MONITORING YEAR 7 ANNUAL REPORT
Final

AGONY ACRES MITIGATION SITE
Guilford County, NC
NCDEQ Contract 004949
DMS Project Number 95716
USACE Action ID Number 2012-1909
NCDWR Project Number 2013-1305

Data Collection Period: March 2021 – November 2021
Draft Submission Date: November 30, 2021
Final Submission Date: December 28, 2021

PREPARED FOR:

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

December 28, 2021

Jeremiah Dow
N.C. Division of Mitigation Services
1652 Mail Service Center
Raleigh, NC 27699-1652

RE: Monitoring Year 7 Report for Agony Acres Mitigation Site (95716)
Cape Fear River Basin (03030002)
Guilford County, North Carolina
Contract No. 004949

Dear Mr. Dow,

We have reviewed the comments on the Monitoring Year 7 Report for the above referenced project dated December 21, 2021 and have revised the report based on these comments. The revised documents are submitted with this letter. Below are responses to each of your comments. For your convenience, the comments are reprinted with our response in italics.

1. Executive Summary – please update the SMUS to 6,468.733 and the 3.0 Buffer Mitigation Units (BMUs) to read 130,680 BMUs. Please make the same changes in the 5th paragraph of the project overview.

   The updates have been made.

2. Please update Table 1 with the following changes:

   a. Total R credit = 6,107.333
   b. Total RE credit = 361.4
   c. UT1 Reach 4 = 173.333
   d. UT1A Reach 2 = 116.8
   e. UT1A Reach 3 = 91.4

   These values have been updated in Table 1.

3. Table 6 – Typically, areas of invasive treatment conducted during the monitoring year should be included in this table.

   Table 6 has been updated to account for the total area of invasive vegetation treatments.

4. Please include the assessed length with the visual assessment tables.

   The assessed stream length has been added Table 5a-5d.

5. Plots 10 & 11 are not replicated in the Table 7 export from the mdb when compared to Table 9 in the report. Please review the submitted data and ensure that they support the creation of the same table included in the report.

   Vegetation plots 10 and 11 were located in the buffer mitigation portion of the project which closed out during 2020 (MY6). As such, these plots were not sampled during MY7 (sampling year 5 in the CVS database). We originally created Table 9 in the report by manually deleting columns pertaining to vegetation plots 10 and 11 in the exported table. We have deleted vegetation plots 10 and 11 from sampling year 5 in the CVS database and provided this copy in the electronic submittal.

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

Sincerely,

Jason Lorch, *Monitoring Coordinator*

PREPARED BY:

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EXECUTIVE SUMMARY

Wildlands Engineering, Inc. (Wildlands) completed a full delivery project at the Agony Acres Mitigation Site (Site) for the North Carolina Division of Mitigation Services (DMS) to restore, enhance, and preserve a total of 9,052 linear feet (LF) of perennial and intermittent stream and restore 3.0 acres of riparian buffer in Guilford County, NC. The Site provides 6,468.733 Stream Mitigation Units (SMUs) and 130,680 Buffer Mitigation Units (BMUs). The Site is located in the Reedy Fork Watershed within Cape Fear River Basin Hydrologic Unit Code (HUC) 03030002 (Cape Fear 02) near Ossipee, NC (Figure 1). The streams are all unnamed tributaries (UT) to Reedy Fork and are referred to herein as UT1, UT1A, UT1B, and UT2. The buffer restoration component closed out in July 2020 is adjacent to Reedy Fork and lower UT1.

The Site is located within the Jordan Lake Water Supply Watershed which has been designated as a Nutrient Sensitive Water. The Site's watershed is within Cape Fear local watershed HUC 03030002020070, which was not identified as a Cape Fear 02 Targeted Local Watershed (TLW) in DMS's 2009 Cape Fear River Basin Restoration Priority (RBRP) plan; however, this local watershed was later designated as a Targeted Resource Area (TRA) in the 2011 Request for Proposals (RFP) in the Cape Fear 02. The Agony Acres Mitigation Site fully supports the Cataloging Unit (CU)-wide functional objectives stated in the 2011 RFP to reduce and control nutrient inputs, reduce and control sediment inputs, and protect and augment Significant Natural Heritage Areas in the Cape Fear 02 River Basin. The Site will contribute to meeting the CU-wide Functional Improvement Objectives by establishing the following project goals:

- Reduce sediment inputs by removing cattle from streams and restoring degraded and eroding stream channels;
- Return a network of streams to a stable form that is capable of supporting biological functions;
- Reduce fecal coliform, nitrogen, and phosphorous inputs through removing cattle from streams and establishing and augmenting a forested riparian corridor;
- Protect existing high quality streams and forested buffers; and
- Improve and protect hydrologic inputs to the adjacent Reedy Fork Aquatic Habitat Significant Natural Heritage Area.

The project is helping meet the goals for the watershed outlined in the RBRP and provides numerous ecological benefits within the Cape Fear River Basin. While many of these benefits are limited to the Agony Acres project area; others, such as pollutant removal, reduced sediment loading, and improved aquatic and terrestrial habitat, have farther-reaching effects.

Stream restoration and enhancement construction efforts were completed in September 2014. Baseline as-built monitoring activities (MY0) were completed between October and December 2014. A conservation easement is in place on 30.74 acres of stream and riparian corridors to protect them in perpetuity.

Monitoring Year 7 (MY7) assessment and site visits were completed between March and November 2021 to assess the conditions of the project. Overall, the Site has met the required vegetation, stream, and hydrology success criteria for MY7. The overall stem density for the Site in MY7 is 465 stems per acre, which is greater than the terminal success criterion of 210 stems per acre. Invasive vegetation was treated along UT1 reaches 1-5 and UT2, but some scattered stems and minor populations occur in the remaining project area. All restored and enhanced streams are stable and functioning as designed and have recorded multiple bankfull events. The perched culvert, isolated bank erosion, and log sills identified as stream areas of concern in MY6 have been repaired or stabilized. Beavers inhabited a portion of UT1 Reach 5 for a short time before they were removed. This beaver activity was minor and

did not result in long term damage. Both stream gages on UT1B recorded persistent steam flow and met the hydrologic criteria for MY7 (Appendix 5).

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APPENDICES

Section 1: PROJECT OVERVIEW

The Agony Acres Mitigation Site (Site) is located in northeastern Guilford County, north of Gibsonville (Figure 1). From Gibsonville take NC 61 north 5.5 miles. Turn right on Sockwell Road and travel 1.4 miles. The project site is located north of Sockwell Road and is bound on the north by Reedy Fork. The Site is located in the Carolina Slate Belt of the Piedmont Physiographic Province. The project watershed is classified as approximately 65% managed herbaceous cover, 30% mixed upland hardwoods, 3% cultivated, 2% southern yellow pine, and the remaining 1% is low intensity development. The drainage area for the Agony Acres Mitigation Site is 358 acres.

The Site is located in the Reedy Fork Watershed within the Jordan Lake Water Supply Watershed which has been designated a Nutrient Sensitive Water. The project streams flow directly into Reedy Fork which flows into the Haw River and eventually into the Jordan Lake Reservoir. The Site's watershed is within Hydrologic Unit Code (HUC) 03030002020070 which was not identified as a Cape Fear 02 Targeted Local Watershed (TLW) in DMS's 2009 Cape Fear River Basin Restoration Priority (RBRP) plan; however, this HUC was later designated as a Targeted Resource Area (TRA) in the 2011 Request for Proposals (RFP) in the Cape Fear 02. The Site connects to Reedy Fork and three separate but connected Significant Natural Heritage areas. Reedy Fork Aquatic Habitat, Reedy Fork Slopes at NC 61, and Altamahaw Alluvial Forest are all listed on the NC Natural Heritage GIS database and are immediately adjacent to the Site. There are also records for several state threatened, special concern, and significantly rare mussel species in Reedy Fork.

North Carolina Division of Mitigation Services (DMS) completed a Local Watershed Plan (LWP) in 2008 on the HUC immediately downstream which begins at the confluence of Reedy Fork and the Haw River and includes Travis and Tickle Creeks. The Site is located less than one mile outside of the LWP area and has a very similar land use pattern. The 2008 Little Alamance, Travis, and Tickle Creeks LWP identified nutrient inputs from agriculture and stream bank erosion in altered reaches as major stressors within this TLW. The Site was identified as a stream and buffer restoration and cattle exclusion opportunity to improve water quality and buffers within the TRA.

The Site consists of four tributaries to Reedy Fork which are located within the North Carolina Division of Water Resources (NCDWR) subbasin 03-06-02 of the Cape Fear River Basin. The project stream reaches include UT1, UT1A, UT1B, and UT2.

Mitigation work within the Site included restoration, enhancement, and preservation of 9,052 linear feet (LF) of perennial and intermittent stream channel and 3.0 acres (ac) of riparian buffer restoration. The Site provides 6,468.733 Stream Mitigation Units (SMUs) and 180,680 Buffer Mitigation Units (BMUs). The stream areas were also planted with native vegetation to improve habitat and protect water quality.

The final mitigation plan was submitted and accepted by the DMS in March 2014. Construction activities were completed by Land Mechanic Designs, Inc. in September 2014. The planting was completed by Bruton Natural Systems, Inc. in December 2014. The baseline as-built survey was completed by Kee Mapping and Surveying, in October 2014. Annual monitoring will be conducted for seven years with the close-out anticipated to occur in 2022 given the success criteria are met. The buffer riparian buffer restoration component of the Site closed out in July 2020. Appendix 1 provides more detailed project activity, history, contact information, directions, and watershed/site background information for this project.

1.1 Project Goals and Objectives

Prior to construction activities, the stream channels exhibited varying degrees of degradation across the Site. The Site was used as agricultural and pasture land and most of the buffers had been reduced to narrow corridors. Cattle had free access to the streams, which resulted in sporadic degraded stream banks and poor bed forms.

The restored stream channels on the Site were previously incised and overwidened in many locations, likely as a result of historic channelization. The alterations of the Site to promote cattle grazing and farming resulted in elimination of many of the ecological functions of this small stream complex. Specifically, functional losses at the Site included degraded aquatic habitat, altered hydrology (related to loss of floodplain connection and lowered water table), and a reduction of the quality and quantity of riparian wetland habitats and related water quality benefits. Ongoing bank erosion was also occurring at some locations due to high, overly steep banks, and lack of bank vegetation. Table 4 in Appendix 1 and Tables 10a-d in Appendix 4 present the pre-restoration conditions in detail.

The mitigation project is intended to provide numerous ecological benefits within the Cape Fear River Basin. While many of these benefits are limited to the Agony Acres Mitigation Site project area; others, such as pollutant removal and improved aquatic and terrestrial habitat, 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 DMS's mitigation needs while maximizing the ecological and water quality uplift within the watershed.

The following project specific goals established in the Agony Acres Mitigation Plan (Wildlands, 2014) include:

- Reduce sediment inputs by removing cattle from streams and restoring degraded and eroding stream channels;
- Return a network of streams to a stable form that is capable of supporting biological functions important to sensitive species within and adjacent to the project site;
- Reduce fecal coliform, nitrogen, and phosphorous inputs through removing cattle from streams and establishing and augmenting a forested riparian corridor;
- Protect existing high quality streams and forested buffers that provide habitat important to sensitive species within and adjacent to the project site;
- Improve and protect hydrologic inputs to the adjacent Reedy Fork Aquatic Habitat Significant Natural Heritage Area; and
- Improve and protect hydrologic inputs to Reedy Fork, which is listed as impaired on the 2012 NC 303(d) list for impaired aquatic life and for elevated fecal coliform levels.

The project goals will be addressed through the following project objectives:

- On-site nutrient inputs were decreased by removing cattle from streams, re-establishing floodplain connectivity, and filtering on-site runoff through buffer zones. Off-site nutrient input will be absorbed on-site by filtering flood flows through restored floodplain areas, where flood flow will spread through native vegetation. Vegetation is expected to uptake excess nutrients.
- Stream bank erosion which contributes sediment load to the creeks was greatly reduced, if not eliminated, in the project area. Eroding stream banks were stabilized using bioengineering, natural channel design techniques, and grading to reduce bank angles and bank height. Storm flow containing grit and fine sediment is filtered through restored floodplain areas, where flow will spread through native vegetation. Spreading flood flows also reduces velocity and allows

sediment to settle out. Sediment transport capacity of restored reaches was improved so that capacity balances more closely to load. Sediment load reduction will be monitored through assessing bank stability with cross section surveys and visual assessment through photo documentation which serves as an accepted surrogate for direct turbidity measurements.

- Restored riffle/pool sequences promote aeration of water and create deep water zones, helping to lower water temperature. Establishment and maintenance of riparian buffers creates long-term shading of the channel flow to minimize thermal heating. Lower water temperatures will help maintain dissolved oxygen concentrations.
- In-stream structures were constructed to improve habitat diversity and trap detritus. Wood habitat structures were included in the stream as part of the restoration design. Such structures include log drops and rock structures that incorporate woody debris and native onsite rock.
- Adjacent buffer and riparian habitats were restored with native vegetation as part of the project. Native vegetation provides cover and food for terrestrial creatures. Native plant species were planted and invasive species treated. Eroding and unstable areas were stabilized with vegetation as part of this project.
- The restored land is protected in perpetuity through a conservation easement.

The design streams were restored to the appropriate form based on the surrounding landscape, climate, and natural vegetation communities but also with strong consideration to existing watershed conditions and trajectory. Specifically, the site design was developed to restore a small stream complex directly adjacent to Reedy Fork. Other key factors addressed in the design were to create stable habitats, improve riparian buffers, and restore the natural migration patterns for fish spawning. Figure 2 and Table 1 in Appendix 1 present the stream mitigation components for the Agony Acres Mitigation Site.

1.2 Monitoring Year 7 Data Assessment

Annual monitoring and quarterly site visits were conducted during MY7 to assess the condition of the project. The stream and buffer success criteria for the Site follow the approved success criteria presented in the Agony Acres Mitigation Plan (Wildlands, 2014).

1.2.1 Vegetative Assessment

Planted woody vegetation was monitored in accordance with the guidelines and procedures developed by the Carolina Vegetation Survey-DMS Level 2 Protocol (Lee et al., 2006). A total of 16 10 meter by 10 meter vegetation plots were established during the baseline monitoring within the project easement areas. Two of these plots (VP 10 and VP 11) were located in the closed-out buffer restoration component so only 14 plots were monitored during MY7. The final vegetative success criteria for the stream restoration and enhancement areas will be the survival of 210 planted stems per acre in the riparian corridor at the end of the required monitoring period (MY7). Planted vegetation must average 10 feet in height in each plot at the end of the seventh year of monitoring.

The MY7 vegetation survey was completed in August 2021. The 2021 vegetation monitoring resulted in a site-wide average stem density of 465 planted stems per acre, which is greater than the final requirement of 210 planted stems per acre. Each of the 14 plots monitored individually exceeded the MY7 stem density criterion. The riparian buffer is thriving and planted stems have achieved excellent height growth. Each of the 14 vegetation plots have an average tree height exceeding 10 feet (Table 7a). Interspersion of mature late successional trees throughout the project easement in conjunction with planted stems provide a diverse, multi-stratum forest that fulfills multiple wildlife habitat requirements. Refer to Appendix 2 for vegetation plot photographs and the vegetation condition assessment table and Appendix 3 for vegetation data tables.

Numerous mature trees have been present along lower UT1A and UT1 prior to construction. NCIRT requested some form of reporting on mature tree mortality that has occurred since construction. A rudimentary survey was conducted during MY7 which counted surviving and dead or fallen trees in the floodplain and lower portion of the side slope where construction disturbance appeared possible. Live and dead trees that were clearly separated from the floodplain or construction disturbance footprint were ignored. Fifty-five trees were included in this inventory; 32 were surviving and 21 were dead. Detailed investigation of cause of mortality was not conducted. The following discussion is simply our observations and speculation. Of the 21 dead trees, 9 occurred on the lower portion of the side slope, but in a high enough position that increased water elevation was an unlikely cause of mortality. Construction equipment disturbance may have been a contributing factor. The remaining 12 dead trees occurred on the floodplain where increased water table elevation may have been a stressor, but undiscernible from the effects of construction equipment disturbance. Increased water table elevation and construction equipment disturbance may have acted as cumulative stressors which resulted in mature tree mortality. It should be noted that considerable deadfall is present along UT1A Reach 3, a preservation reach that was completely undisturbed. These trees presumably died of some cause unrelated to the stream restoration project. No data was collected on percentage of dead trees in this area, although the concentration of dead trees appears somewhat higher along restored stream reaches.

1.2.2 Vegetation Areas of Concern

Identifiable populations of Chinese privet (*Ligustrum sinense*), Japanese honeysuckle (*Lonicera japonica*), and multiflora rose (*Rosa multiflora*) were treated along UT1 Reaches 1-5 and UT2 totaling 1.97 acres, 2.0 acres, and 1.21 acres, respectively (Figure 3.1-3.2). Scattered invasive stems were also treated along UT1 Reaches 1-5 and UT2. A total of 0.57 acres of Japanese honeysuckle occurs along UT1A Reach 1 and UT1 Reach 5 which was not treated during MY7 (Figure 3.2).

1.2.3 Stream Assessment

Morphological surveys for MY7 were conducted in April 2021. All streams within the Site are stable with little to no erosion and have met the success criteria for MY7. While there have been some minor post-construction adjustments within the restored channels; the cross sections show little to no change in the bankfull area, maximum depth, or width-to-depth ratio. Surveyed riffle cross sections fell within the parameters defined for channels of the appropriate Rosgen stream type. Pebble counts indicated coarser materials in the riffle features and finer particles in the pool features.

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

1.2.4 Stream Areas of Concern

Beaver activity occurred on UT1 where it approaches the Reedy Fork floodplain (Figure 3.2). Beaver activity was identified in September and removal of three beavers and two dams was completed in early November. Beavers also attempted to inhabit this area during the fall of MY4, MY5, and MY6. Despite temporary damming of the stream and severance of numerous black willow stems during these years, the stream and vegetation community has proven resilient to short-term beaver inhabitance. Stream banks remained stable and no changes to stream geomorphology have been detected through visual observation or cross section surveys (Appendix 4). Primarily black willow trees were affected which appear to have maintained healthy below-ground root mass. Severed black willow stems resprouted vigorously each spring and achieved five to six feet of height growth by the following fall. Photo point 10 is located in the area which has been most substantially impacted by beaver activity over the past four

fall seasons (Appendix 2). The MY7 beaver activity was minor and few planted stems were affected. Only two small dams were built and the crests of the dams were below bankfull elevation.

During MY6, a perched culvert on UT1A, log sills on UT2, and a small, isolated occurrence of bank erosion on lower UT1 were identified as needing improvement. The perched culvert was repaired by installing a log sill with a boulder immediately downstream of the log to lessen the water surface drop and make it resemble a naturally occurring feature. The log sills downstream of the crossing on UT2 were replaced using a small excavator and have remained stable. The small machine was able to navigate between rows of trees and disturbance to soil and vegetation was minimal. The UT2 log sills above the crossing that were reported as piping in MY6 have been partially hand repaired. Some stream flow has been restored over the top of these two sills but a portion of the flow is still piping around or underneath. This minor piping does not appear to present risk of failure, bank erosion, or channel instability. The area of isolated bank erosion in lower UT1 was live-staked during the 2020-2021 dormant season and seeded. The resulting vegetative stabilization appears to have improved the condition and stability of this bank. Photographs of these repairs are included in Appendix 2.

1.2.5 Hydrology Assessment

Two bankfull flow events within separate years must be documented on the restoration and enhancement reaches within the seven-year monitoring period. In addition, the presence of baseflow must be documented along portions of UT1B constructed with a Priority I restoration approach. Baseflow must be present for at least some portion of the year (most likely in the winter/early spring) during years with normal rainfall conditions. While there is no stream flow criteria established in the mitigation plan for UT1A, gages were added during the fall of 2018 (MY4) after observation that the lower portion of the channel had limited flow during late summer and early fall.

Multiple bankfull events were recorded on all streams at the Site during MY7 (Table 13). Bankfull Events on all streams have been recorded during previous monitoring years; therefore, the Site has met the bankfull stream hydrology criterion for the duration of the monitoring period.

The downstream flow gage in UT1B recorded flow above the thalweg elevation throughout MY7 with the exception of few, scattered two to eight hour periods during July, August, and September. The upstream flow gage in UT1B recorded baseflow throughout the entire observed duration of MY7 (Appendix 5). UT1B has met the baseflow criterion for MY1 through MY7. Each flow gauge in UT1A showed the same general trend. The stream flowed persistently from the beginning of the year until June, after which it flowed sporadically through the remainder of the MY7 data observation period. In previous years, more persistent stream flow resumed in September. August through November of 2021 had exceptionally low rainfall which is probably the reason for limited stream flow during the fall. The reason for less persistent stream flow in UT1A relative to other project streams is believed to be a result of different soils and geology. It is not apparent that flow loss is related to any aspect of the restoration design. Appendix 5 contains hydrologic data.

1.2.6 Maintenance Plan

The entire site will continue to be monitored and treated for invasive species until project closeout.

1.3 Monitoring Year 7 Summary

Vegetation, stream, and hydrology criteria were met for MY7. Each of the 14 vegetation plots attained the final success criterion of 210 planted stems per acre with an average heigh exceeding 10 feet. The diverse riparian buffer is progressing into a mature forest. Invasive vegetation was treated although some scattered stems and small populations remain. All streams at the Site are stable and functioning as designed. Minor beaver activity occurred and beavers were removed, but no long term damage to the

site occurred. UT1B attained the baseflow criterion and multiple bankfull events were recorded on all streams during MY7. The project has successfully restored aquatic and terrestrial ecosystems and created numerous functional improvements relative to the pre-restoration condition.

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). Crest gages were installed in surveyed riffle cross sections and monitored quarterly. Hydrology attainment installation and monitoring methods are in accordance with the USACE (USACE, 2003) standards. Vegetation monitoring protocols followed the Carolina Vegetation Survey-DMS Level 2 Protocol (Lee et al., 2006). Reporting follows the DMS Monitoring Report Template and Guidance Version 1.3 (DMS, 2010).

Section 3: REFERENCES

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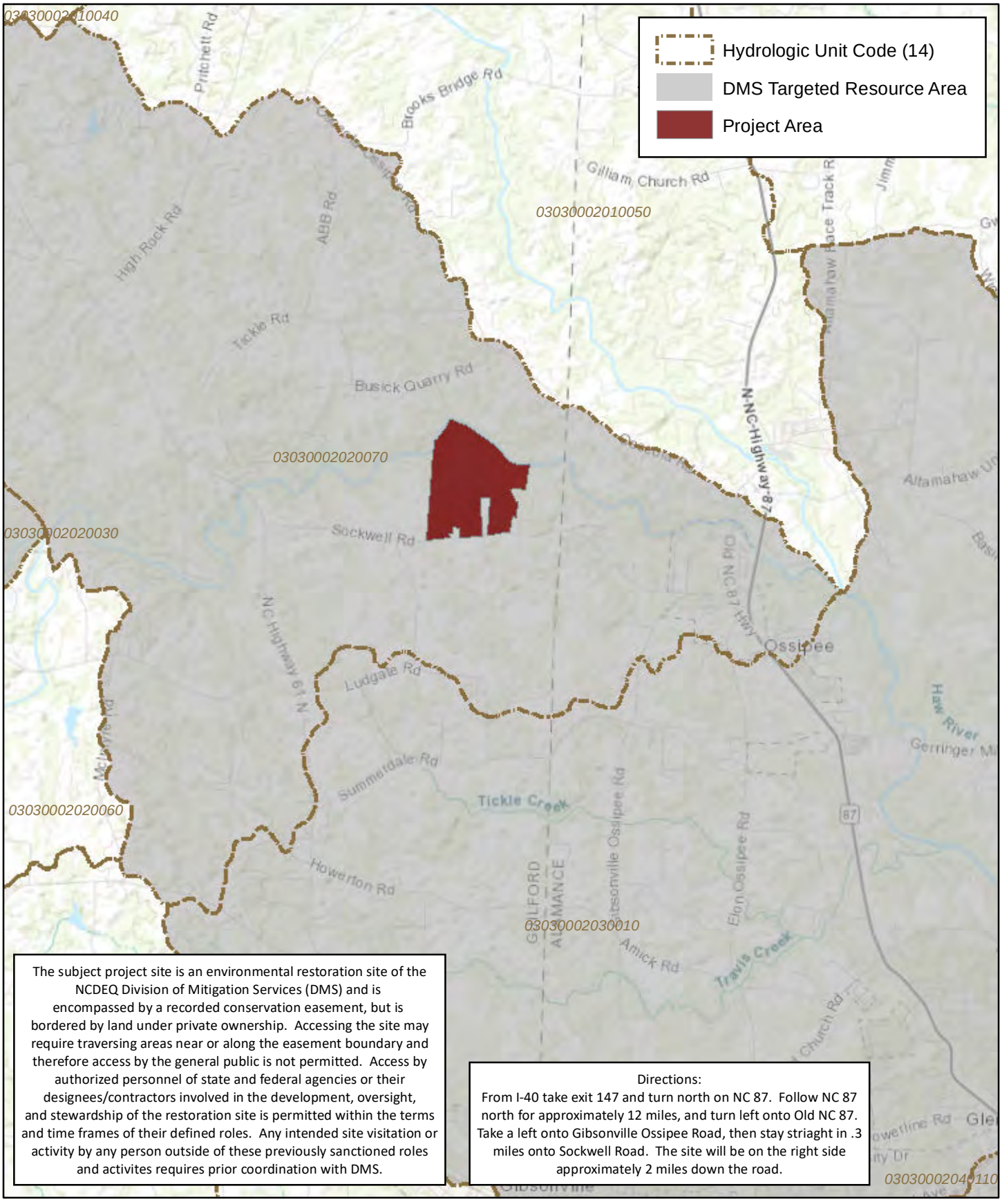
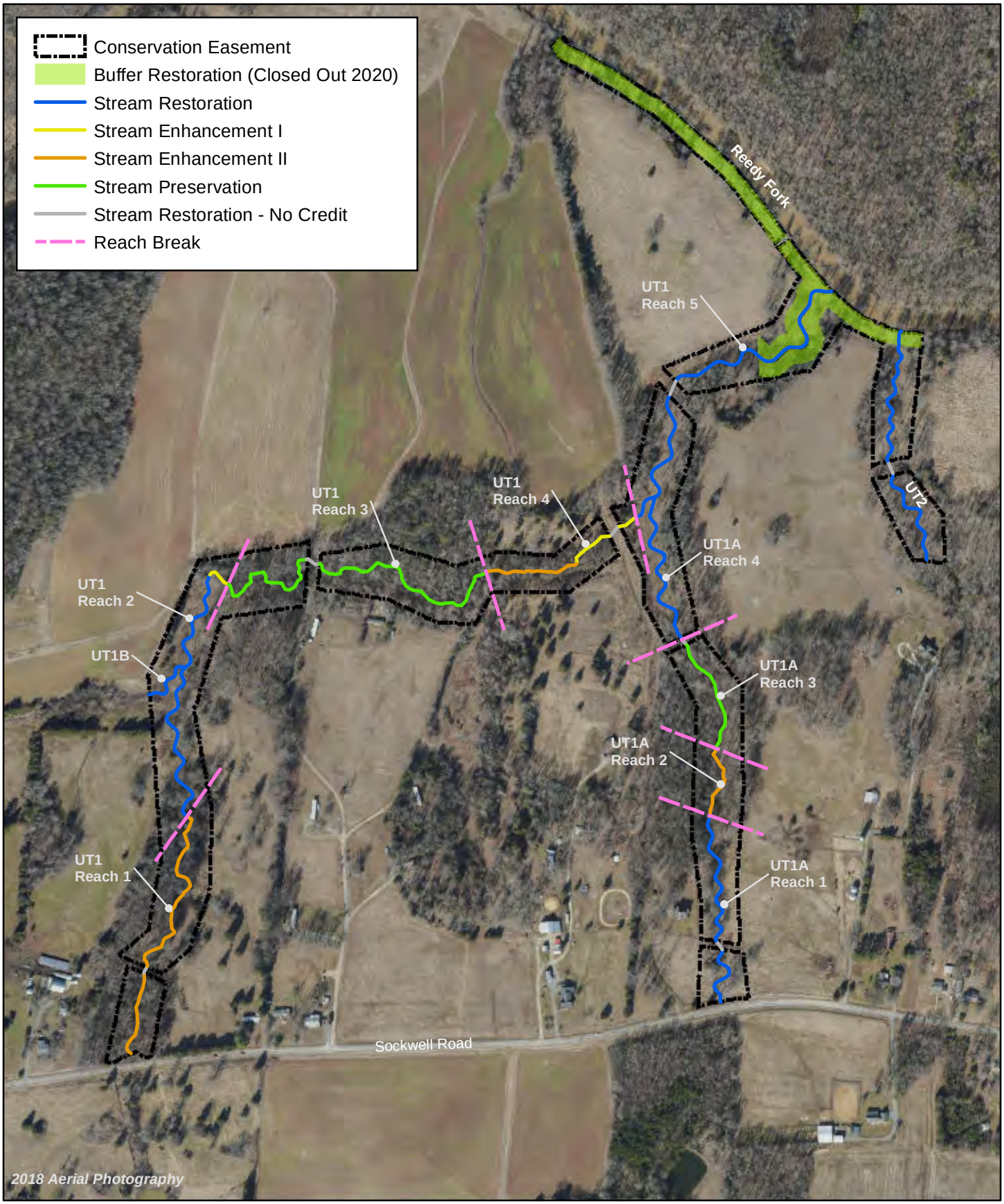
APPENDIX 1. General Tables and Figures



WILDLANDS ENGINEERING

Figure 1. Project Vicinity Map
Agony Acres Mitigation Site
DMS Project No. 95716
Monitoring Year 7 - 2021

Guilford County, NC



WILDLANDS ENGINEERING

0 250 500 Feet

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Figure 2. Project Component/Asset Map
Agony Acres Mitigation Site
DMS Project No. 95716
Monitoring Year 7 - 2021

Guilford County, NC

Table 1. Project Components and Mitigation Credits
Agony Acres Mitigation Site (DMS Project No.95716)
Monitoring Year 7 - 2021

MITIGATION CREDITS

	Stream		Riparian Wetland		Non-Riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	6,107.333**	361.4	N/A	N/A	N/A	N/A	130,680	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/BMU)
STREAMS							
UT1-Reach 1 (DOT ROW)	100+00 to 100+14	40**	EII	Enhancement (No Credit)	40**	---	---
UT1-Reach 1	100+14 to 103+62; 103+93 to 111+24	1,053**	EII	Enhancement	1,053**	2.5	421.2**
UT1-Reach 1 (Easement Break)	103+62 to 103+93	31	EII	Enhancement (No Credit)	31	---	---
UT1-Reach 2	111+24 to 122+38	1,039	P1	Restoration	1,114	1	1,114
UT1-Reach 2	122+38 to 123+31	93	EI	Enhancement	93	1.5	62
UT1-Reach 3	123+31 to 128+50; 129+06 to 137+37	1,350		Preservation	1,350	5	270
UT1-Reach 3 (Easement Break)	128+50 to 129+06	56		Preservation (No Credit)	56	---	---
UT1-Reach 4	137+37 to 140+92	355	EII	Enhancement	355	2.5	142
UT1-Reach 4	140+92 to 142+66; 143+20 to 144+06	260	EI	Enhancement	260	1.5	173.333
UT1-Reach 4 (Easement Break)	142+66 to 143+20	54	EI	Enhancement (No Credit)	54	---	---
UT1-Reach 5	144+06 to 149+65; 150+20 to 158+94	1,355	P1/2	Restoration	1,433	1	1,433
UT1-Reach 5 (Easement Break)	149+65 to 150+20	65	P1	Restoration (No Credit)	55	---	---
UT1A-Reach 1 (DOT ROW)	200+00 to 200+05	5	P1	Restoration (No Credit)	5	---	---
UT1A-Reach 1	200+05 to 202+64; 203+04 to 208+49	738	P1	Restoration	804	1	804
UT1A-Reach 1 (Easement Break)	202+64 to 203+04	32	P1	Restoration (No Credit)	40	---	---
UT1A-Reach 2	208+49 to 211+41	292	EII	Enhancement	292	2.5	116.8
UT1A-Reach 3	211+41 to 215+98	457		Preservation	457	5	91.4
UT1A-Reach 3 (Easement Break)	215+98 to 216+28	30	EII	Enhancement (No Credit)	30	---	---
UT1A-Reach 4	216+28 to 222+78	461	P1	Restoration	650	1	650
UT1B	300+00 to 302+19	243	P1	Restoration	219	1	219
UT2	400+00 to 404+16; 404+67 to 410+23	975	P1	Restoration	972	1	972
UT2 (Easement Break)	404+16 to 404+67	53	P1/2	Restoration (No Credit)	51	---	---
Riparian Buffer Area	---	---	---	Restoration	3.0 (130,680 ft^2)	1	130,680

COMPONENT SUMMATION

Restoration Level	Stream (LF)	Riparian Wetland (acres)		Non-Riparian Wetland (acres)	Buffer (acres)	Upland (acres)
		Riverine	Non-Riverine			
Restoration	5,192	-	-	-	3.0	-
Enhancement		-	-	-	-	-
Enhancement I	353					
Enhancement II	1,700**					
Creation		-	-	-		
Preservation	1,807	-	-	-		-
High Quality Preservation	-	-	-	-		-

N/A: not applicable
* Credit calculations were originally calculated along the as-built thalweg and updated to be calculated along stream centerlines as stated in the approved Mitigation Plan for Monitoring Year 3 after discusions with NC IRT.
**Values updated during MY4 to account for DOT culvert replacement project.

