MONITORING YEAR 1 ANNUAL REPORT

Final

January 2023

DOUBLE H FARMS MITIGATION SITE

Alleghany County, NC
DEQ Contract No. 7608
DMS Project No. 100082

New River Basin HUC 05050001
USACE Action ID No. SAW-2018-01771
NCDEQ DWR#: 18-1270
RFP #: 16-007403
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PREPARED FOR:

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

January 23, 2023

Mr. Harry Tsomides
Western Project Manager
NCDEQ – Division of Mitigation Services
2090 U.S. 70 Highway
Swannanoa, NC 28778-8211

RE: Final Year 1 Monitoring Report Review
Double H Farms Mitigation Site, Alleghany County
New River Basin – HUC 05050001
DMS Project ID No. 100082 / DEQ Contract #7608

Dear Mr. Tsomides:

Wildlands Engineering, Inc. (Wildlands) has reviewed the Division of Mitigation Services (DMS) comments from the Draft Year 1 Monitoring Report for the Double H Farms Mitigation Site. The report and associated digital files have been updated to reflect those comments. The Final MY1 Report is included. DMS' comments are noted below in **bold** text. Wildlands' responses to DMS' report comments are noted below in *italics*.

DMS' comment: There is a source of overland sediment coming from outside the easement at the corner of UT4 and UT to Crab Creek. Wildlands has installed coir logs; thank you for implementing that measure. Has WEI discussed this area with the landowner or considered a BMP or other longer-term improvement/stabilization measure in order to stop the sedimentation at its source?

Wildlands' Response: The overland sediment is likely occurring due to the steep slope of the adjacent hillside. Wildlands will continue to monitor the repair and amount of sediment deposition occurring in the area and if needed will propose additional measures in MY2.

DMS' comment: At the 8/17/22 IRT meeting it was noted that portions along UT6 need invasives vegetation management. Does WEI plan to treat invasives on UT6?

Wildlands' Response: As discussed in Section 2.5 under the IRT Site Walk Follow-Up, the treatment of multiflora rose (Rosa multiflora) took place in October 2022 within the existing forested areas of the easement along UT1A and UT6 and will continue to be monitored and treated as necessary throughout the remaining monitoring years. Please refer to the Repair Photographs in Appendix A for photo documentation.

DMS' comment: Can WEI confirm that all action items C. through G. from the 8/17/22 IRT meeting minutes have been completed?

Wildlands' Response: All action items discussed in the 8/17/22 MY0 Credit Release Site Walk Meeting Minutes located in the Appendix F have been addressed. Please refer to the Repair Photographs in Appendix A and Section 2.5 under the IRT Site Walk Follow-Up portion of the report.

DMS' comment: As a reminder, monitoring providers are responsible for checking the easement integrity across the project site for mowing/grazing encroachments, missing, bent or wobbly post markers, fence damage, etc. Can WEI confirm that the entire site boundary, marking integrity, and easement compliance was checked?

Wildlands' Response: Wildlands has fully checked on the easement perimeter across the project site in MY1 and the boundary across the project remains intact.

DMS' comment: Please confirm there are no remaining encroachments on the project (rip rap extensions from the crossings, fencing, etc) that were noted during the MY0/baseline IRT review, and that those issues were fully rectified during MY1.

Wildlands' Response: There are three small areas containing scattered remaining riprap from the headwall.

- *One is a 3-foot encroachment on the upstream side of the UT4 Reach 1 crossing,*
- *One is a 2-foot encroachment on the upstream side of the UT6 crossing, and*
- *One is a 1-foot encroachment on the downstream side of UT6 crossing.*

These minor areas of scattered rip rap were left in place because by the time the MY1 maintenance work was to be conducted, the areas had naturalized. The rock had settled into the streambank soils, and the vegetation was becoming established within the rock crevices. Since the areas were acting more like a naturalized stabilization measure, the removal of such a small area of rock on each reach would have likely caused more damage than leaving it in place. Therefore, the length of the riprap encroachment at the UT4 Reach 1 and UT6 crossing has been removed from the stream length; however, the credits for each reach did not change from what was approved in the Mitigation Plan. The remainder of the riprap crossing encroachments (UT to Crab Creek Reach 1 and UT4 Reach 2) and the fencing encroachments were removed during maintenance for MY1.

As requested, Wildlands has included two hard copies of the Final Double H Farms Mitigation Year 1 Monitoring Report with a copy of our comment response letter inserted after the report's cover page. In addition, a USB drive with the full final electronic copy of the report, our response letter, and all the electronic support files has been included. Please let me know if you have any questions.

Sincerely,

Kristi Suggs
Senior Environmental Scientist
ksuggs@wildlandseng.com

MONITORING YEAR 1 ANNUAL REPORT

DOUBLE H FARMS MITIGATION SITE

Alleghany County, NC

New River Basin
HUC 05050001

DMS Project No. 100082
USACE Action ID No. SAW-2018-01771
NCDEQ DWR#: 18-1270

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DOUBLE H FARMS MITIGATION SITE

Monitoring Year 1 Annual Report

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Section 1: PROJECT OVERVIEW

The Double H Farms Mitigation Site (Site) is situated in the Blue Ridge Physiographic Province of North Carolina, in the rural countryside in Alleghany County near Ennice, NC, and approximately eleven miles northwest of the Town of Sparta. The Site is loosely bound by Little Pine Road to the southwest, Crab Creek Road to the west, and Wilson Road to the north (Figure 3.0). Ten unnamed tributaries (UTs) to Crab Creek (UT to Crab Creek, UT1, UT1A, UT3, UT3A, UT4, UT5, UT6, UT7, and Hillside Tributary) are protected as part of the project's conservation easement. Table 3 presents information related to the project attributes.

1.1 Project Quantities and Credits

The project restored, enhanced, and preserved 8,650 linear feet (LF) of streams and preserved and enhanced 4.872 acres (AC) of wetlands. Additionally, pastureland was converted into riparian buffer, and cattle were excluded from Site's streams and wetlands. The work proposed on the Site will provide 6,560.410 stream mitigation units (SMUs) and 2.151 wetland mitigation units (WMUs). The Site is located within the Little River targeted local watershed Hydrologic Unit Code (HUC) 05050001030020 in the northeastern portion of the New River basin 05050001 (New 01). This Site was included in the 2004-2007 Little River and Brush Creek Local Watershed Plan (LWP).

Please refer to Table 1 and Table 1.1 for project quantities and credits by stream and the credit summary table, respectively. Annual monitoring will be conducted for seven years with close-out anticipated to commence in 2028 given the success criteria are met.

Table 1: Project Quantities and Credits

Project Components						
Project Stream	**Mitigation Plan Footage[1, 3]**	**As-Built Footage[1, 3]**	**Mitigation Category**	**Restoration Level**	**Mitigation Ratio (X:1)**	**Credits**
UT to Crab Creek Reach 1 and Reach 2	2,817.7	2,817.000	Cold	R	1.000	2,817.700
UT1 Reach 1	619.1	606.000	Cold	P	10.000	61.910
UT1 Reach 2	91.8	84.000	Cold	EII	5.000	18.360
UT1A Reach 1	1,112.9	1,114.000	Cold	R	1.000	1,112.900
UT1A Reach 2	110.0	110.000	Cold	P	10.000	11.000
UT3	365.5	365.000	Cold	EII	3.000	121.833
UT3A	145.7	146.000	Cold	EII	3.000	48.561
UT4 Reach 1	849.8	847.000	Cold	R	1.000	849.800
UT4 Reach 2	588.6	602.000	Cold	EI	1.500	392.400
UT5 Reach 1[2]	252.1	252.000	Cold	EII	2.500	100.840
UT5 Reach 2	305.0	305.000	Cold	R	1.000	305.000

Table 1: Project Quantities and Credits

Project Components						
Project Stream	**Mitigation Plan Footage[1, 3]**	**As-Built Footage[1, 3]**	**Mitigation Category**	**Restoration Level**	**Mitigation Ratio (X:1)**	**Credits**
Hillside Tributary	248.1	248.000	Cold	EII	2.500	99.240
UT6	283.0	283.000	Cold	P	N/A	0.000
	422.4	419.000	Cold	EII	2.500	168.960
UT7[2]	451.9	452.000	Cold	R	1.000	451.900
					Total:	**6,560.410**
Project Wetlands						
Wetlands C and F	0.308	0.303	RR	P	10.000	0.031
Wetland N	0.932	0.932	RR	E	3.000	0.311
All other Site Wetlands	3.618	3.637	RR	E	2.000	1.809
					Total:	**2.151**

Notes:
1. Internal culvert crossings are excluded from the credited stream footage.
2. No direct credit for BMP's.
3. UT1A contains an overhead powerline easement that was excluded from the stream lengths.
4. The length of the riprap easement encroachment at the UT4 Reach 1 and UT6 crossings has been removed from the as-built stream length.

Table 1.2: Credit Summary Table

Project Credits							
Restoration Level	**Stream**			**Riparian Wetland**		**Non-Riparian Wetland**	**Coastal Marsh**
	Warm	**Cool**	**Cold**	**Riverine**	**Non-Riverine**		
Restoration	N/A	N/A	5,537.300	N/A	N/A	N/A	N/A
Re-establishment				N/A	N/A	N/A	N/A
Rehabilitation				N/A	N/A	N/A	N/A
Enhancement				2.120	N/A	N/A	N/A
Enhancement I	N/A	N/A	392.400				
Enhancement II	N/A	N/A	557.800				
Creation				N/A	N/A	N/A	N/A
Preservation	N/A	N/A	72.910	0.031	N/A	N/A	
Totals	**N/A**	**N/A**	**6,560.410**	**2.151**	**N/A**	**N/A**	**N/A**

1.2 Project Goals and Objectives

The Site is providing numerous ecological benefits within the New River Basin. The project goals were established with careful consideration to address stressors that were identified in the 2004-2007 Little River and Brush Creek Local Watershed Plan, the 2009 New River Basin Restoration Priorities (RBRP) report, and the 2015 North Carolina Wildlife Resource Commission's (NCWRC) Wildlife Action Plan

(WAP). The project has improved stream functions through the implementation of stream restoration and enhancement, the conversion of maintained pastureland into riparian buffer, and the exclusion of cattle from the Site's streams and wetlands. Improvements are outlined below as project goals and objectives.

Table 2: Goals, Performance Criteria, and Functional Improvements

Goal	Objective/Treatment	Likely Functional Uplift	Performance Criteria	Measurement	Cumulative Monitoring Results
Reconnect channels with floodplains and riparian wetlands to allow a natural flooding regime.	Reconstruct stream channels with appropriate bankfull dimensions and depth relative to the existing floodplain. Remove overburden to reconnect with adjacent wetlands.	Dispersion of high flows on the floodplain and recharging of riparian wetlands.	Four bankfull events in separate years within monitoring period.	UT to Crab Creek R2 Crest Gage (CG); UT1A R1 Stream Gage (SG).	Two bankfull events were recorded in MY1. The SG on UT1A R1 met the minimum criteria (30 days).
Exclude livestock from stream channels and wetlands.	Install livestock fencing as needed to exclude livestock from stream channels, wetlands, and riparian areas.	Reduction in sediment inputs from bank erosion, reduction of shear stress, and improved overall hydraulic function. Eliminate cattle trampling wetlands.	There is no required performance standard for this metric.	Visual annual assessments.	No cattle within the easement.
Restore and enhance native floodplain vegetation.	Plant native tree and understory species in riparian zones and plant appropriate species on streambanks. Protect and enhance existing forested riparian buffers. Allow wetlands determined to have good bog turtle potential to be open herbaceous areas that naturally succeed.	Reduction in floodplain sediment inputs from runoff, increased bank stability, increased LWD and organic material in streams. Support all stream functions.	Survival rate of 320 stems per acre at MY3, 260 planted stems per acre at MY5, and 210 stems per acre at MY7. Height Requirement is 6 feet at MY5 and 8 feet at MY7. Bog plots with >80% vegetated cover with >50% of species with an indicator status of FAC or wetter.	9 permanent, 5 mobile vegetation plots. 2 bog herbaceous assess areas of suitable bog turtle habitat. Plots will be assessed in MY1, MY2, MY3, MY5 and MY7.	10/14 (71%) veg plots have a stem density greater than 320 stems per acre. Both bog plots have a vegetative cover of 80% and greater than 50% of the species have an indicator status of FAC - OBL.

Table 2: Goals, Performance Criteria, and Functional Improvements

Goal	Objective/Treatment	Likely Functional Uplift	Performance Criteria	Measurement	Cumulative Monitoring Results
Improve the stability of stream channels.	Construct stream channels slated for restoration with stable dimensions and appropriate depth relative to the existing floodplain. Add bank revetments and instream structures to protect restored/ enhanced streams.	Reduction of sediment inputs from bank erosion, shear stress and increase floodplain engagement.	ER remains greater than 2.2 for C channels and 1.4 for B channels, and a BHR of less than 1.2. Visual assessments showing progression towards stability.	14 cross-sections surveyed in MY1, 2, 3, 5, & 7.	Streams and structures are stable. BHR is <1.2, and entrenchment ratios are >1.4 for B channels and >2.2 for C channels.
Improve instream habitat.	Install habitat features such as constructed steps, cover logs, and brush toes on restored reaches. Add woody materials to channel beds. Construct pools of varying depth. Remove man-made impoundment.	Increase and diversify available habitats for macroinvertebrates, fish, and amphibians. Promote aquatic species migration and recolonization and increase in biodiversity over time.	There is no required performance standard for this metric.	N/A.	N/A
Treat concentrated agricultural runoff.	Install agricultural BMPs in areas of concentrated agricultural runoff to treat runoff before it enters the stream channel.	Reduce nutrient input from surrounding agricultural fields.	There is no required performance standard for this metric.	Annual visual assessments.	N/A
Permanently protect the project Site from harmful uses.	Establish a conservation easement on the Site.	Protect Site from encroachment on the riparian corridor and direct impact to stream and wetlands.	Prevent easement encroachment.	Visually inspect the perimeter of the Site to ensure that no easement encroachment is occurring.	No easement encroachments.

1.3 Project Attributes

The Site's immediate drainage area, as well as the surrounding watershed, has a long history of agricultural activity. Stream and wetland functional stressors for the Site were related to both historic and current land use practices. Major stream stressors for the Site pre-restoration included livestock trampling and fecal coliform inputs, lack of stabilizing stream bank and riparian vegetation, active erosion, and incision. The effects of these stressors resulted in channel instability, degraded water quality, and the loss of both aquatic and riparian habitat throughout the Site's immediate watershed when compared to reference conditions.

The overall Site topography consists of steep and confined valleys along the tributaries that flow into a more open and gradually sloped valley along the mainstem of UT to Crab Creek. All tributaries, except UT4 and UT to Crab Creek, originate as headwater seeps on the project parcels. UT4 begins below the roadway culvert of Crab Creek Road. UT to Crab Creek begins offsite and flows northeast to the project's outlet. All Site drainage areas are encompassed by the UT to Crab Creek watershed, which extends northwest past Crab Creek Road and is typically defined by forested and agricultural land use with sporadic rural residential developments. Pre-construction conditions are outlined in Table 3 below and Table 8 in Appendix C.

Table 3: Project Attributes

Project Watershed Summary Information			
Physiographic Province	Blue Ridge	**River Basin**	New River
USGS Hydrologic Unit 8-digit	5050001	**USGS Hydrologic Unit 14-digit**	5050001030020
Project Watershed Summary Information			
DWR Sub-basin	05-07-03	**2011 NLCD Land Use Classification**	Forest (35%), Agriculture (57%), Developed (8%)
Project Drainage Area (acres)	274	**Project Drainage Area Percentage of Impervious Area**	0.5%

Reach Summary Information								
Parameters	**UT to Crab Creek R1**	**UT to Crab Creek R2**	**UT1A R1**	**UT1A R2**	**UT1 R1**	**UT1 R2**	**UT3**	**UT3A**
Post-project length (feet)	2,817		1,114	110	606	84	365	146
Valley confinement (Confined, moderately confined, unconfined)	Moderately Confined	Unconfined	Confined	Moderately Confined	Unconfined	Moderately confined	Unconfined	
Drainage area (acres)	127	274	14		47		49	1
Perennial (P), Intermittent (I), Ephemeral (E)	P	P	I/P	P	P	P	P	P
NCDWR Water Quality Classification	Class C; Tr; HQW							
Dominant Stream Classification (existing)	C4b	C4b	A4	N/A	N/A	N/A	N/A	N/A
Dominant Stream Classification (proposed)	B4	C4	A4a+/B4a	N/A	N/A	N/A	N/A	N/A
Dominant Evolutionary Classification (Simon) if applicable	III	IV	III	VI	VI	IV->V	VI	VI

Table 3: Project Attributes

Parameters	UT4 R1	UT4 R2	UT5 R1	UT5 R2	UT6	UT7	Hillside Tributary
Post-project length (feet)	847	602	252	305	419	452	248
Valley confinement (Confined, moderately confined, unconfined)	Confined	Moderately Confined	Confined	Moderately Confined	Confined	Confined	Unconfined
Drainage area (acres)	27	35	10		12	23	4
Perennial (P), Intermittent (I), Ephemeral (E)	P	P	P	P	I/P	P	P
NCDWR Water Quality Classification	Class C; Tr; HQW						
Dominant Stream Classification (existing)	B4a	B4a	N/A	B4a	N/A	B4a	N/A
Dominant Stream Classification (proposed)	B4a	B4a	N/A	B4a	N/A	B4a	N/A
Dominant Evolutionary Classification (Simon) if applicable	III	IV	V	V	VI	III	V

Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Supporting Docs?**
Waters of the United States - Section 404	Yes	Yes	USACE Action ID #SAW-2018-01771
Waters of the United States - Section 401	Yes	Yes	DWR# 20181270
Division of Land Quality (Erosion and Sediment Control)	Yes	Yes	NPDES Construction Stormwater General Permit NCG010000
Endangered Species Act	Yes	Yes	Categorical Exclusion Document in Mitigation Plan
Historic Preservation Act	Yes	Yes	Categorical Exclusion Document in Mitigation Plan
Coastal Zone Management Act (CZMA)/Coastal Area Management Act (CAMA)	No	N/A	N/A
FEMA Floodplain Compliance	No	N/A	N/A
Essential Fisheries Habitat	No	N/A	N/A

Wetland Summary Information			
Parameters	**Wetlands C and F**	**Wetland N**	**All other Site Wetlands**
Pre-project area (acres)	0.303	0.932	3.637
Post-project area (acres)	N/A	N/A	N/A
Wetland Type (non-riparian, riparian)	Riparian Riverine		
Mapped Soil Series	Chester Loam, 10-25% slopes (CeE)	Alluvial Land, wet (AD)	Chester Loam, 10-25% slopes (CeE), Alluvial Land, wet (AD), Tate Loam, 6-10% slopes (TaC)
Soil Hydric Status	Hydric		

Section 2: Monitoring Year 1 Data Assessment

Annual monitoring and Site visits were conducted during MY1 to assess the condition of the project. The vegetation and stream success criteria for the Site follow the approved success criteria presented in the Mitigation Plan (Wildlands, 2020). Performance criteria for vegetation, stream, and hydrologic assessment are located in Section 1.2 Table 2: Goals, Performance Criteria, and Functional Improvements. Methodology for annual monitoring is presented in the Monitoring Year (MY) 0 Annual Report (Wildlands, 2022).

2.1 Vegetative Assessment

Please see the Current Condition Plan View (CCPV) maps for permanent vegetation plot (VP) locations, MY1 mobile plot locations, bog turtle herbaceous plot locations, and vegetation transect locations. Vegetation plot and vegetation transect photographs are located in Appendix A. All vegetation summary data for plots and transects are in Appendix B. Please note Table 6 summarizes only the "Mitigation Plan" Performance Standard stem densities. Two additional riparian species were approved by the IRT and documented in the MY0 Annual Monitoring Report (Wildlands, 2022). To account for the inclusion of the approved "Post Mitigation Plan" species, please refer to the "Post Mitigation Plan" planted densities in Table 7. These densities are used in the results discussion below.

Vegetation Monitoring Plot Results

The MY1 permanent plot planted stem density using the "Post Mitigation Plan" performance standard ranged from 283 to 526 stems per acre with 8 out of 9 on track to meet the MY3 criteria of 320 stems per acre. The only permanent plot that did not meet the MY3 criteria is VP4. However, with a stem density of 283 stems per acre, it is on track to meet the MY5 stem density criteria.

The MY1 mobile plot stem "Post Mitigation Plan" planted densities ranged from 121 to 405 stems per acre with 2 out of 5 on track to meet MY3 criteria. Of the three mobile plots that did not meet the MY3 criteria, two (R4 and R5) are located on steep hillslopes and one (R1) is located within a highly saturated existing wetland. All three mobile plots are located in areas where herbaceous vegetation is in direct competition with planted woody stems. Additionally, in MY1, stems can be easily overlooked during the assessment due to dense herbaceous cover and low stem heights.

Overall, 71% (10/14) vegetation plots are on track to meet the MY3 density criteria. The average stem height was 2 feet. The average planted density in MY1 was 364 stems per acre for the site as a whole, exceeding the MY3 criteria of 320 stems per acre. The average species diversity is five species per plot. In MY1, there is diverse native herbaceous cover throughout the Site. The riparian vegetation is becoming established and planted woody stems are continuing to develop. The riparian vegetation will continue to be assessed in future monitoring years.

MY0 Credit Release Site Walk Vegetative Action Items

As requested at the 8/17/22 MY0 Credit Release Site Walk, a separate planting zone map with stream reaches has been included in the report, as well as two additional vegetation transects to monitor the development of woody stems in wetland areas. A map delineating the herbaceous wetlands, the bog turtle habitat wetlands, and wetlands planted entirely with woody riparian species has also been included in the report appendix. In order to maintain herbaceous cover as the dominant vegetation for the bog turtle habitat, plantings of woody riparian species were limited to 15 feet from the top of bank on tributaries UT3, UT3A, UT5, UT6, and Hillside Tributary. In areas, where the bog turtle wetlands intersected the main channel corridor of UT to Crab Creek, riparian species were planted 30 feet from the top of bank. Vegetative assessment results for bog turtle and riparian wetlands are discussed below.

