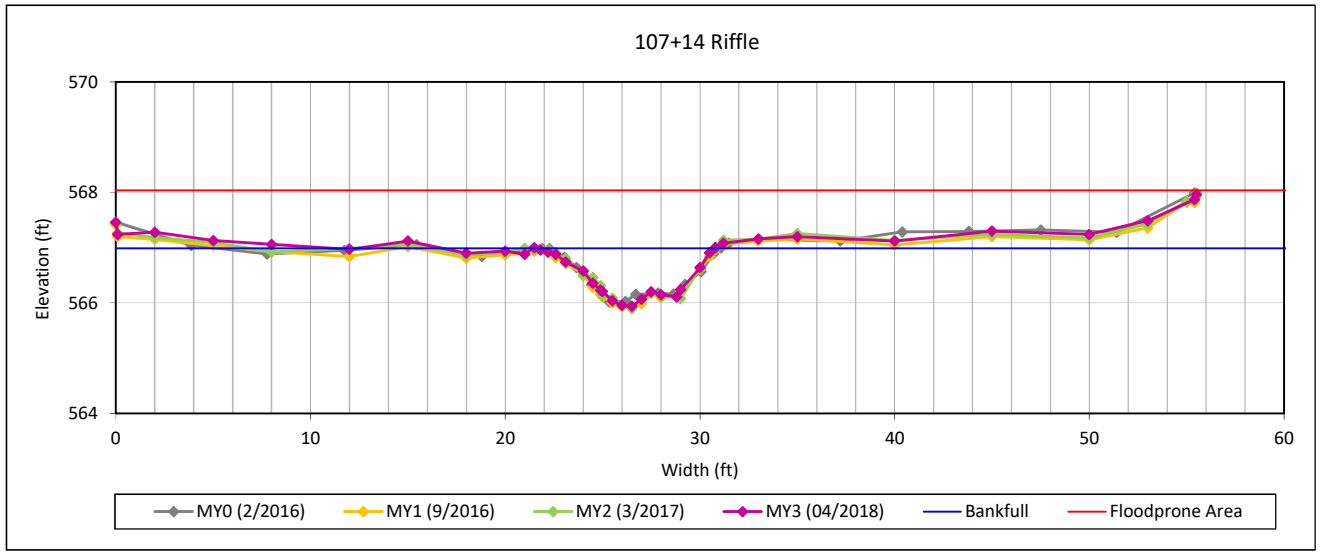
UT South Fork Reach 1 - Cross Section 4 Pool (Station 118+63)

Pin	Date	Exposure (in)
Upstream	4/15/2016	0.0
Midstream		0.0
Downstream		0.0
Upstream	9/14/2016	0.0
Midstream		0.0
Downstream		0.0
Upstream	10/19/2017	0.0
Midstream		0.0
Downstream		0.0
Upstream	10/22/2018	0.0
Midstream		0.0
Downstream		0.0

Cross Section Plots

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Cross Section 1, UTSF Reach 1



Bankfull Dimensions	
5.3	x-section area (ft.sq.)
8.6	width (ft)
0.6	mean depth (ft)
1.1	max depth (ft)
8.9	wetted perimeter (ft)
0.6	hydraulic radius (ft)
13.8	width-depth ratio
85.0	W flood prone area (ft)
9.9	entrenchment ratio
1.0	low bank height ratio

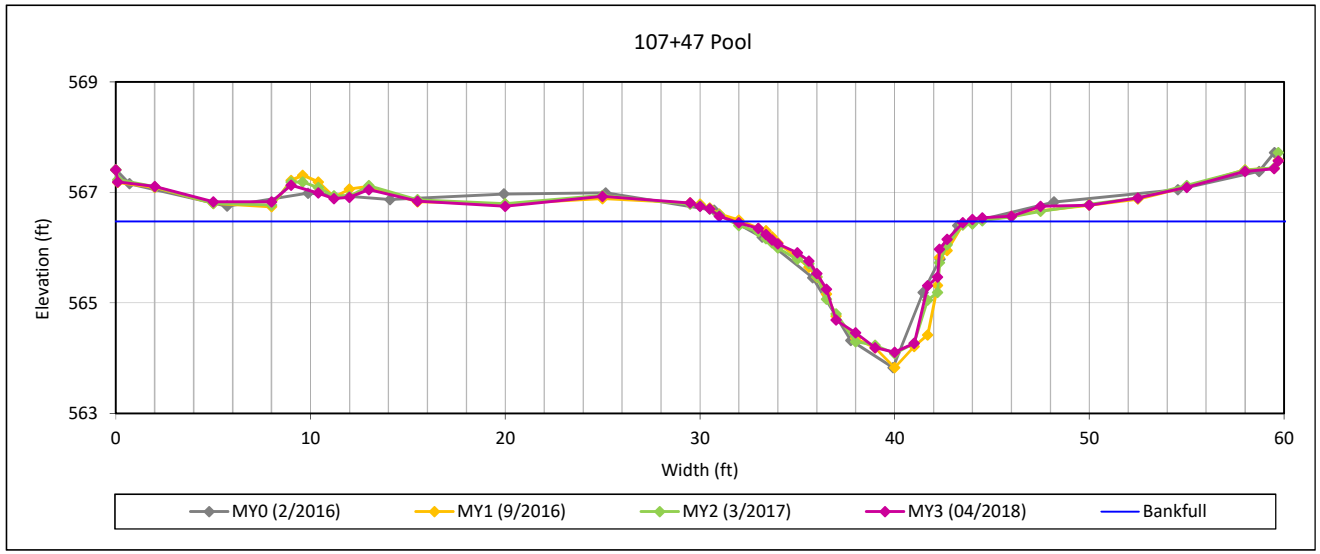
Survey Date: 04/2018
Field Crew: Wildlands Engineering

View Downstream

Cross Section Plots

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Cross Section 2, UTSF Reach 1



Bankfull Dimensions	
13.6	x-section area (ft.sq.)
11.9	width (ft)
1.1	mean depth (ft)
2.4	max depth (ft)
13.5	wetted perimeter (ft)
1.0	hydraulic radius (ft)
10.4	width-depth ratio

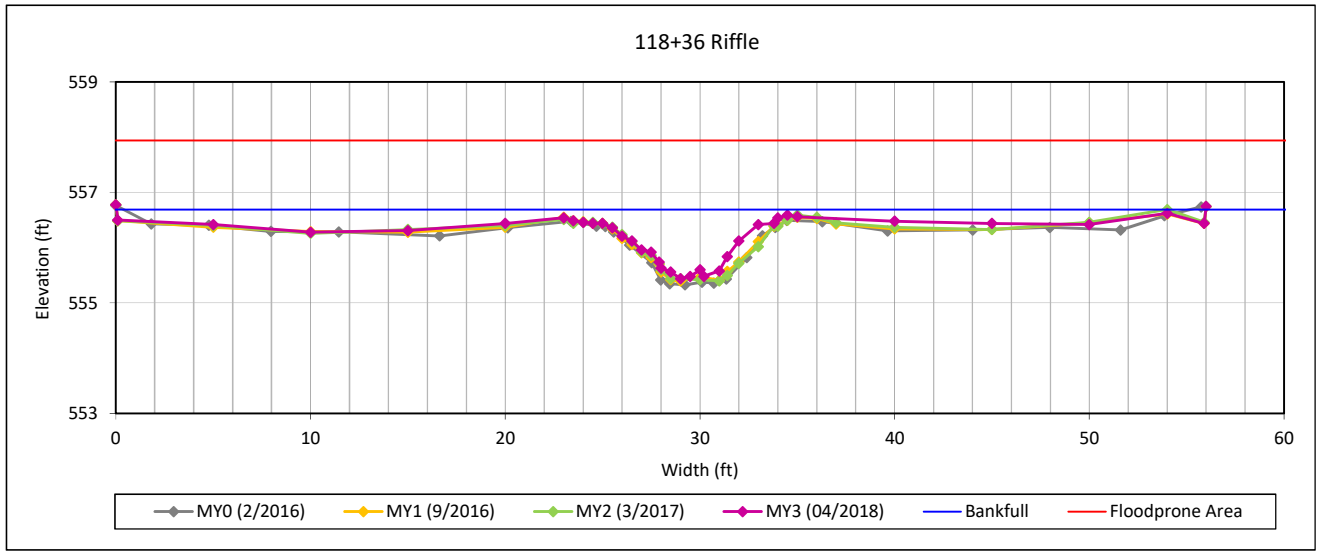
Survey Date: 04/2018
Field Crew: Wildlands Engineering

View Downstream

Cross Section Plots

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Cross Section 3, UTSF Reach 1



Bankfull Dimensions	
6.8	x-section area (ft.sq.)
9.5	width (ft)
0.7	mean depth (ft)
1.3	max depth (ft)
9.9	wetted perimeter (ft)
0.7	hydraulic radius (ft)
13.3	width-depth ratio
85.0	W flood prone area (ft)
8.9	entrenchment ratio
0.8	low bank height ratio

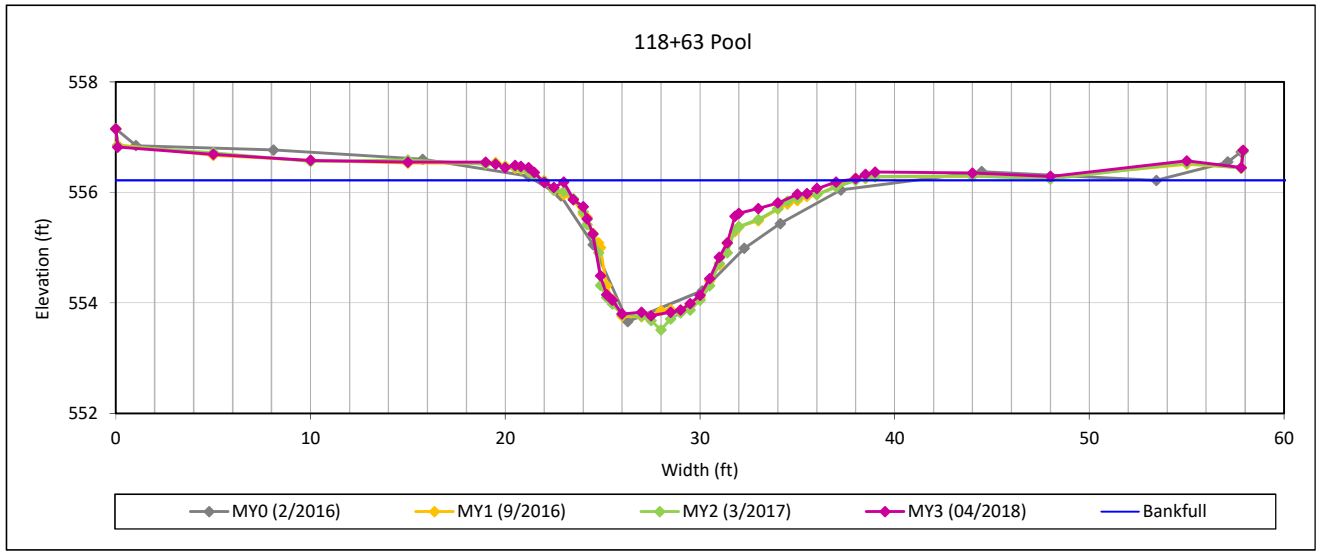
Survey Date: 04/2018
Field Crew: Wildlands Engineering

View Downstream

Cross Section Plots

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Cross Section 4, UTSF Reach 1



Bankfull Dimensions	
17.5	x-section area (ft.sq.)
15.6	width (ft)
1.1	mean depth (ft)
2.5	max depth (ft)
17.2	wetted perimeter (ft)
1.0	hydraulic radius (ft)
13.9	width-depth ratio

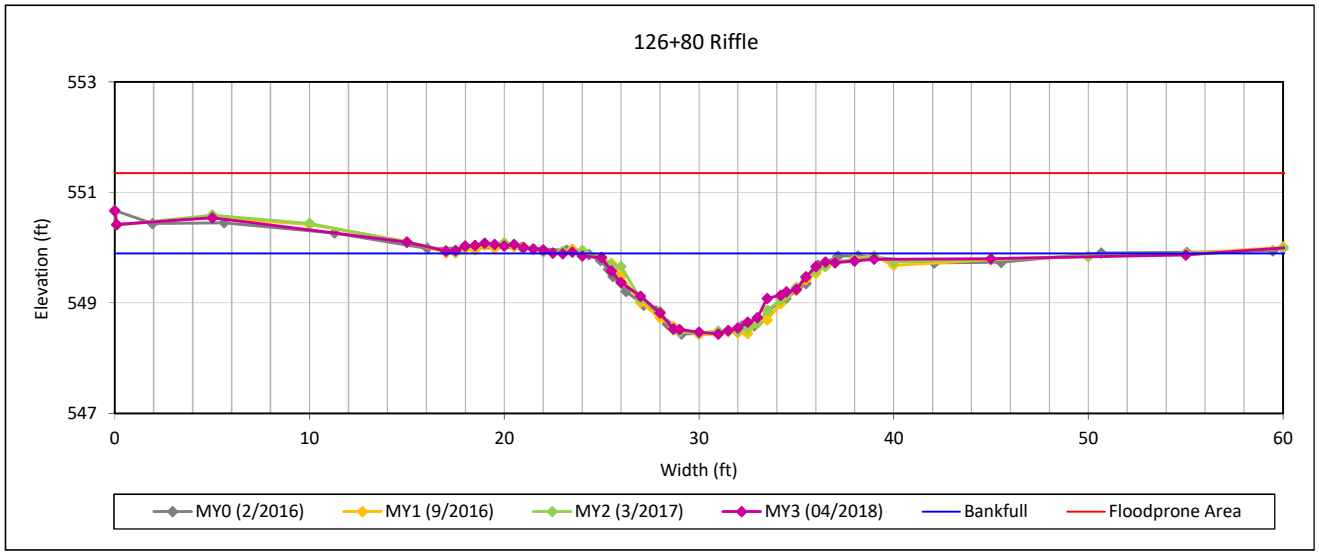
Survey Date: 04/2018
Field Crew: Wildlands Engineering

View Downstream

Cross Section Plots

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Cross Section 5, UTSF Reach 2



Bankfull Dimensions	
10.9	x-section area (ft.sq.)
13.6	width (ft)
0.8	mean depth (ft)
1.5	max depth (ft)
14.1	wetted perimeter (ft)
0.8	hydraulic radius (ft)
16.9	width-depth ratio
150.0	W flood prone area (ft)
11.0	entrenchment ratio
0.9	low bank height ratio

