



MONITORING YEAR 1 ANNUAL REPORT FINAL

January 2022

MCLENNY ACRES MITIGATION SITE

Wayne County, NC
Neuse River Basin
HUC 03020201

DMS Project No. 100038
NCDEQ Contract No. 7423
DWR Project No. 2018-0197
USACE Action ID No. 2018-02042

Data Collection Dates: April-November 2021

DMS RFP No. 16-007279
June 21, 2017

PREPARED FOR:



NC Department of Environmental Quality Division of Mitigation Services

1652 Mail Service Center
Raleigh, NC 27699-1652

January 19, 2022

Jeremiah Dow
Project Manager
NCDEQ- Division of Mitigation Services
217 West Jones St.
Raleigh, NC 27603

Subject: McClenny Acres Mitigation Site – Monitoring Year 1 Report
Neuse River Basin – HUC 03020201
Wayne County
DMS Project ID No. 100038
Contract # 7423

Dear Mr. Dow:

On January 14, 2022, Wildlands Engineering received comments from the North Carolina Division of Mitigation Services (DMS) regarding the Draft Monitoring Year 1 Report for the McClenny Acres Mitigation Site dated December 2021. DMS comments are reprinted below with Wildlands' responses in italics.

1. Please submit the supporting data for the random vegetation plots with stem height included.

Response: Random vegetation plot data has been added to the digital submittal.

2. Please include figures displaying the data from UT1, UT2, and UT4 stage recorders and submit these data.

Response: Recorded Bankfull Events Plots have been added to Appendix D and corresponding data is included in the digital submittal.

3. Per the Notice of Initial Credit Release email dated 7/22/21 from the IRT, please include the June 15 site visit minutes in the MY1 report. Along with meeting minutes, please include the MYO IRT comments and Wildlands' responses.

Response: The June 15, 2021 IRT meeting minutes and MYO IRT report comments and responses have been added as Appendix F to the report.

4. What is the status of pine thinning along the forested length of UT3?

Response: Pine removal along the forested length of UT3 occurred during December 2021. Report text, figures, tables, and digital files have been updated to include this information.

Thank you for your review and providing comments on this submittal. If you have any further questions, please contact me at (919) 851-9986, or by email (jlorch@wildlandseng.com).

Sincerely,

A handwritten signature in black ink, appearing to read 'J Lorch', written in a cursive style.

Jason Lorch, *Monitoring Coordinator*

PREPARED BY:



312 West Millbrook Road, Suite 225
Raleigh, NC 27609

Jason Lorch
jlorch@wildlandseng.com
Phone: 919.851.9986

MCCLENNY ACRES MITIGATION SITE
Monitoring Year 1 Annual Report

TABLE OF CONTENTS

Section 1: PROJECT OVERVIEW **1-1**

 1.1 Project Quantities and Credits 1-1

 1.2 Project Goals and Objectives 1-2

 1.3 Project Attributes..... 1-3

Section 2: Monitoring Year 1 Data Assessment **2-1**

 2.1 Vegetative Assessment 2-1

 2.2 Vegetation Areas of Concern 2-1

 2.3 Stream Assessment..... 2-1

 2.4 Stream Areas of Concern 2-1

 2.5 Stream Hydrology Assessment 2-1

 2.6 Wetland Assessment..... 2-2

 2.7 Adaptive Management Plan 2-2

 2.8 Monitoring Year 1 Summary 2-2

Section 3: REFERENCES..... **3-1**

TABLES

Table 1: Project Quantities and Credits 1-1

Table 2: Goals, Performance Criteria, and Functional Improvements 1-2

Table 3: Project Attributes 1-4

FIGURES

Figure 1 Current Condition Plan View Key

Figure 1a-b Current Condition Plan View

APPENDICES

Appendix A Visual Assessment Data

Table 4 Visual Stream Morphology Stability Assessment Table

Table 5 Vegetation Condition Assessment Table

 Stream Photographs

 Vegetation Plot Photographs

 Groundwater Well Photographs

Appendix B Vegetation Plot Data

Table 6a Vegetation Plot Data - Fixed

Table 6b Vegetation Plot Data - Random

Table 7 Vegetation Performance Standards Summary Table

Appendix C Stream Geomorphology Data

 Cross-Section Plots

Table 8 Baseline Stream Data Summary

Table 9 Cross-Section Morphology Monitoring Summary

Appendix D	Hydrology Data
Table 10	Bankfull Events
Table 11	Rainfall Summary
	Recorded Bankfull Events Plots
Table 12	Recorded In-Stream Flow Events Summary
	Recorded In-Stream Flow Events Plot
Table 13	Groundwater Gauge Summary
	Groundwater Gauge Plots
	Soil Temperature Probe Plot
Appendix E	Project Timeline and Contact Information
Table 14	Project Activity and Reporting History
Table 15	Project Contact Table
Appendix F	IRT Correspondence
	Meeting Minutes: As-Built IRT Site Visit June 15, 2021
	MYO Report IRT Comments and Wildlands' Response



Section 1: PROJECT OVERVIEW

The McClenny Acres Mitigation Site (Site) is located in Wayne County, approximately four miles west of Goldsboro. The Site is within a new targeted local watershed (TLW) which was not described in the 2010 Neuse River Basin Restoration Priorities (RBRP) plan (Breeding, 2010). Table 3 presents information related to the project attributes.

1.1 Project Quantities and Credits

Mitigation work within the Site included restoration, enhancement II, and preservation of perennial and intermittent stream channels, along with re-establishment and enhancement of wetlands. Table 1 below shows stream credits by reach and the total amount of stream credits expected at closeout.

Table 1: Project Quantities and Credits

PROJECT MITIGATION QUANTITIES							
Project Segment	Mitigation Plan Footage	As-Built Footage	Mitigation Category	Restoration Level	Mitigation Ratio (X:1)	Credits	Comments
STREAMS							
UT1	1,263	1,286	Warm	R	1	1,263.000	Full Channel Restoration, Planted Buffer
	20	20	N/A	N/A	N/A	N/A	Utility R.O.W., Not for Credit
	1,471	1,497	Warm	R	1	1,471.000	Full Channel Restoration, Planted Buffer
UT2 Reach 1	95	89	Warm	P	10	8.900	Conservation Easement
UT2 Reach 2	574	574	Warm	R	1	574.000	Full Channel Restoration, Planted Buffer
	21	21	N/A	N/A	N/A	N/A	Utility R.O.W., Not for Credit
	314	311	Warm	R	1	314.000	Full Channel Restoration, Planted Buffer
UT3 Reach 1	472	472	Warm	R	1	472.000	Full Channel Restoration, Buffer Planting
UT3 Reach 2	170	153	Warm	R	1	145.000	Full Channel Restoration, Buffer Planting
	89	163	N/A	N/A	N/A	N/A	Utility R.O.W., Not for Credit
	1,117	1,082	Warm	R	1	1068.000	Full Channel Restoration
UT4 Reach 1	3,824	3,862	Warm	R	1	3,824.000	Full Channel Restoration
UT4 Reach 2	174	167	Warm	EII	2.5	69.600	Floodplain Berm Removed
Total						9,209.500	
WETLANDS							
Wetland Re-establishment	36.795	36.328	Riparian	Re-establishment	1	36.328	Restored Hydrology, Planted
Wetland Enhancement	0.588	0.560	Riparian	Enhancement	2	0.280	Enhanced Hydrology
Total						36.608	

Restoration Level	Stream	Riparian Wetland
	Warm	Riverine
Restoration	9,131.000	
Enhancement II	69.600	
Preservation	8.900	
Re-Establishment		36.328
Enhancement		0.280
Total Stream Credit	9,209.500	
Total Wetland Credit		36.608

1.2 Project Goals and Objectives

The project is intended to provide numerous ecological benefits within the Neuse River Basin. Table 2 below describes expected outcomes to water quality and ecological processes and provides project goals and objectives.

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 that will maintain a stable pattern and profile considering hydrologic and sediment inputs to the system, the landscape setting, and the watershed conditions.	Reduce and control sediment inputs and contribute to protection of or improvement of a Water Supply and Nutrient-Sensitive Water.	ER stays over 2.2 and BHR below 1.2 with visual assessments showing progression towards stability.	Cross-section monitoring and visual inspections.	All stream channels are stable and performing as designed.
Reconnect channels with floodplains and riparian wetlands.	Reconstruct stream channels with appropriate bankfull dimensions and depth relative to the existing floodplain.	Reduce shear stress on channel; hydrate adjacent wetland areas; and filter pollutants out of overbank flows.	Four bankfull events in separate monitoring years. 30 consecutive days of flow for intermittent channel.	Crest gauges and/or pressure transducers recording flow elevations.	UT1, UT2, UT3, and UT4 obtained bankfull events in MY1. UT3 obtained 61 days of consecutive flow during MY1.
Improve instream habitat.	Install habitat features such as cover logs, log sills, and brush toes into restored/enhanced streams. Add woody materials to channel beds. Construct pools of varying depth.	Support biological communities and processes; and provide aquatic habitats for diverse populations of aquatic organisms.	There is no required performance standard for this metric.	N/A	N/A



Goal	Objective/ Treatment	Likely Functional Uplift	Performance Criteria	Measurement	Cumulative Monitoring Results
Restore wetland hydrology, soils, and plant communities.	Restore and enhance riparian wetlands by raising stream beds, plugging existing ditches, removing berm material over relic hydric soils, and planting native wetland species.	Improve terrestrial habitat; and contribute to protection of or improvement of a Water Supply and Nutrient-Sensitive Water.	Free groundwater surface within 12 inches of the ground surface for 10-14% of the growing season under normal precipitation conditions.	Groundwater wells equipped with transducers recording depth to water table. Transducers recording soil temperature.	10 out of 19 groundwater gauges indicated successful criterion attainment during MY1.
Restore and enhance native floodplain vegetation.	Plant native tree species in riparian zone where insufficient.	Reduce and control sediment inputs; reduce and manage nutrient inputs; provide a canopy to shade streams and reduce thermal loadings; and contribute to protection of or improvement of a Water Supply and Nutrient-Sensitive Water.	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 7 feet at MY5 and 10 feet at MY7.	One hundred square meter vegetation plots are placed on 2% of the planted area of the Site and monitored annually.	All 25 vegetation plots have a planted stem density greater than 320 stems per acre.
Permanently protect the project site from harmful uses.	Establish conservation easements on the Site.	Ensure that development and agricultural uses that would damage the Site or reduce the benefits of the project are prevented.	Prevent easement encroachment.	Visually inspect the perimeter of the Site to ensure no easement encroachment is occurring.	No easement encroachments.

1.3 Project Attributes

The Site was restored by Wildlands through a full delivery contract with DMS. Tables 3 provide detailed information regarding the project information and attributes.



Table 3: Project Attributes

PROJECT INFORMATION				
Project Name	McClenny Acres Mitigation Site	County	Wayne County	
Project Area (acres)	52.08	Project Coordinates	35° 23' 25"N, 78° 03' 15"W	
PROJECT WATERSHED SUMMARY INFORMATION				
Physiographic Province	Coastal Plain	River Basin	Neuse	
USGS HUC 8-digit	03020201	USGS HUC 14-digit	03020201200030	
DWR Sub-basin	03-04-12	Land Use Classification	38% cultivated crops; 21% forest; 17% shrub herbaceous; 15% wetland; 9% residential	
Project Drainage Area (acres)	828	Percentage of Impervious Area	2.1%	
RESTORATION TRIBUTARY SUMMARY INFORMATION				
Parameters	UT1	UT2	UT3	UT4
Pre-project length (feet)	2,986	1,254	2,610	2,826
Post-project (feet)	2,783	974	1,707	4,029
Valley confinement	Unconfined			
Drainage area (acres)	423	40	222	784
Perennial, Intermittent, Ephemeral	Perennial	Perennial	Intermittent/ Perennial	Perennial
DWR Water Quality Classification	WS-IV (NSW)			
Dominant Stream Classification (existing)	E5/G5	F5		E5/G5
Dominant Stream Classification (proposed)	C5	C5	C5	C5
Dominant Evolutionary class (Simon) if applicable	Stage III/IV	Stage III		Stage IV
REGULATORY CONSIDERATIONS				
Parameters	Applicable?	Resolved?	Supporting Documentation	
Water of the United States - Section 404	Yes	Yes	USACE Nationwide Permit No. 27 and DWQ 401 Water Quality Certification No. 4134.	
Water of the United States - Section 401	Yes	Yes		
Endangered Species Act	Yes	Yes	Categorical Exclusion in Mitigation Plan (Wildlands, 2020)	
Historic Preservation Act	Yes	Yes		
Coastal Zone Management Act (CZMA or CAMA)	N/A	N/A	N/A	
Essential Fisheries Habitat	No	N/A	N/A	



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 MY0 Annual Report (Wildlands, 2021).

2.1 Vegetative Assessment

The MY1 vegetative survey was completed in September 2021. Vegetation monitoring of fixed plots resulted in an average stem density of 613 planted stems per acre, with individual plots ranging in density from 445 to 728 stems per acre. Random plot surveys resulted in an average stem density of 599 stems per acre with individual plots ranging in density from 324 to 1,012 stems per acre. Stem density values for each individual fixed and random plot exceeded the interim requirement of 320 stems per acre. Herbaceous vegetation is well established across the site and includes native pollinator-friendly species. Refer to Appendix A for Vegetation Plot Photographs and the Vegetation Condition Assessment Table and Appendix B for Vegetation Plot Data.

2.2 Vegetation Areas of Concern

Mature pine (*Pinus taeda*) trees were harvested and removed from a 4.31 acre area within the conservation easement surrounding UT3 during December of 2021. Additional mature pines remain within a 2.06 acre area along the east side of upper UT4. Girdling this area of pine trees will be considered to reduce the seed source within the conservation easement, although it is Wildlands' understanding that pine removal is not required as a condition of the mitigation plan or subsequent correspondence in this area (Figure 1a, 1b). No other vegetation areas of concern were identified during MY1.

2.3 Stream Assessment

Morphological surveys for MY1 were conducted in April 2021. All streams within the Site are stable and functioning as designed. Some sediment has accumulated in the cross-section (XS) 1 pool of UT1. This is possibly related to the sudden energy relief provided by the restored channel relative to the off-project, steeper, and more incised condition of UT1. Additionally, some variation in pool depth is characteristic of sediment dynamics in sand bed streams. The max depth and water surface slope observed in XS 1 indicate this pool is still functioning as designed. All remaining cross-sections at the Site show little to no change in the bankfull area and width-to-depth ratio and bank height ratios are less than 1.2. Refer to Appendix A for the Visual Stream Morphology Stability Assessment Table and Stream Photographs. Refer to Appendix C for Stream Geomorphology Data.

2.4 Stream Areas of Concern

No stream areas of concern were identified during MY1.

2.5 Stream Hydrology Assessment

Bankfull events were recorded on UT1, UT2, UT3, and UT4. Each of these channels must experience three more bankfull events in separate years over the next six monitoring years.

In addition, the presence of baseflow must be documented on the restored intermittent reach (UT3 Reach 1) for a minimum of 30 consecutive days during a calendar year with normal precipitation. UT3



Reach 1 maintained baseflow for at least 61 consecutive days and 143 total days during MY1. Hydrologic data recording did not begin until February 26, 2021. Refer to Appendix 5 for hydrologic data.

2.6 Wetland Assessment

The performance criterion for groundwater gauges (GW) 1 and 5 is a free groundwater surface within 12 inches of the soil surface for 14% of the growing season. GW 2-4 and GW 6-19 have a 10% hydroperiod criterion. Growing season dates approved in the Mitigation Plan were March 4 through November 21 with allowance for modification based on soil temperature data and bud burst. During MY1, bud burst of red maple (*Acer rubrum*) was observed on February 26, 2021 and soil temperature was above 41 degrees Fahrenheit for the entire data observation period. Therefore, growing season dates used for MY1 wetland hydrology evaluation are March 1, 2021 through November 21, 2021.

Ten of the 19 GWs at the site attained the success criterion for MY1 (Table 13). Groundwater hydrology across the site was affected by a relatively dry spring. Minimal rainfall occurred during the last week of February and first two weeks of March. Below normal quantities of rainfall were also observed during April and May. Additional seasons of water table observation are required to better understand hydrology at the site and thoroughly evaluate the success of wetland re-establishment areas. Refer to Figures 1-1b for the groundwater gauge locations and Appendix D for groundwater hydrology data and plots.

2.7 Adaptive Management Plan

“No mow” signs were added along the powerline maintenance limits to aid in field identification of the area Duke Progress will maintain. Additional girdling of loblolly pine along the east side of upper UT4 is being considered. No additional adaptive management practices are required at this time.

2.8 Monitoring Year 1 Summary

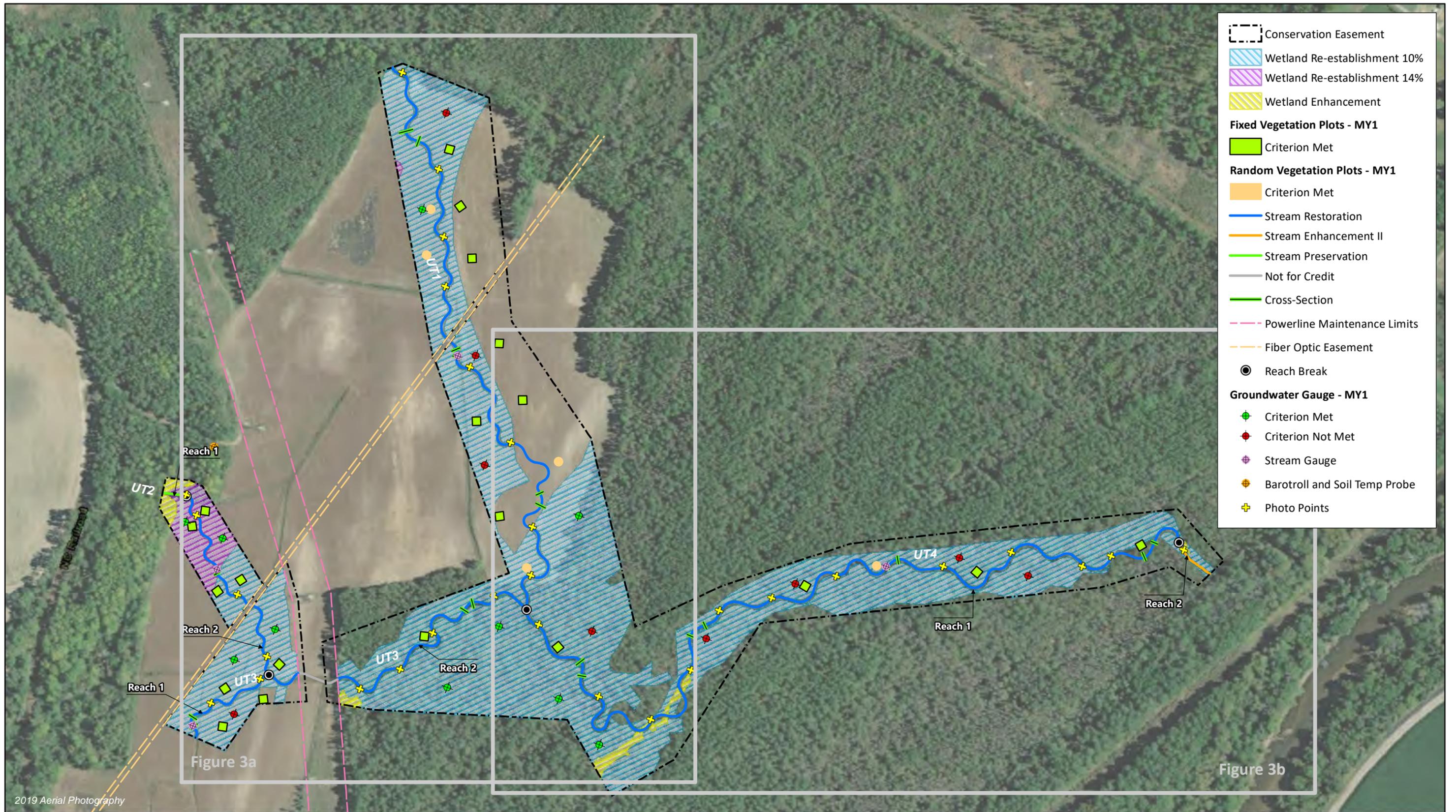
All vegetation plots are on track to exceed the MY3 interim requirement of 320 planted stems per acre. Herbaceous cover and planted stems appear to have acclimated to site conditions and have become well established throughout the project area. Bankfull events were documented on UT1, UT2, UT3, and UT4 and greater than 30 days of consecutive flow was recorded on UT3, fulfilling MY1 success requirement. Ten of 19 groundwater wells indicated successful re-establishment of wetland hydrology during MY1; however, this relatively low success rate is probably related to abnormally low rainfall quantities in the spring. Overall, the Site has exhibited excellent vegetation growth and stream channel stability during MY1 and demonstrates early indicators of successfully restored, diverse aquatic and terrestrial ecosystems.

Summary information and data related to the performance of various project and monitoring elements can be found in the tables and figures in the report appendices. All raw data supporting the tables and figures in the appendices are available from DMS upon request.

Section 3: REFERENCES

- Breeding, R. 2010. Neuse River Basin Restoration Priorities. North Caroline Ecosystem Enhancement Program. Accessed at:
https://files.nc.gov/ncdeq/Mitigation%20Services/Watershed_Planning/Neuse_River_Basin/FINAL%20RBRP%20Neuse%202010_%2020111207%20CORRECTED.pdf
- Rosgen, D. L. 1994. A classification of natural rivers. *Catena* 22:169-199.
- Rosgen, D.L. 1996. *Applied River Morphology*. Pagosa Springs, CO: Wildland Hydrology Books.
- Wildlands Engineering, Inc. 2020. McClenny Acres Mitigation Site Mitigation Plan. DMS, Raleigh, NC.
- Wildlands Engineering, Inc. 2021. McClenny Acres Mitigation Site Monitoring Year 0 (MY0) Annual Report. DMS, Raleigh, NC.





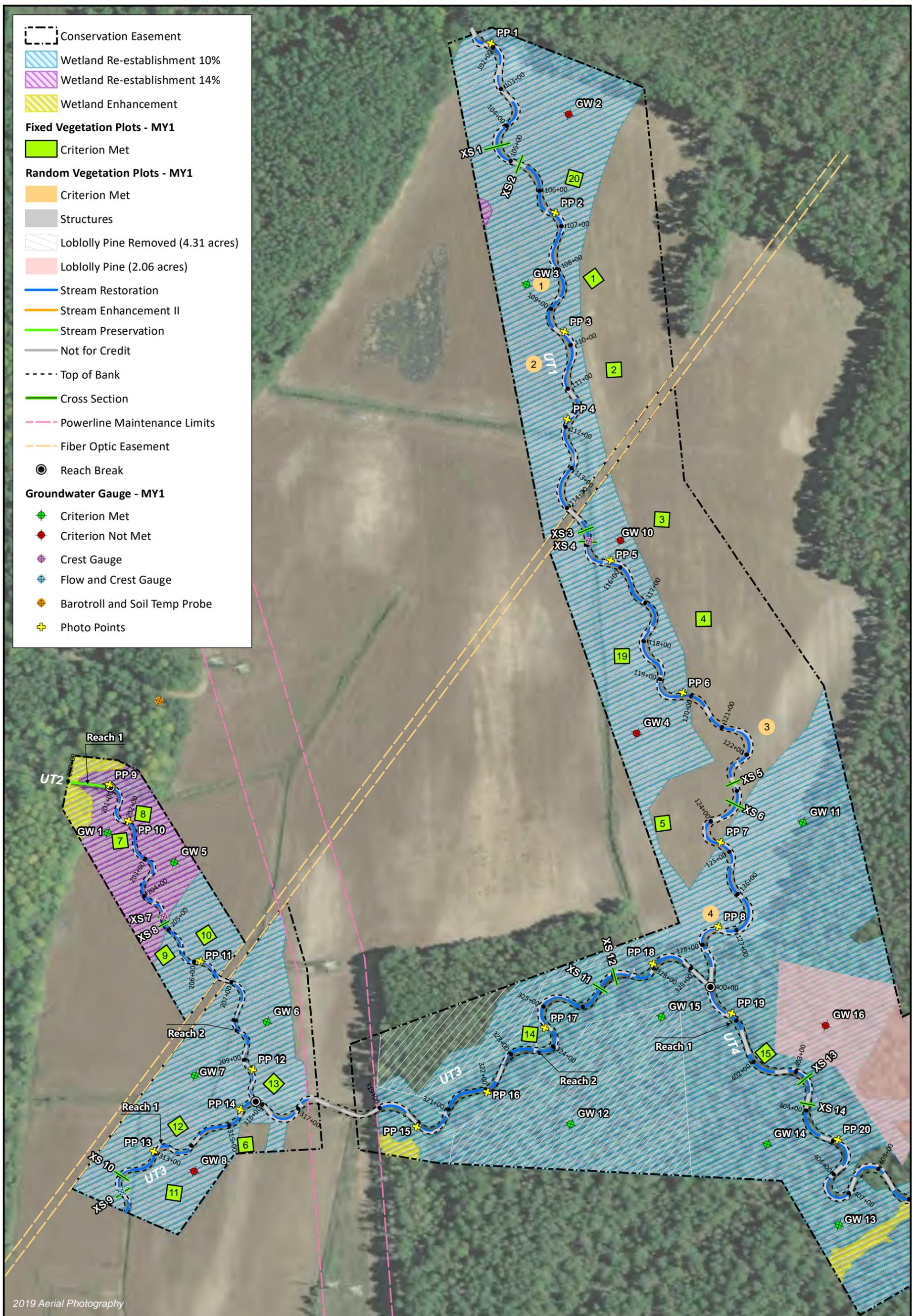
2019 Aerial Photography



0 350 Feet



Figure 1 - Current Condition Plan View Key
 McClenny Acres Mitigation Site
 DMS Project No. 100038
 Monitoring Year 1 - 2021