Wetland planting and crediting maps are included in the Figures section of the Appendix. Meeting minutes from the 8/17/22 IRT Site walk are located in Appendix F.

Bog Turtle Herbaceous Wetland Vegetation Plot Results

The bog turtle habitat was visually monitored and assessed in MY1. Both bog vegetation plots were fully vegetated with 100% cover and the dominant species had a wetland indicator status ranging from FACW-OBL. In both plots a variety of native wetland species were present but the dominant species was *Juncus effusus*. Other common species found in the plots included *Impatiens capensis, Galium tinctorium, Carex lurida, Eleocharis sp.,* and *Polygonum sp*. No native woody species or invasive species were observed in either plot. Overall, the bogs are maintaining herbaceous wetland cover to support bog turtle habitat. Summary data and photographs of each plot can be found in Appendix B and Appendix A, respectively.

Vegetation Transect Results

Two woody vegetation transects were added to monitor the survivorship of the planted riparian corridor. In MY1 vegetation transect 1 was located within the headwater wetland A along UT1A and had a total stem count of 7 woody stems, each of a different species. Transect 2 was located within wetland AA near the UT6/ UT to Crab Creek Confluence and had a total woody stem count of 5 stems. These transects will rotate throughout the 15 and 30 foot planted wooded buffers along UT to Crab Creek, UT5, and UT6 adjacent to wetland N, P, W and AA for the remaining monitoring years and are not held to the density or height requirements.

2.2 Stream Assessment

Riffle cross-sections (XS) on the restoration reaches should be stable and show minor change in bankfull area, maximum depth ratio, and width-to-depth ratio. All riffle cross-sections should fall within the parameters defined for the designated stream type. If any changes do occur, these changes will be evaluated to assess whether the stream channel is showing signs of instability. Indicators of instability include a vertically incising thalweg and/or eroding channel banks.

Morphological surveys for MY1 were conducted in August 2022. Riffle cross-section survey results indicate that channel dimensions are stable and functioning as designed on all restoration reaches with minimal adjustments from MY0 to MY1. Pool cross-sections along UT to Crab Creek show both slight aggradation and scour at various cross-sections along the restored channel from MY0 to MY1. This is an indication that sediment is moving and depositing naturally through the system over time. Cross-section plots and dimensional results are located in Appendix C.

Pebble counts were conducted in January of 2022 during the MY0 data collection and were included in the as-built report (Wildlands, 2022). However, based on a DMS Technical Workgroup memo from 10/19/21 and concurrence received on 10/28/21 from the DMS project manager, pebble count collection is no longer required for the project from MY1 – MY7. Therefore, pebble counts will not be conducted during the remaining monitoring years unless requested by the IRT or deemed necessary based on best professional judgement. A copy of the DMS Technical Workgroup Memo and the email confirmation from the DMS project manager (Personal communication, Tsomides 2021) are located in Appendix F.

2.3 Stream Hydrology Assessment

Crest Gages

An automated pressure transducer was installed on UT to Crab Creek to document bankfull events throughout the seven-year monitoring period. Henceforth, this device is referred to as a "crest gage (CG)." At the end of the seven-year monitoring period, four or more bankfull flow events must have occurred in separate years.

There were two recorded bankfull events during the first year of monitoring which have been verified by a photo of recent point bar deposition during the 10/14/22 Site walk. Based on collected rainfall obtain from the nearest rain gage station, the Site received a total of 44.8 inches of precipitation as of October 2022. The 30th and 70th percentile data collected from the SPARTA 3.5 SSW, NC WETS Station (1971 – 2000 indicate that the recorded rainfall for 2022 falls within the average amount of annual precipitation.

Two crest gages originally installed to collect bankfull events on UT4 Reach 1 and UT1A Reach 1, CG2 and CG3 respectively. During the MY0 Credit Release Site Walk meeting (Wildlands, 2022), bankfull occurrences on restored, highly sloped, B-channels were discussed, and it was decided to re-locate the gages at the same cross-sections to capture in-stream flow data. In-stream flow data for CG2 and CG3 will be reported in monitoring years 2-7. Please refer to Appendix D for hydrology summary data and gage plots, and Appendix F for the 8/17/22 MY0 Credit Release Site Walk meeting minutes for gage re-location approval. Photos of the newly installed gage locations are included in the "Supplemental Photographs" section in Appendix A.

Intermittent Stream Flow

The presence of baseflow was documented at the perennial channel start below the UT1A headwater wetland seep. In MY1, UT1A's baseflow exceeded the minimum criteria of 30 consecutive days during a normal precipitation year and recorded 271 days of consecutive stream flow. Refer to Appendix D for hydrologic data.

2.4 Wetland Hydrology Assessment

As part of the IRT's approval for the Site's Mitigation Plan, the NC DWR requested that ground water gages within existing wetlands to monitor the effect of stream restoration on existing wetland hydrology. To heed this request, two representative gages (GWG1 and GWG2) were installed in Wetland S and Wetland M to record groundwater levels twice each day. The established growing season for Allegheny County, NC is from April 26 through October 11 under typical precipitation conditions compiled from the SPARTA 3.5 SSW, NC WETS Station (1971 – 2000). The groundwater gages are not being held to success criteria and were installed solely to verify the continuation of hydrology. The groundwater gage plots are available in Appendix D.

2.5 Areas of Concern and Management Activity

MY1 Maintenance Activities

During MY1 the following easement encroachments were resolved during the MY1 maintenance activities and the changes are reflected on the CCPV maps.

UT to Crab Creek Reach 1:

- Sta. 103+33 - 103+38: Downstream of the crossing in the right floodplain, the 5 LF of riprap along the headwall that encroached into the easement was removed.

UT4 Reach 2:

- Sta. 413+47 – 413+54: Upstream of the crossing at the pipe inlet, the 7 LF of riprap along the headwall that encroached into the easement was removed.

UT to Crab Creek:

- Sta. 100+09 – 100+60: Fence line that was inadvertently installed from the easement corner in right floodplain to easement boundary along stream centerline was removed. Cattle do not have access on the adjacent parcels; therefore, the removal of the fence is not of concern.
- Sta. 104+50 – 106+11: A fence encroachment in right floodplain due to a missing post was moved outside of the easement boundary.

The following three, minor riprap easement encroachments were not removed during the MY1 maintenance activities.

UT4 Reach 1:

- Sta. 404+30 – 404+33: Upstream of the crossing in the right floodplain, some scattered riprap from the headwall encroaches 3 LF into the easement.

UT6:

- Sta. 605+24 – 605+26: Upstream of the crossing, the riprap apron at the pipe inlet encroaches 2 LF into the easement.
- Sta. 605+71 – 605+72: Downstream of the crossing to the right of the pipe outlet, some riprap from the headwall encroaches 1 LF into the easement.

These encroachments will remain in place because by the time the MY1 maintenance work was to be conducted, the areas had naturalized. The rock had settled into the streambank soils, and the vegetation was becoming established within the rock crevices. Since the areas are acting like a naturalized stabilization measure, the removal of such a small area of rock on each reach would have likely caused more damage than leaving it in place. The length of each riprap crossing encroachment has been removed from the stream length; however, the credits for each reach did not change from what was approved in the Mitigation Plan.

IRT Site Walk Follow-Up

All action items discussed in the 8/17/22 MY0 Credit Release Site Walk meeting minutes located in the Appendix F have been addressed. A coir log check was added at the corner of UT4 and the UT to Crab Creek confluence. A partial baffle was added to right culvert inlet on the UT to Crab Creek Crossing 2 located at station 114+46 to direct baseflow to one culvert. The piping log sill on UT to Crab Creek R1 station 113+46 was notched to allow flow over the structure. The drop across the J-hook on UT to Crab Creek station 112+09 was repaired by adding splash rock and building up the downstream head of riffle to decrease the grade change over the structure. Treatment of multiflora rose (*Rosa multiflora*) took place in October 2022 within the existing forested areas of the easement along UT1A and UT6. Areas will continue to be monitored and treated as necessary in the remaining monitoring years. Documentation of the repairs listed above are located in the repair photographs in Appendix A. A separate planting map and vegetation transects have been added to the MY1 report as discussed in Section 2.1.

2.6 Monitoring Year 1 Summary

In MY1, the Site has met the required performance success criteria. Cross-section survey results indicate that channel dimensions are stable and functioning as designed on all restoration reaches. Seventy-one percent of vegetation plots met MY3 criteria, with an average planted stem density of 364 stems per acre. The four vegetation plots with low stem densities are likely to improve as woody stems continue to develop and resprout, and volunteers become established in the riparian corridor. There are a diverse

mix of native herbaceous species throughout the Site. Both bog vegetation plots were fully vegetated with 100% herbaceous cover, and their dominant species had a wetland indicator status ranging from FACW-OBL. SG1 recorded 271 days of consecutive flow, and two bankfull events were documented during MY1. CG2 and CG3 located on UT4 and UT1A, respectively, were moved on 10/14/22 to capture in-stream flow data that will be included in all future monitoring reports per discussion with the IRT during the MY0 Credit Release Site Walk (Wildlands, 2022). Fencing and culvert headwall encroachment adjustments were completed in March 2022. All action items requested by the IRT during the MY0 Credit Release Site Walk (Wildlands, 2022) have been addressed and documentation has been provided in the report text and appendices. Treatment of multiflora rose (*Rosa multiflora*) took place in October 2022 within the existing forested easement along UT1A and UT6. All areas of the project Site will continue to be monitored and treated as necessary throughout remaining monitoring years.

Section 3: REFERENCES

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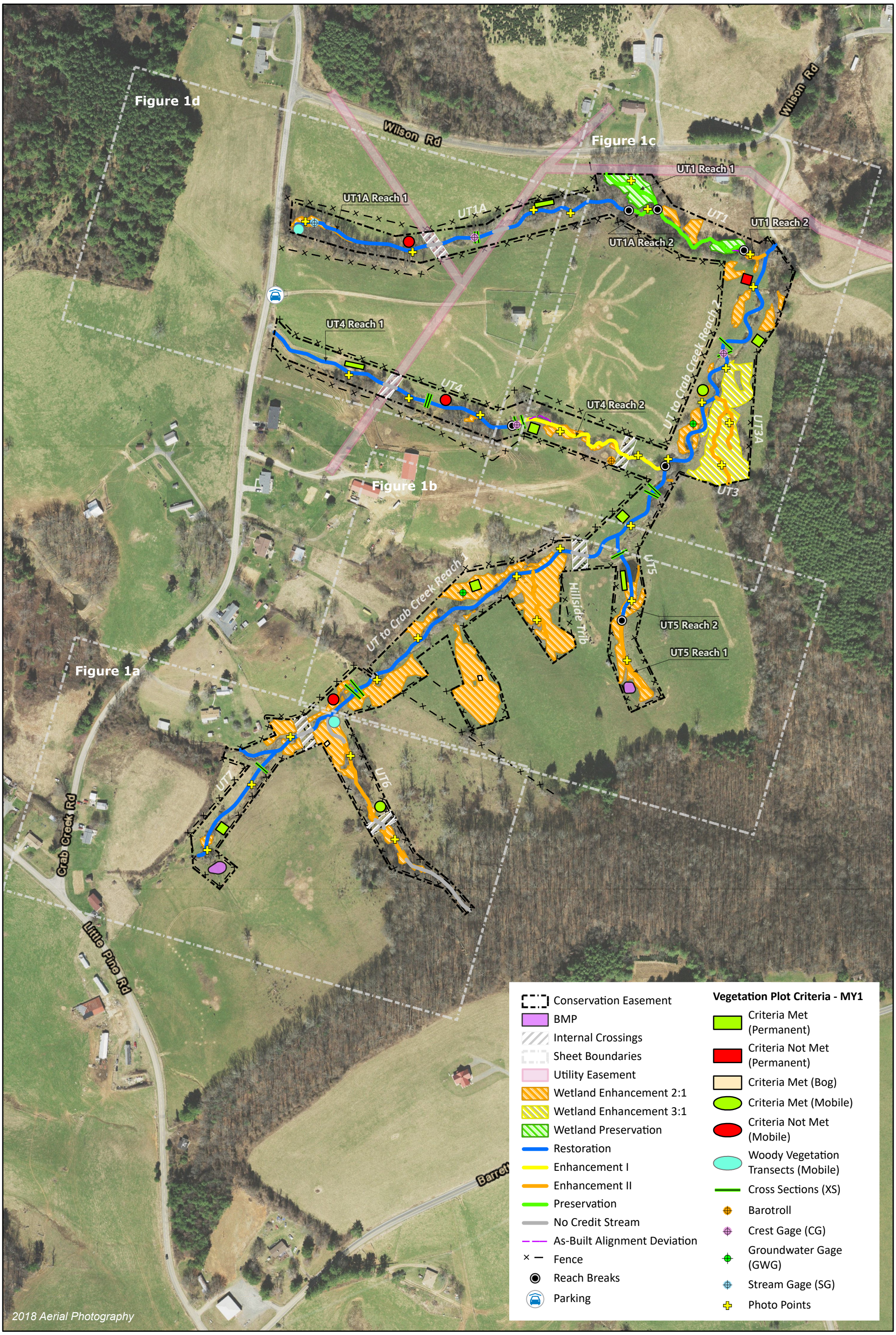


WILDLANDS ENGINEERING

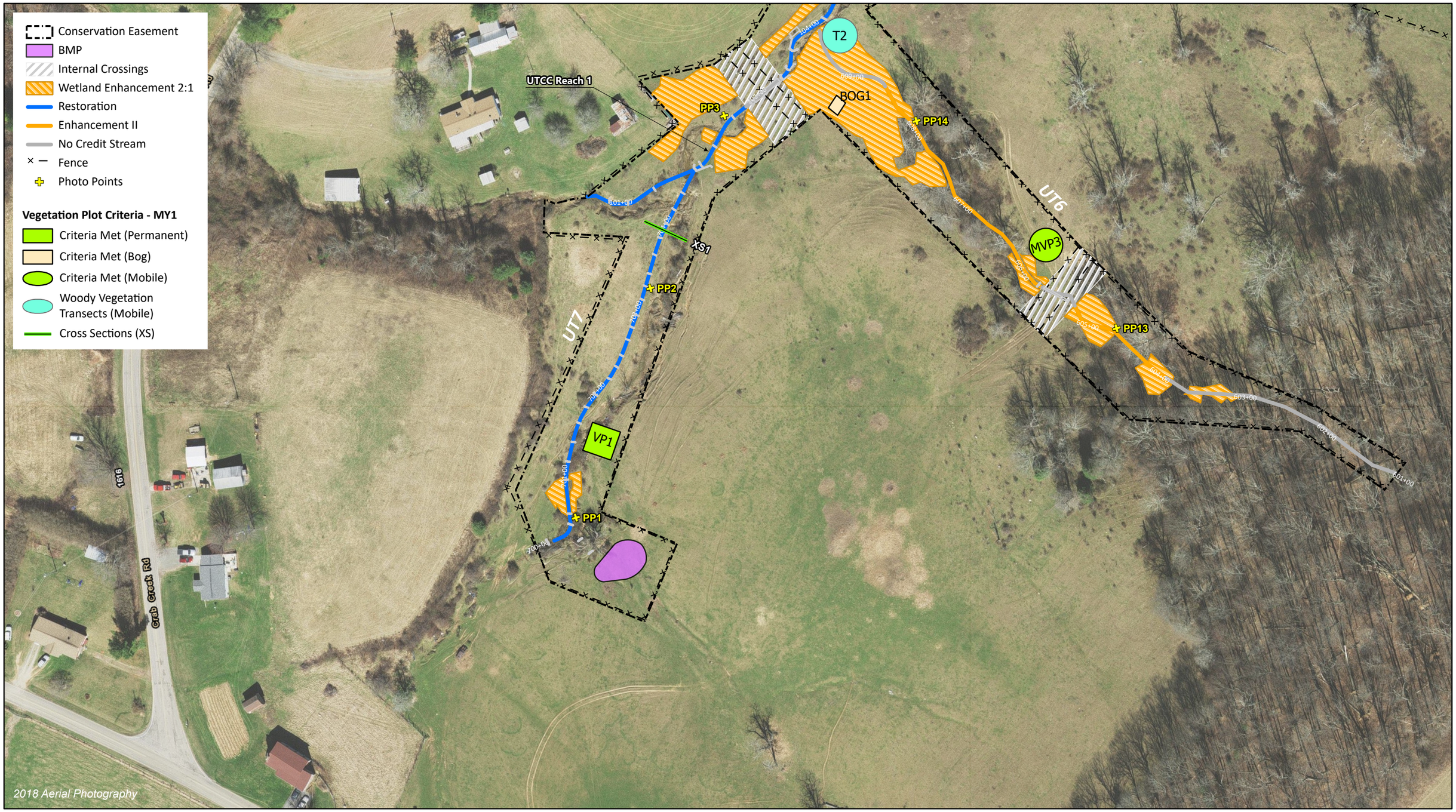
Environmental Quality

0 300 600 Feet

N

Figure 1 Current Condition Plan View (Key)
Double H Farms Mitigation Site
DMS Project No. 100082
New River Basin (05050001)
Monitoring Year 1 - 2022

Alleghany County, NC



WILDLANDS ENGINEERING

Environmental Quality

0 100 200 Feet

Figure 1a Current Condition Plan View
Double H Farms Mitigation Site
DMS Project No. 100082
New River Basin (05050001)
Monitoring Year 1 - 2022

Alleghany County, NC

2018 Aerial Photography

UTCC Reach 1

UT5 Reach 2

UT5 Reach 1

Hillside Trib

UT to Crab Creek

PP4 PP5 PP6 PP7 PP8 PP15 PP16 PP17

VP2 VP6

GWG1

XS2 XS3 XS8

BOG2

MVP1

Conservation Easement
BMP
Internal Crossings
Wetland Enhancement 2:1
Restoration
Enhancement II
No Credit Stream
Fence
Reach Breaks

Vegetation Plot Criteria - MY1

Criteria Met (Permanent)
Criteria Met (Bog)
Criteria Not Met (Mobile)
Cross Sections (XS)
Groundwater Gage (GWG)
Photo Points

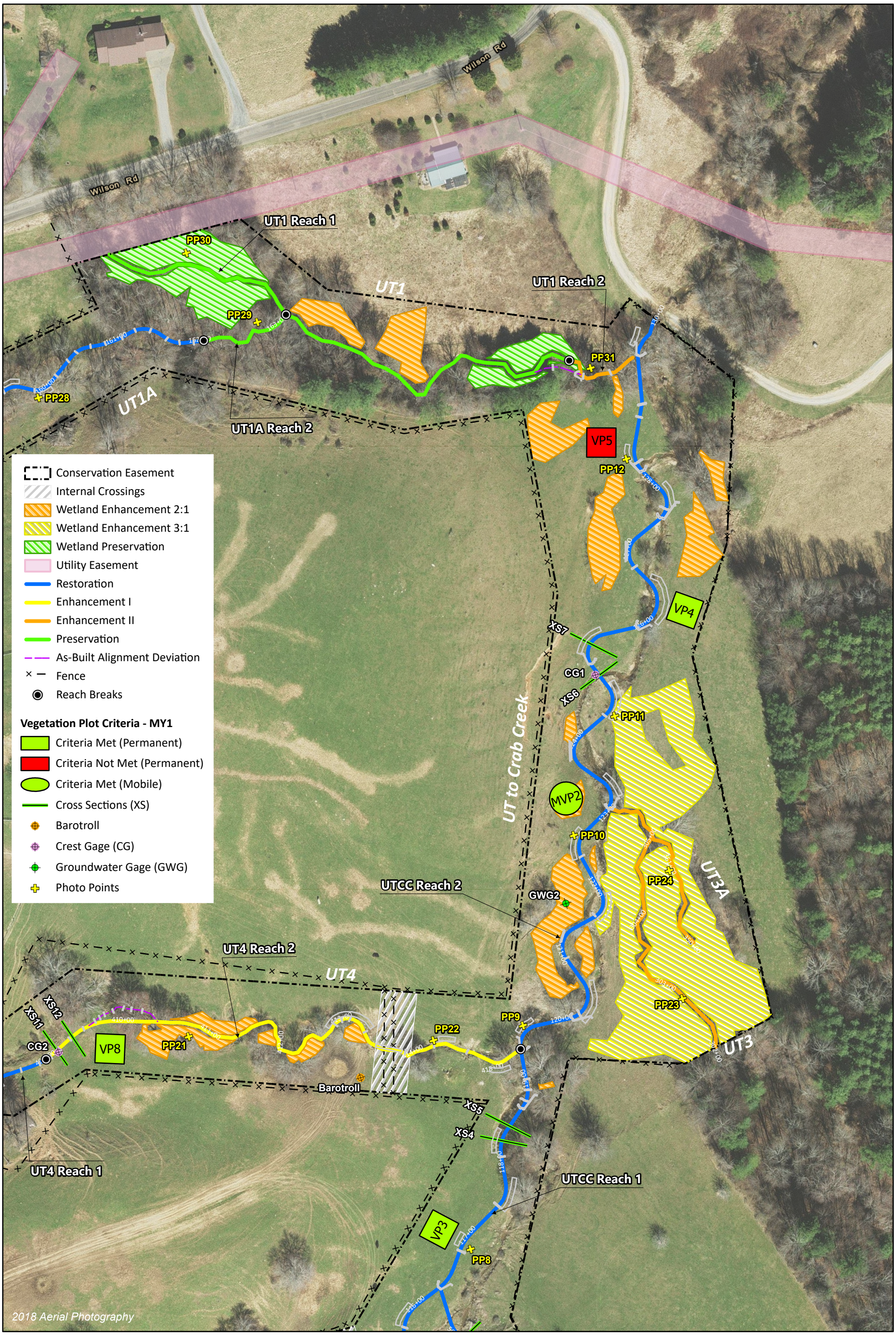
WILDLANDS ENGINEERING

Environmental Quality

0 100 200 Feet

Figure 1b Current Condition Plan View
Double H Farms Mitigation Site
DMS Project No. 100082
New River Basin (05050001)
Monitoring Year 1 - 2022