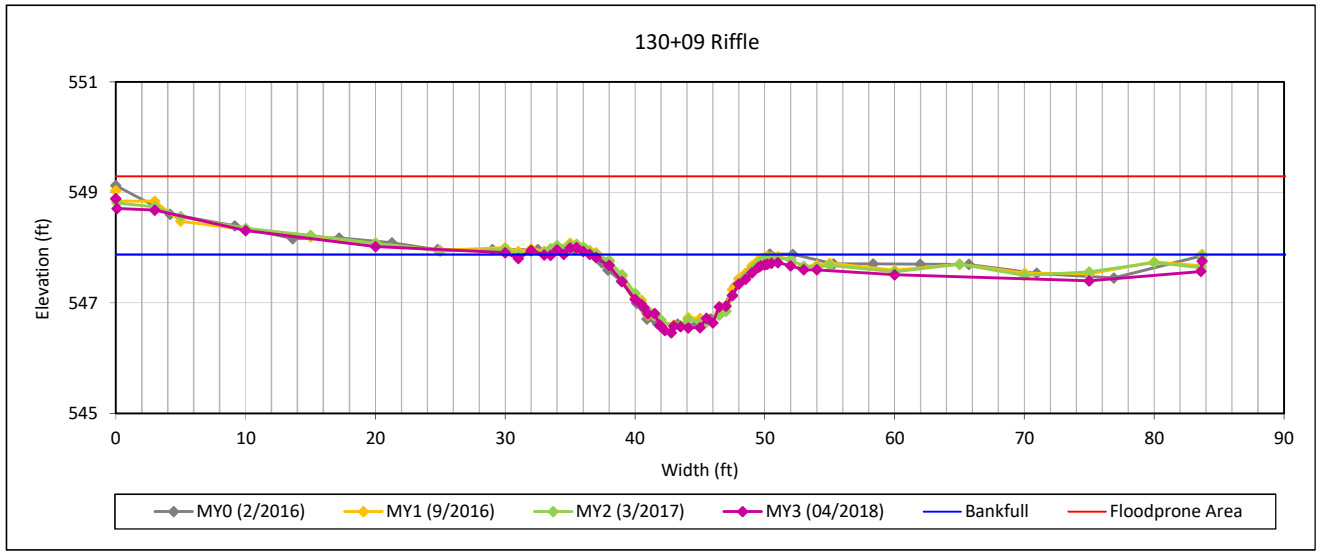
Survey Date: 04/2018
Field Crew: Wildlands Engineering

View Downstream

Cross Section Plots

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Cross Section 6, UTSF Reach 2



Bankfull Dimensions	
10.9	x-section area (ft.sq.)
15.3	width (ft)
0.7	mean depth (ft)
1.4	max depth (ft)
15.8	wetted perimeter (ft)
0.7	hydraulic radius (ft)
21.5	width-depth ratio
150.0	W flood prone area (ft)
9.8	entrenchment ratio
0.9	low bank height ratio

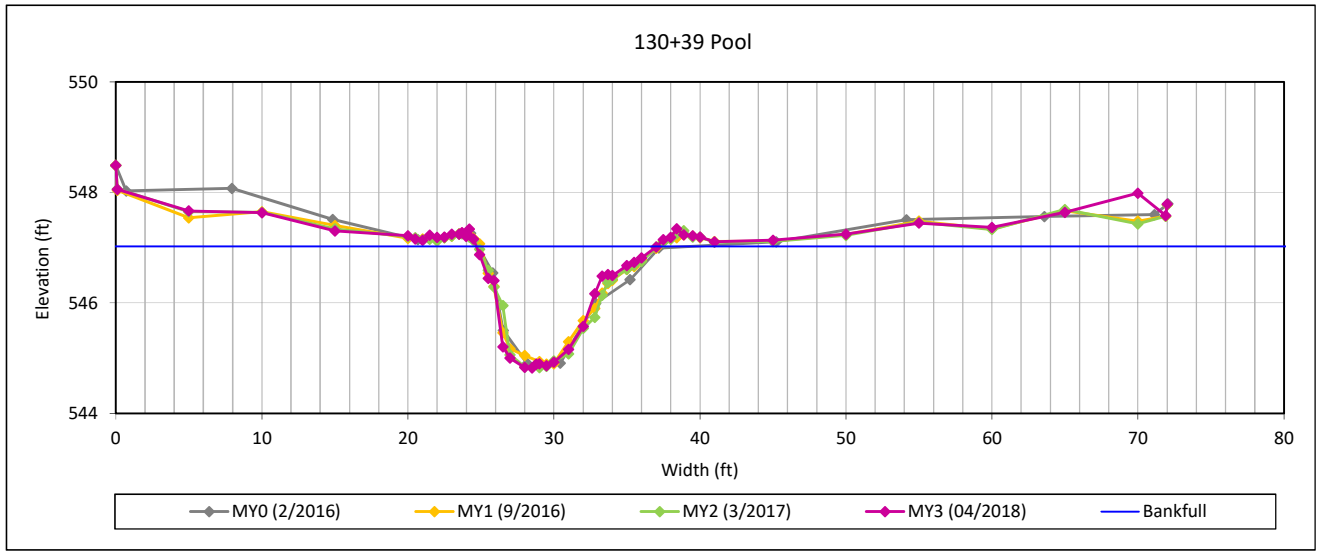
Survey Date: 04/2018
Field Crew: Wildlands Engineering

View Downstream

Cross Section Plots

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Cross Section 7, UTSF Reach 2



Bankfull Dimensions	
14.7	x-section area (ft.sq.)
12.4	width (ft)
1.2	mean depth (ft)
2.2	max depth (ft)
13.8	wetted perimeter (ft)
1.1	hydraulic radius (ft)
10.4	width-depth ratio

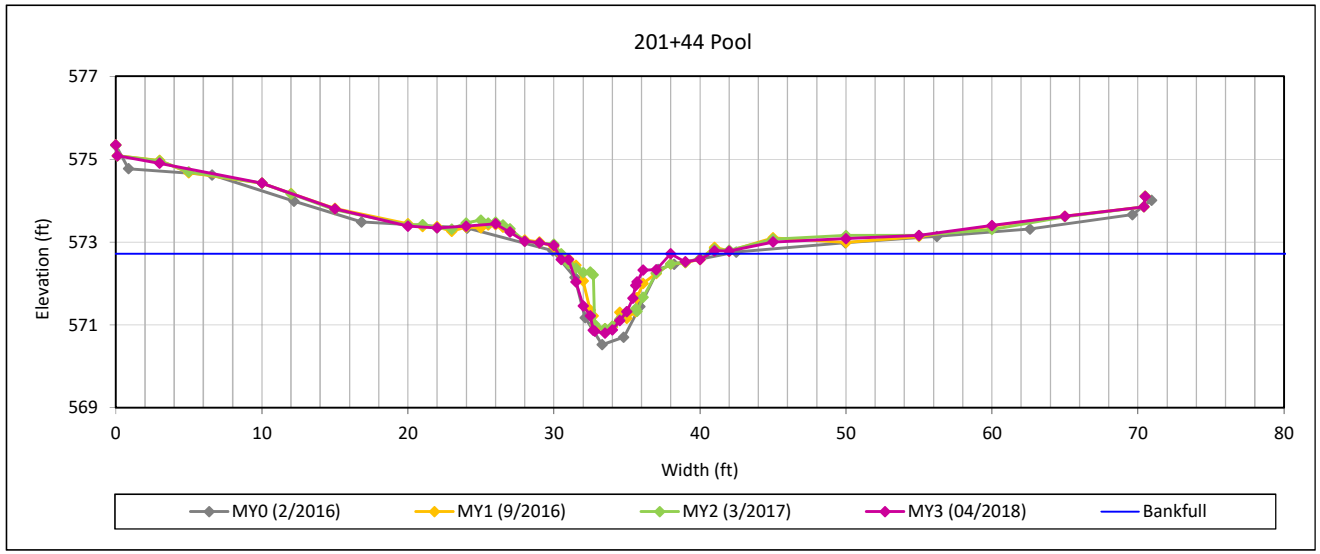
Survey Date: 04/2018
Field Crew: Wildlands Engineering

View Downstream

Cross Section Plots

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Cross Section 8, UT1C



Bankfull Dimensions	
7.7	x-section area (ft.sq.)
10.4	width (ft)
0.7	mean depth (ft)
1.9	max depth (ft)
11.8	wetted perimeter (ft)
0.7	hydraulic radius (ft)
13.9	width-depth ratio

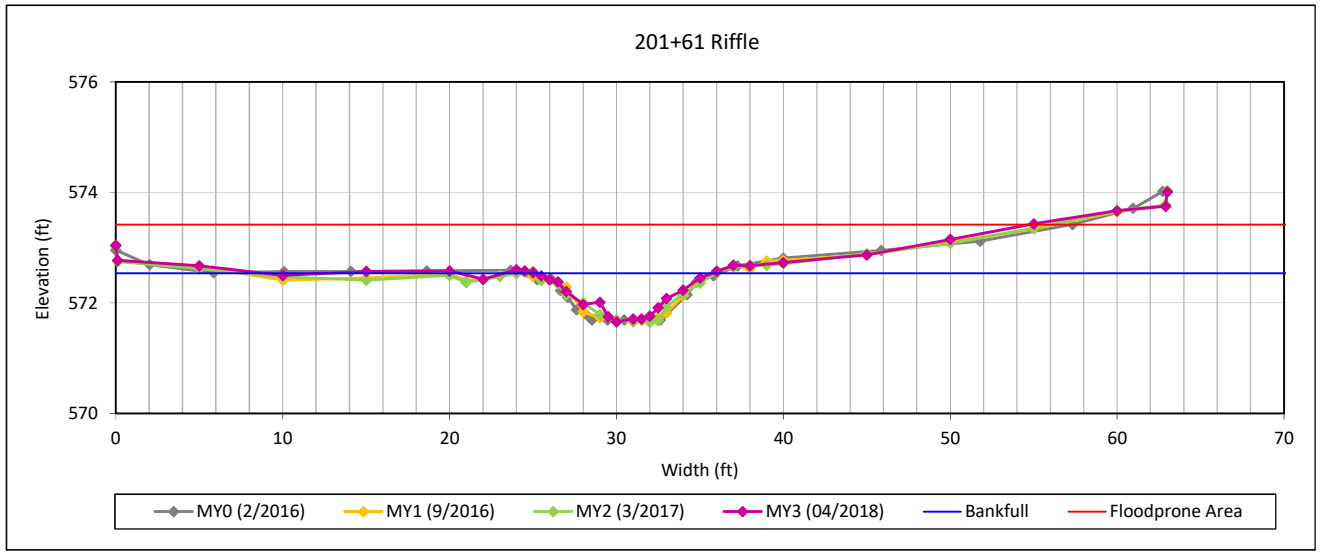
Survey Date: 04/2018
Field Crew: Wildlands Engineering

View Downstream

Cross Section Plots

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Cross Section 9, UT1C



Bankfull Dimensions	
4.9	x-section area (ft.sq.)
10.7	width (ft)
0.5	mean depth (ft)
0.9	max depth (ft)
10.9	wetted perimeter (ft)
0.5	hydraulic radius (ft)
23.2	width-depth ratio
60.0	W flood prone area (ft)
5.6	entrenchment ratio
0.9	low bank height ratio

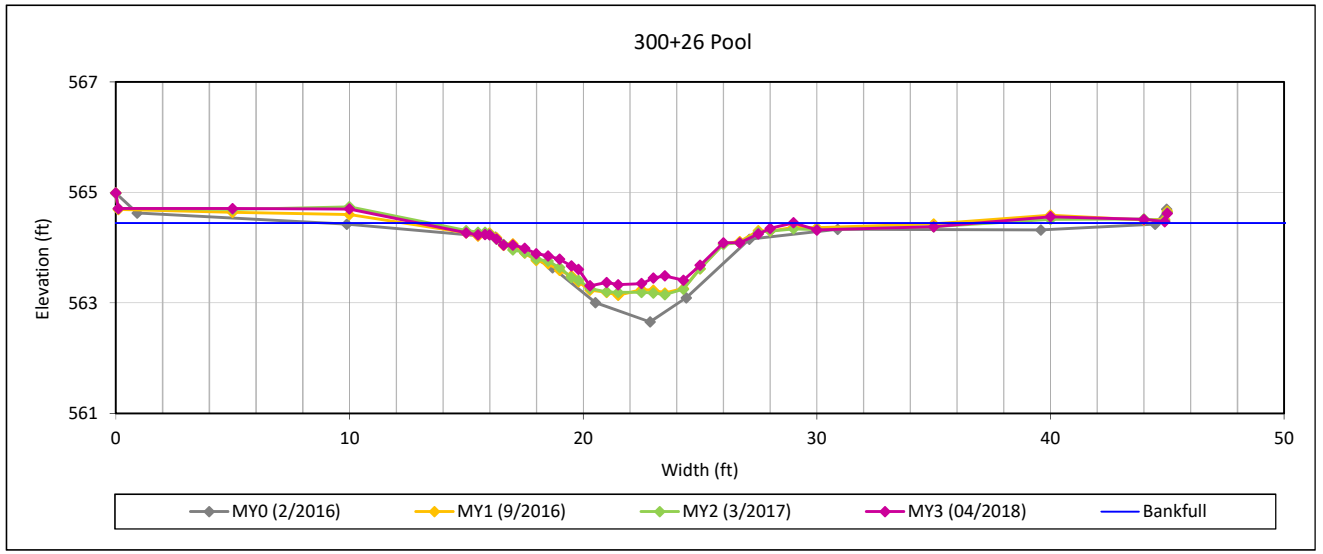
Survey Date: 04/2018
Field Crew: Wildlands Engineering

View Downstream

Cross Section Plots

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Cross Section 10, UT2B



Bankfull Dimensions	
8.6	x-section area (ft.sq.)
13.2	width (ft)
0.7	mean depth (ft)
1.1	max depth (ft)
13.5	wetted perimeter (ft)
0.6	hydraulic radius (ft)
20.2	width-depth ratio

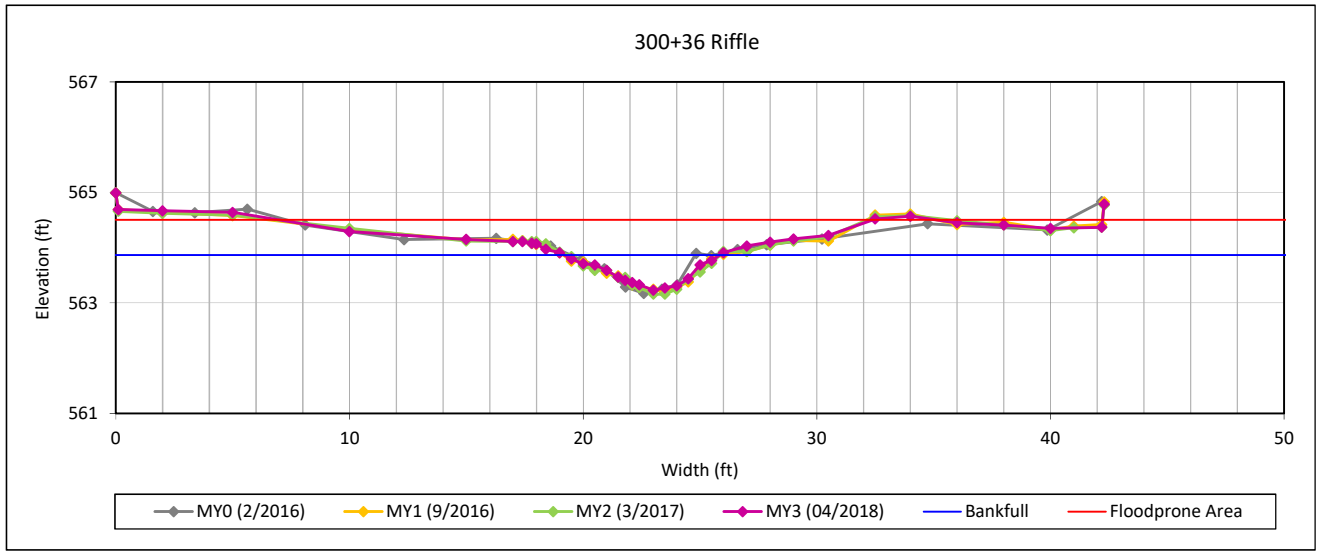
Survey Date: 04/2018
Field Crew: Wildlands Engineering

