MONITORING YEAR 2 ANNUAL REPORT

Final

BANNER FARM MITIGATION SITE

Henderson County, NC
French Broad River Basin
HUC 06010105

DMS Project No. 100062
DEQ Contract No. 7530
DMS RFP No. 16-007334
Date of Issue: September 8, 2017
USACE Action ID No. SAW-2018-01153
DWR Project No. 20181032

Data Collection Dates: January 2023 – November 2023
Draft Submittal Date: November 30, 2023
Final Submittal Date: January 8, 2024

PREPARED FOR:

NC Department of Environmental Quality
Division of Mitigation Services
1652 Mail Service Center
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PREPARED BY:

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January 8, 2024

Mr. Matthew Reid
Asheville Regional Office
2090 U.S. 70 Highway
Swannanoa, NC 28778-8211

RE: **Banner Farm Draft MY2 Report Review**
French Broad River Basin – CU# 06010105
Henderson County
DMS Project ID No. 100062
Contract # 7530

Dear Mr. Reid:

Wildlands Engineering, Inc. (WEI) has reviewed the Division of Mitigation Services (DMS) comments from the Draft MY2 Monitoring report for the Banner Farm Mitigation Site provided in bold type below and offers the following responses in italics.

Wetland Hydrology: Thank you for including the discussion regarding percent increase in maximum consecutive days of groundwater within the first 12 inches compared between pre and post construction data as well as the French Broad River stage height correlation. 2023 was a dry year and the Banner Farm hydrology data reflects this. Six of the 23 ground water gauges met success criteria for MY2. Three of the successful six wells are located in the rehabilitation section along Banner Reach 2. The majority of the reestablishment area is not meeting. Does WEI have any thoughts or concerns with site hydrology moving to MY3?

Wildlands Response: Even though 2023 was a dry year, there was still an upward trend in hydrology compared to pre-construction groundwater data. Assuming MY3 (2024) rainfall returns to normal amounts, WEI expects many more groundwater gages to meet criteria within the re-establishment areas, especially gages that recorded equal or greater number of consecutive days compared to the reference gage.

Once MY3 (2024) data has been collected and analyzed, wetland assets not trending towards success will be considered at risk. Assets are placed at risk in order to not over-release credits for the project. As a result, future contractual payments are reduced. DMS will work with WEI if this occurs to determine project credits and a revised payment schedule.

Wildlands Response: Wildlands understands the potential for wetland assets to be considered at risk in MY3 if data is not trending towards success. If necessary, Wildlands will work with NCDMS to adjust credits and project payment schedules as required.

Recommend installing additional wells to better define wetland areas meeting success criteria.

Wildlands Response: WEI plans to install additional wells in the credited wetland areas before the start of the 2024 growing season. The data and locations will be presented in the MY3 report.

Areas of low stem density will be replanted in 2023/2024. Please include replant information (species, quantities, etc.) in MY3 report.

Wildlands Response: Replant information will be included in the MY3 (2024) report.

The floodplain pool located in the southernmost portion of the site was planted with live stakes and whips in February 2023. Has this effort been successful? Has the floodplain pool reduced in size? Please show the perimeter of the floodplain pool on the CCPV.

Wildlands Response: In September 2022 (MY1), herbaceous plugs were planted in the floodplain pool and woody live stakes and whips were added in February 2023 (MY2). These efforts have been successful, and the floodplain pool has reduced in size, though the perimeter varies seasonally. Photos of the floodplain pool have been added to the Supplemental Photographs Log in Appendix A. The current perimeter of the floodplain pool has been added to the CCPV figures.

As a reminder, the IRT requested a mobile plot in the wetland rehabilitation area north of UT1 at least once during MY2 or MY3 in their MY0/Asbuilt comments. Please consider this request when conducting future monitoring.

Wildlands Response: Thank you for the reminder. WEI will be sure to locate a mobile plot in the wetland rehabilitation area north of UT1 during the upcoming MY3 vegetation monitoring.

Resolved Easement Encroachments: Thank you for including the Resolved Easement Encroachment List table. This information is greatly appreciated. Please add the location of the resolved easement encroachments to the CCPV.

Wildlands Response: The locations of the resolved easement encroachments have been added to the CCPV figures.

Three beaver dams were reported on Banner Creek. Does WEI plan to remove the dams and trap beaver?

Wildlands Response: Currently, the dams are considered minor and not backing up water or causing scour. WEI will continue to closely monitor beaver activity and will take action if the dams begin to cause stream instability. Photos have been added to the Supplemental Photographs Log in Appendix A to illustrate the minor nature of the dams.

If possible, please update Table 11 Rainfall Summary with end of year data in final submittal.

Wildlands Response: Table 11 and the monthly rainfall data plot have been updated with the end of year data. Text was added in section 2.4 to include the end of year data summary. The 30th and 70th percentile rainfall data was updated to be calculated for the prior 30 years from the WETS station Asheville Regional Airport. The updated rainfall data and WETS table have been included in the electronic support files.

<u>Digital Deliverable Comments:</u>

Please submit the random vegetation plot locations.

Wildlands Response: The random (mobile) vegetation plot locations have been included in the geodatabase named "Banner_Farm_AsBuilt.gdb" and saved as the feature layer named "Banner_VegPlot_Mobile".

Enclosed please find two hard copies of the Final MY2 Monitoring Report and an electronic copy of the report and support files. Please contact me at 828-774-6221 x 107 if you have any questions.

Sincerely,

Mimi Caddell
Environmental Scientist
mcaddell@wildlandseng.com

BANNER FARM MITIGATION SITE

Monitoring Year 2 Annual Report

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Section 1: PROJECT OVERVIEW

The Banner Farm Mitigation Site (Site) is located in Henderson County, approximately five miles west of Hendersonville near Horse Shoe. The Site is positioned in the Blue Ridge Physiographic Province and project streams include Banner Creek and two associated tributaries which drain to the French Broad River. At the confluence with Banner Creek, the French Broad River is defined in the 2016 North Carolina Integrated Report as Class WS-IV waters. This classification of waters is protected for drinking, culinary, food processing, aquatic life, secondary recreation, and freshwater purposes.

1.1 Project Quantities and Credits

The site is located on 7 parcels under 4 different landowners and a conservation easement was recorded on 46.52 acres. Mitigation work within the Site included restoration of perennial stream channels and creation, re-establishment, and rehabilitation of wetland areas. Table 1 below shows stream and wetland credits and the total amount of credits expected at closeout.

Table 1: Project Quantities and Credits

Project Components							
Project Segment	**Original Mitigation Plan Ft/Ac**	**As-Built Ft/Ac**	**Mitigation Category**	**Original Restoration Level**	**Original Mitigation Ratio (X:1)**	**Credits**	**Comments**
Stream							
Banner Creek Reach 1	797	827	Cool	R	1.000	797.000	Restoring dimension, pattern, and profile, reconnecting channels with floodplains and wetlands, replanting buffers, protecting with conservation easement
Banner Creek Reach 2	866	836	Cool	R	1.000	866.000	
Banner Creek Reach 3	467	467	Cool	R	1.000	467.000	
Banner Creek Reach 4a	794	780	Cool	R	1.000	794.000	
Banner Creek Reach 4b	420	434	Cool	R	1.000	420.000	
UT1	1,071	1,071	Cool	R	1.000	1,071.000	
UT2	1,879	1,879	Cool	R	1.000	1,879.000	
					Total:	**6,294.000**	
Wetland							
Wetland Re-Establishment	31.820	31.671	RR	REE	1.000	31.820	Re-establish hydrology via the plugging/filling of drainage features, stream grading, wetland planting, invasive species treatment, permanent conservation easement

Project Components							
Project Segment	**Original Mitigation Plan Ft/Ac**	**As-Built Ft/Ac**	**Mitigation Category**	**Original Restoration Level**	**Original Mitigation Ratio (X:1)**	**Credits**	**Comments**
Wetland Rehabilitation	2.760	2.746	RR	RH	2.000	1.380	Improve hydrology via the plugging/filling of drainage features, wetland planting, stream grading, invasive species treatment, permanent conservation easement
Wetland Creation	1.140	1.094	RR	C	3.000	0.380	Priority 2 stream grading, plugging/filling of drainage features, wetland planting, invasive species treatment, permanent conservation easement
					Total:	**33.580**	

Project Credits							
Restoration Level	**Stream**			**Riparian Wetland**		**Non-Riparian Wetland**	**Coastal Marsh**
	Warm	**Cool**	**Cold**	**Riverine**	**Non-Riv**		
Restoration		6,294.000					
Re-establishment				31.820			
Rehabilitation				1.380			
Enhancement							
Enhancement I							
Enhancement II							
Creation				0.380			
Preservation							
Totals		**6,294.000**		**33.580**			

1.2 Project Goals and Objectives

The project is intended to provide numerous ecological benefits. Table 2 below provides projects goals and objectives and the expected outcomes to water quality and ecological processes.

Table 2: Goals, Performance Criteria, and Functional Improvements

Goal	Objective/ Treatment	Likely Functional Uplift	Performance Criteria	Measurement	Cumulative Monitoring Results
Stabilize eroding stream banks.	Reconstruct stream channels slated for restoration with stable dimensions. Add bank revetments and in-stream structures to protect restored streams.	Reduce erosion and sediment inputs.	Cross-sections should be stable and show little change in bankfull area and width-to-depth ratio.	Cross-section monitoring and visual inspections.	In MY2, most cross-section dimensions closely match baseline monitoring.
Improve the stability of stream channels.	Construct stream channels that will maintain a stable pattern and profile considering the hydrologic and sediment inputs to the system, landscape setting, and watershed conditions.	Reduce erosion and sediment inputs; maintain appropriate bedforms and sediment size distribution.	Entrenchment ratio (ER) stays over 2.2 and bank height ratio (BHR) below 1.2 with visual assessments showing progress toward stability.	Cross-section monitoring and visual inspections.	In MY2, most cross-sections show streams are stable and functioning as designed. All show ERs are over 2.2 and 9/11 riffle XS BHRs are below 1.2.
Improve instream habitat.	Install habitat features including constructed riffles, cover logs, and brush toes into restored streams. Add woody materials to channel beds. Construct pools of varying depth.	Support biological communities and processes; provide aquatic habitat 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
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, filter pollutants out of overbank flows, provide surface storage of water on floodplain, increase groundwater recharge while reducing outflow of stormwater, support water quality, and habitat goals.	Four bankfull events in separate years within the 7-year monitoring period.	Crest gages with transducers recording stage elevations.	All project streams experienced multiple bankfull events in MY1 and MY2.
Restore wetland hydrology, soils, and plant communities.	Restore and enhance riparian wetlands by raising stream beds, plug existing ditches, removing berm material over relic hydric soils, and planting native wetland species.	Increase water storage, increase groundwater recharge, water quality treatment through retention, and increase habitat for aquatic and terrestrial species.	Free groundwater surface within 12 inches of the ground surface for 12% of the growing season (26 consecutive days).	Groundwater gages installed in wetland re-establishment, creation, and rehabilitation areas and monitored annually.	In MY1, 4/18 GWGs met or exceeded hydrologic success criteria. In MY2, 6/23 GWGs met or exceeded success criteria.
Restore and enhance native floodplain vegetation.	Plant native tree species in riparian zone where they are currently insufficient.	Provide a canopy to shade streams and reduce thermal loading. Stabilize stream banks and floodplain. Support water quality habitat goals.	Survival rate of 320 stems per acre at MY3, 260 planted stems per acre at MY5, and 210 stems per acre at MY7. Average height of 6 feet in each plot at MY5 and 8 feet in each plot at MY7 for planted stems.	Vegetation plots measuring 100 square meters established in 2% of the open planted area and monitored annually.	In MY0, all plots met MY3 density criteria. In MY1, 23/24 permanent and 9/12 mobile vegetation plots met MY3 density criteria. In MY2, 22/24 permanent and 5/12 mobile plots are meeting MY3 density criteria.

Goal	Objective/ Treatment	Likely Functional Uplift	Performance Criteria	Measurement	Cumulative Monitoring Results
Permanently protect the Site from harmful uses.	Establish conservation easements on the Site.	Protect and enhance aquatic habitat, reduce sediments inputs, and protect any rare natural communities.	Prevent easement encroachment.	Visually inspect the perimeter of the Site to ensure no easement encroachment is occurring.	All previously reported encroachments have been resolved.

1.3 Project Attributes

The Site and adjoining properties have sustained predominantly rural characteristics for approximately 60 years. Portions of Site parcels were extensively ditched to drain and maintain adjacent agricultural fields for row crop production from 1964 to the commencement of project construction. Large segments of the ditches were determined to be modified streams including Banner Creek, UT1, and UT2. Throughout the watershed, agricultural land use declined slightly from 1964 to 1994 as residential areas were established and fields were abandoned and allowed to reforest. The watershed has since remained relatively stable with only minor changes in land use. Table 3 below presents additional information on pre-restoration conditions.

Table 3: Project Attributes

Project Information					
Project Name	Banner Farm Mitigation Site				
County	Henderson				
Project Area (acres)	46.52				
Project Coordinates (latitude and longitude decimal)	35° 21' 7"N, 82° 33' 13" W				
Project Watershed Summary Information					
Physiographic Province	Blue Ridge				
River Basin	French Broad				
USGS Hydrologic Unit 8-digit	06010105				
DWR Sub-basin	04-03-02				
Project Drainage Area (acres)	722				
Project Drainage Area Percentage of Impervious Area	1.5%				
Land Use Classification	44% cultivated crops and hay, 27% forest, 2.5% shrub/grassland/herbaceous, 0.5% wetlands, 26% residential				
Reach Summary Information					
Parameters	**Banner Creek**				
	R1	**R2**	**R3**	**R4a**	**R4b**
Pre-project length (feet)	705	945	357	607	802
Post-project length (feet)	827	836	467	780	434
Valley confinement (Confined, moderately confined, unconfined)	Unconfined				
Drainage area (acres)	390	422	429	634	722
Perennial, Intermittent, Ephemeral	P				
NCDWR Water Quality Classification	WS-IV (WSW)				
Dominant Stream Classification (existing)	C4	C4	C4	C5/4	C5/4
Dominant Stream Classification (proposed)	C4	C4	C4	C5/4	C5/4
Dominant Evolutionary Classification (Simon) if applicable	V	IV	III	IV	IV
Parameters	**UT1**			**UT2**	
Pre-project length (feet)	620			2042	
Post-project length (feet)	1,071			1,879	
Valley confinement (Confined, moderately confined, unconfined)	Unconfined				
Drainage area (acres)	83			192	
Perennial, Intermittent, Ephemeral	P				
NCDWR Water Quality Classification	WS-IV (WSW)				
Dominant Stream Classification (existing)	E/C5			E/C5	
Dominant Stream Classification (proposed)	E5			C4	
Dominant Evolutionary Classification (Simon) if applicable	IV				

Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Supporting Docs?**
USACE Public Notice - Section 404	Yes	Yes	SAW-2018-01153[1]
Water of the United States - Section 404	Yes	Yes	PCN[2]
Water of the United States - Section 401	Yes	Yes	PCN[2]
Endangered Species Act	Yes	Yes	Final Mitigation Plan
Historic Preservation Act	Yes	Yes	Final Mitigation Plan
Coastal Zone Management Act	No	N/A	N/A
FEMA Floodplain Compliance	Yes	Yes	No Rise Certification
Essential Fisheries Habitat	No	N/A	N/A

[1] Public Notice was issued on August 28, 2018.
[2]PCN was submitted to DMS with Final Mitigation Plan for IRT submittal.

Wetland Summary Information						
Parameters	**Wetland Rehabilitation Areas**					
	A	**D**	**E**	**F**	**H**	**I**
Post-project area (acres)	0.46	0.12	<0.01	0.03	0.06	<0.01
Wetland Type (non-riparian, riparian)	Riparian					
Classification	Bottomland Hardwood Forest					
Mapped Soil Series	Toxaway/ Rosman	Toxaway/ Codorus	Toxaway	Toxaway	Codorus/ Delanco	Codorus
Soil Hydric Status	Yes/No		Yes		No	
Restoration or enhancement method	Rehabilitation (Vegetative, hydrology)					
Parameters	**Wetland Rehabilitation Areas**					
	J	**K**	**L**	**R**	**S**	**W**
Post-project area (acres)	0.05	0.11	<0.01	1.65		0.28
Wetland Type (non-riparian, riparian)	Riparian					
Classification	Bottomland Hardwood Forest					
Mapped Soil Series	Codorus/ Delanco	Codorus/ Bradson	Codorus	Codorus/ Delanco	Codorus/ Bradson	Toxaway
Soil Hydric Status	No					
Restoration or enhancement method	Rehabilitation (Vegetative, hydrology)					
Parameters	**Wetland Re-establishment Areas**					
Post-project area (acres)	31.67					
Wetland Type (non-riparian, riparian)	Riparian					
Mapped Soil Series	Codorus/Delanco/Bradson/Toxaway/Rosman					
Soil Hydric Status	No					
Restoration or enhancement method	Re-establishment (Vegetative, hydrology)					
Parameters	**Wetland Creation Areas**					
Post-project area (acres)	1.094					
Wetland Type (non-riparian, riparian)	Riparian					
Mapped Soil Series	Rosman					
Soil Hydric Status	No					
Restoration or enhancement method	Creation (Vegetative, hydrology)					

Section 2: Monitoring Year 2 Data Assessment

The MY2 data collection was conducted between January and November 2023 to assess the condition of the project. Performance criteria for vegetation, stream, and hydrologic assessments are located in Section 1.2 Table 2: Goals, Performance Criteria, and Functional Improvements. The Site will be monitored for a total of seven years with the final monitoring activities scheduled for 2028.