Alleghany County, NC



WILDLANDS ENGINEERING

Environmental Quality

0 100 200 Feet

Figure 1c Current Condition Plan View
Double H Farms Mitigation Site
DMS Project No. 100082
New River Basin (05050001)
Monitoring Year 1 - 2022

Alleghany County, NC

WILDLANDS ENGINEERING

NC Environmental Quality

0 100 200 Feet

Figure 1d Current Condition Plan View Map
Double H Farms Mitigation Site
DMS Project No. 100082
New River Basin (05050001)
Monitoring Year 1 - 2022

Alleghany County, NC

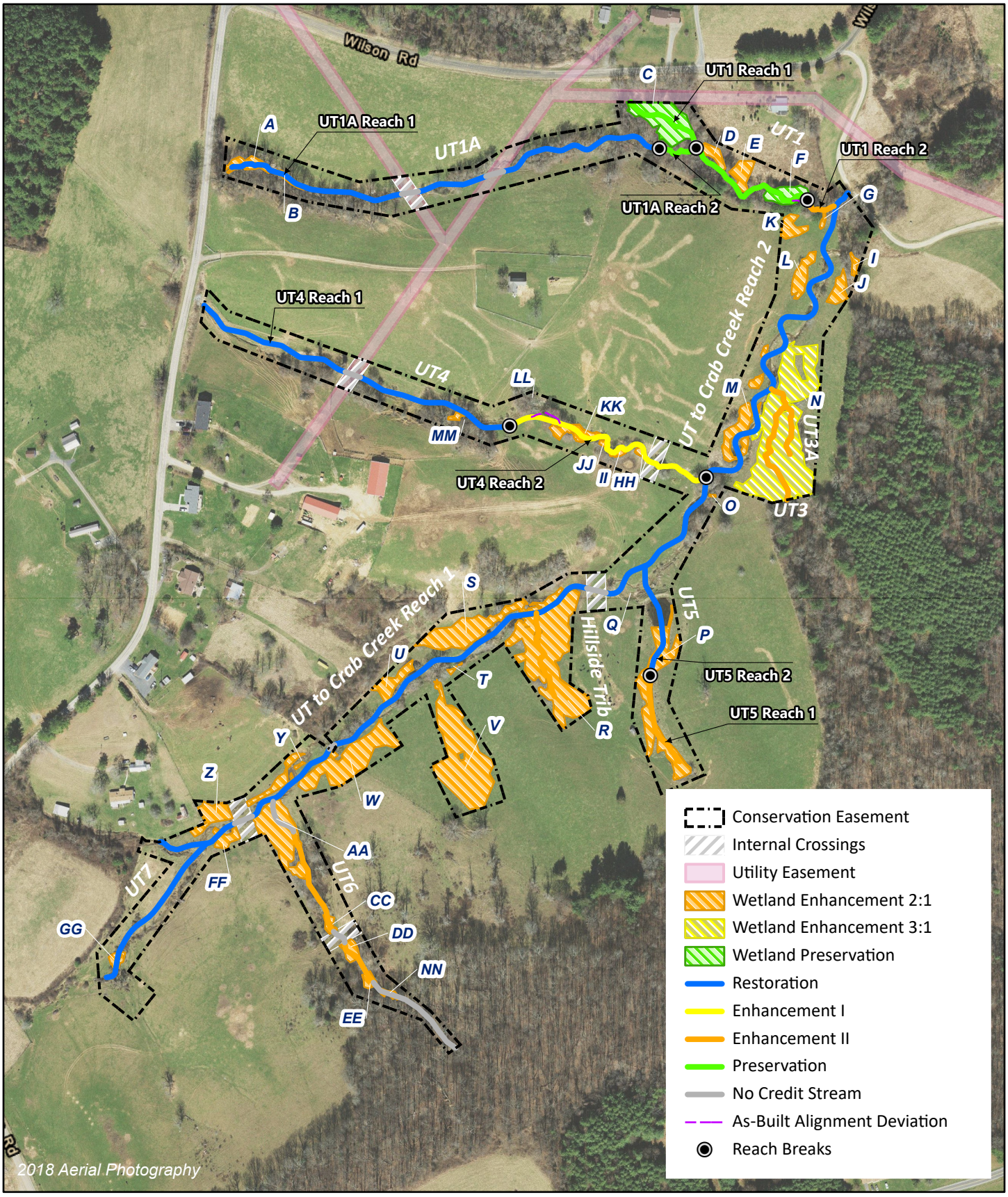


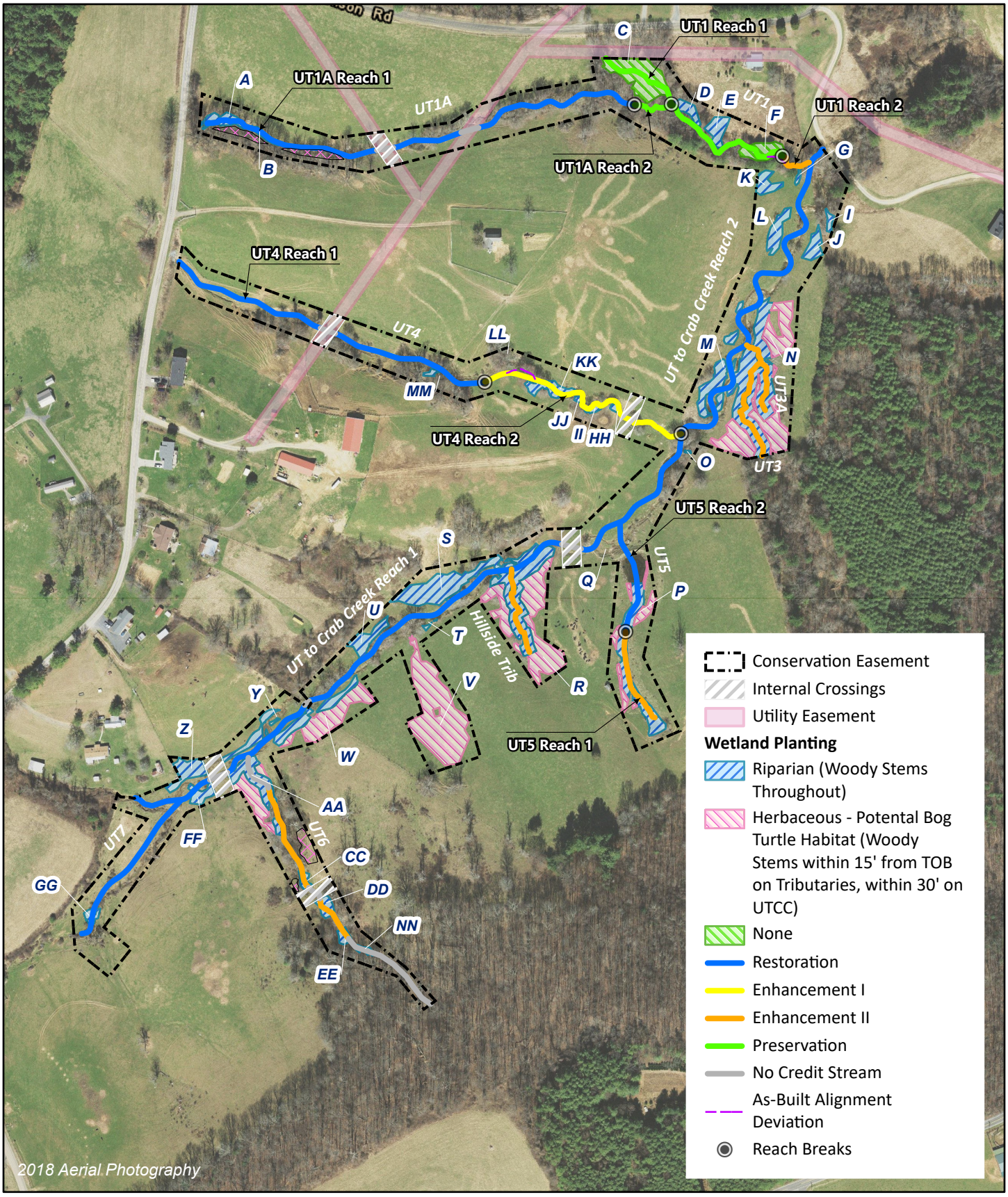
Figure 2a Project Component and Wetland Asset Map
Double H Farms Mitigation Site
DMS Project No. 100082
New River Basin (05050001)
Monitoring Year 1 - 2022

Alleghany County, NC

WILDLANDS ENGINEERING

NC Environmental Quality

0 350 Feet



WILDLANDS ENGINEERING

Environmental Quality

0 350 Feet

Figure 2b Wetland Planting Map
Double H Farms Mitigation Site
DMS Project No. 100082
New River Basin (05050001)
Monitoring Year 1 - 2022

Alleghany County, NC

APPENDIX A. Visual Assessment Data

Table 4a. Visual Stream Morphology Stability Assessment Table

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

UT to Crab Creek Date last assessed: 10/12/2022

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-Built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	2,817
					Assessed Bank Length	5,634
Bank	**Surface Scour/ Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse.			0	100%
					Totals: **0**	**100%**
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	59	59		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	25	25		100%

UT1A Reach 1 Date last assessed: 10/12/2022

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-Built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	1,114
					Assessed Bank Length	2,228
Bank	**Surface Scour/ Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse.			0	100%
					Totals: **0**	**100%**
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	65	65		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	2	2		100%

Table 4b. Visual Stream Morphology Stability Assessment Table

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

UT4 Reach 1 Date last assessed: 10/12/2022

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-Built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	847
					Assessed Bank Length	1,694
Bank	**Surface Scour/ Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse.			0	100%
					Totals:	**100%**
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	41	41		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	7	7		100%

UT4 Reach 2 Date last assessed: 10/12/2022

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-Built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	602
					Assessed Bank Length	1,204
Bank	**Surface Scour/ Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse.			0	100%
					Totals:	**100%**
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	16	16		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	3	3		100%

Table 4c. Visual Stream Morphology Stability Assessment Table

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

UT5 Reach 2 Date last assessed: 10/12/2022

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-Built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	305
					Assessed Bank Length	610
Bank	**Surface Scour/ Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse.			0	100%
					Totals:	**100%**
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	32	32		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	1	1		100%

UT7 Date last assessed: 10/12/2022

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-Built	Amount of Unstable Footage	% Stable, Performing as Intended
					Assessed Stream Length	452
					Assessed Bank Length	904
Bank	**Surface Scour/ Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse.			0	100%
					Totals:	**100%**
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	22	22		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	0	0		N/A

Table 5. Vegetation Condition Assessment Table
Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Date Last Assessed: 10/12/2022
Planted Acreage **17.70**

Vegetation Category	Definitions	Mapping Threshold (ac)	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material.	0.10	0	0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on current MY stem count criteria.	0.10	0	0%
		Total	**0**	**0%**
Areas of Poor Growth Rates	Planted areas where average height is not meeting current MY Performance Standard.	0.10	0	0%
		Cumulative Total	**0.0**	**0%**

Easement Acreage **21.00**

Vegetation Category	Definitions	Mapping Threshold (ac)	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern	Invasives may occur outside of planted areas and within the easement and will therefore be calculated against the total easement acreage. Include species with the potential to directly outcompete native, young, woody stems in the short-term or community structure for existing communities. Invasive species included in summation above should be identified in report summary.	0.10	0	0%
Easement Encroachment Areas	Encroachment may be point, line, or polygon. Encroachment to be mapped consists of any violation of restrictions specified in the conservation easement. Common encroachments are mowing, cattle access, vehicular access. Encroachment has no threshold value as will need to be addressed regardless of impact area.	none	0 Encroachments Noted / 0 ac	

STREAM PHOTOGRAPHS

PHOTO POINT 1 UT7 – upstream *(8/9/2022)*

PHOTO POINT 1 UT7 – downstream *(8/9/2022)*

PHOTO POINT 2 UT7 – upstream *(8/9/2022)*

PHOTO POINT 2 UT7 – downstream *(8/9/2022)*

PHOTO POINT 3 UT to CC Reach 1 – upstream *(8/9/2022)*

PHOTO POINT 3 UT to CC Reach 1 – downstream *(8/9/2022)*

PHOTO POINT 4 UT to CC Reach 1 – upstream *(8/9/2022)*

PHOTO POINT 4 UT to CC Reach 1 – downstream *(8/9/2022)*

PHOTO POINT 5 UT to CC Reach 1 – upstream *(8/9/2022)*

PHOTO POINT 5 UT to CC Reach 1 – downstream *(8/9/2022)*

PHOTO POINT 6 UT to CC Reach 1 – upstream *(8/9/2022)*

PHOTO POINT 6 UT to CC Reach 1 – downstream *(8/9/2022)*

PHOTO POINT 7 UT to CC Reach 1 – upstream *(8/9/2022)*

PHOTO POINT 7 UT to CC Reach 1 – downstream *(8/9/2022)*

PHOTO POINT 8 UT to CC Reach 1 – upstream *(8/9/2022)*

PHOTO POINT 8 UT to CC Reach 1 – downstream *(8/9/2022)*

PHOTO POINT 9 UT to CC Reach 2 – upstream *(8/9/2022)*

PHOTO POINT 9 UT to CC Reach 2 – downstream *(8/9/2022)*

	
PHOTO POINT 10 UT to CC Reach 2 – upstream *(8/9/2022)*	**PHOTO POINT 10 UT to CC Reach 2 –** downstream *(8/9/2022)*
	
PHOTO POINT 11 UT to CC Reach 2 – upstream *(8/9/2022)*	**PHOTO POINT 11 UT to CC Reach 2 –** downstream *(8/9/2022)*
	
PHOTO POINT 12 UT to CC Reach 2 – upstream *(8/9/2022)*	**PHOTO POINT 12 UT to CC Reach 2 –** downstream *(8/9/2022)*

	
PHOTO POINT 13 UT6– upstream *(8/9/2022)*	**PHOTO POINT 13 UT6 –** downstream *(8/9/2022)*
	
PHOTO POINT 14 UT6 – upstream *(8/9/2022)*	**PHOTO POINT 14 UT6 –** downstream *(8/9/2022)*
	
PHOTO POINT 15 Hillside Tributary– upstream *(8/9/2022)*	**PHOTO POINT 15 Hillside Tributary–** downstream *(8/9/2022)*

	
PHOTO POINT 16 UT5 Reach 1 – upstream *(8/9/2022)*	**PHOTO POINT 16 UT5 Reach 1 –** downstream *(8/9/2022)*
	
PHOTO POINT 17 UT5 Reach 2 – upstream *(8/9/2022)*	**PHOTO POINT 17 UT5 Reach 2–** downstream *(8/9/2022)*
	
PHOTO POINT 18 UT4 Reach 1 – upstream *(8/9/2022)*	**PHOTO POINT 18 UT4 Reach 1 –** downstream *(8/9/2022)*

PHOTO POINT 19 UT4 Reach 1 – upstream *(8/9/2022)*

PHOTO POINT 19 UT4 Reach 1 – downstream *(8/9/2022)*

PHOTO POINT 20 UT4 Reach 1 – upstream *(8/9/2022)*

PHOTO POINT 20 UT4 Reach 1 – downstream *(8/9/2022)*

PHOTO POINT 21 UT4 Reach 2 – upstream *(8/9/2022)*

PHOTO POINT 21 UT4 Reach 2 – downstream *(8/9/2022)*

PHOTO POINT 22 UT4 Reach 2 – upstream *(8/9/2022)*

PHOTO POINT 22 UT4 Reach 2 – downstream *(8/9/2022)*

PHOTO POINT 23 UT3 – upstream *(8/9/2022)*

PHOTO POINT 23 UT3 – downstream *(8/9/2022)*

PHOTO POINT 24 UT3A – upstream *(8/9/2022)*

PHOTO POINT 24 UT3A – downstream *(8/9/2022)*

	
PHOTO POINT 25 UT1A Reach 1– upstream *(8/9/2022)*	**PHOTO POINT 25 UT1A Reach 1 –** downstream *(8/9/2022)*
	
PHOTO POINT 26 UT1A Reach 1– upstream *(8/9/2022)*	**PHOTO POINT 26 UT1A Reach 1–** downstream *(8/9/2022)*
	
PHOTO POINT 27 UT1A Reach 1– upstream *(8/9/2022)*	**PHOTO POINT 27 UT1A Reach 1–** downstream *(8/9/2022)*

	
PHOTO POINT 28 UT1A Reach 1– upstream *(8/9/2022)*	**PHOTO POINT 28 UT1A Reach 1–** downstream *(8/9/2022)*
	
PHOTO POINT 29 UT1A Reach 2 – upstream *(8/9/2022)*	**PHOTO POINT 29 UT1A Reach 2–** downstream *(8/9/2022)*
	
PHOTO POINT 30 UT1 Reach 1– upstream *(8/9/2022)*	**PHOTO POINT 30 UT1 Reach 1–** downstream *(8/9/2022)*

	
PHOTO POINT 31 UT1 Reach 2– upstream *(8/9/2022)*	**PHOTO POINT 31 UT1 Reach 2 –** downstream *(8/9/2022)*

INTERNAL CROSSING PHOTOGRAPHS

	
UT to Crab Creek Reach 1 Crossing 1 (102+83) **–** inlet *(10/12/2022)*	**UT to Crab Creek Reach 1 Crossing 1** (103+33) **–** outlet *(10/12/2022)*
	
UT to Crab Creek R1 Crossing 2 (114+46) **–** inlet *(10/12/2022)*	**UT to Crab Creek R1 Crossing 2** (114+98) **–** outlet *(10/12/2022)*
	
UT1A Reach 1 Crossing (154+73) **–** inlet *(10/12/2022)*	**UT1A Reach 1 Crossing** (155+17) **–** outlet *(10/12/2022)*

	
UT4 Reach 1 Crossing (404+33) **–** inlet *(10/12/2022)*	**UT4 Reach 1 Crossing** (404+74) **–** outlet *(10/12/2022)*
	
UT4 Reach 2 Crossing (413+54) **–** inlet *(10/12/2022)*	**UT4 Reach 2 Crossing** (413+96) **–** outlet *(10/12/2022)*
	
UT6 Crossing (605+26) **–** inlet *(10/12/2022)*	**UT6 Crossing** (605+71) **– o**utlet *(10/12/2022)*

REPAIR PHOTOGRAPHS

Stream Repairs	
	
UT to Crab Creek R1 Crossing 2 (114+54) **–** Culvert Baseflow Adjustment for Aquatic Organism Passage (AOP) *(10/12/2022)*	**UT to Crab Creek R1** (113+46) **–** Piping Log Sill Repair *(10/12/2022)*
	
UT to Crab Creek R1 J-Hook (112+09) **–** Splash Rock Installation for AOP *(10/12/2022)*	**UT to Crab Creek R2/ UT4 Confluence–** Coir Log Install to Mitigate Overland Sediment Influx from Area Outside of the Conservation Easement *(10/12/2022)*

Fencing Repairs & Invasive Management

UT to Crab Creek R1 (Station 104+75 – 106+25) – Fence Relocated Outside of Conservation Easement *(10/12/2022)*

UT to Crab Creek R1 (Approximately Station 100+00 – 100+60) – Fence Removed from Inside Conservation Easement *(10/12/2022)*

UT6 – Invasive Treatment Along EII channel *(10/12/2022)*

SUPPLEMENTAL PHOTOGRAPHS

UT to Crab Creek Point Bar Deposition – *(10/14/2022)*

UT1A R1 Start of Stream Flow – *(10/14/2022)*

UT1A R1 Top of Bank CG3 In-stream Location – *(10/14/2022)*

UT1A R1 CG3 Relocated In-stream – *(10/14/2022)*

UT4 R1 Top of Bank CG2 Location – *(10/14/2022)*

UT4 R1 CG2 Relocated In-stream – *(10/14/2022)*

PERMANENT VEGETATION PLOT PHOTOGRAPHS

PERMANENT VEGETATION PLOT 1 *(8/10/2022)*

PERMANENT VEGETATION PLOT 2 *(8/10/2022)*

PERMANENT VEGETATION PLOT 3 *(8/10/2022)*

PERMANENT VEGETATION PLOT 4 *(8/10/2022)*

PERMANENT VEGETATION PLOT 5 *(8/10/2022)*

PERMANET VEGETATION PLOT 6 *(8/10/2022)*

PERMANENT VEGETATION PLOT 7 *(8/10/2022)*

PERMANENT VEGETATION PLOT 8 *(8/10/2022)*

PERMANENT VEGETATION PLOT 9 *(8/10/2022)*

MOBILE VEGETATION PLOT PHOTOGRAPHS

MOBILE VEGETATION PLOT 1 FACING NORTH *(8/10/2022)*

MOBILE VEGETATION PLOT 2 FACING NORTH *(8/10/2022)*

MOBILE VEGETATION PLOT 3 FACING NORTH *(8/10/2022)*

MOBILE VEGETATION PLOT 4 FACING NORTH *(8/10/2022)*

MOBILE VEGETATION PLOT 5 FACING NORTH *(8/10/2022)*

BOG VEGETATION PLOT PHOTOGRAPHS

	
BOG VEGETATION PLOT 1 *(8/10/2022)*	**BOG VEGETATION PLOT 2** *(8/10/2022)*

VEGETATION TRANSECT PHOTOGRAPHS

	
VEGETATION TRANSECT 1 EAST FACING *(10/13/2022)*	**VEGETATION TRANSECT 2 NORTH FACING** *(10/13/2022)*

APPENDIX B. Vegetation Plot Data

Table 6a. Vegetation Plot Data

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Planted Acreage	17.7
Date of Initial Plant	2022-01-25
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	NA
Date of Current Survey	2022-08-10
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 1 F		Veg Plot 2 F		Veg Plot 3 F		Veg Plot 4 F		Veg Plot 5 F		Veg Plot 6 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	Acer negundo	boxelder	Tree	FAC					3	3					2	2
	Alnus serrulata	hazel alder	Tree	OBL			2	2	5	5						
	Betula nigra	river birch	Tree	FACW					1	1					3	3
	Carpinus caroliniana	American hornbeam	Tree	FAC							2	2	2	2		
	Diospyros virginiana	common persimmon	Tree	FAC	1	1					2	2	3	3	1	1
	Euonymus americanus	bursting-heart	Shrub	FAC							1	1				
	Liriodendron tulipifera	tuliptree	Tree	FACU												
	Oxydendrum arboreum	sourwood	Shrub	UPL												
	Physocarpus opulifolius	common ninebark	Shrub	FACW									1	1		
	Platanus occidentalis	American sycamore	Tree	FACW	2	2	7	7	2	2	4	4			4	4
	Prunus serotina	black cherry	Tree	FACU							2	2				
	Quercus alba	white oak	Tree	FACU	3	3										
	Quercus rubra	northern red oak	Tree	FACU	1	1										
	Sambucus canadensis	American black elderberry	Tree				2	2	2	2					1	1
Sum	Performance Standard				7	7	11	11	13	13	11	11	6	6	11	11
Post Mitigation Plan Species	Aesculus sylvatica	painted buckeye	Tree	FAC							1	1				
	Morus rubra	red mulberry	Tree	FACU	4	4					1	1	1	1		
Sum	Proposed Standard				11	11	11	11	13	13	13	13	7	7	11	11
Mitigation Plan Performance Standard	Current Year Stem Count					7		11		13		11		6		11
	Stems/Acre					283		364		526		445		243		445
	Species Count					4		3		5		5		3		5
	Dominant Species Composition (%)					36		64		38		31		43		36
	Average Plot Height (ft.)					2		2		2		2		2		2
	% Invasives					0		0		0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					11		11		13		13		7		11
	Stems/Acre					445		364		526		526		283		445
	Species Count					5		3		5		7		4		5
	Dominant Species Composition (%)					36		64		38		31		43		36
	Average Plot Height (ft.)					2		2		2		2		1		2
	% Invasives					0		0		0		0		0		0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.