View Downstream

Cross Section Plots

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Cross Section 11, UT2B



Bankfull Dimensions	
2.3	x-section area (ft.sq.)
6.7	width (ft)
0.3	mean depth (ft)
0.6	max depth (ft)
6.8	wetted perimeter (ft)
0.3	hydraulic radius (ft)
19.3	width-depth ratio
60.0	W flood prone area (ft)
9.0	entrenchment ratio
1.1	low bank height ratio

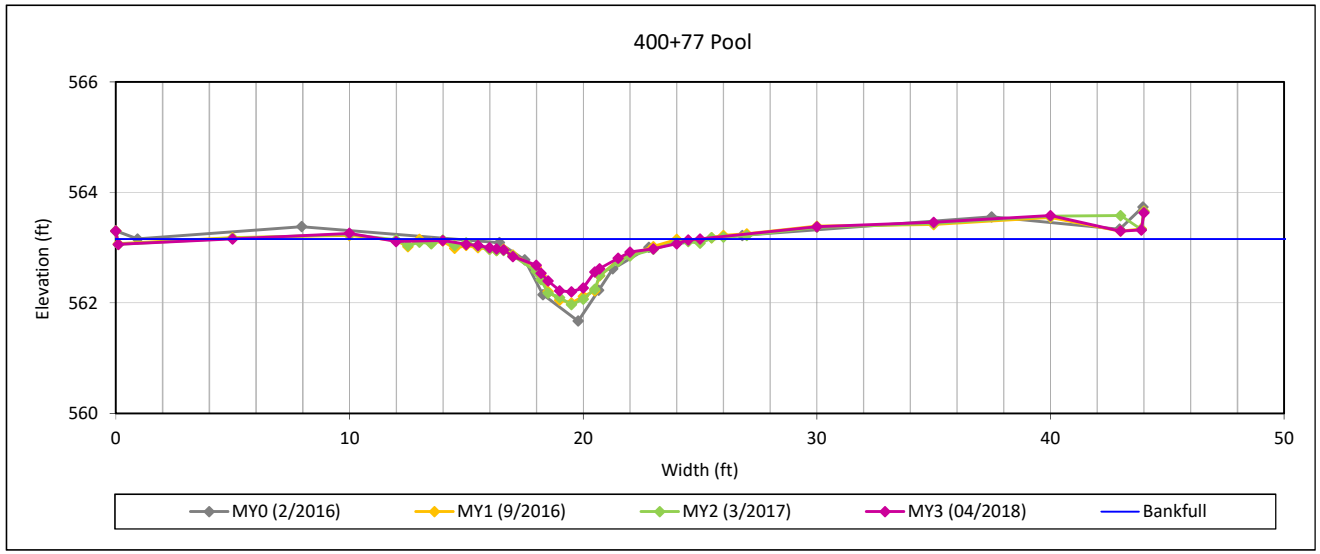
Survey Date: 04/2018
Field Crew: Wildlands Engineering

View Downstream

Cross Section Plots

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Cross Section 12, UT3B



Bankfull Dimensions	
3.8	x-section area (ft.sq.)
10.9	width (ft)
0.3	mean depth (ft)
1.0	max depth (ft)
11.2	wetted perimeter (ft)
0.3	hydraulic radius (ft)
31.2	width-depth ratio

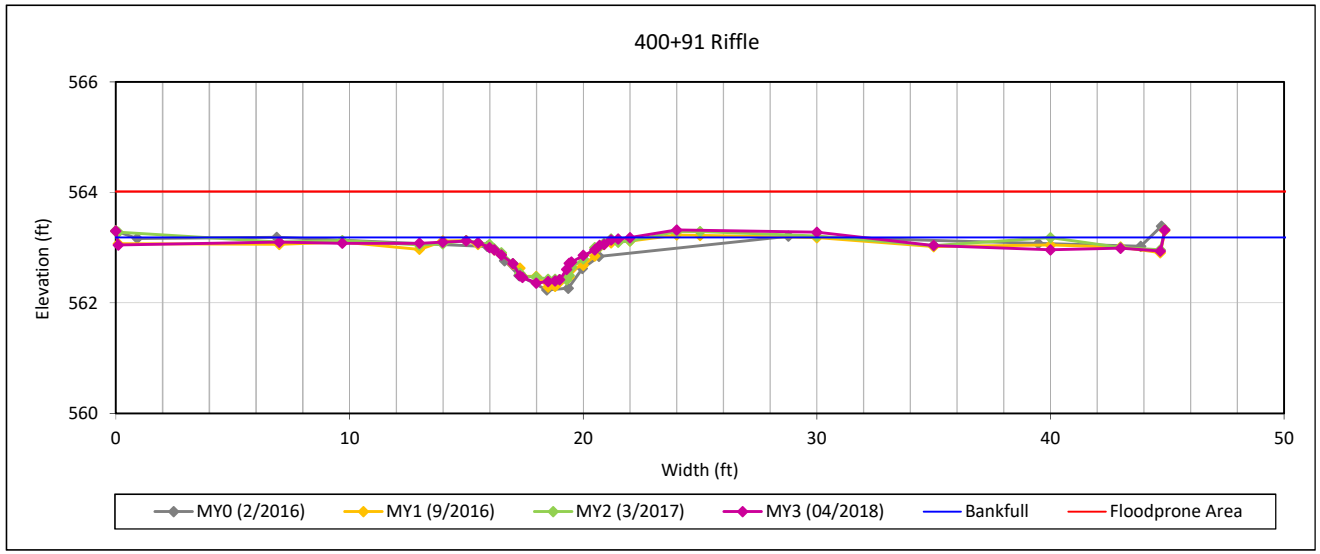
Survey Date: 04/2018
Field Crew: Wildlands Engineering

View Downstream

Cross Section Plots

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Cross Section 13, UT3B



Bankfull Dimensions	
2.7	x-section area (ft.sq.)
6.6	width (ft)
0.4	mean depth (ft)
0.8	max depth (ft)
6.9	wetted perimeter (ft)
0.4	hydraulic radius (ft)
16.5	width-depth ratio
60.0	W flood prone area (ft)
9.1	entrenchment ratio
0.9	low bank height ratio

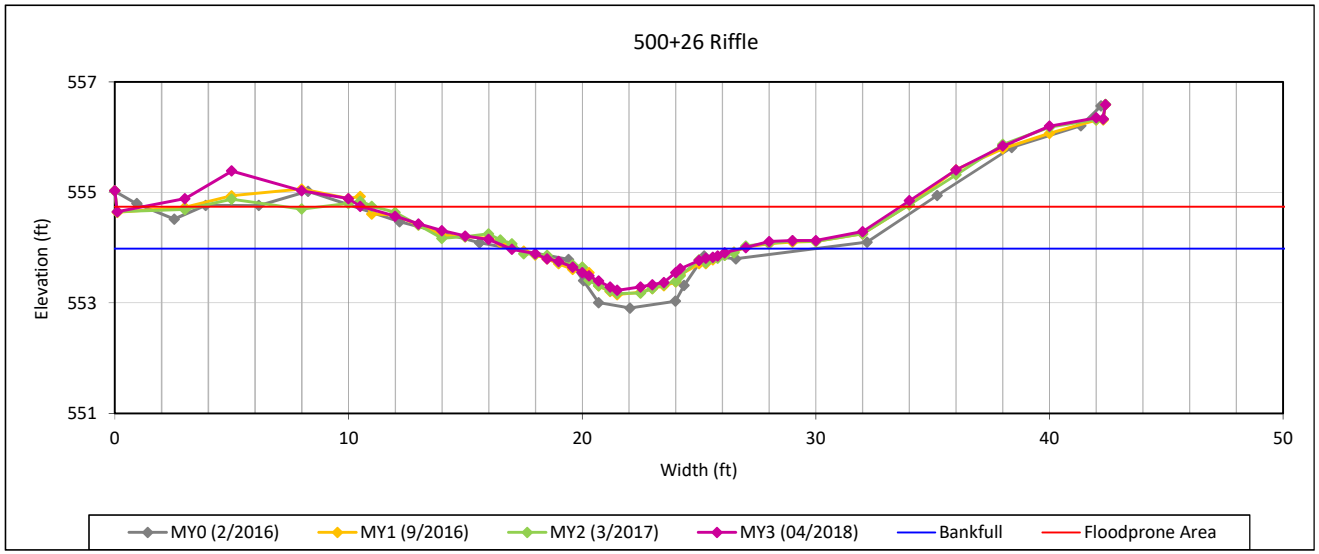
Survey Date: 04/2018
Field Crew: Wildlands Engineering

View Downstream

Cross Section Plots

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Cross Section 14, UT4B



Bankfull Dimensions	
3.6	x-section area (ft.sq.)
9.9	width (ft)
0.4	mean depth (ft)
0.8	max depth (ft)
10.1	wetted perimeter (ft)
0.4	hydraulic radius (ft)
27.4	width-depth ratio
25.0	W flood prone area (ft)
2.5	entrenchment ratio
0.7	low bank height ratio

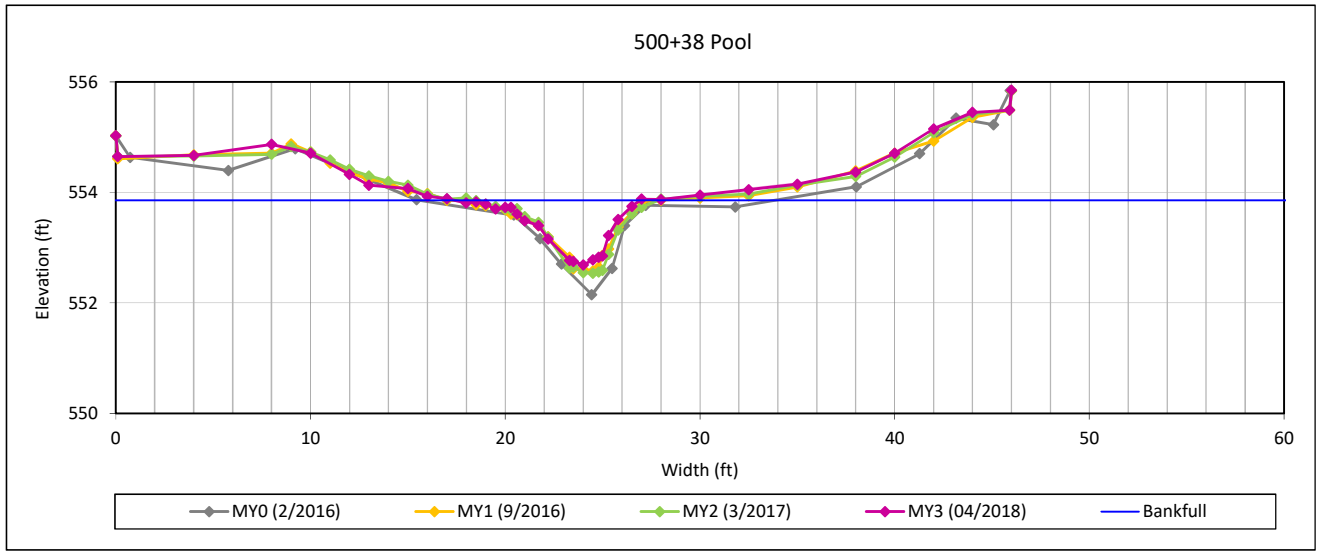
Survey Date: 04/2018
Field Crew: Wildlands Engineering

View Downstream

Cross Section Plots

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Cross Section 15, UT4B



Bankfull Dimensions	
4.3	x-section area (ft.sq.)
6.5	width (ft)
0.7	mean depth (ft)
1.2	max depth (ft)
7.0	wetted perimeter (ft)
0.6	hydraulic radius (ft)
9.8	width-depth ratio

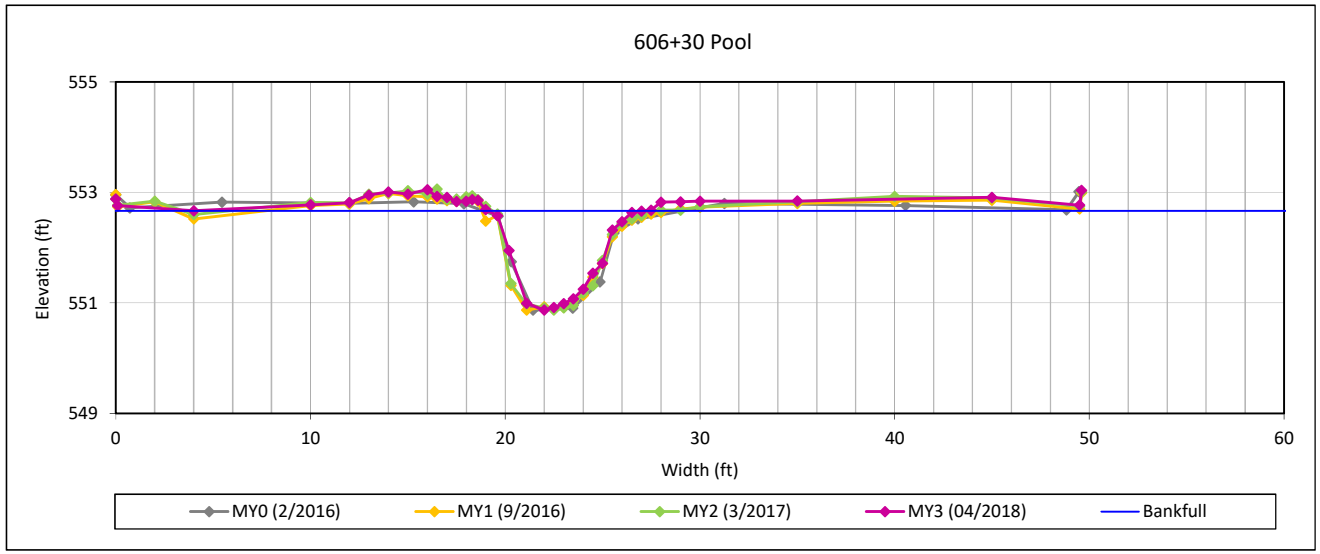
Survey Date: 04/2018
Field Crew: Wildlands Engineering

View Downstream

Cross Section Plots

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Cross Section 16, UT5



Bankfull Dimensions	
7.9	x-section area (ft.sq.)
8.1	width (ft)
1.0	mean depth (ft)
1.8	max depth (ft)
9.3	wetted perimeter (ft)
0.9	hydraulic radius (ft)
8.3	width-depth ratio