Table 2. Project Activity and Reporting History
Agony Acres Mitigation Site (DMS Project No.95716)
Monitoring Year 7 - 2021

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

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

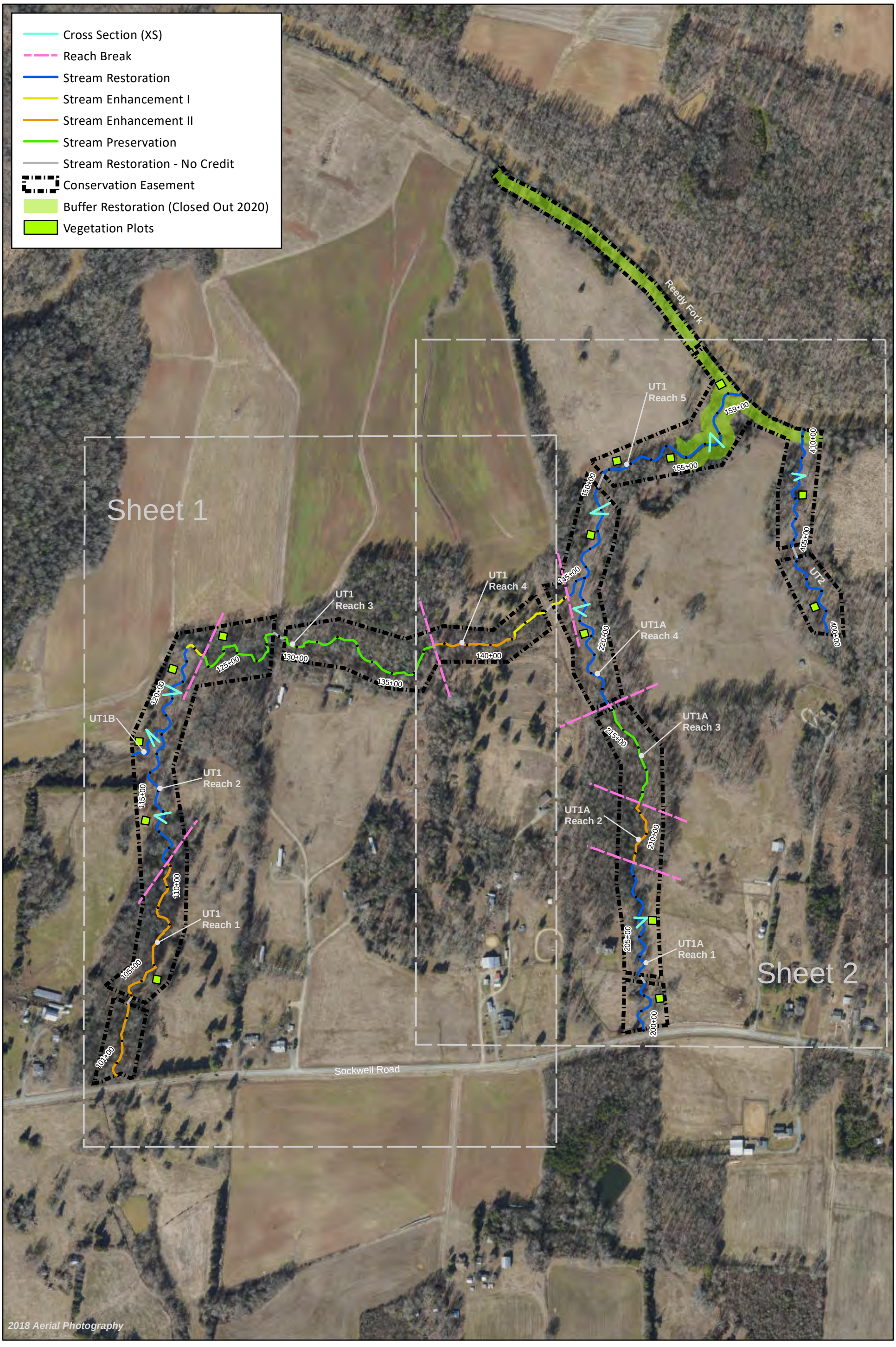
Table 3. Project Contact Table
Agony Acres Mitigation Site (DMS Project No.95716)
Monitoring Year 7 - 2021

Designer Nicole Macaluso, PE, CFM	**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	**Dykes and Son Nursery**
Live Stakes	**Bruton Natural Systems, Inc**
Monitoring Performers Monitoring, POC	**Wildlands Engineering, Inc.** Jason Lorch 919.851.9986, ext. 107

Table 4. Project Information and Attributes
Agony Acres Mitigation Site (DMS Project No.95716)
Monitoring Year 7 - 2021

PROJECT INFORMATION						
Project Name	Agony Acres Mitigation Site					
County	Guilford County					
Project Area	30.74 acres					
Planted Area	18.4 acres					
Project Coordinates (latitude and longitude)	36° 10′ 40″ N, 79° 33′ 02″ W					
PROJECT WATERSHED SUMMARY INFORMATION						
Physiographic Province	Piedmont					
River Basin	Cape Fear River					
USGS Hydrologic Unit 8-digit	03030002					
USGS Hydrologic Unit 14-digit	03030002020070					
DWR Sub-basin	03-06-02					
Project Drainiage Area (acres)	358 acres					
Project Drainage Area Percentage of Impervious Area	<1%					
CGIA Land Use Classification	65% Managed Herbaceous Cover, 30% Mixed Upland Hardwoods, 3% Cultivated, 2% Southern Yellow Pine, <1% Low Intensity Development					
REACH SUMMARY INFORMATION						
Parameters	**UT1 - Reaches 1 -3**	**UT1 - Reaches 4 & 5**	**UT1A**	**UT1B**	**UT2**	
Length of reach (linear feet) - Post-Restoration	3,711	2,157	2,278	219	1,023	
Drainage area (acres)	228	358	103	61	61	
NCDWR stream identification score	42.5	46.5	41	29.25	32.25	
NCDWR Water Quality Classification	WS-V					
Morphological Desription (stream type)	P	P	P/I	P	P	
Evolutionary trend (Simon's Model) - Pre- Restoration	I, III	III, IV	I, II/III	II/III	II/III	
Underlying mapped soils	Cecil sandy loam, Congaree loam, Coronaca clay loam, Enon fine sandy loam, Enon clay loam, Madison clay loam, Mecklenburg sandy clay loam, Wehadkee loam					
Drainage class	---	---	---	---	---	---
Soil Hydric status	---	---	---	---	---	---
Slope	---	---	---	---	---	---
FEMA classification	N/A					
Native vegetation community	Piedmont bottomland forest					
Percent composition exotic invasive vegetation -Post-Restoration	0%					
REGULATORY CONSIDERATIONS						
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**			
Waters of the United States - Section 404	Yes	Yes	USACE Nationwide Permit No.27 and DWQ 401 Water Quality Certification No. 3885.			
Waters of the United States - Section 401	Yes	Yes				
Division of Land Quality (Dam Safety)	No	N/A	N/A			
Endangered Species Act	Yes	Yes	Agony Acres Mitigation Plan; Wildlands determined "no effect" on Guilford County listed endangered species.			
Historic Preservation Act	Yes	Yes	No historic resources were found to be impacted (letter from SHPO dated 1/15/13).			
Coastal Zone Management Act (CZMA)/Coastal Area Management Act (CAMA)	No	N/A	N/A			
FEMA Floodplain Compliance	N/A	N/A	The project streams do not have an associated regulatory floodplain; however portions of UT1, UT1A, and UT2 are located within the floodway and flood fringe of Reedy Fork (FEMA Zone AE, FIRM panels 8838 and 8848).			
Essential Fisheries Habitat	No	N/A	N/A			

APPENDIX 2. Visual Assessment Data

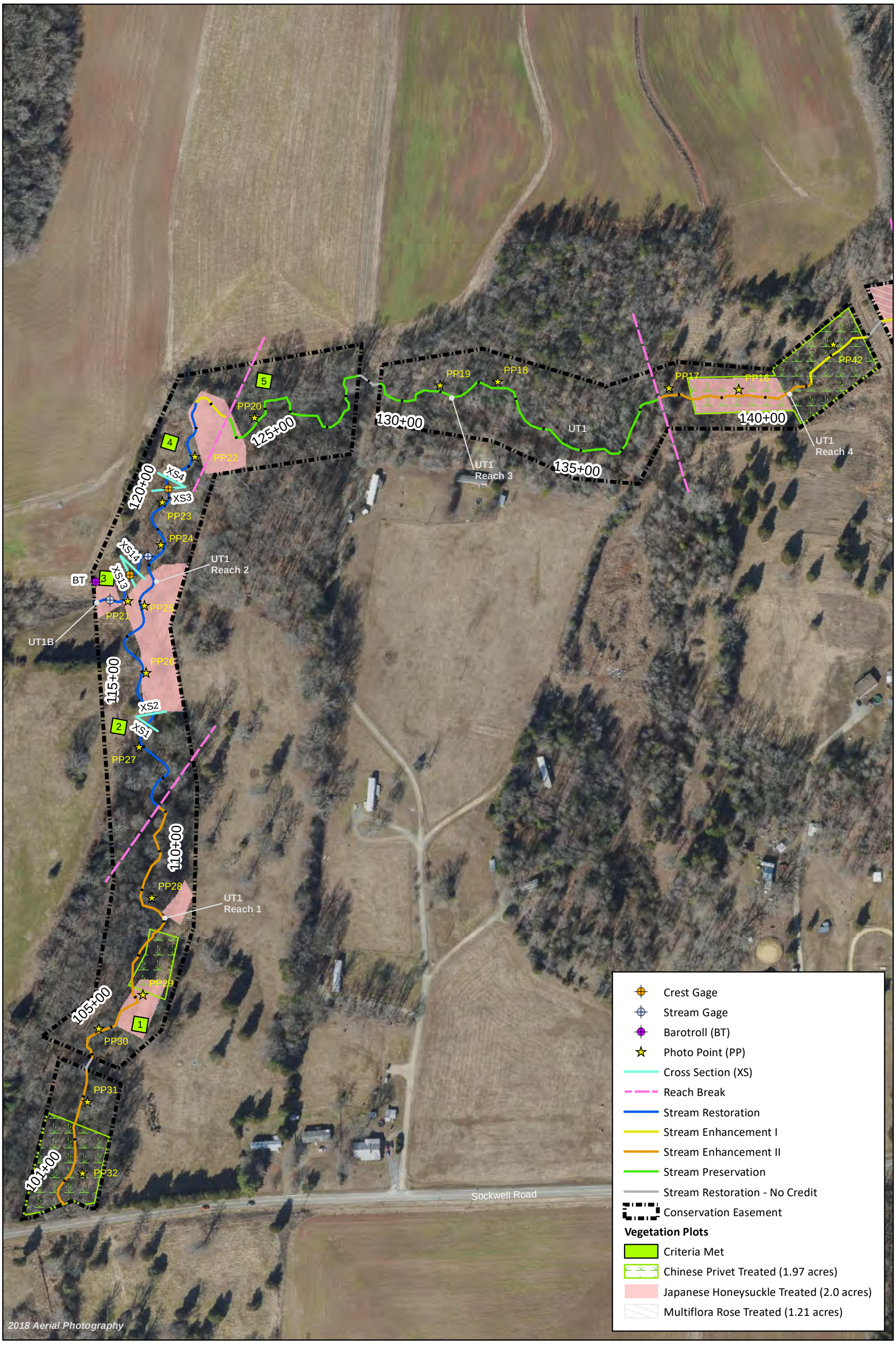


WILDLANDS ENGINEERING

0 250 500 Feet

Figure 3.0 Integrated Current Condition Plan View (Key)
Agony Acres Mitigation Site
DMS Project No. 95716
Monitoring Year 7 - 2021

Guilford County, NC



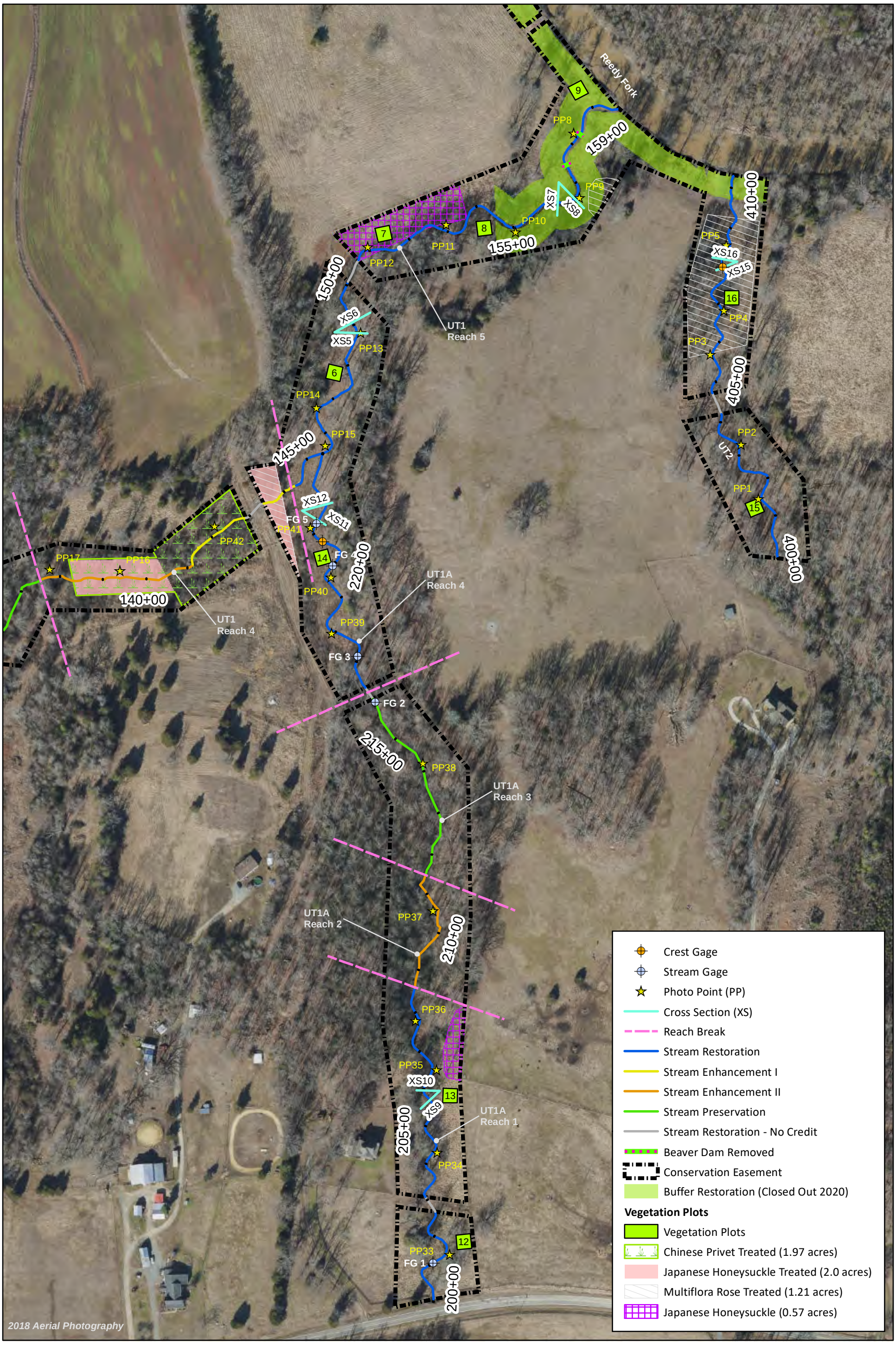
WILDLANDS ENGINEERING

0 250 500 Feet

N

Figure 3.1. Integrated Current Condition Plan View
(Sheet 1 of 2)
Agony Acres Mitigation Site
DMS Project No. 95716
Monitoring Year 7 - 2021

Guilford County, NC



WILDLANDS ENGINEERING

0 250 500 Feet

N

Figure 3.2. Integrated Current Condition Plan View
(Sheet 2 of 2)
Agony Acres Mitigation Site
DMS Project No. 95716
Monitoring Year 7 - 2021

Guilford County, NC

Table 5a. Visual Stream Morphology Stability Assessment Table

Agony Acres Mitigation Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

UT1 **Total Assessed Stream Length: 2,900 ft**

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	42	42			100%			
	3. Meander Pool Condition	Depth Sufficient	39	39			100%			
		Length Appropriate	39	39			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	39	39			100%			
		Thalweg centering at downstream of meander bend (Glide)	39	39			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	n/a	n/a	n/a
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	n/a	n/a	n/a
	3. Mass Wasting	Bank slumping, caving, or collapse			0	0	100%	n/a	n/a	n/a
				TOTALS	0	0	100%	n/a	n/a	n/a
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	16	16			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%	16	16			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow	16	16			100%			

Table 5b. Visual Stream Morphology Stability Assessment Table

Agony Acres Mitigation Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

UT1A **Total Assessed Stream Length: 1,454 ft**

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	26	26			100%			
	3. Meander Pool Condition	Depth Sufficient	26	26			100%			
		Length Appropriate	26	26			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	26	26			100%			
		Thalweg centering at downstream of meander bend (Glide)	26	26			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	n/a	n/a	n/a
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	n/a	n/a	n/a
	3. Mass Wasting	Bank slumping, caving, or collapse			0	0	100%	n/a	n/a	n/a
				TOTALS	0	0	100%	n/a	n/a	n/a
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	3	3			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	3	3			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	3	3			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%	3	3			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow	3	3			100%			

Table 5c. Visual Stream Morphology Stability Assessment Table

Agony Acres Mitigation Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

UT1B **Total Assessed Stream Length: 219 ft**

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	6	6			100%			
	3. Meander Pool Condition	Depth Sufficient	5	5			100%			
		Length Appropriate	5	5			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	5	5			100%			
		Thalweg centering at downstream of meander bend (Glide)	5	5			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	n/a	n/a	n/a
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	n/a	n/a	n/a
	3. Mass Wasting	Bank slumping, caving, or collapse			0	0	100%	n/a	n/a	n/a
				TOTALS	0	0	100%	n/a	n/a	n/a
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	1	1			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	1	1			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%	1	1			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow	1	1			100%			

Table 5d. Visual Stream Morphology Stability Assessment Table

Agony Acres Mitigation Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

UT2 **Total Assessed Stream Length: 972**

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	20	20			100%			
	3. Meander Pool Condition	Depth Sufficient	21	21			100%			
		Length Appropriate	21	21			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	21	21			100%			
		Thalweg centering at downstream of meander bend (Glide)	21	21			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	n/a	n/a	n/a
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	n/a	n/a	n/a
	3. Mass Wasting	Bank slumping, caving, or collapse			0	0	100%	n/a	n/a	n/a
				TOTALS	0	0	100%	n/a	n/a	n/a
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	5	5			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	5	5			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	5	5			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%	5	5			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow	5	5			100%			

Table 6. Vegetation Condition Assessment Table
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

Planted Acreage **18**

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%**

Easement Acreage **31**

Vegetation Category	Definitions	Mapping Threshold (SF)	Number of Polygons	Combined Acreage	% of Planted Acreage
Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	1,000	12	5.1	16.6%
Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	none	0	0	0%

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

STREAM PHOTOGRAPHS
Monitoring Year 7

	
PHOTO POINT 1 UT2 – looking upstream *(04/21/2021)*	**PHOTO POINT 1 UT2** – looking downstream *(04/21/2021)*
	
PHOTO POINT 2 UT2 – looking upstream *(04/21/2021)*	**PHOTO POINT 2 UT2** – looking downstream *(04/21/2021)*
	
PHOTO POINT 3 UT2 – looking upstream *(04/21/2021)*	**PHOTO POINT 3 UT2** – looking downstream *(04/21/2021)*

	
PHOTO POINT 4 UT2 – looking upstream *(04/21/2021)*	**PHOTO POINT 4 UT2** – looking downstream *(04/21/2021)*
	
PHOTO POINT 5 UT2 – looking upstream *(04/21/2021)*	**PHOTO POINT 5 UT2** – looking downstream *(04/21/2021)*
	
PHOTO POINT 8 UT1 R5 – looking upstream (*04/21/2021*)	**PHOTO POINT 8 UT1 R5 –** looking downstream (*04/21/2021*)

	
PHOTO POINT 9 UT1 R5 – looking upstream (*04/21/2021*)	**PHOTO POINT 9 UT1 R5 –** looking downstream (*04/21/2021*)
	
PHOTO POINT 10 UT1 R5 – looking upstream (*04/21/2021*)	**PHOTO POINT 10 UT1 R5 –** looking downstream (*04/21/2021*)
	
PHOTO POINT 11 UT1 R5 – looking upstream (*04/21/2021*)	**PHOTO POINT 11 UT1 R5 –** looking downstream (*04/21/2021*)

	
PHOTO POINT 12 UT1 R5 – looking upstream (*04/21/2021*)	**PHOTO POINT 12 UT1 R5 –** looking downstream (*04/21/2021*)
	
PHOTO POINT 13 UT1 R5 – looking upstream (*04/21/2021*)	**PHOTO POINT 13 UT1 R5 –** looking downstream (*04/21/2021*)
	
PHOTO POINT 14 UT1 R5 – looking upstream (*04/21/2021*)	**PHOTO POINT 14 UT1 R5 –** looking downstream (*04/21/2021*)

	
PHOTO POINT 15 UT1 R5 – looking upstream (*04/21/2021*)	**PHOTO POINT 15 UT1 R5 –** looking downstream (*04/21/2021*)
	
PHOTO POINT 16 UT1 R4 – looking upstream *(04/21/2021)*	**PHOTO POINT 16 UT1 R4** – looking downstream *(04/21/2021)*
	
PHOTO POINT 17 UT1 R4 – looking upstream *(04/21/2021)*	**PHOTO POINT 17 UT1 R4** – looking downstream *(04/21/2021)*

	
PHOTO POINT 42 UT1 R4 – looking upstream *(04/21/2021)*	**PHOTO POINT 42 UT1 R4** – looking downstream *(04/21/2021)*
	
PHOTO POINT 18 UT1 R3 – looking upstream *(04/21/2021)*	**PHOTO POINT 18 UT1 R3** – looking downstream *(04/21/2021)*
	
PHOTO POINT 19 UT1 R3 – looking upstream *(04/21/2021)*	**PHOTO POINT 19 UT1 R3** – looking downstream *(04/21/2021)*

	
PHOTO POINT 20 UT1 R3 – looking upstream *(04/21/2021)*	**PHOTO POINT 20 UT1 R3** – looking downstream *(04/21/2021)*
	
PHOTO POINT 21 UT1B – looking upstream *(04/21/2021)*	**PHOTO POINT 21 UT1B** – looking downstream *(04/21/2021)*
	
PHOTO POINT 22 UT1 R2 – looking upstream (*04/21/2021*)	**PHOTO POINT 22 UT1 R2 –** looking downstream (*04/21/2021*)

	
PHOTO POINT 23 UT1 R2 – looking upstream (*04/21/2021*)	**PHOTO POINT 23 UT1 R2 –** looking downstream (*04/21/2021*)
	
PHOTO POINT 24 UT1 R2 – looking upstream (*04/21/2021*)	**PHOTO POINT 24 UT1 R2 –** looking downstream (*04/21/2021*)
	
PHOTO POINT 25 UT1 R2 – looking upstream (*04/21/2021*)	**PHOTO POINT 25 UT1 R2 –** looking downstream (*04/21/2021*)

	
PHOTO POINT 26 UT1 R2 – looking upstream (*04/21/2021*)	**PHOTO POINT 26 UT1 R2 –** looking downstream (*04/21/2021*)
	
PHOTO POINT 27 UT1 R2 – looking upstream (*04/21/2021*)	**PHOTO POINT 27 UT1 R2 –** looking downstream (*04/21/2021*)
	
PHOTO POINT 28 UT1 R1 – looking upstream (*04/21/2021*)	**PHOTO POINT 28 UT1 R1 –** looking downstream (*04/21/2021*)

	
PHOTO POINT 29 UT1 R1 – looking upstream (*04/21/2021*)	**PHOTO POINT 29 UT1 R1 –** looking downstream (*04/21/2021*)
	
PHOTO POINT 30 UT1 R1 – looking upstream (*04/21/2021*)	**PHOTO POINT 30 UT1 R1 –** looking downstream (*04/21/2021*)
	
PHOTO POINT 31 UT1 R1 – looking upstream (*04/21/2021*)	**PHOTO POINT 31 UT1 R1 –** looking downstream (*04/21/2021*)

	
PHOTO POINT 32 UT1 R1 – looking upstream (*04/21/2021*)	**PHOTO POINT 32 UT1 R1 –** looking downstream (*04/21/2021*)
	
PHOTO POINT 33 UT1A R1 – looking upstream *(04/21/2021)*	**PHOTO POINT 33 UT1A R1** – looking downstream *(04/21/2021)*
	
PHOTO POINT 34 UT1A R1 – looking upstream *(04/21/2021)*	**PHOTO POINT 34 UT1A R1** – looking downstream *(04/21/2021)*

	
PHOTO POINT 35 UT1A R1 – looking upstream *(04/21/2021)*	**PHOTO POINT 35 UT1A R1** – looking downstream *(04/21/2021)*
	
PHOTO POINT 36 UT1A R1 – looking upstream *(04/21/2021)*	**PHOTO POINT 36 UT1A R1** – looking downstream *(04/21/2021)*
	
PHOTO POINT 37 UT1A R2 – looking upstream (*04/21/2021*)	**PHOTO POINT 37 UT1A R2 –** looking downstream (*04/21/2021*)

	
PHOTO POINT 38 UT1A R3 – looking upstream (*04/21/2021*)	**PHOTO POINT 38 UT1A R3 –** looking downstream (*04/21/2021*)
	
PHOTO POINT 39 UT1A R4 – looking upstream *04/21/2021)*	**PHOTO POINT 39 UT1A R4** – looking downstream *(04/21/2021)*
	
PHOTO POINT 40 UT1A R4 – looking upstream *(04/21/2021)*	**PHOTO POINT 40 UT1A R4** – looking downstream *(04/21/2021)*

	
PHOTO POINT 41 UT1A R4 – looking upstream *(04/21/2021)*	**PHOTO POINT 41 UT1A R4** – looking downstream *(04/21/2021)*

REPAIRED STREAM AREAS OF CONCERN PHOTOGRAPHS
Monitoring Year 7

	
UT1A Perched Culvert – *(04/17/2020)*	**UT1A Culvert Repaired** – *(07/21/2021)*
	
UT2 Piping Log Sills – *(04/17/2020)*	**UT2 Log Sills Repaired** – *(07/21/2021)*
	
UT1 Isolated Bank Erosion – (09/23/2020)	**UT1 Isolated Bank Erosion with Vegetative Stabilization** – (07/21/2021)

VEGETATION PHOTOGRAPHS
Agony Acres
Monitoring Year 7

	
VEG PLOT 1 *(8/18/2021)*	**VEG PLOT 2** *(8/18/2021)*
	
VEG PLOT 3 *(8/18/2021)*	**VEG PLOT 4** *(8/18/2021)*
	
VEG PLOT 5 *(8/18/2021)*	**VEG PLOT 6** *(8/18/2021)*

VEG PLOT 7 *(8/18/2021)*

VEG PLOT 8 *(8/18/2021)*

VEG PLOT 9 *(8/18/2021)*

VEG PLOT 12 *(8/18/2021)*

VEG PLOT 13 *(8/18/2021)*

VEG PLOT 14 *(8/18/2021)*

	
VEG PLOT 15 *(8/18/2021)*	**VEG PLOT 16** *(8/18/2021)*

APPENDIX 3. Vegetation Plot Data

Table 7. Vegetation Plot Criteria Attainment

Agony Acres Mitigation Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

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	
12	Y	
13	Y	
14	Y	
15	Y	
16	Y	

*Vegetation Plots 10 and 11 were located in the Buffer Mitigation portion of the site which closed out during MY5.