2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).

3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 6b. Vegetation Plot Data Continued

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Planted Acreage	17.7
Date of Initial Plant	2022-01-25
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	NA
Date of Current Survey	2022-08-10
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 7 F		Veg Plot 8 F		Veg Plot 9 F		Veg Plot 1 R	Veg Plot 2 R	Veg Plot 3 R	Veg Plot 4 R	Veg Plot 5 R
					Planted	Total	Planted	Total	Planted	Total	Total	Total	Total	Total	Total
Species Included in Approved Mitigation Plan	Acer negundo	boxelder	Tree	FAC											1
	Alnus serrulata	hazel alder	Tree	OBL								1			
	Betula nigra	river birch	Tree	FACW											
	Carpinus caroliniana	American hornbeam	Tree	FAC								2			
	Diospyros virginiana	common persimmon	Tree	FAC					2	2		1	1		2
	Euonymus americanus	bursting-heart	Shrub	FAC			2	2	2	2				1	
	Liriodendron tulipifera	tuliptree	Tree	FACU					1	1	1		1		
	Oxydendrum arboreum	sourwood	Shrub	UPL										1	
	Physocarpus opulifolius	common ninebark	Shrub	FACW											
	Platanus occidentalis	American sycamore	Tree	FACW	3	3	2	2	3	3	2	1	2	1	1
	Prunus serotina	black cherry	Tree	FACU	2	2						1			
	Quercus alba	white oak	Tree	FACU	3	3	1	1					5	2	
	Quercus rubra	northern red oak	Tree	FACU	1	1	3	3				1	1		1
	Sambucus canadensis	American black elderberry	Tree												
Sum	Performance Standard				9	9	8	8	8	8	3	7	10	5	5
Post Mitigation Plan Species	Aesculus sylvatica	painted buckeye	Tree	FAC			1	1				1			
	Morus rubra	red mulberry	Tree	FACU	1	1			2	2				2	
Sum	Proposed Standard				10	10	9	9	10	10	3	8	10	7	5
Mitigation Plan Performance Standard	Current Year Stem Count					9		8		8	3	7	10	5	5
	Stems/Acre					364		324		324	121	283	405	202	202
	Species Count					4		4		4	2	6	5	4	4
	Dominant Species Composition (%)					30		33		30	67	25	50	29	40
	Average Plot Height (ft.)					3		2		2	2	2	2	1	2
	% Invasives					0		0		0	0	0	0	0	0
Post Mitigation Plan Performance Standard	Current Year Stem Count					10		9		10	3	8	10	7	5
	Stems/Acre					405		364		405	121	324	405	283	202
	Species Count					5		5		5	2	7	5	5	4
	Dominant Species Composition (%)					30		33		30	67	25	50	29	40
	Average Plot Height (ft.)					2		2		2	2	2	2	1	2
	% Invasives					0		0		0	0	0	0	0	0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.

2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).

3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 7a. Vegetation Performance Standards Summary Table

Double H Farms Mitigation Site

DMS Project No. 100082

Monitoring Year 1 - 2022

Vegetation Performance Standards Summary Table												
	Veg Plot 1 F				Veg Plot 2 F				Veg Plot 3 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1	283*	2	4*	0	364	2	3	0	526	2	5	0
Monitoring Year 0	324	2	5	0	567	2	4	0	648	2	6	0
	Veg Plot 4 F				Veg Plot 5 F				Veg Plot 6 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1	445*	2	5*	0	243*	2	3*	0	445	2	5	0
Monitoring Year 0	445	2	5	0	364	2	5	0	688	2	7	0
	Veg Plot 7 F				Veg Plot 8 F				Veg Plot 9 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1	364*	3	4*	0	324*	2	4*	0	324*	2	4*	0
Monitoring Year 0	405	2	5	0	405	2	5	0	364	2	4	0
	Veg Plot Group 1 R				Veg Plot Group 2 R				Veg Plot Group 3 R			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1	121	2	2	0	283*	2	6*	0	405	2	5	0
Monitoring Year 0	364	2	7	0	567	2	10	0	567	2	7	0
	Veg Plot Group 4 R				Veg Plot Group 5 R							
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives				
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1	202*	1	4*	0	202	2	4	0				
Monitoring Year 0	445	2	7	0	324	2	6	0				

Each monitoring year represents a different plot for the random vegetation plot "groups". Random plots are denoted with an R, and fixed plots with an F.

*For stem densities and number of species in plots that include post-mitigation plan approved species please refer to Table 7 for the "Post Mitigation Plan Performance Standard" referenced in the text.

7b. Bog Herbaceous Wetland Vegetation Plot Data

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Bog Plot 1					
Absolute Plot Cover	**Species**			**Wetland Indicator Status**	**Dominant Species?**
	Scientific Name	**Common Name**	**% of total cover**		
100%	*Juncus effusus*	Soft Rush	70%	FACW	Y
	Impatiens capensis	Jewelweed	5%	FACW	N
	Persicaria sagittata	Tearthumb	4%	OBL	N
	Leersia oryzoides	Rice Cutgrass	4%	OBL	N
	Panicum clandestinum	Deertongue	4%	FAC	N
	Galium tinctorium	Bedstraw	5%	OBL	N
	Solidago sp.	Goldenrod	4%	FACU - OBL	N
	Eleocharis sp.	Spike-Rush	4%	FACW - OBL	N

Bog Plot 2					
Absolute Plot Cover	**Species**			**Wetland Indicator Status**	**Dominant Species?**
	Scientific Name	**Common Name**	**% of total cover**		
100%	*Juncus effusus*	Soft Rush	40%	FACW	Y
	Carex lurida	Shallow Sedge	35%	OBL	Y
	Verbesina sp.	Crownbeard	2%	FACU - FAC	N
	Polygonum sp.	Smartweed	5%	FAC - OBL	N
	Persicaria sagittata	Tearthumb	2%	OBL	N
	Eupatorium perfoliatum	Boneset	2%	FACW	N
	Lycopus uniflorus	Northern Horehound	2%	OBL	N
	Vernonia noveboracensis	Ironweed	2%	FACW	N
	Eleocharis sp.	Spike-Rush	10%	FACW - OBL	N

Table 7c. Vegetation Transect Table

Vegetation Plot Data

DMS Project No. 100082

Monitoring Year 1 - 2022

Transect 1: UT1A Wetland		
Scientific Name	Performance Standard Approval	MY1 Stems
Prunus serotina	Approved Mit Plan	1
Platanus occidentalis	Approved Mit Plan	1
Morus rubra	Approved Post Mit Plan	1
Quercus rubra	Approved Mit Plan	1
Liriodendron tulipifera	Approved Mit Plan	1
Diospyros virginiana	Approved Mit Plan	1
Cornus amomum	Approved Mit Plan	1
	TOTAL STEM COUNT:	**7**
	TOTAL SPECIES COUNT:	**7**
	AVERAGE PLOT HEIGHT (Meters)	**0.7**

Transect 2: Wetland AA: UT6/ UT to Crab Creek Confluence		
Scientific Name	Performance Standard Approval	MY1 Stems
Salix nigra	Approved Mit Plan	2
Platanus occidentalis	Approved Mit Plan	1
Prunus serotina	Approved Mit Plan	1
Diospyros virginiana	Approved Mit Plan	1
	TOTAL STEM COUNT:	**5**
	TOTAL SPECIES COUNT:	**4**
	AVERAGE PLOT HEIGHT (Meters)	**0.5**

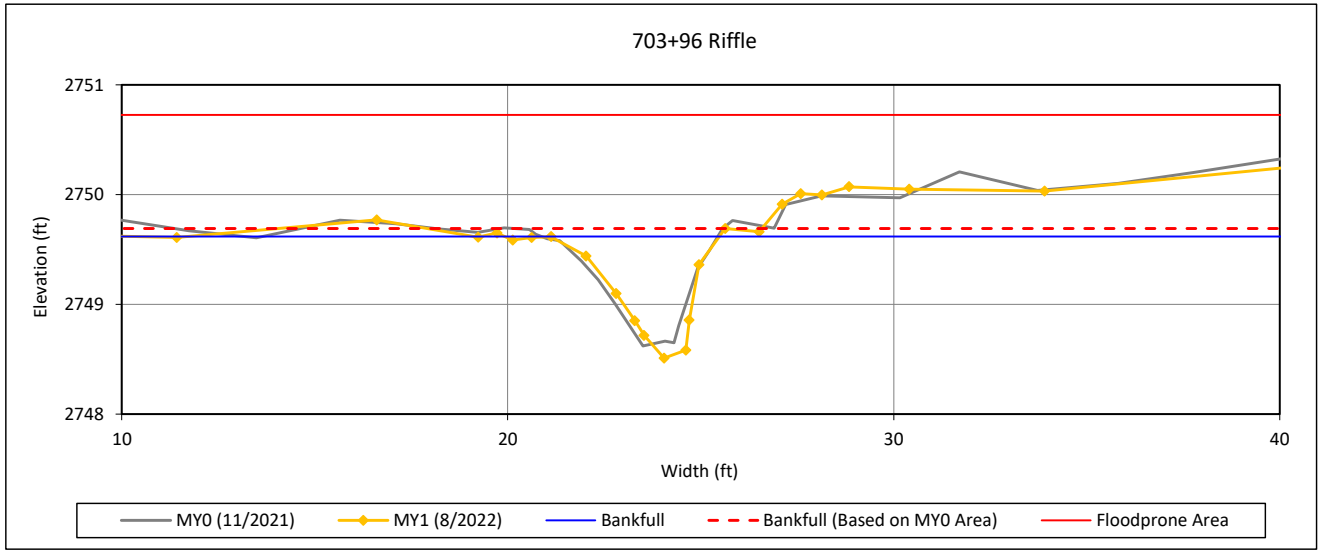
Transects are not held to density or height requirements per MY0 IRT site walk comments (8/17/2022) in Appendix F.

APPENDIX C. Stream Geomorphology Data

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Cross-Section 1 - UT7



Bankfull Dimensions	
2.3	x-section area (ft.sq.)
4.4	width (ft)
0.5	mean depth (ft)
1.1	max depth (ft)
5.2	wetted perimeter (ft)
0.4	hydraulic radius (ft)
8.4	width-depth ratio
52.0	W flood prone area (ft)
11.9	entrenchment ratio
1.0	low bank height ratio

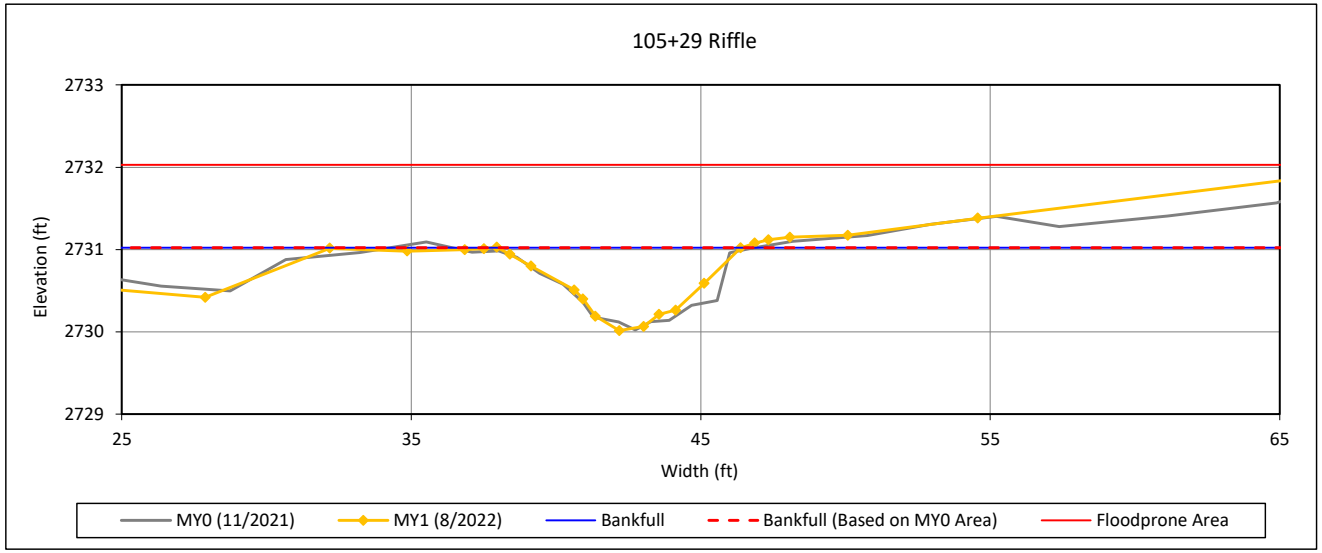
Survey Date: 8/2022
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Cross-Section 2 - UT to Crab Creek R1



Bankfull Dimensions	
4.5	x-section area (ft.sq.)
8.4	width (ft)
0.5	mean depth (ft)
1.0	max depth (ft)
8.7	wetted perimeter (ft)
0.5	hydraulic radius (ft)
15.5	width-depth ratio
69.3	W flood prone area (ft)
8.3	entrenchment ratio
1.0	low bank height ratio

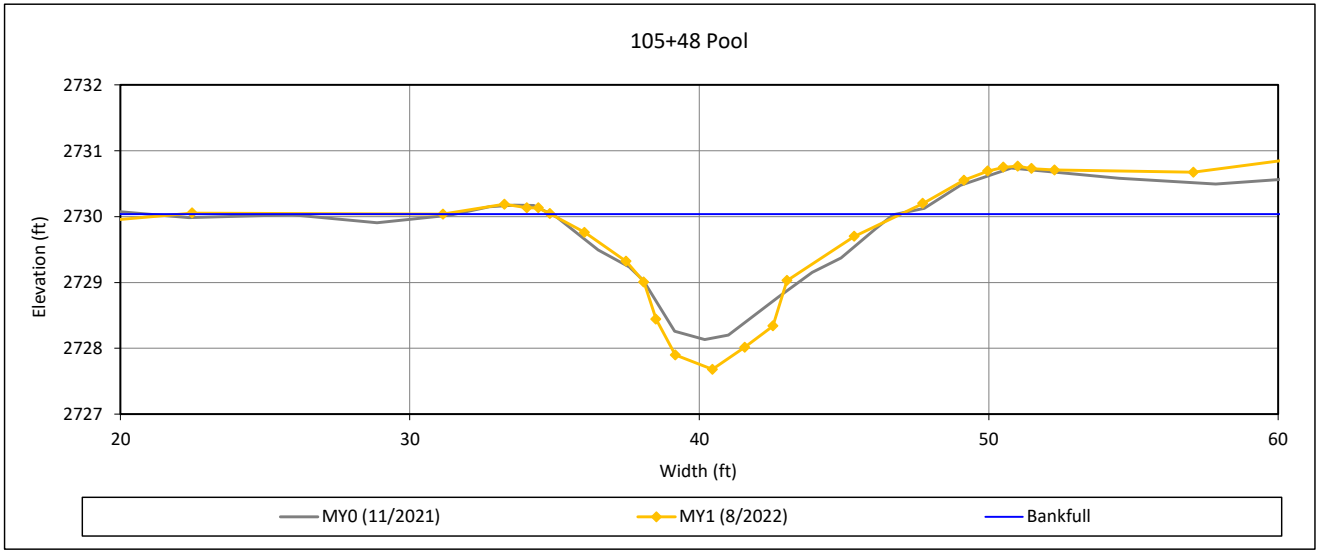
Survey Date: 8/2022
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Cross-Section 3 - UT to Crab Creek R1



Bankfull Dimensions	
12.9	x-section area (ft.sq.)
12.1	width (ft)
1.1	mean depth (ft)
2.4	max depth (ft)
13.4	wetted perimeter (ft)
1.0	hydraulic radius (ft)
11.4	width-depth ratio

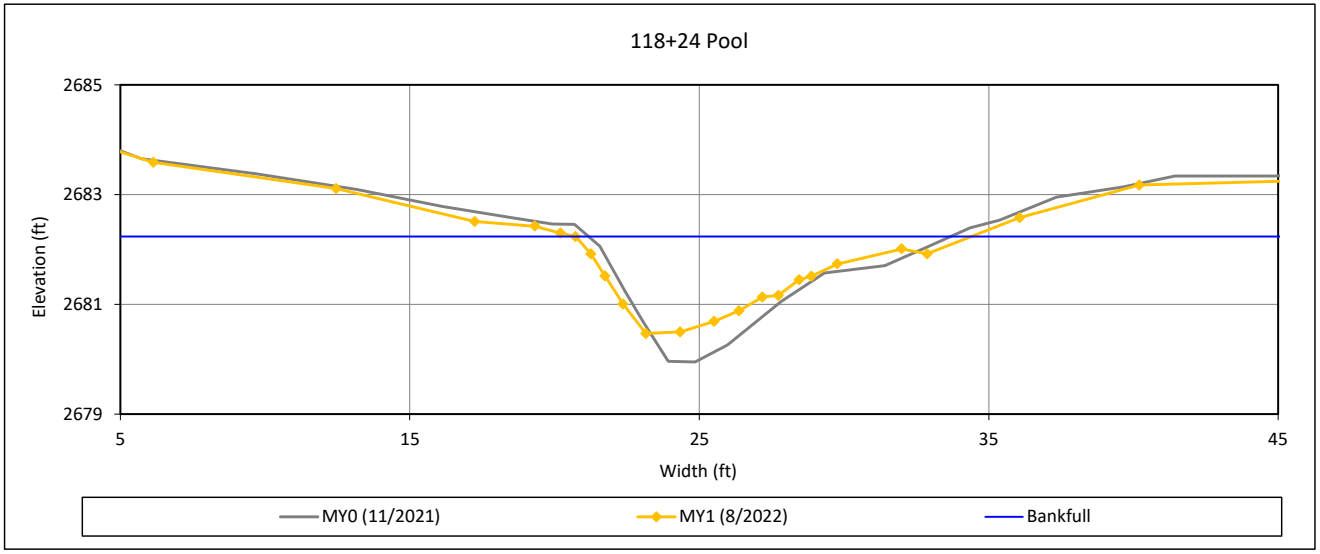
Survey Date: 8/2022
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Cross-Section 4 - UT to Crab Creek R1



Bankfull Dimensions	
11.8	x-section area (ft.sq.)
13.7	width (ft)
0.9	mean depth (ft)
1.8	max depth (ft)
14.5	wetted perimeter (ft)
0.8	hydraulic radius (ft)
15.9	width-depth ratio

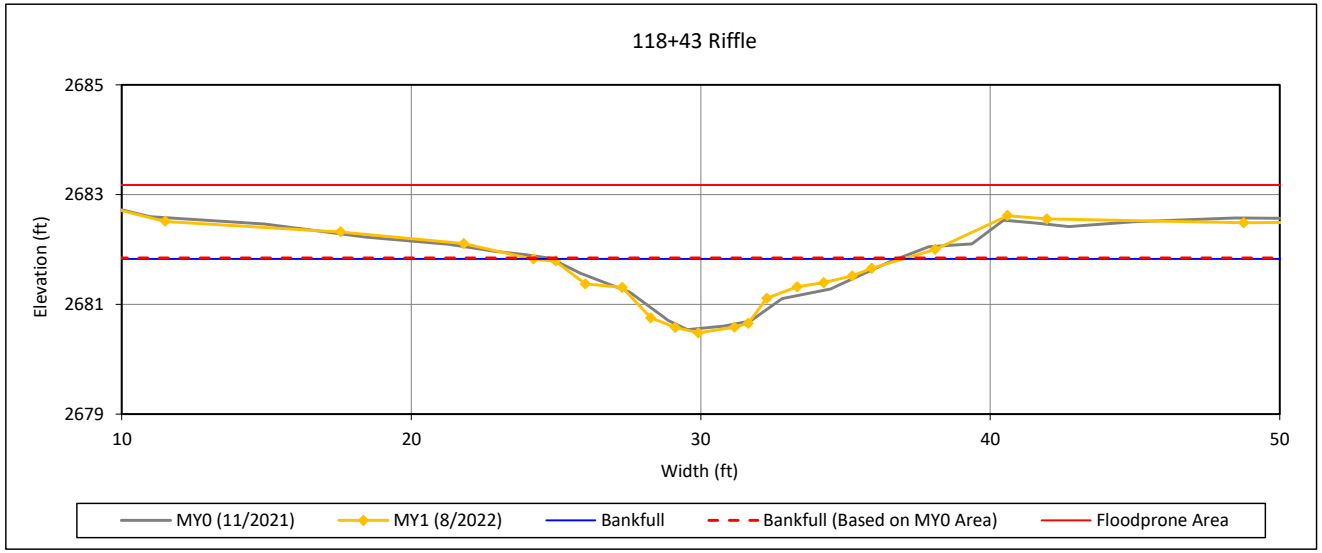
Survey Date: 8/2022
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Cross-Section 5 - UT to Crab Creek R1