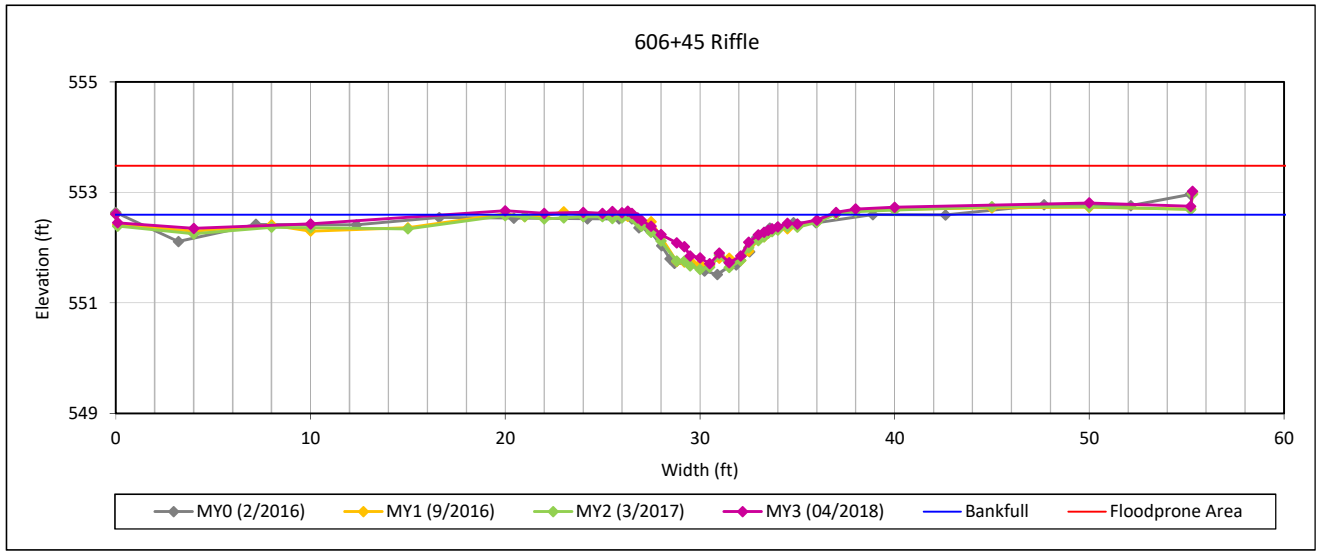
Survey Date: 04/2018
Field Crew: Wildlands Engineering

View Downstream

Cross Section Plots

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

Cross Section 17, UT5



Bankfull Dimensions	
4.0	x-section area (ft.sq.)
8.4	width (ft)
0.5	mean depth (ft)
0.9	max depth (ft)
8.7	wetted perimeter (ft)
0.5	hydraulic radius (ft)
17.7	width-depth ratio
100.0	W flood prone area (ft)
11.9	entrenchment ratio
0.8	low bank height ratio

Survey Date: 04/2018
Field Crew: Wildlands Engineering

View Downstream

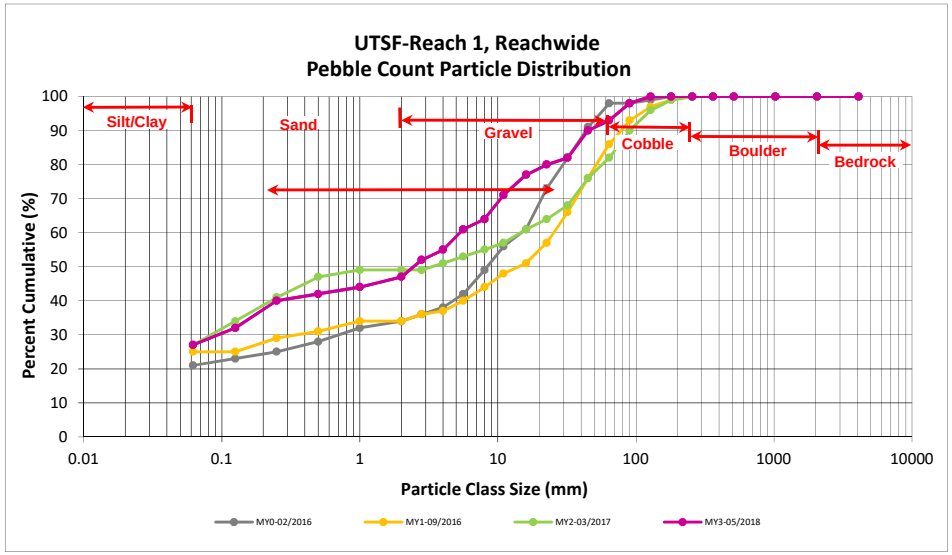
Reachwide and Cross Section Pebble Count Plots

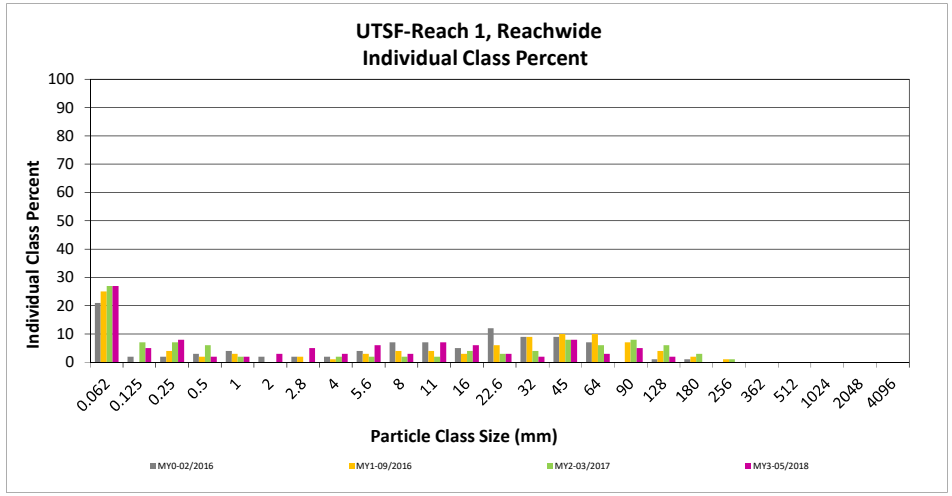
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UTSF-Reach 1, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	12	15	27	27	27
SAND	Very fine	0.062	0.125	1	4	5	5	32
	Fine	0.125	0.250	8		8	8	40
	Medium	0.25	0.50	2		2	2	42
	Coarse	0.5	1.0	1	1	2	2	44
	Very Coarse	1.0	2.0	2	1	3	3	47
GRAVEL	Very Fine	2.0	2.8	2	3	5	5	52
	Very Fine	2.8	4.0	2	1	3	3	55
	Fine	4.0	5.6	5	1	6	6	61
	Fine	5.6	8.0	3		3	3	64
	Medium	8.0	11.0	5	2	7	7	71
	Medium	11.0	16.0	5	1	6	6	77
	Coarse	16.0	22.6	2	1	3	3	80
	Coarse	22.6	32	2		2	2	82
	Very Coarse	32	45	8		8	8	90
	Very Coarse	45	64	3		3	3	93
COBBLE	Small	64	90	5		5	5	98
	Small	90	128	2		2	2	100
	Large	128	180					100
	Large	180	256					100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**70**	**30**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.16
D_{50} =	2.4
D_{84} =	34.8
D_{95} =	73.4
D_{100} =	128.0





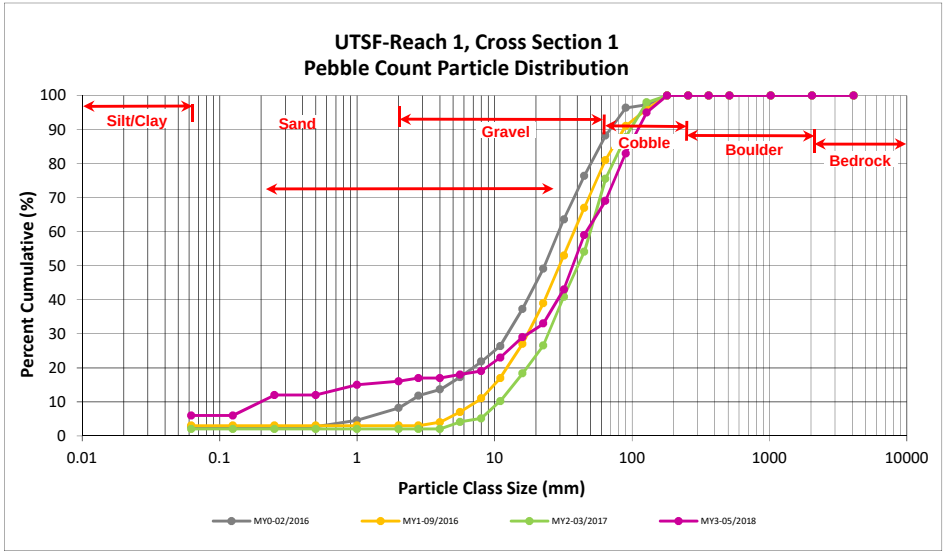
Reachwide and Cross Section Pebble Count Plots

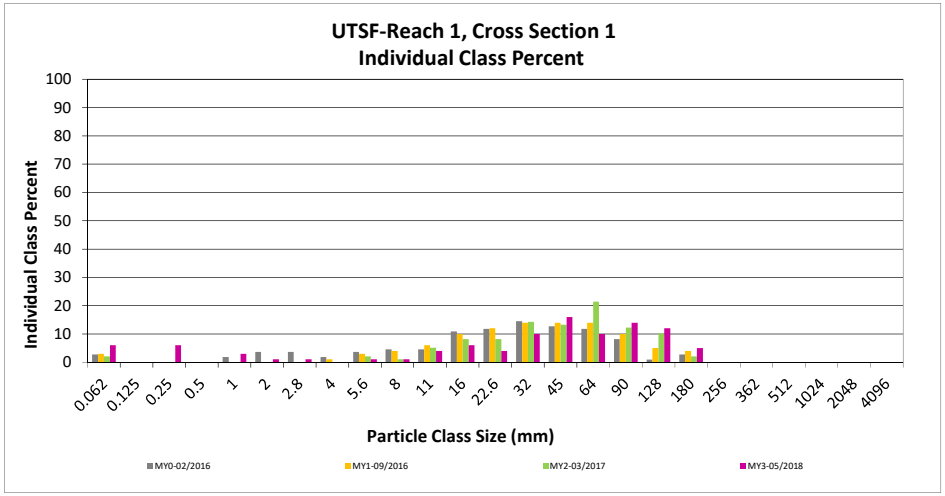
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UTSF-Reach 1, Cross Section 1

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	23	23	23
SAND	Very fine	0.062	0.125	6	6	29
	Fine	0.125	0.250	8	8	37
	Medium	0.25	0.50			37
	Coarse	0.5	1.0	1	1	38
	Very Coarse	1.0	2.0	2	2	40
GRAVEL	Very Fine	2.0	2.8	1	1	41
	Very Fine	2.8	4.0	2	2	43
	Fine	4.0	5.6	3	3	46
	Fine	5.6	8.0	5	5	51
	Medium	8.0	11.0	4	4	55
	Medium	11.0	16.0	4	4	59
	Coarse	16.0	22.6	4	4	63
	Coarse	22.6	32	11	11	74
	Very Coarse	32	45	10	10	84
	Very Coarse	45	64	8	8	92
COBBLE	Small	64	90	5	5	97
	Small	90	128	3	3	100
	Large	128	180			100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross Section 1	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.21
D_{50} =	7.4
D_{84} =	45.0
D_{95} =	78.5
D_{100} =	128.0





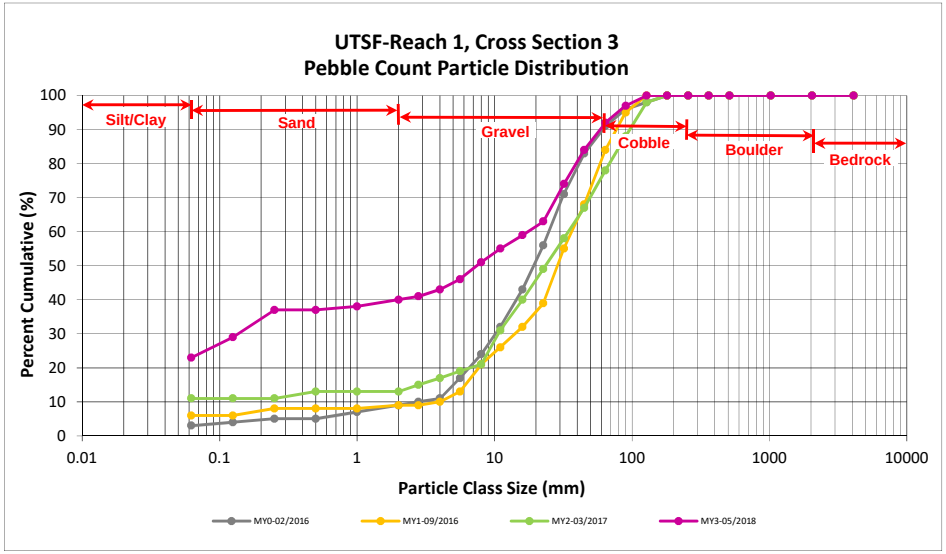
Reachwide and Cross Section Pebble Count Plots

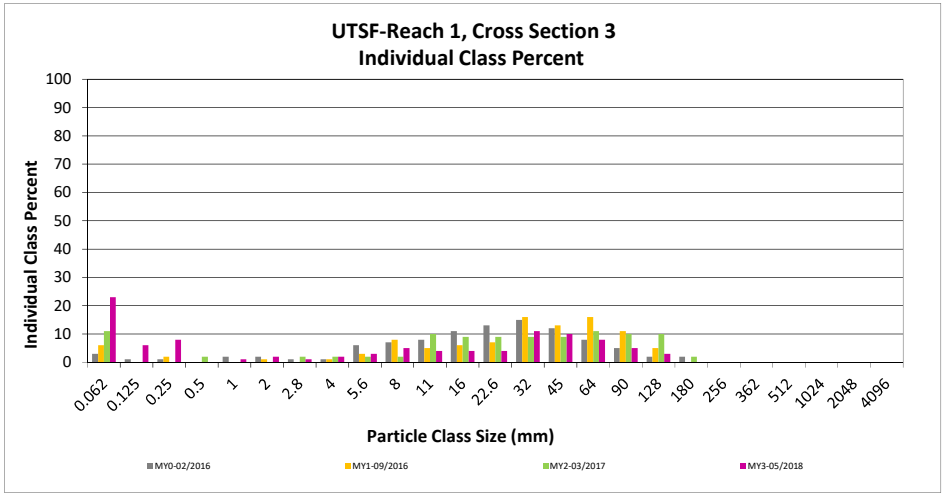
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UTSF-Reach 1, Cross Section 3

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	23	23	23
SAND	Very fine	0.062	0.125	6	6	29
	Fine	0.125	0.250	8	8	37
	Medium	0.25	0.50			37
	Coarse	0.5	1.0	1	1	38
	Very Coarse	1.0	2.0	2	2	40
GRAVEL	Very Fine	2.0	2.8	1	1	41
	Very Fine	2.8	4.0	2	2	43
	Fine	4.0	5.6	3	3	46
	Fine	5.6	8.0	5	5	51
	Medium	8.0	11.0	4	4	55
	Medium	11.0	16.0	4	4	59
	Coarse	16.0	22.6	4	4	63
	Coarse	22.6	32	11	11	74
	Very Coarse	32	45	10	10	84
	Very Coarse	45	64	8	8	92
COBBLE	Small	64	90	5	5	97
	Small	90	128	3	3	100
	Large	128	180			100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross Section 3	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.21
D_{50} =	7.4
D_{84} =	45.0
D_{95} =	78.5
D_{100} =	128.0