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

Agony Acres Mitigation Site (DMS Project No 95716)

Monitoring Year 7 - 2021

Average Height by Plot (feet)					
Plot	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
1	2.6	3.0	4.5	8.9	14.1
2	2.4	2.5	3.3	7.4	11.3
3	2.9	3.1	4.6	11.5	15.7
4	2.8	3.3	6.3	15.5	20.8
5	2.5	2.5	4.6	8.4	12.6
6	3.1	3.4	4.9	10.6	16.2
7	3.0	2.8	5.6	11.3	16.5
8	3.1	3.7	8.6	18.1	24.6
9	3.0	3.3	6.5	12.4	18.9
12	2.6	2.7	3.6	9.9	17.5
13	2.7	2.6	4.3	8.4	15.2
14	2.9	3.4	6.1	10.6	15.9
15	3.0	2.7	5.0	10.7	15.0
16	2.6	3.3	5.9	12.2	17.9

Table 8. CVS Vegetation Plot Metadata

Agony Acres Mitigation Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

Database name	Agony Acres- MY7- v2.3.1.mdb
Database location	F:\Projects\005-02136 Agony Acres\Monitoring\Monitoring Year 7\Vegetation Assessment
Computer name	JASON-PC
File size	68157440
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY	
Project Code	95716
project Name	Agony Acres Mitigation Site
Description	Stream & Buffer Site
River Basin	Cape Fear
Sampled Plots	14

Table 9. Planted and Total Stem Counts
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

			Current Plot Data (MY7 2021)														
			VP 1			VP 2			VP 3			VP 4			VP 5		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	Tree						1						1			
Acer rubrum	red maple	Tree															
Ailanthus altissima	tree of heaven	Exotic															1
Alnus serrulata	hazel alder	Shrub							1	1	1						
Betula nigra	river birch	Tree				1	1	1	2	2	2	3	3	3			
Cornus amomum	silky dogwood	Shrub															
Diospyros virginiana	common persimmon	Tree															
Fraxinus pennsylvanica	green ash	Tree	3	3	3	4	4	4	3	3	3	2	2	2	2	2	2
Gleditsia triacanthos	honeylocust	Tree															
Ilex opaca	American holly	Tree			2												
Juglans nigra	black walnut	Tree						1									
Juniperus virginiana	eastern redcedar	Tree			4												
Liquidambar styraciflua	sweetgum	Tree			14			3			2			4			
Liriodendron tulipifera	tuliptree	Tree			3									3			
Nyssa sylvatica	blackgum	Tree						1									
Platanus occidentalis	American sycamore	Tree	3	3	3				4	4	4	4	4	7	2	2	2
Quercus alba	white oak	Tree															
Quercus michauxii	swamp chestnut oak	Tree				1	1	1	1	1	1	1	1	1	5	5	5
Quercus pagoda	cherrybark oak	Tree	2	2	2	3	3	3	1	1	1	2	2	2			
Quercus phellos	willow oak	Tree	2	2	2	1	1	1	2	2	2	1	1	1	1	1	1
Quercus rubra	northern red oak	Tree															
Quercus velutina	black oak	Tree															
Rhus	sumac	Shrub															
Rhus copallinum	flameleaf sumac	Shrub															
Sambucus	elderberry	Shrub									2						
Ulmus	elm	Tree															
		Stem count	10	10	33	10	10	16	14	14	18	13	13	24	10	10	10
		size (ares)	1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02		
		Species count	4	4	8	5	5	9	7	7	9	6	6	9	4	4	5
		Stems per ACRE	405	405	1,335	405	405	647	567	567	728	526	526	971	405	405	405

Color Coding for Table

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

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

Table 9. Planted and Total Stem Counts
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

			Current Plot Data (MY7 2021)														
			VP 6			VP 7			VP 8			VP 9			VP 12		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	Tree			5						2			47			
Acer rubrum	red maple	Tree			3						3						
Ailanthus altissima	tree of heaven	Exotic															
Alnus serrulata	hazel alder	Shrub	4	4	4												
Betula nigra	river birch	Tree	4	4	4	3	3	3	1	1	1						
Cornus amomum	silky dogwood	Shrub															
Diospyros virginiana	common persimmon	Tree															
Fraxinus pennsylvanica	green ash	Tree	2	2	6	3	3	3	4	4	5	5	5	29	3	3	3
Gleditsia triacanthos	honeylocust	Tree															
Ilex opaca	American holly	Tree															
Juglans nigra	black walnut	Tree															
Juniperus virginiana	eastern redcedar	Tree															
Liquidambar styraciflua	sweetgum	Tree			12			2			3						
Liriodendron tulipifera	tuliptree	Tree			10									1			
Nyssa sylvatica	blackgum	Tree															
Platanus occidentalis	American sycamore	Tree	2	2	22	3	3	12	5	5	5	4	4	4	4	4	4
Quercus alba	white oak	Tree			1												
Quercus michauxii	swamp chestnut oak	Tree	2	2	2	4	4	4	1	1	1				1	1	1
Quercus pagoda	cherrybark oak	Tree	1	1	1										1	1	1
Quercus phellos	willow oak	Tree															
Quercus rubra	northern red oak	Tree															
Quercus velutina	black oak	Tree															
Rhus	sumac	Shrub															
Rhus copallinum	flameleaf sumac	Shrub															
Sambucus	elderberry	Shrub															
Ulmus	elm	Tree						6									
		Stem count	15	15	70	13	13	30	11	11	20	9	9	81	9	9	9
		size (ares)		1			1			1			1			1	
		size (ACRES)		0.02			0.02			0.02			0.02			0.02	
		Species count	6	6	11	4	4	6	4	4	7	2	2	4	4	4	4
		Stems per ACRE	607	607	2,833	526	526	1,214	445	445	809	364	364	3,278	364	364	364

Color Coding for Table

Exceeds requirements by 10%

Exceeds requirements, but by less than 10%

Fails to meet requirements, by less than 10%

Fails to meet requirements by more than 10%

Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes

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

T: Total Stems

Table 9. Planted and Total Stem Counts
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

			Current Plot Data (MY7 2021)												Annual Means		
			VP 13			VP 14			VP 15			VP 16			MY7 (2021)		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	Tree						1						4			61
Acer rubrum	red maple	Tree												4			10
Ailanthus altissima	tree of heaven	Exotic															1
Alnus serrulata	hazel alder	Shrub				1	1	1				1	1	1	7	7	7
Betula nigra	river birch	Tree	3	3	3	2	2	2							19	19	19
Cornus amomum	silky dogwood	Shrub															
Diospyros virginiana	common persimmon	Tree															3
Fraxinus pennsylvanica	green ash	Tree	2	2	2			1	3	3	5	2	2	42	38	38	110
Gleditsia triacanthos	honeylocust	Tree															
Ilex opaca	American holly	Tree						1									3
Juglans nigra	black walnut	Tree															1
Juniperus virginiana	eastern redcedar	Tree															4
Liquidambar styraciflua	sweetgum	Tree						30									70
Liriodendron tulipifera	tuliptree	Tree			1			36						85			139
Nyssa sylvatica	blackgum	Tree															1
Platanus occidentalis	American sycamore	Tree				3	3	33	4	4	8	3	3	3	41	41	107
Quercus alba	white oak	Tree															1
Quercus michauxii	swamp chestnut oak	Tree	6	6	6	4	4	4	2	2	2	1	1	1	29	29	29
Quercus pagoda	cherrybark oak	Tree	2	2	2	2	2	2	1	1	1				15	15	15
Quercus phellos	willow oak	Tree							1	1	1	4	4	4	12	12	12
Quercus rubra	northern red oak	Tree						6									6
Quercus velutina	black oak	Tree															
Rhus	sumac	Shrub															
Rhus copallinum	flameleaf sumac	Shrub															
Sambucus	elderberry	Shrub															2
Ulmus	elm	Tree									2						8
		Stem count	13	13	14	12	12	117	11	11	19	11	11	144	161	161	608
		size (ares)		1			1			1			1			14	
		size (ACRES)		0.02			0.02			0.02			0.02			0.35	
		Species count	4	4	5	5	5	11	5	5	6	5	5	8	7	7	21
		Stems per ACRE	526	526	567	486	486	4,735	445	445	769	445	445	5,827	465	465	1,757

Color Coding for Table

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

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

Table 9. Planted and Total Stem Counts
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

			Annual Means														
			MY5 (2019)			MY3 (2017)			MY2 (2016)			MY1 (2015)			MY0 (2015)		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	Tree			41			16						2			
Acer rubrum	red maple	Tree						4			30			10			
Ailanthus altissima	tree of heaven	Exotic			6												
Alnus serrulata	hazel alder	Shrub	8	8	8	10	10	11	15	15	15	26	26	26	27	27	27
Betula nigra	river birch	Tree	19	19	19	21	21	23	20	20	20	27	27	27	28	28	28
Cornus amomum	silky dogwood	Shrub									2						
Diospyros virginiana	common persimmon	Tree			3												
Fraxinus pennsylvanica	green ash	Tree	50	50	72	51	51	67	52	52	82	55	55	56	55	55	55
Gleditsia triacanthos	honeylocust	Tree			1			1									
Ilex opaca	American holly	Tree						1			3						
Juglans nigra	black walnut	Tree												1			
Juniperus virginiana	eastern redcedar	Tree						3									
Liquidambar styraciflua	sweetgum	Tree			185			129			30			10			
Liriodendron tulipifera	tuliptree	Tree			201			74			71			32			
Nyssa sylvatica	blackgum	Tree			7												
Platanus occidentalis	American sycamore	Tree	47	47	205	49	49	235	50	50	115	56	56	101	56	56	56
Quercus alba	white oak	Tree															
Quercus michauxii	swamp chestnut oak	Tree	31	31	31	34	34	34	35	35	35	36	36	36	36	36	36
Quercus pagoda	cherrybark oak	Tree	16	16	16	18	18	18	20	20	20	25	25	25	25	25	25
Quercus phellos	willow oak	Tree	16	16	16	16	16	16	18	18	18	30	30	30	30	30	30
Quercus rubra	northern red oak	Tree						6			40			10			
Quercus velutina	black oak	Tree			1												
Rhus	sumac	Shrub						1									
Rhus copallinum	flameleaf sumac	Shrub			23			2									
Sambucus	elderberry	Shrub															
Ulmus	elm	Tree						9									
		Stem count	187	187	835	199	199	650	210	210	481	255	255	366	257	257	257
		size (ares)		16			16			16			16			16	
		size (ACRES)		0.40			0.40			0.40			0.40			0.40	
		Species count	7	7	16	7	7	18	7	7	13	7	7	13	7	7	7
		Stems per ACRE	473	473	2,112	503	503	1,644	531	531	1,217	645	645	926	650	650	650

Color Coding for Table

Exceeds requirements by 10%

Exceeds requirements, but by less than 10%

Fails to meet requirements, by less than 10%

Fails to meet requirements by more than 10%

Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes

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

T: Total Stems

APPENDIX 4. Morphological Summary Data and Plots

Table 10a. Baseline Stream Data Summary
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

UT1

		PRE-RESTORATION CONDITION				REFERENCE REACH DATA										DESIGN				AS-BUILT/BASELINE			
Parameter	Gage	UT1 - Reach 2		UT1 - Reach 5		Onsite Reference Reach - UT1A - Reach 3		UT to Polecat Creek		Spencer Creek 1		Spencer Creek 2		UT To Cane Creek		UT1 - Reach 2		UT1 - Reach 5		UT1 - Reach 2		UT1 - Reach 5	
				Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																							
Bankfull Width (ft)		6.5		13.9	16.0	11.1		5.3	10.9	10.7	11.2	6.3	9.3	11.5	12.3	10.2		12.8		10.2	10.4	11.9	13.6
Floodprone Width (ft)		10		20	>50	25		25	65	60	>114	14	125	31		22	51	28	64	60	100	200	
Bankfull Mean Depth		0.8		1.5	4.3	0.7		1.0	1.1	1.6	1.8	0.8	1.0	0.8	1.0	0.8		0.9		0.6	0.9	0.8	0.9
Bankfull Max Depth		1.4		1.9	5.2	1.0		1.4	1.7	2.1	2.6	1.0	1.2	1.2	1.6	1.0	1.2	1.2	1.5	1.1	1.4	1.3	1.6
Bankfull Cross Sectional Area (ft^2)	N/A	5.2		24.6	59.0	7.4		5.4	12.4	17.8	19.7	6.6	8.7	8.9	12.2	7.9		12.0		6.2	9.0	9.1	11.9
Width/Depth Ratio		8.2		3.3	10.4	16.6		5.2	9.6	5.8	7.1	7.9	9.3	12.3	14.4	13.1		13.6		12.0	16.8	15.5	15.7
Entrenchment Ratio[1]		1.5		1.2	>3.6	2		3.2	8.3	5.5	>10.2	1.7	4.3	>2.5		2.2	5.0	2.2	5.0	5.9	9.6	14.7	16.8
Bank Height Ratio[2]		2.3		1.0	2.0	1.0		1.0	1.1	1.0		1.0	1.0	--	--	1.0	1.0	1.0	1.0	1.0		1.0	
D50 (mm)		3.47		14.60		---		---		---		---		---		---		---		Silt/ Clay		0.11	
Profile																							
Riffle Length (ft)		---		---		---		---		---		---		---		---		---		13.9	73.2	23.7	81.3
Riffle Slope (ft/ft)		---		---		N/A		0.0040	0.0470	0.0130		0.0184	0.0343	0.0188	0.0704	0.0148	0.0453	0.0118	0.0363	0.0078	0.0317	0.0090	0.0304
Pool Length (ft)	N/A	---		---		---		---		---		---		---		---		---		17.2	42.8	17.6	76.6
Pool Max Depth (ft)		2.4		2.5		1.6		1.8		3.3		1.2	1.8	2.6		0.9	3.2	1.1	3.9	1.6	3.7	2.0	4.9
Pool Spacing (ft)		---		---		N/A		34	52	71		9	46	27	73	13	67	17	84	31	78	35	103
Pool Volume (ft^3)		---		---		---		---		---		---		---		---		---		---		---	
Pattern																							
Channel Beltwidth (ft)		12	20	48	157	N/A		28	50	38	41	10	50	102		16	74	20	93	20	68	34	72
Radius of Curvature (ft)		6	18	13	86	N/A		19	50	11	15	12	85	23	38	18	31	23	38	18	26	23	38
Rc:Bankfull Width (ft/ft)	N/A	0.8	2.3	1.6	10.9	N/A		2.0	5.3	1.3	1.4	1.9	9.1	2.0	3.1	1.8	3.0	1.8	3.0	1.8	2.5	1.9	2.8
Meander Length (ft)		27	45	176	260	N/A		--	--	--	--	53	178	--	--	31	151	38	192	70	120	97	160
Meander Width Ratio		1.5	2.5	6.1	19.9	N/A		3.0	5.3	3.4	3.6	1.6	5.4	8.3	8.9	1.6	7.3	1.6	7.3	2.0	6.5	2.9	5.3
Substrate, Bed and Transport Parameters																							
Ri%/Ru%/P%/G%/S%		---		---		---		---		---		---		---		---		---		---		---	
SC%/Sa%/G%/C%/B%/Be%		---		---		---		---		---		---		---		---		---		---		---	
d16/d35/d50/d84/d95/d100	N/A	0.33/1.88/3.47/ 45.0/117/256		0.18/3.2/14.6/ 128/234/>2048		---		---		---		---		---		---		---		SC/ SC/SC/ 41.3/79.2/128.0		SC/SC/0.11/ 45.0/104.7/180.0	
Reach Shear Stress (Competency) lb/ft^2		0.43		1.26		---		---		---		---		---		0.49		0.63		0.38		0.56	
Max part size (mm) mobilized at bankfull		---		---		---		---		---		---		---		---		---		---		---	
Stream Power (Capacity) W/m^2		---		---		---		---		---		---		---		---		---		---		---	
Additional Reach Parameters																							
Drainage Area (SM)		0.25		0.56		0.15		0.41		0.96		0.37		0.29		0.25		0.56		0.25		0.56	
Watershed Impervious Cover Estimate (%)		<1%		<1%		---		---		---		---		---		<1%		<1%		<1%		<1%	
Rosgen Classification		G4		E4, G4		B3		E4		E4		E4		C4/E4		C4		C4		C4		C4	
Bankfull Velocity (fps)		2.7		1.7	5.7	4.9		2.2	3.5	4.9	5.4	5.0	5.6	3.8		2.5-5		2.5-5		2.6	3.4	3.3	3.6
Bankfull Discharge (cfs)		14		129		37		20		97		35		40		25.0		46.0		17.0	30.9	30.3	42.9
Q-NFF regression		---		---				---		---		---		---		---		---		---		---	
Q-USGS extrapolation	N/A	---		---				---		---		---		---		---		---		---		---	
Q-Mannings		---		---				---		---		---		---		---		---		---		---	
Valley Length (ft)		---		---		---		---		---		---		---		907		1,232		---		---	
Channel Thalweg Length (ft)		1,132		1,417		---		---		---		---		---		1,114		1,488		1,137		1,535	
Sinuosity		1.14		1.24		1.04		1.40		2.32		1.00	1.30	1.40		1.20	1.30	1.20	1.30	1.20		1.22	
Water Surface Slope (ft/ft)[2]		---		---		---		---		---		---		---		---		---		0.0111		0.0122	
Bankfull Slope (ft/ft)		0.0093	0.0190	0.0005	0.0130	0.0490		0.0120		0.0047		0.0190	0.0220	0.0150		0.0070	0.0150	0.0054	0.0172	0.0096		0.0104	

(---): Data was not provided
N/A: Not Applicable

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

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

Table 10b. Baseline Stream Data Summary
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

UT1A

		PRE-RESTORATION CONDITION				REFERENCE REACH DATA										DESIGN				AS-BUILT/BASELINE			
Parameter	Gage	UT1A - Reach 1		UT1A - Reach 4		Onsite Reference Reach - UT1A - Reach 3		UT to Polecat Creek		Spencer Creek 1		Spencer Creek 2		UT To Cane Creek		UT1A - Reach 1		UT1A - Reach 4		UT1A - Reach 1		UT1A - Reach 4	
						Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle																							
Bankfull Width (ft)	N/A	5.8		9.3		11.1		5.3	10.9	10.7	11.2	6.3	9.3	11.5	12.3	8.0		8.2		8.0		8.1	
Floodprone Width (ft)		15		>80		25		25	65	60	>114	14	125	31		18	40	18	41	50		200	
Bankfull Mean Depth		1.1		1.0		0.7		1.0	1.1	1.6	1.8	0.8	1.0	0.8	1.0	0.6		0.6		0.5		0.6	
Bankfull Max Depth		1.4		1.5		1.0		1.4	1.7	2.1	2.6	1	1.2	1.2	1.6	0.7	0.9	0.8	1.0	0.9		1.8	
Bankfull Cross Sectional Area (ft^2)		6.3		9.3		7.4		5.4	12.4	17.8	19.7	6.6	8.7	8.9	12.2	4.8		5.0		4.0		5.0	
Width/Depth Ratio		5.3		9.0		16.6		5.2	9.6	5.8	7.1	7.9	9.3	12.3	14.4	13.4		13.6		15.9		13.2	
Entrenchment Ratio[1]		2.6		>8.6		2		3.2	8.3	5.5	>10.2	1.7	4.3	>2.5		2.2	5.0	2.2	5.0	6.3		24.8	
Bank Height Ratio[2]		1.7		1.5		1.0		1.0	1.1	1.0		1.0	1.0	--	--	1.0	1.0	1.0	1.0	1.0		1.0	
D50 (mm)		4.31		5.06		---		---		---		---		---		---		---		1.41		0.25	
Profile																							
Riffle Length (ft)	N/A	---		---		---		---		---		---		---		---		---		15.5	42.0	20.5	51.9
Riffle Slope (ft/ft)		---		---		N/A		0.0040	0.0470	0.0130		0.0184	0.0343	0.0188	0.0704	0.0148	0.0453	0.0212	0.0652	0.0077	0.0505	0.0109	0.0449
Pool Length (ft)		---		---		---		---		---		---		---		---		---		5.4	52.2	9.1	35.5
Pool Max Depth (ft)		1.8		3.6		1.6		1.8		3.3		1.2	1.8	2.6		0.7	2.4	0.7	2.5	1.6	3.5	1.4	3.1
Pool Spacing (ft)		---		---		N/A		34	52	71		9	46	27	73	10	53	11	54	20	85	45	82
Pool Volume (ft^3)		---		---		---		---		---		---		---		---		---		---		---	
Pattern																							
Channel Beltwidth (ft)	N/A	30	35	N/A	N/A	N/A		28	50	38	41	10	50	102		13	58	13	60	24	60	35	55
Radius of Curvature (ft)		12	57	N/A	N/A	N/A		19	50	11	15	12	85	23	38	14	24	15	25	14	23	15	23
Rc:Bankfull Width (ft/ft)		1.5	7.2	N/A	N/A	N/A		2.0	5.3	1.3	1.4	1.9	9.1	2.0	3.1	1.8	3.0	1.8	3.0	1.8	2.9	1.9	2.8
Meander Length (ft)		89	104	N/A	N/A	N/A		--	--	--	--	53	178	--	--	24	120	25	123	70	112	96	117
Meander Width Ratio		3.8	4.4	N/A	N/A	N/A		3.0	5.3	3.4	3.6	1.6	5.4	8.3	8.9	1.6	7.3	1.6	7.3	3.0	7.5	4.3	6.8
Substrate, Bed and Transport Parameters																							
Ri%/Ru%/P%/G%/S%	N/A	---		---		---		---		---		---		---		---		---		---		---	
SC%/Sa%/G%/C%/B%/Be%		---		---		---		---		---		---		---		---		---		---		---	
d16/d35/d50/d84/d95/d100		0.15/2.18/4.31/ 16/139/256		0.45/2.71/5.06/ 67.7/122/362		---		---		---		---		---		---		---		SC/SC/1.41/ 33.4/64.0/128.0		SC/SC/0.25/ 26.2/75.9/180.0	
Reach Shear Stress (Competency) lb/ft^2		0.50		1.76		---		---		---		---		---		0.48		0.54		0.38		0.49	
Max part size (mm) mobilized at bankfull		---		---		---		---		---		---		---		---		---		---		---	
Stream Power (Capacity) W/m^2		---		---		---		---		---		---		---		---		---		---		---	
Additional Reach Parameters																							
Drainage Area (SM)	N/A	0.12		0.16		0.15		0.41		0.96		0.37		0.29		0.12		0.16		0.12		0.16	
Watershed Impervious Cover Estimate (%)		<1%		<1%		---		---		---		---		---		<1%		<1%		<1%		<1%	
Rosgen Classification		E4		E4		B3		E4		E4		E4		C4/E4		C4		C4		C4		C4	
Bankfull Velocity (fps)		3.3		5.2		4.9		2.2	3.5	4.9	5.4	5.0	5.6	3.8		2.5-5		2.5-5		2.6		3.0	
Bankfull Discharge (cfs)		21		50		37		20		97		35		40		14.0		17.0		15.9		15.0	
Q-NFF regression		---		---				---		---		---		---		---		---		---		---	
Q-USGS extrapolation		---		---				---		---		---		---		---		---		---		---	
Q-Mannings		---		---				---		---		---		---		---		---		---		---	
Valley Length (ft)		---		---		---		---		---		---		---		673		530		---		---	
Channel Thalweg Length (ft)		770		461		---		---		---		---		---		849		650		857		666	
Sinuosity		1.12		1.03		1.04		1.40		2.32		1.00	1.30	1.40		1.20	1.30	1.20	1.30	1.21		1.25	
Water Surface Slope (ft/ft)[2]		---		---		---		---		---		---		---		---		---		0.0126		N/A	
Bankfull Slope (ft/ft)		0.0095		0.0150		0.0490		0.0120		0.0047		0.0190	0.0220	0.0150		0.0103	0.0175	0.0141	0.0153	0.0137		0.0129	

(---): Data was not provided
N/A: Not Applicable

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

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

Table 10c. Baseline Stream Data Summary
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

UT1B

		PRE-RESTORATION	REFERENCE REACH DATA										DESIGN		AS-BUILT/ BASELINE	
Parameter	**Gage**	**UT1B**	**Onsite Reference Reach - UT1A - Reach 3**		**UT to Polecat Creek**		**Spencer Creek 1**		**Spencer Creek 2**		**UT To Cane Creek**		**UT1B**		**UT1B**	
			Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Dimension and Substrate - Riffle																
Bankfull Width (ft)	N/A	4.9	11.1		5.3	10.9	10.7	11.2	6.3	9.3	11.5	12.3	7.3		7.7	
Floodprone Width (ft)		36	25		25	65	60	>114	14	125	31		16	37	70	
Bankfull Mean Depth		1.1	0.7		1.0	1.1	1.6	1.8	0.8	1.0	0.8	1.0	0.6		0.5	
Bankfull Max Depth		1.9	1.0		1.4	1.7	2.1	2.6	1.0	1.2	1.2	1.6	0.7	0.9	0.7	
Bankfull Cross Sectional Area (ft^2)		5.4	7.4		5.4	12.4	17.8	19.7	6.6	8.7	8.9	12.2	5.2		3.5	
Width/Depth Ratio		4.4	16.6		5.2	9.6	5.8	7.1	7.9	9.3	12.3	14.4	12.6		17.0	
Entrenchment Ratio[1]		7.5	2.3		3.2	8.3	5.5	>10.2	1.7	4.3	>2.5		2.2	5.0	9.1	
Bank Height Ratio[2]		1.6	1.0		1.0	1.1	1.0		1.0	1.0	--	--	1.0	1.0	1.0	
D50 (mm)		---	---		---		---		---		---		---		Silt/Clay	
Profile																
Riffle Length (ft)	N/A	---	---		---		---		---		---		---		12.1	24.4
Riffle Slope (ft/ft)		---	N/A		0.0040	0.0470	0.0130		0.0184	0.0343	0.0188	0.0704	0.0222	0.0680	0.0219	0.0425
Pool Length (ft)		---	---		---		---		---		---		---		11.9	30.9
Pool Max Depth (ft)		2.5	1.6		1.8		3.3		1.2	1.8	2.6		0.7	2.4	1.7	2.5
Pool Spacing (ft)		---	N/A		34	52	71		9	46	27	73	9	48	30	45
Pool Volume (ft^3)		---	---		---		---		---		---		---		---	
Pattern																
Channel Beltwidth (ft)	N/A	N/A	N/A	N/A	28	50	38	41	10	50	102		12	53	25	40
Radius of Curvature (ft)		N/A	N/A	N/A	19	50	11	15	12	85	23	38	13	22	14	20
Rc:Bankfull Width (ft/ft)		N/A	N/A	N/A	2.0	5.3	1.3	1.4	1.9	9.1	2.0	3.1	1.8	3.0	1.8	2.6
Meander Length (ft)		N/A	N/A	N/A	--	--	--	--	53	178	--	--	22	110	60	72
Meander Width Ratio		N/A	N/A	N/A	3.0	5.3	3.4	3.6	1.6	5.4	8.3	8.9	1.6	7.3	3.2	5.2
Substrate, Bed and Transport Parameters																
Ri%/Ru%/P%/G%/S%	N/A	---	---		---		---		---		---		---		---	
SC%/Sa%/G%/C%/B%/Be%		---	---		---		---		---		---		---		---	
d16/d35/d50/d84/d95/d100		---	---		---		---		---		---		---		SC/SC/SC/ 19.5/40.2/90.0	
Reach Shear Stress (Competency) lb/ft^2		---	---		---		---		---		---		---		0.21	
Max part size (mm) mobilized at bankfull		---	---		---		---		---		---		---		---	
Stream Power (Capacity) W/m^2		---	---		---		---		---		---		---		---	
Additional Reach Parameters																
Drainage Area (SM)	N/A	0.10	0.15		0.41		0.96		0.37		0.29		0.10		0.10	
Watershed Impervious Cover Estimate (%)		<1%	---		---		---		---		---		<1%		<1%	
Rosgen Classification		E4	B3		E4		E4		E4		C4/E4		C4		C4	
Bankfull Velocity (fps)		4.6	4.9		2.2	3.5	4.9	5.4	5.0	5.6	3.8		1.5-4		1.9	
Bankfull Discharge (cfs)		25	37		20		97		35		40		11		6.6	
Q-NFF regression		---			---		---		---		---		---		---	
Q-USGS extrapolation		---			---		---		---		---		---		---	
Q-Mannings		---			---		---		---		---		---		---	
Valley Length (ft)		---	---		---		---		---		---		199		---	
Channel Thalweg Length (ft)		243	---		---		---		---		---		219		232	
Sinuosity		1.06	1.04		1.40		2.32		1.00	1.30	1.40		1.20	1.30	1.34	
Water Surface Slope (ft/ft)[2]		---	---		---		---		---		---		---		0.0095	
Bankfull Slope (ft/ft)		0.0200	0.0490		0.0120		0.0047		0.0190	0.0220	0.0150		0.0100	0.0200	0.0181	

(---): Data was not provided
N/A: Not Applicable

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

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

Table 10d. Baseline Stream Data Summary
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

UT2

		PRE-RESTORATION		REFERENCE REACH DATA										DESIGN		AS-BUILT/ BASELINE	
Parameter	**Gage**	**UT2**		**Onsite Reference Reach - UT1A - Reach 3**		**UT to Polecat Creek**		**Spencer Creek 1**		**Spencer Creek 2**		**UT To Cane Creek**		**UT2**		**UT2**	
				Min	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Dimension and Substrate - Riffle																	
Bankfull Width (ft)	N/A	6.2	9.6	11.1		5.3	10.9	10.7	11.2	6.3	9.3	11.5	12.3	6.6		6.7	
Floodprone Width (ft)		>20		25		25	65	60	>114	14	125	31		15	33	50	
Bankfull Mean Depth		0.6	1.1	0.7		1.0	1.1	1.6	1.8	0.8	1.0	0.8	1.0	0.5		0.5	
Bankfull Max Depth		1.0	2.0	1.0		1.4	1.7	2.1	2.6	1.0	1.2	1.2	1.6	0.6	0.8	0.7	
Bankfull Cross Sectional Area (ft^2)		5.2	7.0	7.4		5.4	12.4	17.8	19.7	6.6	8.7	8.9	12.2	3.4		3.4	
Width/Depth Ratio		5.5	15.5	16.6		5.2	9.6	5.8	7.1	7.9	9.3	12.3	14.4	12.8		12.9	
Entrenchment Ratio[1]		>2.4		2.3		3.2	8.3	5.5	>10.2	1.7	4.3	>2.5		2.2	5.0	7.5	
Bank Height Ratio[2]		1.0	2.1	1.0		1.0	1.1	1.0		1.0	1.0	--	--	1.0	1.0	1.0	
D50 (mm)		2.11		---		---		---		---		---		---		Silt/Clay	
Profile																	
Riffle Length (ft)	N/A	---		---		---		---		---		---		---		13.9	51.7
Riffle Slope (ft/ft)		---		N/A		0.0040	0.0470	0.0130		0.0184	0.0343	0.0188	0.0704	0.0179	0.0549	0.0146	0.0525
Pool Length (ft)		---		---		---		---		---		---		---		10.0	28.4
Pool Max Depth (ft)		1.4		1.6		1.8		3.3		1.2	1.8	2.6		0.6	2.1	1.0	2.4
Pool Spacing (ft)		---		N/A		34	52	71		9	46	27	73	9	44	25	66
Pool Volume (ft^3)		---		---		---		---		---		---		---		---	
Pattern																	
Channel Beltwidth (ft)	N/A	32	54	N/A		28	50	38	41	10	50	102		11	48	19	50
Radius of Curvature (ft)		12	43	N/A		19	50	11	15	12	85	23	38	12	20	12	20
Rc:Bankfull Width (ft/ft)		1.5	5.4	N/A		2.0	5.3	1.3	1.4	1.9	9.1	2.0	3.1	1.8	3.0	1.8	3.0
Meander Length (ft)		102	103	N/A		--	--	--	--	53	178	--	--	20	99	58	98
Meander Width Ratio		4.1	6.8	N/A		3.0	5.3	3.4	3.6	1.6	5.4	8.3	8.9	1.6	7.3	2.8	7.5
Substrate, Bed and Transport Parameters																	
Ri%/Ru%/P%/G%/S%	N/A	---		---		---		---		---		---		---		---	
SC%/Sa%/G%/C%/B%/Be%		---		---		---		---		---		---		---		---	
d16/d35/d50/d84/d95/d100		0.2/0.68/2.11/ 20.7/98.3/256		---		---		---		---		---		---		SC/SC/SC/ 30.2/64.0/128.0	
Reach Shear Stress (Competency) lb/ft^2		---		---		---		---		---		---		---		0.64	
Max part size (mm) mobilized at bankfull		---		---		---		---		---		---		---		---	
Stream Power (Capacity) W/m^2		---		---		---		---		---		---		---		---	
Additional Reach Parameters																	
Drainage Area (SM)	N/A	0.09		0.15		0.41		0.96		0.37		0.29		0.09		0.09	
Watershed Impervious Cover Estimate (%)		<1%		---		---		---		---		---		<1%		<1%	
Rosgen Classification		E4		B3		E4		E4		E4		C4/E4		C4		C4	
Bankfull Velocity (fps)		3.0	5.1	4.9		2.2	3.5	4.9	5.4	5.0	5.6	3.8		2.5-5		3.4	
Bankfull Discharge (cfs)		23		37		20		97		35		40		11.0		11.5	
Q-NFF regression		---				---		---		---		---		---		---	
Q-USGS extrapolation		---				---		---		---		---		---		---	
Q-Mannings		---				---		---		---		---		---		---	
Valley Length (ft)		---		---		---		---		---		---		905		---	
Channel Thalweg Length (ft)		1,028		---		---		---		---		---		1,023		1,032	
Sinuosity		1.06		1.04		1.40		2.32		1.00	1.30	1.40		1.20	1.30	1.16	
Water Surface Slope ($ft/ft)^2$		---		---		---		---		---		---		---		0.0207	
Bankfull Slope (ft/ft)		0.0130	0.0220	0.0490		0.0120		0.0047		0.0190	0.0220	0.0150		0.0121	0.0231	0.0195	

(---): Data was not provided
N/A: Not Applicable

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

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

Table 11. Morphology and Hydraulic Summary (Dimensional Parameters - Cross Section)
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