Bankfull Dimensions	
8.1	x-section area (ft.sq.)
11.7	width (ft)
0.7	mean depth (ft)
1.3	max depth (ft)
12.1	wetted perimeter (ft)
0.7	hydraulic radius (ft)
16.9	width-depth ratio
50.7	W flood prone area (ft)
4.3	entrenchment ratio
1.0	low bank height ratio

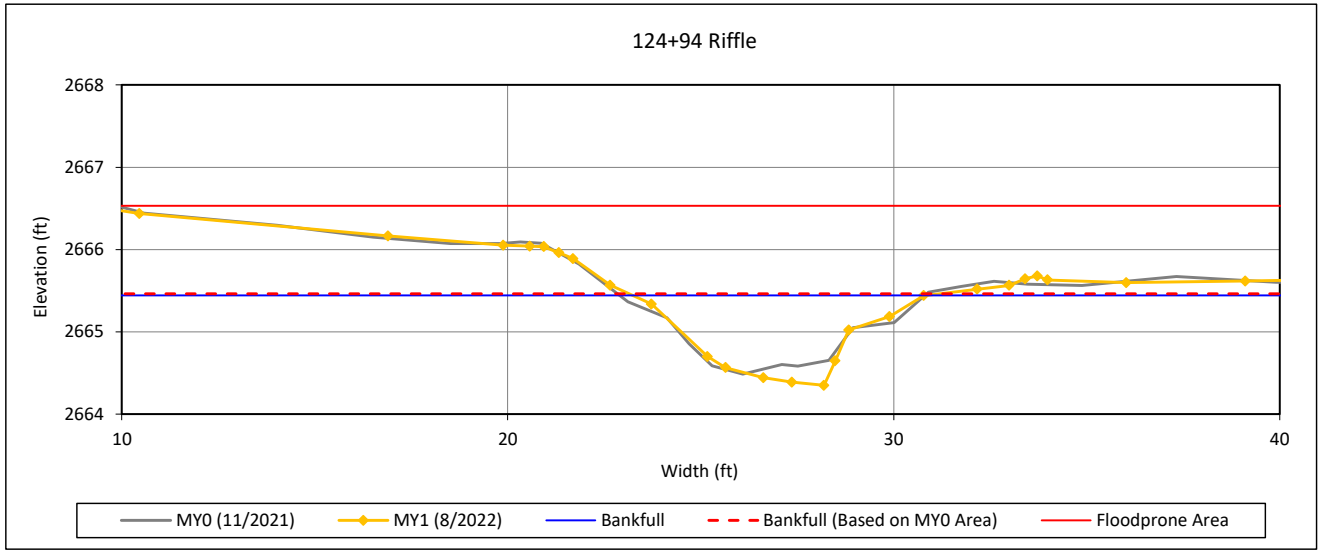
Survey Date: 8/2022
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Cross-Section 6 - UT to Crab Creek R2



Bankfull Dimensions	
4.5	x-section area (ft.sq.)
7.5	width (ft)
0.6	mean depth (ft)
1.1	max depth (ft)
8.0	wetted perimeter (ft)
0.6	hydraulic radius (ft)
12.5	width-depth ratio
42.6	W flood prone area (ft)
5.7	entrenchment ratio
1.0	low bank height ratio

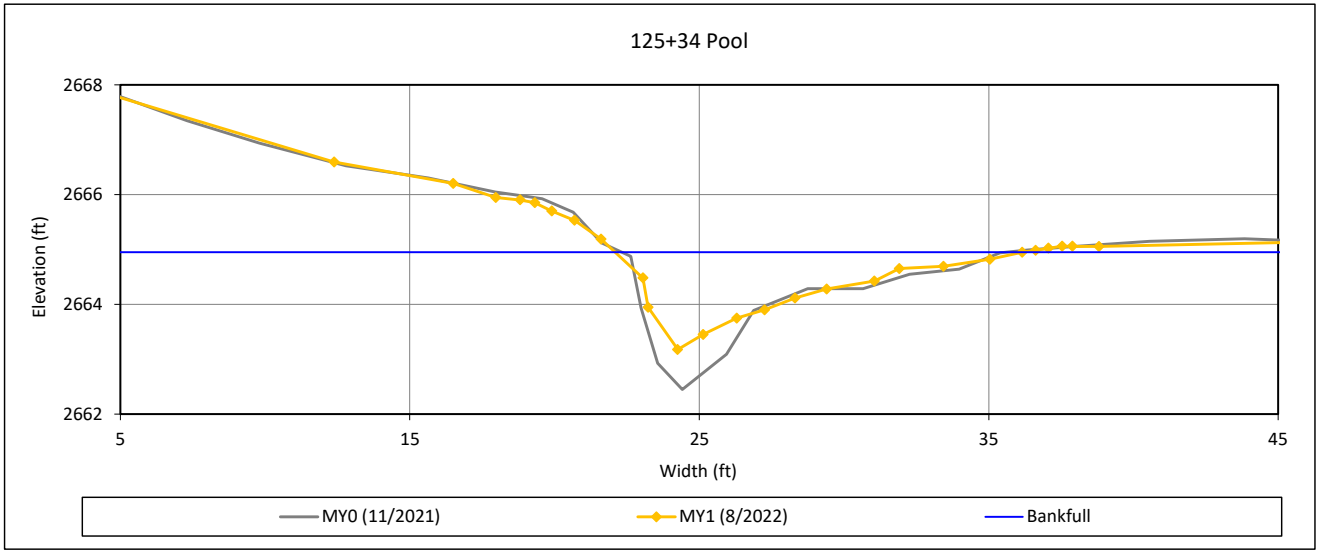
Survey Date: 8/2022
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Cross-Section 7 - UT to Crab Creek R2



Bankfull Dimensions	
9.8	x-section area (ft.sq.)
14.1	width (ft)
0.7	mean depth (ft)
1.8	max depth (ft)
15.0	wetted perimeter (ft)
0.7	hydraulic radius (ft)
20.2	width-depth ratio

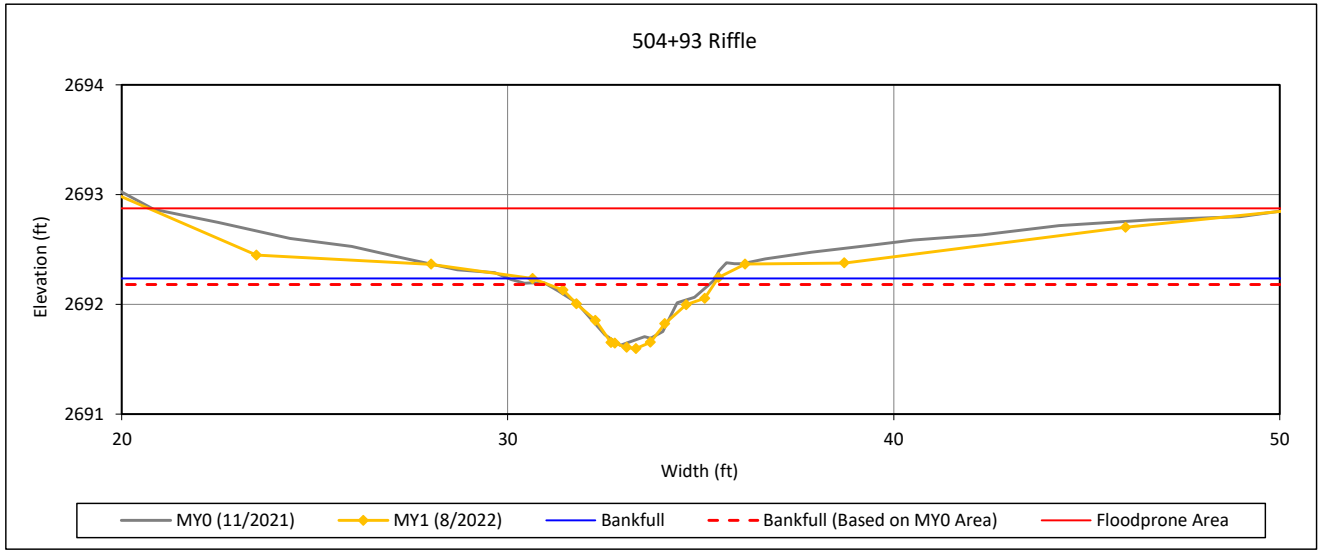
Survey Date: 8/2022
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Cross-Section 8 - UT5 R2



Bankfull Dimensions	
1.6	x-section area (ft.sq.)
4.8	width (ft)
0.3	mean depth (ft)
0.6	max depth (ft)
5.0	wetted perimeter (ft)
0.3	hydraulic radius (ft)
14.7	width-depth ratio
30.0	W flood prone area (ft)
6.2	entrenchment ratio
1.1	low bank height ratio

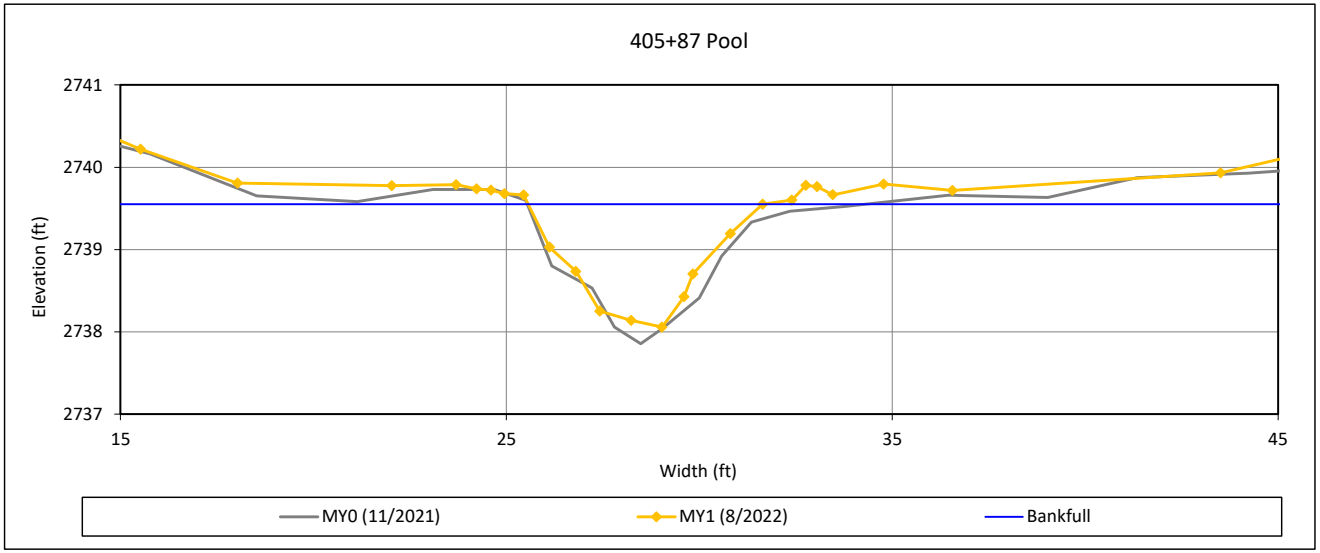
Survey Date: 8/2022
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Cross-Section 9 - UT4 R1



Bankfull Dimensions	
5.2	x-section area (ft.sq.)
6.1	width (ft)
0.9	mean depth (ft)
1.5	max depth (ft)
6.9	wetted perimeter (ft)
0.8	hydraulic radius (ft)
7.1	width-depth ratio

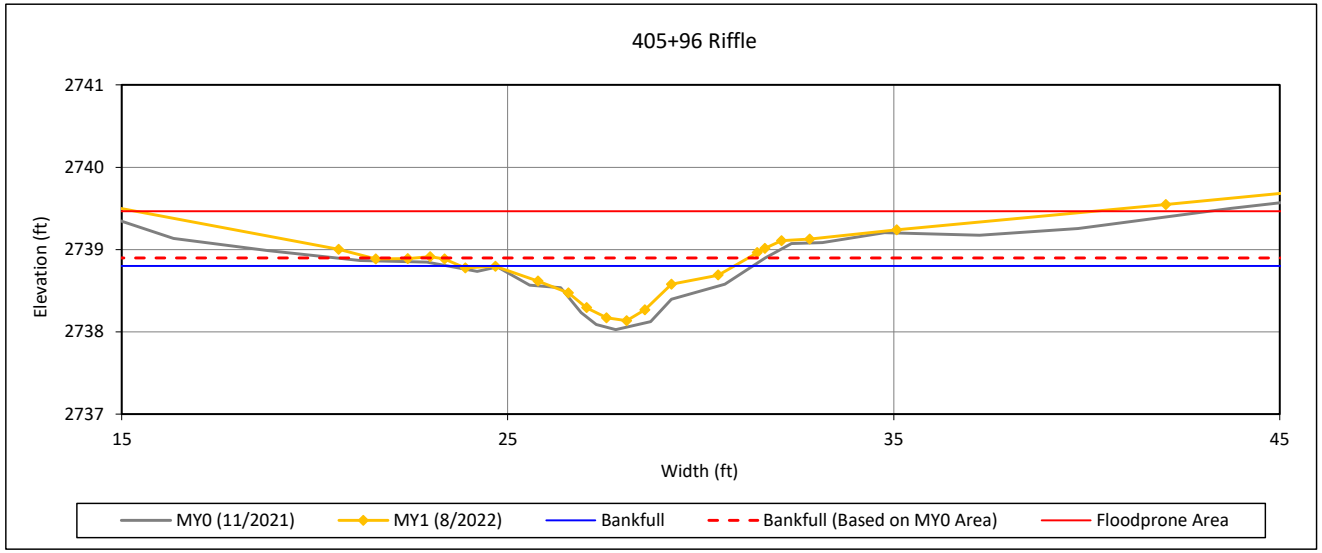
Survey Date: 8/2022
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Cross-Section 10 - UT4 R1



Bankfull Dimensions	
1.9	x-section area (ft.sq.)
6.2	width (ft)
0.3	mean depth (ft)
0.7	max depth (ft)
6.4	wetted perimeter (ft)
0.3	hydraulic radius (ft)
20.1	width-depth ratio
29.9	W flood prone area (ft)
4.8	entrenchment ratio
0.9	low bank height ratio

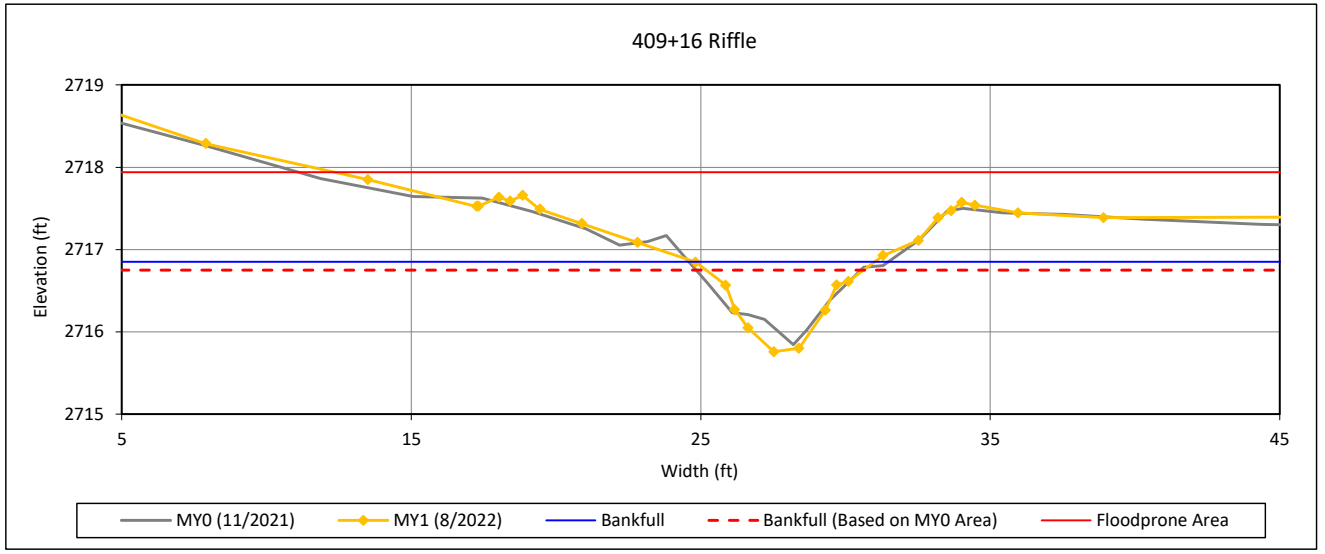
Survey Date: 8/2022
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Cross-Section 11 - UT4 R2



Bankfull Dimensions	
3.5	x-section area (ft.sq.)
6.2	width (ft)
0.6	mean depth (ft)
1.1	max depth (ft)
6.7	wetted perimeter (ft)
0.5	hydraulic radius (ft)
10.9	width-depth ratio
33.4	W flood prone area (ft)
5.4	entrenchment ratio
1.1	low bank height ratio

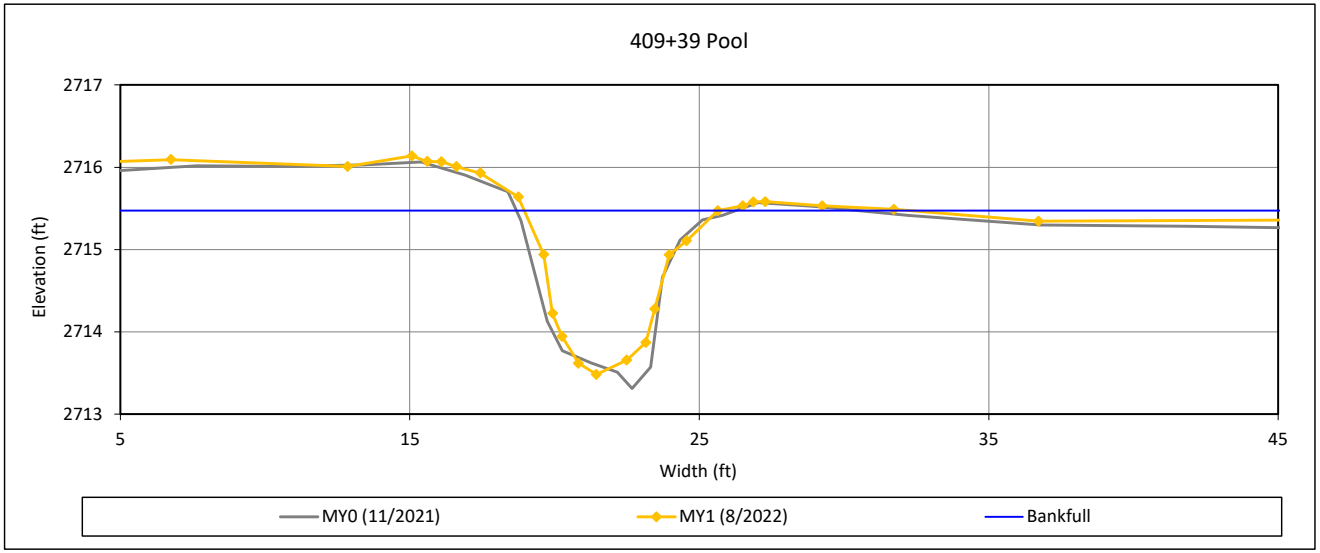
Survey Date: 8/2022
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Cross-Section 12 - UT4 R2



Bankfull Dimensions	
7.5	x-section area (ft.sq.)
6.7	width (ft)
1.1	mean depth (ft)
2.0	max depth (ft)
8.2	wetted perimeter (ft)
0.9	hydraulic radius (ft)
5.9	width-depth ratio

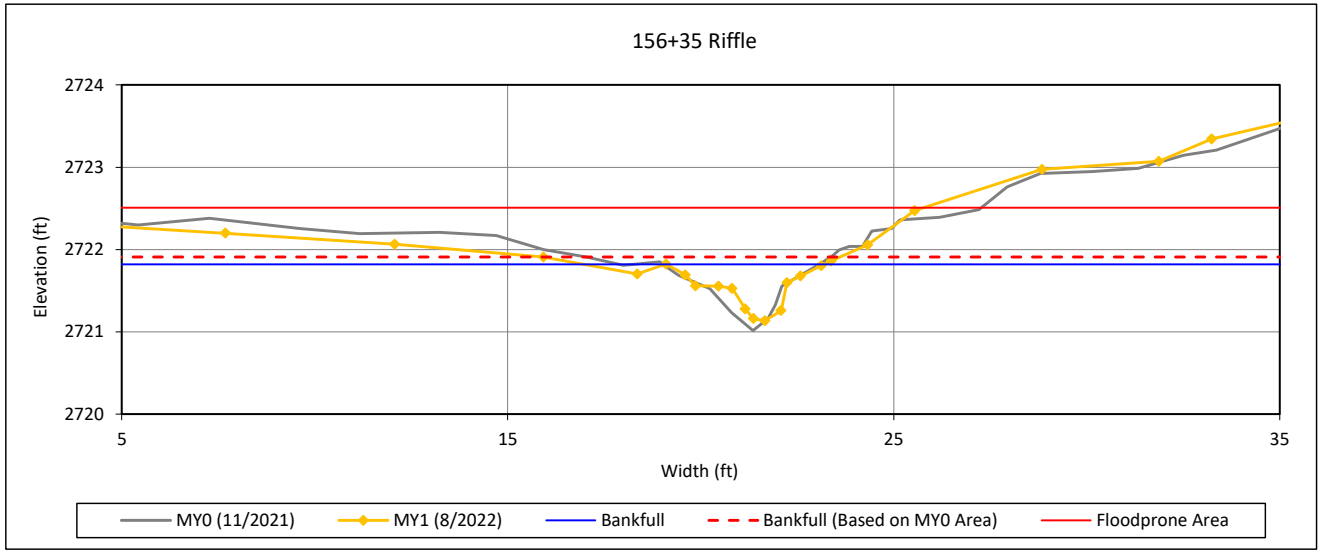
Survey Date: 8/2022
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Cross-Section 13 - UT1A R1