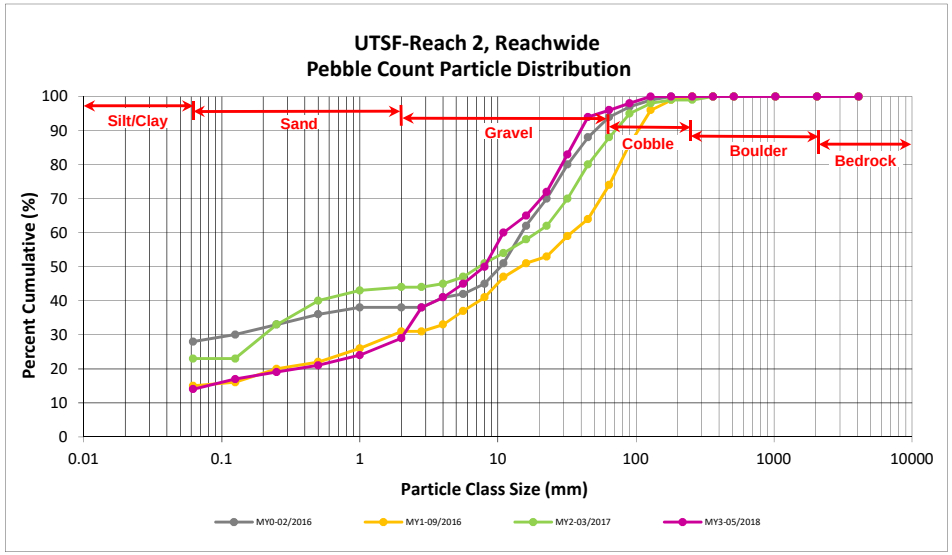
Reachwide and Cross Section Pebble Count Plots

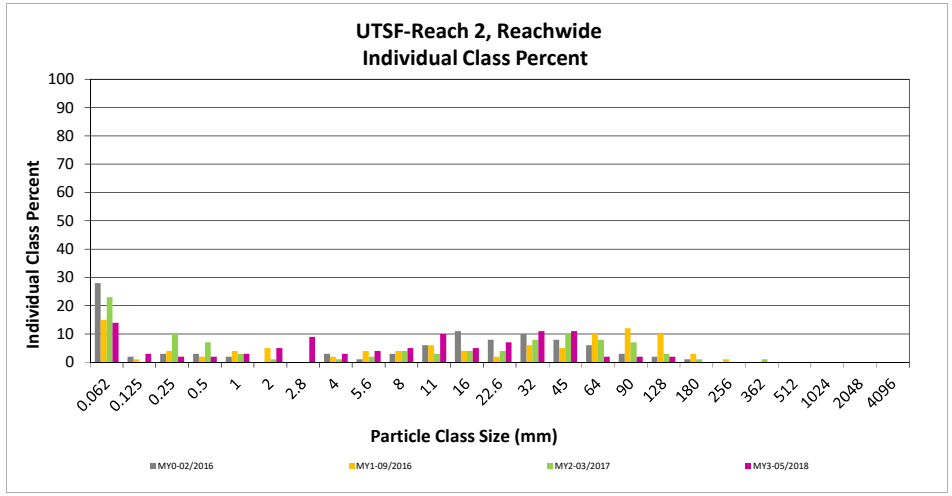
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UTSF-Reach 2, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	3	11	14	14	14
SAND	Very fine	0.062	0.125	1	2	3	3	17
	Fine	0.125	0.250		2	2	2	19
	Medium	0.25	0.50		2	2	2	21
	Coarse	0.5	1.0	1	2	3	3	24
	Very Coarse	1.0	2.0	1	4	5	5	29
GRAVEL	Very Fine	2.0	2.8	1	8	9	9	38
	Very Fine	2.8	4.0	1	2	3	3	41
	Fine	4.0	5.6	3	1	4	4	45
	Fine	5.6	8.0	2	3	5	5	50
	Medium	8.0	11.0	9	1	10	10	60
	Medium	11.0	16.0	5		5	5	65
	Coarse	16.0	22.6	7		7	7	72
	Coarse	22.6	32	4	7	11	11	83
	Very Coarse	32	45	7	4	11	11	94
	Very Coarse	45	64	2		2	2	96
COBBLE	Small	64	90	1	1	2	2	98
	Small	90	128	2		2	2	100
	Large	128	180					100
	Large	180	256					100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	0.10
D_{35} =	2.50
D_{50} =	8.0
D_{84} =	33.0
D_{95} =	53.7
D_{100} =	128.0





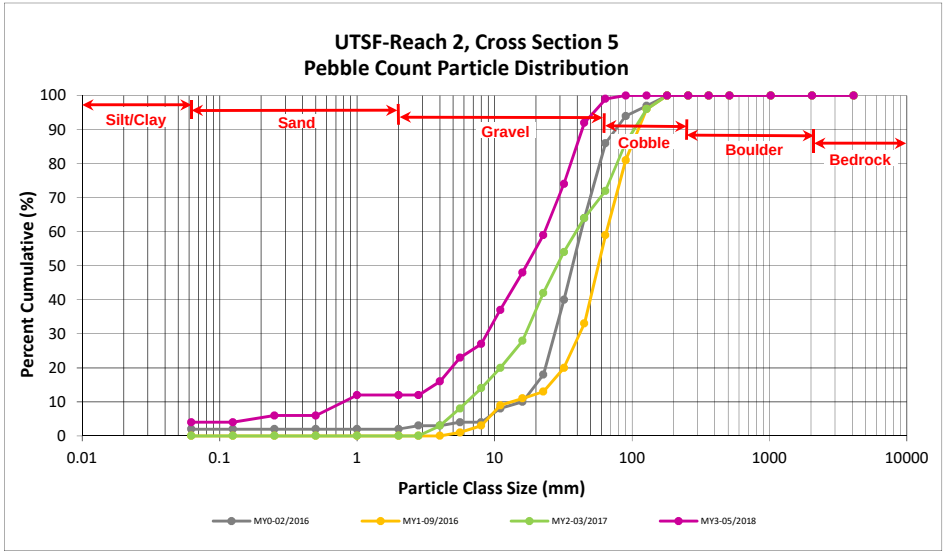
Reachwide and Cross Section Pebble Count Plots

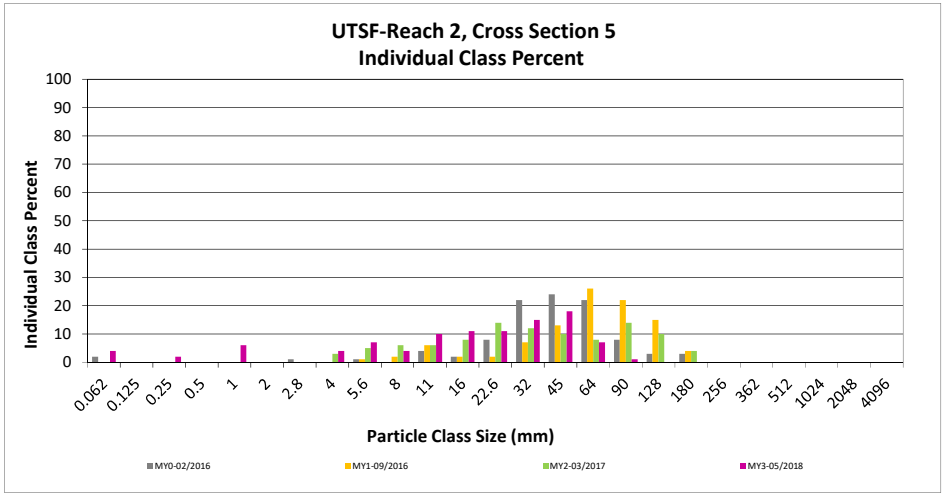
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UTSF-Reach 2, Cross Section 5

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	23	23	23
SAND	Very fine	0.062	0.125	6	6	29
	Fine	0.125	0.250	8	8	37
	Medium	0.25	0.50			37
	Coarse	0.5	1.0	1	1	38
	Very Coarse	1.0	2.0	2	2	40
GRAVEL	Very Fine	2.0	2.8	1	1	41
	Very Fine	2.8	4.0	2	2	43
	Fine	4.0	5.6	3	3	46
	Fine	5.6	8.0	5	5	51
	Medium	8.0	11.0	4	4	55
	Medium	11.0	16.0	4	4	59
	Coarse	16.0	22.6	4	4	63
	Coarse	22.6	32	11	11	74
	Very Coarse	32	45	10	10	84
	Very Coarse	45	64	8	8	92
COBBLE	Small	64	90	5	5	97
	Small	90	128	3	3	100
	Large	128	180			100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross Section 5	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.21
D_{50} =	7.4
D_{84} =	45.0
D_{95} =	78.5
D_{100} =	128.0





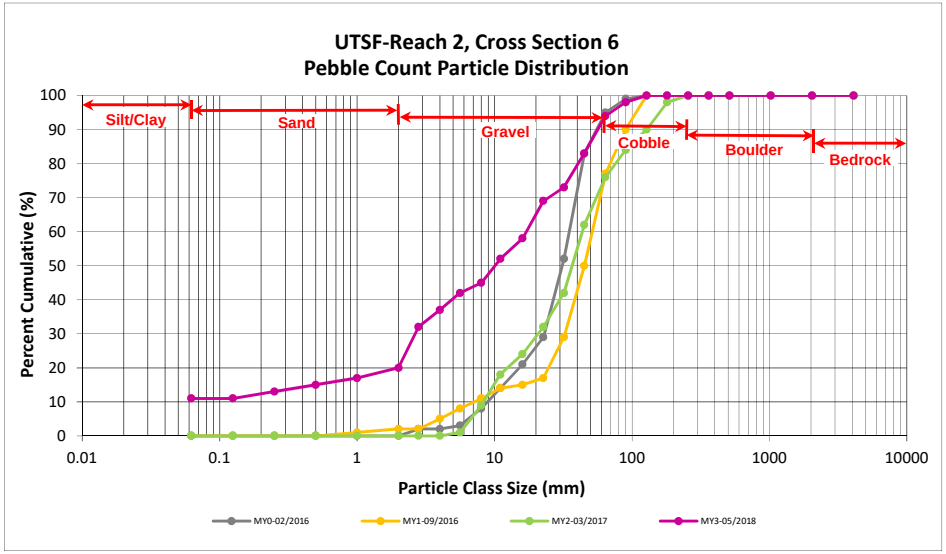
Reachwide and Cross Section Pebble Count Plots

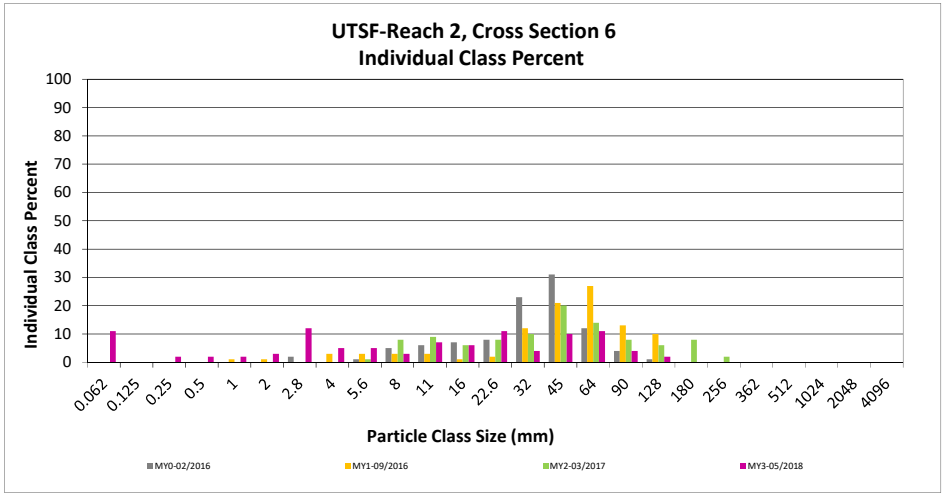
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UTSF-Reach 2, Cross Section 6

Particle Class		Diameter (mm)		Riffle 100-Count	Summary	
		min	max		Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	23	23	23
SAND	Very fine	0.062	0.125	6	6	29
	Fine	0.125	0.250	8	8	37
	Medium	0.25	0.50			37
	Coarse	0.5	1.0	1	1	38
	Very Coarse	1.0	2.0	2	2	40
GRAVEL	Very Fine	2.0	2.8	1	1	41
	Very Fine	2.8	4.0	2	2	43
	Fine	4.0	5.6	3	3	46
	Fine	5.6	8.0	5	5	51
	Medium	8.0	11.0	4	4	55
	Medium	11.0	16.0	4	4	59
	Coarse	16.0	22.6	4	4	63
	Coarse	22.6	32	11	11	74
	Very Coarse	32	45	10	10	84
	Very Coarse	45	64	8	8	92
COBBLE	Small	64	90	5	5	97
	Small	90	128	3	3	100
	Large	128	180			100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross Section 6	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.21
D_{50} =	7.4
D_{84} =	45.0
D_{95} =	78.5
D_{100} =	128.0