2019 Aerial Photography



0 100 200 Feet

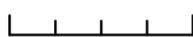
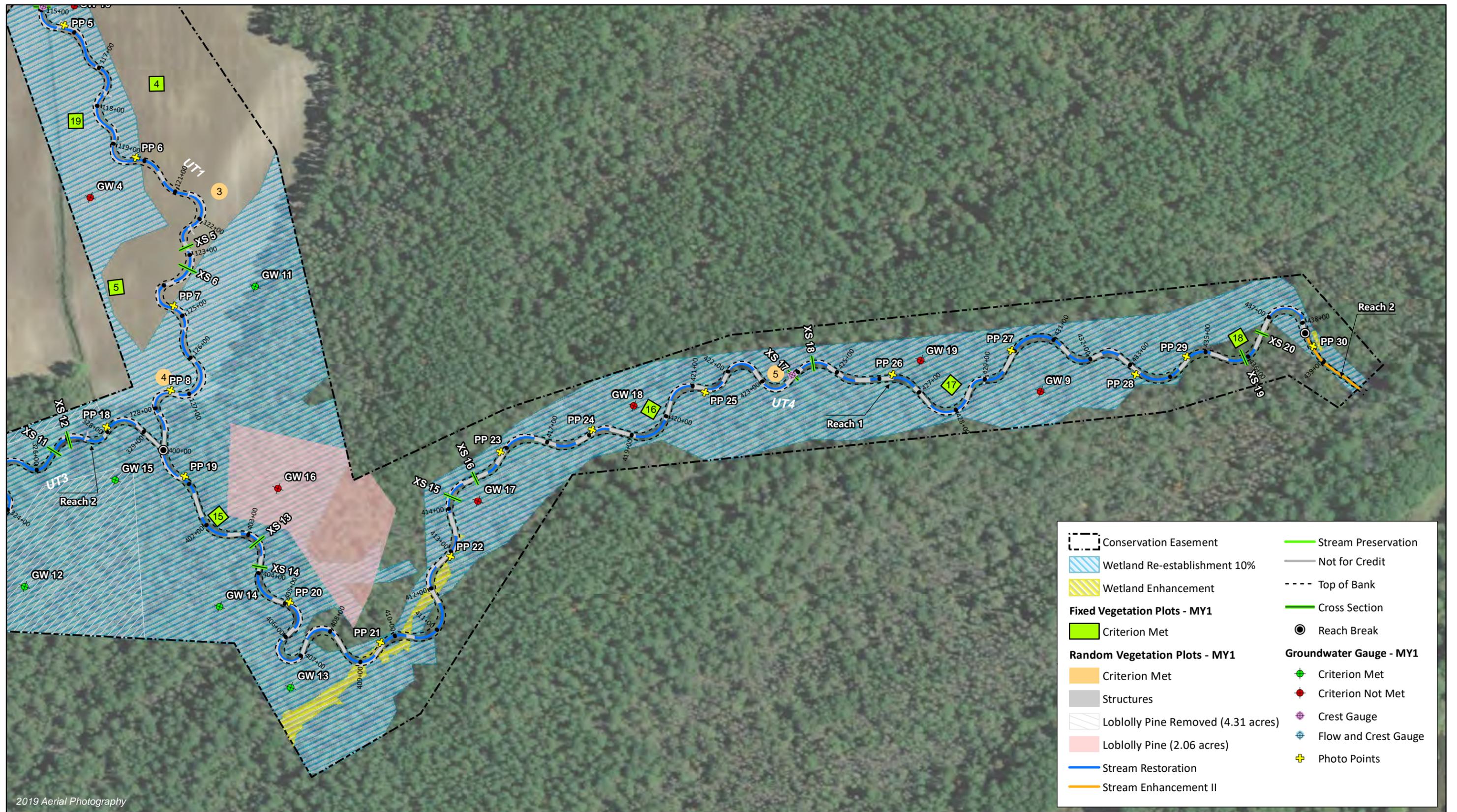


Figure 1a - Current Condition Plan View
 McClenny Acres Mitigation Site
 DMS Project No. 100038
 Monitoring Year 1 - 2021

Wayne County, NC



APPENDIX A. VISUAL ASSESSMENT DATA

Table 4. Visual Stream Morphology Stability Assessment Table

McClenny Acres Mitigation Site
 DMS Project No. 100038
 Monitoring Year 1 - 2021

UT1

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	2,783
					Assessed Bank Length	5,566
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 <u>NOT</u> 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.	8	8		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	33	33		100%

UT2

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	974
					Assessed Bank Length	1,948
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 <u>NOT</u> 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.	4	4		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	11	11		100%

Table 4. Visual Stream Morphology Stability Assessment Table

McClenny Acres Mitigation Site
 DMS Project No. 100038
 Monitoring Year 1 - 2021

UT3

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	1,707
					Assessed Bank Length	3,414
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 <u>NOT</u> 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.	3	3		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	7	7		100%

UT4

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	4,029
					Assessed Bank Length	8,056
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 <u>NOT</u> 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.	1	1		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%.	18	18		100%

Table 5. Vegetation Condition Assessment Table

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Planted Acreage 34.56

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 54.24

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 UT1 – upstream (4/29/2021)



PHOTO POINT 1 UT1 – downstream (4/29/2021)



PHOTO POINT 2 UT1 – upstream (4/29/2021)



PHOTO POINT 2 UT1 – downstream (4/29/2021)



PHOTO POINT 3 UT1 – upstream (4/29/2021)



PHOTO POINT 3 UT1 – downstream (4/29/2021)



PHOTO POINT 4 UT1 – upstream (4/29/2021)



PHOTO POINT 4 UT1 – downstream (4/29/2021)



PHOTO POINT 5 UT1 – upstream (4/29/2021)



PHOTO POINT 5 UT1 – downstream (4/29/2021)



PHOTO POINT 6 UT1 – upstream (4/29/2021)



PHOTO POINT 6 UT1 – downstream (4/29/2021)



PHOTO POINT 7 UT1 – upstream (4/29/2021)



PHOTO POINT 7 UT1 – downstream (4/29/2021)



PHOTO POINT 8 UT1 – upstream (4/29/2021)



PHOTO POINT 8 UT1 – downstream (4/29/2021)



PHOTO POINT 9 UT2 Reach 1 – upstream (4/29/2021)



PHOTO POINT 9 UT2 Reach 2 – downstream (4/29/2021)



PHOTO POINT 10 UT2 Reach 2 – upstream (4/29/2021)



PHOTO POINT 10 UT2 Reach 2 – downstream (4/29/2021)



PHOTO POINT 11 UT2 Reach 2 – upstream (4/29/2021)



PHOTO POINT 11 UT2 Reach 2 – downstream (4/29/2021)



PHOTO POINT 12 UT2 Reach 2 – upstream (4/29/2021)



PHOTO POINT 12 UT 2 Reach 2 – downstream (4/29/2021)



PHOTO POINT 13 UT3 Reach 1 – upstream (6/9/2021)



PHOTO POINT 13 UT3 Reach 1 – downstream (6/9/2021)



PHOTO POINT 14 UT3 Reach 1 – upstream (6/9/2021)



PHOTO POINT 14 UT3 Reach 1 – downstream (6/9/2021)



PHOTO POINT 15 UT3 Reach 2 – upstream (6/9/2021)



PHOTO POINT 15 UT3 Reach 2 – downstream (6/9/2021)



PHOTO POINT 16 UT3 Reach 2 – upstream (6/9/2021)



PHOTO POINT 16 UT3 Reach 2 – downstream (6/9/2021)



PHOTO POINT 17 UT3 Reach 2 – upstream (6/9/2021)



PHOTO POINT 17 UT3 Reach 2 – downstream (6/9/2021)



PHOTO POINT 18 UT3 Reach 2 – upstream (6/9/2021)



PHOTO POINT 18 UT3 Reach 2 – downstream (6/9/2021)



PHOTO POINT 19 UT4 Reach 1 – upstream (4/29/2021)



PHOTO POINT 19 UT4 Reach 1 – downstream (4/29/2021)



PHOTO POINT 20 UT4 Reach 1 – upstream (4/29/2021)



PHOTO POINT 20 UT4 Reach 1 – downstream (4/29/2021)



PHOTO POINT 21 UT4 Reach 1 – upstream (4/29/2021)



PHOTO POINT 21 UT4 Reach 1 – downstream (4/29/2021)



PHOTO POINT 22 UT4 Reach 1 – upstream (4/29/2021)



PHOTO POINT 22 UT4 Reach 1 – downstream (4/29/2021)



PHOTO POINT 23 UT4 Reach 1 – upstream (4/29/2021)



PHOTO POINT 23 UT4 Reach 1 – downstream (4/29/2021)



PHOTO POINT 24 UT4 Reach 1 – upstream (4/29/2021)



PHOTO POINT 24 UT4 Reach 1 – downstream (4/29/2021)



PHOTO POINT 25 UT4 Reach 1 – upstream (4/29/2021)



PHOTO POINT 25 UT4 Reach 1 – downstream (4/29/2021)



PHOTO POINT 26 UT4 Reach 1 – upstream (4/29/2021)



PHOTO POINT 26 UT4 Reach 1 – downstream (4/29/2021)



PHOTO POINT 27 UT4 Reach 1 – upstream (4/29/2021)



PHOTO POINT 27 UT4 Reach 1 – downstream (4/29/2021)



PHOTO POINT 28 UT4 Reach 1 – upstream (4/29/2021)



PHOTO POINT 28 UT4 Reach 1 – downstream (4/29/2021)



PHOTO POINT 29 UT4 Reach 1 – upstream (4/29/2021)



PHOTO POINT 29 UT4 Reach 1 – downstream (4/29/2021)



PHOTO POINT 30 UT4 Reach 2 – upstream (4/29/2021)



PHOTO POINT 30 UT4 Reach 2 – downstream (4/29/2021)

VEGETATION PLOT PHOTOGRAPHS



VEGETATION PLOT 1 (9/1/2021)



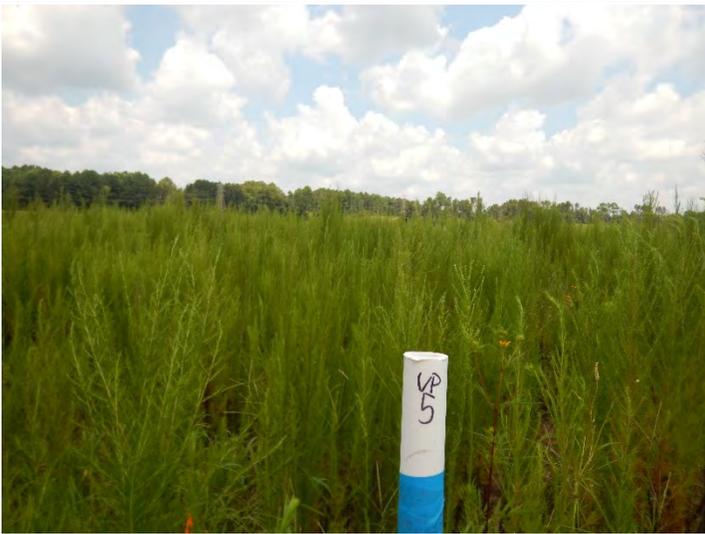
VEGETATION PLOT 2 (9/1/2021)



VEGETATION PLOT 3 (9/1/2021)



VEGETATION PLOT 4 (9/1/2021)



VEGETATION PLOT 5 (9/1/2021)



VEGETATION PLOT 6 (9/1/2021)



VEGETATION PLOT 7 (8/25/2021)



VEGETATION PLOT 8 (8/25/2021)



VEGETATION PLOT 9 (8/25/2021)



VEGETATION PLOT 10 (9/16/2021)



VEGETATION PLOT 11 (8/9/2021)



VEGETATION PLOT 12 (8/9/2021)



VEGETATION PLOT 13 (8/9/2021)



VEGETATION PLOT 14 (8/25/2021)



VEGETATION PLOT 15 (8/25/2021)



VEGETATION PLOT 16 (8/25/2021)



VEGETATION PLOT 17 (8/25/2021)



VEGETATION PLOT 18 (8/25/2021)



VEGETATION PLOT 19 (8/25/2021)



VEGETATION PLOT 20 (8/25/2021)



RANDOM VP 1 (8/25/2021)



RANDOM VP 2 (9/16/2021)



RANDOM VP 3 (8/25/2021)

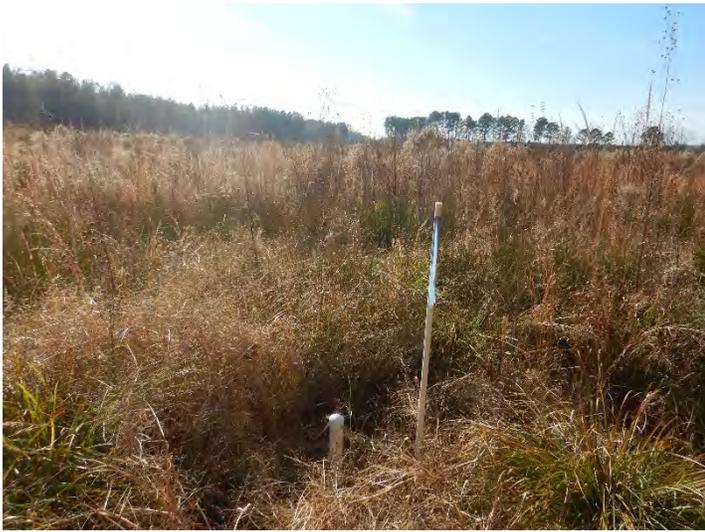


RANDOM VP 4 (8/25/2021)



RANDOM VP 5 (8/25/2021)

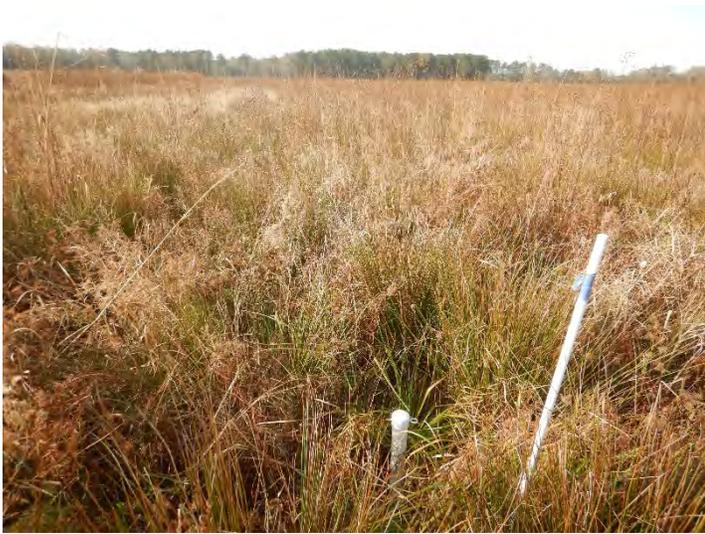
GROUNDWATER WELL PHOTOGRAPHS



GROUNDWATER WELL 1 - (12/2/2021)



GROUNDWATER WELL 2 - (12/2/2021)



GROUNDWATER WELL 3 - (12/2/2021)



GROUNDWATER WELL 4 - (12/2/2021)



GROUNDWATER WELL 5 - (12/2/2021)



GROUNDWATER WELL 6 - (12/2/2021)



GROUNDWATER WELL 7 – (12/2/2021)



GROUNDWATER WELL 8 – (12/2/2021)



GROUNDWATER WELL 9 – (12/2/2021)



GROUNDWATER WELL 10 – (12/2/2021)



GROUNDWATER WELL 11 – (12/2/2021)



GROUNDWATER WELL 12 – (12/2/2021)



GROUNDWATER WELL 13 – (12/2/2021)



GROUNDWATER WELL 14 – (12/2/2021)



GROUNDWATER WELL 15 – (12/2/2021)



GROUNDWATER WELL 16 – (12/2/2021)



GROUNDWATER WELL 17 – upstream (12/2/2021)



GROUNDWATER WELL 18 – (12/2/2021)



GROUNDWATER WELL 19 – (12/2/2021)

APPENDIX B. VEGETATION PLOT DATA

Table 6a. Vegetation Plot Data - Fixed

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Scientific Name	Common Name	Species Type	Current Plot Data (MY1 2021)														
			VP 1			VP 2			VP 3			VP 4			VP 5		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
<i>Betula nigra</i>	River Birch	Tree	4	4	4	3	3	3	3	3	3	4	4	4	1	1	1
<i>Diospyros virginiana</i>	American Persimmon	Tree				1	1	1	1	1	1	1	1	1			
<i>Fraxinus pennsylvanica</i>	Green Ash	Tree	2	2	2							1	1	1	1	1	1
<i>Magnolia virginiana</i>	Sweetbay Magnolia	Shrub Tree	1	1	1							1	1	1	1	1	1
<i>Nyssa biflora</i>	Swamp Tupelo	Tree															
<i>Platanus occidentalis</i>	Sycamore	Tree	2	2	2	3	3	3	3	3	3	3	3	3	5	5	5
<i>Populus deltoides</i>	Eastern Cottonwood	Tree	1	1	1	2	2	2				1	1	1			
<i>Quercus lyrata</i>	Overcup Oak	Tree															
<i>Quercus michauxii</i>	Swamp Chestnut Oak	Tree				2	2	2	1	1	1				3	3	3
<i>Quercus pagoda</i>	Cherrybark Oak	Tree	1	1	1	2	2	2	1	1	1				1	1	1
<i>Quercus phellos</i>	Willow Oak	Tree	3	3	3	1	1	1	6	6	6	2	2	2	2	2	2
<i>Salix nigra</i>	Black Willow	Tree															
<i>Taxodium distichum</i>	Bald-cypress	Tree										1	1	1	2	2	2
<i>Ulmus alata</i>	Winged Elm	Tree															
Stem count			14	14	14	14	14	14	15	15	15	14	14	14	16	16	16
size (ares)			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02		
Species count			7	7	7	7	7	7	6	6	6	8	8	8	8	8	8
Stems per ACRE			567	567	567	567	567	567	607	607	607	567	567	567	647	647	647

Color Coding for Table

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

PnoLS: Number of Planted stems excluding live stakes

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

T: Total Stems

Table 6a. Vegetation Plot Data - Fixed

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Scientific Name	Common Name	Species Type	Current Plot Data (MY1 2021)														
			VP 6			VP 7			VP 8			VP 9			VP 10		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
<i>Betula nigra</i>	River Birch	Tree	1	1	1	2	2	2	3	3	3	2	2	2	4	4	4
<i>Diospyros virginiana</i>	American Persimmon	Tree	1	1	1												
<i>Fraxinus pennsylvanica</i>	Green Ash	Tree				1	1	1				1	1	1	1	1	1
<i>Magnolia virginiana</i>	Sweetbay Magnolia	Shrub Tree	1	1	1	1	1	1	1	1	1				1	1	1
<i>Nyssa biflora</i>	Swamp Tupelo	Tree				2	2	2	1	1	1	2	2	2	3	3	3
<i>Platanus occidentalis</i>	Sycamore	Tree	3	3	3	2	2	2	3	3	3	3	3	3	1	1	1
<i>Populus deltoides</i>	Eastern Cottonwood	Tree															
<i>Quercus lyrata</i>	Overcup Oak	Tree				1	1	1	1	1	1	1	1	1	1	1	1
<i>Quercus michauxii</i>	Swamp Chestnut Oak	Tree	5	5	5				2	2	2	1	1	1	1	1	1
<i>Quercus pagoda</i>	Cherrybark Oak	Tree	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1
<i>Quercus phellos</i>	Willow Oak	Tree	1	1	1												
<i>Salix nigra</i>	Black Willow	Tree				2	2	2				1	1	1	1	1	1
<i>Taxodium distichum</i>	Bald-cypress	Tree				5	5	5	3	3	3	5	5	5	3	3	3
<i>Ulmus alata</i>	Winged Elm	Tree				1	1	1				1	1	1	1	1	1
	Stem count		14	14	14	18	18	18	15	15	15	18	18	18	18	18	18
	size (ares)		1			1			1			1			1		
	size (ACRES)		0.02			0.02			0.02			0.02			0.02		
	Species count		7	7	7	10	10	10	8	8	8	10	10	10	11	11	11
	Stems per ACRE		567	567	567	728	728	728	607	607	607	728	728	728	728	728	728

Color Coding for Table

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

PnoLS: Number of Planted stems excluding live stakes

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

T: Total Stems

Table 6a. Vegetation Plot Data - Fixed

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Scientific Name	Common Name	Species Type	Current Plot Data (MY1 2021)														
			VP 11			VP 12			VP 13			VP 14			VP 15		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
<i>Betula nigra</i>	River Birch	Tree	3	3	3	3	3	3	5	5	5	2	2	2	1	1	1
<i>Diospyros virginiana</i>	American Persimmon	Tree															
<i>Fraxinus pennsylvanica</i>	Green Ash	Tree	1	1	1				1	1	1	1	1	1			
<i>Magnolia virginiana</i>	Sweetbay Magnolia	Shrub Tree				1	1	1	1	1	1	2	2	2			
<i>Nyssa biflora</i>	Swamp Tupelo	Tree	2	2	2	2	2	2	2	2	2	1	1	1	3	3	3
<i>Platanus occidentalis</i>	Sycamore	Tree	1	1	1	4	4	4	2	2	2	2	2	2	1	1	1
<i>Populus deltoides</i>	Eastern Cottonwood	Tree															
<i>Quercus lyrata</i>	Overcup Oak	Tree	1	1	1										1	1	1
<i>Quercus michauxii</i>	Swamp Chestnut Oak	Tree	2	2	2	4	4	4				3	3	3	1	1	1
<i>Quercus pagoda</i>	Cherrybark Oak	Tree	1	1	1	1	1	1	5	5	5				1	1	1
<i>Quercus phellos</i>	Willow Oak	Tree															
<i>Salix nigra</i>	Black Willow	Tree	1	1	1							1	1	1			
<i>Taxodium distichum</i>	Bald-cypress	Tree	3	3	3	3	3	3				2	2	2	3	3	3
<i>Ulmus alata</i>	Winged Elm	Tree	1	1	1				1	1	1				1	1	1
	Stem count		16	16	16	18	18	18	17	17	17	14	14	14	12	12	12
	size (ares)		1			1			1			1			1		
	size (ACRES)		0.02			0.02			0.02			0.02			0.02		
	Species count		10	10	10	7	7	7	7	7	7	8	8	8	8	8	8
	Stems per ACRE		647	647	647	728	728	728	688	688	688	567	567	567	486	486	486

Color Coding for Table

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

PnoLS: Number of Planted stems excluding live stakes

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

T: Total Stems

Table 6a. Vegetation Plot Data - Fixed

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Scientific Name	Common Name	Species Type	Current Plot Data (MY1 2021)														
			VP 16			VP 17			VP 18			VP 19			VP 20		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
<i>Betula nigra</i>	River Birch	Tree	2	2	2				2	2	2	3	3	3	1	1	1
<i>Diospyros virginiana</i>	American Persimmon	Tree															
<i>Fraxinus pennsylvanica</i>	Green Ash	Tree	1	1	1				1	1	1						
<i>Magnolia virginiana</i>	Sweetbay Magnolia	Shrub Tree	1	1	1	1	1	1									
<i>Nyssa biflora</i>	Swamp Tupelo	Tree	1	1	1							2	2	2	1	1	1
<i>Platanus occidentalis</i>	Sycamore	Tree	3	3	3	2	2	2	3	3	3	2	2	2	4	4	4
<i>Populus deltoides</i>	Eastern Cottonwood	Tree															
<i>Quercus lyrata</i>	Overcup Oak	Tree							1	1	1				1	1	1
<i>Quercus michauxii</i>	Swamp Chestnut Oak	Tree	2	2	2	1	1	1	2	2	2	2	2	2	2	2	2
<i>Quercus pagoda</i>	Cherrybark Oak	Tree	2	2	2	2	2	2	2	2	2	3	3	3			
<i>Quercus phellos</i>	Willow Oak	Tree															
<i>Salix nigra</i>	Black Willow	Tree				2	2	2	1	1	1	1	1	1			
<i>Taxodium distichum</i>	Bald-cypress	Tree	1	1	1	2	2	2	4	4	4	3	3	3	5	5	5
<i>Ulmus alata</i>	Winged Elm	Tree				1	1	1									
Stem count			13	13	13	11	11	11	16	16	16	16	16	16	14	14	14
size (ares)			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02		
Species count			8	8	8	7	7	7	8	8	8	7	7	7	6	6	6
Stems per ACRE			526	526	526	445	445	445	647	647	647	647	647	647	567	567	567

Color Coding for Table

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

PnoLS: Number of Planted stems excluding live stakes

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

T: Total Stems

Table 6a. Vegetation Plot Data - Fixed

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Scientific Name	Common Name	Species Type	Annual Means					
			MY1 (2021)			MY0 (2021)		
			PnoLS	P-all	T	PnoLS	P-all	T
<i>Betula nigra</i>	River Birch	Tree	49	49	49	53	53	53
<i>Diospyros virginiana</i>	American Persimmon	Tree	4	4	4	4	4	4
<i>Fraxinus pennsylvanica</i>	Green Ash	Tree	12	12	12	12	12	12
<i>Magnolia virginiana</i>	Sweetbay Magnolia	Shrub Tree	13	13	13	13	13	13
<i>Nyssa biflora</i>	Swamp Tupelo	Tree	22	22	22	22	22	22
<i>Platanus occidentalis</i>	Sycamore	Tree	52	52	52	54	54	54
<i>Populus deltoides</i>	Eastern Cottonwood	Tree	4	4	4	4	4	4
<i>Quercus lyrata</i>	Overcup Oak	Tree	8	8	8	9	9	9
<i>Quercus michauxii</i>	Swamp Chestnut Oak	Tree	34	34	34	35	35	35
<i>Quercus pagoda</i>	Cherrybark Oak	Tree	28	28	28	28	28	28
<i>Quercus phellos</i>	Willow Oak	Tree	15	15	15	15	15	15
<i>Salix nigra</i>	Black Willow	Tree	10	10	10	10	10	10
<i>Taxodium distichum</i>	Bald-cypress	Tree	45	45	45	50	50	50
<i>Ulmus alata</i>	Winged Elm	Tree	7	7	7	7	7	7
Stem count			303	303	303	316	316	316
size (ares)			20			20		
size (ACRES)			0.49			0.49		
Species count			14	14	14	14	14	14
Stems per ACRE			613	613	613	639	639	639

Color Coding for Table

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

PnoLS: Number of Planted stems excluding live stakes

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

T: Total Stems

Table 6b. Vegetation Plot Data - Random

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Scientific Name	Common Name	Species Type	Current Plot Data (MY1 2021)										Annual Summary			
			RVP 1		RVP 2		RVP 3		RVP 4		RVP 5		MY1 (2021)		MY0 (2021)	
			Te	Total	Te	Total	Te	Total	Te	Total	Te	Total	Te	Total	Te	Total
<i>Alnus serrulata</i>	Hazel Alder	Shrub Tree									1	1	1	1		
<i>Betula nigra</i>	River Birch	Tree	2	2			3	3	1	1	2	2	8	8	13	13
<i>Chamaecyparis thyoides</i>	Atlantic White Cedar	Tree			25	25							25	25		
<i>Diospyros virginiana</i>	Persimmon	Tree													1	1
<i>Fraxinus pennsylvanica</i>	Green Ash	Tree													2	2
<i>Magnolia virginiana</i>	Sweetbay	Shrub Tree					1	1					1	1	2	2
<i>Nyssa biflora</i>	Swamp Tupelo	Tree									2	2	2	2	7	7
<i>Platanus occidentalis</i>	Sycamore	Tree	3	3			6	6	1	1	4	4	14	14	12	12
<i>Populus deltoides</i>	Eastern Cottonwood	Tree													1	1
<i>Quercus lyrata</i>	Overcup Oak	Tree													1	1
<i>Quercus michauxii</i>	Swamp Chestnut Oak	Tree	1	1									1	1	7	7
<i>Quercus pagoda</i>	Cherrybark Oak	Tree					3	3	2	2	2	2	7	7	13	13
<i>Quercus phellos</i>	Willow Oak	Tree													2	2
<i>Salix nigra</i>	Black Willow	Shrub Tree	2	2							2	2	4	4		
<i>Taxodium distichum</i>	Bald-cypress	Tree					1	1	8	8	2	2	11	11	17	17
Stem count			8	8	25	25	14	14	12	12	15	15	74	74	78	78
size (ares)			1		1		1		1		1		1		5	
size (ACRES)			0.02		0.02		0.02		0.02		0.02		0.12		0.12	
Species count			4	4	1	1	5	5	4	4	7	7	15	15	12	12
Stems per ACRE			324	324	1,012	1,012	567	567	486	486	607	607	599	599	631	631

Color Coding for Table

Exceeds requirements by 10%

Exceeds requirements, but by less than 10%

Fails to meet requirements, by less than 10%

Fails to meet requirements by more than 10%

Te - Number of Stems including exotic species

Total - Number of stems excluding exotic species

Table 7. Vegetation Performance Standards Summary Table

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

	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	567	2.7	7	0	567	2.6	7	0	607	2.3	6	0
Monitoring Year 0	567	2.7	7	0	567	2.8	7	0	607	2.3	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	567	2.4	8	0	647	2.7	8	0	567	2.1	7	0
Monitoring Year 0	607	2.5	8	0	647	2.6	8	0	607	2.3	7	0
	Veg Plot 7 F				Veg Plot Group 8 F				Veg Plot Group 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	728	2.5	10	0	607	2.5	8	0	728	2.3	10	0
Monitoring Year 0	728	2.5	10	0	607	2.4	8	0	728	2.2	10	0

*Fixed plots are denoted with an F and Random plots with an R.