Bankfull Dimensions	
1.2	x-section area (ft.sq.)
4.1	width (ft)
0.3	mean depth (ft)
0.7	max depth (ft)
4.5	wetted perimeter (ft)
0.3	hydraulic radius (ft)
13.5	width-depth ratio
26.1	W flood prone area (ft)
6.4	entrenchment ratio
0.9	low bank height ratio

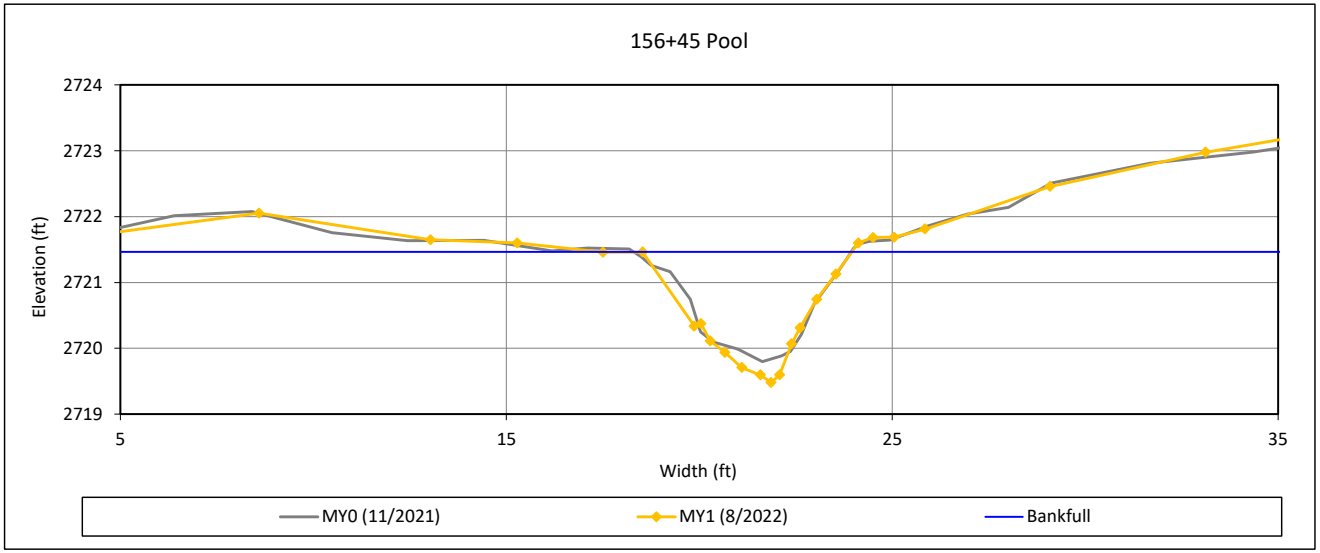
Survey Date: 8/2022
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Cross-Section 14 - UT1A R1



Bankfull Dimensions	
5.9	x-section area (ft.sq.)
5.4	width (ft)
1.1	mean depth (ft)
2.0	max depth (ft)
6.9	wetted perimeter (ft)
0.8	hydraulic radius (ft)
5.0	width-depth ratio

Survey Date: 8/2022
Field Crew: Wildlands Engineering

View Downstream

Table 8. Baseline Stream Data Summary
Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Pre-Existing Condition																				
Parameter	UT to Crab Creek Reach			UT to Crab Creek Reach			UT1A Reach 1			UT4 Reach 1			UT4 Reach 2			UT5 Reach 2			UT7		
	Min	Max	n	Min	Max	n	Min	Max	n	Min	Max	n	Min	Max	n	Min	Max	n	Min	Max	n
Dimension and Substrate - Riffle																					
Bankfull Width (ft)	10.2		1	8.9		1	2.8		1	7.6		1	12.7		1	2.1		1	6.3		1
Floodprone Width (ft)	43		1	26		1	3		1	8		1	34		1	14		1	12		1
Bankfull Mean Depth (ft)	0.5		1	0.9		1	0.5		1	0.6		1	0.7		1	0.4		1	0.6		1
Bankfull Max Depth (ft)	0.9		1	1.3		1	0.7		1	1.2		1	1.3		1	0.8		1	1.0		1
Bankfull Cross-sectional Area (ft^2)	4.8		1	7.9		1	1.5		1	4.3		1	8.4		1	0.9		1	4.0		1
Width/Depth Ratio	21.9		1	10.2		1	5.2		1	13.2		1	19.1		1	4.8		1	10.0		1
Entrenchment Ratio[1]	4.2		1	2.9		1	1.2		1	1.1		1	2.7		1	6.7		1	1.8		1
Bank Height Ratio	1.7		1	2.3		1	6.8		1	1.7		1	1.0		1	1.0		1	3.5		1
Max part size (mm) mobilized at bankfull	---		1	---		1	---		1	---		1	---		1	---		1	---		1
Rosgen Classification	C4b			C4b			B4a			B4a			B4a			B4a			B4a		
Bankfull Discharge (cfs)	20			40			6			7			9			6			7		
Sinuosity	1.20			1.20			1.02			1.03			1.09			1.02			1.05		
Bankfull/Channel Slope (ft/ft)[2]	0.0370			0.0245			0.0645			0.0569			0.0499			0.0840			0.0741		

Design																					
Parameter	UT to Crab Creek Reach			UT to Crab Creek Reach			UT1A Reach 1			UT4 Reach 1			UT4 Reach 2			UT5 Reach 2			UT7		
	Min	Max	n	Min	Max	n	Min	Max	n	Min	Max	n	Min	Max	n	Min	Max	n	Min	Max	n
Dimension and Substrate - Riffle																					
Bankfull Width (ft)	8.0		1	11.0		1	4.3		1	5.0		1	5.0		1	4.3		1	4.5		1
Floodprone Width (ft)	16		1	24	110+	1	9		1	10		1	10		1	9		1	---		1
Bankfull Mean Depth (ft)	0.5		1	0.8		1	0.3		1	0.4		1	0.4		1	0.3		1	0.3		1
Bankfull Max Depth (ft)	0.8		1	1.2		1	0.5		1	0.5		1	0.5		1	0.4		1	---		1
Bankfull Cross-sectional Area (ft^2)	4.3		1	8.7		1	1.4		1	1.9		1	1.9		1	1.2		1	1.5		1
Width/Depth Ratio	14.8		1	13.9		1	13.2		1	13.3		1	13.3		1	15.9		1	13.5		1
Entrenchment Ratio[1]	2.0		1	2.2	10+	1	2.0		1	2.0		1	2.0		1	2.0		1	1.4+		1
Bank Height Ratio	1.0		1	1.0		1	1.0		1	1.0		1	1.0		1	1.0		1	1.0-1.1		1
Max part size (mm) mobilized at bankfull	237.0		1	130.0		1	180.0		1	214.0		1	208.0		1	95.0		1	132.0		1
Rosgen Classification	B4			C4			B4a			B4a			B4a			B4a			B4a		
Bankfull Discharge (cfs)	20			40			6			7			9			5			7		
Sinuosity	1.05			1.28			1.03			1.05			1.17			1.02			1.04		
Bankfull/Channel Slope (ft/ft)[2]	0.0380			0.0170	0.0440		0.0650	0.1760		0.0700			0.0670			0.0310	0.1150		0.0410	0.0740	

As-Built/ Baseline																					
Parameter	UT to Crab Creek Reach			UT to Crab Creek Reach			UT1A Reach 1			UT4 Reach 1			UT4 Reach 2			UT5 Reach 2			UT7		
	Min	Max	n	Min	Max	n	Min	Max	n	Min	Max	n	Min	Max	n	Min	Max	n	Min	Max	n
Dimension and Substrate - Riffle																					
Bankfull Width (ft)	7.8	12.0	2	8.1		1	4.2		1	6.6		1	5.9		1	4.3		1	5.3		1
Floodprone Width (ft)	50	66	2	42		1	28		1	31		1	34		1	24		1	52		1
Bankfull Mean Depth (ft)	0.6	0.7	2	0.6		1	0.4		1	0.4		1	0.5		1	0.3		1	0.5		1
Bankfull Max Depth (ft)	0.9	1.3	2	1.0		1	0.8		1	0.8		1	0.9		1	0.6		1	1.1		1
Bankfull Cross-sectional Area (ft^2)[1]	4.4	8.3	2	4.7		1	1.6		1	2.5		1	2.9		1	1.3		1	2.6		1
Width/Depth Ratio	13.7	17.4	2	14.0		1	11.5		1	17.1		1	11.9		1	14.4		1	10.6		1
Entrenchment Ratio[1]	4.2	8.4	2	5.1		1	6.5		1	4.7		1	5.8		1	5.6		1	9.9		1
Bank Height Ratio	1.0		2	1.0		1	1.0		1	1.0		1	1.0		1	1.0		1	1.0		1
Max part size (mm) mobilized at bankfull	63.0	79.0	2	39.0		1	86.0		1	78.0		1	95.0		1	61.0		1	86.0		1
Rosgen Classification	B4			C4b			B4a			B4a			B4a			B4a			B4a		
Bankfull Discharge (cfs)	21.3	46.4		17.9			8.1			12.8			16.7			5.5			14.2		
Sinuosity	0.913			0.913			1.05			1.02			1.39			0.984			0.985		
Bankfull/Channel Slope (ft/ft)[2]	0.0382			0.0227			0.0838			0.0681			0.0664			0.0696			0.0634		

1. ER for the baseline/monitoring parameters are based on the width of the cross-section, in lieu of assuming the width across the floodplain.
2. Channel slope is calculated from the surface of the channel bed rather than water surface.
(---): Data was not provided, N/A: Not Applicable

Table 9. Cross-Section Morphology Monitoring Summary

Double H Farms Mitigation Site

DMS Project No. 100082

Monitoring Year 1 - 2022

	UT7 Cross-Section 1 Riffle						UT to Crab Creek R1 Cross-Section 2 Riffle						UT to Crab Creek R1 Cross-Section 3 Pool						UT to Crab Creek R1 Cross-Section 4 Pool					
Dimensions	**MY0**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY0**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY0**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY0**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	2749.7	2749.7					2731.0	2731.0					N/A	N/A					N/A	N/A				
Bank Height Ratio - Based on AB Bankfull[1] Area	1.0	1.0					1.0	1.0					N/A	N/A					N/A	N/A				
Thalweg Elevation	2748.6	2748.5					2730.0	2730.0					2728.1	2727.7					2679.9	2680.5				
LTOB[2] Elevation	2749.7	2749.6					2731.0	2731.0					2730.0	2730.0					2682.4	2682.2				
LTOB[2] Max Depth (ft)	1.1	1.1					0.9	1.0					1.9	2.4					2.4	1.8				
LTOB[2] Cross Sectional Area (ft^2)	2.6	2.3					4.4	4.5					11.7	12.9					15.7	11.8				
	UT to Crab Creek R1 Cross-Section 5 Riffle						**UT to Crab Creek R2 Cross-Section 6 Riffle**						**UT to Crab Creek R2 Cross-Section 7 Pool**						**UT5 R2 Cross-Section 8 Riffle**					
Dimensions	**MY0**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY0**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY0**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY0**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	2681.8	2681.9					2665.5	2665.5					N/A	N/A					2692.2	2692.2				
Bank Height Ratio - Based on AB Bankfull[1] Area	1.0	1.0					1.0	1.0					N/A	N/A					1.0	1.1				
Thalweg Elevation	2680.5	2680.5					2664.5	2664.4					2662.4	2663.2					2691.6	2691.6				
LTOB[2] Elevation	2681.8	2681.8					2665.5	2665.4					2664.9	2665.0					2692.2	2692.2				
LTOB[2] Max Depth (ft)	1.3	1.3					1.0	1.1					2.5	1.8					0.6	0.6				
LTOB[2] Cross Sectional Area (ft^2)	8.3	8.1					4.7	4.5					12.1	9.8					1.3	1.6				
	UT4 R1 Cross Section 9 Pool						**UT4 R1 Cross Section 10 Riffle**						**UT4 R2 Cross-Section 11 Riffle**						**UT4 R2 Cross-Section 12 Pool**					
Dimensions	**MY0**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY0**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY0**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY0**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	N/A	N/A					2738.8	2738.9					2716.8	2716.8					N/A	N/A				
Bank Height Ratio - Based on AB Bankfull[1] Area	N/A	N/A					1.0	0.9					1.0	1.1					N/A	N/A				
Thalweg Elevation	2737.9	2738.1					2738.0	2738.1					2715.8	2715.8					2713.3	2713.5				
LTOB[2] Elevation	2739.3	2739.6					2738.8	2738.8					2716.8	2716.9					2715.4	2715.5				
LTOB[2] Max Depth (ft)	1.5	1.5					0.8	0.7					0.9	1.1					2.1	2.0				
LTOB[2] Cross Sectional Area (ft^2)	4.7	5.2					2.5	1.9					2.9	3.5					7.7	7.5				
	UT1A R1 Cross-Section 13 Riffle						**UT1A R1 Cross-Section 14 Pool**																	
Dimensions	**MY0**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**	**MY0**	**MY1**	**MY2**	**MY3**	**MY5**	**MY7**												
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	2721.9	2721.9					N/A	N/A																
Bank Height Ratio - Based on AB Bankfull[1] Area	1.0	0.9					N/A	N/A																
Thalweg Elevation	2721.0	2721.1					2719.8	2719.5																
LTOB[2] Elevation	2721.9	2721.8					2721.5	2721.5																
LTOB[2] Max Depth (ft)	0.8	0.7					1.7	2.0																
LTOB[2] Cross Sectional Area (ft^2)	1.6	1.2					5.6	5.9																

1 - Bank Height Ratio (BHR) takes the As-built bankful area as the basis for adjusting each subsequent years bankfull elevation.

2 - LTOB Area and Max depth - These are based on the LTOB elevation for each years survey (The same elevation used for the LTOB in the BHR calculation). Area below the LTOB elevation will be used and tracked for each year as above. The difference between the LTOB elevation and the thalweg elevation (same as in the BHR calculation) will be recroded and tracked above as LTOB max depth.

APPENDIX D. Hydrology Data

Table 10. Bankfull Events

Double H Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Reach	MY1 (2022)	MY2 (2023)	MY3 (2024)	MY4 (2025)	MY5 (2026)	MY6 (2027)	MY7 (2028)
UT to Crab Creek Reach 2 (CG1)	5/27/2022 8/19/2022						
UT4 Reach 1 (CG2)*	N/A						
UT1A Reach 1 (CG3)*							

*CG2 and CG3 are located on B-channels and have been relocated in-stream to capture flow on 10/14/22 per the 8/17/2022 IRT meeting minutes and therefore are not being evaluated for bankfull criteria.

Table 11. Rainfall Summary

Double H Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

	MY1 (2022)	MY2 (2023)	MY3 (2024)	MY4 (2025)	MY5 (2026)	MY6 (2027)	MY7 (2028)
Annual Precip Total	44.88*						
WETS 30th Percentile[1]	47.56						
WETS 70th Percentile[1]	58.53						
Normal	*						

*Annual precipitation total was collected up until 10/13/2022. Data will be updated in MY2.

1 - WETS 30th and 70th percentile data downloaded from the SPARTA 3.5 SSW, NC WETS Station (1971-2000).

Table 12. Recorded In-Stream Flow Events Summary

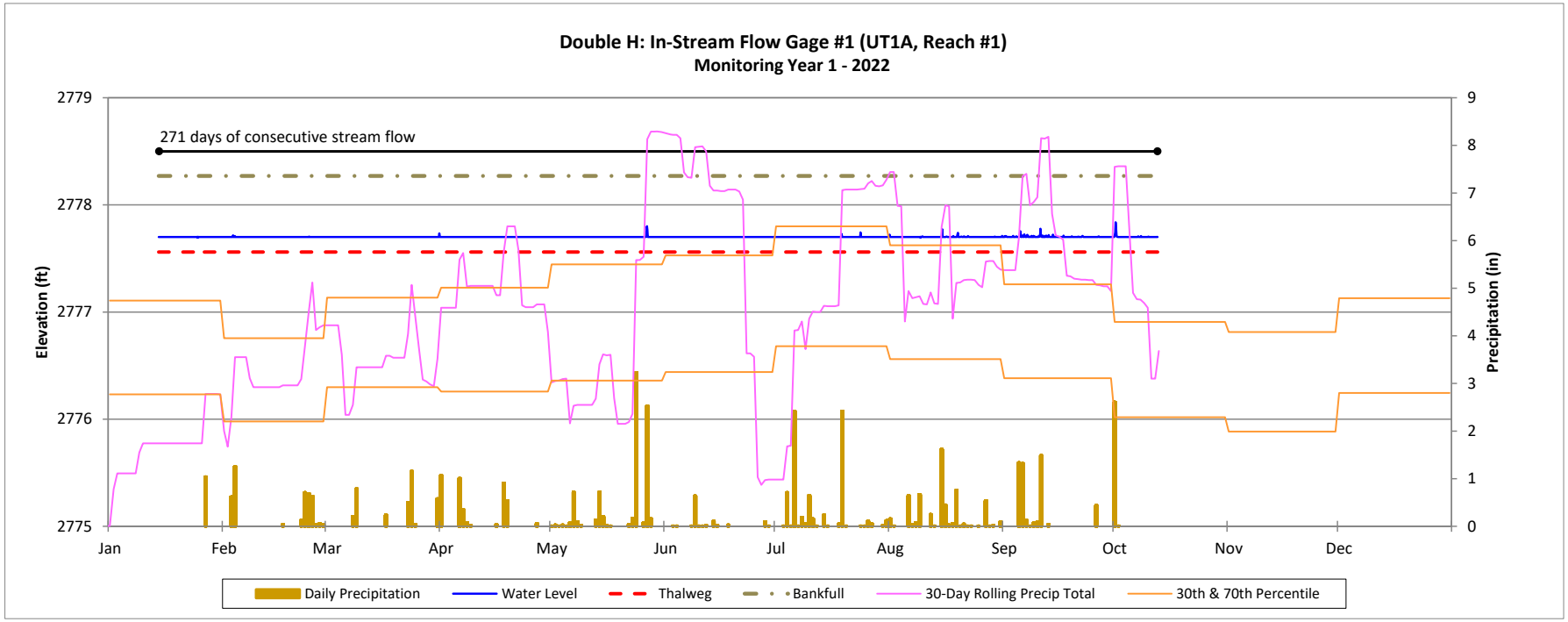
Double H Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Reach	Max Consecutive Days/Total Days Meeting Success Criteria[1]						
	MY1 (2022)	MY2 (2023)	MY3 (2024)	MY4 (2025)	MY5 (2026)	MY6 (2027)	MY7 (2028)
UT1A Reach 1 (SG1)	**271 Days**						

1 - Success criteria is 30 consecutive days of flow.

2 - Data collected through October 12, 2022.