2.1 Vegetative Assessment

The MY2 vegetative survey was completed in July 2023. The average stem density across all vegetation plots is 381 stems per acre. In MY2, 22 out of 24 permanent vegetation plots (VP) and 5 out of 12 mobile vegetation plots (MP) are on track to meet the MY3 interim density requirement of 320 stems per acre. 9 vegetation plots (VP3, VP5, MP2, MP3, MP5, MP6, MP9, MP11, and MP12) are not meeting the interim MY3 density criteria. 3 of the vegetation plots not meeting criteria (VP3, MP5, and MP11) are still meeting the MY5 criteria with densities greater than 260 stems per acre. Based on visual assessments, areas around VP5, MP3, MP6, MP9, and MP11 are representative of larger areas of low stem density. See Section 2.5.1 for further discussion on the Site's vegetation areas of concern. Within the permanent plots, there was approximately an 89% planted stem survival rate between MY1 and MY2. Of the more prevalent planted tree/shrub species, box elder (*Acer negundo*), river birch (*Betula nigra*), sycamore (*Platanus occidentalis*), black willow (*Salix nigra*), and American elm (*Ulmus americana*) have the highest overall survival rates. Herbaceous vegetation is becoming well established throughout the Site. There are also a variety of hydrophytic species within the wetland areas beginning to flourish. Refer to Appendix A for Vegetation Plot Photographs and the Vegetation Condition Assessment Table and Appendix B for Vegetation Plot Data.

2.2 Stream Assessment

Morphological surveys for MY2 were completed in June 2023. Most cross-sections show dimensions within an acceptable range of the design parameters indicating that the streams are stable and functioning as designed. Two riffle cross-sections along Banner Creek Reach 1 and Reach 4b (XS4 and XS12, respectively) experienced an increase in bankfull depths and bank height ratios in MY1 but have since stabilized in MY2. See section 2.5.2 for further discussion about stream areas of concern.

As stated in the MY1 annual report (Wildlands, 2022), pebble counts will not be conducted during the remaining monitoring years unless requested by the IRT or deemed necessary by best professional judgement. Refer to Appendix A for the Visual Stream Morphology Stability Assessment Table and Stream Photographs. Refer to Appendix C for Stream Geomorphology Data.

2.3 Stream Hydrology Assessment

In total, 3 automated crest gages (CG) were installed along Banner Creek Reach 2, UT1, and UT2 to monitor bankfull events. In MY2, multiple bankfull events were documented on all project streams. Therefore, the hydrologic success criteria of four bankfull events in separate years has been partially met. Refer to Appendix D for Hydrology Data.

2.4 Wetland Hydrology Assessment

In MY0, eighteen groundwater gages (GWGs) and one soil temperature probe were installed during MY0 across the wetland re-establishment, rehabilitation, and creation areas. At the end of MY1 (2022), two groundwater gages (GWG 19 and GWG 20) were added along Banner Creek Reaches 1 and 2 to document potential wetland areas that have been created by the project. On February 7, 2023, three additional groundwater gages (GWG 21, 22, and 23) were installed to capture hydrology data within the wetland re-establishment areas. All monitoring gages are downloaded on a quarterly basis and

maintained as needed. Calibrations were checked by manually measuring water levels on all gages which validated the recorded data from the pressure transducers. A groundwater gage has been established since pre-construction in a reference wetland located on the Sierra Nevada property in Mills River and is located 5.5 aerial miles from the Site.

Of the twenty-three GWGs, six met or exceeded the wetland hydrology success criteria for MY2 with the percentage of consecutive days of the growing season ranging from 16.8% to 100%. The reference gage did not meet the success criteria with four consecutive days (1.9%) of the growing season recorded. Of the remaining GWGs installed on the Site, eleven did not meet the success criteria but recorded consecutive days greater or equal to the reference gage. Consequently, six GWGs did not meet success criteria and recorded fewer consecutive days than the reference gage. When compared to reference gage data, gages located in the wetland re-establishment areas generally follow the infiltration rates of the reference gage, with many of the Site's GWGs having higher baseline water levels in the summer/fall than the reference. Gage data will continue to be compared to reference gage data in subsequent monitoring reports to analyze trends in hydrology.

The percent increase in maximum consecutive days of groundwater within 12-inches of the soil surface was compared between pre- and post-construction monitoring data. In MY1, while only four of the eighteen GWGs met or exceeded the wetland hydrology success criteria, average groundwater across the site elevated dramatically and maximum consecutive days of groundwater within 12-inches of the soil surface increased by an average of 124%. The baseline groundwater increased even though rainfall during the growing season was approximately 10.7-inches less when comparing pre-construction to MY1 data. In MY2, the elevated groundwater trend observed in MY1 continued even though rainfall recorded during the growing season was approximately 14.2-inches less when comparing pre-construction to MY2 data and maximum consecutive days increased by an average of 16%.

Daily rainfall along with 30th and 70th percentile precipitation data was obtained from the Asheville Airport (Station ID 310300) which is located approximately 5 aerial miles from the Site. The precipitation data indicates lower than normal rainfall in March, June, September, October, and November. These periods of low rainfall correspond with large groundwater drawdowns at both the reference wetland and at the project Site. Additionally, the annual precipitation for 2023 was approximately 5.3 inches below the annual 30th percentile WETS table which indicates that it was a drier than normal year.

The wetland re-establishment and creation areas are located within the larger floodplain of the French Broad River and therefore are interconnected to the stage height of the river. Data was obtained from a nearby United States Geological Survey (USGS) river gage located approximately 5.4 miles upstream from the Site on the French Broad River at Blantyre, NC (Station ID 03443000). This year, the river's gage heights are generally lower when compared to the median gage heights (1996 to 2023), particularly at critical times prior to the initial period of the growing season.

Refer to Appendix A for Groundwater Gage and Wetland Photographs, and Appendix D for Hydrology Data including summary tables and plots of the GWGs and French Broad River gage height.

2.5 Areas of Concern and Adaptive Management Activities

2.5.1 Vegetation

MY2 visual assessments reveal that over 99% of the conservation easement is currently unaffected by invasive species. When present, these species include Chinese privet (*Ligustrum sinense*) and Asian bittersweet (*Celastrus orbiculatus*). In March and April 2023, clusters of Chinese privet, multiflora rose (*Rosa multiflora),* Japanese honeysuckle (*Lonicera japonica*), and Asian bittersweet were treated along the buffer of Banner Creek above the road crossing. During this same time, mature individuals of callery

pear (*Pyrus calleryana*) and Chinese privet were treated within the former ditch locations adjacent to the wetland re-establishment areas. In April and May 2023, populations of reed canary grass were treated. Additional treatments will continue as needed to help manage and eliminate remaining invasive species populations.

Native woody and herbaceous vegetation are becoming well established on over 97% of the planted acreage. The mature river birch trees that were protected during construction along Banner Creek reach 1 are surviving and continue to appear healthy in MY2. The MY1 report documented two areas of low stem density associated with mowing overreach, one area associated with the repairs that occurred along Banner Creek Reach 4b in October 2022, and one area located within the floodplain pool in the southernmost part of the Site. Previously documented areas of low stem density (approximately 0.46 acres or 1% of the planted acreage) were supplementally planted in February 2023 with approved species from the project's Final Mitigation Plan (Wildlands, 2020). See the table below for planting species and quantities. The supplemental plantings were assessed later in the growing season, and it appears that the planted stems are surviving and healthy.

Supplemental Planting List – February 2023				
Scientific Name	**Common Name**	**Size**	**Wetland Indicator Status**	**Quantity**
Platanus occidentalis	Sycamore	Bare root	FACW	50
Betula nigra	River Birch	Bare root	FACW	50
Diospyros virginiana	Persimmon	Bare root	FAC	25
Acer negundo	Box elder	Bare root	FAC	50
Liriodendron tulipifera	Tulip Poplar	Bare root	FACU	20
Ulmus americana	American Elm	Bare root	FACW	25
Salix sericea	Silky Willow	Whip	OBL	25
Cephalanthus occidentalis	Buttonbush	Whip	OBL	25
Sambucus canadensis	Elderberry	Whip	FAC	25
Cornus amonum	Silky Dogwood	Whip	FACW	25
Salix sericea	Silky Willow	Live stake	OBL	75
Cephalanthus occidentalis	Buttonbush	Live stake	OBL	20
Cornus amonum	Silky Dogwood	Live stake	FACW	15
Salix nigra	Black Willow	Live stake	OBL	15

New areas of low stem density have been identified in MY2 and are represented by MP3, MP6, MP9, MP11, and VP5. These plots are not meeting the MY3 density criteria and lack volunteers of desired woody stems species. The remaining plots that did not formally meet the interim density criteria do not represent larger areas of low stem density and appear isolated to the boundaries of the plots. The mapped areas of low stem density total approximately 1.3 acres (2.9% of the planted acreage) and will be replanted in the winter of 2023/2024 with approved species from the Mitigation Plan (Wildlands, 2020).

Herbaceous cover has improved within the floodplain pool located in the southernmost part of the Site. Standing water receded significantly throughout the remainder of MY2. As listed above, live stakes and whips were added to this area in February 2023, and it was subsequently reseeded in the spring. This floodplain pool is contributing to the diversity of habitat provided by the mosaic of wetland types within the Site.

2.5.2 Stream

Banner Creek Reach 4b was designed with a priority 2 approach to tie into the bed elevation of the receiving French Broad River where backwater and potential aggradation and degradation cycling is expected as described in the Mitigation Plan (Wildlands, 2020). Numerous large storm events in MY1 caused stability issues along Banner Creek Reach 4b and a repair plan was implemented. Overall, the repairs along Banner Creek Reach 4b that were completed in October 2022 and documented in the MY1 report (Wildlands, 2022), appear stable and functioning as designed. Live stakes (species listed in Section 2.5.1) were added to the banks in February 2023. Cross-section 12 is located at a riffle that initially degraded, and the October 2022 repair work was not intended to rebuild to match the as-built profile. The MY2 survey at XS12 show that this repair area has remained stable. MY2 visual assessments revealed a small area of bank scour and structure piping along Banner Creek Reach 4b. Wildlands plans to address these areas of instability in the winter of 2023/2024.

Two hand repairs were completed in February 2023 to address minor surface bank scour discovered along the bank of Banner Creek Reach 1 and 4a. Live stakes were added, and visual assessments reveal that the banks appear stable. Otherwise, the bed scour mapped along Banner Creek Reach 1 at station 5+60 has not degraded further and is considered of minor concern but will continue to be monitored for signs of instability. Additionally, three small beaver dams (less than 2 feet in height) were noted in MY2 but were not causing any erosion or significantly impounding water. Wildlands will continue to monitor the beaver activity to ensure it does not interfere with stream stability or vegetation survival on the Site.

2.5.3 Conservation Easement

To reconcile the constructed farm entrance encroachment originally noted in MY0, Wildlands has modified the recorded conservation easement to release the farm entrance (0.08 acres) from the project area. The plat has been signed by the landowners, approved by the State Property Office, and recorded by Henderson County. The conservation easement boundary in the CCPV figures has been updated and referenced acreages have been updated throughout the report.

In MY1, minor unresolved encroachments included slight mowing overreach and row crop intrusion. These encroachments have been since resolved in MY2. The table below summarizes the easement encroachments and associated adaptive management activities. Refer to Appendix B for photos of the resolved encroachments. In MY2, Wildlands inspected the conservation easement in its entirety numerous times to ensure compliance.

Resolved Easement Encroachment List – MY2				
Encroachment Location	**MY2 Status**	**Description**	**MY2 Adaptive Management**	**Area (Acres)**
Banner Creek Reach 2 STA 15+00 – Left Floodplain	Resolved	Slight crop overreach from small garden behind trailer observed in MY1.	Installed additional posts in May 2023.	0.0012
UT2 STA 201+00 – Right Floodplain	Resolved	Slight mowing scalloping observed in MY1.	Installed additional posts/ horse tape in January 2023.	0.0058

Site maintenance and adaptive measurement implementation will continue to follow those outlined in the Final Mitigation Plan (Wildlands, 2020). No adaptive management plans are needed at this time.

2.6 Monitoring Year 2 Summary

Overall, the Site is on track to meet most of the required stream, vegetation, and hydrology success criteria for MY2. The average planted stem density for the Site is 381 stems per acres and is on track to meet the MY3 requirement of 320 stems per acre. Geomorphic surveys indicate that cross-section bankfull dimensions closely match the baseline monitoring, with some minor adjustments, and streams

are functioning as intended. At least one bankfull event was documented on all project reaches in MY2. Six of the twenty-three groundwater gages on the Site met or exceeded the hydrology success criteria. The MY2 visual assessment identified a few areas of concern including pockets of invasive species, small areas of low stem density, isolated areas of bed and bank scour, and one piping structure. Wildlands will continue to monitor these areas and adaptive management actions will be implemented as necessary throughout the seven-year monitoring period to maintain the ecological health of the Site.

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: METHODOLOGY

Annual monitoring will consist of collecting morphologic, vegetative, and hydrologic data to assess The project's success based on the goals outlined in the Site's Mitigation Plan (Wildlands, 2020). Monitoring requirements will follow guidelines outlined in the NC IRT Stream and Wetland Mitigation Guidance Update (2016). 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.

Geomorphic data was collected following the standards outlined in The Stream Channel Reference Site: An Illustrated Guide to Field Techniques (Harrelson et al., 1994) and in Stream Restoration: A Natural Channel Design Handbook (Doll et al., 2003). All Integrated Current Condition Mapping was collected by either a professional licensed surveyor or an Arrow 100® Submeter GNSS Receiver and processed using ArcPro. Crest gages, using automated pressure transducers, were installed in riffle cross-sections to monitor stream hydrology throughout the year. Groundwater gages were installed using guidance from the USACE's *Technical Standard for Water-Table Monitoring of Potential Wetland Sites* (2005). Stream hydrology and vegetation monitoring protocols followed the Wilmington District Stream and Wetland Compensatory Mitigation Update (NCIRT, 2016). Vegetation installation data collection follow the Carolina Vegetation Survey-EEP Level 2 Protocol (Lee et al., 2008); however, vegetation data processing follows the NC DMS Vegetation Data Entry Tool and Vegetation Plot Data Table (NCDMS, 2020).

Section 4: REFERENCES

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Figures

Figure 1c

Figure 1b

Figure 1a

Figure 1d

Figure 1e

Reach 1

Reach 2

Reach 3

Reach 4a

Reach 4b

Banner Creek

UT1

UT2

Banner Farm Rd

Cams Path

Bobbie Memorial Dr

French Broad River

Shaw Creek

GWG1

GWG2

GWG3

GWG4

GWG5

GWG6

GWG7

GWG8

GWG9

GWG10

GWG11

GWG12

GWG13

GWG14

GWG15

GWG16

GWG17

GWG18

GWG19

GWG20

GWG21

GWG22

GWG23

CG1

CG2

CG3

- Conservation Easement
- Project Parcels
- Wetland Re-establishment
- Wetland Rehabilitation
- Wetland Creation
- Exiting Wetland - Not for Credit
- External Crossing
- Internal Crossing
- Powerline Easement
- <30' Buffer Width
- Stream Restoration
- Stream - Not For Credit
- Reach Break
- Gate
- Cross-Section (XS)
- Photo Point (PP)
- VP Origin
- Crest Gage (CG)
- Soil Temperature Gage (T)

Groundwater Gage (GWG) - MY2

- Criteria Met
- Criteria Not Met, #Days >= Reference Gage
- Criteria Not Met, #Days <Reference Gage
- Floodplain Pool - MY2

Permanent Vegetation Plot (VP) - MY2

- Criteria Met
- Criteria Not Met

Mobile Vegetation Plot (MP) - MY2

- Criteria Met
- Criteria Not Met

2019 Aerial Photography

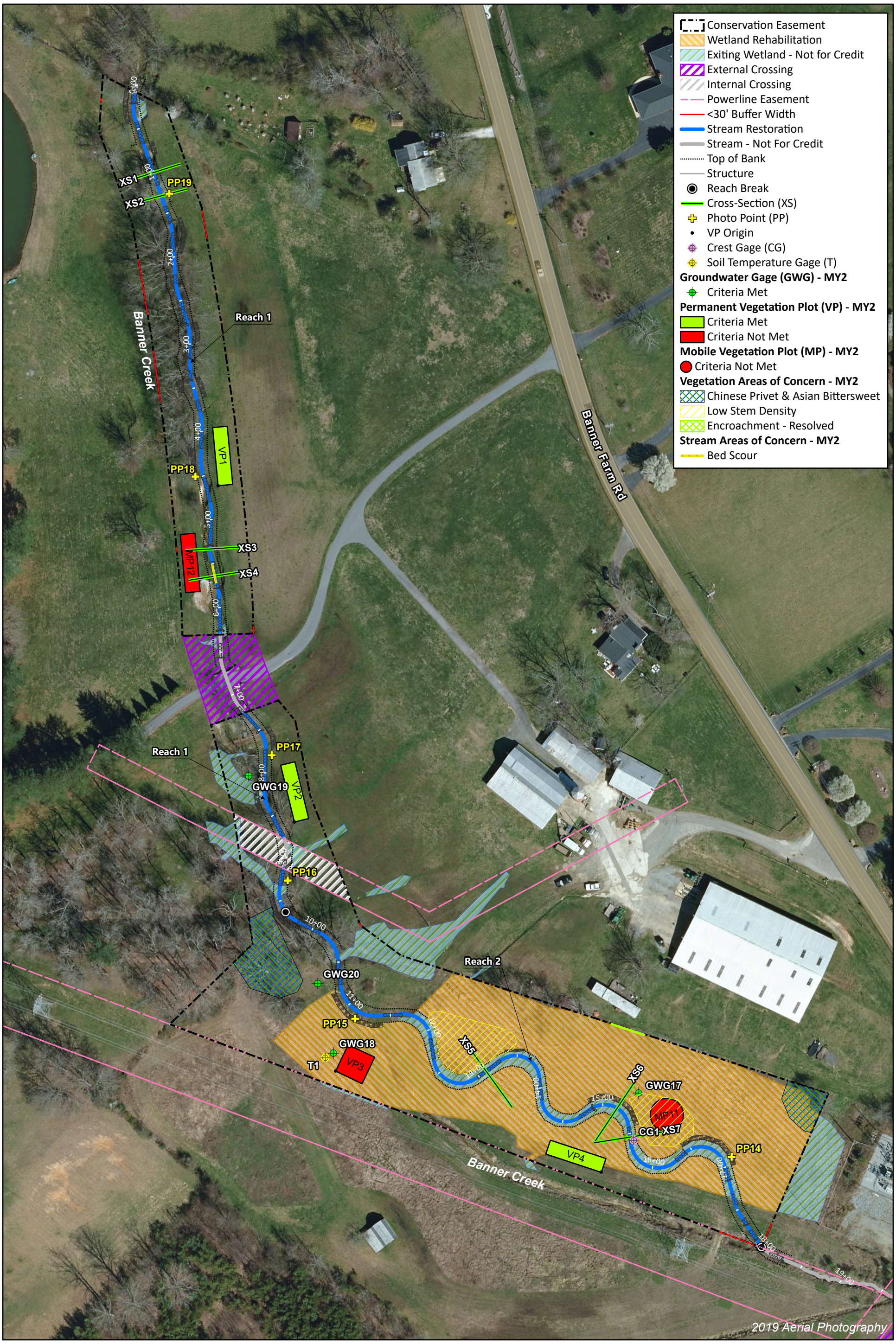
WILDLANDS ENGINEERING

Environmental Quality

0 300 600 Feet

Figure 1 Current Condition Plan View Map (Key)
Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Henderson County, NC