	UT1 Reach 2																					
	Cross Section 1 (Riffle)						Cross Section 2 (Pool)						Cross Section 3 (Riffle)						Cross Section 4 (Pool)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation *(ft)*	651.7	651.7	651.7	651.7	651.8	651.7	651.0	651.0	651.0	651.0	651.2	651.3	644.0	644.0	644.0	644.0	644.0	644.1	643.6	643.6	643.6	643.6	643.6	643.7
Low Bank Elevation (ft)	651.7	651.7	651.7	651.7	651.8	651.7	651.0	651.0	651.0	651.0	651.2	651.3	644.0	644.0	644.0	644.0	644.0	644.1	643.6	643.6	643.6	643.6	643.6	643.7
Bankfull Width (ft)	10.4	9.9	10.5	10.9	12.0	9.4	9.6	9.3	9.3	8.9	10.0	10.6	10.6	10.2	9.7	9.2	9.7	10.1	13.5	13.7	12.9	13.3	12.8	14.3
Floodprone Width (ft)	100	100	100	100	100	100	N/A	N/A	N/A	N/A	N/A	N/A	60	60	60	60	60	60	N/A	N/A	N/A	N/A	N/A	N/A
Bankfull Mean Depth (ft)	0.9	0.8	0.7	0.7	0.7	0.7	1.2	1.1	1.2	1.2	1.2	1.3	0.6	0.6	0.5	0.5	0.6	0.6	1.1	1.0	1.0	1.0	1.0	0.9
Bankfull Max Depth (ft)	1.4	1.4	1.4	1.4	1.5	1.4	2.1	1.9	2.0	1.9	2.2	2.1	1.1	1.1	1.1	1.0	1.1	1.1	1.9	1.8	1.9	1.9	2.0	2.0
Bankfull Cross Sectional Area (ft^2)	9.0	8.0	7.8	7.9	8.7	6.7	11.6	10.4	11.2	10.3	11.9	13.3	6.2	6.2	5.3	4.9	6.2	6.1	14.7	14.2	13.3	13.6	12.4	12.7
Bankfull Width/Depth Ratio	12.0	12.2	14.2	15.1	16.5	13.2	7.9	8.3	7.7	7.6	8.3	8.5	18.2	16.7	17.7	17.5	15.1	16.9	12.4	13.2	12.5	13.1	13.2	16.2
Entrenchment Ratio[1]	9.6	10.1	9.5	9.2	8.4	10.6	N/A	N/A	N/A	N/A	N/A	N/A	5.6	5.9	6.2	6.5	6.2	5.9	N/A	N/A	N/A	N/A	N/A	N/A
Bankfull Bank Height Ratio[2]	1.0	1.0	1.0	1.0	<1.0	<1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
d50 (mm)	18.0	64.0	10.4	27.2	56.1	64.0	N/A	N/A	N/A	N/A	N/A	N/A	13.3	46.6	22.6	23.0	22.6	56.9	N/A	N/A	N/A	N/A	N/A	N/A
	UT1 Reach 5																							
	Cross Section 5 (Pool)						Cross Section 6 (Riffle)						Cross Section 7 (Riffle)						Cross Section 8 (Pool)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation *(ft)*	610.4	610.4	610.4	610.4	610.3	610.4	610.0	610.0	610.0	610.0	610.0	610.1	600.9	600.9	600.9	600.9	600.8	600.9	600.6	600.6	600.6	600.6	600.5	600.6
Low Bank Elevation (ft)	610.4	610.4	610.4	610.4	610.3	610.4	610.0	610.0	610.0	610.0	610.0	610.1	600.9	600.9	600.9	600.9	600.8	600.9	600.6	600.6	600.6	600.6	600.5	600.6
Bankfull Width (ft)	15.9	16.5	16.7	17.1	14.4	15.2	15.3	15.2	16.0	15.1	15.3	14.4	11.9	11.9	11.8	12.0	10.9	11.7	15.2	15.7	16.1	16.1	14.3	14.4
Floodprone Width (ft)	N/A	N/A	N/A	N/A	N/A	N/A	200	200	200	200	200	200	200	200	200	200	200	200	N/A	N/A	N/A	N/A	N/A	N/A
Bankfull Mean Depth (ft)	1.2	1.1	1.2	1.1	1.2	1.2	0.8	0.8	0.8	0.8	1.0	1.1	0.8	0.8	0.8	0.7	0.8	0.9	1.4	1.4	1.3	1.3	1.4	1.5
Bankfull Max Depth (ft)	2.4	2.2	2.4	2.4	2.3	2.5	1.6	1.7	1.8	1.8	2.0	2.1	1.3	1.5	1.4	1.3	1.5	1.6	2.7	2.8	2.8	2.7	3.2	3.0
Bankfull Cross Sectional Area (ft^2)	18.5	18.1	19.3	19.4	17.0	18.0	12.0	12.6	12.5	12.5	14.7	15.5	9.1	10.1	9.3	8.8	8.4	10.0	21.3	21.8	21.1	20.4	19.4	22.2
Bankfull Width/Depth Ratio	13.6	15.1	14.4	15.1	12.2	12.8	19.5	18.4	20.5	18.2	15.9	13.3	15.7	14.0	14.9	16.3	14.1	13.8	10.9	11.3	12.3	12.7	10.5	9.4
Entrenchment Ratio[1]	N/A	N/A	N/A	N/A	N/A	N/A	13.1	13.1	12.5	13.3	13.1	13.9	16.8	16.8	17.0	16.7	18.4	17.1	N/A	N/A	N/A	N/A	N/A	N/A
Bankfull Bank Height Ratio[2]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.0	1.0	1.0	1.0	<1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0
d50 (mm)	N/A	N/A	N/A	N/A	N/A	N/A	15.4	30.8	57.9	29.6	33.5	41.8	16.0	52.1	70.5	40.2	31.0	82.6	N/A	N/A	N/A	N/A	N/A	N/A
	UT1A Reach 1												UT1A Reach 4											
	Cross Section 9 (Riffle)						Cross Section 10 (Pool)						Cross Section 11 (Riffle)						Cross Section 12 (Pool)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation *(ft)*	656.4	656.4	656.4	656.4	656.5	656.5	656.0	656.0	656.0	656.0	656.2	656.0	615.8	615.8	615.8	615.8	615.7	615.7	615.1	615.1	615.1	615.1	615.1	615.1
Low Bank Elevation (ft)	656.4	656.4	656.4	656.4	656.5	656.5	656.0	656.0	656.0	656.0	656.2	656.0	615.8	615.8	615.8	615.8	615.7	615.7	615.1	615.1	615.1	615.1	615.1	615.1
Bankfull Width (ft)	8.0	7.3	7.2	6.7	6.6	6.2	10.5	10.0	10.2	9.4	10.7	8.1	8.1	8.2	8.2	8.9	8.5	9.7	10.6	10.5	10.5	10.8	12.0	11.6
Floodprone Width (ft)	50	50	50	50	50	50	N/A	N/A	N/A	N/A	N/A	N/A	200	200	200	200	200	200	N/A	N/A	N/A	N/A	N/A	N/A
Bankfull Mean Depth (ft)	0.5	0.5	0.5	0.5	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.9	0.6	0.8	0.8	0.8	0.8	0.7	1.2	1.2	1.2	1.1	1.1	1.2
Bankfull Max Depth (ft)	0.9	0.9	0.8	0.8	1.2	1.2	1.5	1.2	1.3	1.3	1.7	1.7	1.8	1.9	1.9	1.8	1.7	1.8	2.7	2.6	2.6	2.5	2.8	2.5
Bankfull Cross Sectional Area (ft^2)	4.0	3.9	3.8	3.3	4.0	3.7	7.8	7.0	6.7	6.5	8.0	7.2	5.0	6.6	6.5	6.7	6.9	7.0	12.3	13.2	13.1	12.4	13.0	13.4
Bankfull Width/Depth Ratio	15.9	13.7	13.8	13.4	10.9	10.2	14.1	14.4	15.5	13.5	14.4	9.2	13.2	10.1	10.4	11.7	10.4	13.5	9.1	8.4	8.4	9.4	1.0	10.1
Entrenchment Ratio[1]	6.3	6.8	6.9	7.5	7.8	8.1	N/A	N/A	N/A	N/A	N/A	N/A	24.8	24.4	24.4	22.6	23.5	20.5	N/A	N/A	N/A	N/A	N/A	N/A
Bankfull Bank Height Ratio[2]	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.2	1.2	1.0	1.0	1.0	1.0	1.0	1.0
d50 (mm)	18.0	17.8	25.2	38.8	20.9	35.4	N/A	N/A	N/A	N/A	N/A	N/A	18.3	42.1	28.5	22.6	24.7	42.6	N/A	N/A	N/A	N/A	N/A	N/A
	UT1B												UT2											
	Cross Section 13 (Riffle)						Cross Section 14 (Pool)						Cross Section 15 (Riffle)						Cross Section 16 (Pool)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**Base**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation *(ft)*	647.1	647.1	647.1	647.1	647.1	647.0	646.9	646.9	646.9	646.9	646.9	646.9	602.9	602.9	602.9	602.9	603.0	602.9	602.4	602.4	602.4	602.4	602.4	602.4
Low Bank Elevation (ft)	647.1	647.1	647.1	647.1	647.1	647.0	646.9	646.9	646.9	646.9	646.9	646.9	602.9	602.9	602.9	602.9	603.0	602.9	602.4	602.4	602.4	602.4	602.4	602.4
Bankfull Width (ft)	7.7	7.8	7.7	7.4	8.7	8.0	9.7	10.1	9.8	10.0	9.8	10.6	7.1	7.0	6.8	6.6	6.8	5.2	9.5	9.5	9.9	9.9	9.0	8.7
Floodprone Width (ft)	70	70	70	70	70	70	N/A	N/A	N/A	N/A	N/A	N/A	50	50	50	50	50	50	N/A	N/A	N/A	N/A	N/A	N/A
Bankfull Mean Depth (ft)	0.5	0.5	0.4	0.4	0.5	0.4	0.8	0.7	0.7	0.7	0.7	0.7	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.7
Bankfull Max Depth (ft)	0.7	0.9	0.8	0.8	0.9	0.9	1.4	1.3	1.4	1.3	1.4	1.4	0.7	0.9	0.9	0.8	1.1	1.0	1.3	1.3	1.3	1.3	1.4	1.7
Bankfull Cross Sectional Area (ft^2)	3.5	3.6	3.2	2.7	4.0	3.0	7.8	7.2	7.2	6.6	7.1	7.7	3.4	3.8	3.5	3.3	3.9	2.8	5.8	5.5	5.8	5.7	5.2	5.9
Bankfull Width/Depth Ratio	17.0	16.9	18.3	20.6	19.2	21.5	12.1	14.2	13.5	15.0	13.7	14.6	14.7	12.9	13.5	13.5	12.1	9.6	15.5	16.3	16.8	17.0	15.3	12.8
Entrenchment Ratio[1]	9.1	9.0	9.1	9.4	8.0	8.8	N/A	N/A	N/A	N/A	N/A	N/A	7.0	7.2	7.3	7.5	7.3	9.6	N/A	N/A	N/A	N/A	N/A	N/A
Bankfull Bank Height Ratio[2]	1.0	1.0	1.0	1.0	1.1	<1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	<1.0	1.0	1.0	1.0	1.0	1.0	1.0
d50 (mm)	21.3	43.9	26.9	23.2	72.7	57.6	N/A	N/A	N/A	N/A	N/A	N/A	19.7	25.0	23.5	29.3	29.6	42.5	N/A	N/A	N/A	N/A	N/A	N/A

[1]Entrenchment Ratio is the flood prone width divided by the bankfull width.
[2]Bank Height Ratio is the bank height divided by the max depth of the bankfull channel.

Table 12a. Monitoring Data - Stream Reach Data Summary
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

UT1 Reach 2

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle												
Bankfull Width (ft)	10.2	10.4	9.9	10.2	9.7	10.5	9.2	10.9	9.7	12.0	9.4	10.1
Floodprone Width (ft)	60	100	60	100	60	100	60	100	60	100	60	100
Bankfull Mean Depth	0.6	0.9	0.6	0.8	0.5	0.7	0.5	0.7	0.6	0.7	0.6	0.7
Bankfull Max Depth	1.1	1.4	1.1	1.4	1.1	1.4	1.0	1.4	1.1	1.5	1.1	1.5
Bankfull Cross Sectional Area (ft^2)	6.2	9.0	6.2	8.0	5.3	7.8	4.9	7.9	6.2	8.7	6.1	6.2
Width/Depth Ratio	12.0	16.8	12.2	16.7	14.2	17.7	15.1	17.5	15.1	16.5	13.2	16.9
Entrenchment Ratio[1]	5.9	9.6	5.9	10.1	6.2	9.5	6.5	9.2	6.2	8.4	5.9	10.6
Bank Height Ratio [2]	1.0		1.0		1.0		1.0		<1.0	1.0	<1.0	1.0
D50 (mm)	13.3	18.0	46.6	64.0	10.4	22.6	23.0	27.2	22.6	56.1	56.9	64.0
Profile												
Riffle Length (ft)	13.9	73.2										
Riffle Slope (ft/ft)	0.0078	0.0317										
Pool Length (ft)	17.2	42.8										
Pool Max Depth (ft)	1.6	3.7										
Pool Spacing (ft)	31	78										
Pool Volume (ft^3)												
Pattern												
Channel Beltwidth (ft)	20	68										
Radius of Curvature (ft)	18	26										
Rc:Bankfull Width (ft/ft)	1.8	2.5										
Meander Wave Length (ft)	70	120										
Meander Width Ratio	2.0	6.5										
Additional Reach Parameters												
Rosgen Classification	C4											
Channel Thalweg Length (ft)	1,137											
Sinuosity (ft)	1.2											
Water Surface Slope (ft/ft)	0.0111											
Bankfull Slope (ft/ft)	0.0096											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	SC/SC/SC/41.3/79.2/128.0		SC/0.28/9.9/93.6/145.5/180.0		0.56\2.57\4.8\64.0\117.2\512.0		0.52\2.43\4.6\34.3\102.1\180.0		SC/1.12/14.1/98.3/180.0/1024.0		SC/0.43/5.9/138.1/220.1/362.0	
% of Reach with Eroding Banks	0%		0%		0%		0%		0%		0%	

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

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

Table 12b. Monitoring Data - Stream Reach Data Summary
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

UT1 Reach 5

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle												
Bankfull Width (ft)	11.9	13.6	11.9	15.2	11.8	16.0	12.0	15.1	10.9	15.3	11.7	14.4
Floodprone Width (ft)	200		200		200		200		200		200	
Bankfull Mean Depth	0.8	0.9	0.8	0.8	0.8	0.8	0.7	0.8	0.8	1.0	0.9	1.1
Bankfull Max Depth	1.3	1.6	1.5	1.7	1.4	1.8	1.3	1.8	1.5	2.0	1.6	2.1
Bankfull Cross Sectional Area (ft^2)	9.1	11.9	10.1	12.6	9.3	12.5	8.8	12.5	8.4	14.7	10.0	15.5
Width/Depth Ratio	15.5	15.7	14.0	18.4	14.9	20.5	16.3	18.2	14.1	15.9	13.3	13.8
Entrenchment Ratio[1]	14.7	16.8	13.1	16.8	12.5	17.0	13.3	16.7	13.1	18.4	13.9	17.1
Bank Height Ratio [2]	1.0		1.0		1.0		1.0		<1.0	1.1	1.1	
D50 (mm)	15.4	16.0	30.8	52.1	57.9	70.5	29.6	40.2	31.0	33.5	41.8	82.6
Profile												
Riffle Length (ft)	23.7	81.3										
Riffle Slope (ft/ft)	0.0090	0.0304										
Pool Length (ft)	17.6	76.6										
Pool Max Depth (ft)	2.0	4.9										
Pool Spacing (ft)	35	103										
Pool Volume (ft^3)												
Pattern												
Channel Beltwidth (ft)	34	72										
Radius of Curvature (ft)	23	38										
Rc:Bankfull Width (ft/ft)	1.9	2.8										
Meander Wave Length (ft)	97	160										
Meander Width Ratio	2.9	5.3										
Additional Reach Parameters												
Rosgen Classification	C4											
Channel Thalweg Length (ft)	1,535											
Sinuosity (ft)	1.2											
Water Surface Slope (ft/ft)	0.0122											
Bankfull Slope (ft/ft)	0.0104											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	SC/SC/0.11/45.0/104.7/180.0		SC\4.47\20.1\74.9\128.0\362.0		0.18\4.00\20.7\75.9\139.4\512.0		SC\0.50\17.1\70.2\104.7\180.0		SC/0.88/14.8/97.3/168.1/362.0		0.31/7.1/18.2/145.5/234.4/362.0	
% of Reach with Eroding Banks	0%		0%		0%		0%		0%		0%	

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

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

Table 12c. Monitoring Data - Stream Reach Data Summary
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

UT1A Reach 1

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle												
Bankfull Width (ft)	8.0		7.3		7.2		6.7		6.6		6.2	
Floodprone Width (ft)	50		50		50		50		50		50	
Bankfull Mean Depth	0.5		0.5		0.5		0.5		0.6		0.6	
Bankfull Max Depth	0.9		0.9		0.8		0.8		1.2		1.2	
Bankfull Cross Sectional Area (ft^2)	4.0		3.9		3.8		3.3		4.0		3.7	
Width/Depth Ratio	15.9		13.7		13.8		13.4		10.9		10.2	
Entrenchment Ratio[1]	6.3		6.8		6.9		7.5		7.8		7.8	
Bank Height Ratio [2]	1.0		1.0		1.0		1.0		1.0		1.0	
D50 (mm)	18.0		17.8		25.2		38.8		20.9		35.4	
Profile												
Riffle Length (ft)	15.5	41.97										
Riffle Slope (ft/ft)	0.0077	0.0505										
Pool Length (ft)	5.4	52.2										
Pool Max Depth (ft)	1.6	3.5										
Pool Spacing (ft)	20	85										
Pool Volume (ft^3)												
Pattern												
Channel Beltwidth (ft)	24	60										
Radius of Curvature (ft)	14	23										
Rc:Bankfull Width (ft/ft)	1.8	2.9										
Meander Wave Length (ft)	70	112										
Meander Width Ratio	3.0	7.5										
Additional Reach Parameters												
Rosgen Classification	C4											
Channel Thalweg Length (ft)	857											
Sinuosity (ft)	1.2											
Water Surface Slope (ft/ft)	0.0126											
Bankfull Slope (ft/ft)	0.0137											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	SC/SC/1.41/33.4/64.0/128.0		0.16\2.24\11.0\42.0\73.4\180.0		0.50\6.01\15.2\52.1\75.9\512.0		SC\0.95\17.3\56.3\83.4\180.0		SC/SC/2.4/39.3/85.0/256.0		SC/0.76/19.5/79.7/128.0/256.0	
% of Reach with Eroding Banks	0%		0%		0%		0%		0%		0%	

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

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

Table 12d. Monitoring Data - Stream Reach Data Summary
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

UT1A Reach 4

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle												
Bankfull Width (ft)	8.1		8.2		8.2		8.9		8.5		9.7	
Floodprone Width (ft)	200		200		200		200		200		200	
Bankfull Mean Depth	0.6		0.8		0.8		0.8		0.8		0.7	
Bankfull Max Depth	1.8		1.9		1.9		1.8		1.7		1.8	
Bankfull Cross Sectional Area (ft^2)	5.0		6.6		6.5		6.7		6.9		7.0	
Width/Depth Ratio	13.2		10.1		10.4		11.7		10.4		13.5	
Entrenchment Ratio[1]	24.8		24.4		24.4		22.6		23.5		20.5	
Bank Height Ratio [2]	1.0		1.0		1.0		1.0		1.0		1.2	
D50 (mm)	18.3		42.1		28.5		22.6		24.7		42.6	
Profile												
Riffle Length (ft)	20.5	51.9										
Riffle Slope (ft/ft)	0.0109	0.0449										
Pool Length (ft)	9.1	35.5										
Pool Max Depth (ft)	1.4	3.1										
Pool Spacing (ft)	45	82										
Pool Volume (ft^3)												
Pattern												
Channel Beltwidth (ft)	35	55										
Radius of Curvature (ft)	15	23										
Rc:Bankfull Width (ft/ft)	1.9	2.8										
Meander Wave Length (ft)	96	117										
Meander Width Ratio	4.3	6.8										
Additional Reach Parameters												
Rosgen Classification	C4											
Channel Thalweg Length (ft)	666											
Sinuosity (ft)	1.2											
Water Surface Slope (ft/ft)	N/A											
Bankfull Slope (ft/ft)	0.0129											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	SC/SC/0.25/26.2/75.9/180.0		SC\4.00\23.4\77.8\119.3\180.0		0.50\7.10\27.6\93.2\143.4\256.0		0.14\0.63\11.4\53.2\106.9\180.0		0.30/1.05/9.89/80.3/151.8/512.0		SC/.6/4.73/101.2/169.2/362.0	
% of Reach with Eroding Banks	0%		0%		0%		0%		0%		0%	

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

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

Table 12e. Monitoring Data - Stream Reach Data Summary
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

UT1B

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle												
Bankfull Width (ft)	7.7		7.8		7.7		7.4		8.7		8.0	
Floodprone Width (ft)	70		70		70		70		70		70	
Bankfull Mean Depth	0.5		0.5		0.4		0.4		0.5		0.4	
Bankfull Max Depth	0.7		0.9		0.8		0.8		0.9		0.9	
Bankfull Cross Sectional Area (ft^2)	3.5		3.6		3.2		2.7		4.0		3.0	
Width/Depth Ratio	17.0		16.9		18.3		20.6		19.2		21.5	
Entrenchment Ratio[1]	9.1		9.0		9.1		9.4		8.0		8.8	
Bank Height Ratio [2]	1.0		1.0		1.0		1.0		1.1		<1.0	
D50 (mm)	21.3		43.9		26.9		23.2		72.7		57.6	
Profile												
Riffle Length (ft)	12.1	24.4										
Riffle Slope (ft/ft)	0.0219	0.0425										
Pool Length (ft)	11.9	30.9										
Pool Max Depth (ft)	1.7	2.5										
Pool Spacing (ft)	30	45										
Pool Volume (ft^3)												
Pattern												
Channel Beltwidth (ft)	25	40										
Radius of Curvature (ft)	14	20										
Rc:Bankfull Width (ft/ft)	1.8	2.6										
Meander Wave Length (ft)	60	72										
Meander Width Ratio	3.2	5.2										
Additional Reach Parameters												
Rosgen Classification	C4											
Channel Thalweg Length (ft)	232											
Sinuosity (ft)	1.3											
Water Surface Slope (ft/ft)	0.0095											
Bankfull Slope (ft/ft)	0.0181											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	SC/SC/SC/19.5/40.2/90.0		SC\0.71\5.6\64.0\107.3\180.0		SC\0.40\3.3\40.2\95.4\128.0		SC\0.62\2.5\62.2\144.6\180.0		SC/2.00/14.8/102.7/139.4/256.0		SC/0.1/1.2/81.0/122.5/256.0	
% of Reach with Eroding Banks	0%		0%		0%		0%		0%		0%	

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

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

Table 12f. Monitoring Data - Stream Reach Data Summary
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

UT2

Parameter	As-Built/Baseline		MY1		MY2		MY3		MY5		MY7	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Dimension and Substrate - Riffle												
Bankfull Width (ft)	7.1		7.0		6.8		6.6		6.8		5.2	
Floodprone Width (ft)	50		50		50		50		50		50	
Bankfull Mean Depth	0.5		0.5		0.5		0.5		0.6		0.5	
Bankfull Max Depth	0.7		0.9		0.9		0.8		1.1		1.0	
Bankfull Cross Sectional Area (ft^2)	3.4		3.8		3.5		3.3		3.9		2.8	
Width/Depth Ratio	14.7		12.9		13.5		13.5		12.1		9.6	
Entrenchment Ratio[1]	7.0		7.2		7.3		7.5		7.3		9.6	
Bank Height Ratio [2]	1.0		1.0		1.0		1.0		1.0		<0.1	
D50 (mm)	19.7		25.0		23.5		29.3		29.6		42.5	
Profile												
Riffle Length (ft)	13.9	51.7										
Riffle Slope (ft/ft)	0.0146	0.0525										
Pool Length (ft)	10.0	28.4										
Pool Max Depth (ft)	1.0	2.4										
Pool Spacing (ft)	25	66										
Pool Volume (ft^3)												
Pattern												
Channel Beltwidth (ft)	19	50										
Radius of Curvature (ft)	12	20										
Rc:Bankfull Width (ft/ft)	1.8	3.0										
Meander Wave Length (ft)	58	98										
Meander Width Ratio	2.8	7.5										
Additional Reach Parameters												
Rosgen Classification	C4											
Channel Thalweg Length (ft)	1,032											
Sinuosity (ft)	1.2											
Water Surface Slope (ft/ft)	0.0207											
Bankfull Slope (ft/ft)	0.0195											
Ri%/Ru%/P%/G%/S%												
SC%/Sa%/G%/C%/B%/Be%												
d16/d35/d50/d84/d95/d100	SC/SC/SC/30.2/64.0/128.0		SC\2.80\10.7\35.9\75.9\180.0		SC\3.23\12.9\43.6\80.3\180.0		SC\SC\1.3\26.9\64.0\180.0		SC/0.5/8.0/57.6/95.4/128.0		0.1/1.85/6.7/64.0/107.3/180.0	
% of Reach with Eroding Banks	0%		0%		0%		0%		0%		0%	

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

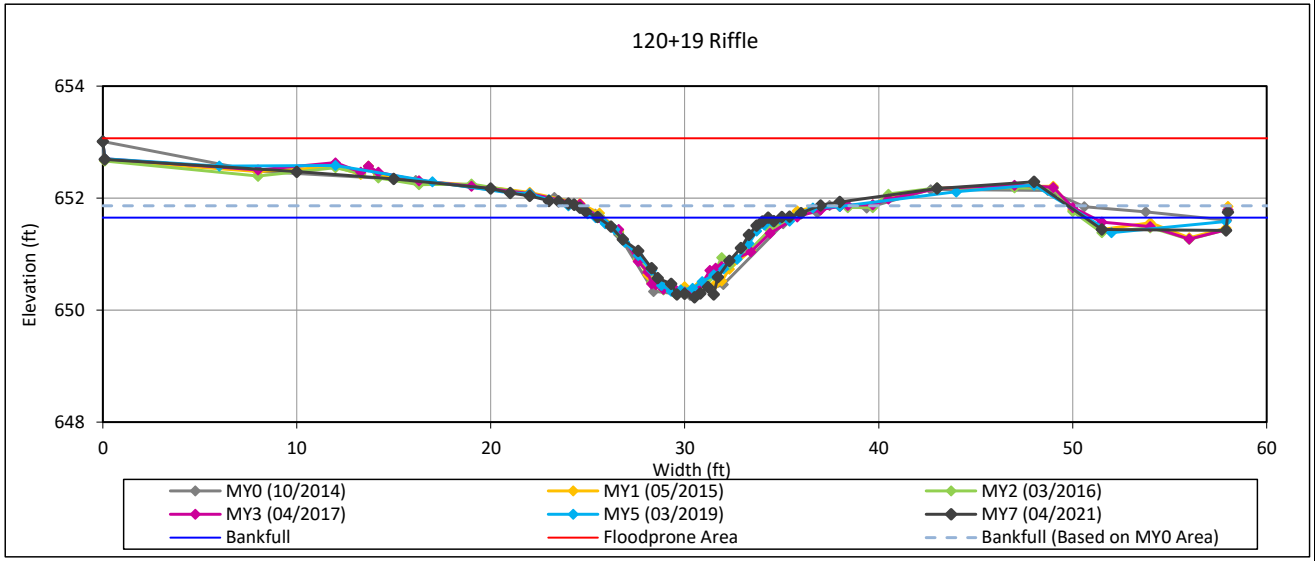
[2]Bank Height Ratio is the bank height divided by the max depth of the bankfull channel.

Cross Section Plots

Agony Acres Mitigtion Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

Cross Section 1-UT1 Reach 2



Bankfull Dimensions	
6.7	x-section area (ft.sq.)
9.4	width (ft)
0.7	mean depth (ft)
1.4	max depth (ft)
10.1	wetted perimeter (ft)
0.7	hyd radi (ft)
13.2	width-depth ratio
100.0	W flood prone area (ft)
10.6	entrenchment ratio
< 1.0	low bank height ratio

Survey Date: 04/2021

Field Crew: Wildlands Engineering

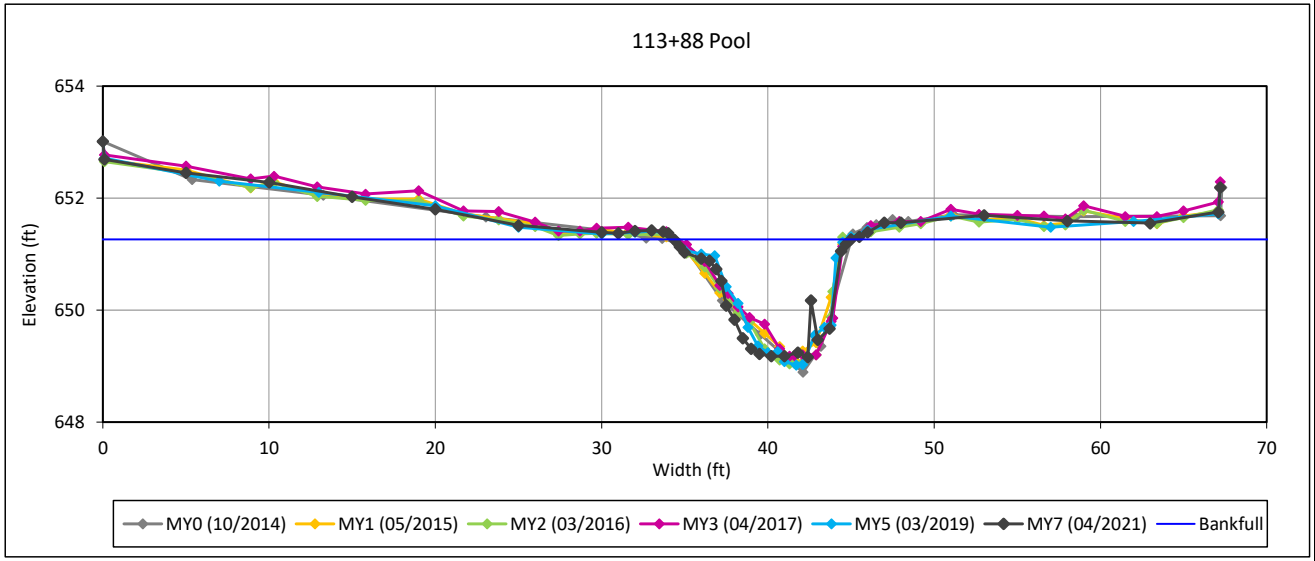
View Downstream

Cross Section Plots

Agony Acres Mitigtion Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

Cross Section 2-UT1 Reach 2



Bankfull Dimensions	
13.3	x-section area (ft.sq.)
10.6	width (ft)
1.3	mean depth (ft)
2.1	max depth (ft)
13.4	wetted perimeter (ft)
1.0	hyd radi (ft)
8.5	width-depth ratio

Survey Date: 04/2021

Field Crew: Wildlands Engineering

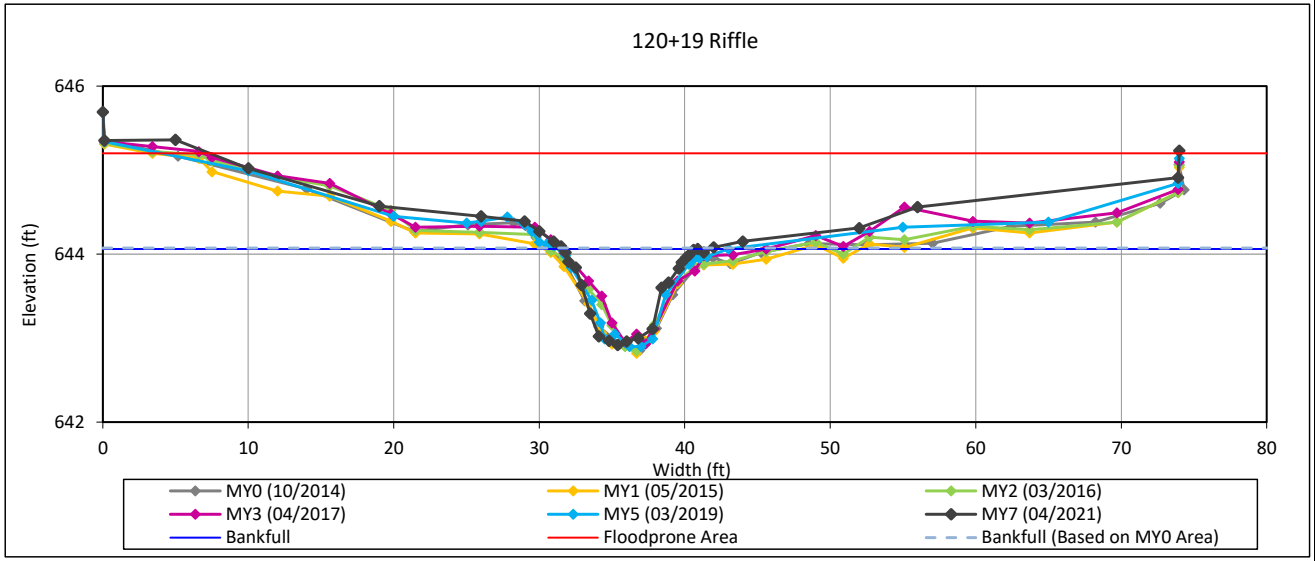
View Downstream

Cross Section Plots

Agony Acres Mitigtion Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

Cross Section 3-UT1 Reach 2



Bankfull Dimensions	
6.1	x-section area (ft.sq.)
10.1	width (ft)
0.6	mean depth (ft)
1.1	max depth (ft)
10.6	wetted perimeter (ft)
0.6	hyd radi (ft)
16.9	width-depth ratio
66.6	W flood prone area (ft)
6.6	entrenchment ratio
1.0	low bank height ratio

Survey Date: 04/2021

Field Crew: Wildlands Engineering

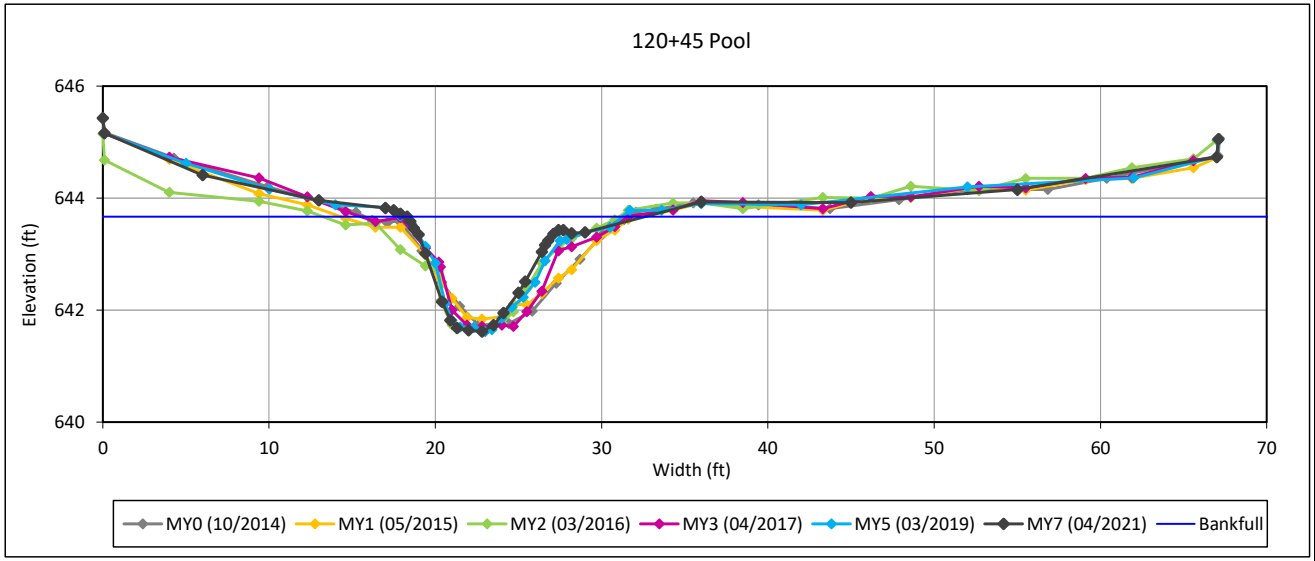
View Downstream

Cross Section Plots

Agony Acres Mitigtion Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

Cross Section 4-UT1 Reach 2



Bankfull Dimensions	
12.7	x-section area (ft.sq.)
14.3	width (ft)
0.9	mean depth (ft)
2.0	max depth (ft)
15.4	wetted perimeter (ft)
0.8	hyd radi (ft)
16.2	width-depth ratio