Table 7. Vegetation Performance Standards Summary Table

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

	Veg Plot 10 F				Veg Plot 11 F				Veg Plot 12 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	728	2.6	11	0	647	2.6	10	0	728	2.1	7	0
Monitoring Year 0	728	2.6	11	0	647	2.7	10	0	971	2.5	7	0
	Veg Plot 13 F				Veg Plot 14 F				Veg Plot 15 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	688	2.7	7	0	567	2.0	8	0	486	1.5	8	0
Monitoring Year 0	688	2.6	7	0	567	2.4	7	0	526	2.3	8	0
	Veg Plot 16 F				Veg Plot Group 17 F				Veg Plot Group 18 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	526	2.3	8	0	445	1.7	7	0	647	2.5	8	0
Monitoring Year 0	567	2.6	8	0	567	2.8	8	0	647	2.8	8	0

*Fixed plots are denoted with an F and Random plots with an R.

Table 7. Vegetation Performance Standards Summary Table

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

	Veg Plot 19 F				Veg Plot 20 F				Veg Plot 1 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	647	2.6	7	0	567	2.7	6	0	324	3.6	4	0
Monitoring Year 0	647	2.7	7	0	567	2.5	6	0	526	2.6	6	0
	Veg Plot 2 R				Veg Plot 3 R				Veg Plot 4 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	1,012	0.6	1	0	567	2.8	5	0	486	2.3	4	0
Monitoring Year 0	647	2.2	6	0	688	2.3	8	0	647	2.3	5	0
	Veg Plot 5 R											
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives								
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1	607	1.8	7	0								
Monitoring Year 0	647	2.4	7	0								

*Fixed plots are denoted with an F and Random plots with an R.

APPENDIX C. STREAM GEOMORPHOLOGY DATA

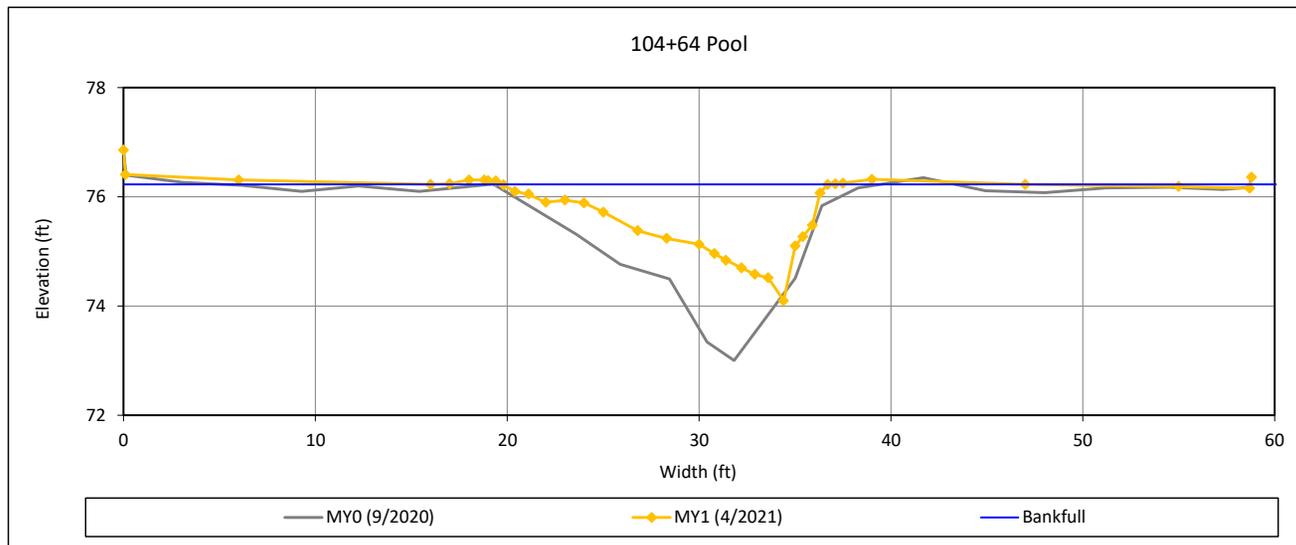
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 1-UT1



Bankfull Dimensions

14.6	x-section area (ft.sq.)
17.0	width (ft)
0.9	mean depth (ft)
2.1	max depth (ft)
18.2	wetted perimeter (ft)
0.8	hydraulic radius (ft)
19.7	width-depth ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

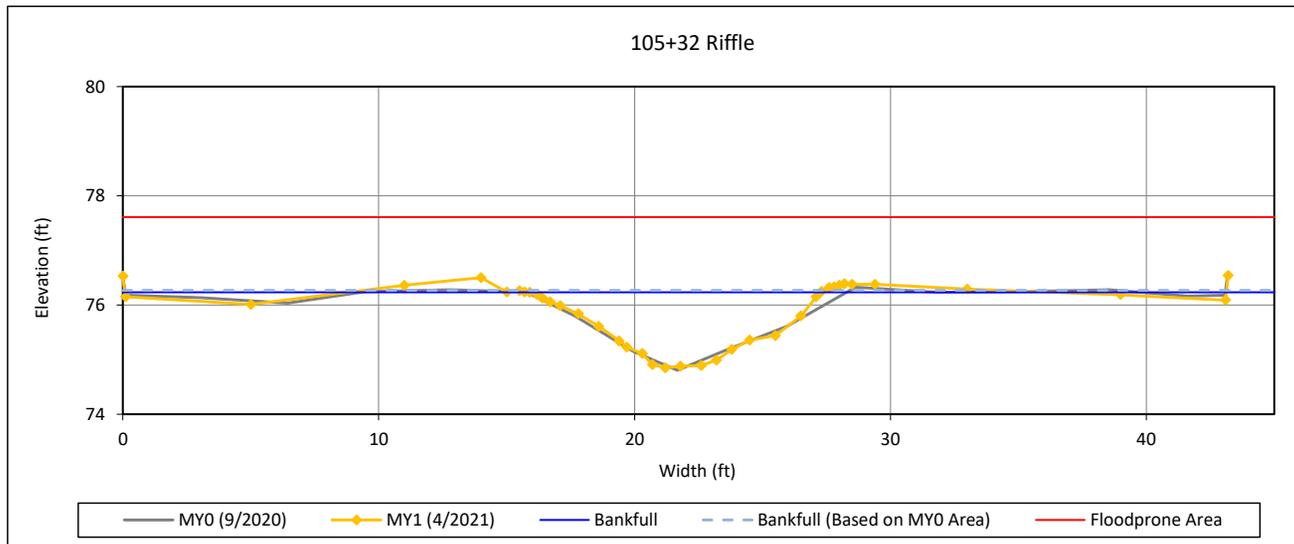
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 2-UT1



Bankfull Dimensions

9.1	x-section area (ft.sq.)
11.4	width (ft)
0.8	mean depth (ft)
1.4	max depth (ft)
11.8	wetted perimeter (ft)
0.8	hydraulic radius (ft)
14.2	width-depth ratio
200.0	W flood prone area (ft)
17.6	entrenchment ratio
1.0	low bank height ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

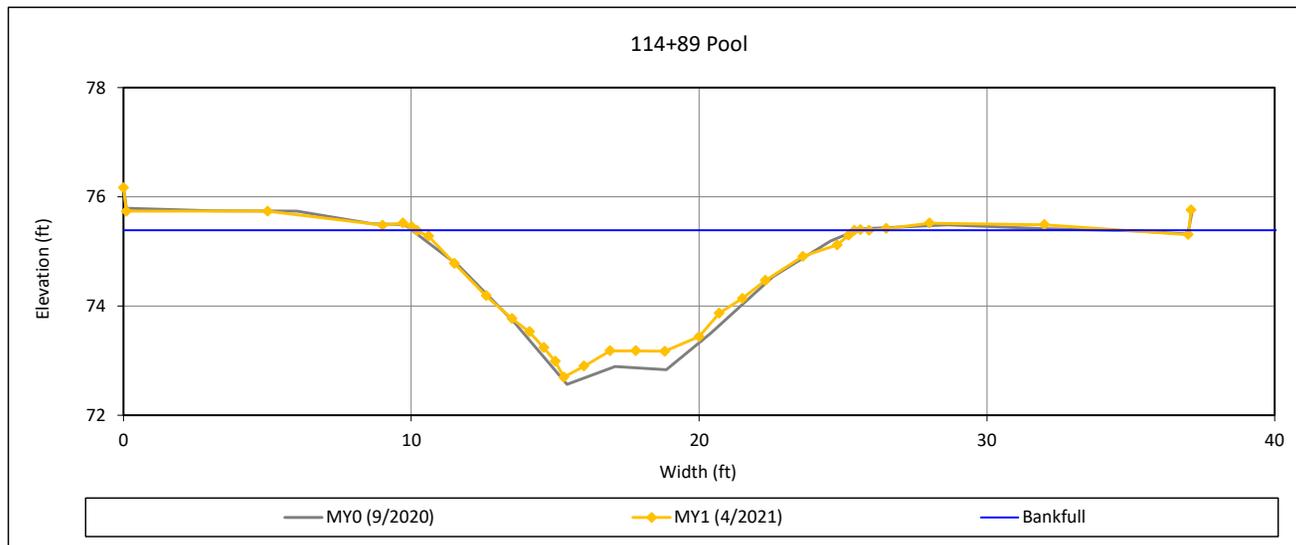
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 3-UT1



Bankfull Dimensions

21.6	x-section area (ft.sq.)
15.2	width (ft)
1.4	mean depth (ft)
2.7	max depth (ft)
16.4	wetted perimeter (ft)
1.3	hydraulic radius (ft)
10.7	width-depth ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

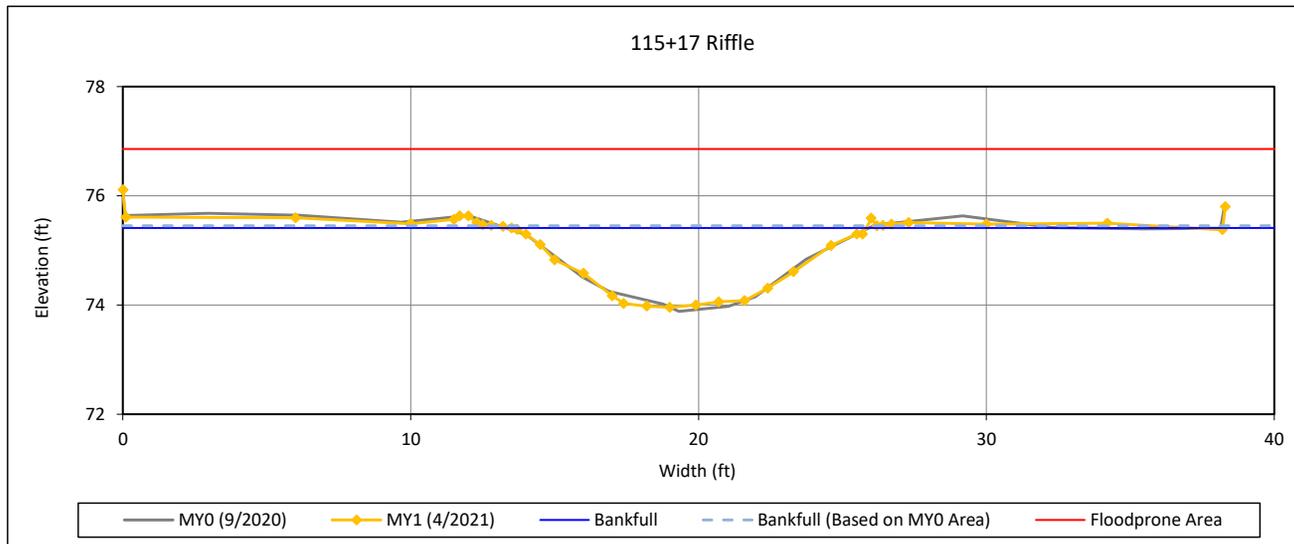
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 4-UT1



Bankfull Dimensions

11.3	x-section area (ft.sq.)
13.3	width (ft)
0.8	mean depth (ft)
1.4	max depth (ft)
13.8	wetted perimeter (ft)
0.8	hydraulic radius (ft)
15.7	width-depth ratio
200.0	W flood prone area (ft)
15.0	entrenchment ratio
1.0	low bank height ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

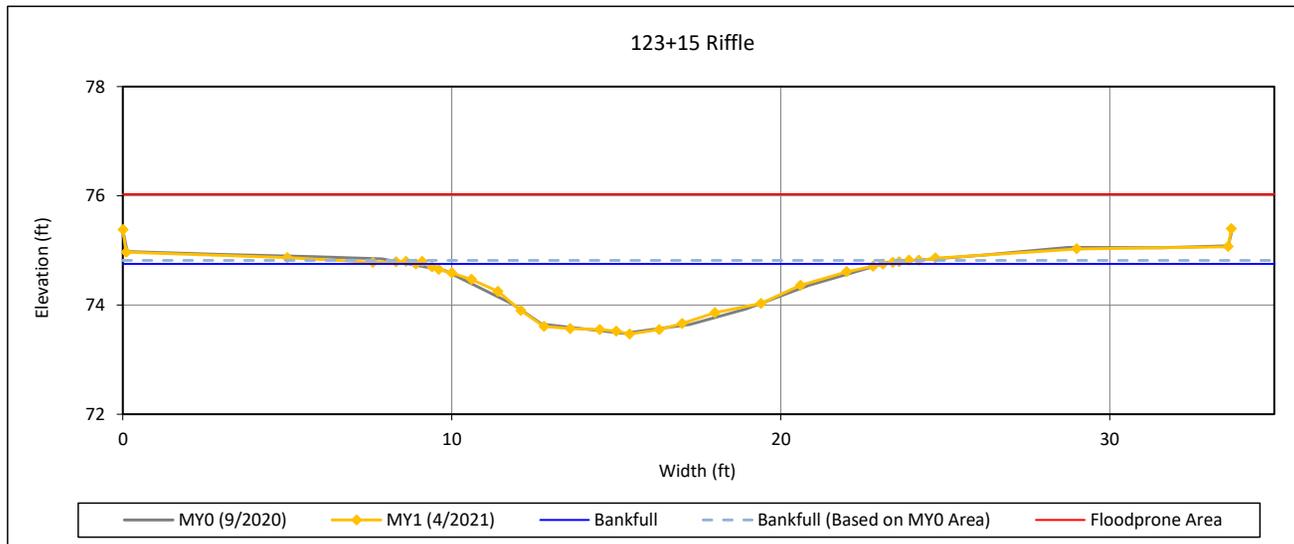
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 5-UT1



Bankfull Dimensions

9.9	x-section area (ft.sq.)
13.9	width (ft)
0.7	mean depth (ft)
1.3	max depth (ft)
14.2	wetted perimeter (ft)
0.7	hydraulic radius (ft)
19.3	width-depth ratio
200.0	W flood prone area (ft)
14.4	entrenchment ratio
1.0	low bank height ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

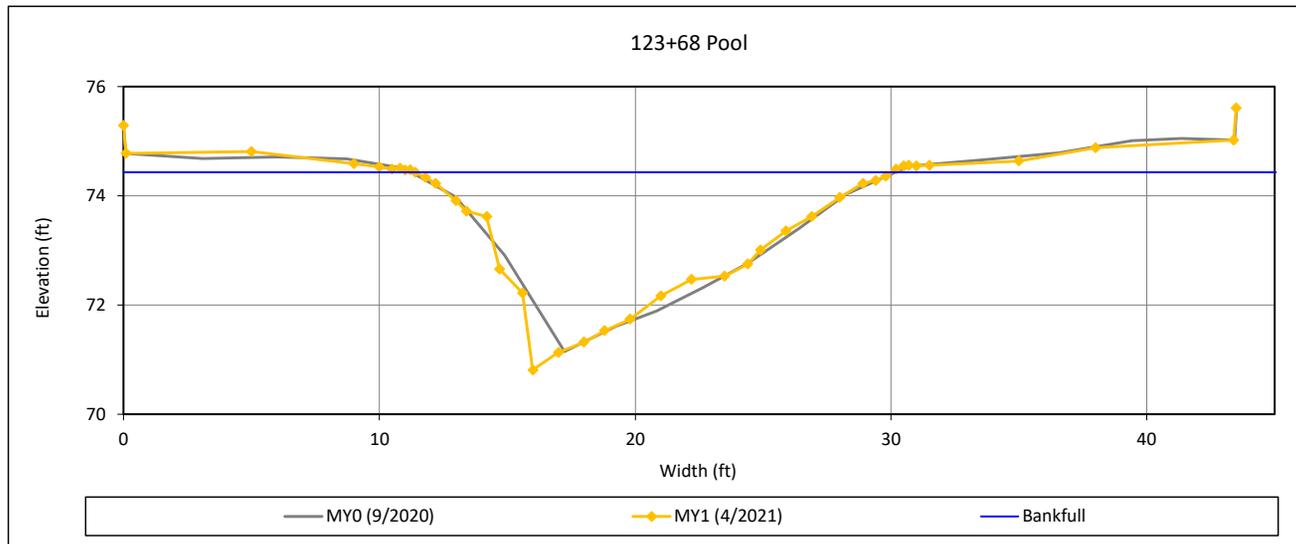
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 6-UT1



Bankfull Dimensions

30.4	x-section area (ft.sq.)
18.6	width (ft)
1.6	mean depth (ft)
3.6	max depth (ft)
21.0	wetted perimeter (ft)
1.4	hydraulic radius (ft)
11.4	width-depth ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

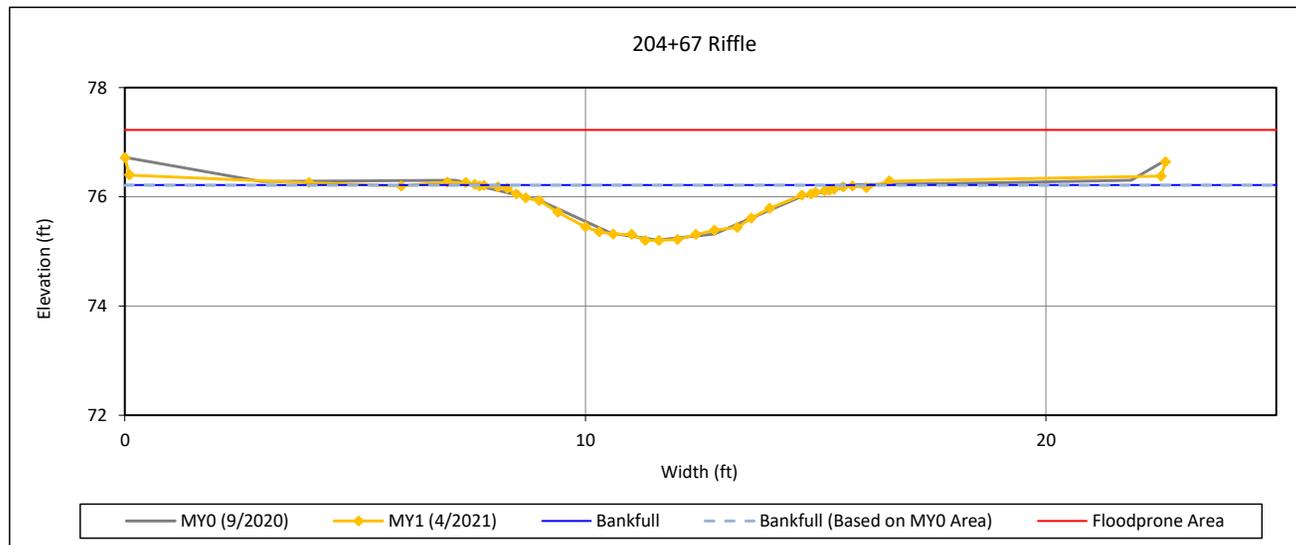
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 7-UT2 Reach 2



Bankfull Dimensions

4.4	x-section area (ft.sq.)
8.0	width (ft)
0.5	mean depth (ft)
1.0	max depth (ft)
8.6	wetted perimeter (ft)
0.5	hydraulic radius (ft)
14.7	width-depth ratio
200.0	W flood prone area (ft)
24.9	entrenchment ratio
1.0	low bank height ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

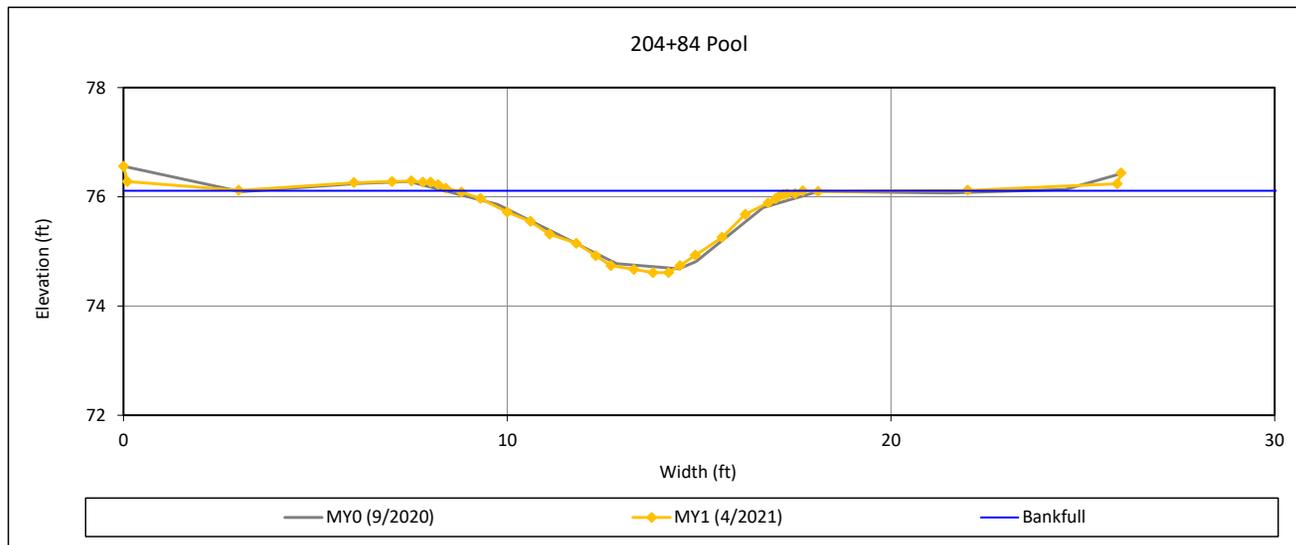
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 8-UT2 Reach 2



Bankfull Dimensions

7.0	x-section area (ft.sq.)
9.0	width (ft)
0.8	mean depth (ft)
1.5	max depth (ft)
9.6	wetted perimeter (ft)
0.7	hydraulic radius (ft)
11.6	width-depth ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