Reachwide and Cross Section Pebble Count Plots

Maney Farm Mitigation Project

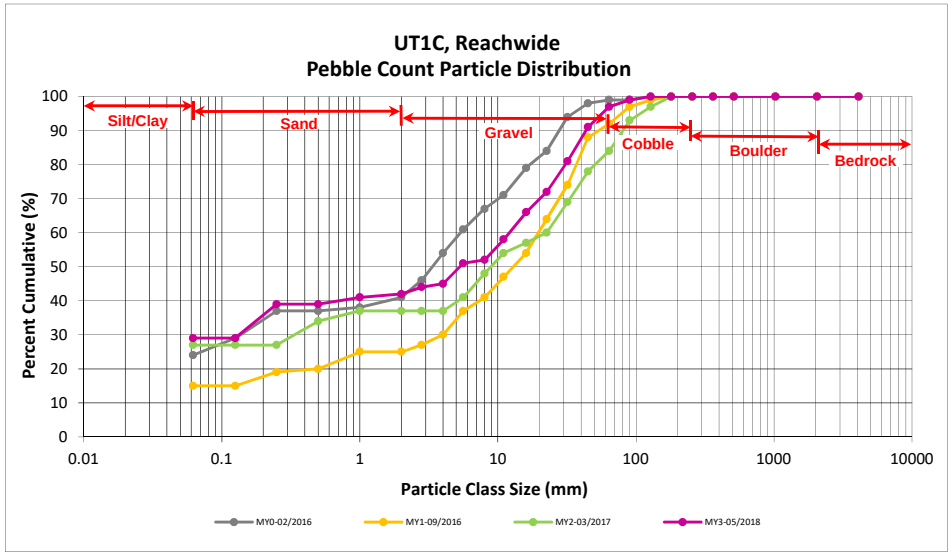
DMS Project No. 96314

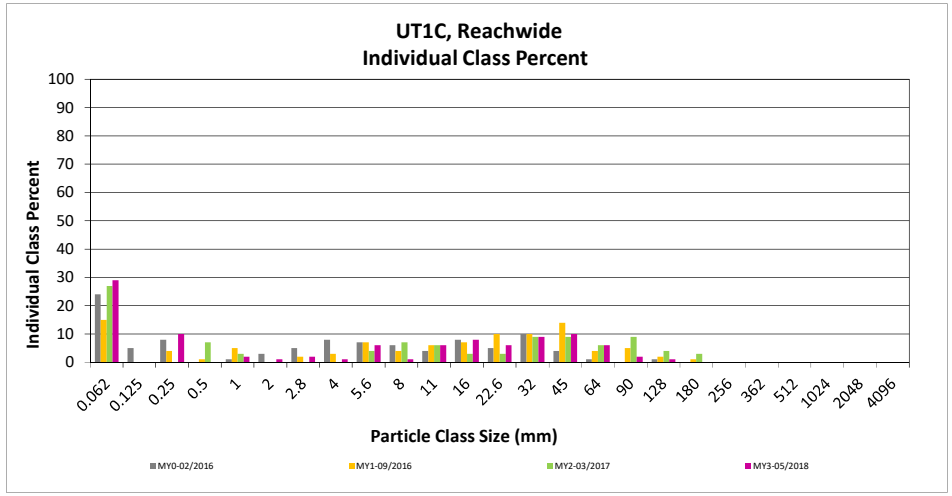
Monitoring Year 3 - 2018

UT1C, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	8	21	29	29	29
SAND	Very fine	0.062	0.125					29
	Fine	0.125	0.250	5	5	10	10	39
	Medium	0.25	0.50					39
	Coarse	0.5	1.0	1	1	2	2	41
	Very Coarse	1.0	2.0		1	1	1	42
GRAVEL	Very Fine	2.0	2.8		2	2	2	44
	Very Fine	2.8	4.0		1	1	1	45
	Fine	4.0	5.6	2	4	6	6	51
	Fine	5.6	8.0	1		1	1	52
	Medium	8.0	11.0	3	3	6	6	58
	Medium	11.0	16.0	7	1	8	8	66
	Coarse	16.0	22.6	6		6	6	72
	Coarse	22.6	32	9		9	9	81
	Very Coarse	32	45	10		10	10	91
	Very Coarse	45	64	5	1	6	6	97
COBBLE	Small	64	90	2		2	2	99
	Small	90	128	1		1	1	100
	Large	128	180					100
	Large	180	256					100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**60**	**40**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.19
D_{50} =	5.3
D_{84} =	35.4
D_{95} =	56.9
D_{100} =	128.0





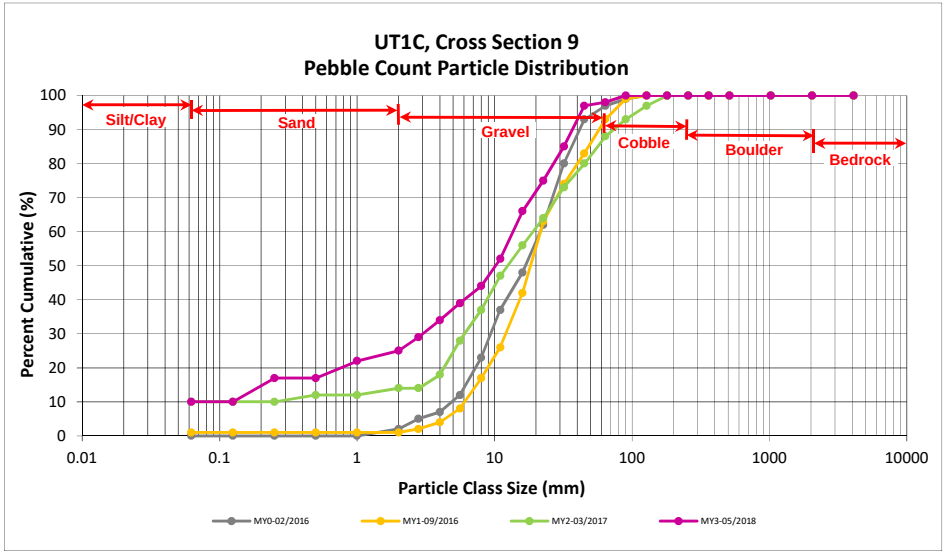
Reachwide and Cross Section Pebble Count Plots

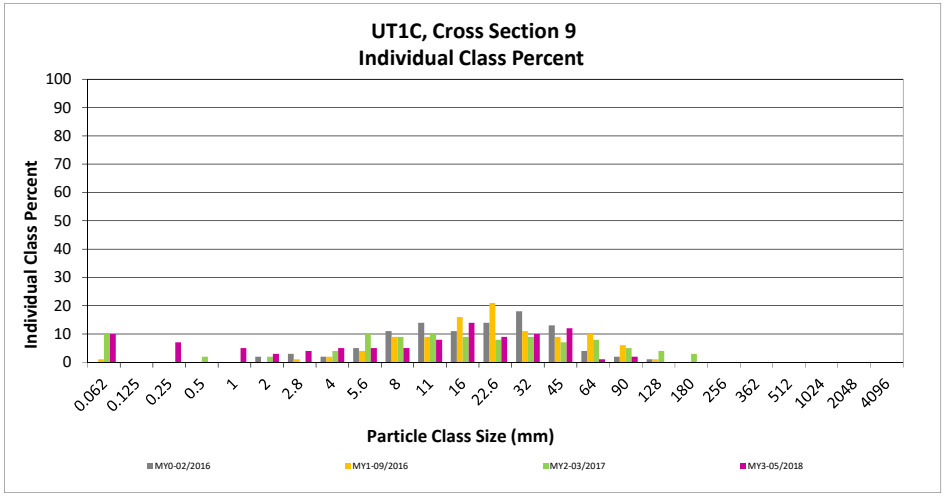
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UT1C, Cross Section 9

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	23	23	23
SAND	Very fine	0.062	0.125	6	6	29
	Fine	0.125	0.250	8	8	37
	Medium	0.25	0.50			37
	Coarse	0.5	1.0	1	1	38
	Very Coarse	1.0	2.0	2	2	40
GRAVEL	Very Fine	2.0	2.8	1	1	41
	Very Fine	2.8	4.0	2	2	43
	Fine	4.0	5.6	3	3	46
	Fine	5.6	8.0	5	5	51
	Medium	8.0	11.0	4	4	55
	Medium	11.0	16.0	4	4	59
	Coarse	16.0	22.6	4	4	63
	Coarse	22.6	32	11	11	74
	Very Coarse	32	45	10	10	84
	Very Coarse	45	64	8	8	92
COBBLE	Small	64	90	5	5	97
	Small	90	128	3	3	100
	Large	128	180			100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross Section 9	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.21
D_{50} =	7.4
D_{84} =	45.0
D_{95} =	78.5
D_{100} =	128.0





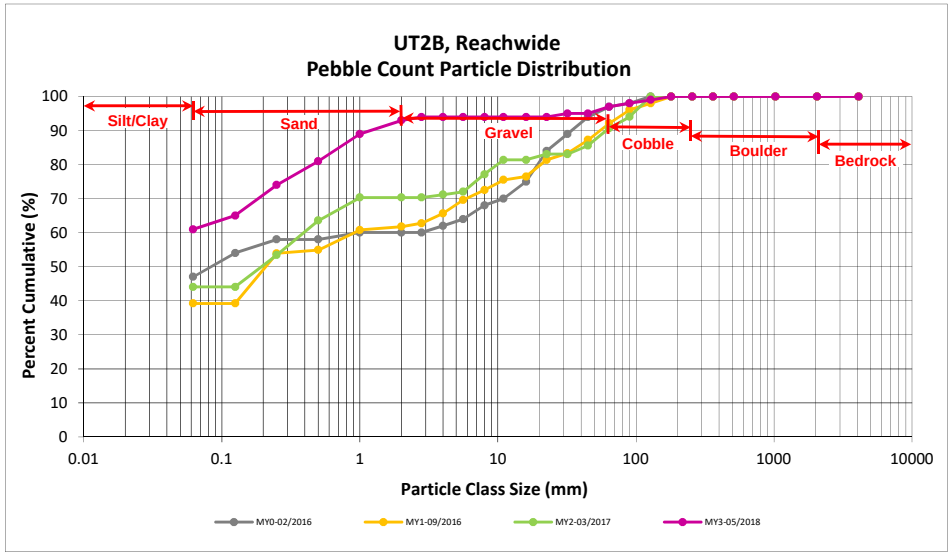
Reachwide and Cross Section Pebble Count Plots

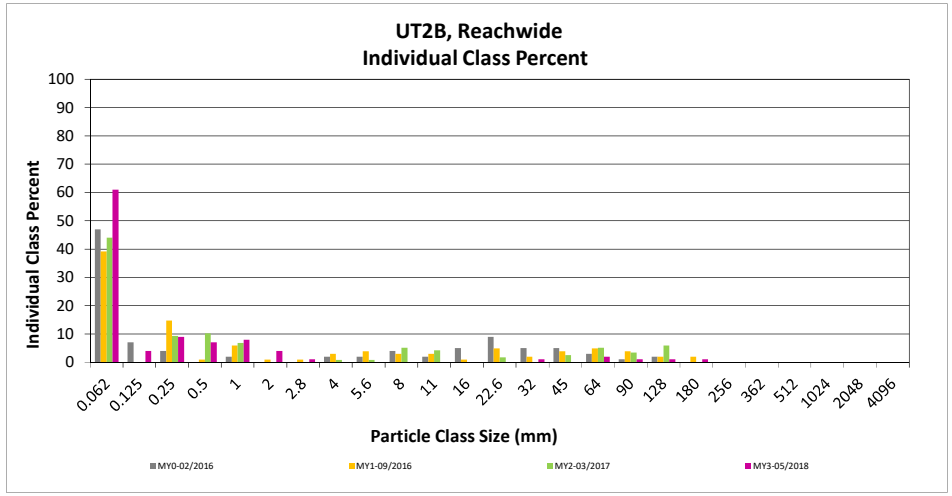
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UT2B, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	31	30	61	61	61
SAND	Very fine	0.062	0.125	2	2	4	4	65
	Fine	0.125	0.250	7	2	9	9	74
	Medium	0.25	0.50	4	3	7	7	81
	Coarse	0.5	1.0	5	3	8	8	89
	Very Coarse	1.0	2.0	4		4	4	93
GRAVEL	Very Fine	2.0	2.8	1		1	1	94
	Very Fine	2.8	4.0					94
	Fine	4.0	5.6					94
	Fine	5.6	8.0					94
	Medium	8.0	11.0					94
	Medium	11.0	16.0					94
	Coarse	16.0	22.6					94
	Coarse	22.6	32	1		1	1	95
	Very Coarse	32	45					95
	Very Coarse	45	64	2		2	2	97
COBBLE	Small	64	90	1		1	1	98
	Small	90	128	1		1	1	99
	Large	128	180	1		1	1	100
	Large	180	256					100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**60**	**40**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	Silt/Clay
D_{50} =	Silt/Clay
D_{84} =	0.6
D_{95} =	32.0
D_{100} =	180.0





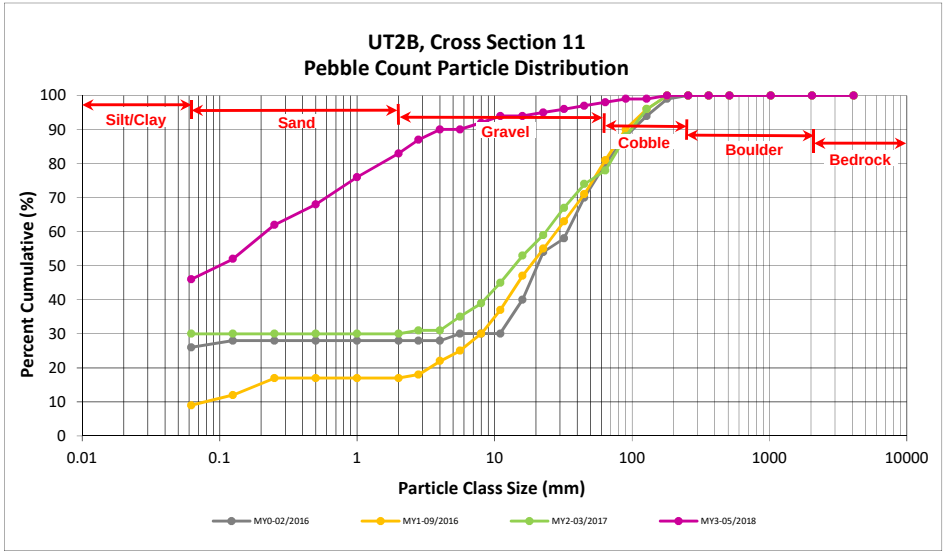
Reachwide and Cross Section Pebble Count Plots

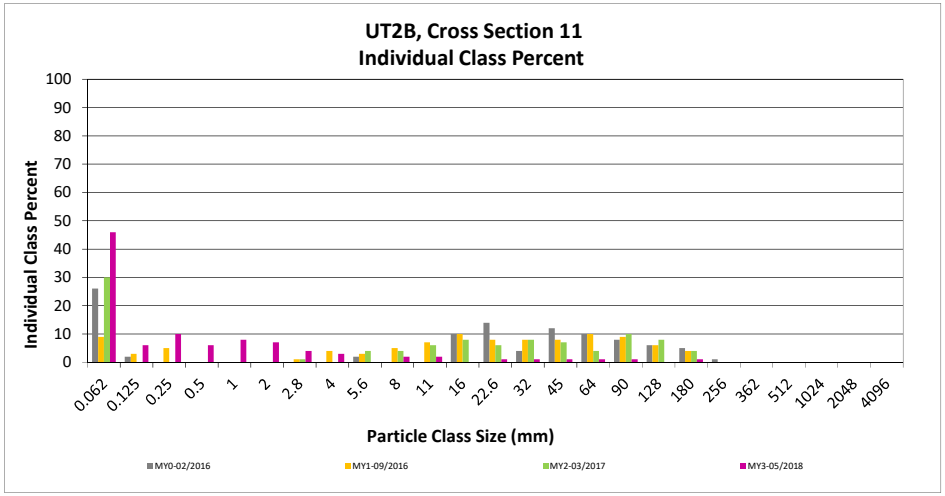
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UT2B, Cross Section 11

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	23	23	23
SAND	Very fine	0.062	0.125	6	6	29
	Fine	0.125	0.250	8	8	37
	Medium	0.25	0.50			37
	Coarse	0.5	1.0	1	1	38
	Very Coarse	1.0	2.0	2	2	40
GRAVEL	Very Fine	2.0	2.8	1	1	41
	Very Fine	2.8	4.0	2	2	43
	Fine	4.0	5.6	3	3	46
	Fine	5.6	8.0	5	5	51
	Medium	8.0	11.0	4	4	55
	Medium	11.0	16.0	4	4	59
	Coarse	16.0	22.6	4	4	63
	Coarse	22.6	32	11	11	74
	Very Coarse	32	45	10	10	84
	Very Coarse	45	64	8	8	92
COBBLE	Small	64	90	5	5	97
	Small	90	128	3	3	100
	Large	128	180			100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross Section 11	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.21
D_{50} =	7.4
D_{84} =	45.0
D_{95} =	78.5
D_{100} =	128.0