Survey Date: 04/2021

Field Crew: Wildlands Engineering

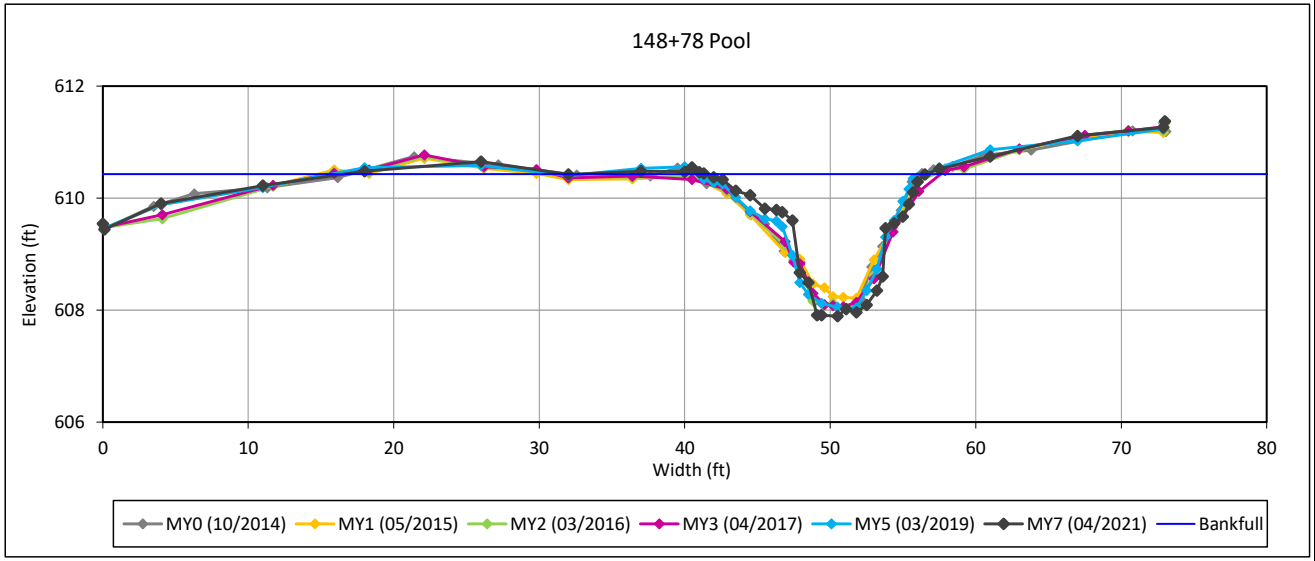
View Downstream

Cross Section Plots

Agony Acres Mitigtion Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

Cross Section 5-UT1 Reach 5



Bankfull Dimensions	
18.0	x-section area (ft.sq.)
15.2	width (ft)
1.2	mean depth (ft)
2.5	max depth (ft)
17.1	wetted perimeter (ft)
1.1	hyd radi (ft)
12.8	width-depth ratio

Survey Date: 04/2021

Field Crew: Wildlands Engineering

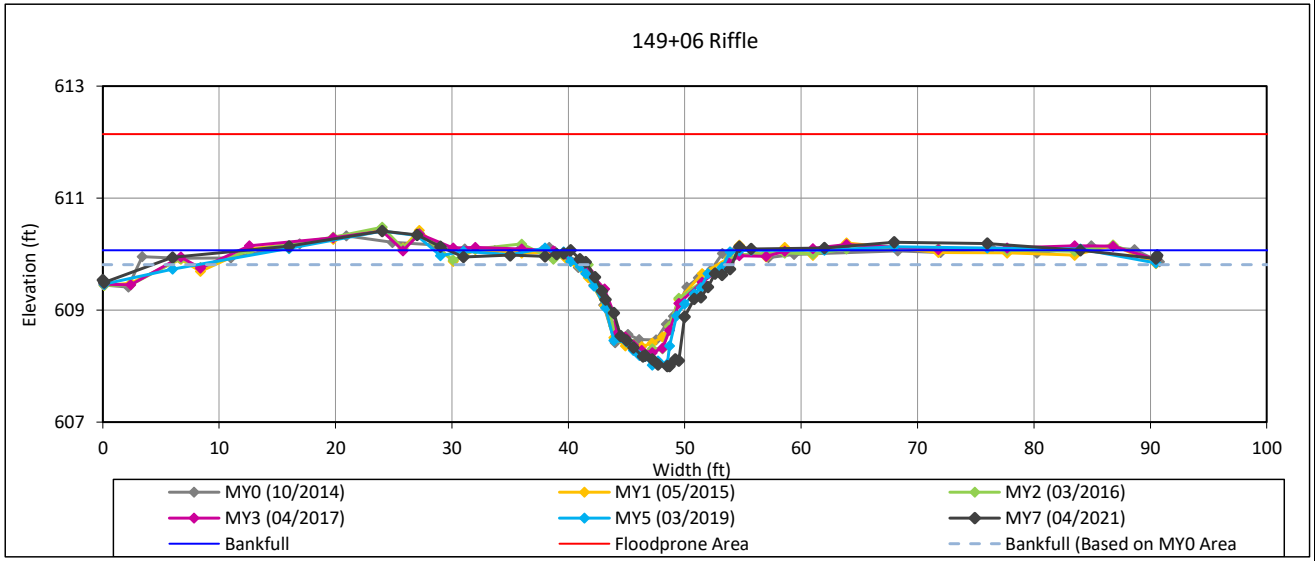
View Downstream

Cross Section Plots

Agony Acres Mitigtion Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

Cross Section 6-UT1 Reach 5



Bankfull Dimensions	
15.5	x-section area (ft.sq.)
14.4	width (ft)
1.1	mean depth (ft)
2.1	max depth (ft)
15.4	wetted perimeter (ft)
1.0	hyd radi (ft)
13.3	width-depth ratio
200.0	W flood prone area (ft)
13.9	entrenchment ratio
1.1	low bank height ratio

Survey Date: 04/2021

Field Crew: Wildlands Engineering

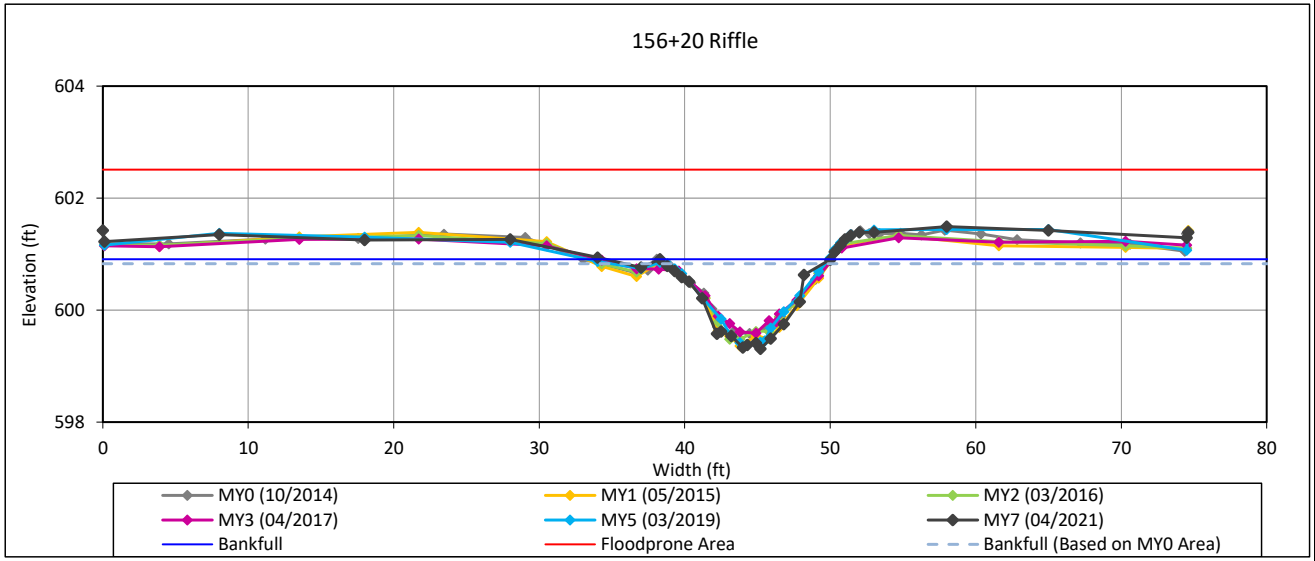
View Downstream

Cross Section Plots

Agony Acres Mitigtion Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

Cross Section 7-UT1 Reach 5



Bankfull Dimensions	
10.0	x-section area (ft.sq.)
11.7	width (ft)
0.9	mean depth (ft)
1.6	max depth (ft)
12.5	wetted perimeter (ft)
0.8	hyd radi (ft)
13.8	width-depth ratio
200.0	W flood prone area (ft)
17.1	entrenchment ratio
1.1	low bank height ratio

Survey Date: 04/2021

Field Crew: Wildlands Engineering

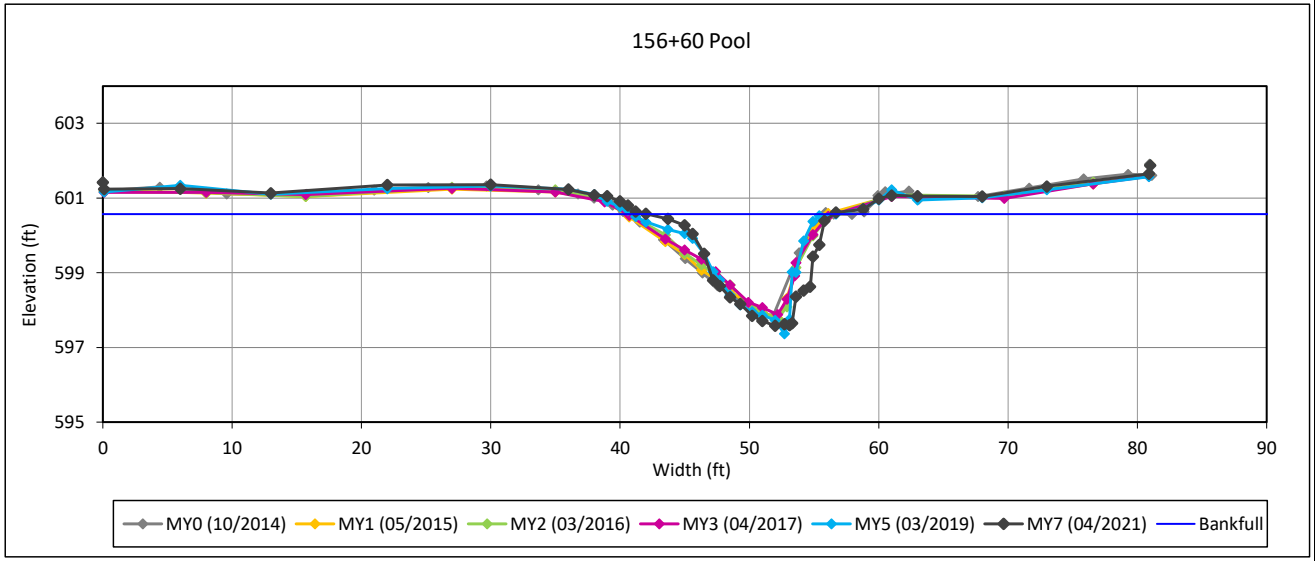
View Downstream

Cross Section Plots

Agony Acres Mitigtion Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

Cross Section 8-UT1 Reach 5



Bankfull Dimensions	
22.2	x-section area (ft.sq.)
14.4	width (ft)
1.5	mean depth (ft)
3.0	max depth (ft)
16.7	wetted perimeter (ft)
1.3	hyd radi (ft)
9.4	width-depth ratio

Survey Date: 04/2021

Field Crew: Wildlands Engineering

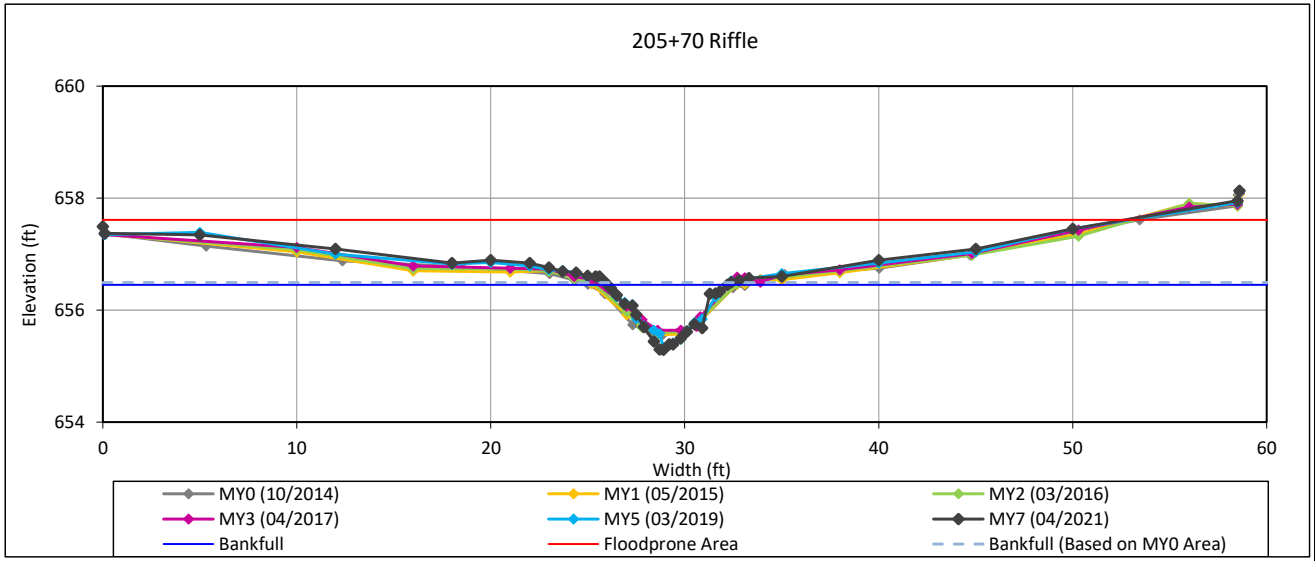
View Downstream

Cross Section Plots

Agony Acres Mitigtion Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

Cross Section 9-UT1A Reach 1



Bankfull Dimensions	
3.7	x-section area (ft.sq.)
6.2	width (ft)
0.6	mean depth (ft)
1.2	max depth (ft)
6.9	wetted perimeter (ft)
0.5	hyd radi (ft)
10.2	width-depth ratio
50.0	W flood prone area (ft)
8.1	entrenchment ratio
1.0	low bank height ratio

Survey Date: 04/2021

Field Crew: Wildlands Engineering

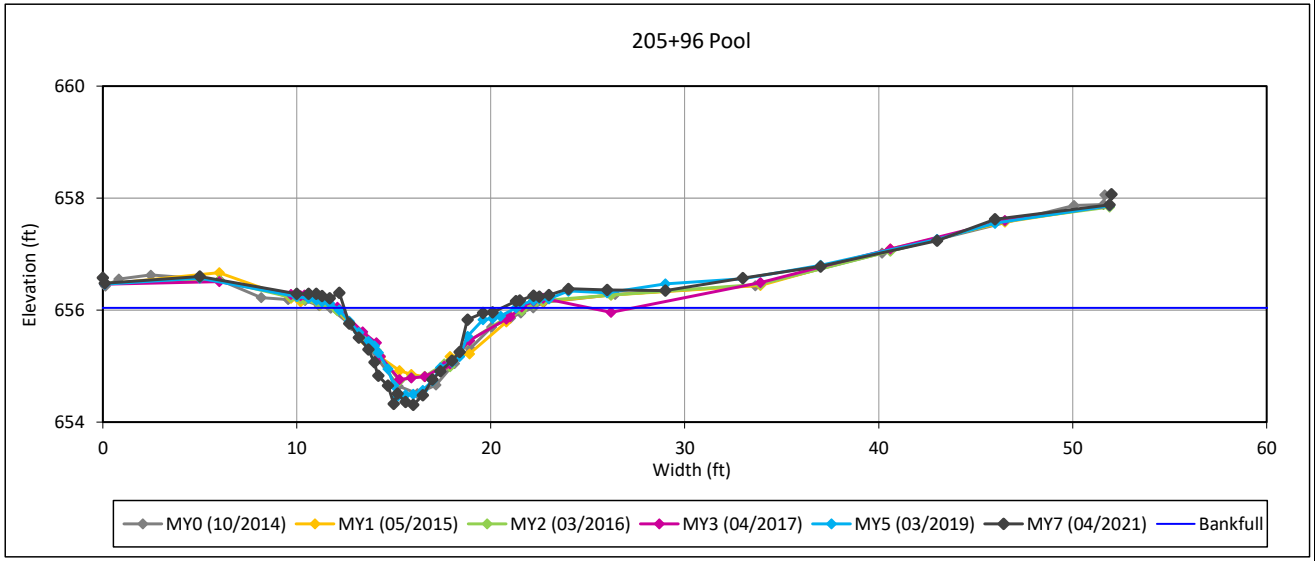
View Downstream

Cross Section Plots

Agony Acres Mitigtion Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

Cross Section 10-UT1A Reach 1



Bankfull Dimensions	
7.2	x-section area (ft.sq.)
8.1	width (ft)
0.9	mean depth (ft)
1.7	max depth (ft)
9.3	wetted perimeter (ft)
0.8	hyd radi (ft)
9.2	width-depth ratio

Survey Date: 04/2021

Field Crew: Wildlands Engineering

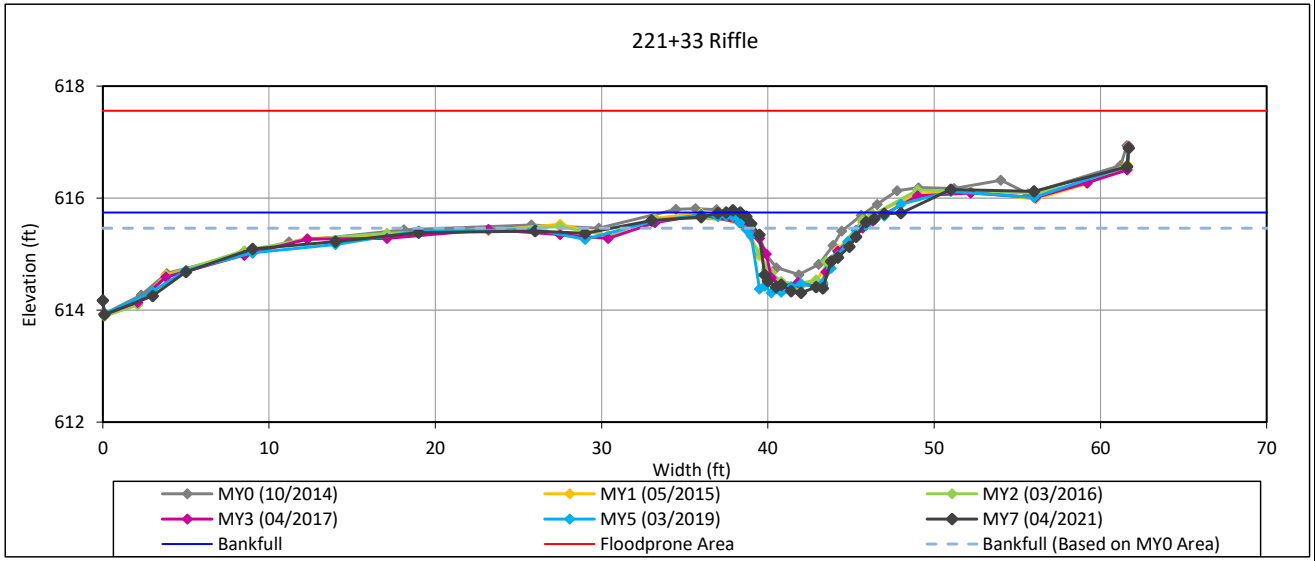
View Downstream

Cross Section Plots

Agony Acres Mitigtion Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

Cross Section 11-UT1A Reach 4



Bankfull Dimensions	
7.0	x-section area (ft.sq.)
9.7	width (ft)
0.7	mean depth (ft)
1.8	max depth (ft)
10.7	wetted perimeter (ft)
0.7	hyd radi (ft)
13.5	width-depth ratio
200.0	W flood prone area (ft)
20.5	entrenchment ratio
1.2	low bank height ratio

Survey Date: 04/2021
Field Crew: Wildlands Engineering

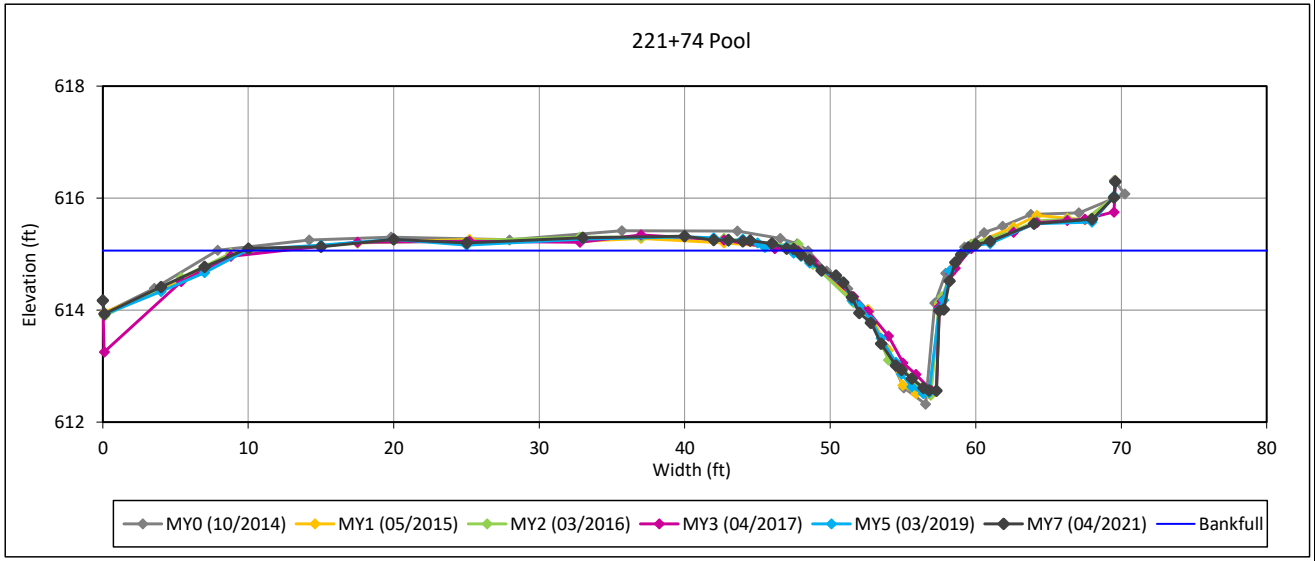
View Downstream

Cross Section Plots

Agony Acres Mitigtion Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

Cross Section 12-UT1A Reach 4



Bankfull Dimensions	
13.4	x-section area (ft.sq.)
11.6	width (ft)
1.2	mean depth (ft)
2.5	max depth (ft)
13.7	wetted perimeter (ft)
1.0	hyd radi (ft)
10.1	width-depth ratio

Survey Date: 04/2021
Field Crew: Wildlands Engineering

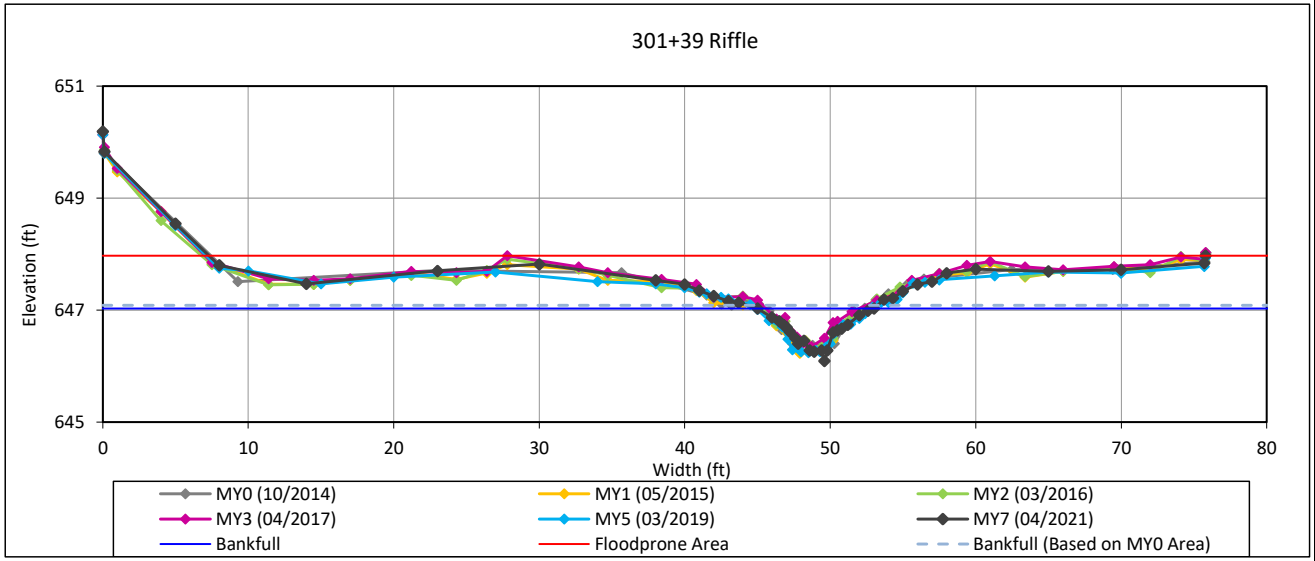
View Downstream

Cross Section Plots

Agony Acres Mitigtion Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

Cross Section 13-UT1B



Bankfull Dimensions	
3.0	x-section area (ft.sq.)
8.0	width (ft)
0.4	mean depth (ft)
0.9	max depth (ft)
8.4	wetted perimeter (ft)
0.4	hyd radi (ft)
21.5	width-depth ratio
70.0	W flood prone area (ft)
8.8	entrenchment ratio
< 1.0	low bank height ratio

Survey Date: 04/2021

Field Crew: Wildlands Engineering

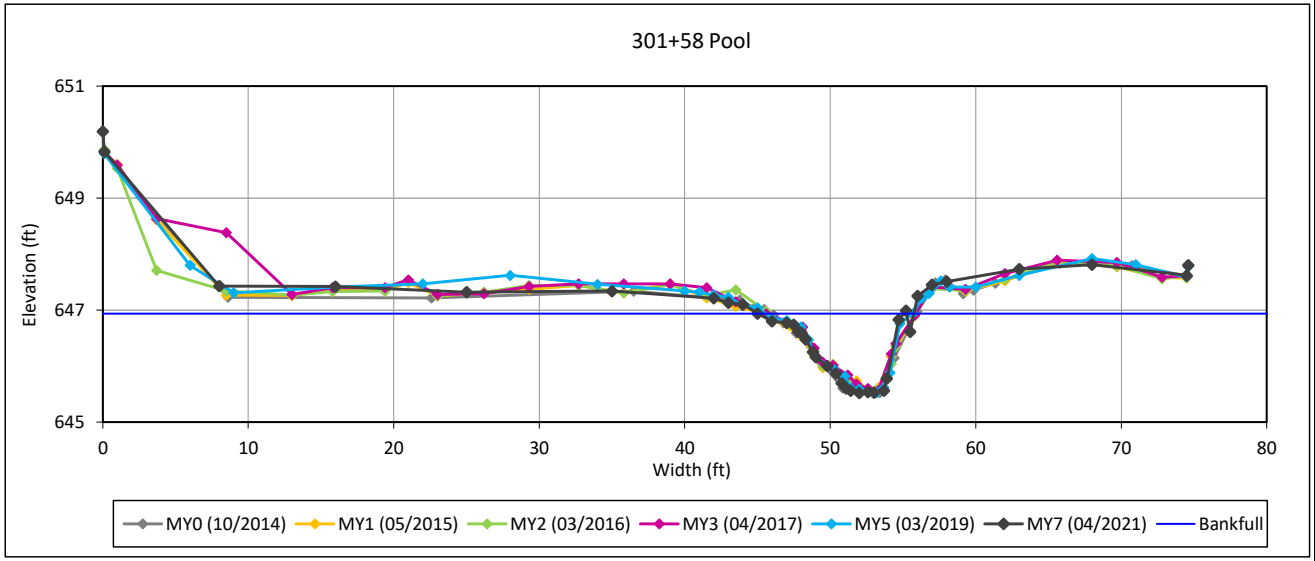
View Downstream

Cross Section Plots

Agony Acres Mitigtion Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

Cross Section 14-UT1B



Bankfull Dimensions	
7.7	x-section area (ft.sq.)
10.6	width (ft)
0.7	mean depth (ft)
1.4	max depth (ft)
11.7	wetted perimeter (ft)
0.7	hyd radi (ft)
14.6	width-depth ratio

Survey Date: 04/2021

Field Crew: Wildlands Engineering

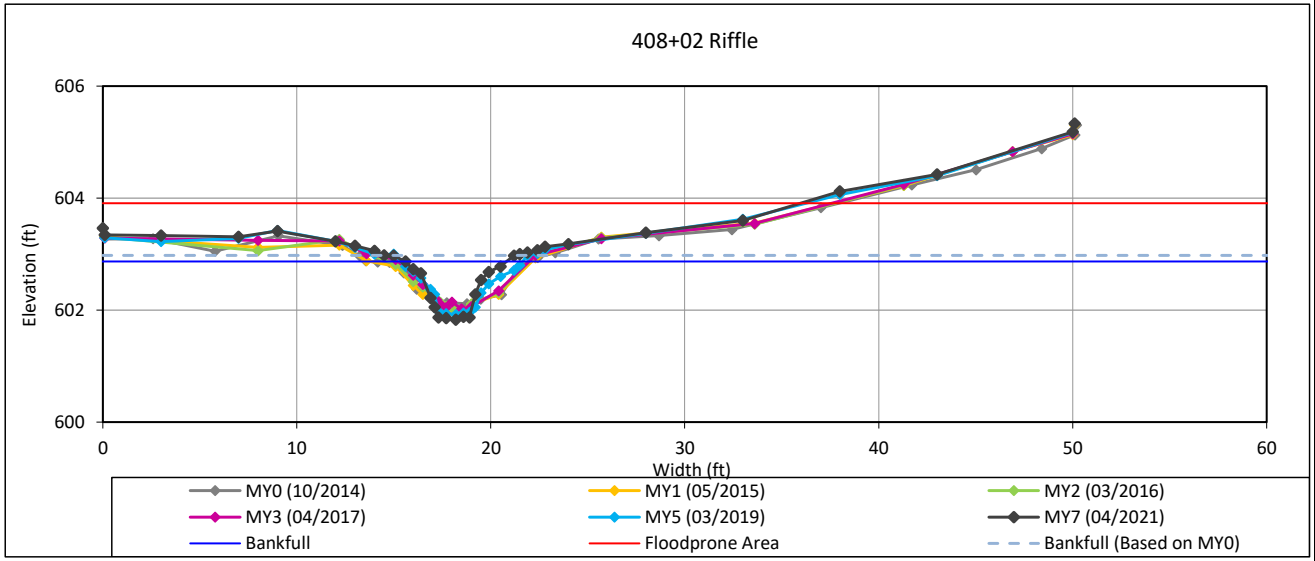
View Downstream

Cross Section Plots

Agony Acres Mitigtion Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

Cross Section 15-UT2



Bankfull Dimensions	
2.8	x-section area (ft.sq.)
5.2	width (ft)
0.5	mean depth (ft)
1.0	max depth (ft)
5.9	wetted perimeter (ft)
0.5	hyd radi (ft)
9.6	width-depth ratio
50.0	W flood prone area (ft)
9.6	entrenchment ratio
< 1.0	low bank height ratio