WILDLANDS ENGINEERING

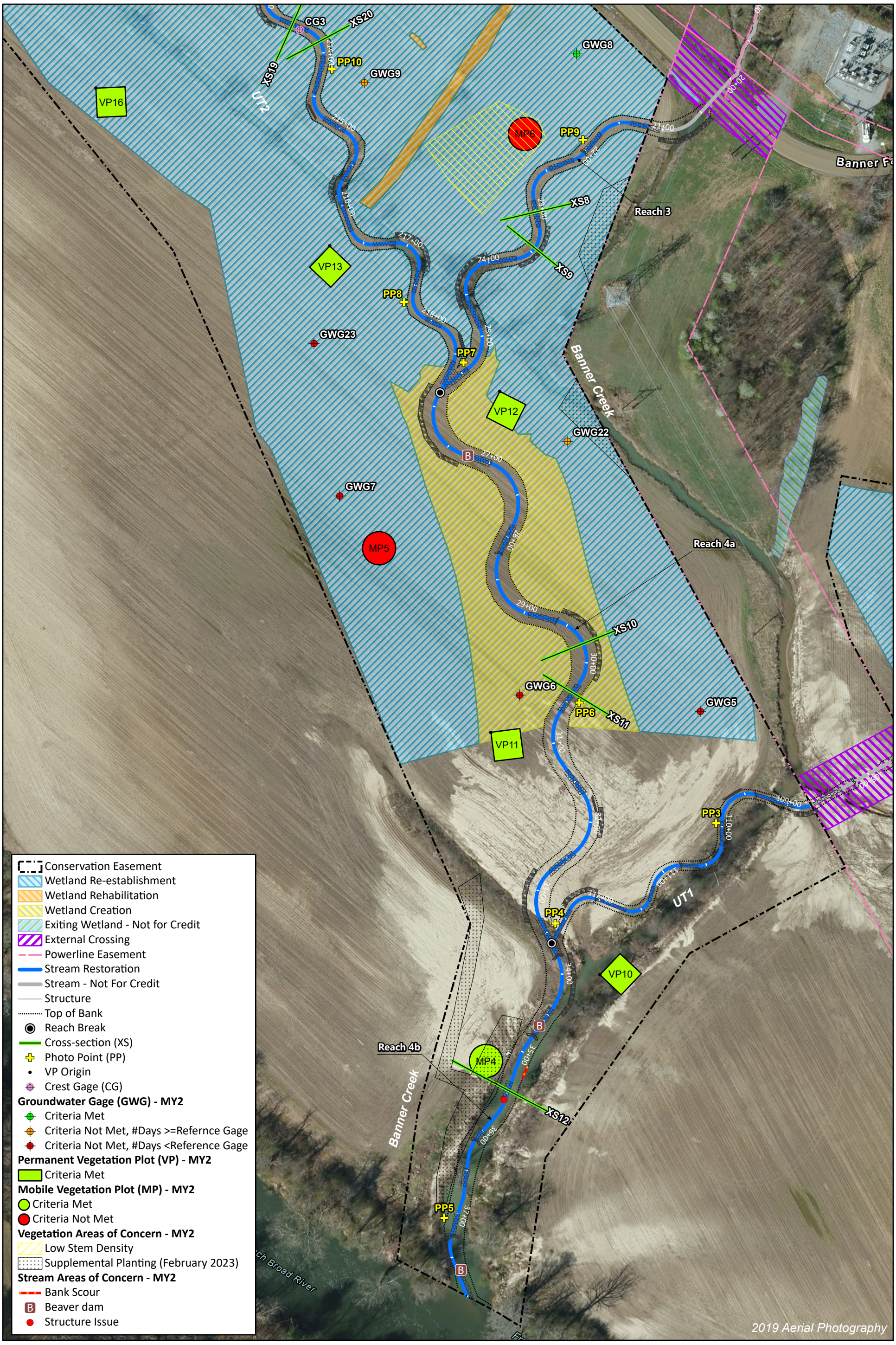
Environmental Quality

0 100 200 Feet

N

Figure 1a Current Condition Plan View Map
Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Henderson County, NC



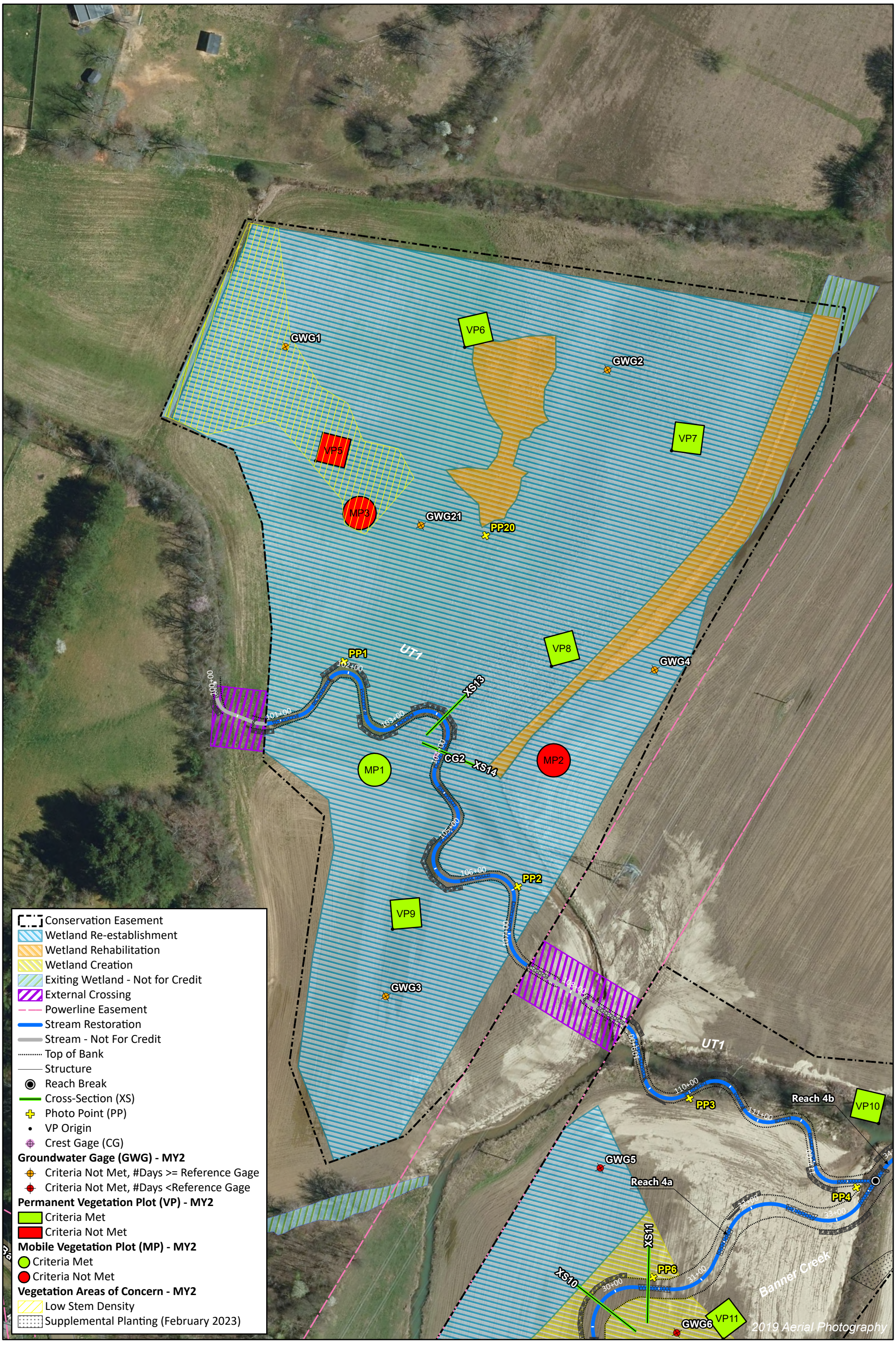
WILDLANDS ENGINEERING

Environmental Quality

0 100 200 Feet

Figure 1b Current Condition Plan View Map
Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Henderson County, NC



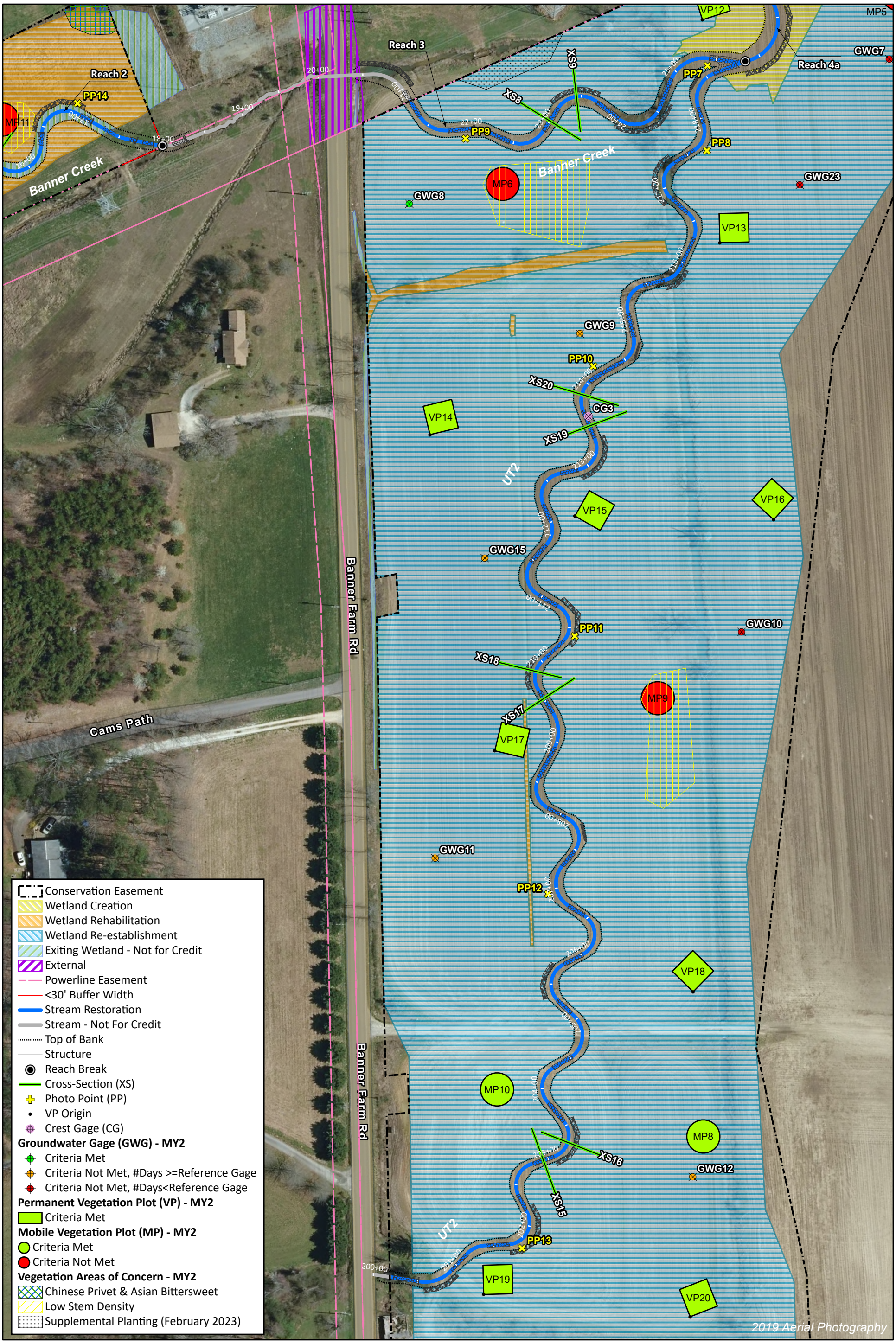
WILDLANDS ENGINEERING

Environmental Quality

0 100 200 Feet

Figure 1c Current Condition Plan View Map
Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Henderson County, NC



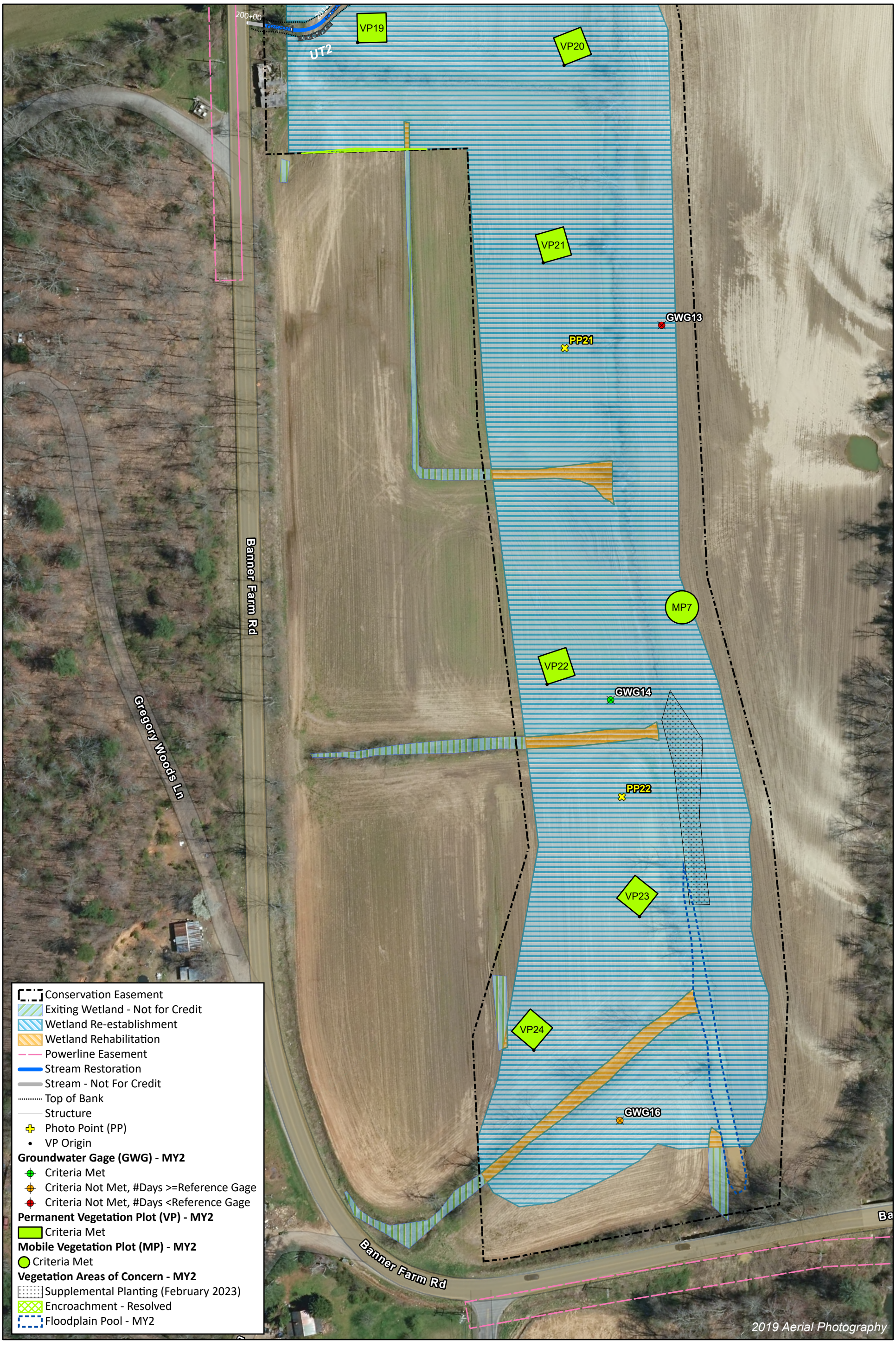
WILDLANDS ENGINEERING

Environmental Quality

0 100 200 Feet

Figure 1d Current Condition Plan View Map
Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Henderson County, NC



WILDLANDS ENGINEERING

Environmental Quality

0 100 200 Feet

Figure 1e Current Condition Plan View Map
Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Henderson County, NC

APPENDIX A. Visual Assessment Data

Table 4a-b. Visual Stream Morphology Stability Assessment Table

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Table 4a: Banner Creek Reach 1 Date Last Assessed: 11/02/2023

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	827
					Assessed Bank Length	1,654
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.	9	9		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	12	12		100%

Table 4b: Banner Creek Reach 2 Date Last Assessed: 11/02/2023

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	836
					Assessed Bank Length	1,672
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.	5	5		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	4	4		100%

Table 4c-d. Visual Stream Morphology Stability Assessment Table

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Table 4c: Banner Creek Reach 3 Date Last Assessed: 11/02/2023

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	467
					Assessed Bank Length	934
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.	1	1		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	2	2		100%

Table 4d: Banner Creek Reach 4a Date Last Assessed: 11/02/2023

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	780
					Assessed Bank Length	1,560
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.	2	2		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	5	5		100%

Table 4e-f. Visual Stream Morphology Stability Assessment Table

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Table 4e: Banner Creek Reach 4b Date Last Assessed: 11/02/2023

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	434
					Assessed Bank Length	868
Bank	**Surface Scour/ Bare Bank**	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour.			15	98%
	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:	**15**	**98%**
Structure	**Grade Control**	Grade control structures exhibiting maintenance of grade across the sill.	3	4		75%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	2	2		100%

Table 4f: UT1 Date Last Assessed: 11/02/2023

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	1,071
					Assessed Bank Length	2,142
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.	4	4		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	8	8		100%