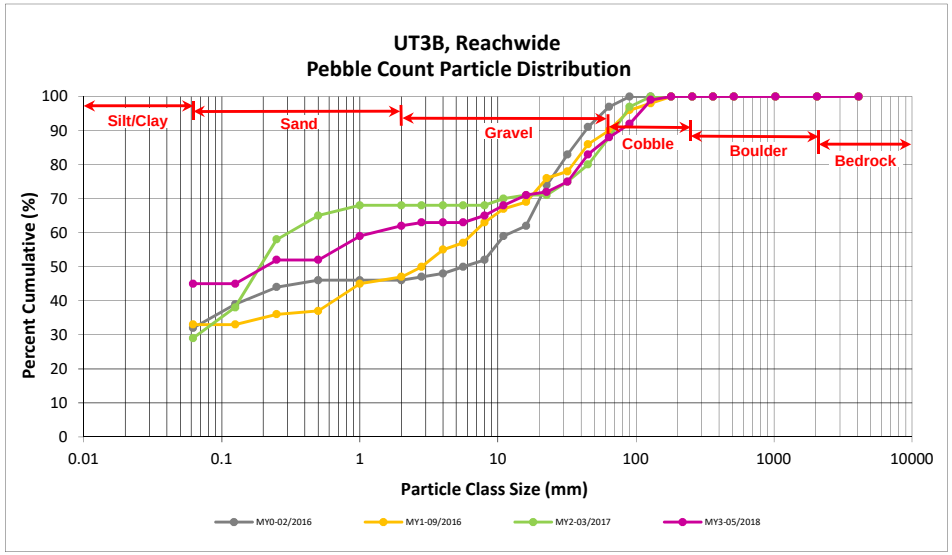
Reachwide and Cross Section Pebble Count Plots

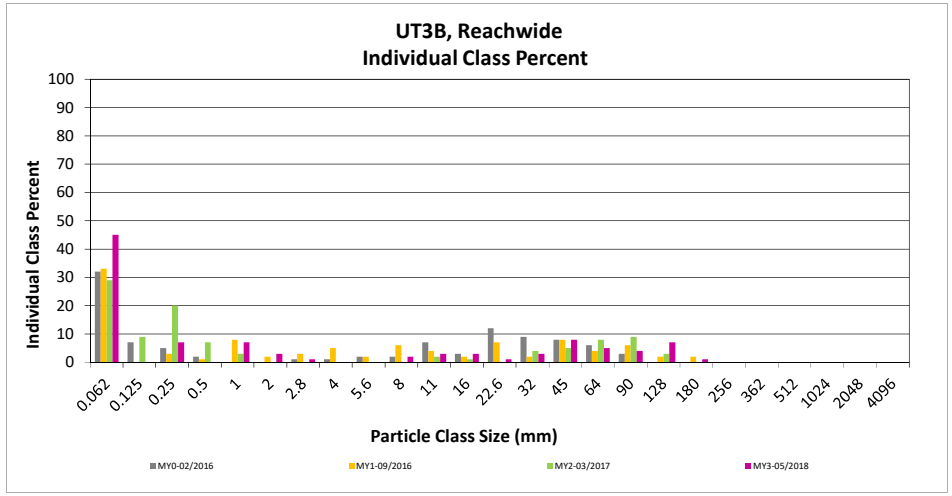
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UT3B, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	15	30	45	45	45
SAND	Very fine	0.062	0.125					45
	Fine	0.125	0.250		7	7	7	52
	Medium	0.25	0.50					52
	Coarse	0.5	1.0	5	2	7	7	59
	Very Coarse	1.0	2.0	2	1	3	3	62
GRAVEL	Very Fine	2.0	2.8	1		1	1	63
	Very Fine	2.8	4.0					63
	Fine	4.0	5.6					63
	Fine	5.6	8.0	2		2	2	65
	Medium	8.0	11.0	3		3	3	68
	Medium	11.0	16.0	3		3	3	71
	Coarse	16.0	22.6	1		1	1	72
	Coarse	22.6	32	3		3	3	75
	Very Coarse	32	45	8		8	8	83
	Very Coarse	45	64	5		5	5	88
COBBLE	Small	64	90	4		4	4	92
	Small	90	128	7		7	7	99
	Large	128	180	1		1	1	100
	Large	180	256					100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**60**	**40**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	Silt/Clay
D_{50} =	0.2
D_{84} =	48.3
D_{95} =	104.7
D_{100} =	180.0





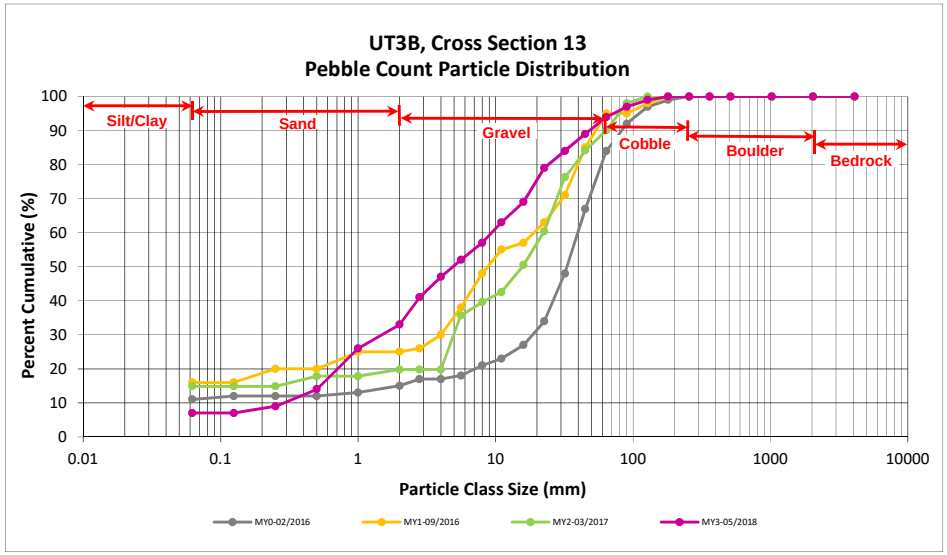
Reachwide and Cross Section Pebble Count Plots

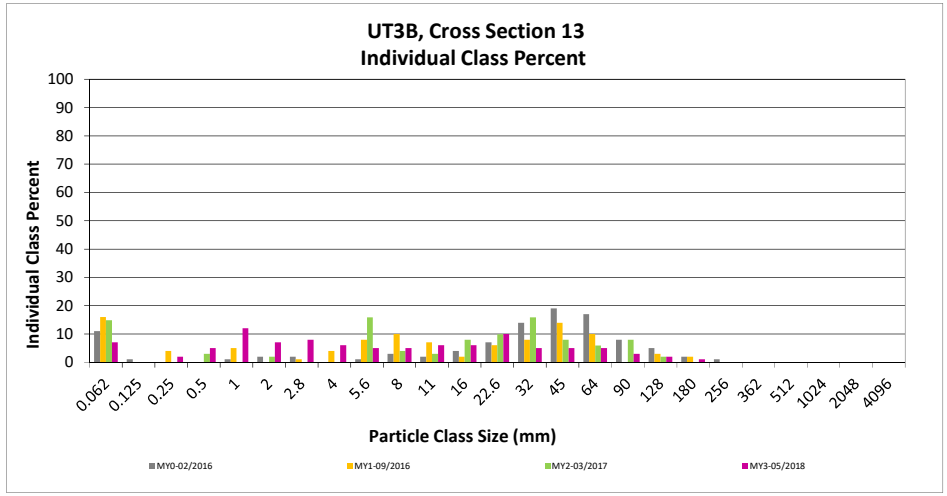
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UT3B, Cross Section 13

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	23	23	23
SAND	Very fine	0.062	0.125	6	6	29
	Fine	0.125	0.250	8	8	37
	Medium	0.25	0.50			37
	Coarse	0.5	1.0	1	1	38
	Very Coarse	1.0	2.0	2	2	40
GRAVEL	Very Fine	2.0	2.8	1	1	41
	Very Fine	2.8	4.0	2	2	43
	Fine	4.0	5.6	3	3	46
	Fine	5.6	8.0	5	5	51
	Medium	8.0	11.0	4	4	55
	Medium	11.0	16.0	4	4	59
	Coarse	16.0	22.6	4	4	63
	Coarse	22.6	32	11	11	74
	Very Coarse	32	45	10	10	84
	Very Coarse	45	64	8	8	92
COBBLE	Small	64	90	5	5	97
	Small	90	128	3	3	100
	Large	128	180			100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross Section 13	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.21
D_{50} =	7.4
D_{84} =	45.0
D_{95} =	78.5
D_{100} =	128.0





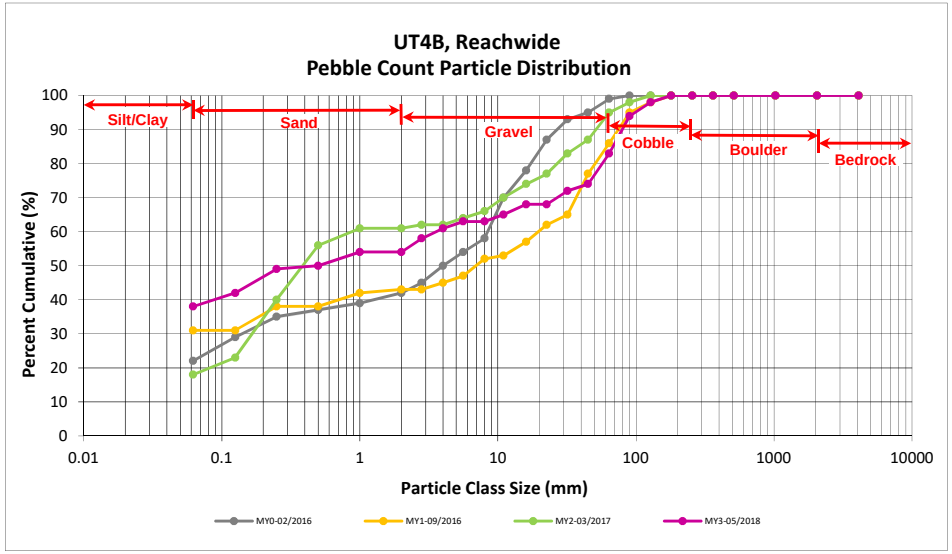
Reachwide and Cross Section Pebble Count Plots

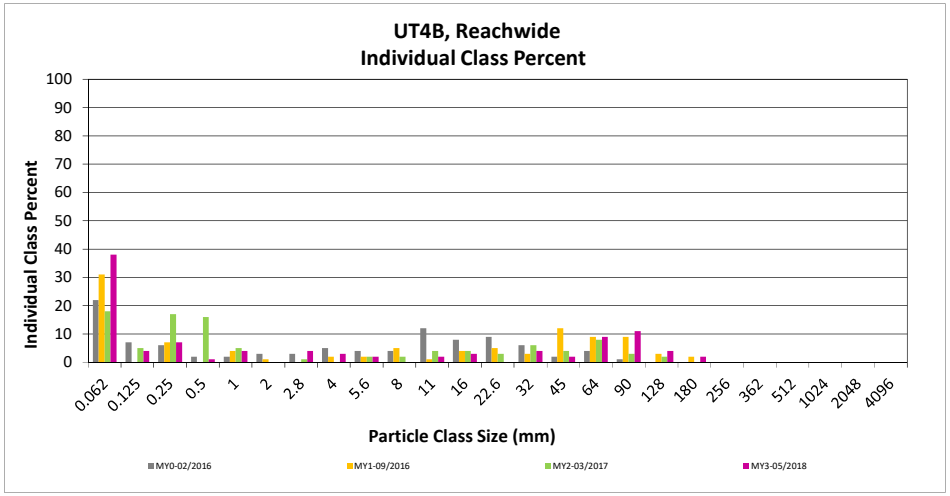
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UT4B, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	8	30	38	38	38
SAND	Very fine	0.062	0.125		4	4	4	42
	Fine	0.125	0.250	2	5	7	7	49
	Medium	0.25	0.50		1	1	1	50
	Coarse	0.5	1.0	1	3	4	4	54
	Very Coarse	1.0	2.0					54
GRAVEL	Very Fine	2.0	2.8	1	3	4	4	58
	Very Fine	2.8	4.0	1	2	3	3	61
	Fine	4.0	5.6	2		2	2	63
	Fine	5.6	8.0					63
	Medium	8.0	11.0	2		2	2	65
	Medium	11.0	16.0	2	1	3	3	68
	Coarse	16.0	22.6					68
	Coarse	22.6	32	4		4	4	72
	Very Coarse	32	45	2		2	2	74
	Very Coarse	45	64	9		9	9	83
COBBLE	Small	64	90	11		11	11	94
	Small	90	128	4		4	4	98
	Large	128	180	1	1	2	2	100
	Large	180	256					100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	Silt/Clay
D_{50} =	0.5
D_{84} =	66.0
D_{95} =	98.3
D_{100} =	180.0





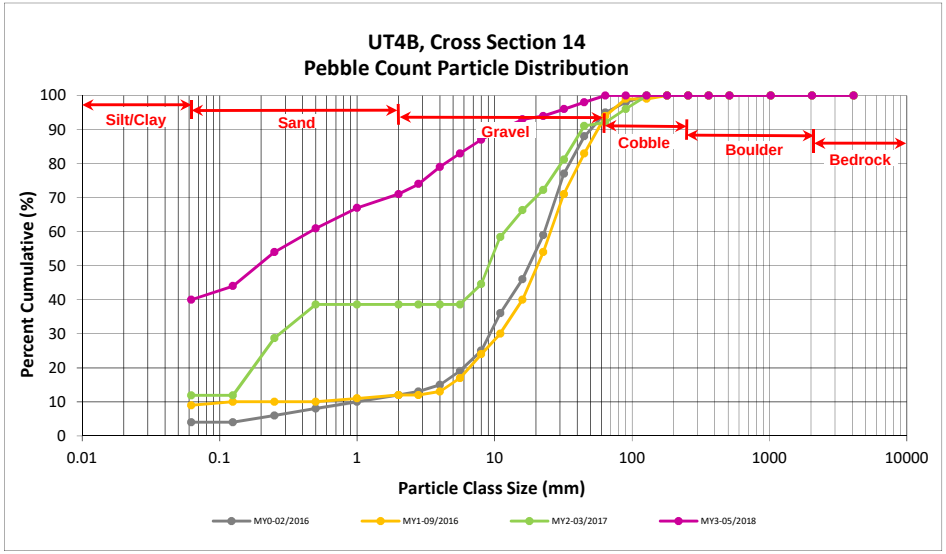
Reachwide and Cross Section Pebble Count Plots