Survey Date: 04/2021

Field Crew: Wildlands Engineering

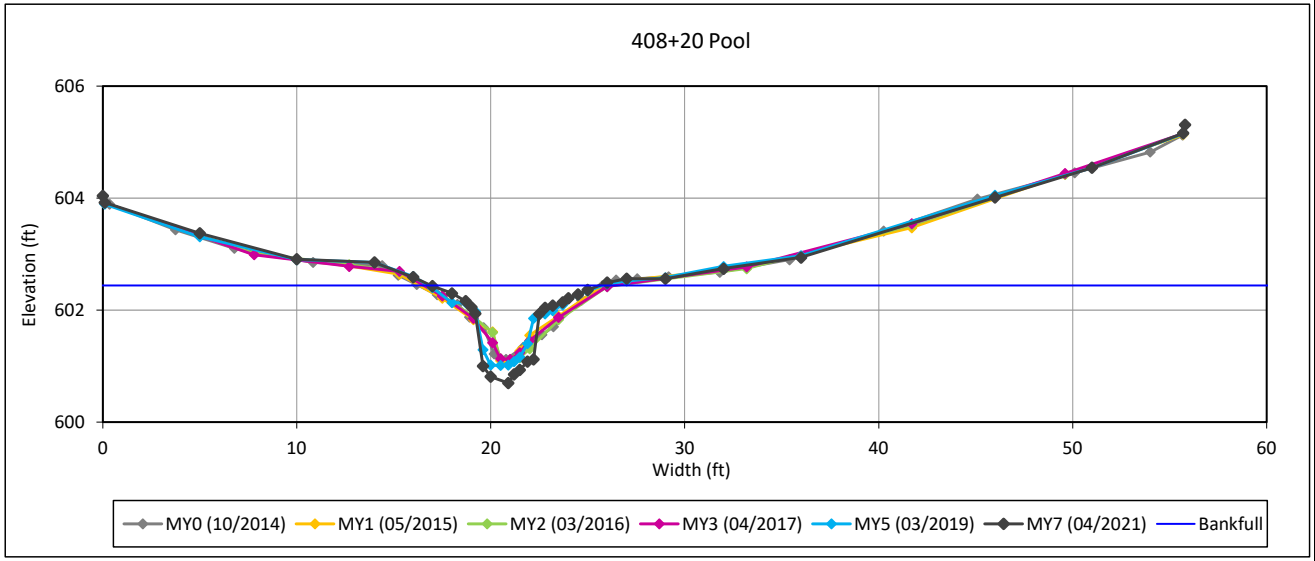
View Downstream

Cross Section Plots

Agony Acres Mitigtion Site (DMS Project No. 95716)

Monitoring Year 7 - 2021

Cross Section 16-UT2



Bankfull Dimensions	
5.9	x-section area (ft.sq.)
8.7	width (ft)
0.7	mean depth (ft)
1.7	max depth (ft)
10.1	wetted perimeter (ft)
0.6	hyd radi (ft)
12.8	width-depth ratio

Survey Date: 04/2021

Field Crew: Wildlands Engineering

View Downstream

Reachwide and Cross Section Pebble Count Plots

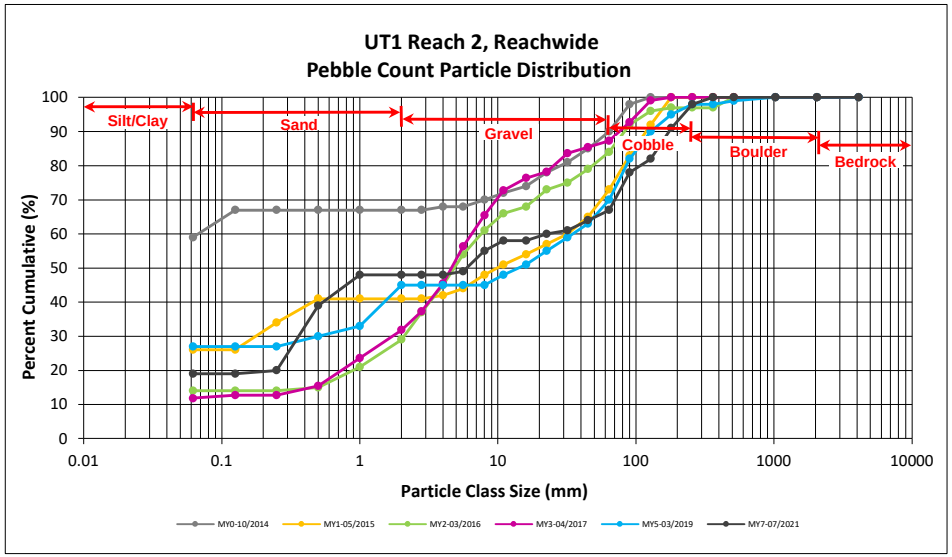
Agony Acres Mitigation Site (DMS Project No. 95716)

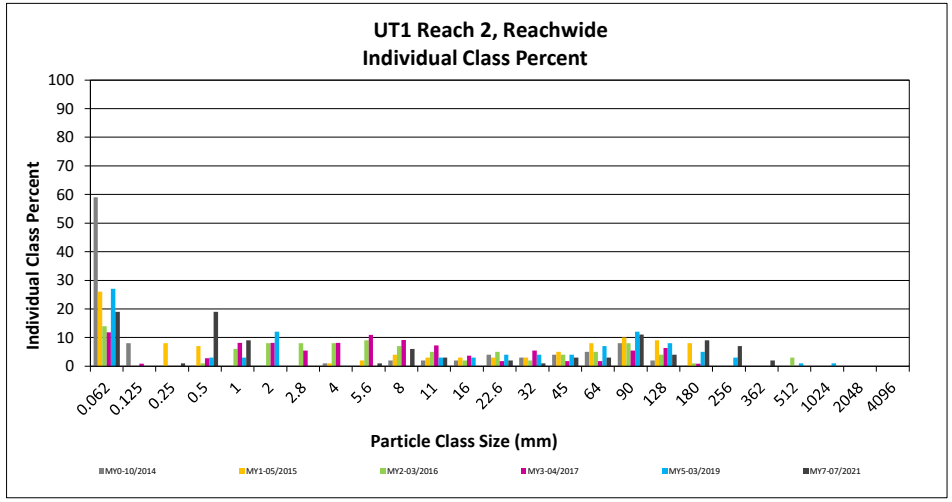
Monitoring Year 7 - 2021

UT1 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		19	19	19	19
SAND	Very fine	0.062	0.125					19
	Fine	0.125	0.250		1	1	1	20
	Medium	0.25	0.50	5	14	19	19	39
	Coarse	0.5	1.0	4	5	9	9	48
	Very Coarse	1.0	2.0					48
GRAVEL	Very Fine	2.0	2.8					48
	Very Fine	2.8	4.0					48
	Fine	4.0	5.6	1		1	1	49
	Fine	5.6	8.0	6		6	6	55
	Medium	8.0	11.0	3		3	3	58
	Medium	11.0	16.0					58
	Coarse	16.0	22.6	2		2	2	60
	Coarse	22.6	32	1		1	1	61
	Very Coarse	32	45	3		3	3	64
	Very Coarse	45	64	3		3	3	67
COBBLE	Small	64	90	11		11	11	78
	Small	90	128	4		4	4	82
	Large	128	180	8	1	9	9	91
	Large	180	256	7		7	7	98
BOULDER	Small	256	362	2		2	2	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} =	0.43
D_{50} =	5.9
D_{84} =	138.1
D_{95} =	220.1
D_{100} =	362.0





Reachwide and Cross Section Pebble Count Plots

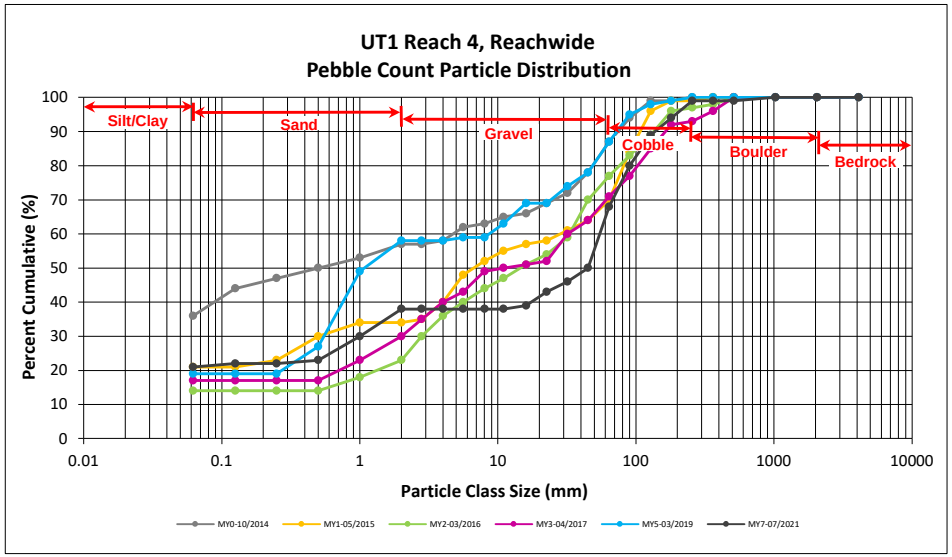
Agony Acres Mitigation Site (DMS Project No. 95716)

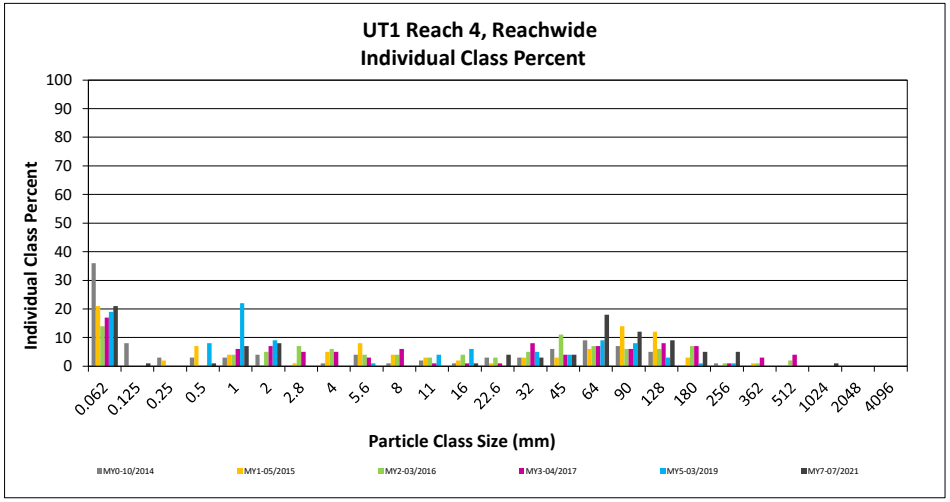
Monitoring Year 7 - 2021

UT1 Reach 4, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	2	19	21	21	21
SAND	Very fine	0.062	0.125	1		1	1	22
	Fine	0.125	0.250					22
	Medium	0.25	0.50	1		1	1	23
	Coarse	0.5	1.0	2	5	7	7	30
	Very Coarse	1.0	2.0	4	4	8	8	38
GRAVEL	Very Fine	2.0	2.8					38
	Very Fine	2.8	4.0					38
	Fine	4.0	5.6					38
	Fine	5.6	8.0					38
	Medium	8.0	11.0					38
	Medium	11.0	16.0	1		1	1	39
	Coarse	16.0	22.6	4		4	4	43
	Coarse	22.6	32	1	2	3	3	46
	Very Coarse	32	45	4		4	4	50
	Very Coarse	45	64	12	6	18	18	68
COBBLE	Small	64	90	10	2	12	12	80
	Small	90	128	7	2	9	9	89
	Large	128	180	5		5	5	94
	Large	180	256	5		5	5	99
BOULDER	Small	256	362					99
	Small	362	512					99
	Medium	512	1024	1		1	1	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} =	1.54
D_{50} =	45.0
D_{84} =	105.3
D_{95} =	193.1
D_{100} =	1024.0





Reachwide and Cross Section Pebble Count Plots

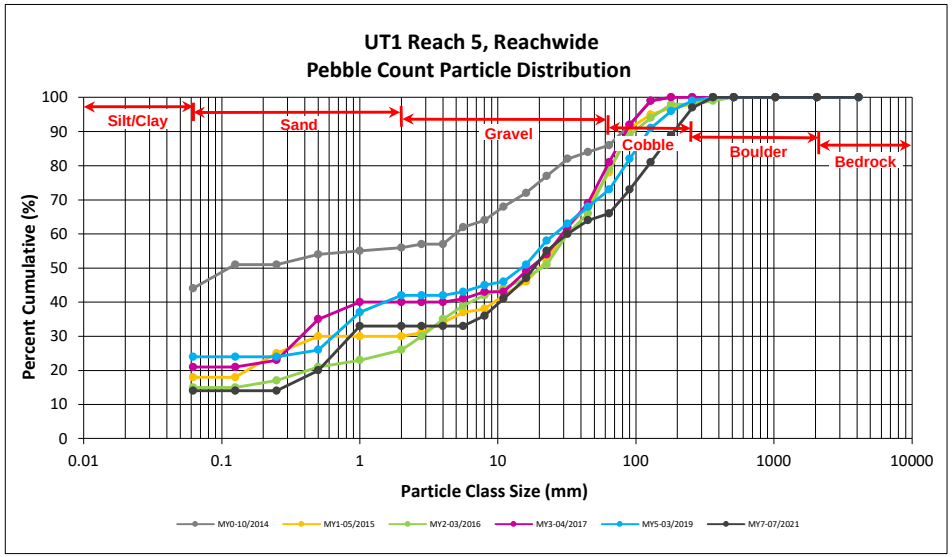
Agony Acres Mitigation Site (DMS Project No. 95716)

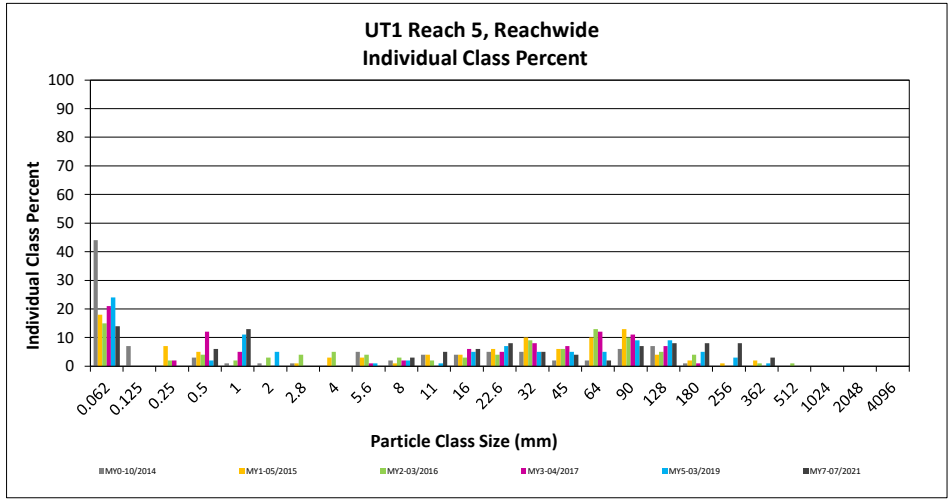
Monitoring Year 7 - 2021

UT1 Reach 5, 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		14	14	14	14
SAND	Very fine	0.062	0.125					14
	Fine	0.125	0.250					14
	Medium	0.25	0.50		6	6	6	20
	Coarse	0.5	1.0	7	6	13	13	33
	Very Coarse	1.0	2.0					33
GRAVEL	Very Fine	2.0	2.8					33
	Very Fine	2.8	4.0					33
	Fine	4.0	5.6					33
	Fine	5.6	8.0	1	2	3	3	36
	Medium	8.0	11.0	2	3	5	5	41
	Medium	11.0	16.0	1	5	6	6	47
	Coarse	16.0	22.6	6	2	8	8	55
	Coarse	22.6	32	5		5	5	60
	Very Coarse	32	45	4		4	4	64
	Very Coarse	45	64	2		2	2	66
COBBLE	Small	64	90	6	1	7	7	73
	Small	90	128	7	1	8	8	81
	Large	128	180	8		8	8	89
	Large	180	256	8		8	8	97
BOULDER	Small	256	362	3		3	3	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} =	0.31
D_{35} =	7.10
D_{50} =	18.2
D_{84} =	145.5
D_{95} =	234.4
D_{100} =	362.0





Reachwide and Cross Section Pebble Count Plots

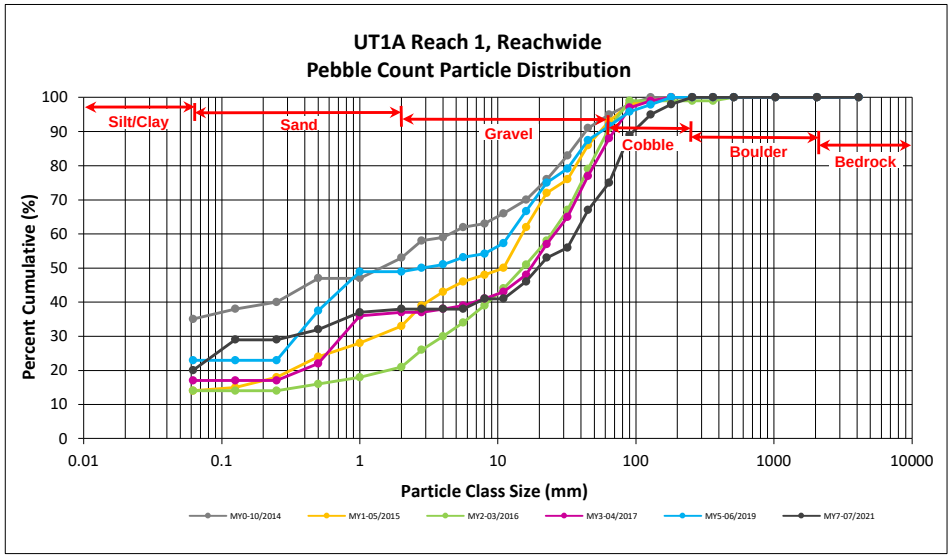
Agony Acres Mitigation Site (DMS Project No. 95716)

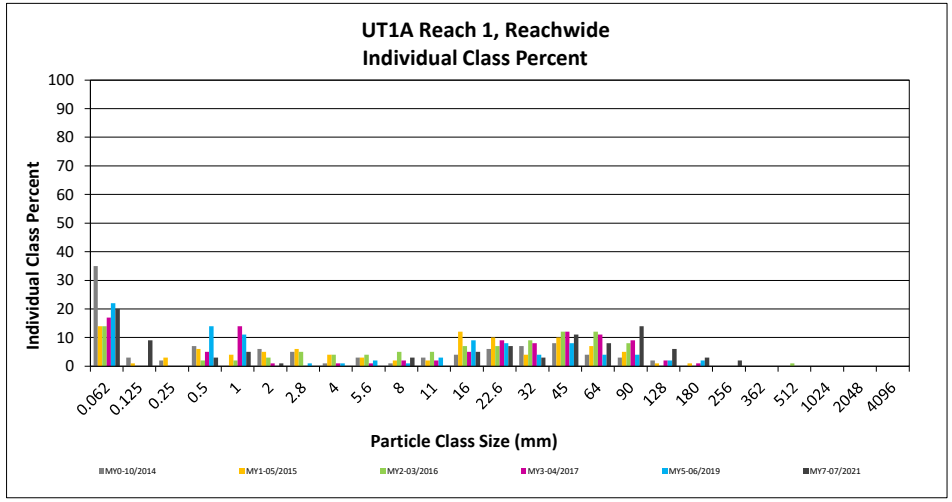
Monitoring Year 7 - 2021

UT1A 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		20	20	20	20
SAND	Very fine	0.062	0.125		9	9	9	29
	Fine	0.125	0.250					29
	Medium	0.25	0.50		3	3	3	32
	Coarse	0.5	1.0	2	3	5	5	37
	Very Coarse	1.0	2.0		1	1	1	38
GRAVEL	Very Fine	2.0	2.8					38
	Very Fine	2.8	4.0					38
	Fine	4.0	5.6					38
	Fine	5.6	8.0		3	3	3	41
	Medium	8.0	11.0					41
	Medium	11.0	16.0	4	1	5	5	46
	Coarse	16.0	22.6	7		7	7	53
	Coarse	22.6	32	3		3	3	56
	Very Coarse	32	45	11		11	11	67
	Very Coarse	45	64	8		8	8	75
COBBLE	Small	64	90	14		14	14	89
	Small	90	128	6		6	6	95
	Large	128	180	3		3	3	98
	Large	180	256	2		2	2	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} =	0.76
D_{50} =	19.5
D_{84} =	79.7
D_{95} =	128.0
D_{100} =	256.0





Reachwide and Cross Section Pebble Count Plots

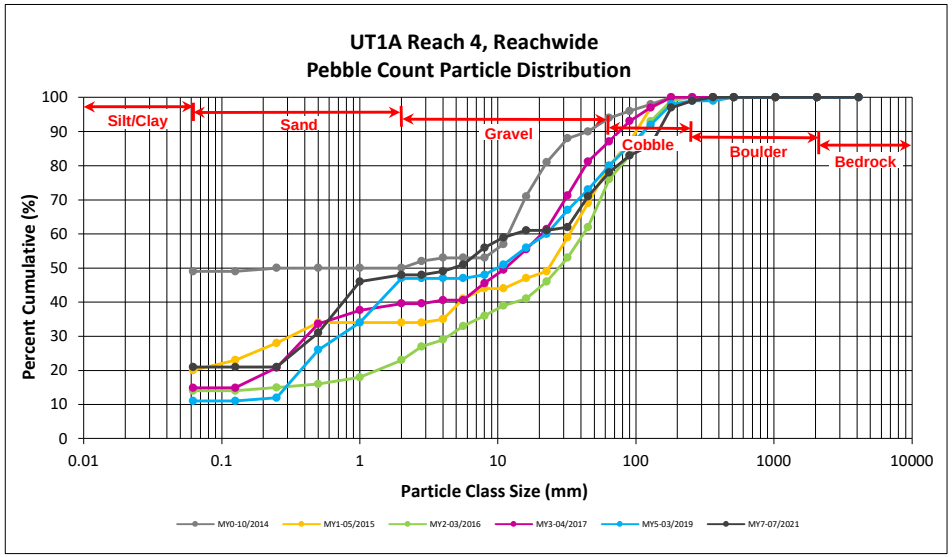
Agony Acres Mitigation Site (DMS Project No. 95716)

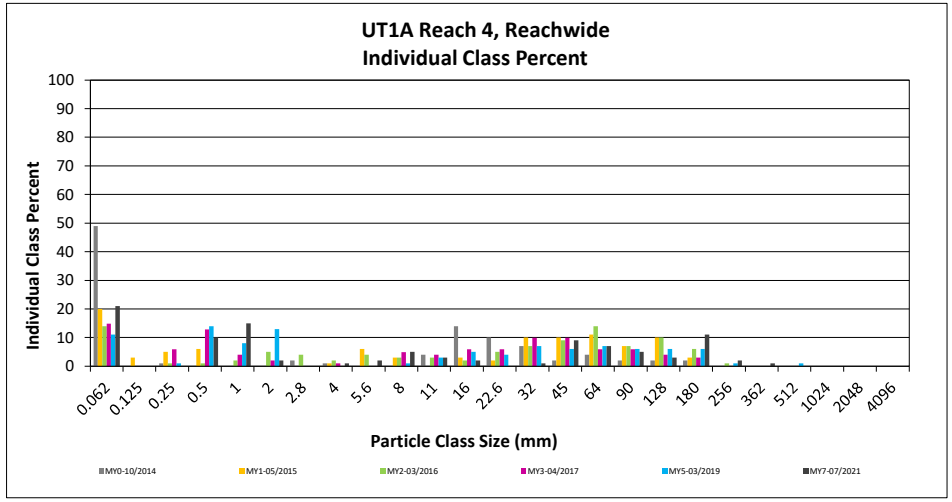
Monitoring Year 7 - 2021

UT1A Reach 4, 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	1	20	21	21	21
SAND	Very fine	0.062	0.125					21
	Fine	0.125	0.250					21
	Medium	0.25	0.50	2	8	10	10	31
	Coarse	0.5	1.0	8	7	15	15	46
	Very Coarse	1.0	2.0	2		2	2	48
GRAVEL	Very Fine	2.0	2.8					48
	Very Fine	2.8	4.0		1	1	1	49
	Fine	4.0	5.6	1	1	2	2	51
	Fine	5.6	8.0	4	1	5	5	56
	Medium	8.0	11.0	3		3	3	59
	Medium	11.0	16.0	2		2	2	61
	Coarse	16.0	22.6					61
	Coarse	22.6	32		1	1	1	62
	Very Coarse	32	45	9		9	9	71
	Very Coarse	45	64	7		7	7	78
COBBLE	Small	64	90	5		5	5	83
	Small	90	128	3		3	3	86
	Large	128	180	10	1	11	11	97
	Large	180	256	2		2	2	99
BOULDER	Small	256	362	1		1	1	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} =	0.60
D_{50} =	4.73
D_{84} =	101.2
D_{95} =	169.2
D_{100} =	362.0





Reachwide and Cross Section Pebble Count Plots

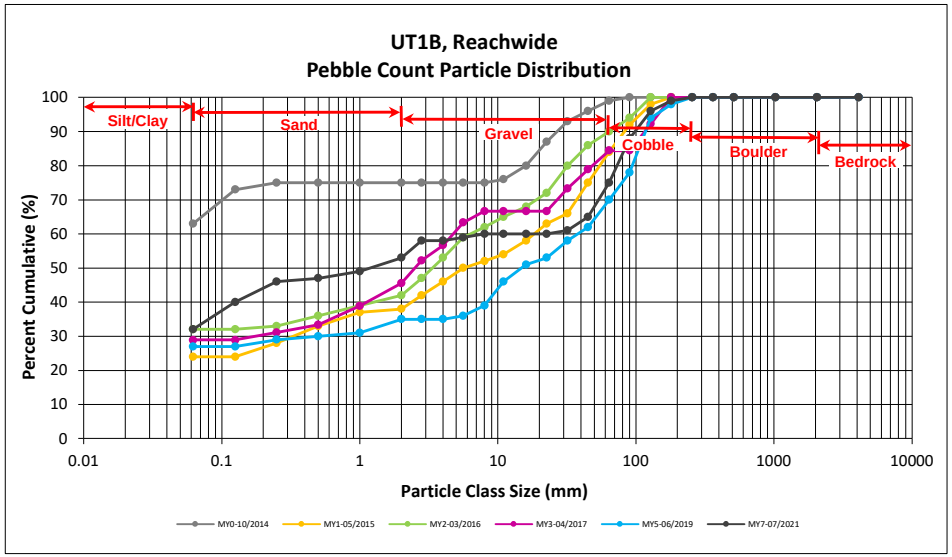
Agony Acres Mitigation Site (DMS Project No. 95716)

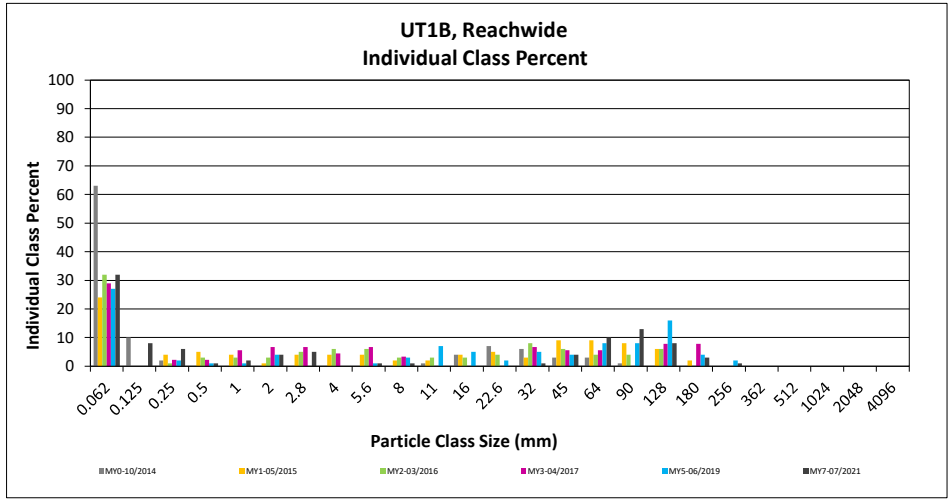
Monitoring Year 7 - 2021

UT1B, Reachwide

Particle Class		Diameter (mm)		Particle Count			Reach Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	6	26	32	32	32
SAND	Very fine	0.062	0.125	1	7	8	8	40
	Fine	0.125	0.250	1	5	6	6	46
	Medium	0.25	0.50	1		1	1	47
	Coarse	0.5	1.0	2		2	2	49
	Very Coarse	1.0	2.0	3	1	4	4	53
GRAVEL	Very Fine	2.0	2.8	4	1	5	5	58
	Very Fine	2.8	4.0					58
	Fine	4.0	5.6	1		1	1	59
	Fine	5.6	8.0	1		1	1	60
	Medium	8.0	11.0					60
	Medium	11.0	16.0					60
	Coarse	16.0	22.6					60
	Coarse	22.6	32	1		1	1	61
	Very Coarse	32	45	4		4	4	65
	Very Coarse	45	64	10		10	10	75
COBBLE	Small	64	90	13		13	13	88
	Small	90	128	8		8	8	96
	Large	128	180	3		3	3	99
	Large	180	256	1		1	1	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} =	0.08
D_{50} =	1.2
D_{84} =	81.0
D_{95} =	122.5
D_{100} =	256.0





Reachwide and Cross Section Pebble Count Plots

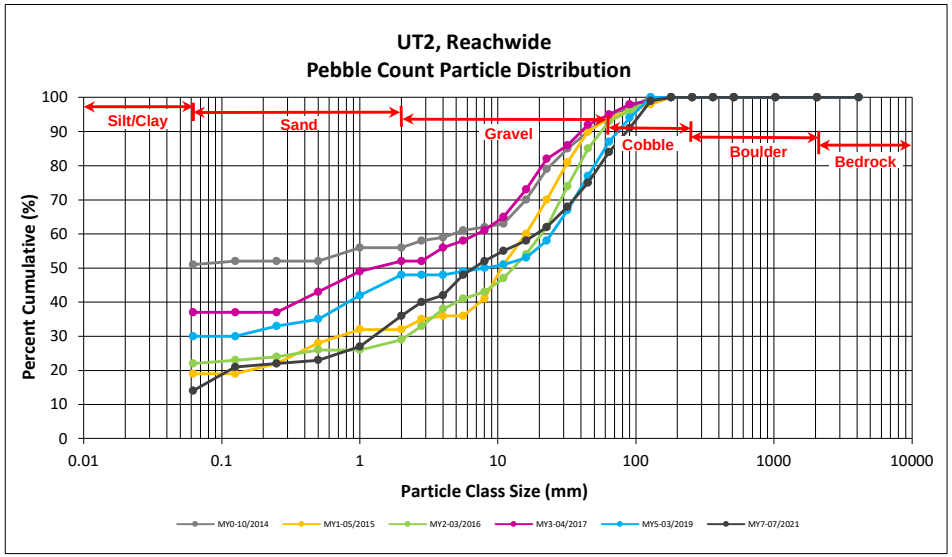
Agony Acres Mitigation Site (DMS Project No. 95716)

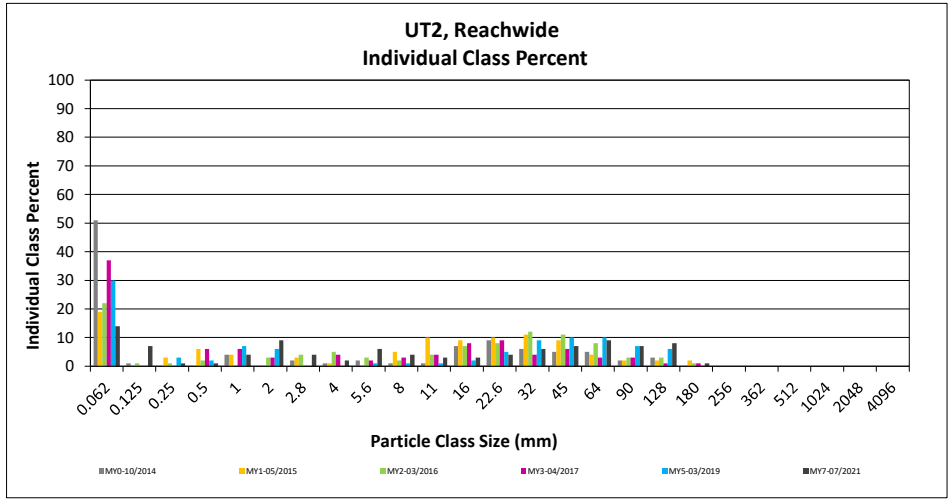
Monitoring Year 7 - 2021

UT2, 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		14	14	14	14
SAND	Very fine	0.062	0.125		7	7	7	21
	Fine	0.125	0.250		1	1	1	22
	Medium	0.25	0.50	1		1	1	23
	Coarse	0.5	1.0	3	1	4	4	27
	Very Coarse	1.0	2.0	4	5	9	9	36
GRAVEL	Very Fine	2.0	2.8	1	3	4	4	40
	Very Fine	2.8	4.0		2	2	2	42
	Fine	4.0	5.6	3	3	6	6	48
	Fine	5.6	8.0	1	3	4	4	52
	Medium	8.0	11.0	2	1	3	3	55
	Medium	11.0	16.0	3		3	3	58
	Coarse	16.0	22.6	4		4	4	62
	Coarse	22.6	32	6		6	6	68
	Very Coarse	32	45	7		7	7	75
	Very Coarse	45	64	9		9	9	84
COBBLE	Small	64	90	7		7	7	91
	Small	90	128	8		8	8	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} =	0.08
D_{35} =	1.85
D_{50} =	6.7
D_{84} =	64.0
D_{95} =	107.3
D_{100} =	180.0