Table 4g. Visual Stream Morphology Stability Assessment Table

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Table 4g: UT2 Date Last Assessed: 11/02/2023

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		1,879
				Assessed Bank Length		3,758
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.	1	1		100%
	Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	12	12		100%

Table 5. Vegetation Condition Assessment Table

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Planted Acreage **45.00** Date Last Assessed: 11/02/2023

Vegetation Category	Definitions	Mapping Threshold (ac)	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material.	0.10	0.00	0.0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on current MY stem count criteria.	0.10	1.31	2.9%
		Total	**1.31**	**2.9%**
Areas of Poor Growth Rates	Planted areas where average height is not meeting current MY Performance Standard.	0.10	0.00	0.0%
		Cumulative Total	**1.31**	**2.9%**

Easement Acreage **46.52** Date Last Assessed: 11/02/2023

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	0.14	0.3%
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
MY2

	
Photo Point 1 – UT1, view upstream *(03/08/2023)*	**Photo Point 1** – UT1, view downstream *(03/08/2023)*
	
Photo Point 2 – UT1, view upstream *(03/08/2023)*	**Photo Point 2** – UT1, view downstream *(03/08/2023)*
	
Photo Point 3 – UT1, view upstream *(03/08/2023)*	**Photo Point 3** – UT1, view downstream *(03/08/2023)*

Photo Point 4 – UT1, view upstream *(03/08/2023)*

Photo Point 4 – Banner Creek R4a, view upstream *(03/08/2023)*

Photo Point 4 – Banner Creek R4b, view downstream *(03/08/2023)*

Photo Point 5 – Banner Creek R4b, view upstream *(03/08/2023)*

Photo Point 5 – Banner Creek R4b, view downstream *(03/08/2023)*

Photo Point 6 – Banner Creek R4a, view upstream *(03/08/2023)*

Photo Point 6 – Banner Creek R4a, view downstream *(03/08/2023)*

Photo Point 7 – UT2, view upstream *(03/08/2023)*

Photo Point 7 – Banner Creek R3, view upstream *(03/08/2023)*

Photo Point 7 – Banner Creek R4a, view downstream *(03/08/2023)*

	
Photo Point 8 – UT2, view upstream *(03/08/2023)*	**Photo Point 8** – UT2, view downstream *(03/08/2023)*
	
Photo Point 9 – Banner Creek R3, view upstream *(03/08/2023)*	**Photo Point 9** – Banner Creek R3, view downstream *(03/08/2023)*
	
Photo Point 10 – UT2, view upstream *(03/08/2023)*	**Photo Point 10** – UT2, view downstream *(03/08/2023)*

	
Photo Point 11 – UT2, view upstream *(03/08/2023)*	**Photo Point 11** – UT2, view downstream *(03/08/2023)*
	
Photo Point 12 – UT2, view upstream *(03/08/2023)*	**Photo Point 12** – UT2, view downstream *(03/08/2023)*
	
Photo Point 13 – UT2, view upstream *(03/08/2023)*	**Photo Point 13** – UT2, view downstream *(03/08/2023)*

Photo Point 14 – Banner Creek R2, view upstream *(03/08/2023)*

Photo Point 14 – Banner Creek R2, view downstream *(03/08/2023)*

Photo Point 15 – Banner Creek R2, view upstream *(03/08/2023)*

Photo Point 15 – Banner Creek R2, view downstream *(03/08/2023)*

Photo Point 16 – Banner Creek R1, view upstream *(03/08/2023)*

Photo Point 16 – Banner Creek R1, view downstream *(03/08/2023)*

Photo Point 17 – Banner Creek R1, view upstream *(03/08/2023)*

Photo Point 17 – Banner Creek R1, view downstream *(03/08/2023)*

Photo Point 18 – Banner Creek R1, view upstream *(03/08/2023)*

Photo Point 18 – Banner Creek R1, view downstream *(03/08/2023)*

Photo Point 19 – Banner Creek R1, view upstream *(03/08/2023)*

Photo Point 19 – Banner Creek R1, view downstream *(03/08/2023)*

Wetland Photographs
MY2

	
Photo Point 20 – wetland rehabilitation/re-establishment area, view north *(03/08/2023)*	**Photo Point 20** – wetland rehabilitation/re-establishment area, view east *(03/08/2023)*
	
Photo Point 20 – wetland re-establishment area, view south *(03/08/2023)*	**Photo Point 20** – wetland re-establishment area, view west *(03/08/2023)*

	
Photo Point 21 – wetland re-establishment area, view north *(03/08/2023)*	**Photo Point 21** – wetland re-establishment area, view east *(03/08/2023)*
	
Photo Point 21 – wetland re-establishment area, view south *(03/08/2023)*	**Photo Point 21** – wetland re-establishment area, view west *(03/08/2023)*

Photo Point 22 –
wetland re-establishment area, view north *(03/08/2023)*

Photo Point 22 –
wetland re-establishment area, view east *(03/08/2023)*

Photo Point 22 –
wetland re-establishment area, view south *(03/08/2023)*

Photo Point 22 –
wetland re-establishment area, view west *(03/08/2023)*

Groundwater Gage Photographs
MY2

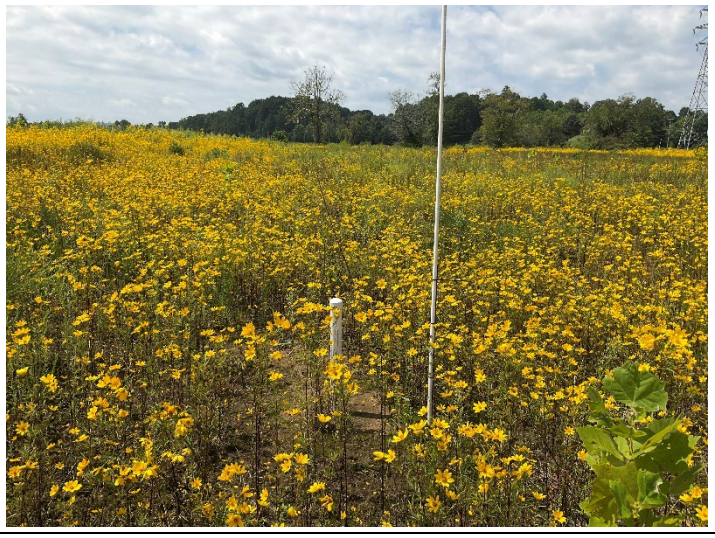
GWG 1 – *(08/31/2023)*

GWG 2 – *(08/31/2023)*

GWG 3 – *(08/31/2023)*

GWG 4 – *(08/31/2023)*

GWG 5 – *(08/31/2023)*



GWG 6 – *(08/31/2023)*

GWG 7 – *(08/31/2023)*

GWG 8 – *(11/02/2023)*

GWG 9 – *(08/31/2023)*

GWG 10 – *(08/31/2023)*

GWG 11 – *(08/31/2023)*

GWG 12 – *(08/31/2023)*

GWG 13 – *(08/31/2023)*

GWG 14 – *(08/31/2023)*

GWG 15 – *(08/31/2023)*

GWG 16 – *(08/31/2023)*

GWG 17 – *(11/02/2023)*

GWG 18 – *(11/02/2023)*

	
GWG 19 – *(11/02/2023)*	**GWG 20** – *(11/02/2023)*
	
GWG 21 – *(08/31/2023)*	**GWG 22** – *(08/31/2023)*
	
GWG 23 – *(08/31/2023)*	**Reference Gage** – *(11/02/2023)*

Crest Gage Photographs
MY2

CG 1 – *(04/26/2023)*

CG 2 – *(04/26/2023)*

CG 3 – *(04/26/2023)*

Culvert Crossing Photographs
MY2

	
Culvert Crossing – Upper UT1, view upstream *(03/08/2023)*	**Culvert Crossing** – Upper UT1, view downstream *(03/08/2023)*
	
Culvert Crossing – Lower UT1, view upstream *(03/08/2023)*	**Culvert Crossing** – Lower UT1, view downstream *(03/08/2023)*
	
Culvert Crossing – Banner Creek R1, view upstream *(03/08/2023)*	**Culvert Crossing** – Banner Creek R1, view downstream *(03/08/2023)*

Vegetation Photographs

MY2

Permanent Vegetation Plot 1 *(07/13/2023)*

Permanent Vegetation Plot 2 *(07/13/2023)*

Permanent Vegetation Plot 3 *(07/13/2023)*

Permanent Vegetation Plot 4 *(07/13/2023)*

Permanent Vegetation Plot 5 *(07/10/2023)*

Permanent Vegetation Plot 6 *(07/10/2023)*

Permanent Vegetation Plot 7 *(07/10/2023)*

Permanent Vegetation Plot 8 *(07/10/2023)*

Permanent Vegetation Plot 9 *(07/10/2023)*

Permanent Vegetation Plot 10 *(07/10/2023)*

Permanent Vegetation Plot 11 *(07/10/2023)*

Permanent Vegetation Plot 12 *(07/10/2023)*

Permanent Vegetation Plot 13 *(07/10/2023)*

Permanent Vegetation Plot 14 *(07/10/2023)*

Permanent Vegetation Plot 15 *(07/10/2023)*

Permanent Vegetation Plot 16 *(07/12/2023)*

Permanent Vegetation Plot 17 *(08/31/2023)*

Permanent Vegetation Plot 18 *(07/12/2023)*

Permanent Vegetation Plot 19 *(07/12/2023)*

Permanent Vegetation Plot 20 *(07/12/2023)*

Permanent Vegetation Plot 21 *(07/12/2023)*

Permanent Vegetation Plot 22 *(07/12/2023)*

Permanent Vegetation Plot 23 *(07/12/2023)*

Permanent Vegetation Plot 24 *(07/12/2023)*

Mobile Vegetation Plot 1 *(07/10/2023)*

Mobile Vegetation Plot 2 *(07/10/2023)*

Mobile Vegetation Plot 3 *(07/10/2023)*

Mobile Vegetation Plot 4 *(07/10/2023)*

Mobile Vegetation Plot 5 *(07/10/2023)*

Mobile Vegetation Plot 6 *(07/10/2023)*

Mobile Vegetation Plot 7 *(07/12/2023)*

Mobile Vegetation Plot 8 *(07/12/2023)*

Mobile Vegetation Plot 9 *(07/12/2023)*

Mobile Vegetation Plot 10 *(08/31/2023)*

Mobile Vegetation Plot 11 *(07/13/2023)*

Mobile Vegetation Plot 12 *(07/13/2023)*

Resolved Encroachment Photographs
MY2

	
Easement Encroachment – MY1, Banner Creek Reach 2 STA 15+00, Left floodplain boundary, Garden row crop overreach *(07/14/2022)*	**Resolved Encroachment – MY2,** Banner Creek Reach 2 STA 15+00, Left floodplain boundary, Added posts & garden outside CE *(11/02/2023)*
	
Easement Encroachment – MY1, UT2 STA 201+00, Right floodplain boundary, Slight mowing scalloping *(11/03/2022)*	**Resolved Encroachment – MY2,** UT2 STA 201+00, Right floodplain boundary, Horse tape added along boundary *(04/26/2023)*

Supplemental Photographs
MY2

Minor beaver dam – MY2, Banner Creek Reach 4a STA 26+75, view upstream *(11/02/2023)*

Minor beaver dam – MY2, Banner Creek Reach 4b STA 37+75 near FBR confluence, view upstream *(11/02/2023)*

Floodplain Pool – MY2, Southernmost portion of the site, photo taken across from VP23, view away from Banner Farm Road *(07/13/2023)*

Floodplain Pool – MY2, Southernmost portion of the site, photo taken across from VP23, view towards Banner Farm Road *(07/13/2023)*