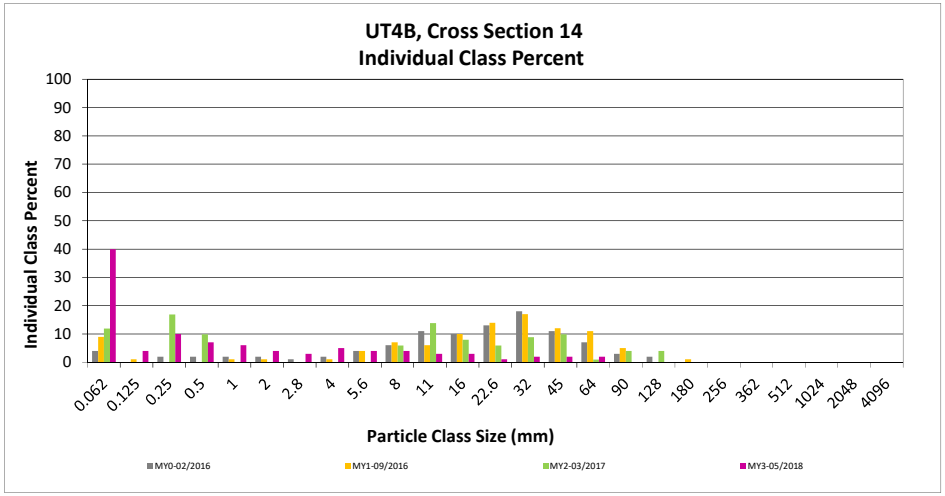
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UT4B, Cross Section 14

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	23	23	23
SAND	Very fine	0.062	0.125	6	6	29
	Fine	0.125	0.250	8	8	37
	Medium	0.25	0.50			37
	Coarse	0.5	1.0	1	1	38
	Very Coarse	1.0	2.0	2	2	40
GRAVEL	Very Fine	2.0	2.8	1	1	41
	Very Fine	2.8	4.0	2	2	43
	Fine	4.0	5.6	3	3	46
	Fine	5.6	8.0	5	5	51
	Medium	8.0	11.0	4	4	55
	Medium	11.0	16.0	4	4	59
	Coarse	16.0	22.6	4	4	63
	Coarse	22.6	32	11	11	74
	Very Coarse	32	45	10	10	84
	Very Coarse	45	64	8	8	92
COBBLE	Small	64	90	5	5	97
	Small	90	128	3	3	100
	Large	128	180			100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross Section 14	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.21
D_{50} =	7.4
D_{84} =	45.0
D_{95} =	78.5
D_{100} =	128.0





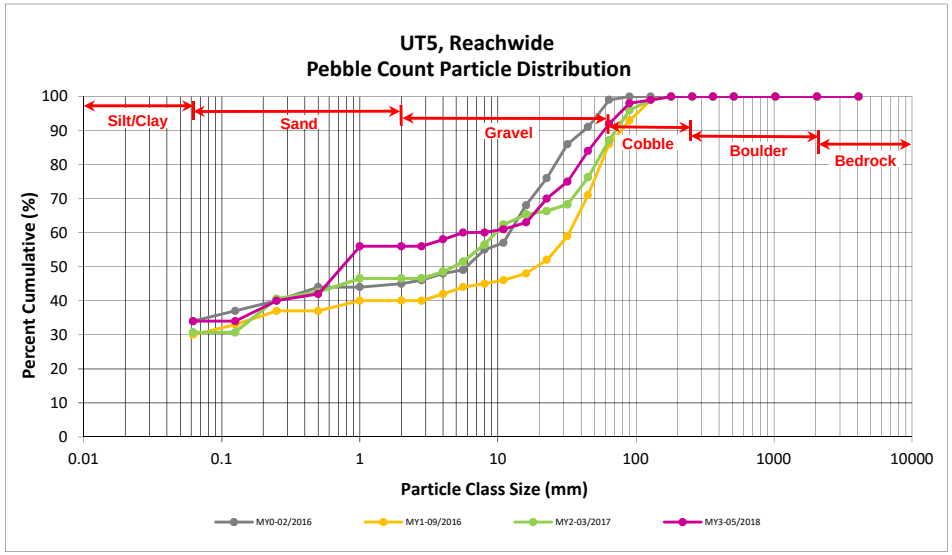
Reachwide and Cross Section Pebble Count Plots

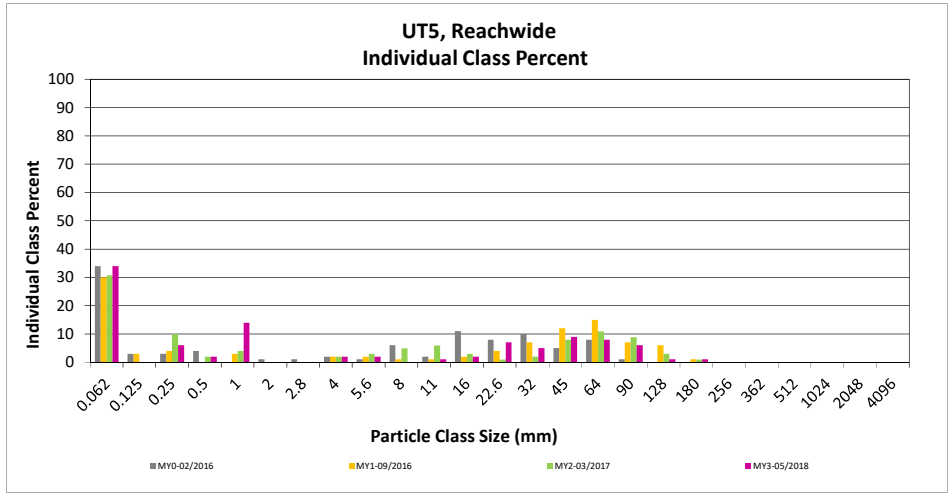
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UT5, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	7	27	34	34	34
SAND	Very fine	0.062	0.125					34
	Fine	0.125	0.250	3	3	6	6	40
	Medium	0.25	0.50		2	2	2	42
	Coarse	0.5	1.0	10	4	14	14	56
	Very Coarse	1.0	2.0					56
GRAVEL	Very Fine	2.0	2.8					56
	Very Fine	2.8	4.0	1	1	2	2	58
	Fine	4.0	5.6		2	2	2	60
	Fine	5.6	8.0					60
	Medium	8.0	11.0	1		1	1	61
	Medium	11.0	16.0	1	1	2	2	63
	Coarse	16.0	22.6	7		7	7	70
	Coarse	22.6	32	3	2	5	5	75
	Very Coarse	32	45	7	2	9	9	84
	Very Coarse	45	64	5	3	8	8	92
COBBLE	Small	64	90	4	2	6	6	98
	Small	90	128		1	1	1	99
	Large	128	180	1		1	1	100
	Large	180	256					100
BOULDER	Small	256	362					100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.14
D_{50} =	0.7
D_{84} =	45.0
D_{95} =	75.9
D_{100} =	180.0





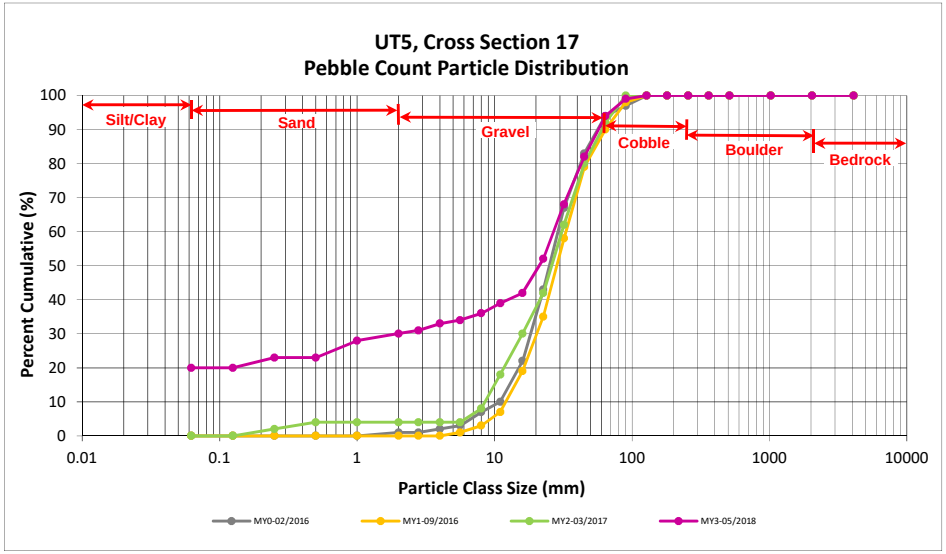
Reachwide and Cross Section Pebble Count Plots

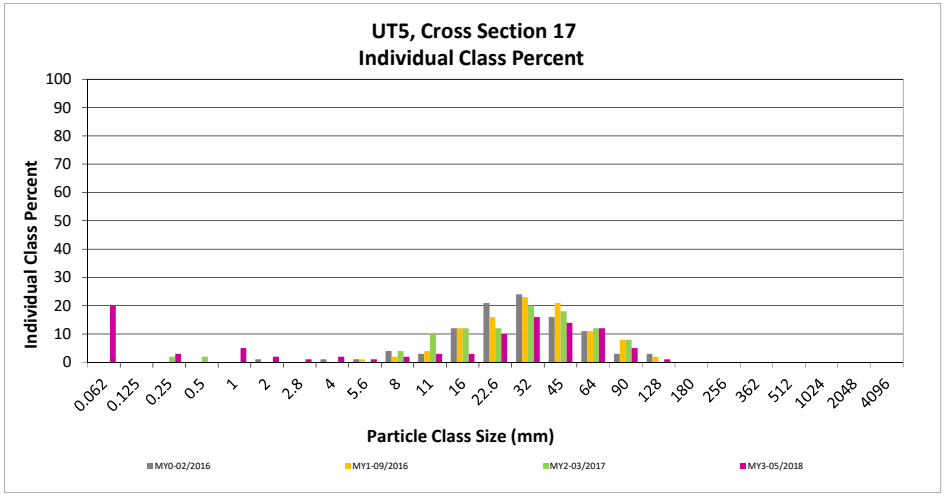
Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018

UT5, Cross Section 17

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	23	23	23
SAND	Very fine	0.062	0.125	6	6	29
	Fine	0.125	0.250	8	8	37
	Medium	0.25	0.50			37
	Coarse	0.5	1.0	1	1	38
	Very Coarse	1.0	2.0	2	2	40
GRAVEL	Very Fine	2.0	2.8	1	1	41
	Very Fine	2.8	4.0	2	2	43
	Fine	4.0	5.6	3	3	46
	Fine	5.6	8.0	5	5	51
	Medium	8.0	11.0	4	4	55
	Medium	11.0	16.0	4	4	59
	Coarse	16.0	22.6	4	4	63
	Coarse	22.6	32	11	11	74
	Very Coarse	32	45	10	10	84
	Very Coarse	45	64	8	8	92
COBBLE	Small	64	90	5	5	97
	Small	90	128	3	3	100
	Large	128	180			100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross Section 17	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	0.21
D_{50} =	7.4
D_{84} =	45.0
D_{95} =	78.5
D_{100} =	128.0





APPENDIX 5. Hydrology Summary Data

Table 14. Verification of Bankfull Events

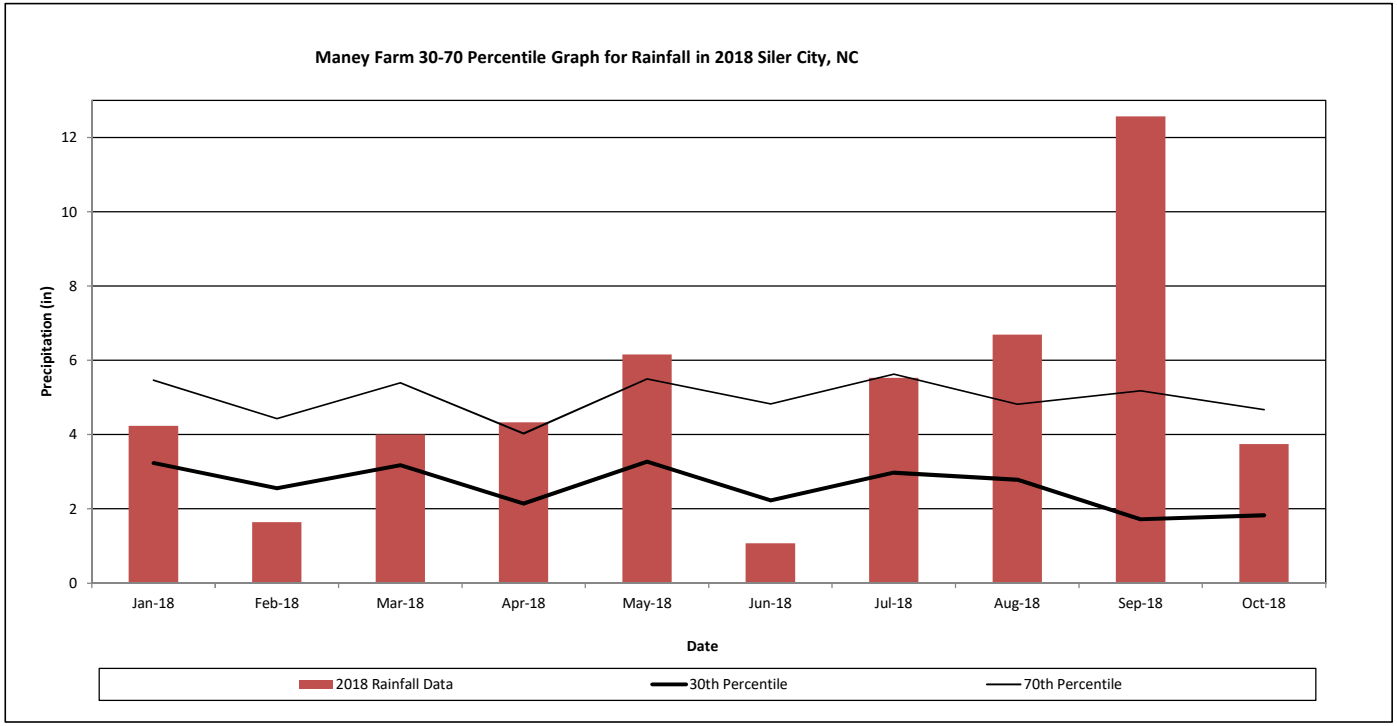
Maney Farm Mitigation Site
DMS Project No. 96314
Monitoring Year 3 - 2018

Reach	Date of Data Collection	Date of Occurrence	Method
UTSF Reach 1	7/3/2018	5/16/2018	Crest Gage/ Pressure Transducer
	10/22/2018	9/17/2018*	
UTSF Reach 2	10/22/2018	**	
UT5	7/3/2018	5/16/2018	
	10/22/2018	9/17/2018*	

*Hurricane Florence
**Crest gauge data malfunctioned

Monthly Rainfall Data

Maney Farm Mitigation Site
DMS Project No. 96314
Monitoring Year 3 - 2018



[1] 2018 monthly rainfall from USDA Station SILER CITY (317924)
[2] 30th and 70th percentile rainfall data collected from weather station Siler City 2 S, NC7924 (USDA, 2002).

Recorded In-stream Flow Events

Maney Farm Mitigation Project
DMS Project No. 96314
Monitoring Year 3 - 2018