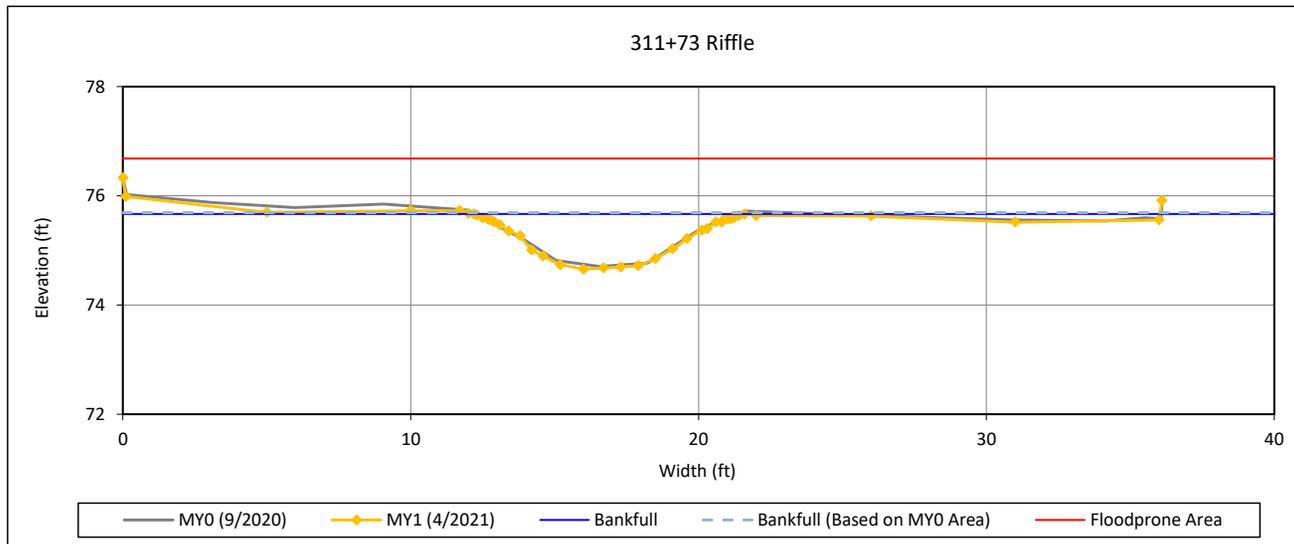
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 9-UT3 Reach 1



Bankfull Dimensions

5.6	x-section area (ft.sq.)
9.8	width (ft)
0.6	mean depth (ft)
1.0	max depth (ft)
10.1	wetted perimeter (ft)
0.6	hydraulic radius (ft)
17.2	width-depth ratio
200.0	W flood prone area (ft)
20.4	entrenchment ratio
1.0	low bank height ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

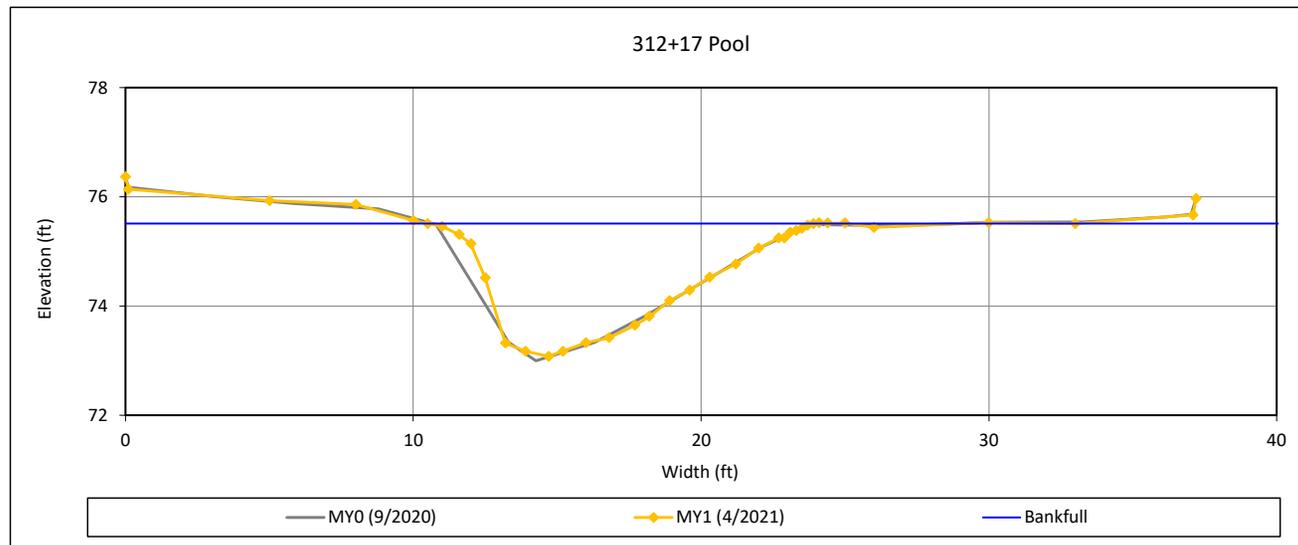
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 10-UT3 Reach 1



Bankfull Dimensions

17.0	x-section area (ft.sq.)
13.4	width (ft)
1.3	mean depth (ft)
2.4	max depth (ft)
14.8	wetted perimeter (ft)
1.1	hydraulic radius (ft)
10.6	width-depth ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

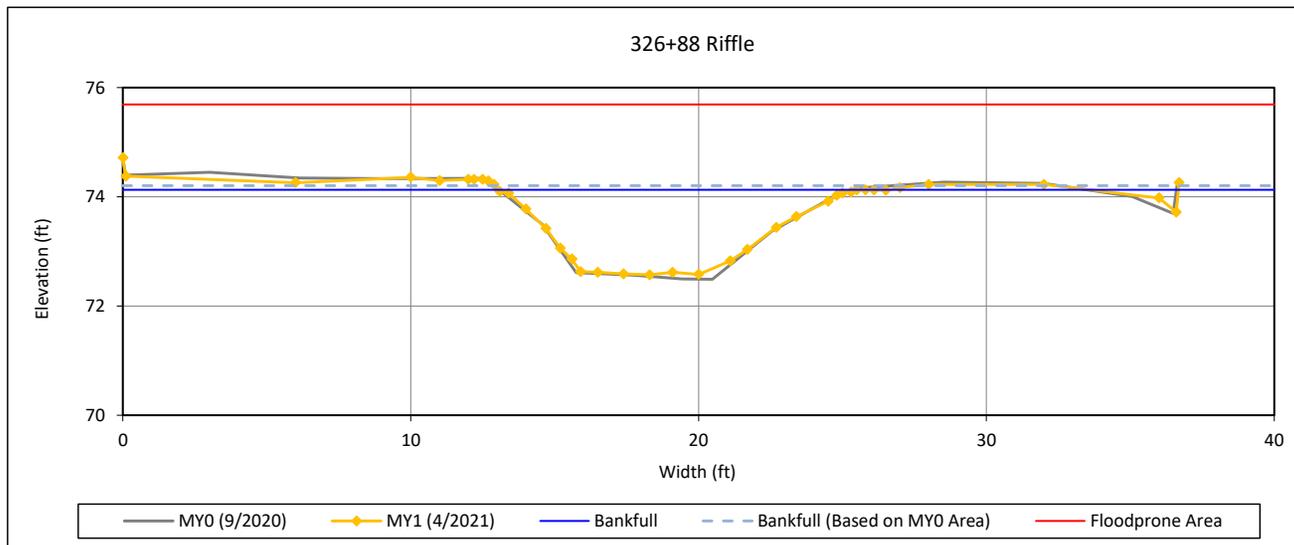
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 11-UT3 Reach 2



Bankfull Dimensions

12.2	x-section area (ft.sq.)
12.4	width (ft)
1.0	mean depth (ft)
1.6	max depth (ft)
13.1	wetted perimeter (ft)
0.9	hydraulic radius (ft)
12.7	width-depth ratio
200.0	W flood prone area (ft)
16.1	entrenchment ratio
1.0	low bank height ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

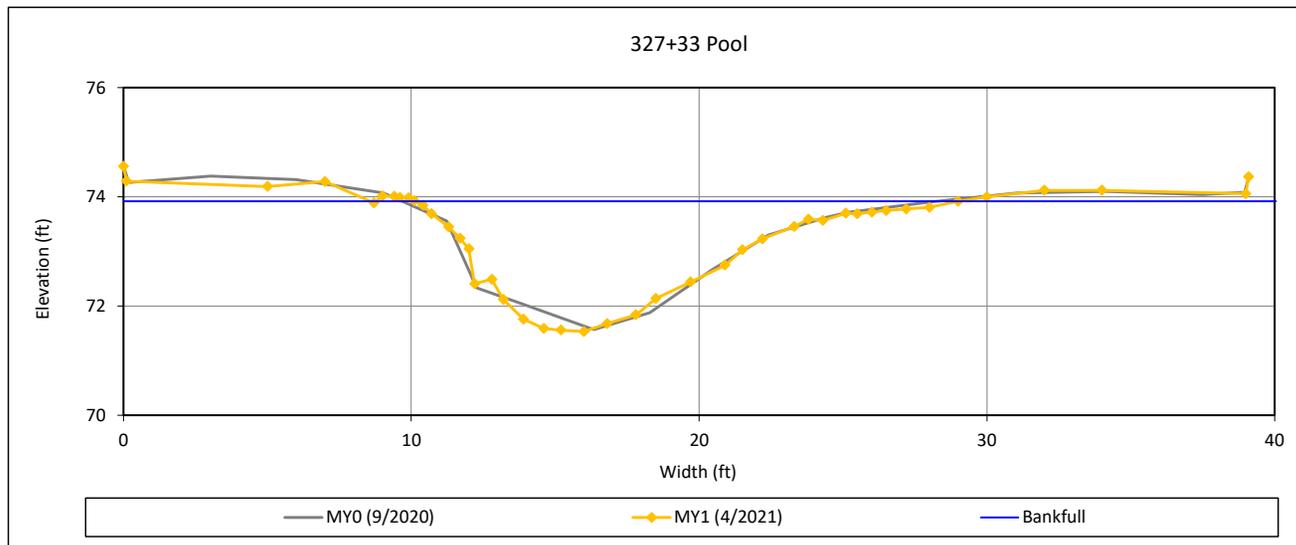
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 12-UT3 Reach 2



Bankfull Dimensions

20.6	x-section area (ft.sq.)
18.9	width (ft)
1.1	mean depth (ft)
2.4	max depth (ft)
20.1	wetted perimeter (ft)
1.0	hydraulic radius (ft)
17.3	width-depth ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

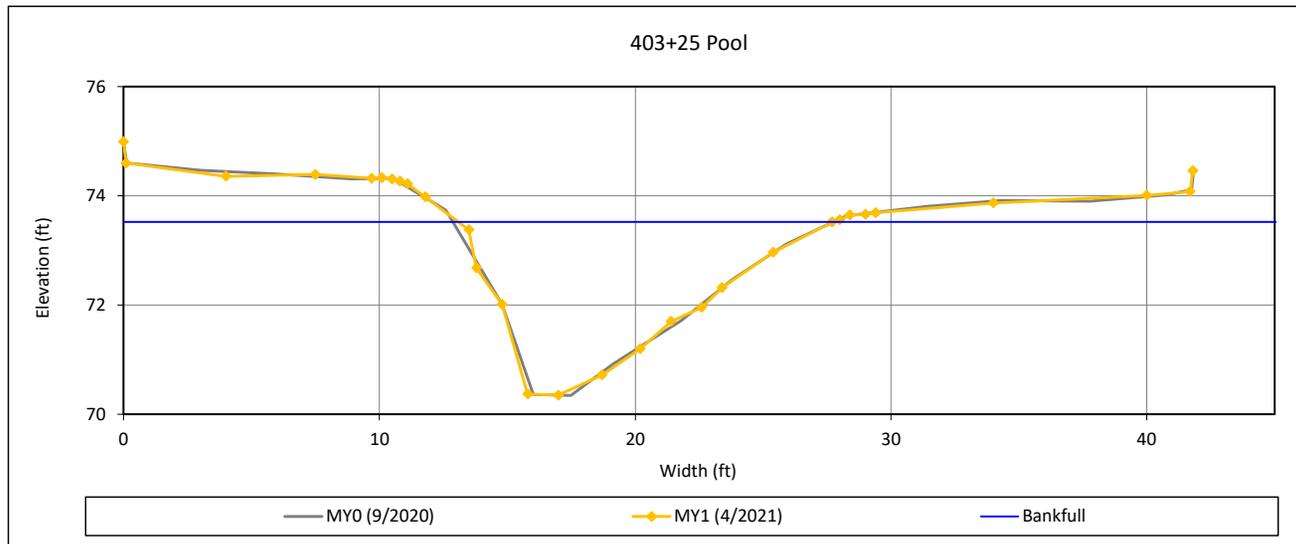
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 13-UT4 Reach 1



Bankfull Dimensions

24.4	x-section area (ft.sq.)
14.6	width (ft)
1.7	mean depth (ft)
3.2	max depth (ft)
16.7	wetted perimeter (ft)
1.5	hydraulic radius (ft)
8.7	width-depth ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

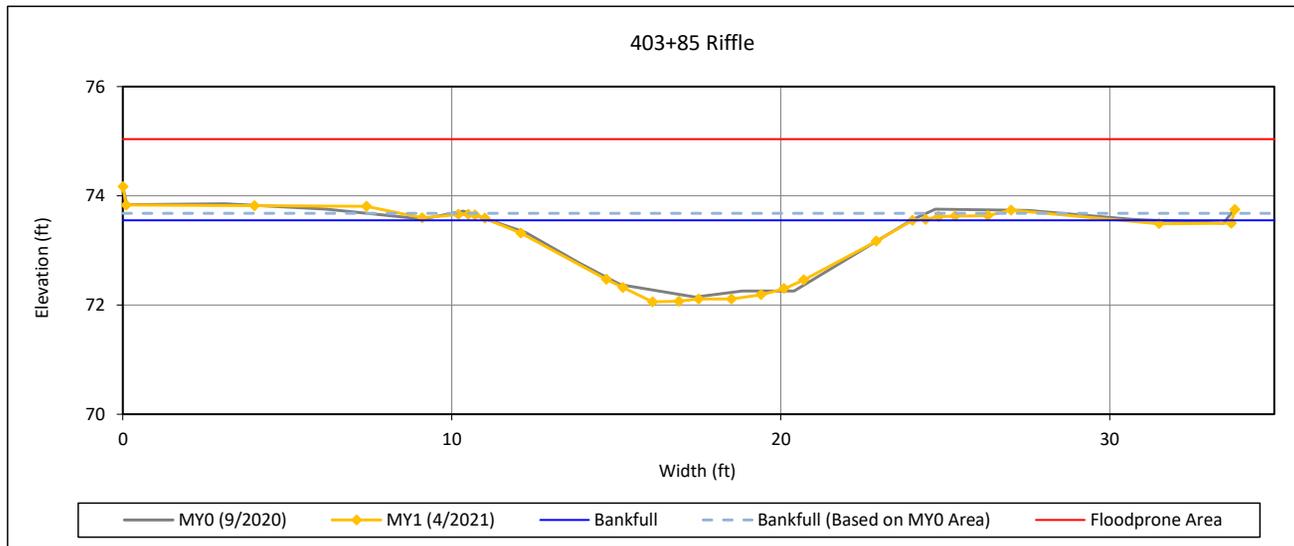
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 14-UT4 Reach 1



Bankfull Dimensions

11.8	x-section area (ft.sq.)
12.8	width (ft)
0.9	mean depth (ft)
1.5	max depth (ft)
13.3	wetted perimeter (ft)
0.9	hydraulic radius (ft)
13.9	width-depth ratio
200.0	W flood prone area (ft)
15.6	entrenchment ratio
< 1.0	low bank height ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

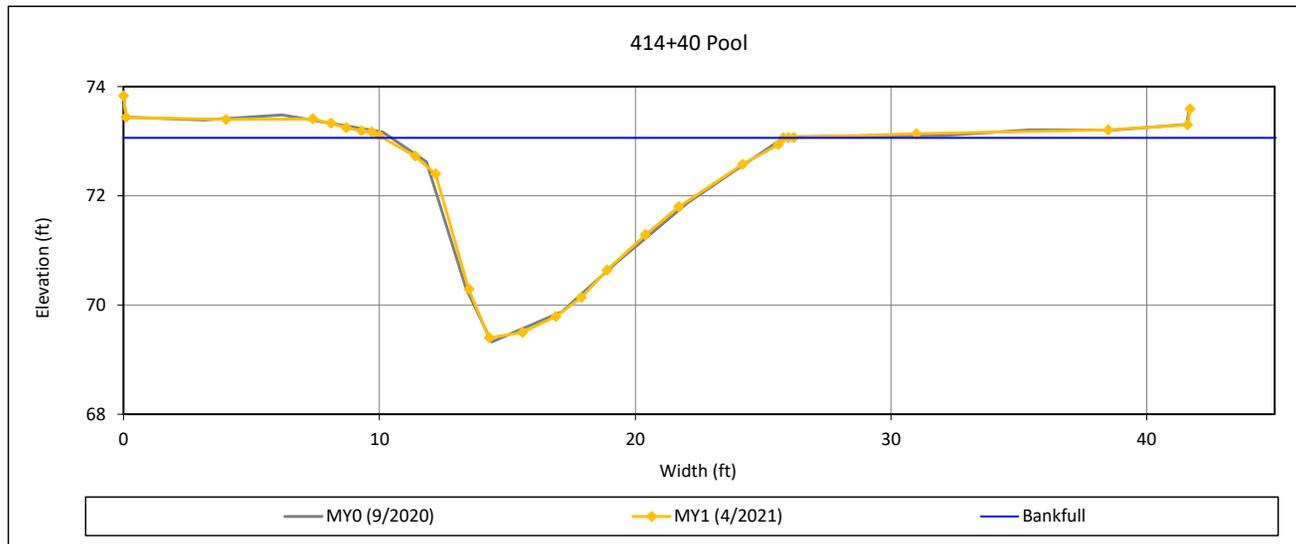
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 15-UT4 Reach 1



Bankfull Dimensions

28.0	x-section area (ft.sq.)
15.6	width (ft)
1.8	mean depth (ft)
3.7	max depth (ft)
18.0	wetted perimeter (ft)
1.6	hydraulic radius (ft)
8.7	width-depth ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

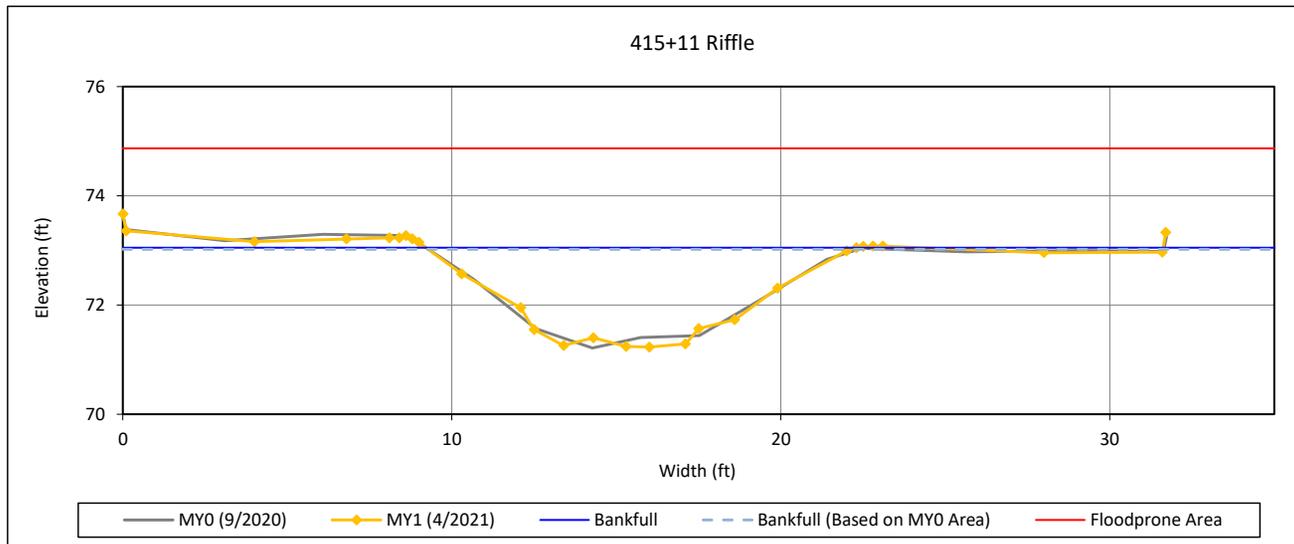
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 16-UT4 Reach 1



Bankfull Dimensions

14.6	x-section area (ft.sq.)
13.1	width (ft)
1.1	mean depth (ft)
1.8	max depth (ft)
13.9	wetted perimeter (ft)
1.1	hydraulic radius (ft)
11.7	width-depth ratio
200.0	W flood prone area (ft)
15.3	entrenchment ratio
1.0	low bank height ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

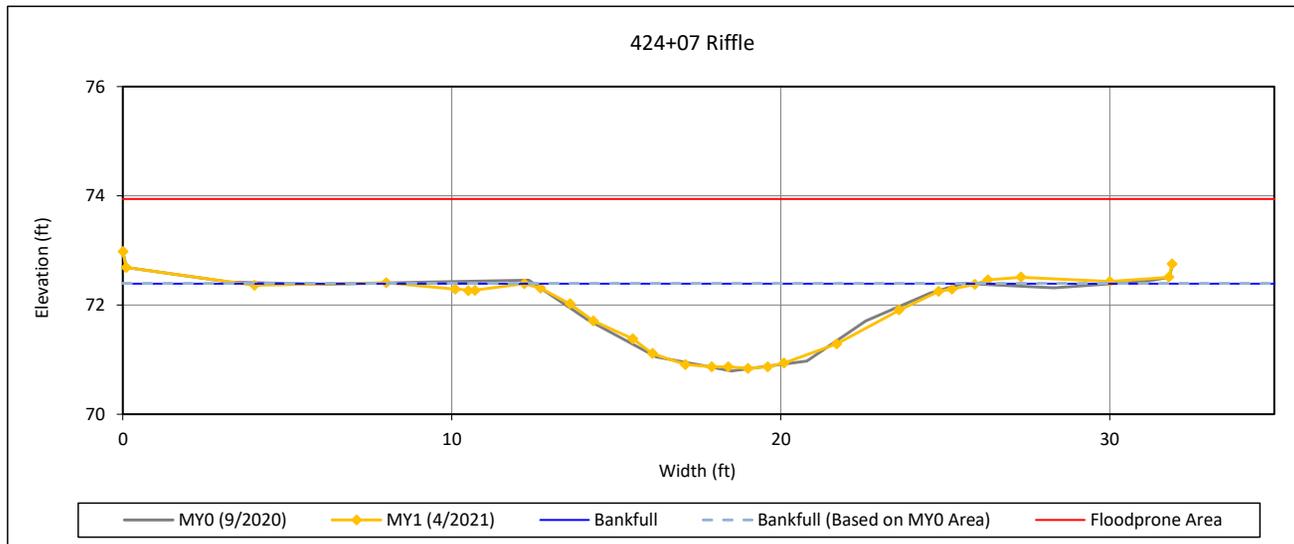
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 17-UT4 Reach 1



Bankfull Dimensions

12.2	x-section area (ft.sq.)
13.8	width (ft)
0.9	mean depth (ft)
1.6	max depth (ft)
14.2	wetted perimeter (ft)
0.9	hydraulic radius (ft)
15.5	width-depth ratio
186.0	W flood prone area (ft)
13.5	entrenchment ratio
1.0	low bank height ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

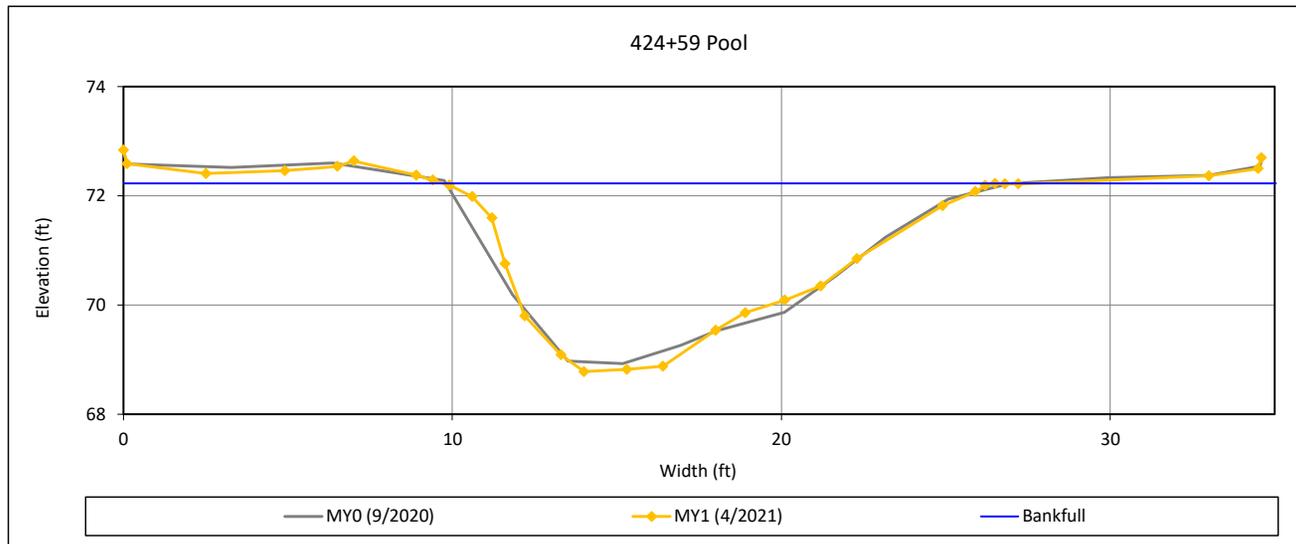
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 18-UT4 Reach 1



Bankfull Dimensions

32.0	x-section area (ft.sq.)
17.9	width (ft)
1.8	mean depth (ft)
3.5	max depth (ft)
19.9	wetted perimeter (ft)
1.6	hydraulic radius (ft)
10.0	width-depth ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