APPENDIX B. Vegetation Plot Data

Table 6a. Vegetation Plot Data

Banner Farm Mitigation Site

DMS Project No. 100062

Monitoring Year 2 - 2023

Planted Acreage	45
Date of Initial Plant	2022-02-13
Date of Current Survey	2023-07-13
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	1	1					1	1			2	2
	Alnus serrulata	*hazel alder*	Tree	OBL												
	Amelanchier arborea	*common serviceberry*	Tree	FAC					1	1						
	Asimina triloba	*pawpaw*	Tree	FAC											1	1
	Betula nigra	*river birch*	Tree	FACW	2	2	3	3	2	2	2	2	1	1		
	Carpinus caroliniana	*American hornbeam*	Tree	FAC												
	Cornus florida	*flowering dogwood*	Tree	FACU												
	Diospyros virginiana	*common persimmon*	Tree	FAC	1	1	1	1								
	Fagus grandifolia	*American beech*	Tree	FACU			1	1								
	Fraxinus pennsylvanica	*green ash*	Tree	FACW	1	1	2	2								
	Hamamelis virginiana	*American witchhazel*	Tree	FACU												
	Ilex opaca	*American holly*	Tree	FACU												
	Liriodendron tulipifera	*tuliptree*	Tree	FACU			1	1								
	Nyssa sylvatica	*blackgum*	Tree	FAC							1	1			1	1
	Platanus occidentalis	*American sycamore*	Tree	FACW	1	1	2	2	2	2	1	1			2	2
	Quercus falcata	*southern red oak*	Tree	FACU	2	2	2	2	2	2						
	Quercus rubra	*northern red oak*	Tree	FACU	1	1										
	Salix nigra	*black willow*	Tree	OBL							3	3	3	3	3	3
	Sambucus canadensis	*American black elderberry*	Tree													
	Ulmus americana	*American elm*	Tree	FACW											1	1
Sum	Performance Standard				9	9	12	12	7	7	8	8	4	4	10	10
Mitigation Plan Performance Standard	Current Year Stem Count					9		12		7		8		4		10
	Stems/Acre					364		486		283		324		121		405
	Species Count					7		7		4		5		2		6
	Dominant Species Composition (%)					22		25		29		38		75		30
	Average Plot Height (ft.)					2		3		1		2		4		3
	% Invasives					0		0		0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					9		12		7		8		4		10
	Stems/Acre					364		486		283		324		121		405
	Species Count					7		7		4		5		2		6
	Dominant Species Composition (%)					22		25		29		38		75		30
	Average Plot Height (ft.)					2		3		1		2		4		3
	% 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
Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Planted Acreage	45
Date of Initial Plant	2022-02-13
Date of Current Survey	2023-07-13
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 10 F		Veg Plot 11 F		Veg Plot 12 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	Acer negundo	*boxelder*	Tree	FAC	2	2	1	1	1	1			2	2	1	1
	Alnus serrulata	*hazel alder*	Tree	OBL									2	2	1	1
	Amelanchier arborea	*common serviceberry*	Tree	FAC												
	Asimina triloba	*pawpaw*	Tree	FAC			1	1								
	Betula nigra	*river birch*	Tree	FACW			2	2	2	2	1	1	2	2	1	1
	Carpinus caroliniana	*American hornbeam*	Tree	FAC									1	1	1	1
	Cornus florida	*flowering dogwood*	Tree	FACU												
	Diospyros virginiana	*common persimmon*	Tree	FAC							1	1				
	Fagus grandifolia	*American beech*	Tree	FACU												
	Fraxinus pennsylvanica	*green ash*	Tree	FACW												
	Hamamelis virginiana	*American witchhazel*	Tree	FACU							1	1				
	Ilex opaca	*American holly*	Tree	FACU									1	1	1	1
	Liriodendron tulipifera	*tuliptree*	Tree	FACU												
	Nyssa sylvatica	*blackgum*	Tree	FAC	1	1										
	Platanus occidentalis	*American sycamore*	Tree	FACW	3	3	3	3	3	3	2	2	2	2	4	4
	Quercus falcata	*southern red oak*	Tree	FACU							1	1				
	Quercus rubra	*northern red oak*	Tree	FACU							2	2				
	Salix nigra	*black willow*	Tree	OBL	2	2	2	2	1	1			3	3	3	3
	Sambucus canadensis	*American black elderberry*	Tree												1	1
	Ulmus americana	*American elm*	Tree	FACW	1	1			3	3			1	1	2	2
Sum	Performance Standard				9	9	9	9	10	10	8	8	14	14	15	15
Mitigation Plan Performance Standard	Current Year Stem Count					9		9		10		8		14		15
	Stems/Acre					364		364		405		324		567		607
	Species Count					5		5		5		6		8		9
	Dominant Species Composition (%)					33		33		30		25		21		27
	Average Plot Height (ft.)					3		2		4		2		3		3
	% Invasives					0		0		0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					9		9		10		8		14		15
	Stems/Acre					364		364		405		324		567		607
	Species Count					5		5		5		6		8		9
	Dominant Species Composition (%)					33		33		30		25		21		27
	Average Plot Height (ft.)					3		2		4		2		3		3
	% 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 6c. Vegetation Plot Data
Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Planted Acreage	45
Date of Initial Plant	2022-02-13
Date of Current Survey	2023-07-13
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 13 F		Veg Plot 14 F		Veg Plot 15 F		Veg Plot 16 F		Veg Plot 17 F		Veg Plot 18 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	Acer negundo	*boxelder*	Tree	FAC	5	5	2	2	2	2	3	3	3	3	2	2
	Alnus serrulata	*hazel alder*	Tree	OBL												
	Amelanchier arborea	*common serviceberry*	Tree	FAC												
	Asimina triloba	*pawpaw*	Tree	FAC												
	Betula nigra	*river birch*	Tree	FACW	1	1	2	2	3	3	3	3	1	1	3	3
	Carpinus caroliniana	*American hornbeam*	Tree	FAC												
	Cornus florida	*flowering dogwood*	Tree	FACU												
	Diospyros virginiana	*common persimmon*	Tree	FAC												
	Fagus grandifolia	*American beech*	Tree	FACU												
	Fraxinus pennsylvanica	*green ash*	Tree	FACW												
	Hamamelis virginiana	*American witchhazel*	Tree	FACU												
	Ilex opaca	*American holly*	Tree	FACU												
	Liriodendron tulipifera	*tuliptree*	Tree	FACU												
	Nyssa sylvatica	*blackgum*	Tree	FAC	1	1					1	1				
	Platanus occidentalis	*American sycamore*	Tree	FACW	3	3	1	1	4	4	5	5	2	2	4	4
	Quercus falcata	*southern red oak*	Tree	FACU												
	Quercus rubra	*northern red oak*	Tree	FACU												
	Salix nigra	*black willow*	Tree	OBL	1	1	4	4	1	1	1	1	2	2	5	5
	Sambucus canadensis	*American black elderberry*	Tree													
	Ulmus americana	*American elm*	Tree	FACW	2	2	1	1	2	2	2	2	1	1	1	1
Sum	Performance Standard				13	13	10	10	12	12	15	15	9	9	15	15
Mitigation Plan Performance Standard	Current Year Stem Count					13		10		12		15		9		15
	Stems/Acre					526		405		486		607		364		607
	Species Count					6		5		5		6		5		5
	Dominant Species Composition (%)					38		40		33		33		33		33
	Average Plot Height (ft.)					3		3		3		3		3		3
	% Invasives					0		0		0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					13		10		12		15		9		15
	Stems/Acre					526		405		486		607		364		607
	Species Count					6		5		5		6		5		5
	Dominant Species Composition (%)					38		40		33		33		33		33
	Average Plot Height (ft.)					3		3		3		3		3		3
	% 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 6d. Vegetation Plot Data
Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Planted Acreage	45
Date of Initial Plant	2022-02-13
Date of Current Survey	2023-07-13
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 19 F		Veg Plot 20 F		Veg Plot 21 F		Veg Plot 22 F		Veg Plot 23 F		Veg Plot 24 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	Acer negundo	*boxelder*	Tree	FAC	1	1			1	1	1	1	1	1	1	1
	Alnus serrulata	*hazel alder*	Tree	OBL	1	1							2	2		
	Amelanchier arborea	*common serviceberry*	Tree	FAC												
	Asimina triloba	*pawpaw*	Tree	FAC												
	Betula nigra	*river birch*	Tree	FACW	2	2	1	1	1	1	3	3	4	4	2	2
	Carpinus caroliniana	*American hornbeam*	Tree	FAC	1	1										
	Cornus florida	*flowering dogwood*	Tree	FACU												
	Diospyros virginiana	*common persimmon*	Tree	FAC												
	Fagus grandifolia	*American beech*	Tree	FACU												
	Fraxinus pennsylvanica	*green ash*	Tree	FACW												
	Hamamelis virginiana	*American witchhazel*	Tree	FACU												
	Ilex opaca	*American holly*	Tree	FACU												
	Liriodendron tulipifera	*tuliptree*	Tree	FACU												
	Nyssa sylvatica	*blackgum*	Tree	FAC	1	1			2	2	2	2	1	1		
	Platanus occidentalis	*American sycamore*	Tree	FACW	1	1	3	3	2	2			2	2	3	3
	Quercus falcata	*southern red oak*	Tree	FACU												
	Quercus rubra	*northern red oak*	Tree	FACU												
	Salix nigra	*black willow*	Tree	OBL	4	4	3	3	2	2	5	5			2	2
	Sambucus canadensis	*American black elderberry*	Tree													
	Ulmus americana	*American elm*	Tree	FACW			2	2	1	1	2	2			1	1
Sum	Performance Standard				11	11	9	9	9	9	13	13	10	10	9	9
Mitigation Plan Performance Standard	Current Year Stem Count					11		9		9		13		10		9
	Stems/Acre					445		364		364		526		405		364
	Species Count					7		4		6		5		5		5
	Dominant Species Composition (%)					36		33		22		38		40		33
	Average Plot Height (ft.)					2		3		2		4		3		3
	% Invasives					0		0		0		0		0		0
Post Mitigation Plan Performance Standard	Current Year Stem Count					11		9		9		13		10		9
	Stems/Acre					445		364		364		526		405		364
	Species Count					7		4		6		5		5		5
	Dominant Species Composition (%)					36		33		22		38		40		33
	Average Plot Height (ft.)					2		3		2		4		3		3
	% 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 6e. Vegetation Plot Data
Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Planted Acreage	45
Date of Initial Plant	2022-02-13
Date of Current Survey	2023-07-13
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 1 R Total	Veg Plot 2 R Total	Veg Plot 3 R Total	Veg Plot 4 R Total	Veg Plot 5 R Total	Veg Plot 6 R Total	Veg Plot 7 R Total	Veg Plot 8 R Total	Veg Plot 9 R Total	Veg Plot 10 R Total	Veg Plot 11 R Total	Veg Plot 12 R Total
Species Included in Approved Mitigation Plan	Acer negundo	*boxelder*	Tree	FAC	3		1		1		2			2	1	
	Alnus serrulata	*hazel alder*	Tree	OBL					1						1	1
	Amelanchier arborea	*common serviceberry*	Tree	FAC												
	Asimina triloba	*pawpaw*	Tree	FAC												
	Betula nigra	*river birch*	Tree	FACW	2			3			2	1				1
	Carpinus caroliniana	*American hornbeam*	Tree	FAC												
	Cornus florida	*flowering dogwood*	Tree	FACU		1										
	Diospyros virginiana	*common persimmon*	Tree	FAC												
	Fagus grandifolia	*American beech*	Tree	FACU												
	Fraxinus pennsylvanica	*green ash*	Tree	FACW												
	Hamamelis virginiana	*American witchhazel*	Tree	FACU												
	Ilex opaca	*American holly*	Tree	FACU										1		
	Liriodendron tulipifera	*tuliptree*	Tree	FACU				1								
	Nyssa sylvatica	*blackgum*	Tree	FAC	1										1	
	Platanus occidentalis	*American sycamore*	Tree	FACW	2		1	3	2	4	4	8		2	1	1
	Quercus falcata	*southern red oak*	Tree	FACU												1
	Quercus rubra	*northern red oak*	Tree	FACU												
	Salix nigra	*black willow*	Tree	OBL	1	1	1		2		4	7	5	3	3	
	Sambucus canadensis	*American black elderberry*	Tree			1										
	Ulmus americana	*American elm*	Tree	FACW	1	1	1	4	1		1			2		
Sum	Performance Standard				10	4	4	11	7	4	13	16	5	10	7	4
Mitigation Plan Performance Standard	Current Year Stem Count				10	4	4	11	7	4	13	16	5	10	7	4
	Stems/Acre				405	162	162	445	283	81	526	648	81	405	283	162
	Species Count				6	4	4	4	5	1	5	3	1	5	5	4
	Dominant Species Composition (%)				30	25	25	36	29	100	31	50	100	30	43	25
	Average Plot Height (ft.)				3	4	3	3	5	3	3	4	3	2	3	2
	% Invasives				0	0	0	0	0	0	0	0	0	0	0	0
Post Mitigation Plan Performance Standard	Current Year Stem Count				10	4	4	11	7	4	13	16	5	10	7	4
	Stems/Acre				405	162	162	445	283	81	526	648	81	405	283	162
	Species Count				6	4	4	4	5	1	5	3	1	5	5	4
	Dominant Species Composition (%)				30	25	25	36	29	100	31	50	100	30	43	25
	Average Plot Height (ft.)				3	4	3	3	5	3	3	4	3	2	3	2
	% Invasives				0	0	0	0	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

Banner Farm Mitigation Site

DMS Project No. 100062

Monitoring Year 2 - 2023

	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	364	2	7	0	486	3	7	0	283	1	4	0
Monitoring Year 1	405	2	7	0	486	2	7	0	364	2	6	0
Monitoring Year 0	648	2	11	0	567	2	8	0	526	2	9	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	324	2	5	0	121	4	2	0	405	3	6	0
Monitoring Year 1	445	2	7	0	162	3	3	0	405	3	6	0
Monitoring Year 0	567	3	8	0	567	3	8	0	607	3	9	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	364	3	5	0	364	2	5	0	405	4	5	0
Monitoring Year 1	486	2	6	0	364	2	5	0	445	3	6	0
Monitoring Year 0	648	3	8	0	607	3	9	0	567	2	7	0
	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	324	2	6	0	567	3	8	0	607	3	9	0
Monitoring Year 1	364	2	6	0	567	3	8	0	607	3	9	0
Monitoring Year 0	607	2	10	0	607	2	9	0	607	3	9	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.

Table 7b. Vegetation Performance Standards Summary Table

Banner Farm Mitigation Site

DMS Project No. 100062

Monitoring Year 2 - 2023

	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	526	3	6	0	405	3	5	0	486	3	5	0
Monitoring Year 1	526	3	6	0	486	3	7	0	567	2	6	0
Monitoring Year 0	567	2	6	0	567	3	9	0	607	2	6	0
	Veg Plot 16 F				Veg Plot 17 F				Veg Plot 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	607	3	6	0	364	3	5	0	607	3	5	0
Monitoring Year 1	607	3	7	0	486	3	6	0	648	3	6	0
Monitoring Year 0	648	2	7	0	567	3	7	0	648	3	6	0
	Veg Plot 19 F				Veg Plot 20 F				Veg Plot 21 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	445	2	7	0	364	3	4	0	364	2	6	0
Monitoring Year 1	445	2	7	0	405	3	5	0	445	3	7	0
Monitoring Year 0	486	3	7	0	648	2	6	0	648	3	7	0
	Veg Plot 22 F				Veg Plot 23 F				Veg Plot 24 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	526	4	5	0	405	3	5	0	364	3	5	0
Monitoring Year 1	567	3	5	0	445	2	5	0	526	2	8	0
Monitoring Year 0	607	3	5	0	648	2	7	0	567	2	8	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.

Table 7c. Vegetation Performance Standards Summary Table

Banner Farm Mitigation Site

DMS Project No. 100062

Monitoring Year 2 - 2023

	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	405	3	6	0	162	4	4	0	162	3	4	0
Monitoring Year 1	526	4	5	0	324	3	4	0	283	4	3	0
Monitoring Year 0	405	3	6	0	486	2	7	0	405	3	6	0
	Veg Plot Group 4 R				Veg Plot Group 5 R				Veg Plot Group 6 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	445	3	4	0	283	5	5	0	81	3	1	0
Monitoring Year 1	445	2	5	0	81	3	2	0	364	3	4	0
Monitoring Year 0	486	2	8	0	445	2	5	0	526	2	6	0
	Veg Plot Group 7 R				Veg Plot Group 8 R				Veg Plot Group 9 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	526	3	5	0	648	4	3	0	81	3	1	0
Monitoring Year 1	202	2	5	0	445	3	4	8	364	2	6	0
Monitoring Year 0	445	2	6	0	405	2	7	0	405	2	5	0
	Veg Plot Group 10 R				Veg Plot Group 11 R				Veg Plot Group 12 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	405	2	5	0	283	3	5	0	162	2	4	0
Monitoring Year 1	405	3	5	0	567	1	8	0	445	2	6	0
Monitoring Year 0	486	2	9	0	526	2	7	0	850	2	12	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.

APPENDIX C. Stream Geomorphology Data

Table 8a. Baseline Stream Data Summary

Banner Farm Mitigation Site

DMS Project No. 100062

Monitoring Year 2 - 2023

	PRE-EXISTING CONDITIONS			DESIGN		MONITORING BASELINE (MY0)		
Parameter	**Banner Creek R1**							
Riffle Only	**Min**	**Max**	**n**	**Min**	**Max**	**Min**	**Max**	**n**
Bankfull Width (ft)	9.8		1	13.5		12.8	14.0	2
Floodprone Width (ft)	25		1	30	68	61	62	2
Bankfull Mean Depth	1.2		1	1.0		1.1	1.2	2
Bankfull Max Depth	1.7		1	1.7		1.8	2.0	2
Bankfull Cross Sectional Area (ft^2)	12.0		1	14.0		15.9	15.9	2
Width/Depth Ratio	8.2		1	13.0		10.2	12.3	2
Entrenchment Ratio	2.5		1	2.2	5.0	4.4	4.7	2
Bank Height Ratio	2.2		1	1.0	1.1	1.0	1.0	2
Max part size (mm) mobilized at bankfull	-			33		-		
Rosgen Classification	C4			C4		C4		
Bankfull Discharge (cfs)	40.5		1	40.0	43.0	52.3	55.2	2
Sinuosity	1.08			1.20		1.20		
Water Surface/Channel Slope $(ft/ft)^2$	0.006			0.002		0.005		
Other	-			-		-		
Parameter	**Banner Creek R2**							
Riffle Only	**Min**	**Max**	**n**	**Min**	**Max**	**Min**	**Max**	**n**
Bankfull Width (ft)	10.4		1	13.5		10.2	13.3	2
Floodprone Width (ft)	58		1	30	68	81	86	2
Bankfull Mean Depth	1.1		1	1.0		0.9	1.1	2
Bankfull Max Depth	2.3		1	1.2	1.7	1.4	1.9	2
Bankfull Cross Sectional Area (ft^2)	11.6		1	14.0		9.6	14.6	2
Width/Depth Ratio	9.3		1	13.0		10.9	12.0	2
Entrenchment Ratio	14.4		1	2.2	5.0	6.5	7.9	2
Bank Height Ratio	1.4		1	1.0	1.1	1.0	1.0	2
Max part size (mm) mobilized at bankfull	-			33		-		
Rosgen Classification	C5/4			C4		C4		
Bankfull Discharge (cfs)	45.7		1	40.0	43.0	18.7	32.1	2
Sinuosity	1.01			1.20		1.20		
Water Surface/Channel Slope $(ft/ft)^2$	0.007			0.002		0.003		
Other	-			-		-		

Table 8b. Baseline Stream Data Summary

Banner Farm Mitigation Site

DMS Project No. 100062

Monitoring Year 2 - 2023

	PRE-EXISTING CONDITIONS			DESIGN		MONITORING BASELINE (MY0)		
Parameter	**Banner Creek R3**							
Riffle Only	**Min**	**Max**	**n**	**Min**	**Max**	**Min**	**Max**	**n**
Bankfull Width (ft)	7.4		1	14.8		14.9		1
Floodprone Width (ft)	31		1	33	74	88		1
Bankfull Mean Depth	1.6		1	1.0		1.4		1
Bankfull Max Depth	2.1		1	1.7		2.2		1
Bankfull Cross Sectional Area (ft^2)	11.9		1	17.3		20.6		1
Width/Depth Ratio	4.6		1	13.0		10.7		1
Entrenchment Ratio	4.2		1	2.2	5.0	5.9		1
Bank Height Ratio	1.7		1	1.0	1.1	1.0		1
Max part size (mm) mobilized at bankfull	-			33		-		
Rosgen Classification	C4			C4		C4		
Bankfull Discharge (cfs)	42.5		1	44.0		44.2		1
Sinuosity	1.00			1.30		1.30		
Water Surface/Channel Slope $(ft/ft)^2$	0.009			0.002		0.002		
Other	-			-		-		
Parameter	**Banner Creek R4a**							
Riffle Only	**Min**	**Max**	**n**	**Min**	**Max**	**Min**	**Max**	**n**
Bankfull Width (ft)	19.4		1	19.8		20.0		1
Floodprone Width (ft)	23		1	44	99	94		1
Bankfull Mean Depth	1.7		1	1.5		1.4		1
Bankfull Max Depth	2.6		1	2.5		2.5		1
Bankfull Cross Sectional Area (ft^2)	32.4		1	30.3		28.2		1
Width/Depth Ratio	11.4		1	13.0		14.2		1
Entrenchment Ratio	1.2		1	2.2	5.0	4.7		1
Bank Height Ratio	2.1		1	1.0		1.0		1
Max part size (mm) mobilized at bankfull	-			44		-		
Rosgen Classification	C4			C5/4		C5/4		
Bankfull Discharge (cfs)	57.5		1	60.0		60.1		1
Sinuosity	1.02			1.20		1.20		
Water Surface/Channel Slope $(ft/ft)^2$	0.001			0.001		0.002		
Other	-			-		-		

Table 8c. Baseline Stream Data Summary

Banner Farm Mitigation Site

DMS Project No. 100062

Monitoring Year 2 - 2023

	PRE-EXISTING CONDITIONS			DESIGN		MONITORING BASELINE (MY0)		
Parameter	**Banner Creek Reach 4b**							
Riffle Only	**Min**	**Max**	**n**	**Min**	**Max**	**Min**	**Max**	**n**
Bankfull Width (ft)	19.4		1	20.8		22.4		1
Floodprone Width (ft)	23		1	46	104	114		1
Bankfull Mean Depth	1.7		1	1.6		1.6		1
Bankfull Max Depth	2.6		1	1.9	2.7	2.7		1
Bankfull Cross Sectional Area (ft^2)	32.4		1	32.7		35.5		1
Width/Depth Ratio	11.4		1	13.0		14.2		1
Entrenchment Ratio	1.2		1	2.2	5.0	5.1		1
Bank Height Ratio	2.1		1	1.0		1.0		1
Max part size (mm) mobilized at bankfull	-			45		-		
Rosgen Classification	C4			C5/4		C5/4		
Bankfull Discharge (cfs)	57.5		1	70.0		145.3		1
Sinuosity	1.02			1.20		1.20		
Water Surface/Channel Slope $(ft/ft)^2$	0.001			0.002		0.005		
Other	-			-		-		
Parameter	**UT1**							
Riffle Only	**Min**	**Max**	**n**	**Min**	**Max**	**Min**	**Max**	**n**
Bankfull Width (ft)	5.2	10.0	1	9.0		9.2		1
Floodprone Width (ft)	15	24	1	20	72	66		1
Bankfull Mean Depth	0.7	0.8	1	0.9		1.0		1
Bankfull Max Depth	1.4	1.7	1	1.5		1.6		1
Bankfull Cross Sectional Area (ft^2)	3.6	7.8	1	8.4		9.6		1
Width/Depth Ratio	7.5	12.9	1	10.0		8.9		1
Entrenchment Ratio	2.4	2.9	1	2.2	8.0	7.2		1
Bank Height Ratio	2.0	2.1	1	1.0		1.0		1
Max part size (mm) mobilized at bankfull	-			30		-		
Rosgen Classification	E/C5			E5		E5		
Bankfull Discharge (cfs)	5.0	8.0	1	14.0		23.5		1
Sinuosity	1.10			1.30		1.30		
Water Surface/Channel Slope $(ft/ft)^2$	0.003			0.002		0.004		
Other	-			-		-		