Reachwide and Cross Section Pebble Count Plots

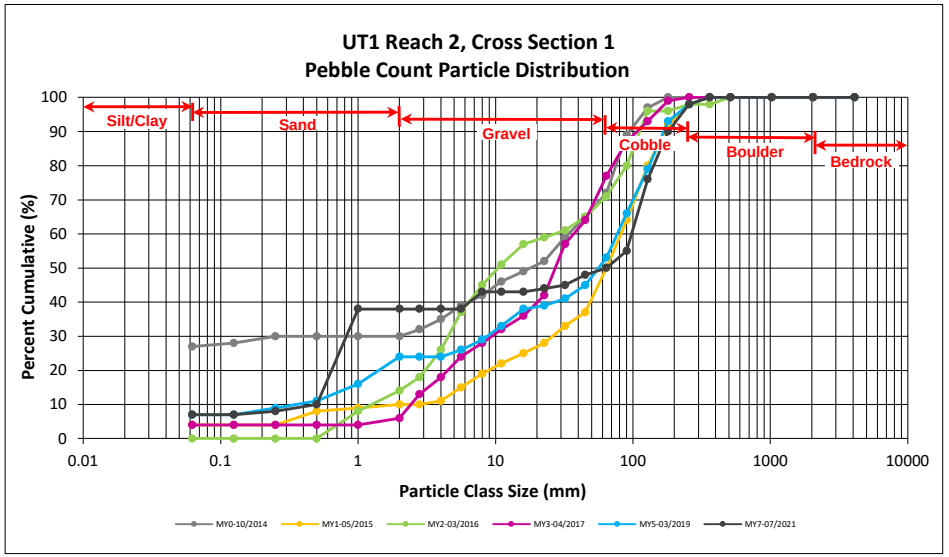
Agony Acres Mitigation Site (DMS Project No. 95716)

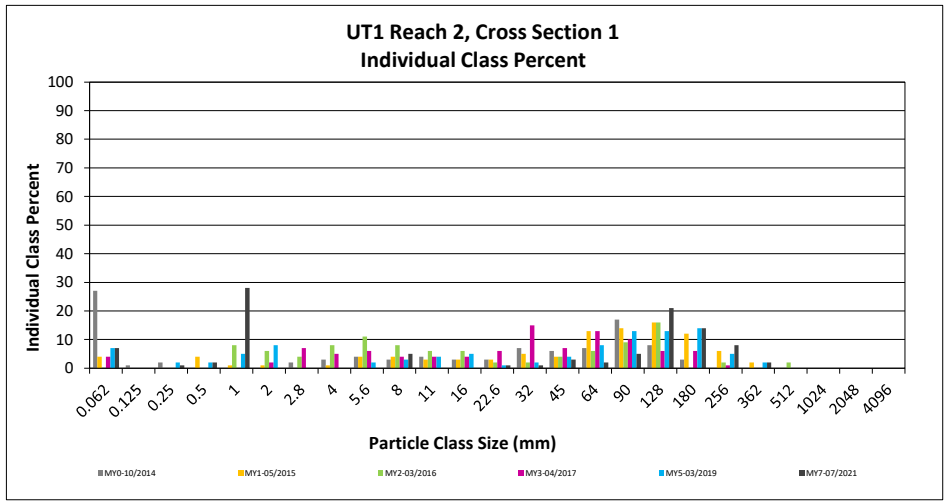
Monitoring Year 7 - 2021

UT1 Reach 2, 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	7	7	7
SAND	Very fine	0.062	0.125			7
	Fine	0.125	0.250	1	1	8
	Medium	0.25	0.50	2	2	10
	Coarse	0.5	1.0	28	28	38
	Very Coarse	1.0	2.0			38
GRAVEL	Very Fine	2.0	2.8			38
	Very Fine	2.8	4.0			38
	Fine	4.0	5.6			38
	Fine	5.6	8.0	5	5	43
	Medium	8.0	11.0			43
	Medium	11.0	16.0			43
	Coarse	16.0	22.6	1	1	44
	Coarse	22.6	32	1	1	45
	Very Coarse	32	45	3	3	48
	Very Coarse	45	64	2	2	50
COBBLE	Small	64	90	5	5	55
	Small	90	128	21	21	76
	Large	128	180	14	14	90
	Large	180	256	8	8	98
BOULDER	Small	256	362	2	2	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} =	0.58
D_{35} =	0.93
D_{50} =	64.0
D_{84} =	155.5
D_{95} =	224.3
D_{100} =	362.0





Reachwide and Cross Section Pebble Count Plots

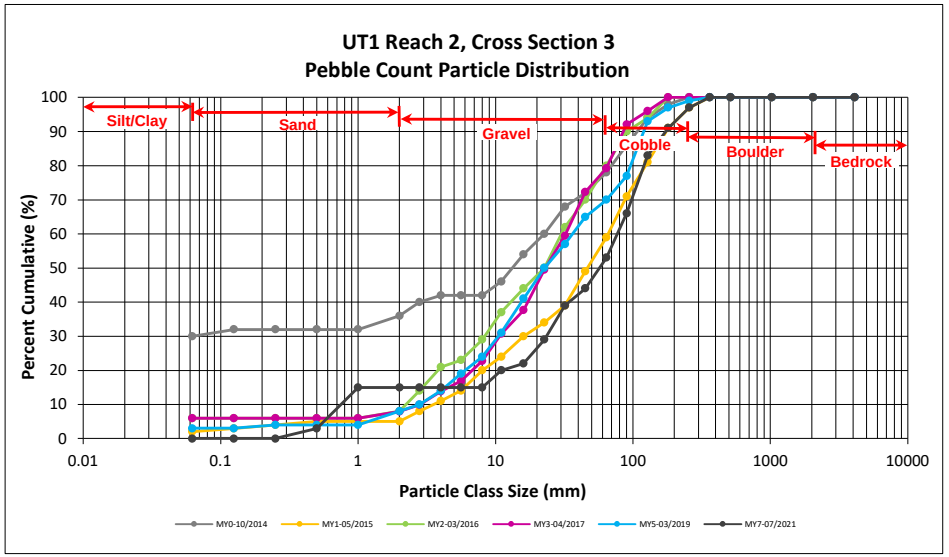
Agony Acres Mitigation Site (DMS Project No. 95716)

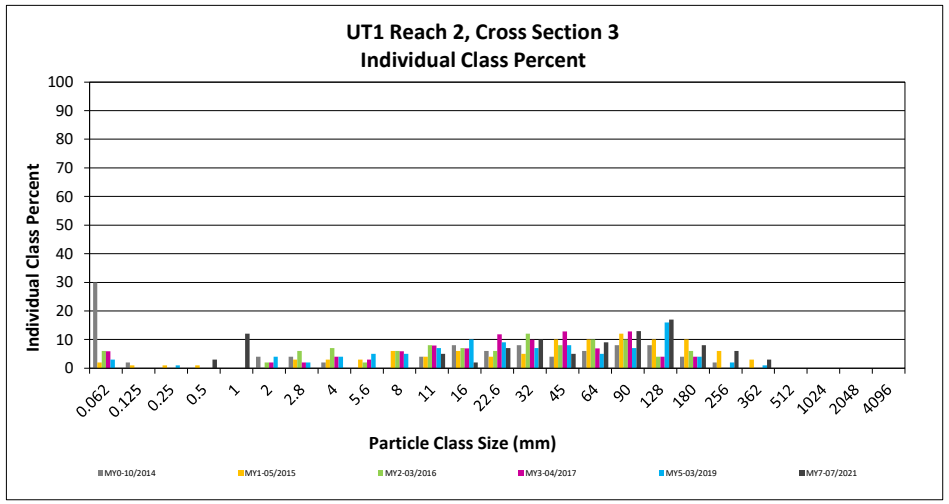
Monitoring Year 7 - 2021

UT1 Reach 2, Cross Section 3

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062			0
SAND	Very fine	0.062	0.125			0
	Fine	0.125	0.250			0
	Medium	0.25	0.50	3	3	3
	Coarse	0.5	1.0	12	12	15
	Very Coarse	1.0	2.0			15
GRAVEL	Very Fine	2.0	2.8			15
	Very Fine	2.8	4.0			15
	Fine	4.0	5.6			15
	Fine	5.6	8.0			15
	Medium	8.0	11.0	5	5	20
	Medium	11.0	16.0	2	2	22
	Coarse	16.0	22.6	7	7	29
	Coarse	22.6	32	10	10	39
	Very Coarse	32	45	5	5	44
	Very Coarse	45	64	9	9	53
COBBLE	Small	64	90	13	13	66
	Small	90	128	17	17	83
	Large	128	180	8	8	91
	Large	180	256	6	6	97
BOULDER	Small	256	362	3	3	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} =	8.53
D_{35} =	27.84
D_{50} =	56.9
D_{84} =	133.6
D_{95} =	227.6
D_{100} =	362.0





Reachwide and Cross Section Pebble Count Plots

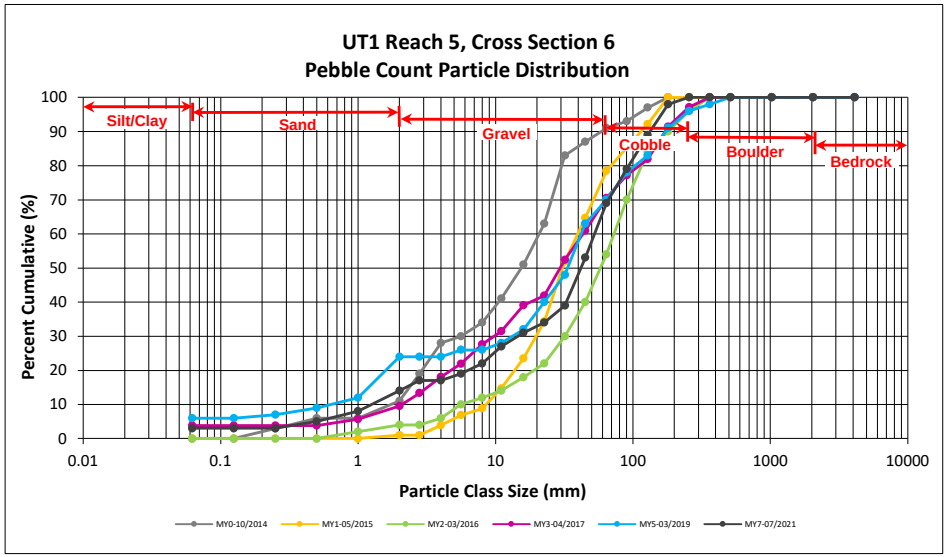
Agony Acres Mitigation Site (DMS Project No. 95716)

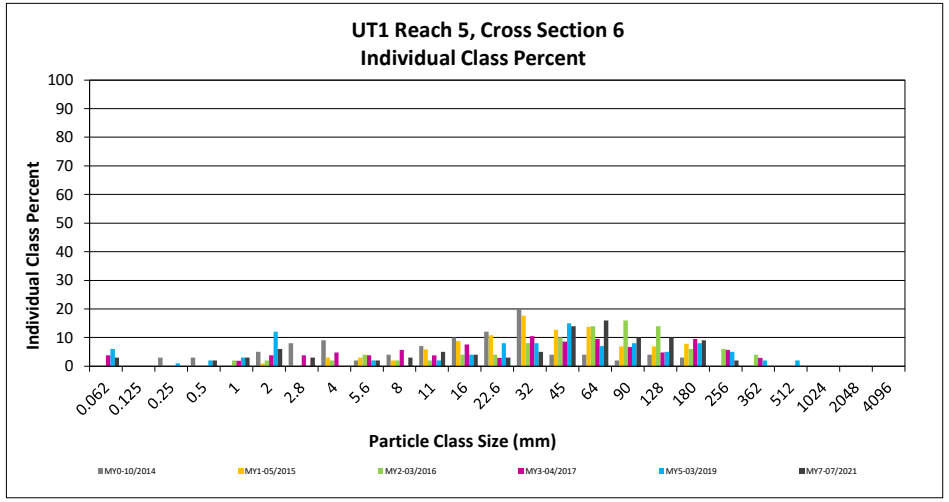
Monitoring Year 7 - 2021

UT1 Reach 5, Cross Section 6

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	3	3	3
SAND	Very fine	0.062	0.125			3
	Fine	0.125	0.250			3
	Medium	0.25	0.50	2	2	5
	Coarse	0.5	1.0	3	3	8
	Very Coarse	1.0	2.0	6	6	14
GRAVEL	Very Fine	2.0	2.8	3	3	17
	Very Fine	2.8	4.0			17
	Fine	4.0	5.6	2	2	19
	Fine	5.6	8.0	3	3	22
	Medium	8.0	11.0	5	5	27
	Medium	11.0	16.0	4	4	31
	Coarse	16.0	22.6	3	3	34
	Coarse	22.6	32	5	5	39
	Very Coarse	32	45	14	14	53
	Very Coarse	45	64	16	16	69
COBBLE	Small	64	90	10	10	79
	Small	90	128	10	10	89
	Large	128	180	9	9	98
	Large	180	256	2	2	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} =	2.50
D_{35} =	24.23
D_{50} =	41.8
D_{84} =	107.3
D_{95} =	160.7
D_{100} =	256.0





Reachwide and Cross Section Pebble Count Plots

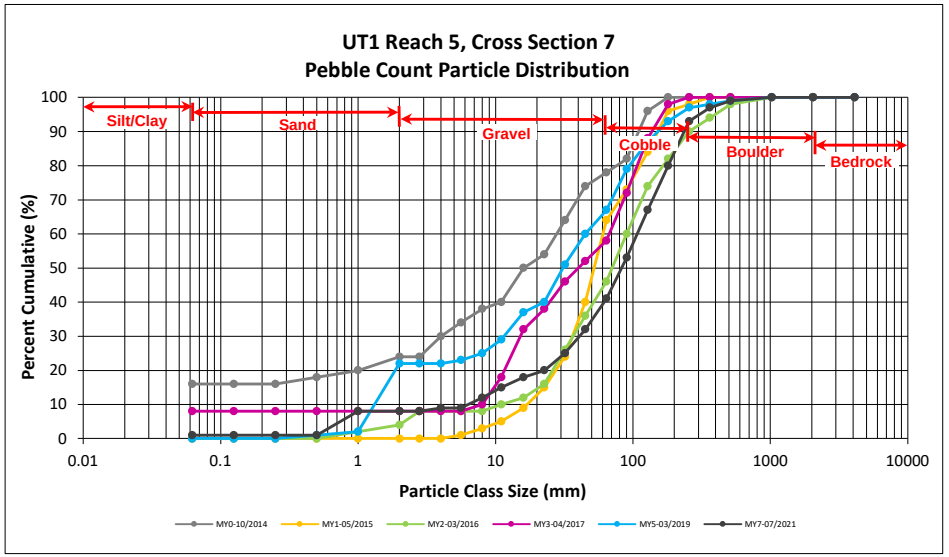
Agony Acres Mitigation Site (DMS Project No. 95716)

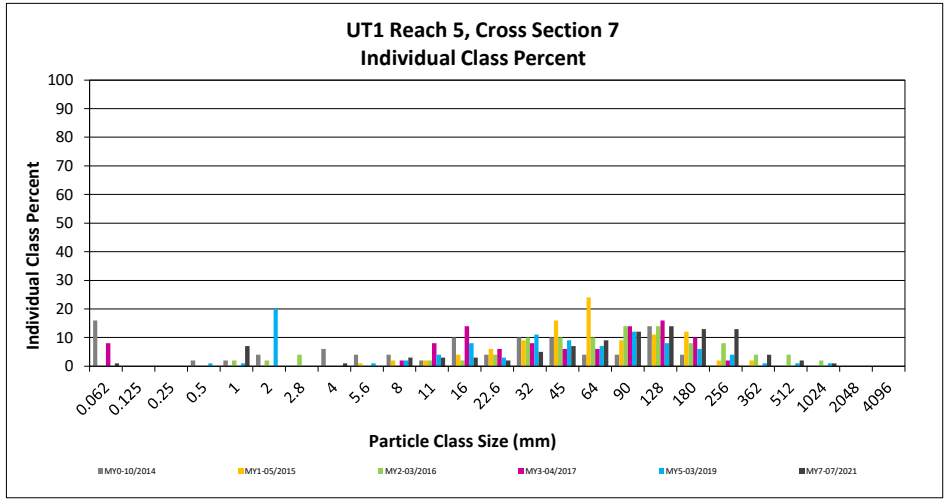
Monitoring Year 7 - 2021

UT1 Reach 5, Cross Section 7

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	1	1
SAND	Very fine	0.062	0.125			1
	Fine	0.125	0.250			1
	Medium	0.25	0.50			1
	Coarse	0.5	1.0	7	7	8
	Very Coarse	1.0	2.0			8
GRAVEL	Very Fine	2.0	2.8			8
	Very Fine	2.8	4.0	1	1	9
	Fine	4.0	5.6			9
	Fine	5.6	8.0	3	3	12
	Medium	8.0	11.0	3	3	15
	Medium	11.0	16.0	3	3	18
	Coarse	16.0	22.6	2	2	20
	Coarse	22.6	32	5	5	25
	Very Coarse	32	45	7	7	32
	Very Coarse	45	64	9	9	41
COBBLE	Small	64	90	12	12	53
	Small	90	128	14	14	67
	Large	128	180	13	13	80
	Large	180	256	13	13	93
BOULDER	Small	256	362	4	4	97
	Small	362	512	2	2	99
	Medium	512	1024	1	1	100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross Section 7	
Channel materials (mm)	
D_{16} =	12.46
D_{35} =	50.61
D_{50} =	82.6
D_{84} =	200.6
D_{95} =	304.4
D_{100} =	1024.0





Reachwide and Cross Section Pebble Count Plots

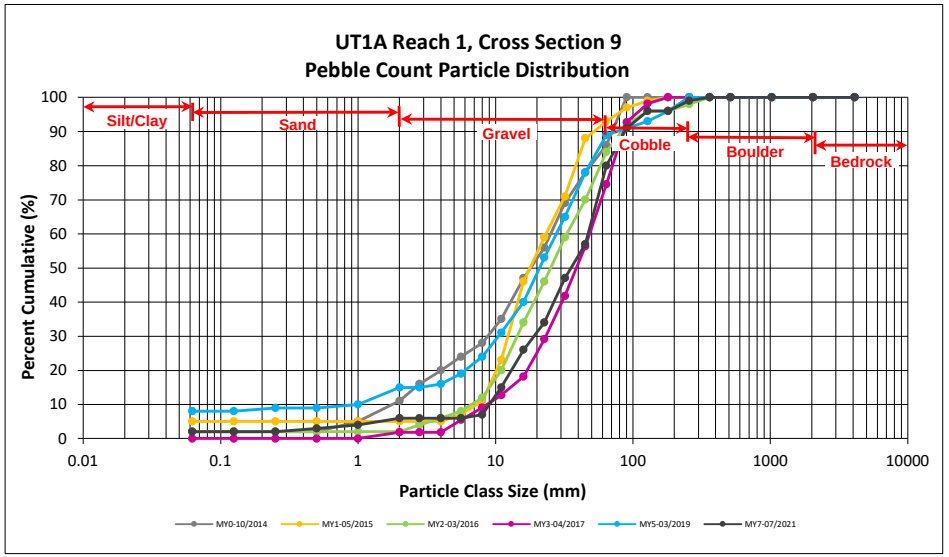
Agony Acres Mitigation Site (DMS Project No. 95716)

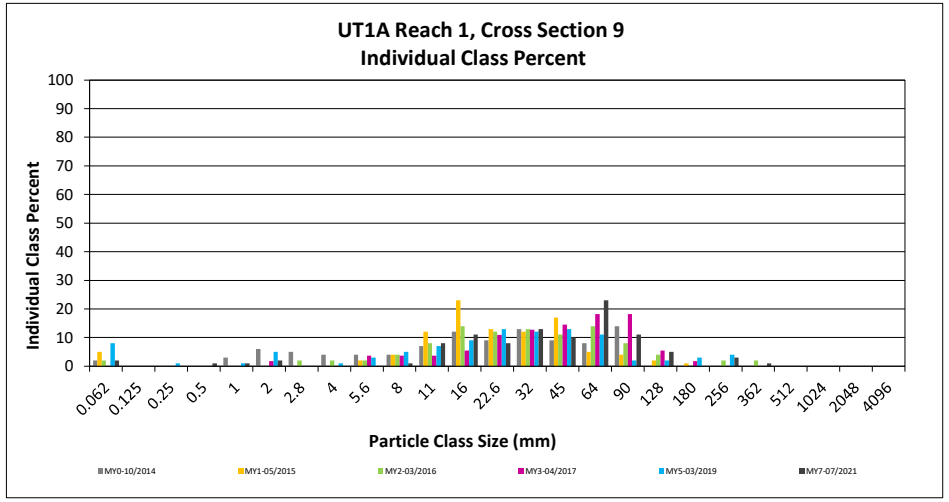
Monitoring Year 7 - 2021

UT1A Reach 1, 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	2	2	2
SAND	Very fine	0.062	0.125			2
	Fine	0.125	0.250			2
	Medium	0.25	0.50	1	1	3
	Coarse	0.5	1.0	1	1	4
	Very Coarse	1.0	2.0	2	2	6
GRAVEL	Very Fine	2.0	2.8			6
	Very Fine	2.8	4.0			6
	Fine	4.0	5.6			6
	Fine	5.6	8.0	1	1	7
	Medium	8.0	11.0	8	8	15
	Medium	11.0	16.0	11	11	26
	Coarse	16.0	22.6	8	8	34
	Coarse	22.6	32	13	13	47
	Very Coarse	32	45	10	10	57
	Very Coarse	45	64	23	23	80
COBBLE	Small	64	90	11	11	91
	Small	90	128	5	5	96
	Large	128	180			96
	Large	180	256	3	3	99
BOULDER	Small	256	362	1	1	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} =	11.38
D_{35} =	23.21
D_{50} =	35.4
D_{84} =	72.4
D_{95} =	119.3
D_{100} =	362.0





Reachwide and Cross Section Pebble Count Plots

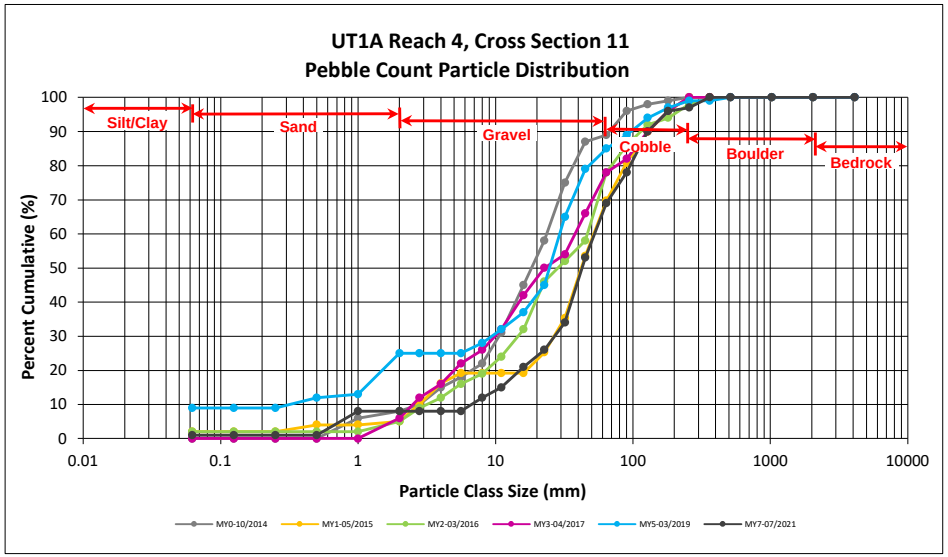
Agony Acres Mitigation Site (DMS Project No. 95716)

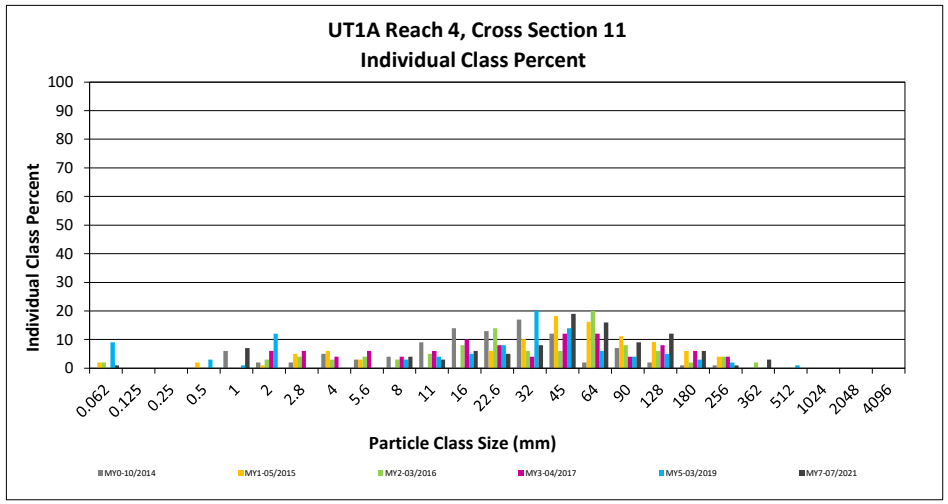
Monitoring Year 7 - 2021

UT1A Reach 4, 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	1	1	1
SAND	Very fine	0.062	0.125			1
	Fine	0.125	0.250			1
	Medium	0.25	0.50			1
	Coarse	0.5	1.0	7	7	8
	Very Coarse	1.0	2.0			8
GRAVEL	Very Fine	2.0	2.8			8
	Very Fine	2.8	4.0			8
	Fine	4.0	5.6			8
	Fine	5.6	8.0	4	4	12
	Medium	8.0	11.0	3	3	15
	Medium	11.0	16.0	6	6	21
	Coarse	16.0	22.6	5	5	26
	Coarse	22.6	32	8	8	34
	Very Coarse	32	45	19	19	53
	Very Coarse	45	64	16	16	69
COBBLE	Small	64	90	9	9	78
	Small	90	128	12	12	90
	Large	128	180	6	6	96
	Large	180	256	1	1	97
BOULDER	Small	256	362	3	3	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} =	11.71
D_{35} =	32.58
D_{50} =	42.6
D_{84} =	107.3
D_{95} =	170.1
D_{100} =	362.0





Reachwide and Cross Section Pebble Count Plots

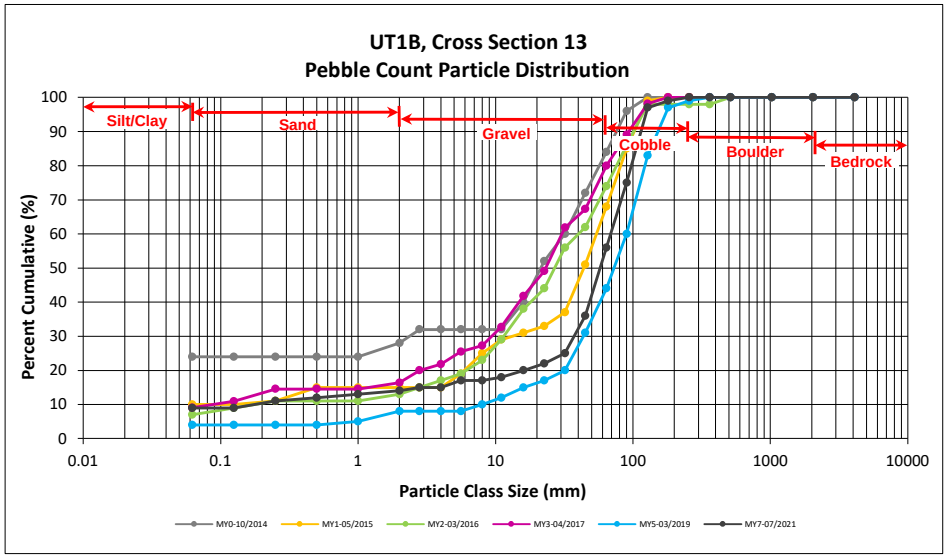
Agony Acres Mitigation Site (DMS Project No. 95716)

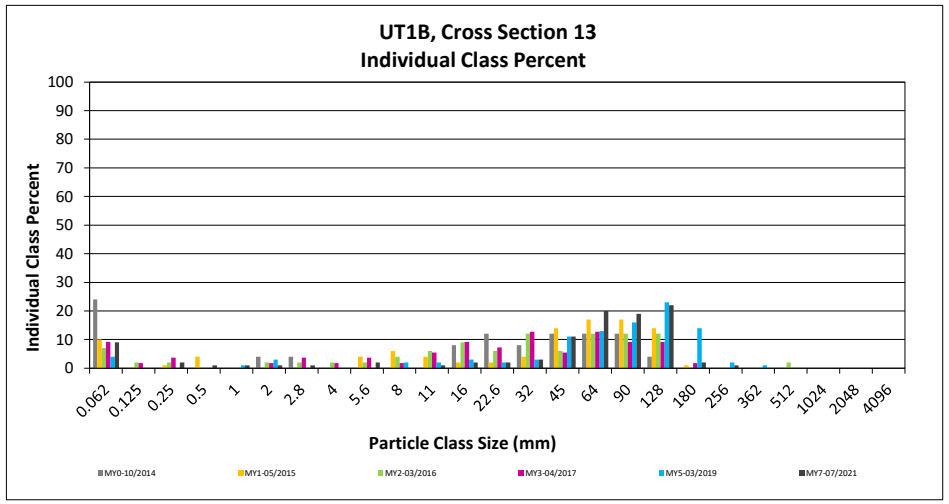
Monitoring Year 7 - 2021

UT1B, 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	9	9	9
SAND	Very fine	0.062	0.125			9
	Fine	0.125	0.250	2	2	11
	Medium	0.25	0.50	1	1	12
	Coarse	0.5	1.0	1	1	13
	Very Coarse	1.0	2.0	1	1	14
GRAVEL	Very Fine	2.0	2.8	1	1	15
	Very Fine	2.8	4.0			15
	Fine	4.0	5.6	2	2	17
	Fine	5.6	8.0			17
	Medium	8.0	11.0	1	1	18
	Medium	11.0	16.0	2	2	20
	Coarse	16.0	22.6	2	2	22
	Coarse	22.6	32	3	3	25
	Very Coarse	32	45	11	11	36
	Very Coarse	45	64	20	20	56
COBBLE	Small	64	90	19	19	75
	Small	90	128	22	22	97
	Large	128	180	2	2	99
	Large	180	256	1	1	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} =	4.73
D_{35} =	43.63
D_{50} =	57.6
D_{84} =	103.9
D_{95} =	124.0
D_{100} =	256.0





Reachwide and Cross Section Pebble Count Plots

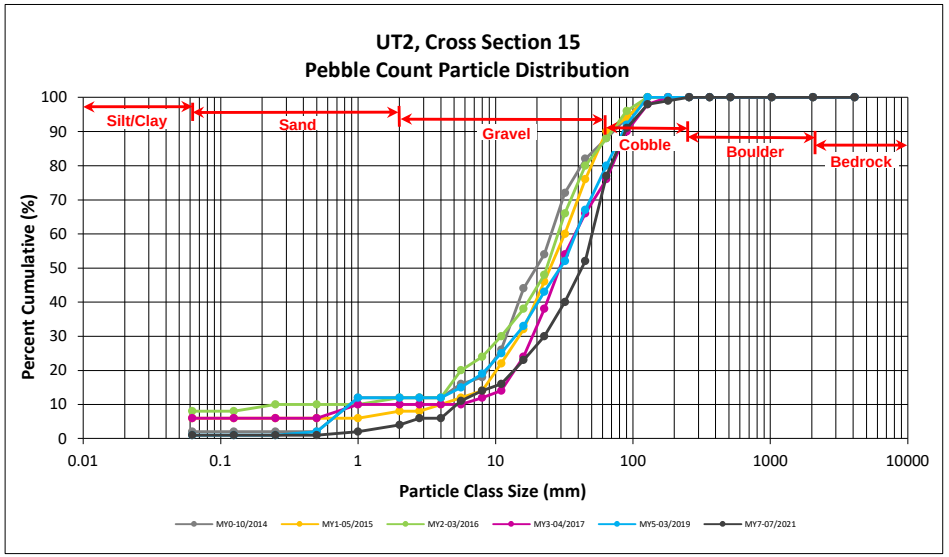
Agony Acres Mitigation Site (DMS Project No. 95716)