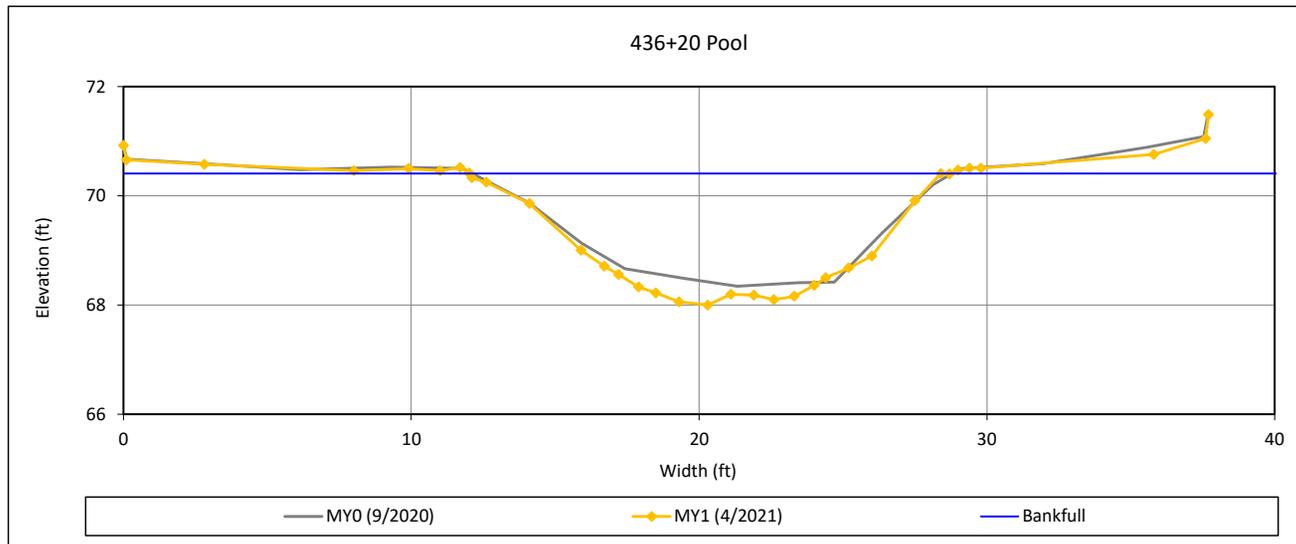
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 19-UT4 Reach 1



Bankfull Dimensions

24.9	x-section area (ft.sq.)
16.7	width (ft)
1.5	mean depth (ft)
2.4	max depth (ft)
17.7	wetted perimeter (ft)
1.4	hydraulic radius (ft)
11.2	width-depth ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

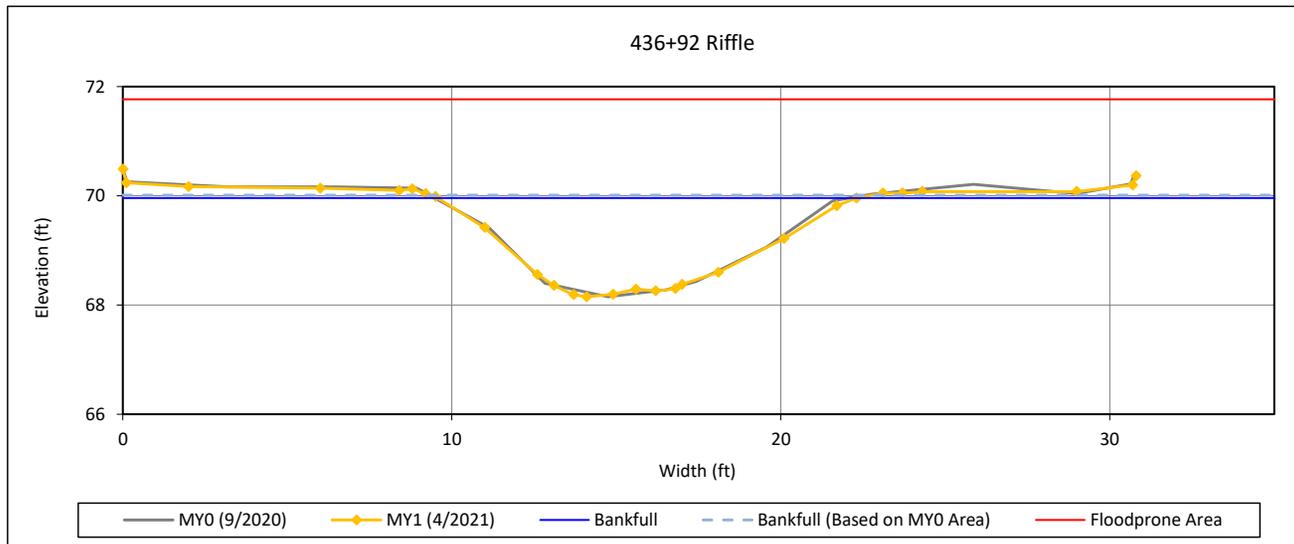
Cross-Section Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Cross-Section 20-UT4 Reach 1



Bankfull Dimensions

13.8	x-section area (ft.sq.)
12.7	width (ft)
1.1	mean depth (ft)
1.8	max depth (ft)
13.4	wetted perimeter (ft)
1.0	hydraulic radius (ft)
11.7	width-depth ratio
178.0	W flood prone area (ft)
14.0	entrenchment ratio
1.0	low bank height ratio

Survey Date: 4/2021

Field Crew: Wildlands Engineering



View Downstream

Table 8. Baseline Stream Data Summary

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Parameter	PRE-EXISTING CONDITIONS			DESIGN		MONITORING BASELINE (MYO)		
	Min	Max	n	Min	Max	Min	Max	n
UT1								
Riffle Only								
Bankfull Width (ft)	5.7	7.1	3	11.6		12.5	14.9	3
Floodprone Width (ft)	10	100	3	26	58	>200		3
Bankfull Mean Depth	0.8	0.9	3	0.9		0.7	0.9	3
Bankfull Max Depth	1.2		3	1.3		1.3	1.6	3
Bankfull Cross Sectional Area (ft ²)	4.9	6.5	3	10.9		9.5	11.9	3
Width/Depth Ratio	6.6	8.1	3	12.4		14.4	20.3	3
Entrenchment Ratio	1.4	17.6	3	2.2	5.0	13.5	16.0	3
Bank Height Ratio	1.6	2.8	3	1.0		1.0		3
Max part size (mm) mobilized at bankfull	---			---		---		
Rosgen Classification	E5/G5			C5		C5		
Bankfull Discharge (cfs)	11.9			12		10.7	15.2	3
Sinuosity	1.05			1.25		1.28		
Water Surface Slope (ft/ft) ²	0.0022			0.0011		0.0014		
Other	---			---		---		
UT2 Reach 2								
Riffle Only								
Bankfull Width (ft)	5.9		1	7.0		8.3		1
Floodprone Width (ft)	7		1	15	35	>200		1
Bankfull Mean Depth	0.3		1	0.6		0.5		1
Bankfull Max Depth	0.5		1	0.9		1.0		1
Bankfull Cross Sectional Area (ft ²)	1.8		1	4.3		4.4		1
Width/Depth Ratio	18.8		1	11.5		15.5		1
Entrenchment Ratio	1.2		1	2.2	5.0	>24		1
Bank Height Ratio	5.6		1	1.0		1.0		1
Max part size (mm) mobilized at bankfull	---			---		---		
Rosgen Classification	F5			C5		C5		
Bankfull Discharge (cfs)	4.2			4.0		4.2		
Sinuosity	1.03			1.25		1.19		
Water Surface Slope (ft/ft) ²	0.0024			0.0014		0.0019		
Other	---			---		---		

Table 8. Baseline Stream Data Summary

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Parameter	PRE-EXISTING CONDITIONS			DESIGN		MONITORING BASELINE (MY0)			
	UT3 Reach 1								
Riffle Only	Min	Max	n	Min	Max	Min	Max	n	
Bankfull Width (ft)	10.2		1	8.8		9.3		1	
Floodprone Width (ft)	12		1	19	44	>200		1	
Bankfull Mean Depth	0.3		1	0.7		0.6		1	
Bankfull Max Depth	0.5		1	1.2		1.0		1	
Bankfull Cross Sectional Area (ft ²)	3.5		1	6.3		5.8		1	
Width/Depth Ratio	29.9		1	12.3		15.8		1	
Entrenchment Ratio	1.2		1	2.2	5.0	>20		1	
Bank Height Ratio	7.1		1	1.0		1.0		1	
Max part size (mm) mobilized at bankfull	---			---		---			
Rosgen Classification	F5			C5		C5			
Bankfull Discharge (cfs)	7.1			7		5			
Sinuosity	1.01			1.25		1.26			
Water Surface Slope (ft/ft) ²	0.0065			0.0015		0.0012			
Other	---			---		---			
Parameter	UT3 Reach 2								
Riffle Only	Min	Max	n	Min	Max	Min	Max	n	
Bankfull Width (ft)	12		1	11.0		12.5		1	
Floodprone Width (ft)	13		1	24	55	>200		1	
Bankfull Mean Depth	0.8		1	0.9		1.0		1	
Bankfull Max Depth	1.3		1	1.0		1.7		1	
Bankfull Cross Sectional Area (ft ²)	9.1		1	9.6		13.1		1	
Width/Depth Ratio	16.0		1	12.6		11.9		1	
Entrenchment Ratio	1		1	2.2	5.0	>16		1	
Bank Height Ratio	3.4		1	1.0		1.0		1	
Max part size (mm) mobilized at bankfull	---			---		---			
Rosgen Classification	F5			C5		C5			
Bankfull Discharge (cfs)	10.0			9.9		16.8			
Sinuosity	1.05			1.20		1.26			
Water Surface Slope (ft/ft) ²	0.0014			0.0010		0.0012			
Other	---			---		---			

Table 8. Baseline Stream Data Summary

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Parameter	PRE-EXISTING CONDITIONS			DESIGN		MONITORING BASELINE (MY0)		
	UT4 Reach 1							
Riffle Only	Min	Max	n	Min	Max	Min	Max	n
Bankfull Width (ft)	5.1	12.4	2	12.8		13.1	13.5	3
Floodprone Width (ft)	13	14	2	28	64	178	>200	3
Bankfull Mean Depth	0.9	1.8	2	1.1		0.9	1.1	3
Bankfull Max Depth	1.3	2.2	2	1.5		1.6	1.9	3
Bankfull Cross Sectional Area (ft ²)	9.0	11.1	2	13.6		12.3	14.5	3
Width/Depth Ratio	2.9	13.9	2	12.1		12.3	13.9	3
Entrenchment Ratio	1.2	2.5	2	2.2	5.0	13.2	>15	3
Bank Height Ratio	2.3	5.3	2	1.0		1.0		3
Max part size (mm) mobilized at bankfull	---			---		---		
Rosgen Classification	E5/F5			C5		C5		
Bankfull Discharge (cfs)	18.4			18.7		15.0	18.9	3
Sinuosity	1.04			1.25		1.29		
Water Surface Slope (ft/ft) ²	0.0010			0.0013		0.0012		
Other	---			---		---		

Table 9. Cross-Section Morphology Monitoring Summary

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Dimension and Substrate	UT1																							
	Cross-Section 1 (Pool)						Cross-Section 2 (Riffle)						Cross-Section 3 (Pool)						Cross-Section 4 (Riffle)					
	Base	MY1	MY2	MY3	MY5	MY7	Base	MY1	MY2	MY3	MY5	MY7	Base	MY1	MY2	MY3	MY5	MY7	Base	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation (ft) - Based on AB Bankfull ¹ Area	N/A	N/A					76.24	76.27					N/A	N/A					75.46	75.45				
Bank Height Ratio - Based on AB Bankfull ¹ Area	N/A	N/A					1.0	1.0					N/A	N/A					1.0	1.0				
Thalweg Elevation (ft)	73.00	74.10					74.81	74.85					72.56	72.70					73.88	73.96				
LTOB ² Elevation (ft)	76.16	76.23					76.24	76.23					75.41	75.39					75.46	75.41				
LTOB ² Max Depth (ft)	3.2	2.1					1.4	1.4					2.8	2.7					1.6	1.4				
LTOB ² Cross-Sectional Area (ft ²)	26.3	14.6					9.5	9.1					23.7	21.6					11.9	11.3				
Dimension and Substrate	UT1												UT2 Reach 2											
	Cross-Section 5 (Riffle)						Cross-Section 6 (Pool)						Cross-Section 7 (Riffle)						Cross-Section 8 (Pool)					
	Base	MY1	MY2	MY3	MY5	MY7	Base	MY1	MY2	MY3	MY5	MY7	Base	MY1	MY2	MY3	MY5	MY7	Base	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation (ft) - Based on AB Bankfull ¹ Area	74.79	74.82					N/A	N/A					76.22	76.21					N/A	N/A				
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.0	1.0					N/A	N/A					1.0	1.0					N/A	N/A				
Thalweg Elevation (ft)	73.48	73.47					71.15	70.81					75.20	75.20					74.68	74.61				
LTOB ² Elevation (ft)	74.59	74.75					74.50	74.43					76.22	76.21					76.10	76.11				
LTOB ² Max Depth (ft)	1.3	1.3					3.4	3.6					1.0	1.0					1.4	1.5				
LTOB ² Cross-Sectional Area (ft ²)	10.9	9.9					31.5	30.4					4.4	4.4					7.0	7.0				
Dimension and Substrate	UT3 Reach 1												UT3 Reach 2											
	Cross-Section 9 (Riffle)						Cross-Section 10 (Pool)						Cross-Section 11 (Riffle)						Cross-Section 12 (Pool)					
	Base	MY1	MY2	MY3	MY5	MY7	Base	MY1	MY2	MY3	MY5	MY7	Base	MY1	MY2	MY3	MY5	MY7	Base	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation (ft) - Based on AB Bankfull ¹ Area	75.22	75.69					N/A	N/A					74.16	74.20					N/A	N/A				
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.0	1.0					N/A	N/A					1.0	1.0					N/A	N/A				
Thalweg Elevation (ft)	74.71	74.66					73.00	73.08					72.49	72.57					71.57	71.53				
LTOB ² Elevation (ft)	75.72	75.67					75.49	75.51					74.16	74.13					73.72	73.92				
LTOB ² Max Depth (ft)	1.0	1.0					2.5	2.4					1.7	1.6					2.1	2.4				
LTOB ² Cross-Sectional Area (ft ²)	5.8	5.6					17.6	17.0					13.1	12.2					17.0	20.6				

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

²LTOB 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 recorded and tracked above as LTOB max depth.

Table 9. Cross-Section Morphology Monitoring Summary

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Dimension and Substrate	UT4 Reach 1																							
	Cross-Section 13 (Pool)						Cross-Section 14 (Riffle)						Cross-Section 15 (Pool)						Cross-Section 16 (Riffle)					
	Base	MY1	MY2	MY3	MY5	MY7	Base	MY1	MY2	MY3	MY5	MY7	Base	MY1	MY2	MY3	MY5	MY7	Base	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation (ft) - Based on AB Bankfull ¹ Area	N/A	N/A					73.72	73.68					N/A	N/A					73.04	73.02				
Bank Height Ratio - Based on AB Bankfull ¹ Area	N/A	N/A					1.0	0.9					N/A	N/A					1.0	1.0				
Thalweg Elevation (ft)	70.34	70.35					72.15	72.06					69.32	69.40					71.21	71.23				
LTOB ² Elevation (ft)	73.64	73.52					73.72	73.55					73.08	73.06					73.04	73.05				
LTOB ² Max Depth (ft)	3.3	3.2					1.6	1.5					3.8	3.7					1.8	1.8				
LTOB ² Cross-Sectional Area (ft ²)	26.1	24.4					13.7	11.8					28.7	28.0					14.2	14.6				
Dimension and Substrate	UT4 Reach 1																							
	Cross-Section 17 (Riffle)						Cross-Section 18 (Pool)						Cross-Section 19 (Pool)						Cross-Section 20 (Riffle)					
	Base	MY1	MY2	MY3	MY5	MY7	Base	MY1	MY2	MY3	MY5	MY7	Base	MY1	MY2	MY3	MY5	MY7	Base	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation (ft) - Based on AB Bankfull ¹ Area	72.40	72.40					N/A	N/A					N/A	N/A					70.03	70.01				
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.0	1.0					N/A	N/A					N/A	N/A					1.0	1.0				
Thalweg Elevation (ft)	70.79	70.84					68.92	68.78					68.35	68.00					68.15	68.15				
LTOB ² Elevation (ft)	72.40	72.39					72.22	72.23					70.50	70.41					70.03	69.96				
LTOB ² Max Depth (ft)	1.6	1.6					3.3	3.5					2.2	2.4					1.9	1.8				
LTOB ² Cross-Sectional Area (ft ²)	12.3	12.2					32.4	32.0					24.0	24.9					14.5	13.8				

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

²LTOB 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 recorded and tracked above as LTOB max depth.

APPENDIX D. HYDROLOGY DATA

Table 10. Bankfull Events

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Reach	MY1 (2021)	MY2 (2022)	MY3 (2023)	MY4 (2024)	MY5 (2025)	MY6 (2026)	MY7 (2027)
UT1	3/16/2021 6/3/2021 6/12/2021 7/19/2021						
UT2	7/19/2021						
UT3	6/3/2021 7/19/2021						
UT4	3/16/2021 7/19/2021						

Table 11. Rainfall Summary

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

	MY1 (2021)	MY2 (2022)	MY3 (2023)	MY4 (2024)	MY5 (2025)	MY6 (2026)	MY7 (2027)
Annual Precip Total	54.18						
WETS 30th Percentile	33.95						
WETS 70th Percentile	58.89						
Normal	Yes						

2021 monthly rainfall data collected from Cherry Research Station (NC State Climate Office).

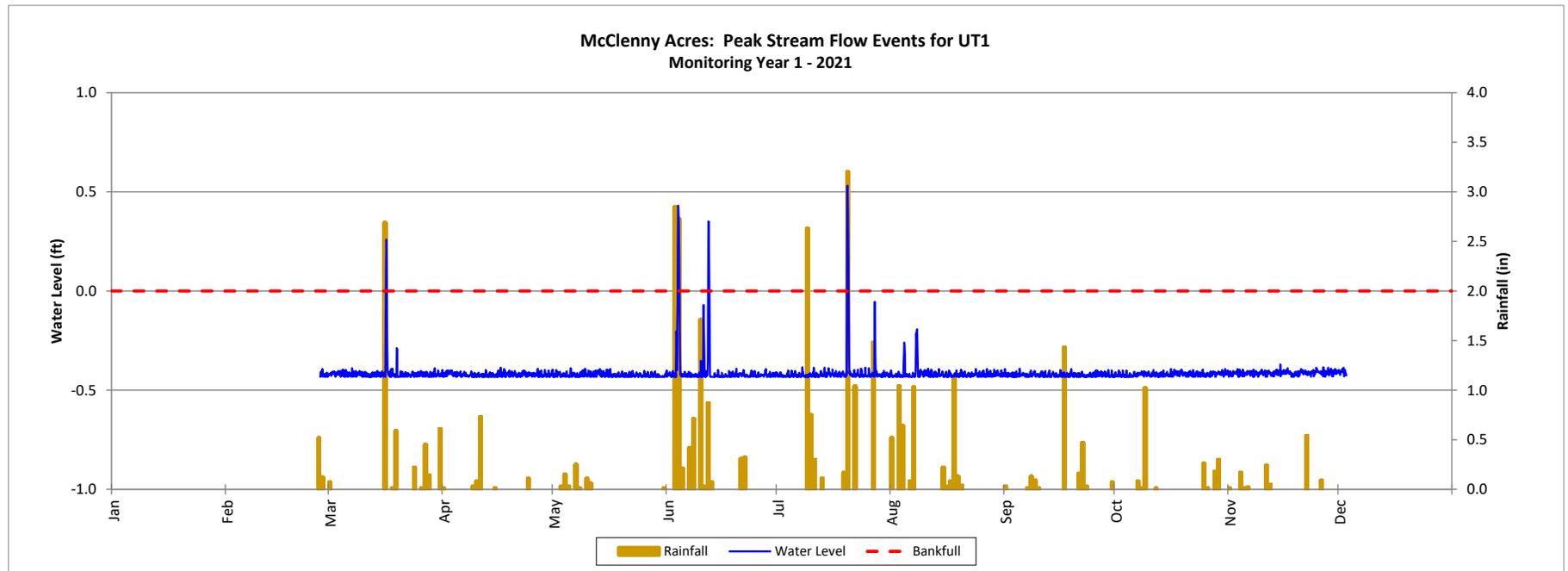
30th and 70 percentile rainfall data collected from Smithfield weather station (317994).

Recorded Bankfull Events Plot

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

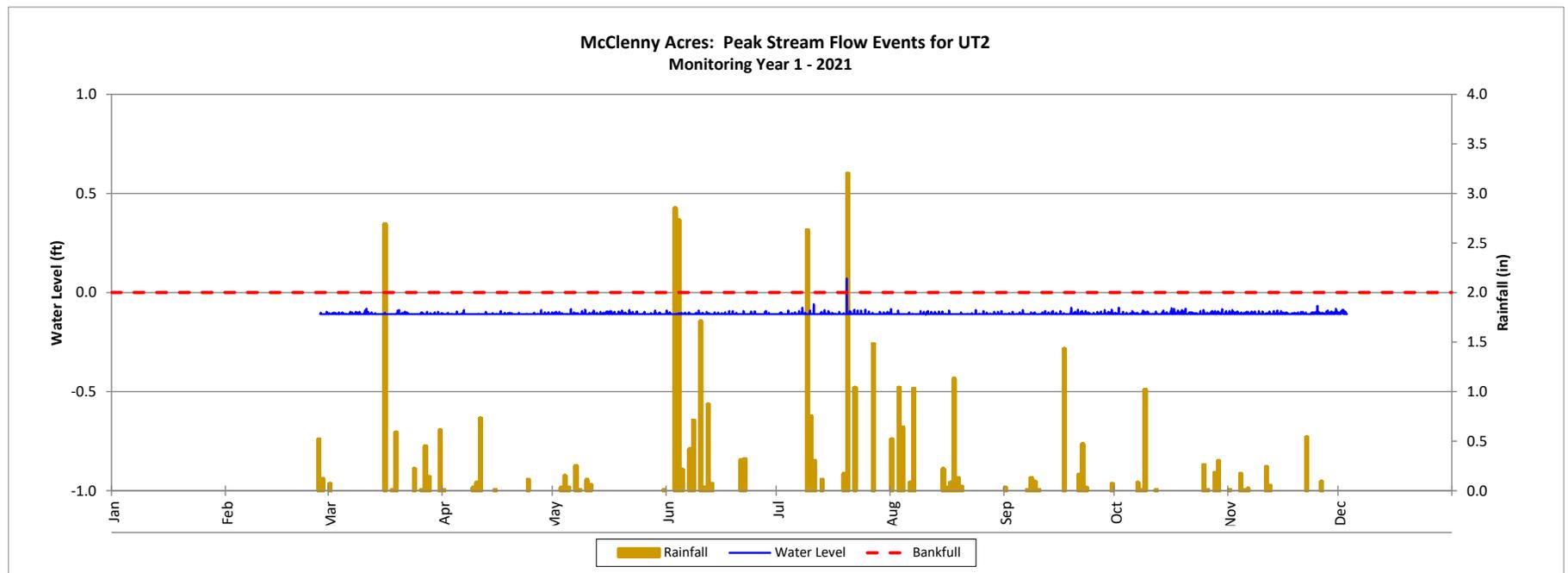


Recorded Bankfull Events Plot

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021



Recorded Bankfull Events Plot

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

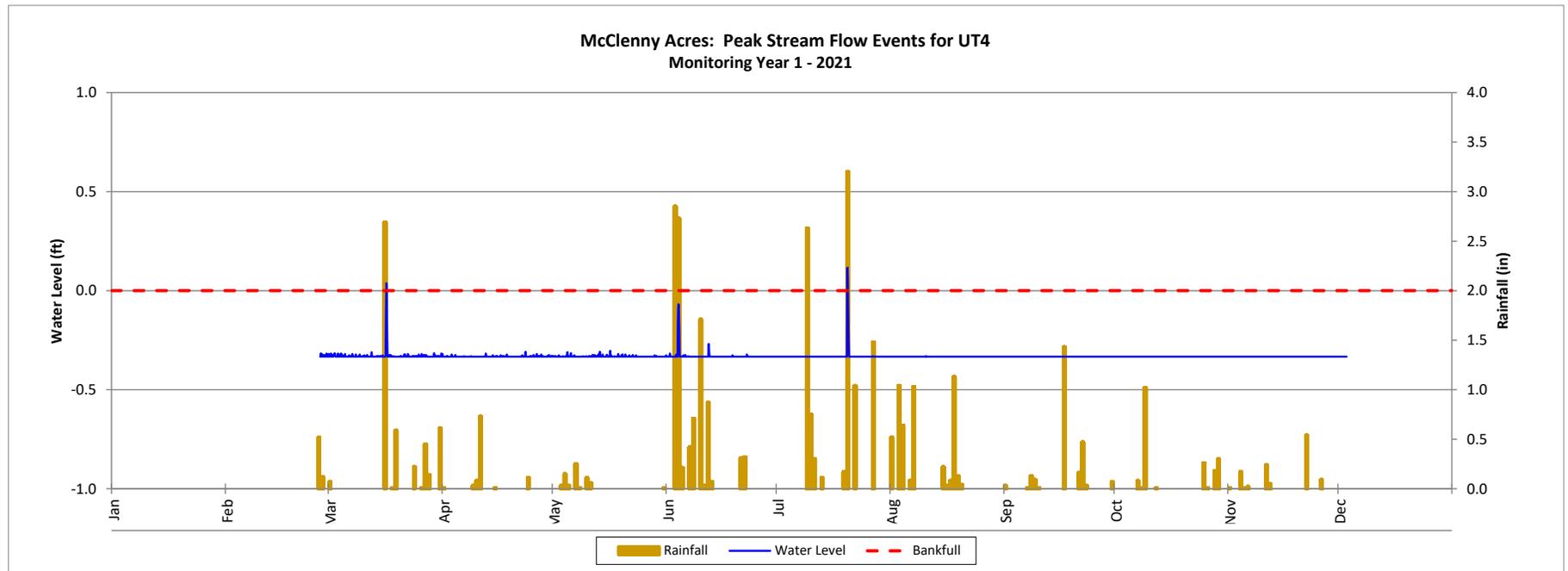


Table 12. Recorded In-Stream Flow Events Summary

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Reach	Max Consecutive Days/Total Days Meeting Success Criteria*						
	MY1 (2021)**	MY2 (2022)	MY3 (2023)	MY4 (2024)	MY5 (2025)	MY6 (2026)	MY7 (2027)
UT3 Reach 1	61 Days/ 143 Days						

*Success criteria is 30 consecutive days of flow.