Table 8d. Baseline Stream Data Summary

Banner Farm Mitigation Site

DMS Project No. 100062

Monitoring Year 2 - 2023

	PRE-EXISTING CONDITIONS			DESIGN		MONITORING BASELINE (MY0)		
Parameter	**UT2**							
Riffle Only	**Min**	**Max**	**n**	**Min**	**Max**	**Min**	**Max**	**n**
Bankfull Width (ft)	4.6		1	12.0		11.0	12.0	3
Floodprone Width (ft)	16		1	26	60	75	82	3
Bankfull Mean Depth	0.9		1	1.1		1.1	1.4	3
Bankfull Max Depth	1.2		1	1.7		1.6	2.0	3
Bankfull Cross Sectional Area (ft^2)	4.1		1	12.8		11.9	15.4	3
Width/Depth Ratio	5.1		1	11.0		7.8	10.5	3
Entrenchment Ratio	3.5		1	2.2	5.0	6.2	7.5	3
Bank Height Ratio	1.4		1	1.0		1.0	1.0	3
Max part size (mm) mobilized at bankfull	-			33		-		
Rosgen Classification	E/C5			C4		C4		
Bankfull Discharge (cfs)	10.0	13.0	1	25.0		14.8	22.5	3
Sinuosity	1.28			1.30		1.30		
Water Surface/Channel Slope $(ft/ft)^2$	0.005			0.002		0.001		
Other	-			-		-		

Table 9a. Cross-Section Morphology Monitoring Summary

Banner Farm Mitigation Site

DMS Project No. 100062

Monitoring Year 2 - 2023

	Banner Creek Reach 1						Banner Creek Reach 1						Banner Creek Reach 1					
	Cross-Section 1 (Riffle)						Cross-Section 2 (Pool)						Cross-Section 3 (Pool)					
	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	2063.92	2064.05	2063.99				-	-	-				-	-	-			
Bank Height Ratio - Based on AB Bankfull[1] Area	1.0	0.9	0.9				-	-	-				-	-	-			
Thalweg Elevation	2062.09	2062.15	2062.11				2060.14	2060.37	2060.16				2059.01	2058.02	2058.23			
LTOB[2] Elevation	2063.92	2063.92	2063.85				2063.62	2063.68	2063.52				2062.56	2062.53	2062.58			
LTOB[2] Max Depth (ft)	1.8	1.8	1.7				3.5	3.3	3.4				3.5	4.5	4.3			
LTOB[2] Cross Sectional Area (ft^2)	15.9	14.1	13.9				31.0	29.0	28.2				26.6	38.7	38.8			
	Banner Creek Reach 1						Banner Creek Reach 2						Banner Creek Reach 2					
	Cross-Section 4 (Riffle)						Cross-Section 5 (Riffle)						Cross-Section 6 (Pool)					
	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	2062.07	2061.52	2061.46				2058.64	2058.82	2058.77				-	-	-			
Bank Height Ratio - Based on AB Bankfull[1] Area	1.0	1.2	1.23				1.0	0.9	0.9				-	-	-			
Thalweg Elevation	2060.08	2058.45	2058.76				2056.76	2056.89	2056.86				2054.66	2054.87	2054.94			
LTOB[2] Elevation	2062.07	2062.01	2062.09				2058.64	2058.64	2058.67				2057.76	2057.99	2057.82			
LTOB[2] Max Depth (ft)	2.0	3.6	3.3				1.9	1.8	1.8				3.1	3.1	2.9			
LTOB[2] Cross Sectional Area (ft^2)	15.9	21.6	23.3				14.6	12.4	13.2				26.5	25.7	22.0			
	Banner Creek Reach 2						Banner Creek Reach 3						Banner Creek Reach 3					
	Cross-Section 7 (Riffle)						Cross-Section 8 (Riffle)						Cross-Section 9 (Pool)					
	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	2057.92	2058.00	2057.95				2055.76	2055.85	2055.81				-	-	-			
Bank Height Ratio - Based on AB Bankfull[1] Area	1.0	1.0	1.0				1.0	1.0	1.0				-	-	-			
Thalweg Elevation	2056.49	2056.57	2056.49				2053.52	2053.57	2053.55				2052.03	2052.21	2052.04			
LTOB[2] Elevation	2057.92	2058.02	2057.97				2055.76	2055.83	2055.84				2055.55	2055.66	2055.55			
LTOB[2] Max Depth (ft)	1.4	1.5	1.5				2.2	2.3	2.3				3.5	3.5	3.5			
LTOB[2] Cross Sectional Area (ft^2)	9.6	9.8	9.9				20.6	20.2	21.1				26.2	25.0	25.0			

[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.

Table 9b. Cross-Section Morphology Monitoring Summary

Banner Farm Mitigation Site

DMS Project No. 100062

Monitoring Year 2 - 2023

	Banner Creek Reach 4a						Banner Creek Reach 4a						Banner Creek Reach 4b					
	Cross-Section 10 (Pool)						Cross-Section 11 (Riffle)						Cross-Section 12 (Riffle)[3]					
	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	-	-	-				2054.69	2054.76	2054.72				2053.69	2052.03	2052.15			
Bank Height Ratio - Based on AB Bankfull[1] Area	-	-	-				1.0	1.0	1.0				1.0	1.4	1.5			
Thalweg Elevation	2050.36	2051.66	2051.76				2052.14	2052.05	2052.13				2050.95	2048.69	2048.91			
LTOB[2] Elevation	2054.68	2054.74	2054.70				2054.69	2054.65	2054.62				2053.69	2053.48	2053.75			
LTOB[2] Max Depth (ft)	4.3	3.1	2.9				2.5	2.6	2.5				2.7	4.8	4.8			
LTOB[2] Cross Sectional Area (ft^2)	68.4	51.2	49.7				28.2	26.0	26.0				35.5	59.4	63.4			
	UT1						UT1						UT2					
	Cross-Section 13 (Pool)						Cross-Section 14 (Riffle)						Cross-Section 15 (Riffle)					
	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	-	-	-				2056.54	2056.63	2056.58				2057.14	2057.29	2057.34			
Bank Height Ratio - Based on AB Bankfull[1] Area	-	-	-				1.0	0.9	1.0				1.0	1.0	0.94			
Thalweg Elevation	2053.81	2053.23	2053.73				2054.96	2055.14	2055.02				2055.16	2055.28	2055.35			
LTOB[2] Elevation	2056.51	2056.50	2056.45				2056.54	2056.54	2056.51				2057.14	2057.20	2057.22			
LTOB[2] Max Depth (ft)	2.7	3.3	2.7				1.6	1.4	1.5				2.0	1.9	1.9			
LTOB[2] Cross Sectional Area (ft^2)	16.8	17.5	16.0				9.6	8.7	8.9				15.4	14.3	14.0			
	UT2						UT2						UT2					
	Cross-Section 16 (Pool)						Cross-Section 17 (Riffle)						Cross-Section 18 (Pool)					
	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	-	-	-				2056.27	2056.32	2056.33				-	-	-			
Bank Height Ratio - Based on AB Bankfull[1] Area	-	-	-				1.0	1.0	1.0				-	-	-			
Thalweg Elevation	2053.10	2053.38	2053.62				2054.31	2054.45	2054.40				2052.20	2052.45	2052.42			
LTOB[2] Elevation	2056.67	2056.70	2056.66				2056.27	2056.29	2056.26				2055.93	2056.00	2055.96			
LTOB[2] Max Depth (ft)	3.6	3.3	3.0				2.0	1.8	1.9				3.7	3.6	3.5			
LTOB[2] Cross Sectional Area (ft^2)	28.4	24.0	22.1				14.1	13.7	13.2				24.5	25.7	26.0			

[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.

[3]Cross-section 12 is located in the MY1 repair area and was not rebuilt to the original design or as-built condition.

Table 9c. Cross-Section Morphology Monitoring Summary

Banner Farm Mitigation Site

DMS Project No. 100062

Monitoring Year 2 - 2023

	UT2						UT2					
	Cross-Section 19 (Riffle)						Cross-Section 20 (Pool)					
	MY0	MY1	MY2	MY3	MY5	MY7	MY0	MY1	MY2	MY3	MY5	MY7
Bankfull Elevation (ft) - Based on AB-Bankfull[1] Area	2055.87	2055.94	2055.90				-	-	-			
Bank Height Ratio - Based on AB Bankfull[1] Area	1.0	1.0	1.0				-	-	-			
Thalweg Elevation	2054.24	2054.32	2054.29				2052.10	2052.25	2052.11			
LTOB[2] Elevation	2055.87	2055.90	2055.89				2055.80	2055.80	2055.84			
LTOB[2] Max Depth (ft)	1.6	1.6	1.6				3.7	3.6	3.7			
LTOB[2] Cross Sectional Area (ft^2)	11.9	11.4	11.8				33.3	32.4	32.8			

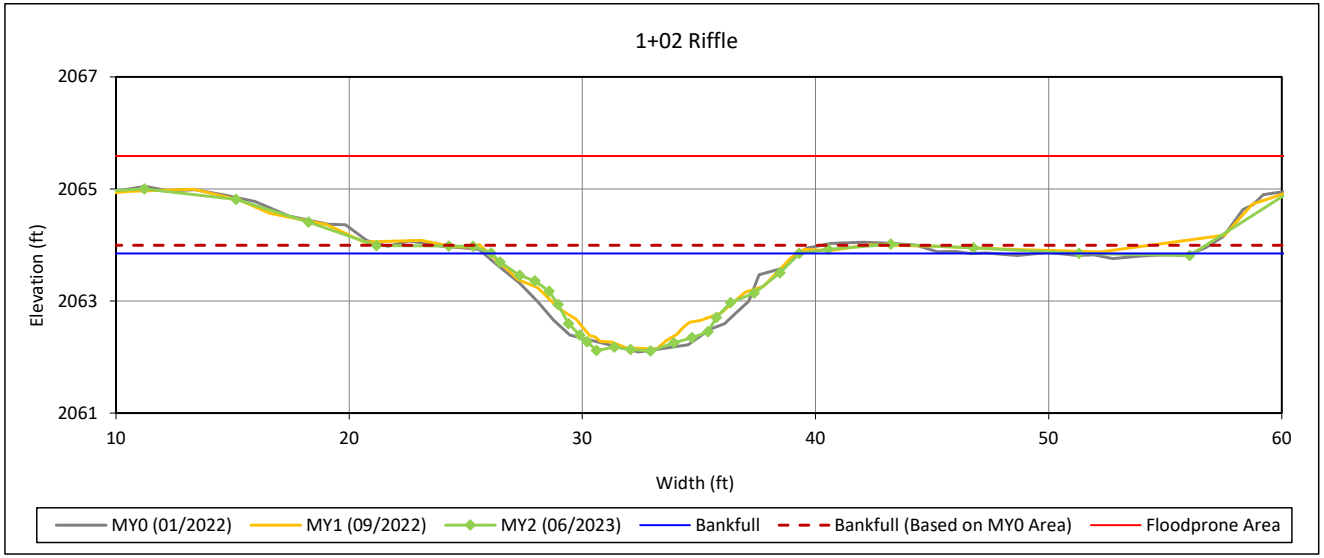
[1]Bank Height Ratio (BHR) takes the As-built bankful area as the basis for adjusting each subsequent years bankfull elevation.

[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.

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 1-Banner Creek Reach 1



Bankfull Dimensions	
13.9	x-section area (ft.sq.)
13.2	width (ft)
1.1	mean depth (ft)
1.7	max depth (ft)
13.9	wetted perimeter (ft)
1.0	hydraulic radius (ft)
12.5	width-depth ratio
61.5	W flood prone area (ft)
4.7	entrenchment ratio
< 1.0	low bank height ratio

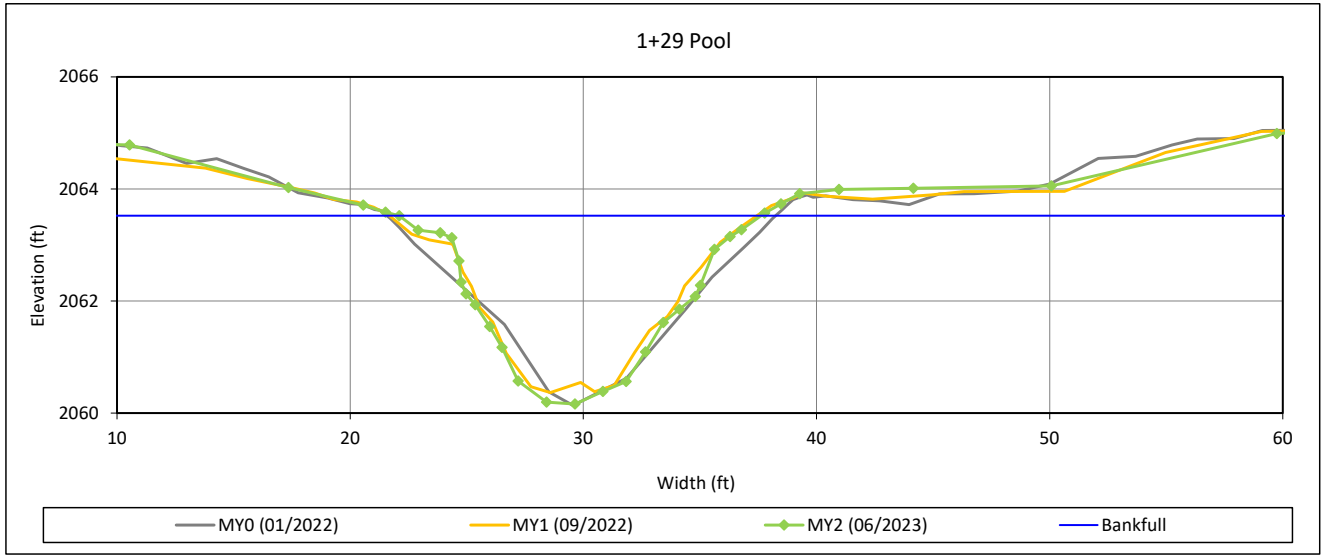
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 2-Banner Creek Reach 1



Bankfull Dimensions	
28.2	x-section area (ft.sq.)
15.5	width (ft)
1.8	mean depth (ft)
3.4	max depth (ft)
17.6	wetted perimeter (ft)
1.6	hydraulic radius (ft)
8.5	width-depth ratio

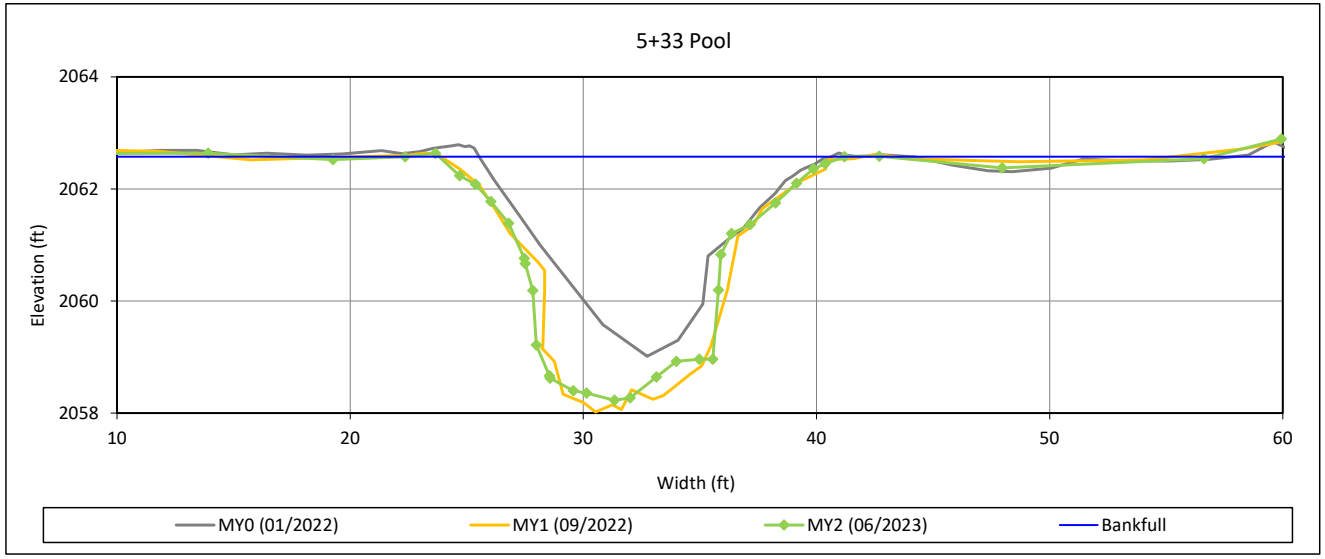
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 3-Banner Creek Reach 1



Bankfull Dimensions	
38.8	x-section area (ft.sq.)
17.4	width (ft)
2.2	mean depth (ft)
4.3	max depth (ft)
21.3	wetted perimeter (ft)
1.8	hydraulic radius (ft)
7.8	width-depth ratio

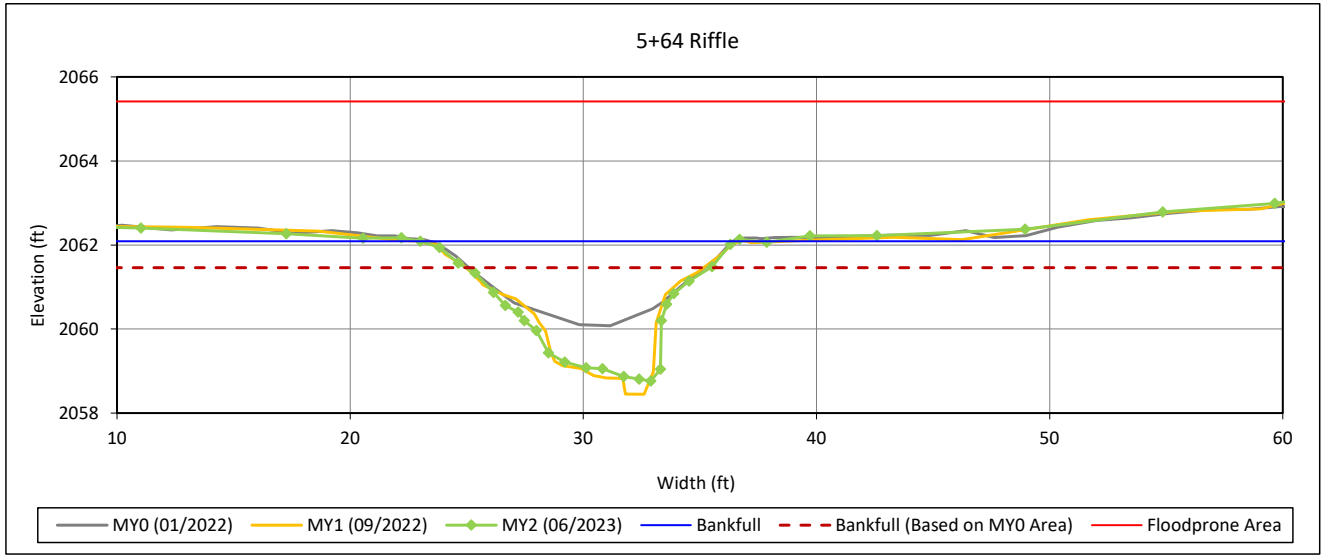
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 4-Banner Creek Reach 1