Recorded In-Stream Flow Events Plot
Double H Mitigation Plan
DMS Project No. 100082
Monitoring Year 1 - 2022

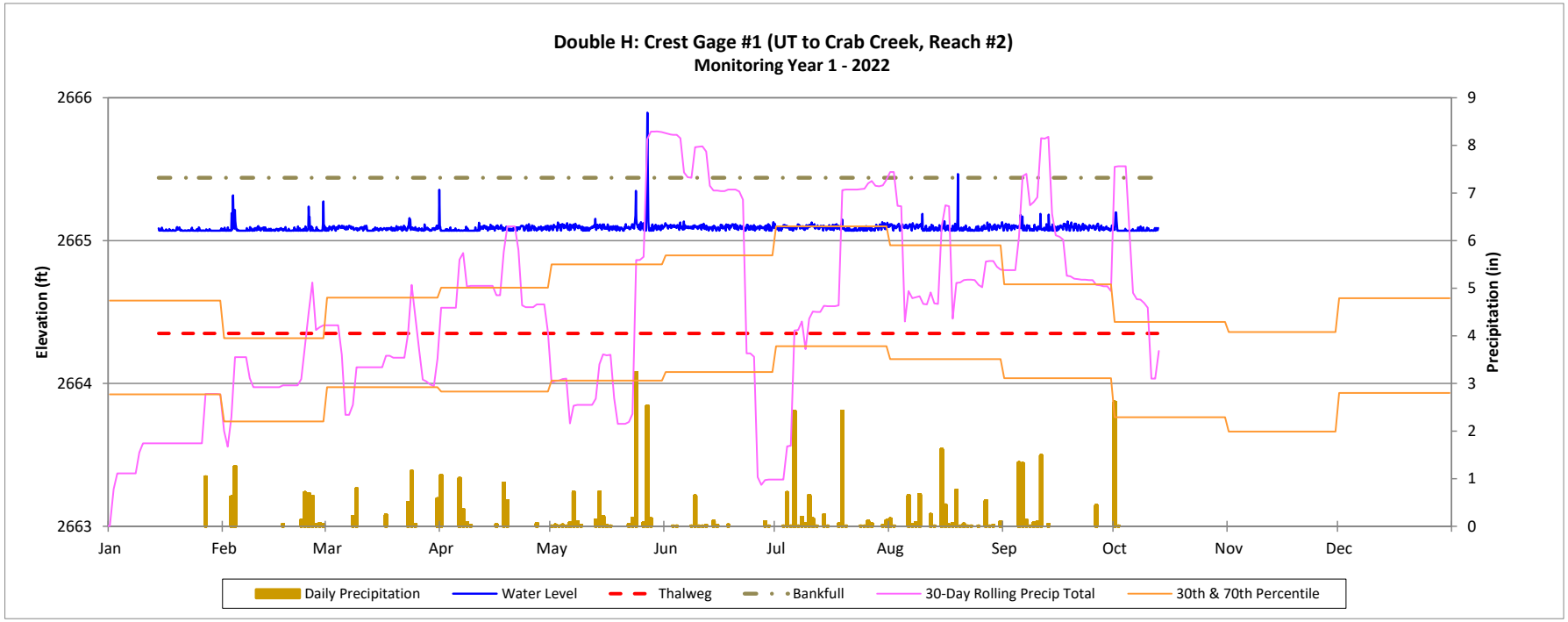


Recorded Bankfull Event Plots

Double H Mitigation Plan

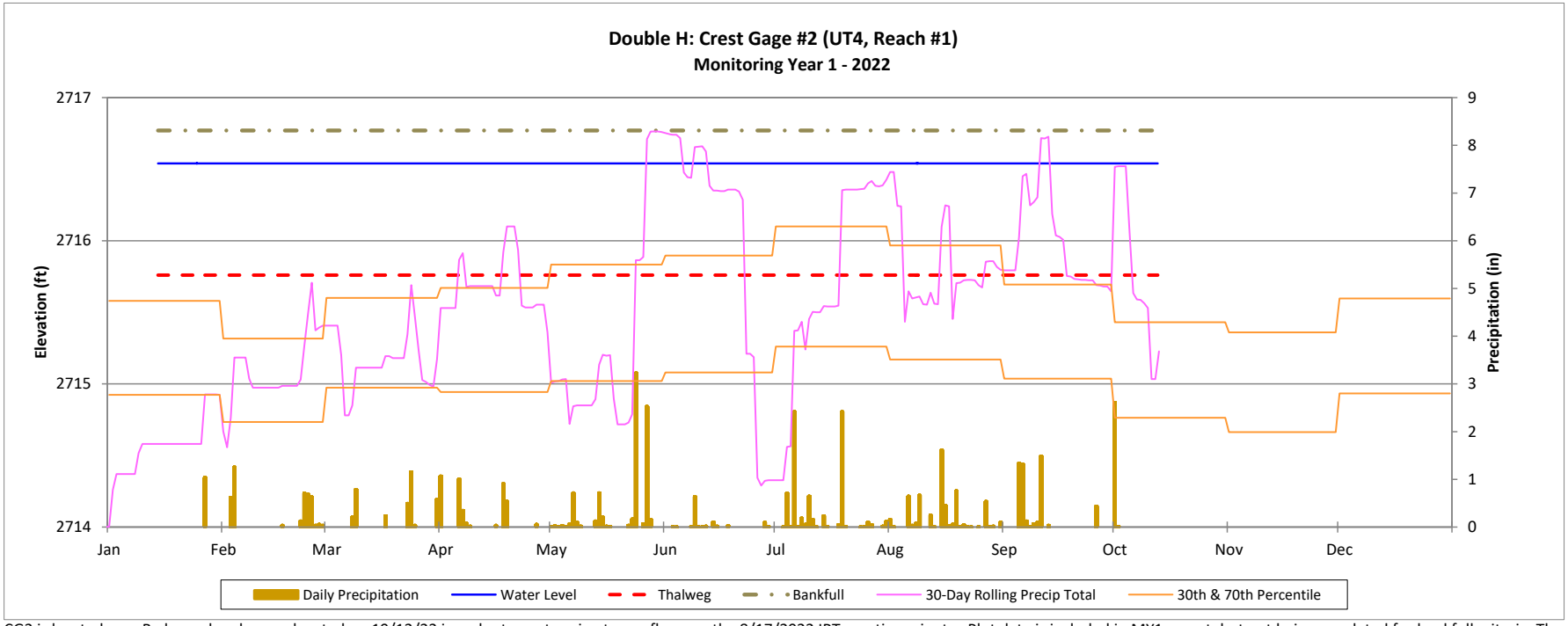
DMS Project No. 100082

Monitoring Year 1 - 2022



Recorded Bankfull Event Plots

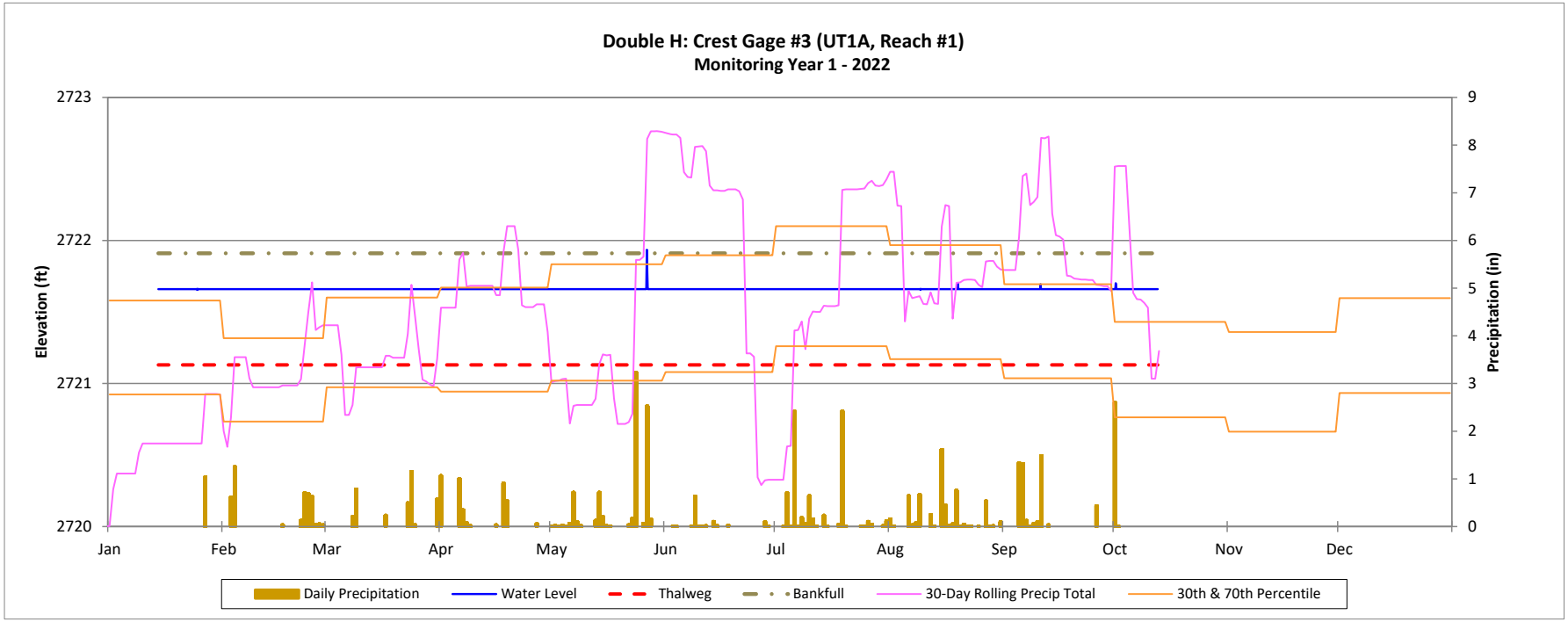
Double H Mitigation Plan
DMS Project No. 100082
Monitoring Year 1 - 2022



CG2 is located on a B-channel and was relocated on 10/12/22 in order to capture in-stream flow per the 8/17/2022 IRT meeting minutes.Plot data is included in MY1 report, but not being evaulated for bankfull criteria. The updated elevations will be reported in MY2.

Recorded Bankfull Event Plots

Double H Mitigation Plan
DMS Project No. 100082
Monitoring Year 1 - 2022



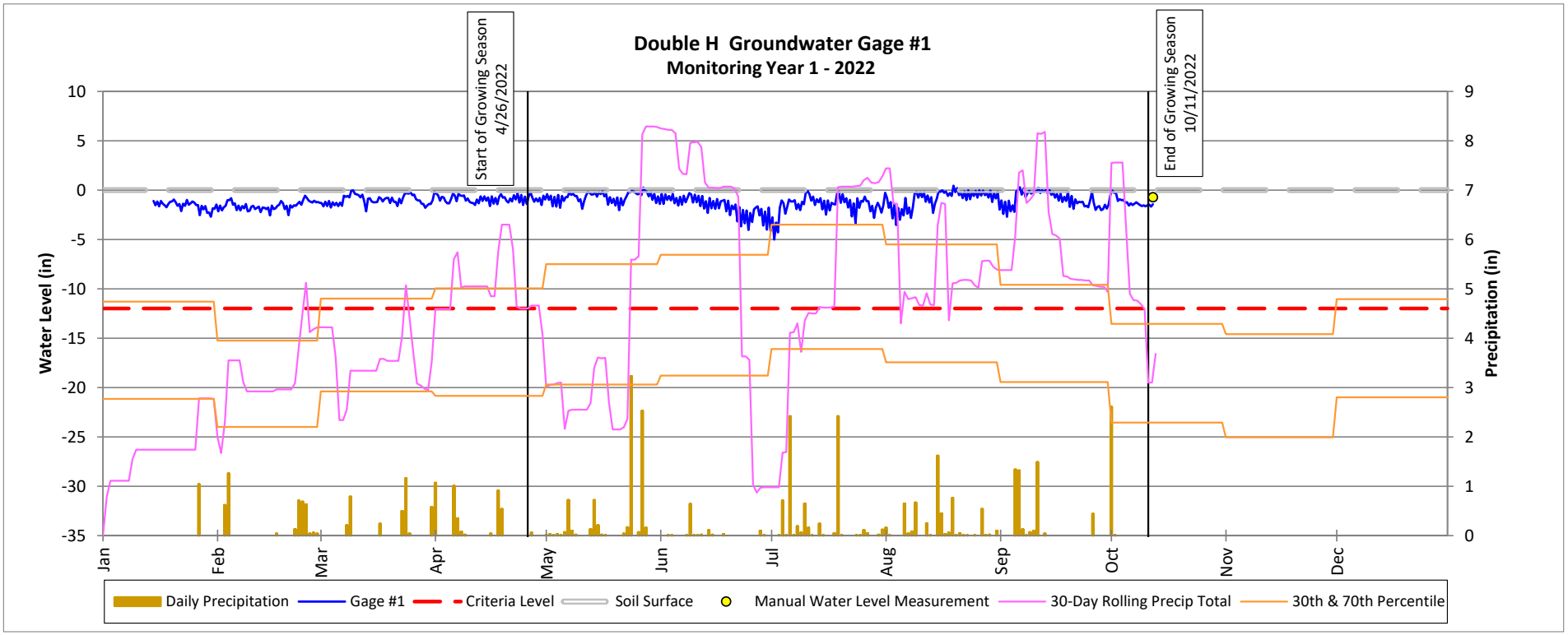
CG3 is located on a B-channel and was relocated on 10/12/22 in order to capture in-stream flow per the 8/17/2022 IRT meeting minutes.Plot data is included in MY1 report, but not being evaulated for bankfull criteria. The updated elevations will be reported in MY2.

Groundwater Gage Plots

Double H Mitigation SIte

DMS Project No. 100082

Monitoring Year 1 - 2022



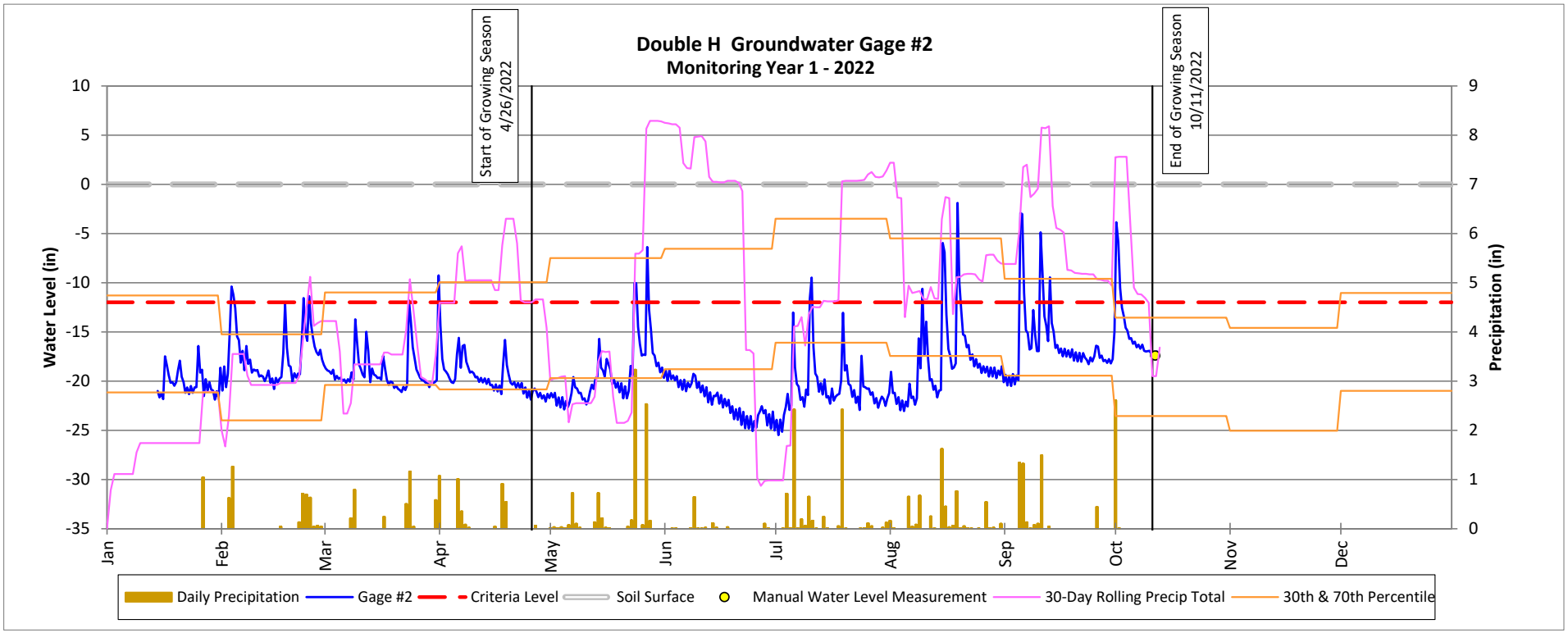
Groundwater gages are not help to hydrology criteria per the Mitigation Plan (Wildlands, 2020.)

Groundwater Gage Plots

Double H Mitigation SIte

DMS Project No. 100082

Monitoring Year 1 - 2022



Groundwater gages are not help to hydrology criteria per the Mitigation Plan (Wildlands, 2020.)

APPENDIX E. Project Timeline and Contact Info

Table 13. Project Activity and Reporting History

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Activity or Deliverable		Data Collection Complete	Task Completion or Deliverable Submission
Project Instituted		N/A	February 2021
Mitigation Plan Approved		January 2018 - November 2020	November 2020
Construction (Grading)		April - September 2021	September 2021
Planting		January 2022	January 2022
As-Built Survey		October 2021 - December 2021	December 2021
Baseline Monitoring Document (Year 0)	Stream Survey	October 2021 - February 2022	February 2022
	Vegetation Survey	January 2022 - February 2022	February 2022
	Encroachment	April - September 2021	March 2022
Year 1 Monitoring	Fencing Repair	March 2022	November 2022
	Stream Survey	August 2022	
	Vegetation Survey	August- October 2022	
	Invasive Treatment	October 2022	
Year 2 Monitoring	Stream Survey		
	Vegetation Survey		
Year 3 Monitoring	Stream Survey		
	Vegetation Survey		
Year 5 Monitoring	Stream Survey		
	Vegetation Survey		
Year 7 Monitoring	Stream Survey		
	Vegetation Survey		

Table 14. Project Contact Table

Double H Farms Mitigation Site
DMS Project No. 100082
Monitoring Year 1 - 2022

Designers Aaron Earley, PE, CFM	**Wildlands Engineering, Inc.** 1430 South Mint Street, Suite 104 Charlotte, NC 28203 704.332.7754
Construction Contractors	**Wildlands Construction, Inc.** 312 W. Millbrook Rd, Suite 225 Raleigh, NC 27609
Planting Contractor	**Bruton Natural Systems, Inc.** PO Box 1197 Fremont, NC 27830
Seeding Contractor	**Wildlands Construction, Inc.** 312 W. Millbrook Rd, Suite 225 Raleigh, NC 27609
Seed Mix Sources	**Garrett Wildflower Seed Farm**
Nursery Stock Suppliers Bare Roots & Live Stakes Herbaceous Plugs	**Dykes and Sons Nursery** **Bruton Natural Systems, Inc.** **Wetland Plants Inc.**
Monitoring Performers Monitoring, POC	**Wildlands Engineering, Inc.** Kristi Suggs (704) 332.7754 x.110

APPENDIX F. Correspondence

MY0 IRT Credit Release Site Visit Meeting Notes (8-17-2022)_Double H Farms_DMS#100082_SAW-2018-01771_DWR# 2018-1270v1

Wiesner, Paul <paul.wiesner@ncdenr.gov>

Tue 8/23/2022 1:03 PM

To: Kim Browning <Kimberly.D.Browning@usace.army.mil>;Davis, Erin B <erin.davis@ncdenr.gov>;Leslie, Andrea J <andrea.leslie@ncwildlife.org>

Cc: Tugwell, Todd J CIV USARMY CESAW (US) <Todd.J.Tugwell@usace.army.mil>;Haywood, Casey M CIV USARMY CESAW (USA) <Casey.M.Haywood@usace.army.mil>;Tsomides, Harry <harry.tsomides@ncdenr.gov>;Allen, Melonie <melonie.allen@ncdenr.gov>;Christine Blackwelder <cblackwelder@wildlandseng.com>;Shawn Wilkerson <swilkerson@wildlandseng.com>;Ella Wickliff <ewickliff@wildlandseng.com>;Sam Kirk <skirk@wildlandseng.com>;Stanfill, Jim <jim.stanfill@ncdenr.gov>;Harmon, Beth <beth.harmon@ncdenr.gov>

2 attachments (203 KB)

DoubleHFarms_100082_IRT MY0 Credit Release Site Visit_8-17-2022.pdf; Double H_100082_NW 01_STR_RW_Initial Release.pdf;

Good afternoon Kim, Erin, and Andrea;

The meeting notes for the August 17, 2022 IRT MY0 Credit Release site visit are attached for your review. As detailed in the meeting notes, Wildlands intends to address action items C, D, E, F, and G in September 2022. Results will be included in the annual monitoring (MY1-2022) report. Remaining action items will be addressed in the appropriate monitoring season.

The initial IRT Notice of NCDMS As-Built Review was sent out on May 20, 2022 and is included below. The IRT reviewed the MY0/ As-built report and had enough concerns that a site visit was requested on June 3, 2022 prior to providing comments and approving the 30% as-built credit release. The IRT project review has been on HOLD since the IRT site visit request.

Please let us know if you have any questions, comments or concerns on the meeting notes or proposed action items. The credit ledger for the 30% MY0 release is also attached for your review.

Thank you

Paul Wiesner
Western Regional Supervisor
North Carolina Department of Environmental Quality
Division of Mitigation Services

828-273-1673 Mobile
paul.wiesner@ncdenr.gov

Western DMS Field Office
5 Ravenscroft Drive
Suite 102
Asheville, N.C. 28801

WILDLANDS
ENGINEERING

MEETING NOTES

MEETING:	IRT MY0 Credit Release Site Visit **DOUBLE H FARMS Mitigation Site** New 05050001; Alleghany County, NC DEQ Contract No. 7608 DMS Project No. 100082 Wildlands Project No. 005-02174
DATE:	Wednesday, August 17, 2022
LOCATION:	Crab Creek Road Ennice, NC

Attendees

Kim Browning, USACE	Paul Wiesner, DMS	Christine Blackwelder, Wildlands
Andrea Leslie, NCWRC	Harry Tsomides, DMS	Ella Wickliff, Wildlands
Erin Davis, DWR	Melonie Allen, DMS	Sam Kirk, Wildlands

Materials

- Wildlands Engineering Double H Farms Mitigation Site Final As-Built Baseline Monitoring Report dated May 16, 2022

Meeting Notes

The meeting began at 10:45 AM. IRT members overviewed items they would like to field review, including construction changes, culvert crossings, and potential bog turtle habitat areas. From there, the group proceeded to walk the site in the following general order: UT1A, UT4 Reach 2, UT to Crab Creek Reach 2, UT to Crab Creek Reach 1, UT6, and UT4 Reach 1. Detailed meeting minutes, organized by stream reach, are presented below.

In general, IRT members felt the stream channels were stable, floodplain vegetation was thriving, and potential bog turtle habitat wetlands had good herbaceous cover and diversity. A few adjustments were requested as outlined in the action item list at the end of the minutes. Kim noted that the NWP certification expires in March 2023, and that if adjustments were completed prior to October 15, 2022 (start of trout moratorium), an adaptive management plan was not needed.

The IRT discussed the crest gauges on the site. There were two gauges on “B” type streams and one gauge on the main stem discussed. The IRT wanted continued monitoring on all crest gauges but indicated that project success criteria could be met with 4 successful bankfull events in separate years on the mainstem. The IRT was less concerned about bankfull events on the “B” type streams as floodplain access is less of a functional concern on those reaches.