**Data collected 2/26/2021 through 12/2/2021.

Recorded In-Stream Flow Events Plot

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

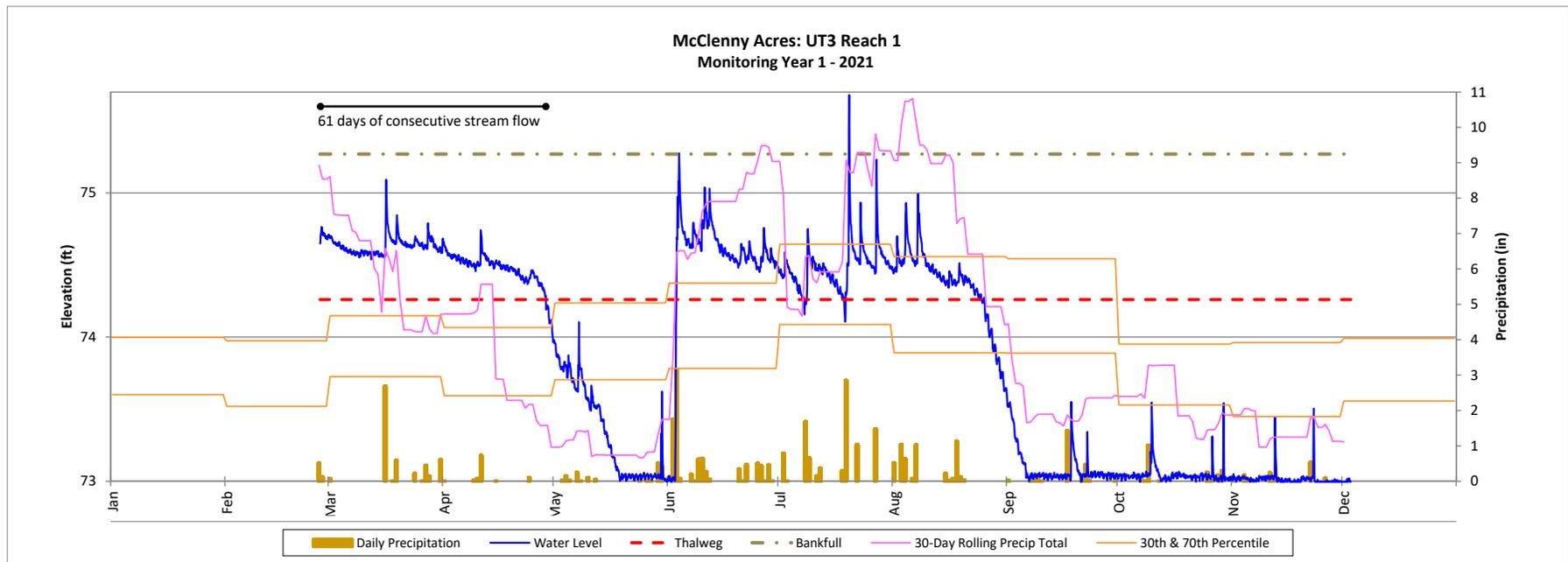


Table 13. Groundwater Gauge Summary

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

Summary of Groundwater Gauge Results for Monitoring Years 1 through 7							
Gauge	Max Consecutive Days During Growing Season (Percentage)						
	MY1 (2021)	MY2 (2022)	MY3 (2023)	MY4 (2024)	MY5 (2025)	MY6 (2026)	MY7 (2027)
1	89 Days (33.5%)						
2	6 Days (2.3%)						
3	87 Days (32.7%)						
4	4 Days (1.5%)						
5	40 Days (15.0%)						
6	40 Days (15.0%)						
7	89 Days (33.5%)						
8	20 Days (7.5%)						
9	2 Days (0.8%)						
10	3 Days (1.1%)						
11	58 Days (21.8%)						
12	57 Days (21.4%)						
13	60 Days (22.6%)						
14	52 Days (19.5%)						
15	60 Days (22.6%)						
16	2 Days (0.8%)						
17	11 Days (4.1%)						
18	24 Days (9.0%)						
19	22 Days (8.3%)						

GW 1 and GW 5 have a 14% (38 consecutive day) hydroperiod criterion. GW 2-4 and GW 6-19 have a 10% (27 consecutive day) hydroperiod criterion.

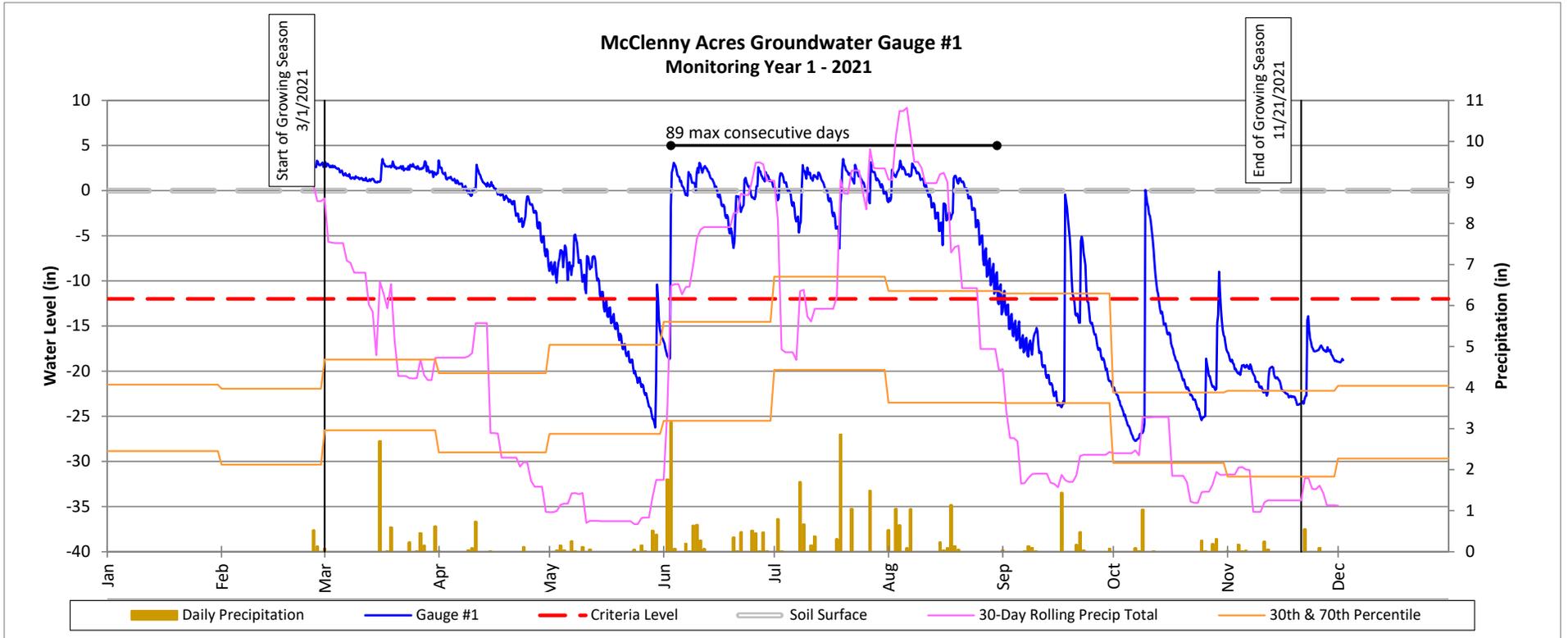
Growing Season Dates: 3/1/2021 to 11/21/2021 (265 days).

Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

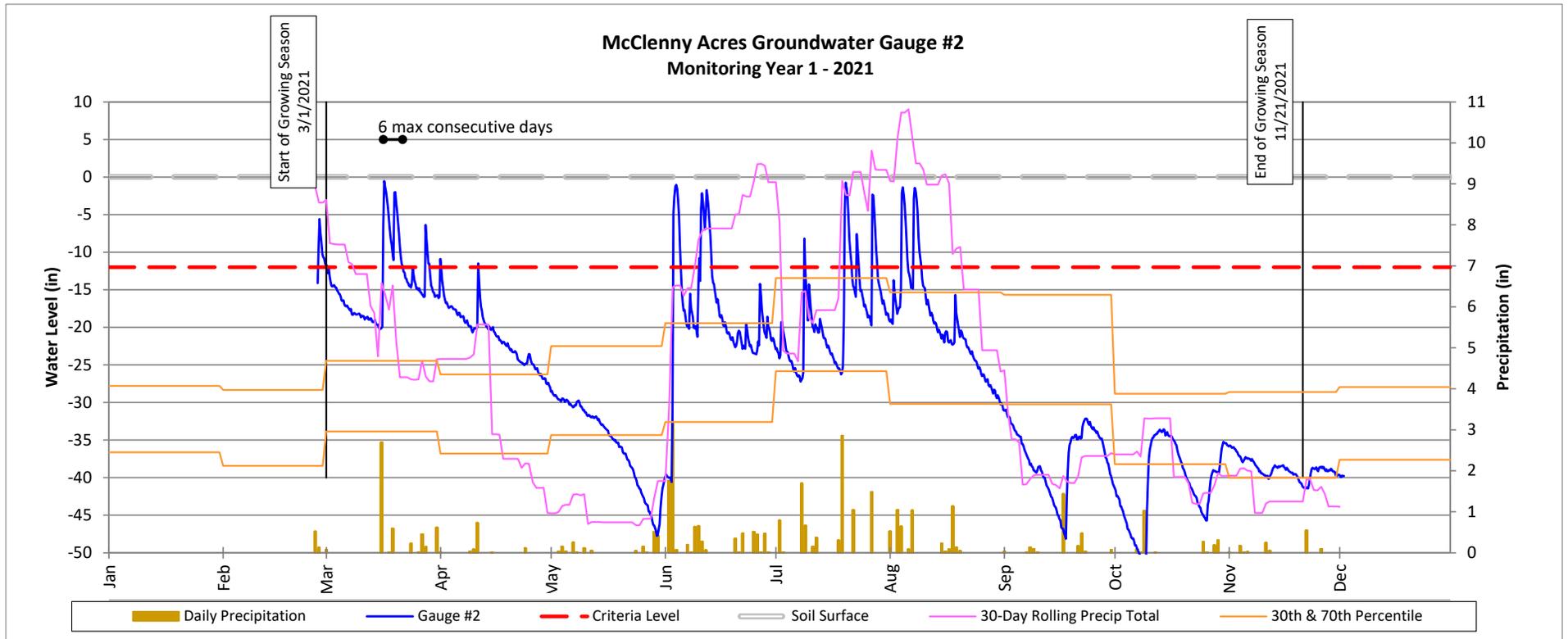


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

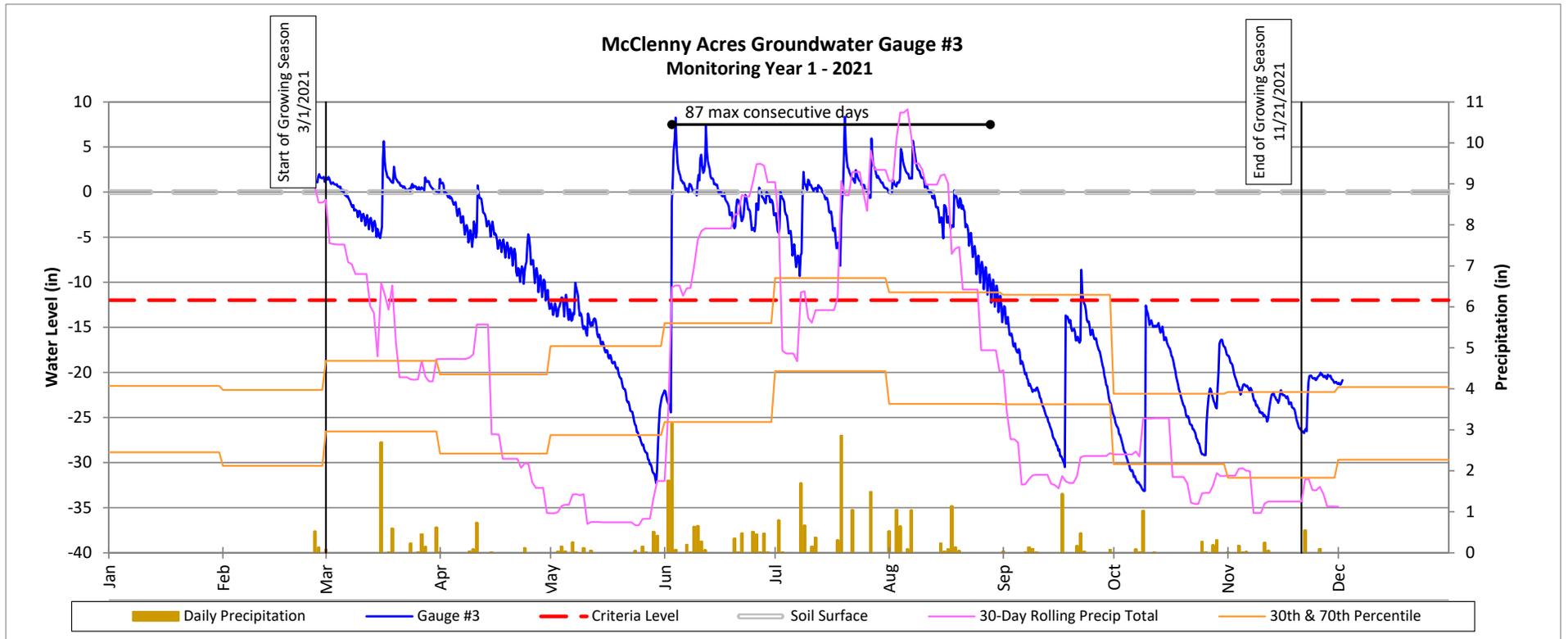


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

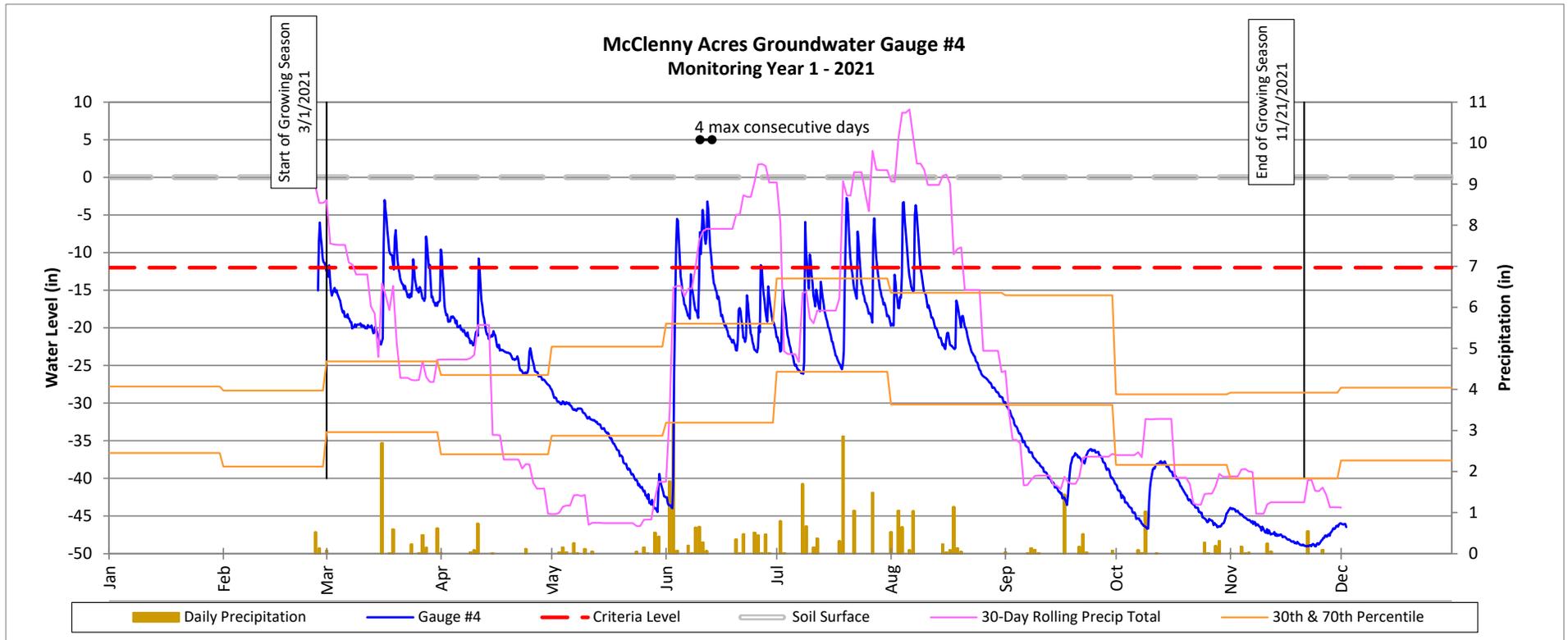


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

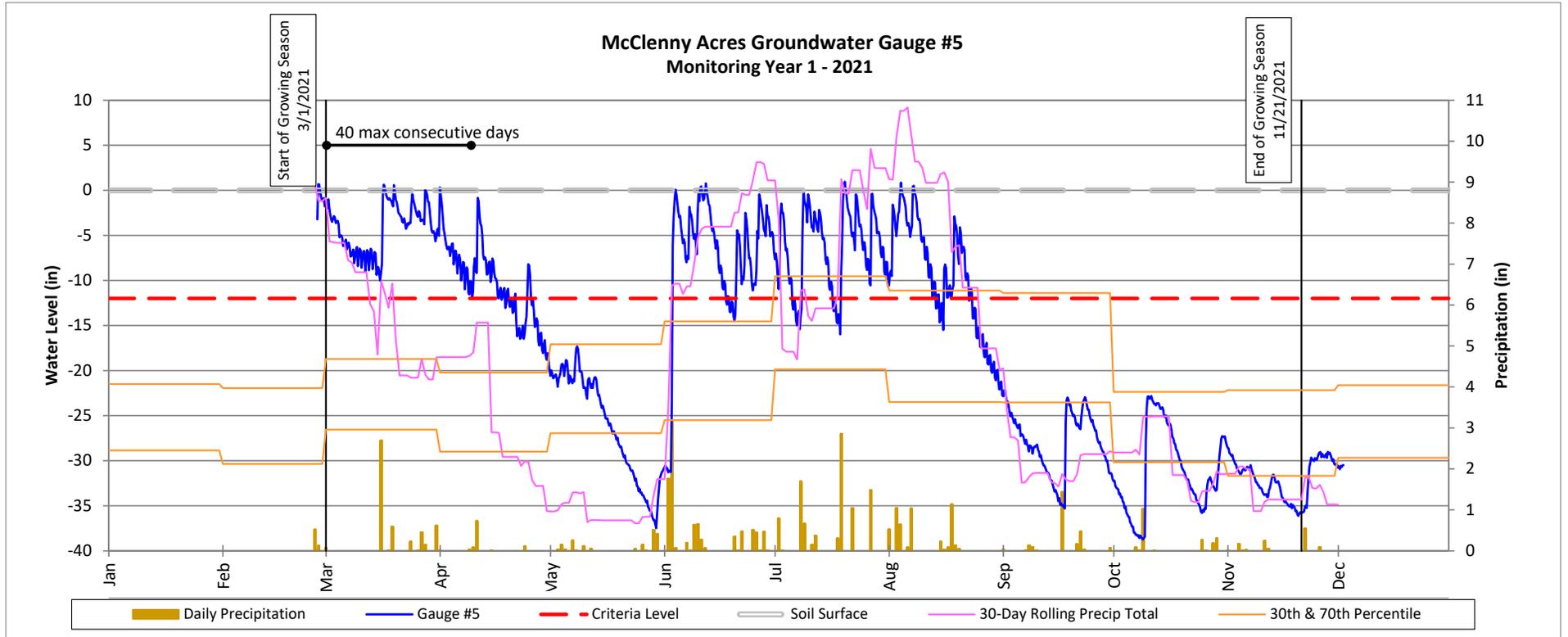


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

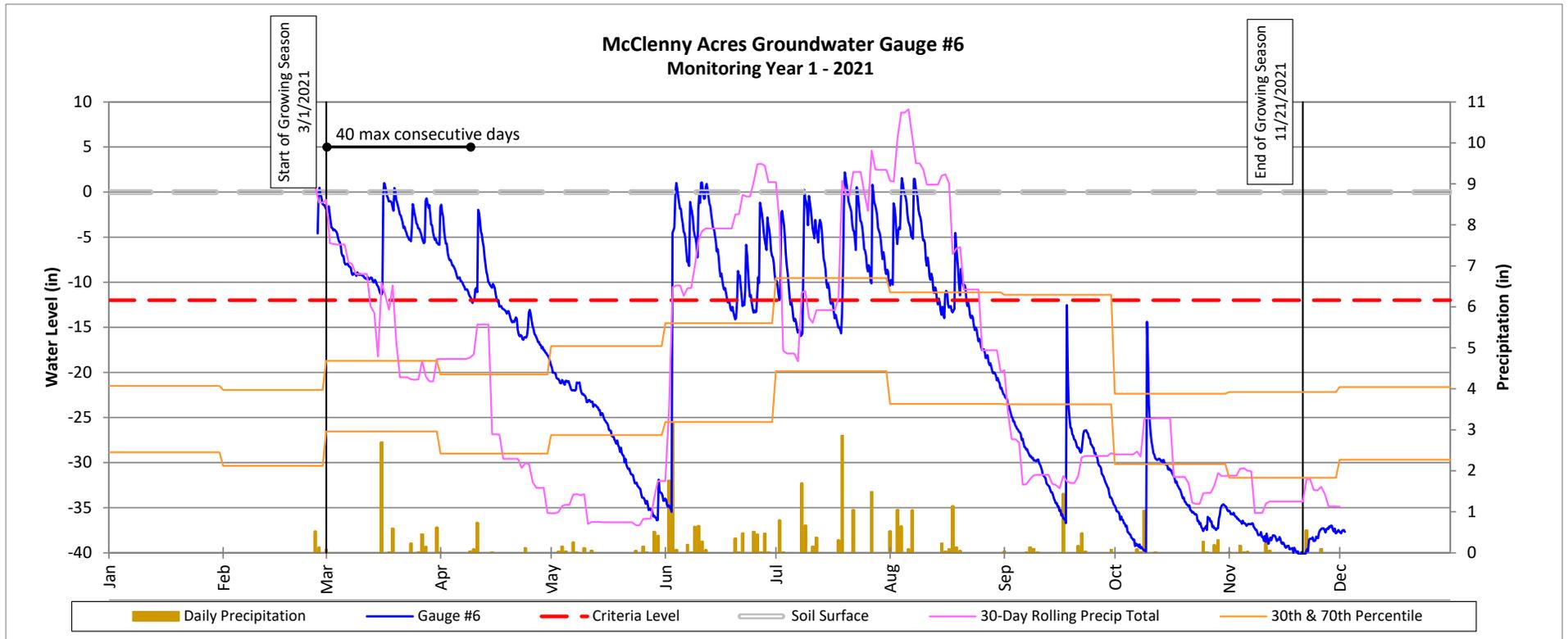


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

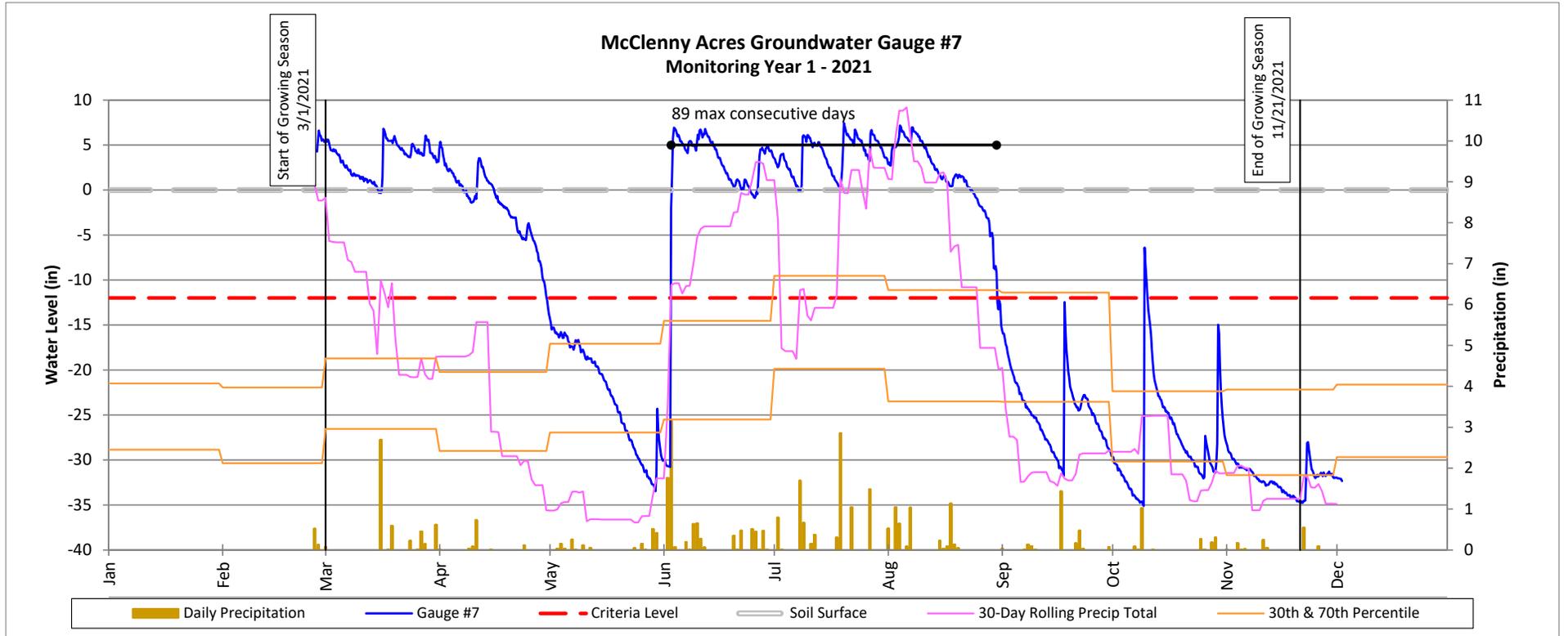


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

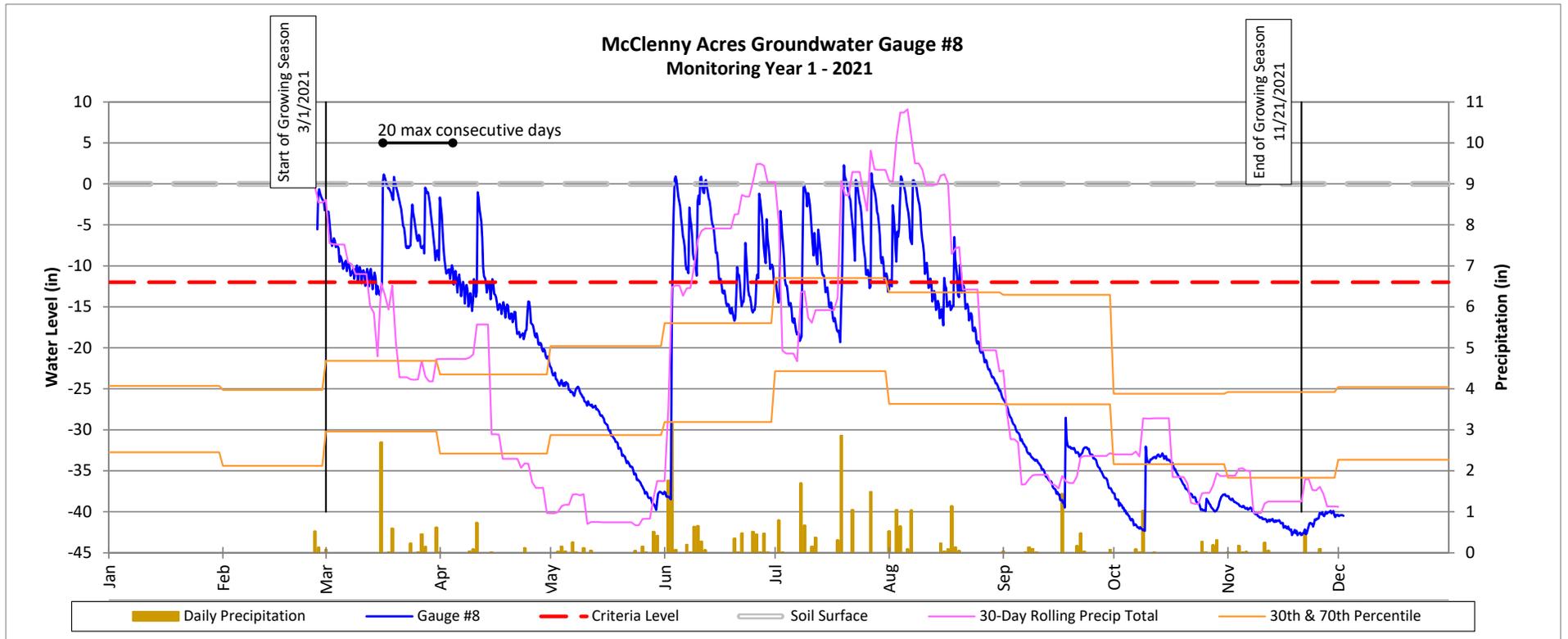


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

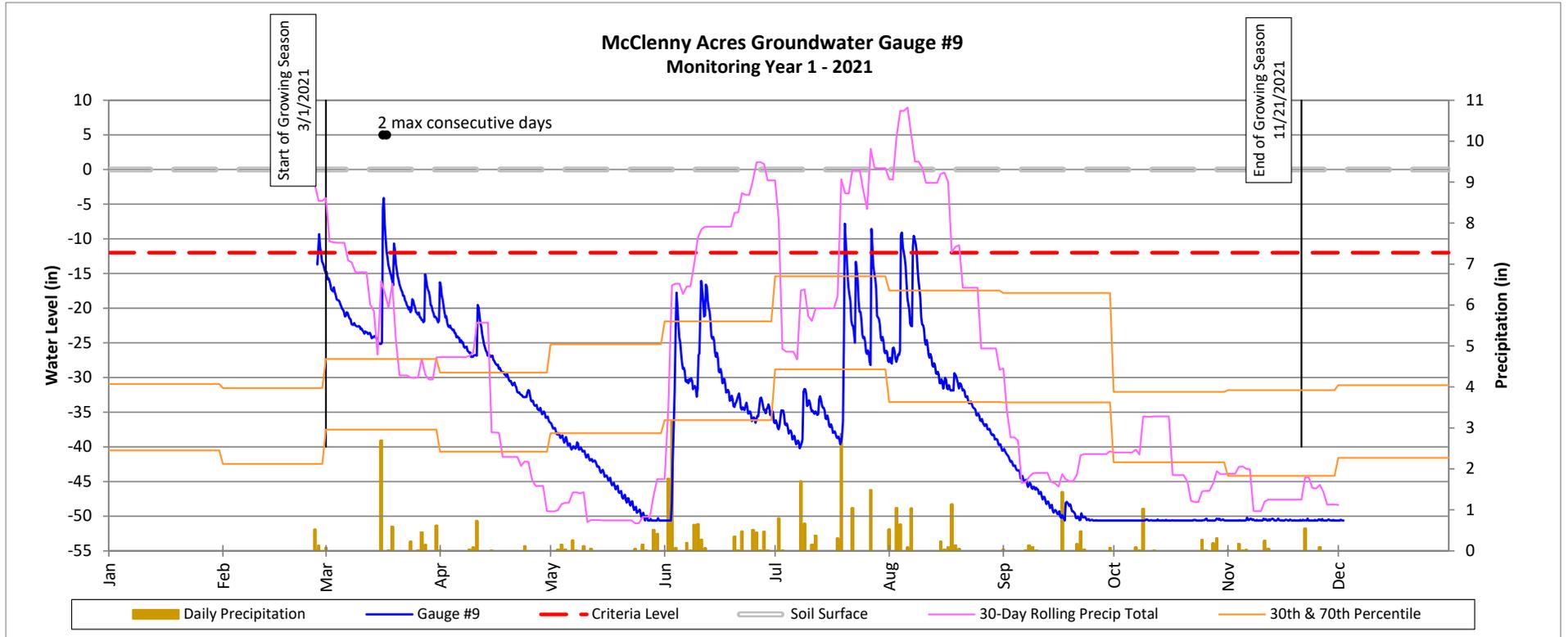


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

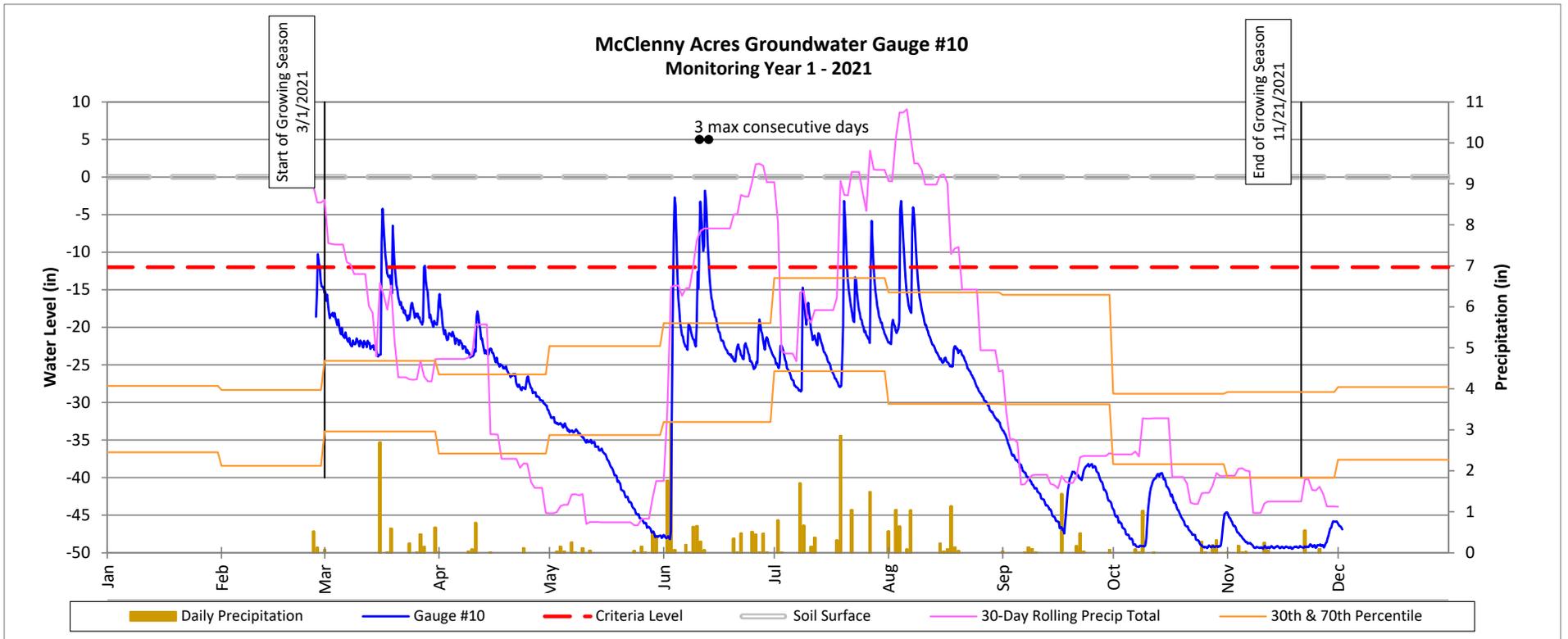


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

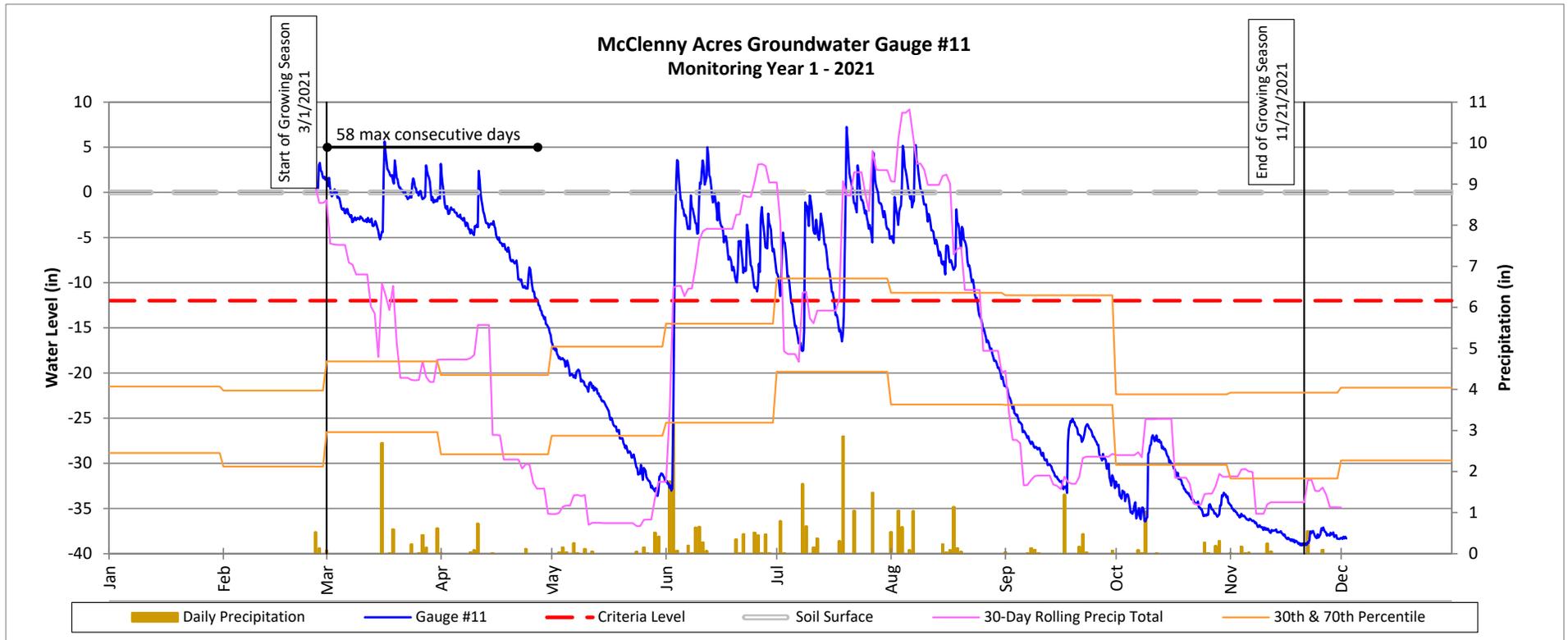


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

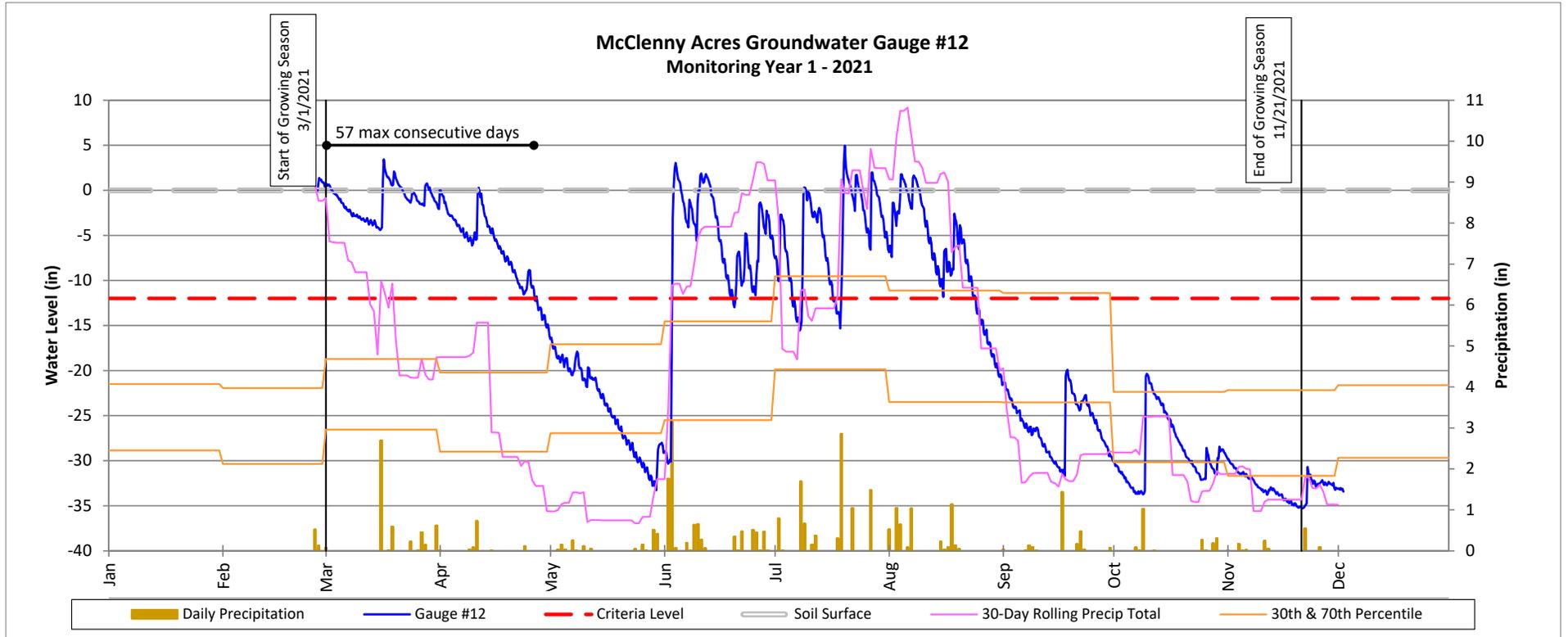


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

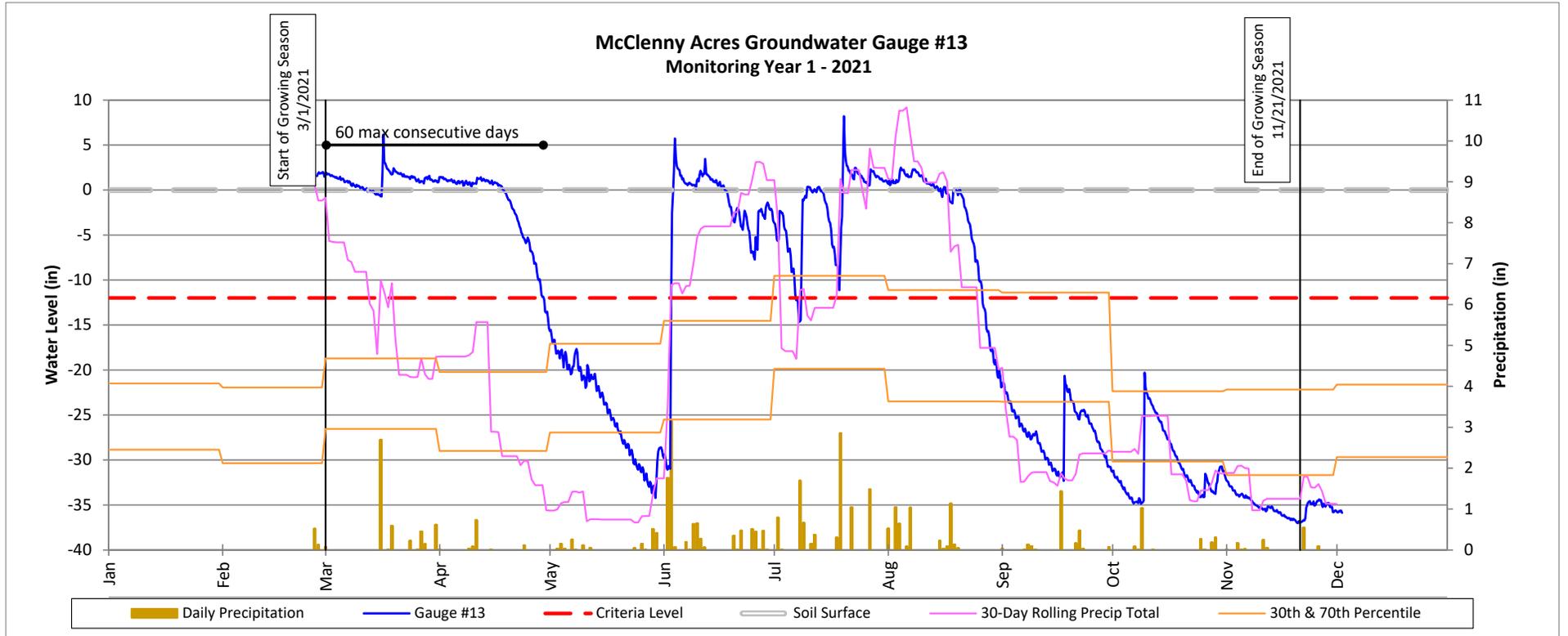


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

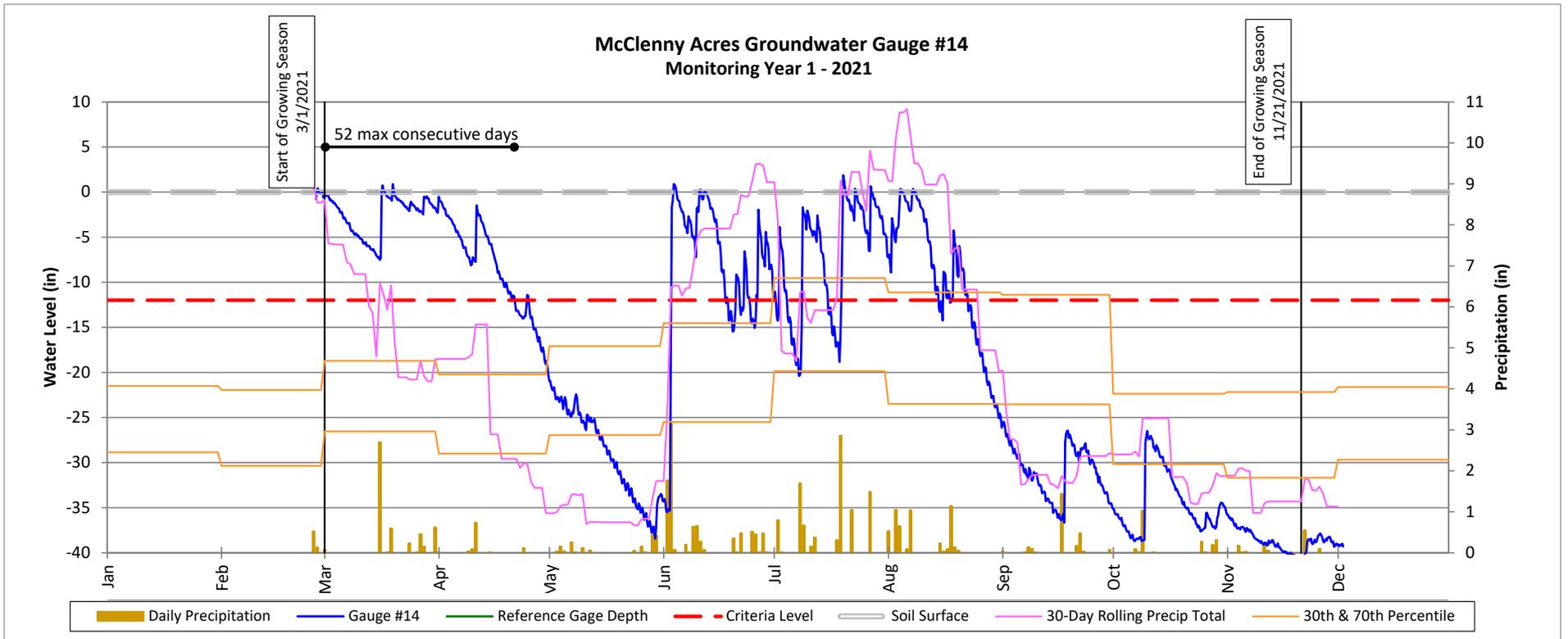


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

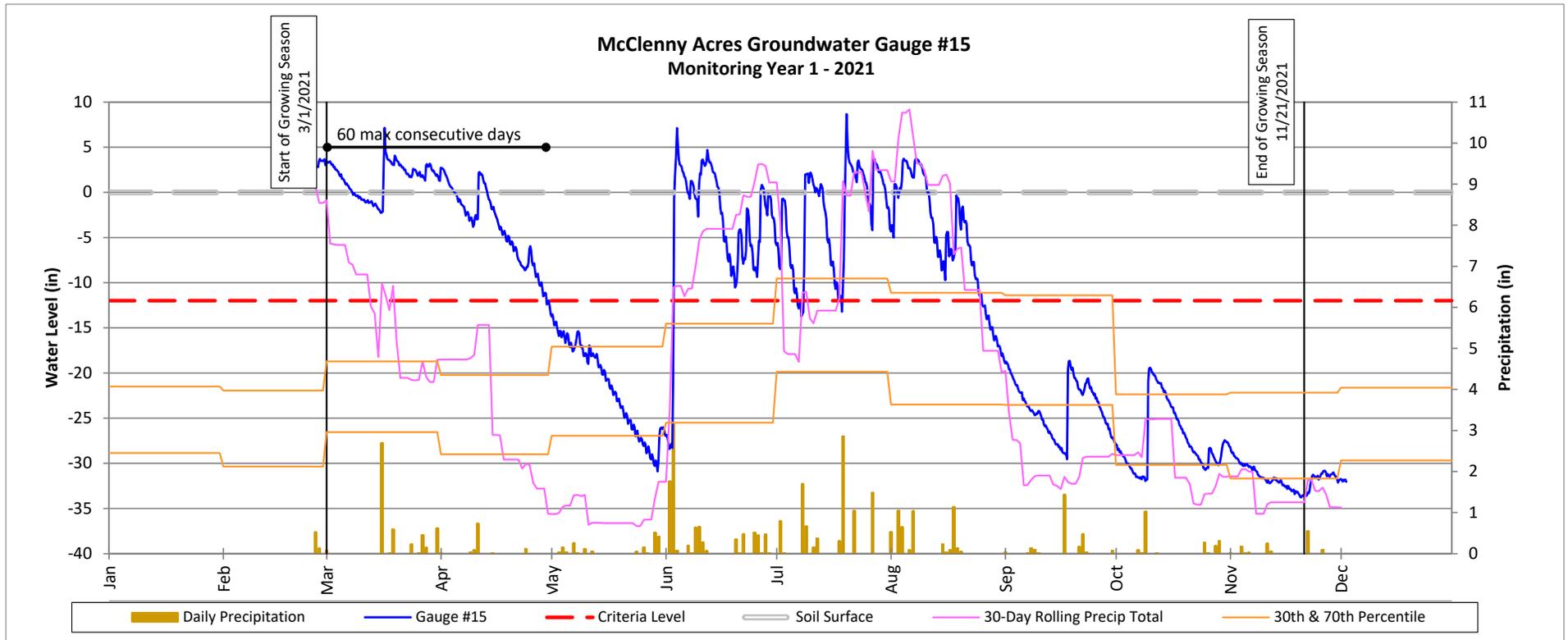


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

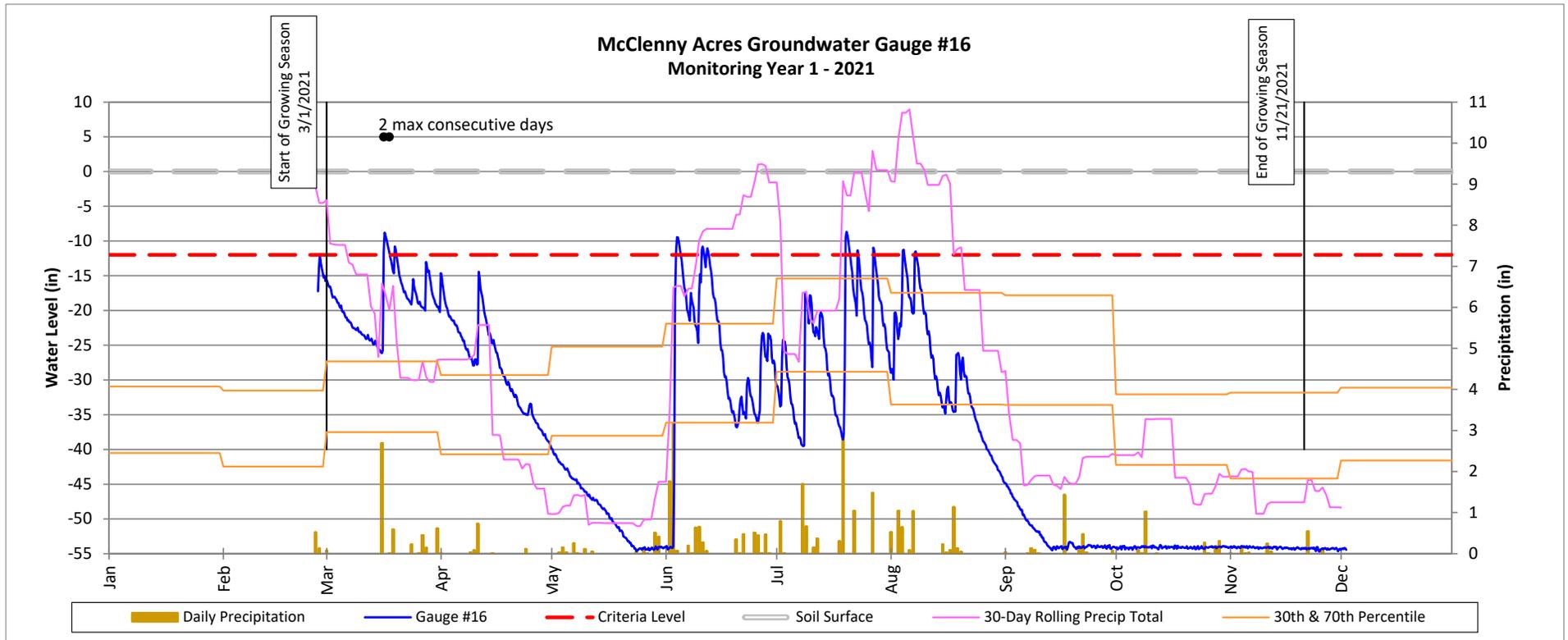


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

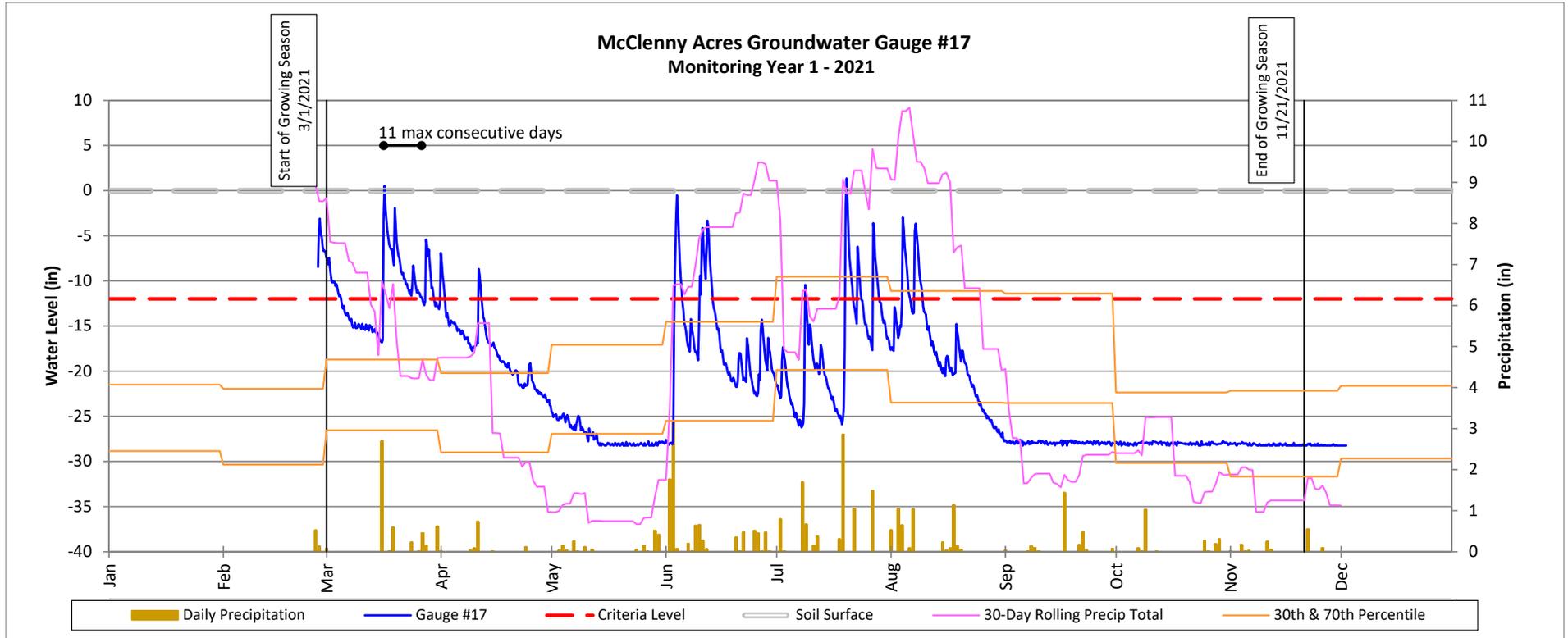


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

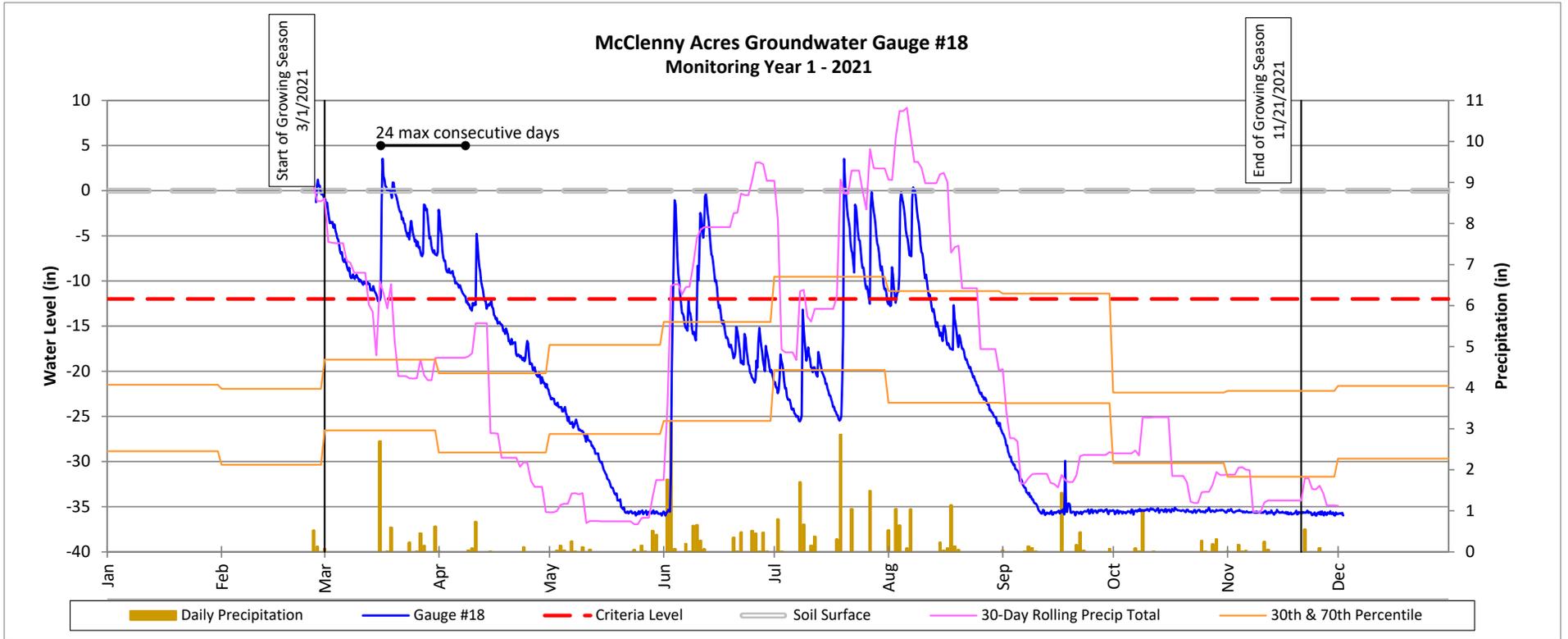


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

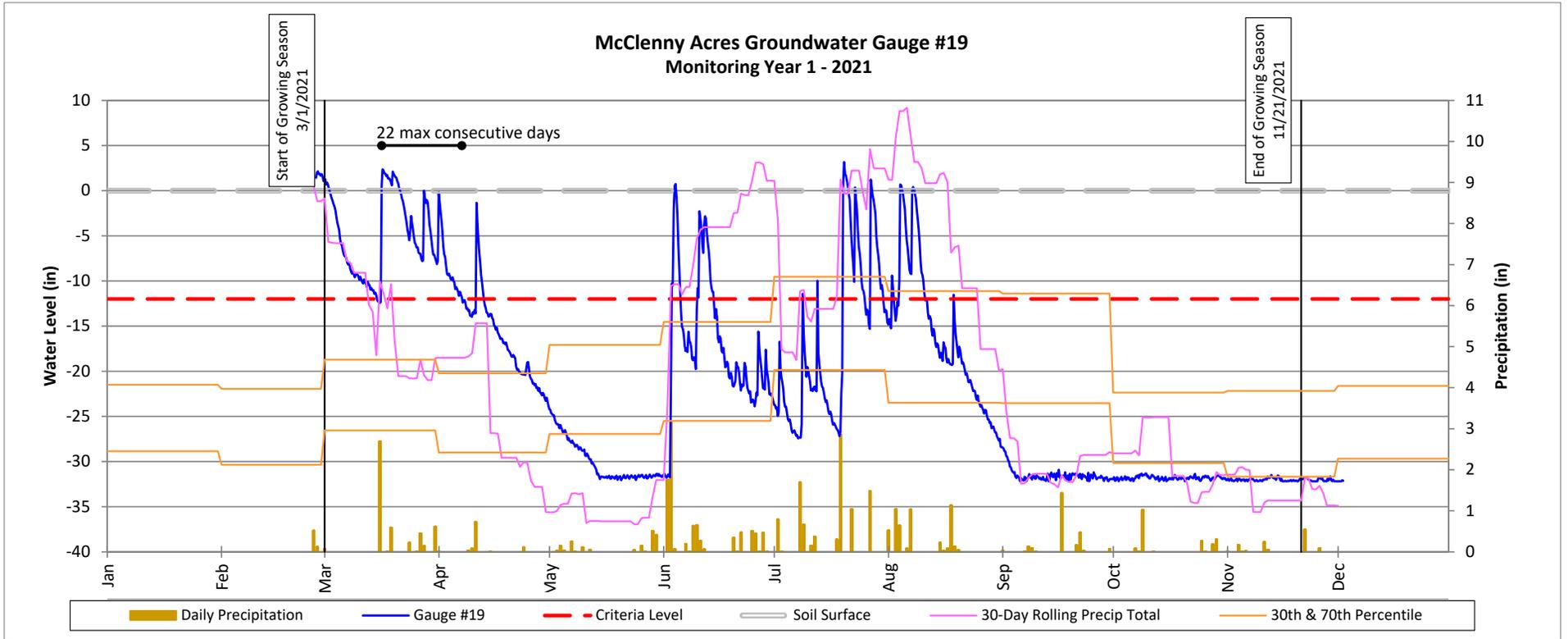


Groundwater Gauge Plots

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021

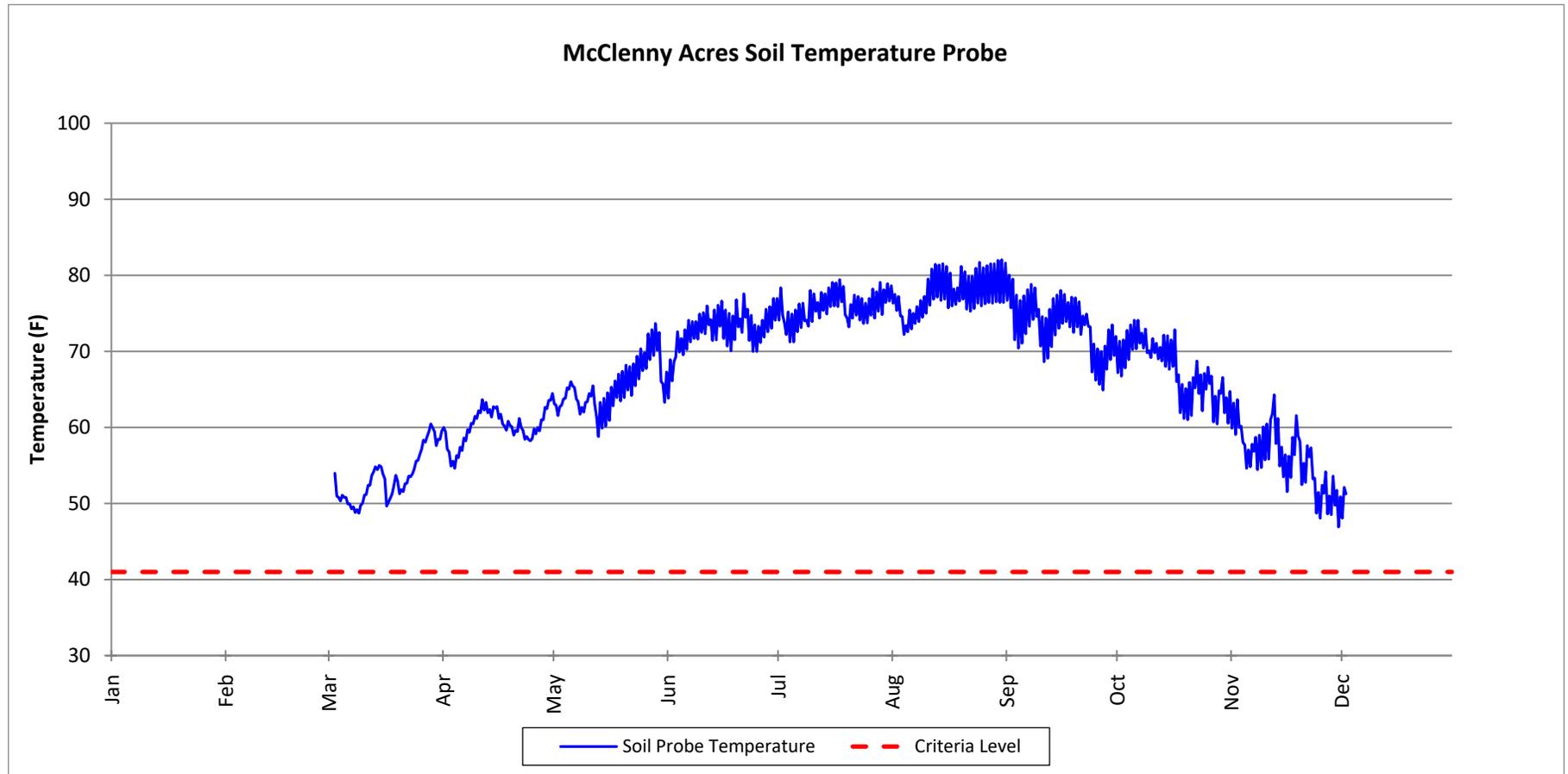


Soil Temperature Probe Plot

McClenny Acres Mitigation Site

DMS Project No. 100038

Monitoring Year 1 - 2021



APPENDIX E. PROJECT TIMELINE AND CONTACT INFORMATION

Table 14. Project Activity and Reporting History

McClenny Acres Mitigation Site
 DMS Project No. 100038
Monitoring Year 1 - 2021

Activity or Deliverable		Data Collection Complete	Task Completion or Deliverable Submission
Project Instituted		NA	January 2018
Mitigation Plan Approved		February 2020	February 2020
Construction (Grading) Completed		NA	September 2020
Planting Completed		NA	March 2021
As-Built Survey Completed		September 2020	September 2020
Baseline Monitoring Document (Year 0)	Stream Survey	September 2020	May 2021
	Vegetation Survey	March 2021	
Year 1 Monitoring	Stream Survey	April 2021	December 2021
	Vegetation Survey	September 2021	
Loblolly Pine Removal			December 2021
Year 2 Monitoring	Stream Survey	2022	December 2022
	Vegetation Survey	2022	
Year 3 Monitoring	Stream Survey	2023	December 2023
	Vegetation Survey	2023	
Year 4 Monitoring			December 2024
Year 5 Monitoring	Stream Survey	2025	December 2025
	Vegetation Survey	2025	
Year 6 Monitoring			December 2026
Year 7 Monitoring	Stream Survey	2027	December 2027
	Vegetation Survey	2027	

Table 15. Project Contact Table

McClenny Acres Mitigation Site
 DMS Project No. 100038
Monitoring Year 1 - 2021

Designer Nicole Macaluso Millns, PE	Wildlands Engineering, Inc. 312 West Millbrook Road, Suite 225 Raleigh, NC 27609 919.851.9986
Construction Contractor	Land Mechanic Designs, Inc. 126 Circle G Lane Willow Spring, NC 27592
Monitoring Performers Monitoring, POC	Wildlands Engineering, Inc. Jason Lorch 919.851.9986

APPENDIX F. IRT CORRESPONDENCE



MEETING MINUTES

MEETING: As-Built IRT Site Visit
McClenny Acres Mitigation Site
Neuse River Basin 03020201; Wayne County, NC
NCDMS Project No. 100038
USACE ID: SAW-2018-02042
NCDEQ Contract No. 7423

DATE: *On-site Meeting: June 15, 2021*
Meeting Notes Distributed: Friday July 23, 2021

Attendees

Todd Tugwell, USACE
Samantha Dailey, USACE
Erin Davis, NC Division of Water Resources
Katie Merritt, NC Division of Water Resources
Jeremiah Dow, NC Division of Mitigation Services
Jeff Keaton, Wildlands Engineering
Daniel Taylor, Wildlands Engineering
Jason Lorch, Wildlands Engineering
Andrew Radecki, Wildlands Engineering
Charlie Neaves, Wildlands Engineering

During the meeting, the group simultaneously discussed topics relevant to the McClenny Acres Mitigation Site (DMS full-delivery mitigation project) and McClenny Acres II Mitigation Bank. Notes below are intended to summarize topics most pertinent to the McClenny Acres Mitigation Site as well as non-site-specific subjects.

Meeting Notes

1. The group discussed that the powerline maintenance limits extend to a line parallel and offset 35' in a northwesterly direction from the center of the northwestern transmission line to a line parallel and offset 115' in a southeasterly direction from the center of the northwest transmission line. The IRT requested that "no mow" signs be placed along the powerline maintenance limits.
2. The group discussed that pine tree removal near the wooded length of UT3 was not completed as planned due availability of the selected tree harvesting contractor and excessively wet site conditions beginning during the late summer of 2020. The IRT stated that they still feel pine removal is necessary to achieve expected ecological uplift. Wildlands plans to remove pine trees through mechanical forest harvesting or girdling. Areas slated for pine removal with no disturbance directly resulting from stream construction were not in the planting plan in the approved mitigation plan due to the expectation that advance regeneration, coppice regeneration of impacted hardwood stems, and natural regeneration

from seed will be sufficient. The IRT also stated they would expect a higher water table in response to pine tree removal.

3. The IRT stated they have observed data reporting in which off-site sourced rain data does not support observations of on-site hydrology data. The group agreed that sourcing data from Cherry Research Farm is acceptable for this Site.
4. The IRT recommended diligence in managing in-stream vegetation based on observations in UT1 and UT2. Treatment of in-stream vegetation that causes sediment deposition was recommended.
5. The group discussed appropriate use of gravel and wood in upper coastal plain streams. Wildlands staff stated that the gravel was used to help with grade control. The IRT did not express any concerns with the use of gravel on this project.
6. The IRT recommended diligence in managing beaver inhabitation of the Site.