Bankfull Dimensions	
23.3	x-section area (ft.sq.)
13.5	width (ft)
1.7	mean depth (ft)
3.3	max depth (ft)
16.1	wetted perimeter (ft)
1.4	hydraulic radius (ft)
7.9	width-depth ratio
60.4	W flood prone area (ft)
4.5	entrenchment ratio
1.2	low bank height ratio

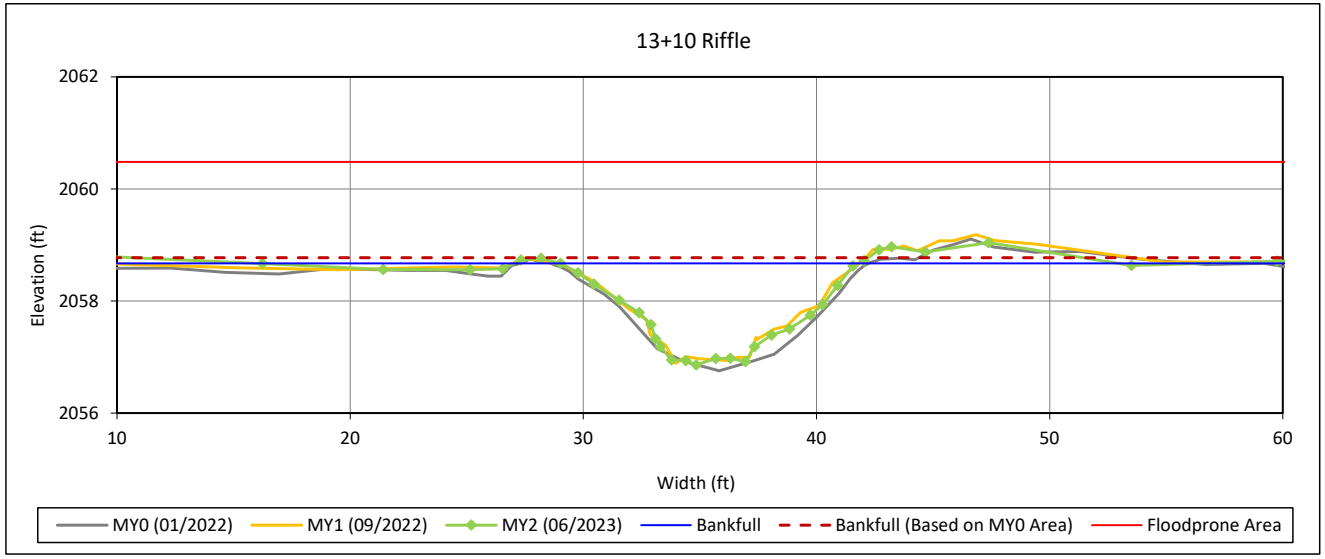
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 5-Banner Creek Reach 2



Bankfull Dimensions	
13.2	x-section area (ft.sq.)
12.8	width (ft)
1.0	mean depth (ft)
1.8	max depth (ft)
13.5	wetted perimeter (ft)
1.0	hydraulic radius (ft)
12.3	width-depth ratio
85.8	W flood prone area (ft)
6.7	entrenchment ratio
< 1.0	low bank height ratio

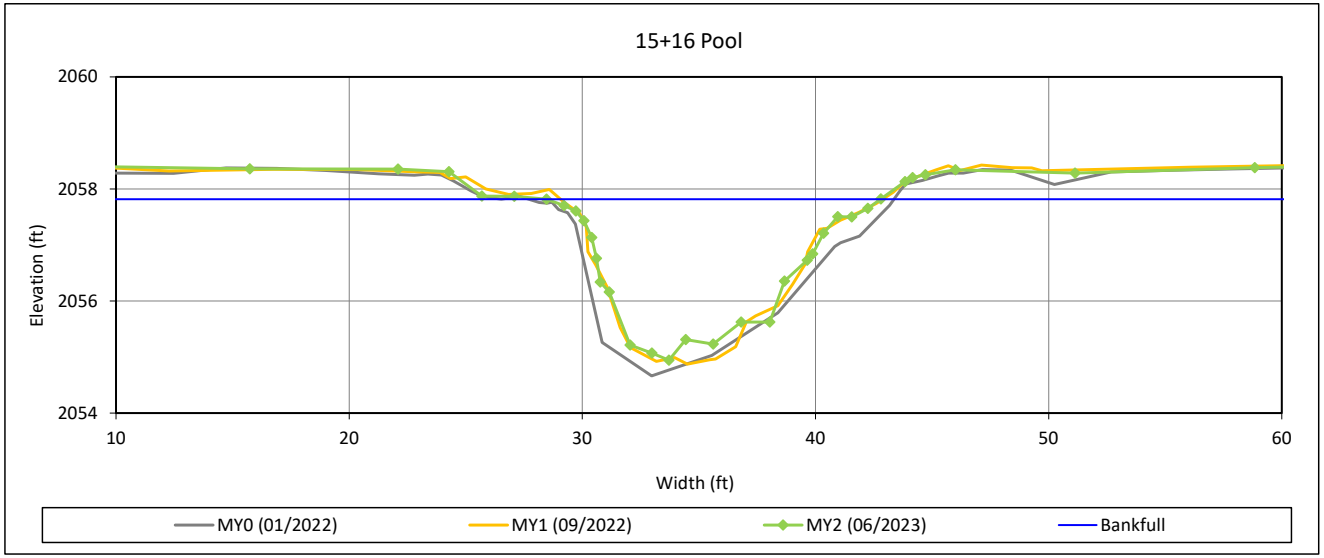
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 6-Banner Creek Reach 2



Bankfull Dimensions	
22.0	x-section area (ft.sq.)
14.3	width (ft)
1.5	mean depth (ft)
2.9	max depth (ft)
16.3	wetted perimeter (ft)
1.4	hydraulic radius (ft)
9.3	width-depth ratio

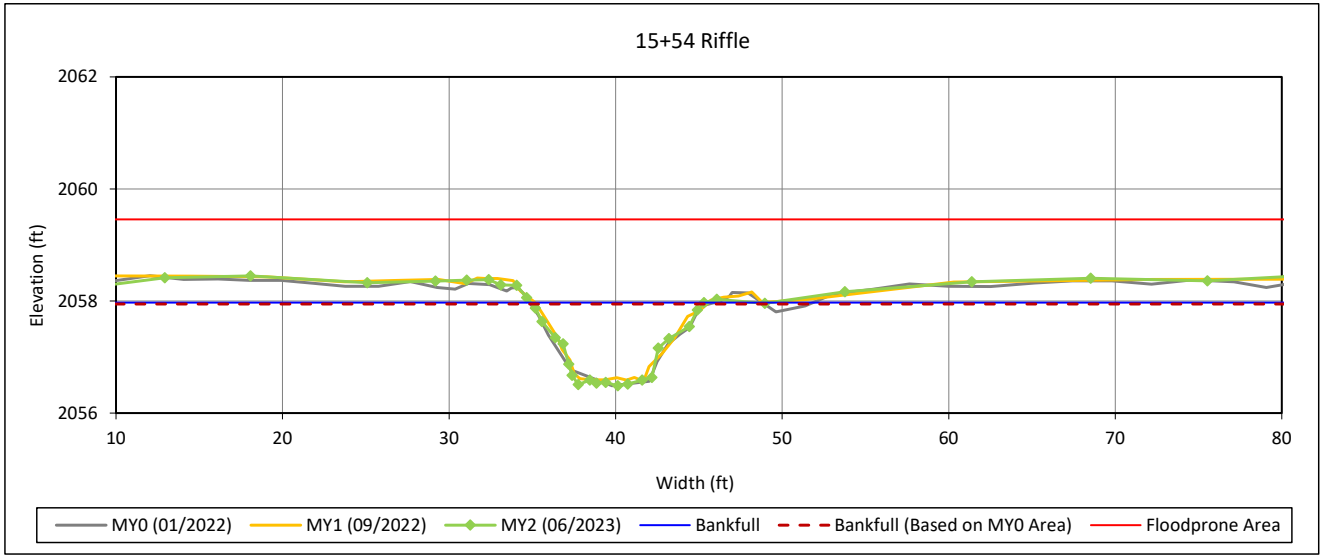
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 7-Banner Creek Reach 2



Bankfull Dimensions	
9.9	x-section area (ft.sq.)
10.4	width (ft)
0.9	mean depth (ft)
1.5	max depth (ft)
11.2	wetted perimeter (ft)
0.9	hydraulic radius (ft)
11.0	width-depth ratio
80.8	W flood prone area (ft)
7.8	entrenchment ratio
1.0	low bank height ratio

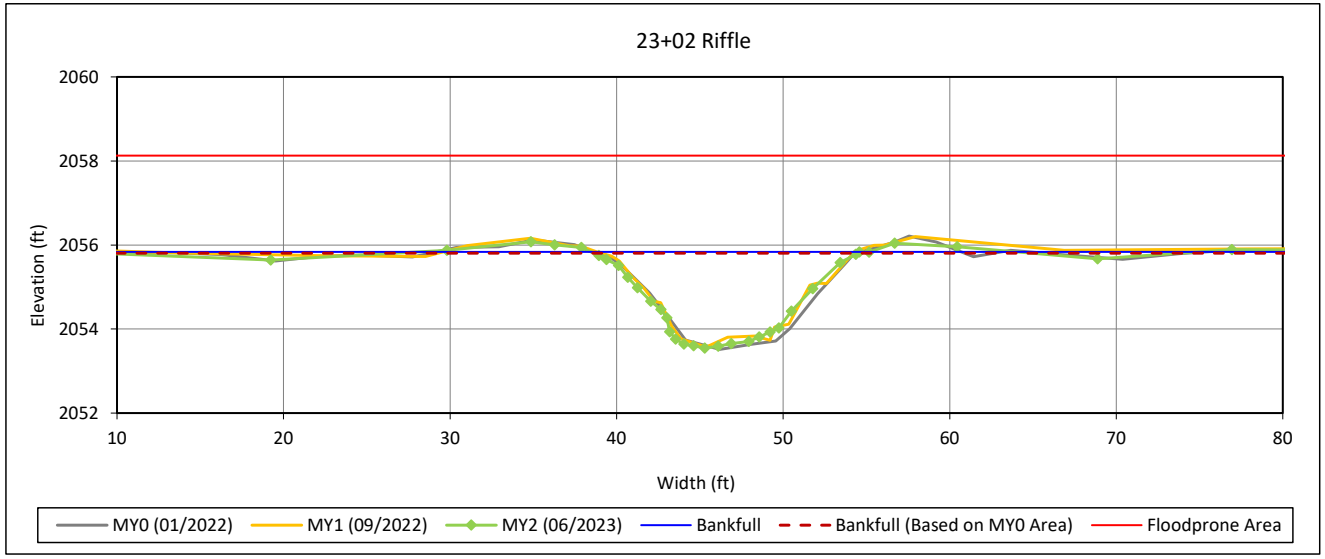
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 8-Banner Creek Reach 3



Bankfull Dimensions	
21.1	x-section area (ft.sq.)
16.1	width (ft)
1.3	mean depth (ft)
2.3	max depth (ft)
17.0	wetted perimeter (ft)
1.2	hydraulic radius (ft)
12.3	width-depth ratio
87.5	W flood prone area (ft)
5.4	entrenchment ratio
1.0	low bank height ratio

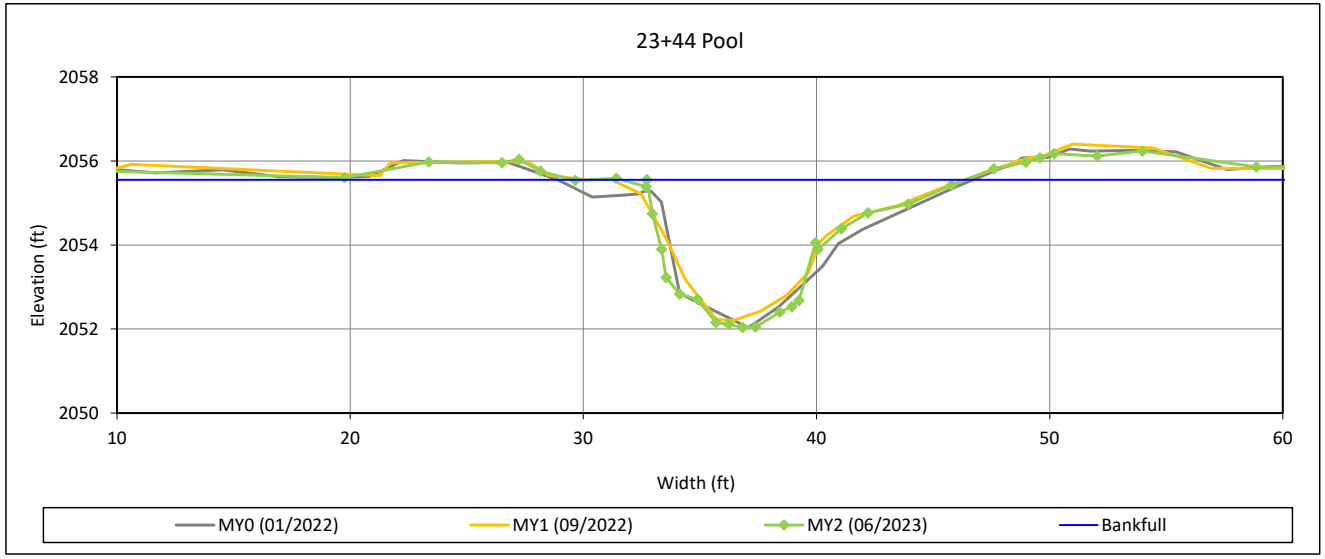
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 9-Banner Creek Reach 3



Bankfull Dimensions	
25.0	x-section area (ft.sq.)
13.7	width (ft)
1.8	mean depth (ft)
3.5	max depth (ft)
16.9	wetted perimeter (ft)
1.5	hydraulic radius (ft)
7.5	width-depth ratio

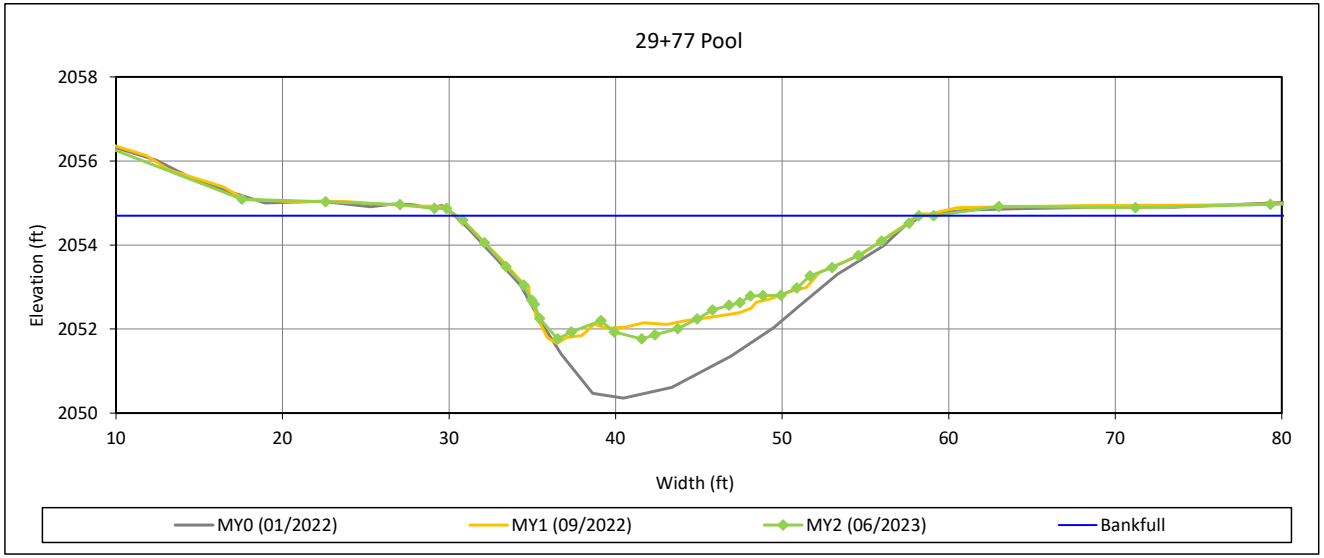
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 10-Banner Creek Reach 4a



Bankfull Dimensions	
49.7	x-section area (ft.sq.)
27.8	width (ft)
1.8	mean depth (ft)
2.9	max depth (ft)
28.9	wetted perimeter (ft)
1.7	hydraulic radius (ft)
15.5	width-depth ratio