UT1A

1. Andrea reviewed the culvert crossing and noted substrate inside. Drop structure upstream of the culvert was reviewed.
2. Erin requested more information on max drop designed. Erin noted Travis Wilson (WRC) states a 6" drop is ideal, and a 12" backwater drop is ideal for migration. Christine noted that over a certain slope, this becomes difficult to design. Erin/Christine discussed cascades as a more ideal steep stream structure.
3. Kim requested one vegetation transect through the wetlands at the top of UT1A during the monitoring period to shown that enhanced vegetation is growing.

UT4

4. Both lower and upper UT4 culvert crossings were noted as acceptable for AOP.
5. There is a source of overland sediment coming from outside the easement at the corner of UT4 and UT to Crab Creek. Erin asked for treatment of this area. Wildlands will install a coir log check and reseed the area.

UT to Crab Creek

6. Kim asked for a linear transect in the areas where a 30-foot buffer was planted adjacent to potential bog turtle habitat wetlands.
7. Andrea noted that the double barrel culvert is problematic for AOP because both culverts are set at the same elevation and noted that it needs adjustment. Christine asked if one culvert could be partially blocked to push all baseflow through one culvert, and Andrea said that was acceptable. Upstream single barrel culvert crossing noted as acceptable for AOP.
8. Andrea also noted one piping log sill upstream of the culvert crossing and a j-hook vane with a large drop that were barriers to aquatic passage. Wildlands will repair the piping log sill and notch the log to define a low point, and will build up the riffle head downstream of the j-hook vane and add an additional splash rock on the j-hook to minimize the drop.

UT6

9. Culvert has sediment in bottom and was noted as acceptable for AOP; potential bog turtle habitat wetland areas also look good.
10. Invasives along this reach need treatment.

The IRT provided some general feedback for future projects throughout the site walk, including the following:

- Erin noted that she compares monitoring elements to the mitigation plan map and asks that deviations not be made to monitoring elements specifically addressed by IRT comments. If deviations are made, please make notes as to why in the report and communicate to the IRT ahead of submittal.
- Andrea does not like log sills straight across channel, as they tend to have shallow, spread out flow and are hard for animals to traverse. Notch logs, or angle/slope, or use rock structures instead.
- When stabilizing outlets, such as outlet from Wetland V, single layer of rock in good contact with soil preferred – do not install deep rock with lots of voids, as this tends to trap small animals.

Action Items

A. Provide a separate planting zone map within each annual monitoring report that clearly shows which wetlands were noted as potential bog turtle habitat and were not planted outside of the immediate streamside buffer. Label stream reaches on this map.
B. Add vegetation transects in the following locations (at least once during the monitoring period)
    a. Wetland A (start of UT1A)
    b. In 15- to 30-foot wide planting areas on UT to Crab Creek, UT5, and UT6 adjacent to Wetlands N, P, W, and AA (potential bog turtle habitat wetlands)
C. Add coir log check at corner of UT4 and Crab Creek confluence where sediment is entering the easement. Reseed area.
D. Add partial baffle to one culvert on the double barrel UT to Crab Creek stream crossing to push baseflow to one culvert.
E. Repair the piping log sill upstream of double barrel crossing on UT to Crab Creek/notch the log to define a low point.
F. J-hook vane upstream of the double barrel UT to Crab Creek crossing: Build up downstream head of riffle and add an additional splash rock on the j-hook to minimize the drop.
G. Manage invasives, particularly along UT6. Address spot multiflora rose on UT1A. Keep an eye on bull thistle popping up throughout easement, manage if needed.

Wildlands intends to address action items C, D, E, F, and G in September 2022. Results will be included in the annual monitoring (MY1) report. Remaining action items will be addressed in the appropriate monitoring season.

The meeting concluded at 1:30 PM.

These meeting minutes were prepared by Christine Blackwelder August 19, 2022, and represent the authors' interpretation of events. Edited to include emailed comments from Harry Tsomides (August 22, 2022) and Paul Weisner (August 23, 2022).

Ella Wickliff

From: Christine Blackwelder
Sent: Thursday, August 25, 2022 1:27 PM
To: Browning, Kimberly D CIV USARMY CESAW (USA)
Cc: Wiesner, Paul; Tsomides, Harry; Shawn Wilkerson; Ella Wickliff; erin.davis@ncdenr.gov; bowers.todd@epa.gov
Subject: RE: Notice of Initial Credit Release / NCDMS Double H Farms Mitigation Site/ SAW-2018-01771 / Alleghany Co.

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Kim,

Thank you! I provided a few quick responses to the below comments in blue.

Thank you!
Christine

. . . . . .

Christine Blackwelder | *Senior Environmental Scientist*
O: 704.332.7754 **M**: 704.287.7646

From: Browning, Kimberly D CIV USARMY CESAW (USA) <Kimberly.D.Browning@usace.army.mil>
Sent: Thursday, August 25, 2022 12:56 PM
To: Wiesner, Paul <paul.wiesner@ncdenr.gov>
Cc: Kristi Suggs <ksuggs@wildlandseng.com>; Christine Blackwelder <cblackwelder@wildlandseng.com>; Shawn Wilkerson <swilkerson@wildlandseng.com>; Allen, Melonie <melonie.allen@ncdenr.gov>; Crumbley, Tyler A CIV USARMY CESAW (USA) <Tyler.A.Crumbley2@usace.army.mil>; Fennel, Tommy E CIV USARMY CESAW (USA) <Tommy.E.Fennel@usace.army.mil>; Harmon, Beth <Beth.Harmon@ncdenr.gov>; Stanfill, Jim <jim.stanfill@ncdenr.gov>; Tsomides, Harry <harry.tsomides@ncdenr.gov>; Tugwell, Todd J CIV USARMY CESAW (USA) <Todd.J.Tugwell@usace.army.mil>; Davis, Erin B <erin.davis@ncdenr.gov>; Bowers, Todd <bowers.todd@epa.gov>; Wilson, Travis W. <travis.wilson@ncwildlife.org>; Leslie, Andrea J <andrea.leslie@ncwildlife.org>; david.mchenry@ncwildlife.org; Haywood, Casey M CIV USARMY CESAW (USA) <Casey.M.Haywood@usace.army.mil>
Subject: Notice of Initial Credit Release / NCDMS Double H Farms Mitigation Site/ SAW-2018-01771 / Alleghany Co.

Hi Paul,

The 15-Day As-Built/MY0 review for the Double H Farms Mitigation Site (SAW-2018-01771) ended June 4, 2022 and a site visit was conducted August 17, 2022. Per Section 332.8(o)(9) of the 2008 Mitigation Rule, this review followed the streamlined review process. All comments received from the NCIRT are incorporated in the email below. Please address

IRT concerns in the MY1 Report. There were no objections to issuing the initial 30% credit release. Please find attached the current signed ledger.

Overall, the site visit summary captures our discussions on site. I wanted to point out that Sam and I discovered a piping structure that needs repaired; I'm not sure if this is the same piping log sill that Andrea pointed out.
Same log sill – sorry for making that confusing. I had forgotten you and Sam got to it first.

Erin Davis, NCDWR:

1. Isn't it a 15-ft woody plant streamside buffer adjacent to the bog turtle habitat (not 30-ft)? Just want to make sure the veg transects are focused on the critical stream shade areas. Also, I'd encourage being proactive on supplemental live staking and bareroot planting any open bank/streamside areas.
    a. I went back and reviewed our planting plan – we did 30-ft of woodies along UT to Crab/15-ft of woodies on tributaries that were flowing adjacent to potential bog turtle wetlands, based on the agency discussion during the mitigation plan development. We will make sure the transects cover these areas.
    b. Noted on supplemental live staking.
2. Communication with the IRT on monitoring station changes before the report submittal is not needed as long as the deviations are justified in the report.
    a. Noted – thanks!

Todd Bowers, USEPA:
(Comments based on MY0 Report)

* Changes were implemented at several locations during construction including material type, the addition and/or removal of structures, and grading. These changes were made due to unforeseen site conditions and availability of on-site materials (excess logs in place of rock for J-hooks and sills, etc). In all instances, the changes provide the same, if not better, stability, habitat, and functional uplift.
* The vegetation planting plan changes were limited to culvert crossings, the addition of two BMPs, and two channel re-alignments.
* At the time of planting in January 2022, two species, cucumber magnolia (Magnolia acuminata) and sweet birch (Betula lenta), from the final IRT approved species list were replaced due to the inability to source the stems. The species were replaced by red mulberry (Morus rubra) and painted buckeye (Aesculus sylvatica) in the buffer planting area.
* For MY0, the planted stem density for the permanent and mobile vegetation plots ranged from 364 to 688 stems/acre and exceeded the interim measure of vegetative success of at least 320 planted stems per acre required at the end of the third monitoring year.
* There were multiple changes in the alignment of the fence throughout the Site due to landowner requests, removal of cattle and additions of fence to ensure cattle exclusion.
* Two areas of fencing encroachments were documented on the record drawings as red lines; however, they will be corrected during MY1 maintenance activities.
* Installed monitoring devices and plot locations closely mimic the locations of those proposed in the Site's Mitigation Plan. Deviations from these locations were made when professional judgement deemed them necessary to better represent as-built field conditions or when installation of the device in the proposed location was not physically feasible.
* Two areas of culvert crossing easement encroachments will be corrected during MY1 maintenance.
* Three minor culvert crossing encroachment areas will remain unresolved and have been documented. Lengths of streams affected by these encroachments will remain in place and deducted from credits for that particular reach.
* The MY0 dimension numbers closely match the design parameters with minor variations.
* The MY0 profiles generally match the profile design parameters.

* Both bog vegetation plots had at least 80% vegetated cover and the dominants species had a wetland indicator status of FACW. There were no native woody species or invasive species observed in either plot.
* The type of stream credit was not noted in the report outside of Table 1; I recommend adding this in future reports.

All of above noted, and we will add the stream credit types in future reports.

Please reach out with any questions.
Thanks,
Kim

Kim (Browning) Isenhour
Mitigation Project Manager, Regulatory Division I U.S. Army Corps of Engineers l 919.946.5107

-----Original Message-----
From: Haywood, Casey M CIV USARMY CESAW (USA) <Casey.M.Haywood@usace.army.mil>
Sent: Friday, May 20, 2022 11:37 AM
To: Tugwell, Todd J CIV USARMY CESAW (USA) <Todd.J.Tugwell@usace.army.mil>; Browning, Kimberly D CIV USARMY CESAW (USA) <Kimberly.D.Browning@usace.army.mil>; Davis, Erin B <erin.davis@ncdenr.gov>; Bowers, Todd <bowers.todd@epa.gov>; holland_youngman@fws.gov; Wilson, Travis W. <travis.wilson@ncwildlife.org>; Leslie, Andrea J <andrea.leslie@ncwildlife.org>; david.mchenry@ncwildlife.org
Cc: Wiesner, Paul <paul.wiesner@ncdenr.gov>; Kristi Suggs <ksuggs@wildlandseng.com>; Christine Blackwelder <cblackwelder@wildlandseng.com>; Shawn Wilkerson <swilkerson@wildlandseng.com>; Allen, Melonie <melonie.allen@ncdenr.gov>; Crumbley, Tyler A CIV USARMY CESAW (USA) <Tyler.A.Crumbley2@usace.army.mil>
Subject: Notice of NCDMS As-Built Review /Double H Farms/ SAW-2018-01771 / Alleghany Co.

Good Morning IRT,

The below referenced FINAL Record Drawing (As-Built) Report review has been requested by NCDMS. Per Section 332.8(o)(9) of the 2008 Mitigation Rule, this review follows the streamlined review process, which requires an IRT review period of 15 calendar days from this email notification. Please provide any comments by 5 PM on the 15-day comment deadline shown below. When providing comments please indicate if your concerns are great enough that you recommend not issuing the credit release. Comments provided after the 15-day comment deadline (shown below) may not be considered.

At the conclusion of this comment period, a copy of all comments will be provided to NCDMS and the NCIRT along with District Engineer's intent to approve or disapprove this Final Record Drawing and initial credit release.

15-Day Comment Start Date: May 20, 2022

15-Day Comment Deadline: June 04, 2022

45-Day Credit Release Approval Deadline: July 04, 2022

Project information and location of the FINAL As-Built Baseline Monitoring Report (MY0):

Double H Farms

DMS # 100082

RFP# 16-007403 – Issued 12/7/2017

Institution Date: 6/15/2018 – Full Delivery

SAW-2018-01771

DWR# 2018-1270

New River Basin

Cataloging Unit 05050001

Alleghany County, North Carolina

Mitigation Plan Project Credits:

6,560.410 SMUs (cold)

2.151 WMUs (riparian)

As-Built - MY0 Project Credits:

6,560.410 SMUs (cold)

2.151 WMUs (riparian)

Mitigation Plan Lengths/ Acreages:

8,663.600 linear feet (stream)

4.858 acres (wetland)

As-Built-MY0 Lengths/ Acreages:

8,650.000 linear feet (stream)

4.872 acres (wetland)

Please note:

The report (Section 4.2, Record Drawings) notes the following (and provides a bullet list) to summarize minor changes from mitigation plan to as-built, to account for the differences in length/acreage: Changes were implemented at several locations during construction including material type, the addition and/or removal of structures, and grading. These changes were made due to unforeseen site conditions and availability of on-site materials. In all instances, the changes provide the same, if not better, stability, habitat, and functional uplift. A sealed survey and record drawing are located in Appendix 4.

FD Provider: Wildlands; Contact: Kristi Suggs ksuggs@wildlandseng.com <mailto:ksuggs@wildlandseng.com> O: 704.332.7754 x110 M: 704.579.4828

NCDEQ - DMS PM: Harry Tsomides, harry.tsomides@ncdenr.gov <mailto:harry.tsomides@ncdenr.gov> M: 828-545-7057

IRT-DMS SharePoint Page:

https://ncconnect.sharepoint.com/sites/IRT-DMS/SitePages/Home.aspx
<Blockedhttps://ncconnect.sharepoint.com/sites/IRT-DMS/SitePages/Home.aspx>

Double H_100082_MY0_2022.pdf

DoubleH_100082_MY0_2022.pdf <Blockedhttps://ncconnect.sharepoint.com/:b:/r/sites/IRT-DMS/AsBuilt%20Report%20%20Drawing/Double%20H%20Farms%20(100082)/DoubleH_100082_MY0_2022.pdf?csf=1&web=1&e=X10d4x>

Double H_100082_AB_2022.pdf

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RIBITS:

https://ribits.ops.usace.army.mil/ords/f?p=107:278:4756008788694:::RP,278:P278_BANK_ID:5269

Thanks,

Casey

Casey Haywood

Mitigation Specialist, Regulatory Division I U.S. Army Corps of Engineers

(919) 750-7397 work cell

BUILDING STRONG ®

To: DMS Technical Workgroup, DMS operations staff

From: Periann Russell, Division of Mitigation Services (DMS)

RE: Pebble count data requirements

Date: October 19, 2021

The DMS Technical Work Group met September 29, 2021 to discuss Interagency Review Team (IRT) and DMS requirements for collecting pebble count data as part of monitoring (MY0-MYx). Agreement was reached between all attending parties that pebble count data will not be required during the monitoring period for all future projects.

Sediment data and particle distribution will still be required for the mitigation plan as part of the proposed design explanation and justification.

Pebble counts and/or particle distributions currently being conducted by providers for annual monitoring may be discontinued at the discretion of the DMS project manager. If particle distribution was listed as a performance standard in the project mitigation plan, the provider is required to communicate the intent to cease data collection with the DMS project manager. The absence of pebble count data in future monitoring reports where pebble count data was listed as part of monitoring in the mitigation plan must be documented in the monitoring report. The September 29, 2021 Technical Work Group meeting may be cited as the source of the new policy.

The IRT reserves the right to request pebble count data/particle distributions if deemed necessary during the monitoring period.

Ella Wickliff

From: Mimi Caddell
Sent: Wednesday, November 2, 2022 9:34 AM
To: Ella Wickliff
Subject: FW: [External] FW: Pebble Count Data Requirements

Mimi Caddell | *Environmental Scientist*
704.222.4918

From: Tsomides, Harry <harry.tsomides@ncdenr.gov>
Sent: Thursday, October 28, 2021 9:03 AM
To: Kristi Suggs <ksuggs@wildlandseng.com>
Cc: Mimi Caddell <mcaddell@wildlandseng.com>
Subject: RE: [External] FW: Pebble Count Data Requirements

Hi Kristi thanks for checking in. This data are now optional. A few things to keep in mind:

The pebble counts should still be collected in MY0/ baseline and reported (per their approved mitigation plan/addenda). For example Double H farms and Laurel Valley.

On “newer” projects without an approved mitigation plan, make sure to propose the approach accordingly and reference the memo in the mitigation plan for IRT review and approval.

Please make sure to document everything in the applicable monitoring reports (per the memo) to avoid any DMS or IRT confusion (Alexander farms, Deep Meadow, Vile, Crooked Creek, Little Pine etc)

If there are projects in monitoring that WEI believes would benefit from continued pebble count data collection then please continue, but that is up to your best professional judgment as the provider.

FD as well as DBB.

Thanks!

==========

Harry Tsomides
Project Manager
Division of Mitigation Services
NC Department of Environmental Quality

Tel. (828) 545-7057
Harry.Tsomides@ncdenr.gov

5 Ravenscroft Drive
Suite 102

Asheville, NC 28801

Email correspondence to and from this address is subject to the North Carolina Public Records Law and may be disclosed to third parties.

From: Kristi Suggs [mailto:ksuggs@wildlandseng.com]
Sent: Wednesday, October 27, 2021 1:19 PM
To: Tsomides, Harry <harry.tsomides@ncdenr.gov>
Cc: Mimi Caddell <mcaddell@wildlandseng.com>
Subject: [External] FW: Pebble Count Data Requirements

CAUTION: External email. Do not click links or open attachments unless you verify. Send all suspicious email as an attachment to Report Spam.

Harry,

Jason Lorch in our Raleigh Office forwarded this meeting memo to me. It says that conducting pebble counts for DMS projects for monitoring (MY0 – MY7) projects is no longer needed as long as it has been okayed by the DMS PM. Moving forward, are you going to allow us to stop doing them on your projects? If so, will DBB projects be treated the same? Please let me know. Thank you!

Kristi

Kristi Suggs | *Senior Environmental Scientist*
O: 704.332.7754 x110 **M**: 704.579.4828

Wildlands Engineering, Inc.
1430 S. Mint St, Suite 104
Charlotte, NC 28203

From: Jason Lorch <jlorch@wildlandseng.com>
Sent: Monday, October 25, 2021 9:05 AM
To: Kristi Suggs <ksuggs@wildlandseng.com>
Subject: FW: Pebble Count Data Requirements

Jason Lorch, GISP | *Senior Environmental Scientist*
O: 919.851.9986 x107 **M**: 919.413.1214

Wildlands Engineering, Inc.
312 West Millbrook Road, Suite 225
Raleigh, NC 27609

From: Russell, Periann <periann.russell@ncdenr.gov>
Sent: Thursday, October 21, 2021 10:05 AM
To: King, Scott <Scott.King@mbakerintl.com>; Catherine Manner <catherine@waterlandsolutions.com>; Tugwell, Todd J CIV USARMY CESAW (US) <Todd.J.Tugwell@usace.army.mil>; adam.spiller@kci.com; Brad Breslow <bbreslow@res.us>; Davis, Erin B <erin.davis@ncdenr.gov>; gginn@wolfcreekeng.com; grant lewis <glewis@axiomenvironmental.org>; Jeff Keaton <jkeaton@wildlandseng.com>; katie mckeithan <Katie.McKeithan@mbakerintl.com>; Kayne Van Stell <kayne@waterlandsolutions.com>; Kevin Tweedy <ktweedy@eprusa.net>; Reid, Matthew <matthew.reid@ncdenr.gov>; Ryan Smith <rsmith@lmgroup.net>; Melia, Gregory <gregory.melia@ncdenr.gov>; Allen, Melonie <melonie.allen@ncdenr.gov>; Famularo, Joseph T <Joseph.Famularo@ncdenr.gov>; Rich@mogmit.com; Bryan Dick <Bryan.Dick@freese.com>; Ryan Medric <rmedric@res.us>; Kim Browning <Kimberly.D.Browning@usace.army.mil>; Kayne Van Stell <kayne@waterlandsolutions.com>; Worth Creech <worth@restorationsystems.com>; Jason Lorch <jlorch@wildlandseng.com>
Cc: Crocker, Lindsay <Lindsay.Crocker@ncdenr.gov>; Wiesner, Paul <paul.wiesner@ncdenr.gov>; Tsomides, Harry <harry.tsomides@ncdenr.gov>; Reid, Matthew <matthew.reid@ncdenr.gov>; Dow, Jeremiah J <jeremiah.dow@ncdenr.gov>; Horton, Jeffrey <jeffrey.horton@ncdenr.gov>; Ullman, Kirsten J <Kirsten.Ullman@NCDENR.gov>; Ackerman, Anjie <anjie.ackerman@ncdenr.gov>; Blackwell, Jamie D <james.blackwell@ncdenr.gov>; Xu, Lin <lin.xu@ncdenr.gov>; Mir, Danielle <Danielle.Mir@ncdenr.gov>; Corson, Kristie <kristie.corson@ncdenr.gov>; Russell, Periann <periann.russell@ncdenr.gov>; Sparks, Kimberly L <Kim.sparks@ncdenr.gov>
Subject: Pebble Count Data Requirements

Please review the attached memo documenting the agreed upon policy for pebble count data requirements.
Please reply (me only) to this email if accept that this memo represents (or misrepresents) our discussion on Sept 29.
Thank you.

Periann Russell
Geomorphologist
Division of Mitigation Services, Science and Analysis
NC Department of Environmental Quality

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919 208 1426 mobile
periann.russell@ncdenr.gov

Mailing: 1652 Mail Service Center Raleigh, NC 27699-1652
Physical: 217 West Jones Street Raleigh, NC 27603