7. The group discussed planted stem diversity, availability of bare-root seedlings, and species substitutions on other sites. The IRT inquired about contracting for seedlings two years in advance to guarantee availability. Wildlands expressed reluctance to do so because of frequent shifts to construction schedules, unpredictable circumstances that arise with projects, and other logistical and economic constraints.

From: Jeff Keaton

Sent: Tuesday, July 27, 2021 1:41 PM

To: Browning, Kimberly D CIV USARMY CESAW (USA) <Kimberly.D.Browning@usace.army.mil>; Dow, Jeremiah J <jeremiah.dow@ncdenr.gov>; John Hutton <jhutton@wildlandseng.com>

Cc: Jason Lorch <jlorch@wildlandseng.com>; Crocker, Lindsay <Lindsay.Crocker@ncdenr.gov>; Beth.Harmon@ncdenr.gov; Tugwell, Todd J CIV USARMY CESAW (USA)

<Todd.J.Tugwell@usace.army.mil>; Davis, Erin B <erin.davis@ncdenr.gov>; Haywood, Casey M CIV (USA) <Casey.M.Haywood@usace.army.mil>; 'Wilson, Travis W. (travis.wilson@ncwildlife.org)'

<travis.wilson@ncwildlife.org>; 'Matthews, Kathryn (kathryn_matthews@fws.gov)'

<kathryn_matthews@fws.gov>; 'Bowers, Todd (bowers.todd@epa.gov)' <bowers.todd@epa.gov>;

Crumbley, Tyler A CIV USARMY CESAW (USA) <Tyler.A.Crumbley2@usace.army.mil>; Merritt, Katie

<katie.merritt@ncdenr.gov>; Dailey, Samantha J CIV USARMY CESAW (USA)

<Samantha.J.Dailey@usace.army.mil>

Subject: RE: Notice of Initial Credit Release/ NCDMS McClenny Acres Mitigation Site / SAW-2018-02042 / Wayne Co.

Folks – I want to provide a follow up to the comments on the McClenny Record Drawing/As-Built comments for the DMS site. First, we plan to address the pines as soon as the site dries out enough. We expect that will be in the next few months. Our preference would be to remove them. However, depending on site conditions, it may be less disruptive to the site to girdle some or all of them, especially on the west side of UT3. It sounds like the IRT does not have a strong preference for how they are handled, but, again, our goal will be to remove as many as possible. Here are responses to Casey's comments:

1. Overall the location of the monitoring devices and vegetation plots seem well placed. Recommend adding or moving a gauge to the wetland boundary on UT1.
 - Wildlands proposes evaluation of groundwater hydrology data to be presented in the MY1 report prior to installation of an additional monitoring well. This will allow for more informed well placement if an additional well is determined necessary.
2. Design sheets: Please verify that the centerline was used for crediting determination, not the thalweg. It is unclear when looking at the design sheets.
 - Stream centerline was used for credit determination.
3. Sheet 4.0 Planting Tables: recommend adding wetland indicator statuses.
 - Since the report is accepted, we would prefer not to make this change and resubmit it. If you like, we could resubmit the page(s) with the planting tables. Let us know if you would like us to do that. Wildlands will include wetland indicator status on planting tables in future mitigation plans and as-built reports.

Thanks. Let me know if there are other questions or concerns.

Jeff

From: Browning, Kimberly D CIV USARMY CESAW (USA) <Kimberly.D.Browning@usace.army.mil>

Sent: Thursday, July 22, 2021 4:58 PM

To: Dow, Jeremiah J <jeremiah.dow@ncdenr.gov>; John Hutton <jhutton@wildlandseng.com>

Cc: Jason Lorch <jlorch@wildlandseng.com>; Jeff Keaton <jkeaton@wildlandseng.com>; Crocker, Lindsay <Lindsay.Crocker@ncdenr.gov>; Beth.Harmon@ncdenr.gov; Tugwell, Todd J CIV USARMY CESAW (USA) <Todd.J.Tugwell@usace.army.mil>; Davis, Erin B <erin.davis@ncdenr.gov>; Haywood, Casey M CIV (USA) <Casey.M.Haywood@usace.army.mil>; 'Wilson, Travis W. (travis.wilson@ncwildlife.org)' <travis.wilson@ncwildlife.org>; 'Matthews, Kathryn (kathryn_matthews@fws.gov)' <kathryn_matthews@fws.gov>; 'Bowers, Todd (bowers.todd@epa.gov)' <bowers.todd@epa.gov>; Crumbley, Tyler A CIV USARMY CESAW (USA) <Tyler.A.Crumbley2@usace.army.mil>; Merritt, Katie <katie.merritt@ncdenr.gov>; Dailey, Samantha J CIV USARMY CESAW (USA) <Samantha.J.Dailey@usace.army.mil>
Subject: Notice of Initial Credit Release/ NCDMS McClenny Acres Mitigation Site / SAW-2018-02042 / Wayne Co.

Good afternoon,

The 15-Day Record Drawing/As-Built review for the NCDMS McClenny Acres Mitigation Site (SAW-2018-02042) ended June 30, 2021 and an IRT site visit was conducted June 15, 2021. 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 within this email. There were no objections to issuing the initial credit release. Please find attached the current signed ledger. As noted by DMS, design creditable stream length was 9,474 lf and as-built creditable stream length is 9,493 lf. A change in project credits to the As-built Assets due to the discovery that the Duke Energy utility easement was previously surveyed as 80' in width when it was actually 150' in width was noted.

USACE and WRC expressed concern with the lack of diversity in the pine stands and requests that clumps of pines that are thick and lack a diverse understory and midstory be cleared or thinned to increase diversity. If girdling is performed, particularly on large pines, the girdle width should be wide enough, and deep enough, to prevent the cambium layer from growing back together. Pine canopy removal should allow more sunlight to reach the forest floor. Please provide the June 15 site visit minutes to the IRT for concurrence and include them in the MY1 report.

DWR Comments, Erin Davis:

DWR requests that the isolated pine stand that was not cleared during construction as originally proposed, be cleared as discussed during the as-built site walk. In order to minimize re-disturbance of the project area and because other desirable species are present, DWR is ok with selectively clearing and/or girdling pines within the wooded wetland reestablishment area south of Reach 2 (specifically targeting pine pockets) rather than the general clearing effort originally proposed. If girdling is performed, please ensure the girdle width is adequate based on the tree size.

USACE Comments, Casey Haywood:

1. Overall the location of the monitoring devices and vegetation plots seem well placed. Recommend adding or moving a gauge to the wetland boundary on UT1.
2. Design sheets: Please verify that the centerline was used for crediting determination, not the thalweg. It is unclear when looking at the design sheets.
3. Sheet 4.0 Planting Tables: recommend adding wetland indicator statuses.

Please feel free to contact me with any questions,

Kim

Kim Browning

Mitigation Project Manager, Regulatory Division | U.S. Army Corps of Engineers