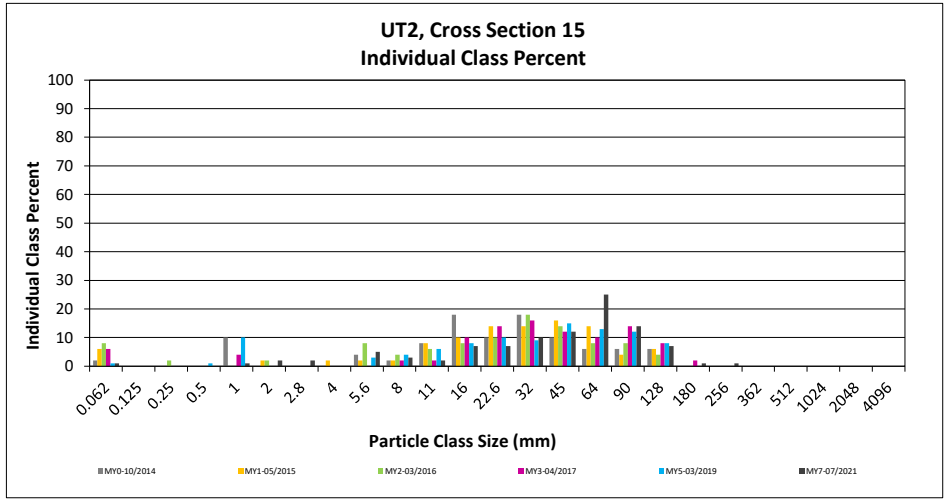
Monitoring Year 7 - 2021

UT2, Cross Section 15

Particle Class		Diameter (mm) min	Diameter (mm) max	Riffle 100-Count	Summary: Class Percentage	Summary: Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	1	1	1
SAND	Very fine	0.062	0.125			1
	Fine	0.125	0.250			1
	Medium	0.25	0.50			1
	Coarse	0.5	1.0	1	1	2
	Very Coarse	1.0	2.0	2	2	4
GRAVEL	Very Fine	2.0	2.8	2	2	6
	Very Fine	2.8	4.0			6
	Fine	4.0	5.6	5	5	11
	Fine	5.6	8.0	3	3	14
	Medium	8.0	11.0	2	2	16
	Medium	11.0	16.0	7	7	23
	Coarse	16.0	22.6	7	7	30
	Coarse	22.6	32	10	10	40
	Very Coarse	32	45	12	12	52
	Very Coarse	45	64	25	25	77
COBBLE	Small	64	90	14	14	91
	Small	90	128	7	7	98
	Large	128	180	1	1	99
	Large	180	256	1	1	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 15	
Channel materials (mm)	
D_{16} =	11.00
D_{35} =	26.89
D_{50} =	42.5
D_{84} =	75.9
D_{95} =	110.1
D_{100} =	256.0





APPENDIX 5. Hydrology Summary Data and Plots

Table 13. Verification of Bankfull Events
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

Reach	Monitoring Year	Date of Data Collection	Date of Occurrence	Method
UT1	MY1	10/5/2015	10/3/2015	Crest Gage/ Pressure Transducer
	MY2	3/14/2016	2/16/2016	
	MY3	8/1/2017	4/24/2017	
			5/23/2017	
			6/19/2017	
		10/24/2017	9/1/2017	
	MY4	2/26/2018	2/6/2018	
		10/9/2018	4/27/2018	
			8/3/2018	
			8/20/2018	
			9/17/2018	
			10/1/2018	
		2/6/2019	10/26/2018	
			11/28/2018	
			12/6/2018	
			12/11/2018	
			12/18/2018	
			12/23/2018	
	MY5	2/6/2019	1/21/2019	
			1/24/2019	
			2/1/2019	
		6/27/2019	2/18/2019	
			2/23/2019	
			3/1/2019	
			3/7/2019	
			3/21/2019	
			4/19/2019	
		2/25/2020	11/14/2019	
			12/6/2019	
			12/22/2019	
	MY6	2/25/2020	1/22/2020	
			2/6/2020	
			2/15/2020	
			2/22/2020	
		8/6/2020	5/21/2020	
			5/24/2020	
			6/19/2020	
		9/23/2020	9/17/2020	
		2/16/2021	10/30/2020	
			11/12/2020	
			11/30/2020	
			12/14/2020	
	MY7	2/16/2021	1/31/2021	
			2/15/2021	
		4/21/2021	3/22/2021	
		11/11/2021	8/14/2021	

Table 13. Verification of Bankfull Events
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

Reach	Monitoring Year	Date of Data Collection	Date of Occurrence	Method
UT1A	MY1	10/5/2015	10/3/2015	Crest Gage/ Pressure Transducer
	MY2	3/14/2016	2/16/2016	
	MY3	8/1/2017	4/24/2017	
			5/23/2017	
			6/19/2017	
	MY4	2/26/2018	2/4/2018	
		10/9/2018	8/20/2018	
			9/17/2018	
		2/6/2019	10/11/2018	
			10/26/2018	
			11/12/2018	
			11/24/2018	
			12/20/2018	
	MY5	2/6/2019	1/21/2019	
			1/24/2019	
		6/27/2019	2/18/2019	
			2/23/2019	
			3/1/2019	
			3/21/2019	
			4/19/2019	
		2/25/2020	10/31/2019	
	MY6	2/25/2020	1/24/2020	
			2/6/2020	
		8/6/2020	5/21/2020	
			6/19/2020	
		9/23/2020	9/17/2020	
		2/16/2021	9/25/2020	
			9/29/2020	
			10/30/2020	
			11/12/2020	
			11/30/2020	
			12/14/2020	
	MY7	2/16/2021	1/24/2021	
			2/15/2021	
		11/11/2021	8/14/2021	

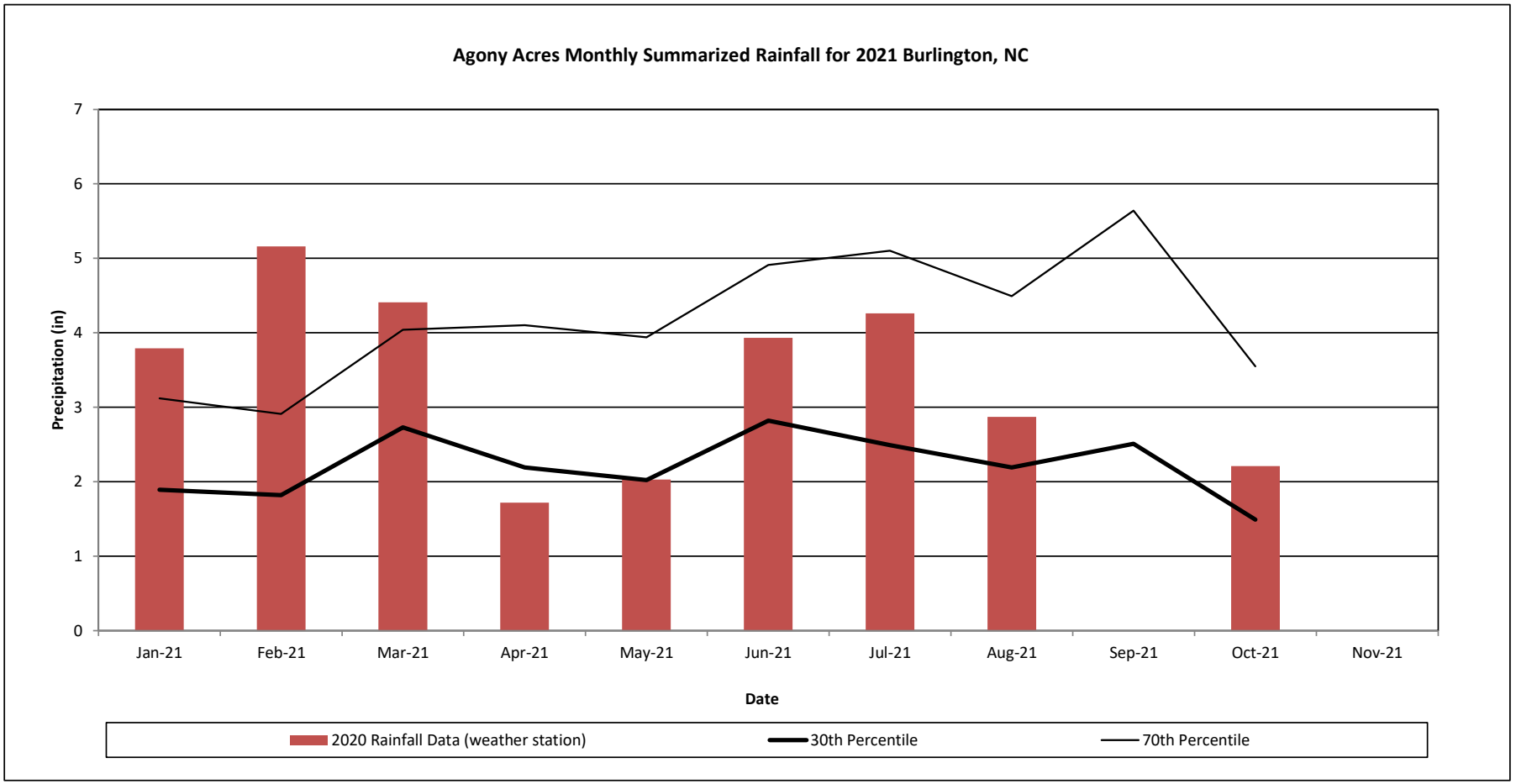
Table 13. Verification of Bankfull Events
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

Reach	Monitoring Year	Date of Data Collection	Date of Occurrence	Method
UT1B	MY1	10/5/2015	10/3/2015	Crest Gage/ Pressure Transducer
	MY2	3/14/2016	2/16/2016	
		8/30/2016	5/3/2016	
	MY3	8/1/2017	4/24/2017	
			5/23/2017	
			6/19/2017	
		10/24/2017	9/1/2017	
	MY4	10/9/2018	8/20/2018	
			9/1/2018	
			9/17/2018	
		2/6/2019	10/11/2018	
			11/13/2018	
	MY5	2/6/2019	1/4/2019	
			1/13/2019	
			1/20/2019	
			1/24/2019	
		6/27/2019	2/18/2019	
			2/23/2019	
			3/1/2019	
			3/21/2019	
			4/19/2019	
	MY6	2/25/2020	2/6/2020	
		8/6/2020	5/21/2020	
			6/19/2020	
		9/23/2020	9/17/2020	
		2/16/2021	9/25/2020	
			9/30/2020	
			11/11/2020	
			11/30/2020	
			12/5/2020	
			12/14/2020	
	MY7	2/16/2021	2/15/2021	
		11/11/2021	8/14/2021	
UT2	MY1	10/5/2015	10/3/2015	
	MY2	3/14/2016	2/16/2016	
		8/30/2016	5/3/2016	
	MY3	8/1/2017	4/24/2017	
			5/23/2017	
			6/19/2017	
		2/26/2018	12/11/2017	
	MY4	2/26/2018	1/7/2018	
		10/9/2018	4/24/2018	
			8/3/2018	
			9/17/2018	
		2/6/2019	10/11/2018	
			10/27/2018	
			11/12/2018	
			12/15/2018	
			12/20/2018	
	MY5	2/6/2019	1/21/2019	
			1/24/2019	
		6/27/2019	2/18/2019	
			2/23/2019	
			6/8/2019	
		10/29/2019	8/1/2019	
	MY6	2/25/2020	2/6/2020	
		6/27/2020	5/22/2020	
			6/19/2020	
		2/16/2021	11/12/2020	
			11/30/2020	
			12/14/2020	
	MY7	2/16/2021	2/13/2021	
		4/21/2021	3/26/2021	
		7/21/2021	7/19/2021	
		11/11/2021	8/14/2021	

Monthly Summarized Rainfall Data

Agony Acres Mitigation Site (DMS Project No. 95716)

Monitoring Year 7 - 2021



1 2021 monthly rainfall collected at Burlington Alamance Regional AP, NC.

2 30th and 70th percentile rainfall data collected from Burlington Alamance Regional AP, NC.

Table 14. In-Stream Flow Gage Attainment Summary
Agony Acres Mitigation Site (DMS Project No. 95716)
Monitoring Year 7 - 2021

Summary of In-Stream Flow Gage Results for Monitoring Years 1 through 7							
Reach	**Max Consecutive Days/Total Days Meeting Success Criteria**						
	Year 1 (2015)	**Year 2(2016)**	**Year 3(2017)**	**Year 4 (2018)**	**Year 5 (2019)**	**Year 6 (2020)**	**Year 7 (2021)***
UT1A R1	UT1A flow gauges installed during fall of MY4 for informational purposes only.				**148 Days/244 Days**	**184 Days/316 Days**	**134 Days/163 Days**
UT1A R3					**194 Days/302 Days**	**203 Days/354 Days**	**147 Days/197 Days**
UT1A R4 Upper					**178 Days/257 Days**	**194 Days/334 Days**	**167 Days/211 Days**
UT1A R4 Middle					**147 Days/233 Days**	**184 Days/ 311 Days**	**147 Days/182 Days**
UT1A R4 Lower					**145 Days/207 Days**	**184 Days/299 Days**	**143 Days/159 Days**
UT1B US	**100 Days/333 Days**	**240 Days/331 Days**	**364 Days/364 Days**	**200 Days/363 Days**	**254 Days/333 Days**	**365 Days/365 Days**	**314 Days/314 Days**
UT1B DS	**176 Days/363 Days**	**364 Days/364 Days**	**364 Days/364 Days**	**363 Days/364 Days**	**312 Days/361 Days**	Gage Malfunctioned During MY6	**181 Days/312 Days**

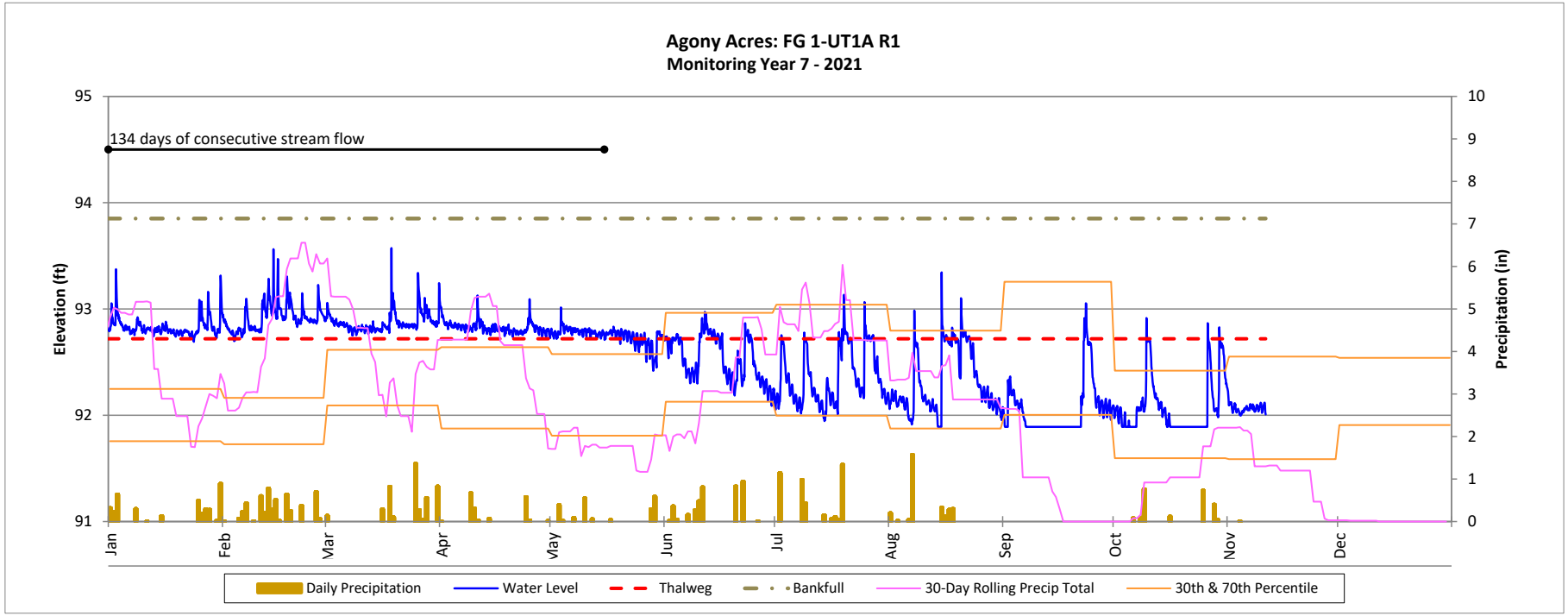
*Data for MY7 recorded through 11/11/2021

Recorded In-Stream Flow Events

Agony Acres Mitigation site

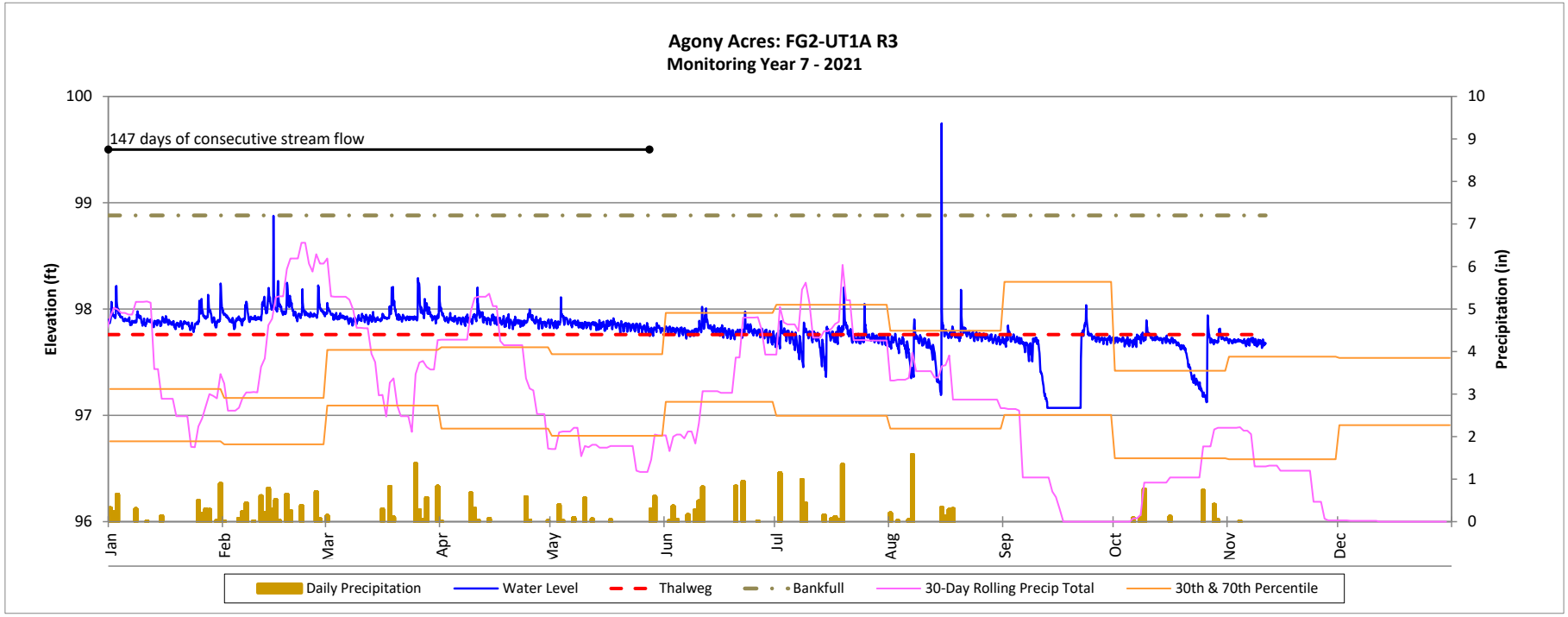
DMS Project No. 95716

Monitoring Year 7 - 2021



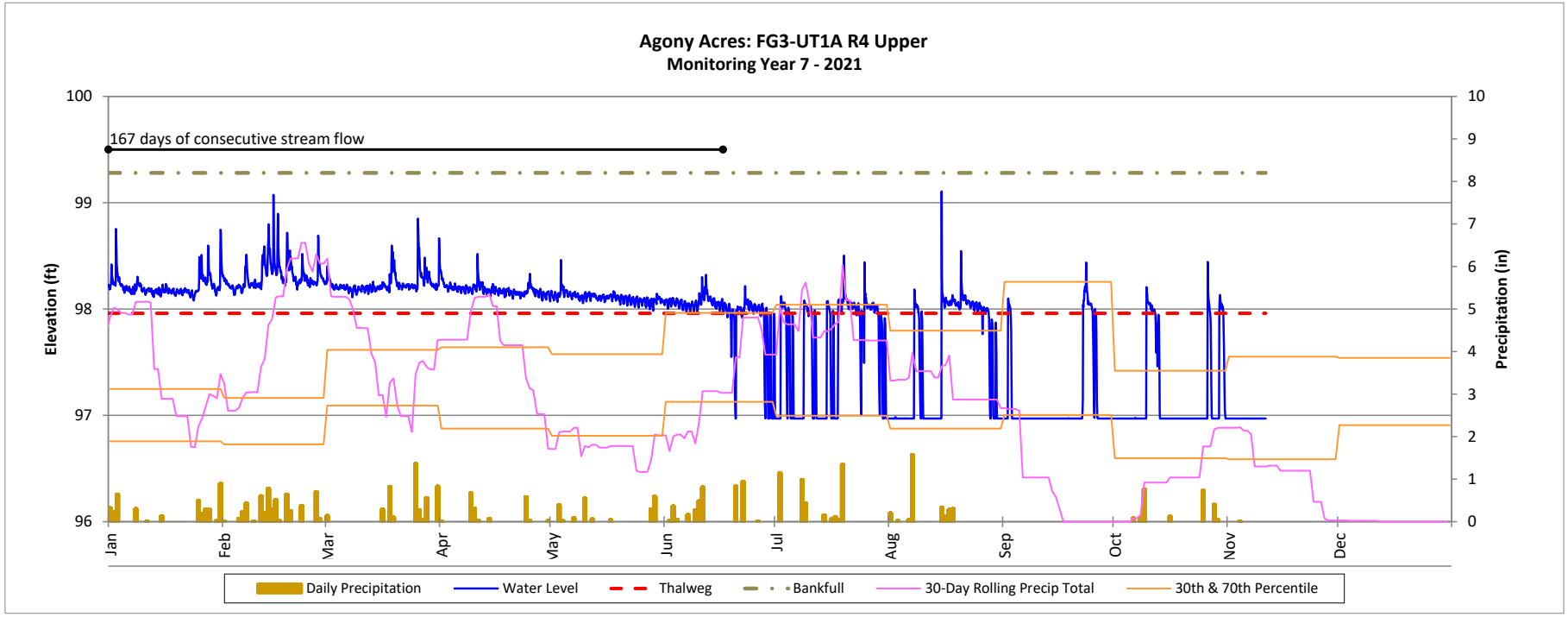
Recorded In-Stream Flow Events

Agony Acres Mitigation site
DMS Project No. 95716
Monitoring Year 7 - 2021



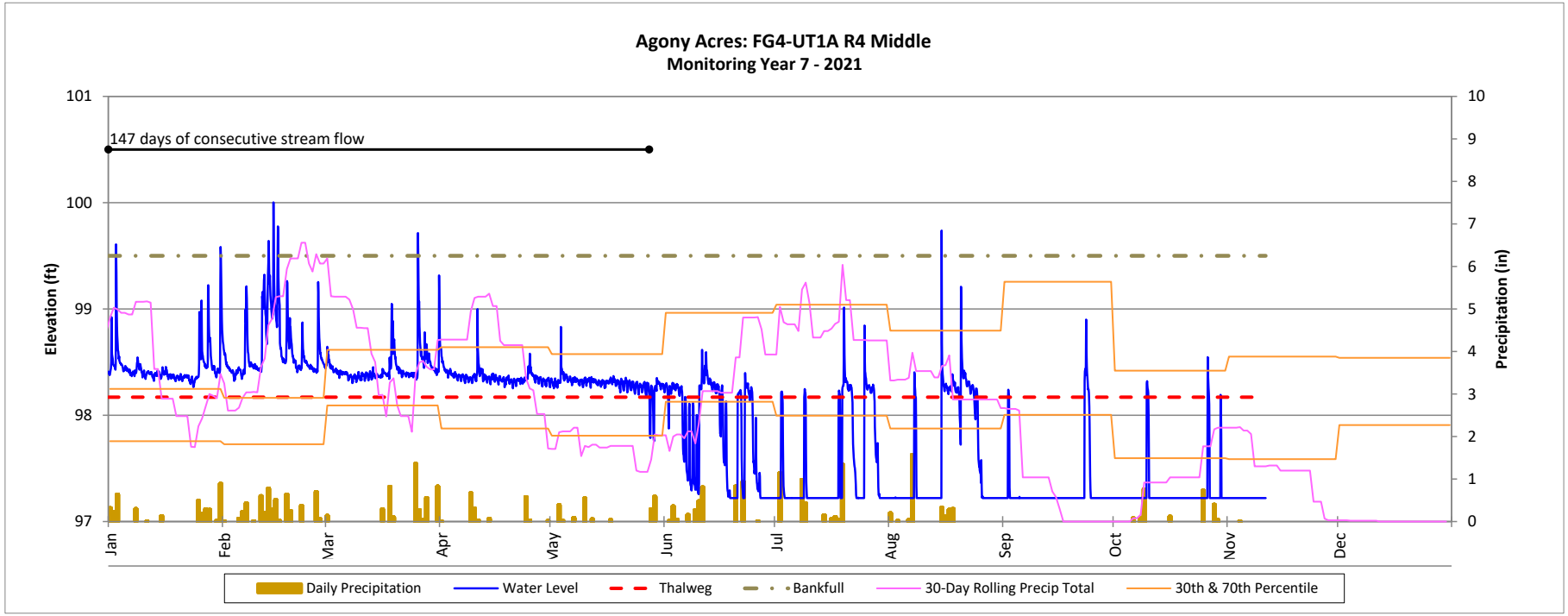
Recorded In-Stream Flow Events

Agony Acres Mitigation site
DMS Project No. 95716
Monitoring Year 7 - 2021



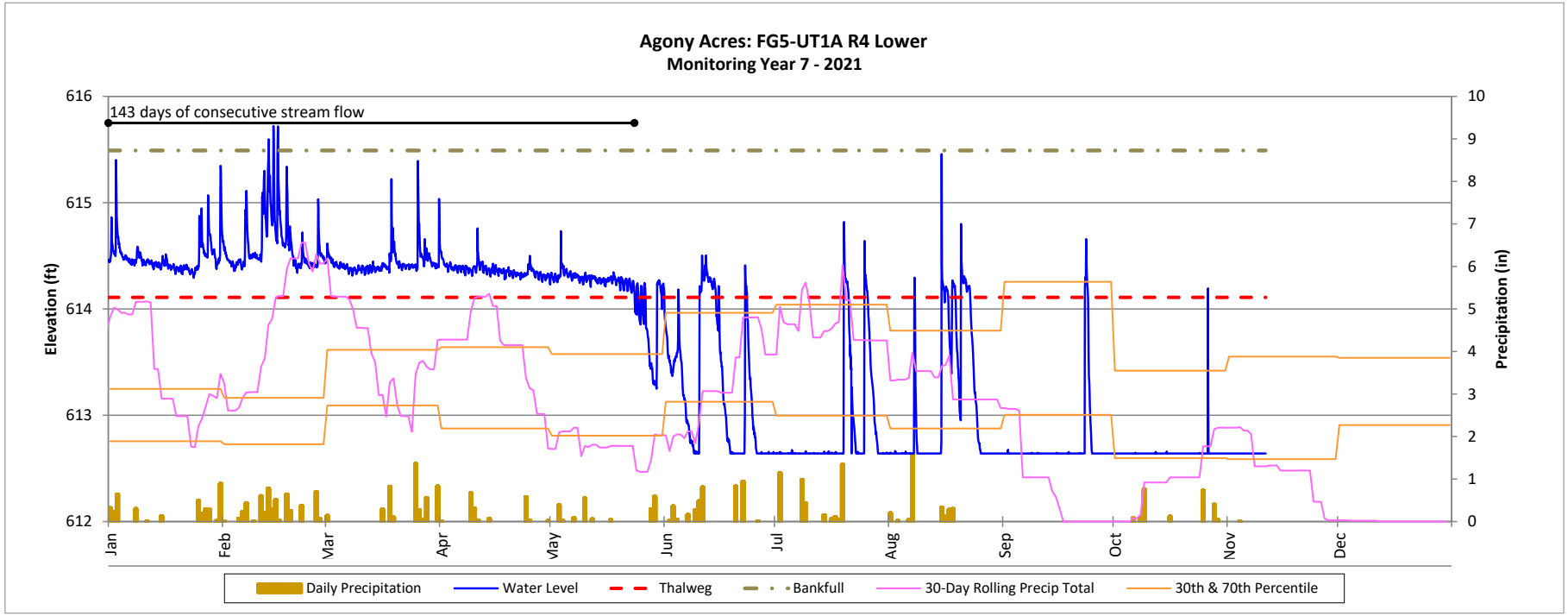
Recorded In-Stream Flow Events

Agony Acres Mitigation site
DMS Project No. 95716
Monitoring Year 7 - 2021



Recorded In-Stream Flow Events

Agony Acres Mitigation site
DMS Project No. 95716
Monitoring Year 7 - 2021



Recorded In-Stream Flow Events

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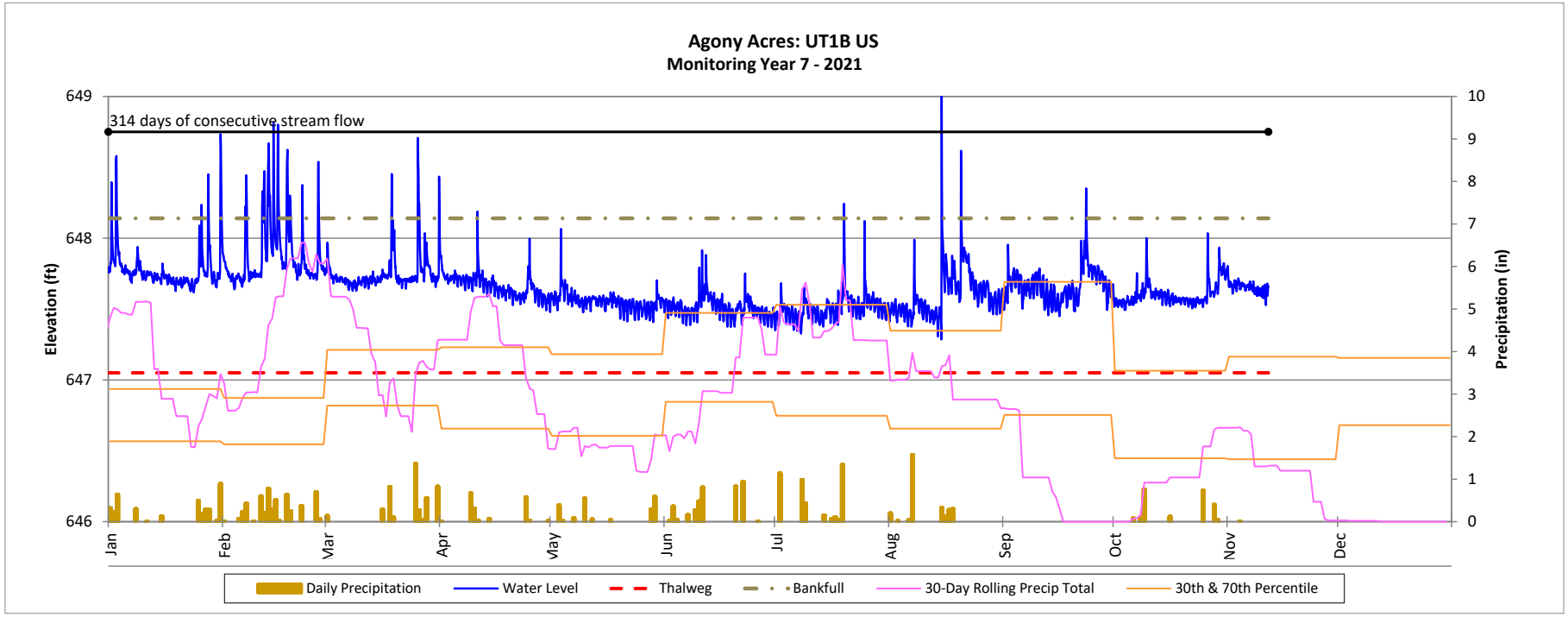

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