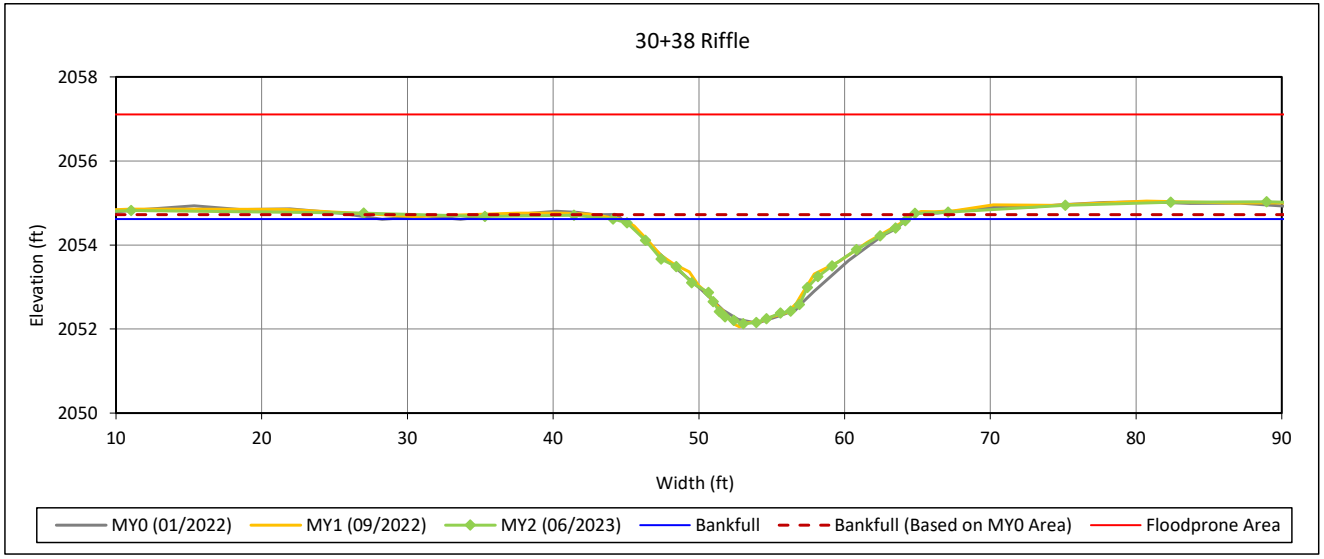
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 11-Banner Creek Reach 4a



Bankfull Dimensions	
26.0	x-section area (ft.sq.)
20.2	width (ft)
1.3	mean depth (ft)
2.5	max depth (ft)
21.0	wetted perimeter (ft)
1.2	hydraulic radius (ft)
15.7	width-depth ratio
93.4	W flood prone area (ft)
4.6	entrenchment ratio
1.0	low bank height ratio

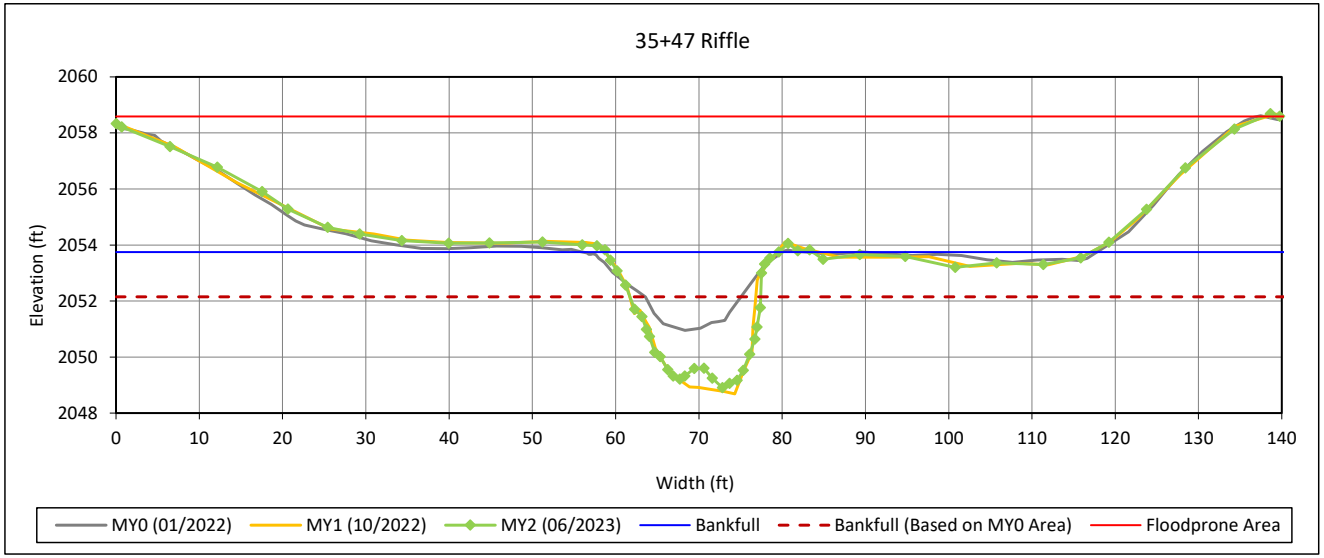
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 12-Banner Creek Reach 4b



Bankfull Dimensions	
63.4	x-section area (ft.sq.)
20.7	width (ft)
3.1	mean depth (ft)
4.8	max depth (ft)
24.6	wetted perimeter (ft)
2.6	hydraulic radius (ft)
6.8	width-depth ratio
137.8	W flood prone area (ft)
6.6	entrenchment ratio
1.5	low bank height ratio

Survey Date: 06/2023
Field Crew: Wildlands Engineering

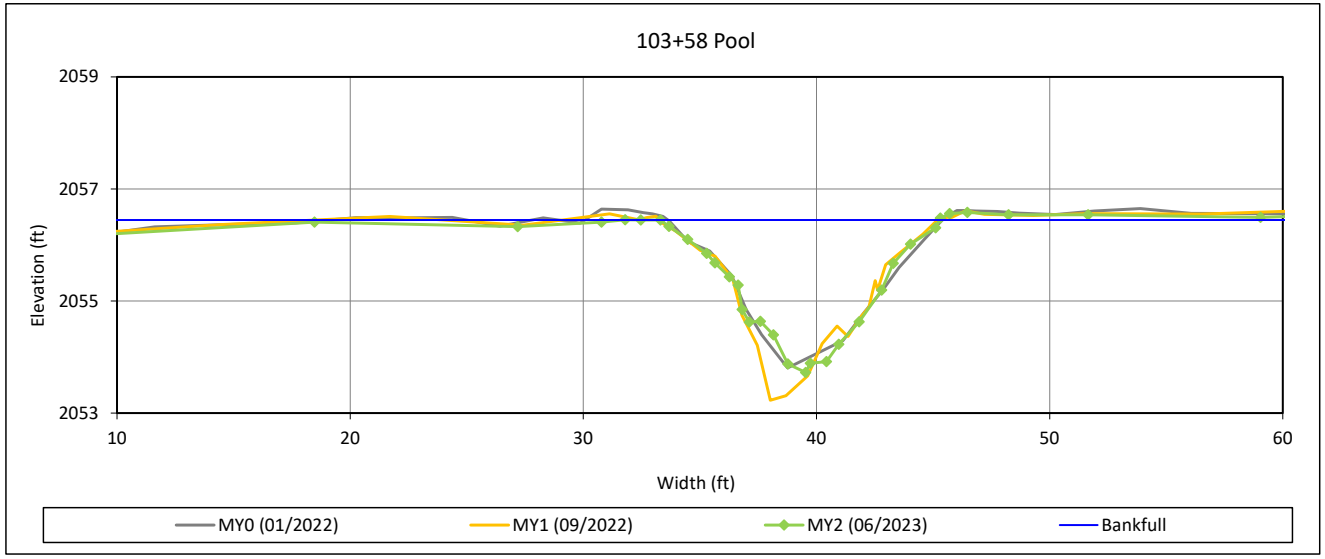
XS12 located in area of MY1 repair and not rebuilt to the original design or as-built condition

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 13-UT1



Bankfull Dimensions	
16.0	x-section area (ft.sq.)
12.0	width (ft)
1.3	mean depth (ft)
2.7	max depth (ft)
13.5	wetted perimeter (ft)
1.2	hydraulic radius (ft)
8.9	width-depth ratio

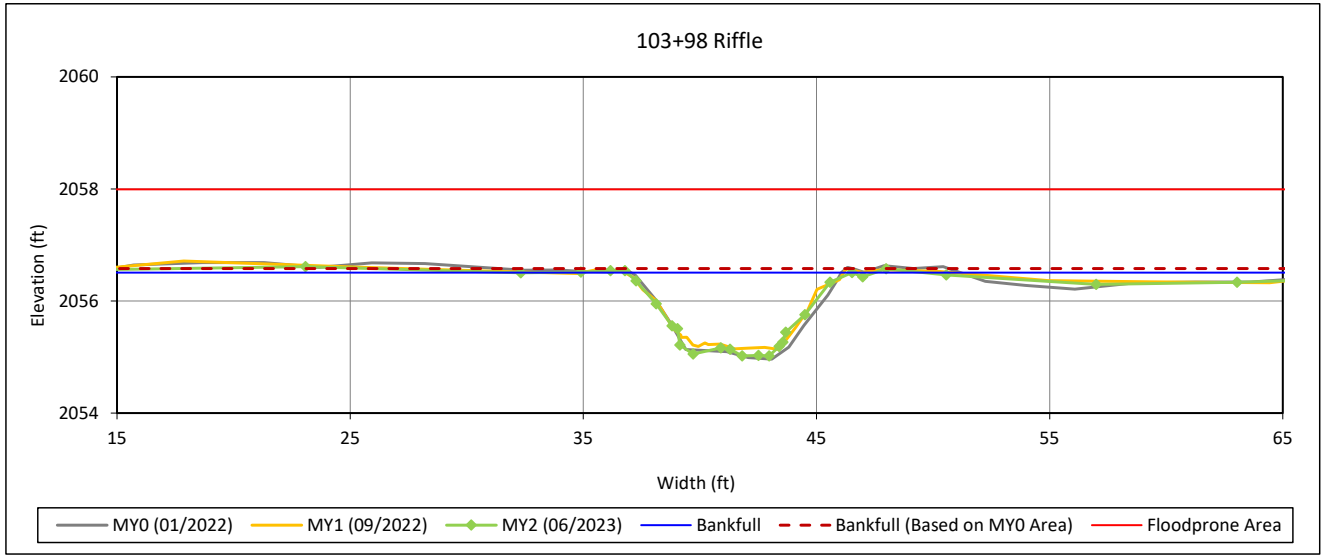
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 14-UT1



Bankfull Dimensions	
8.9	x-section area (ft.sq.)
9.7	width (ft)
0.9	mean depth (ft)
1.5	max depth (ft)
10.5	wetted perimeter (ft)
0.8	hydraulic radius (ft)
10.5	width-depth ratio
66.3	W flood prone area (ft)
6.9	entrenchment ratio
1.0	low bank height ratio

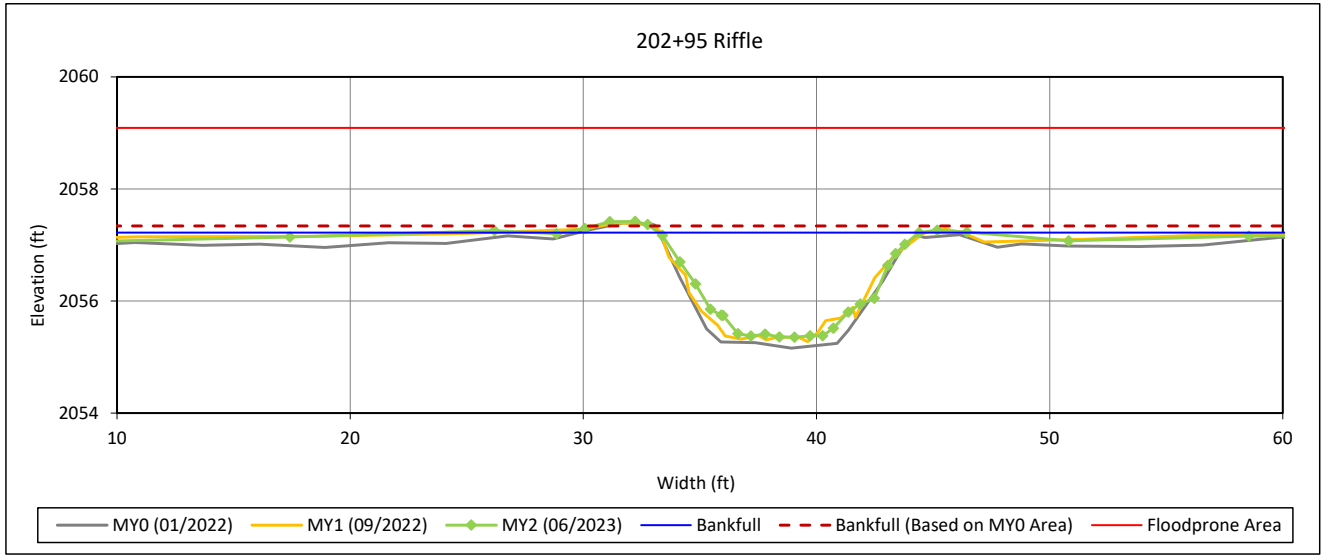
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 15-UT2



Bankfull Dimensions	
14.0	x-section area (ft.sq.)
11.2	width (ft)
1.3	mean depth (ft)
1.9	max depth (ft)
12.2	wetted perimeter (ft)
1.2	hydraulic radius (ft)
8.9	width-depth ratio
81.9	W flood prone area (ft)
7.3	entrenchment ratio
< 1.0	low bank height ratio

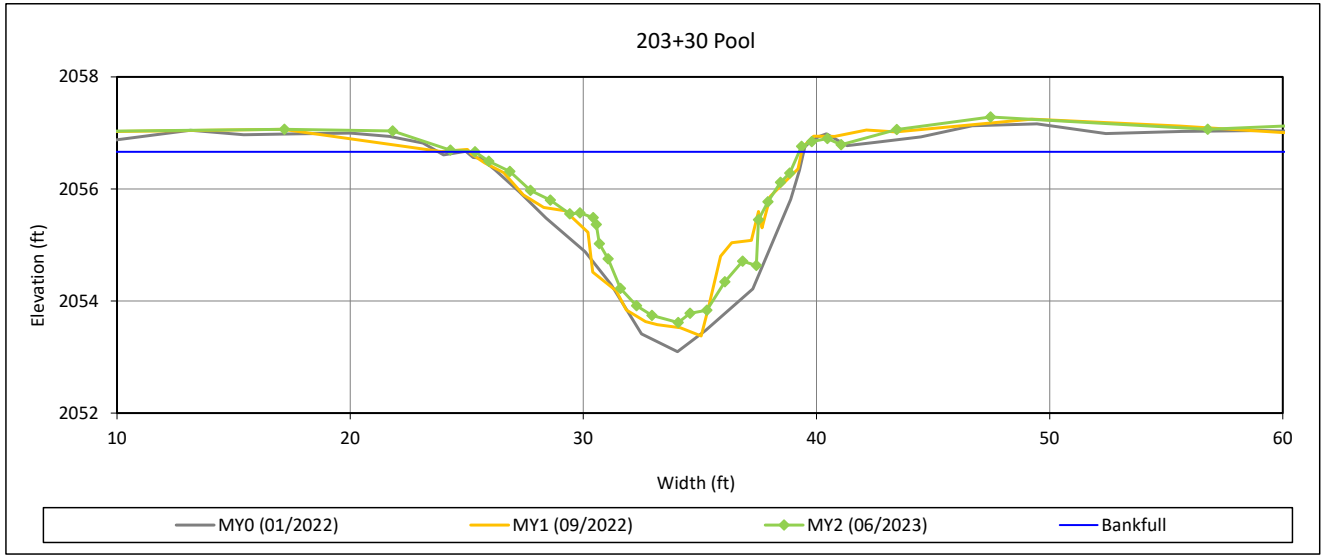
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 16-UT2



Bankfull Dimensions	
22.1	x-section area (ft.sq.)
13.9	width (ft)
1.6	mean depth (ft)
3.0	max depth (ft)
16.1	wetted perimeter (ft)
1.4	hydraulic radius (ft)
8.7	width-depth ratio

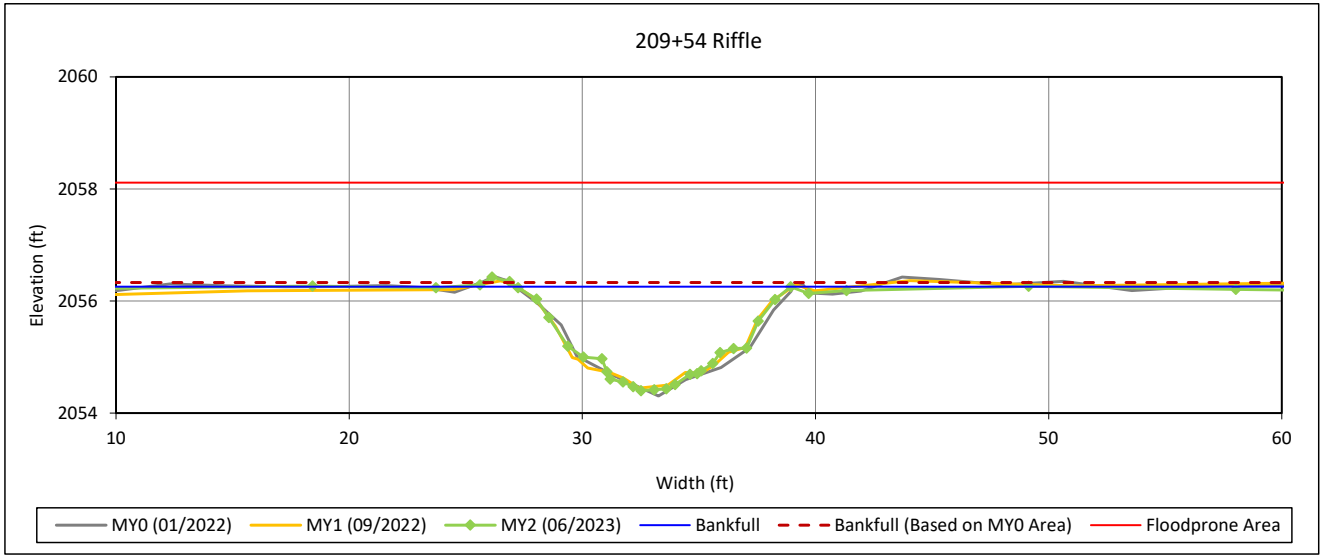
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 17-UT2



Bankfull Dimensions	
13.2	x-section area (ft.sq.)
11.7	width (ft)
1.1	mean depth (ft)
1.9	max depth (ft)
12.7	wetted perimeter (ft)
1.0	hydraulic radius (ft)
10.4	width-depth ratio
74.8	W flood prone area (ft)
6.4	entrenchment ratio
1.0	low bank height ratio

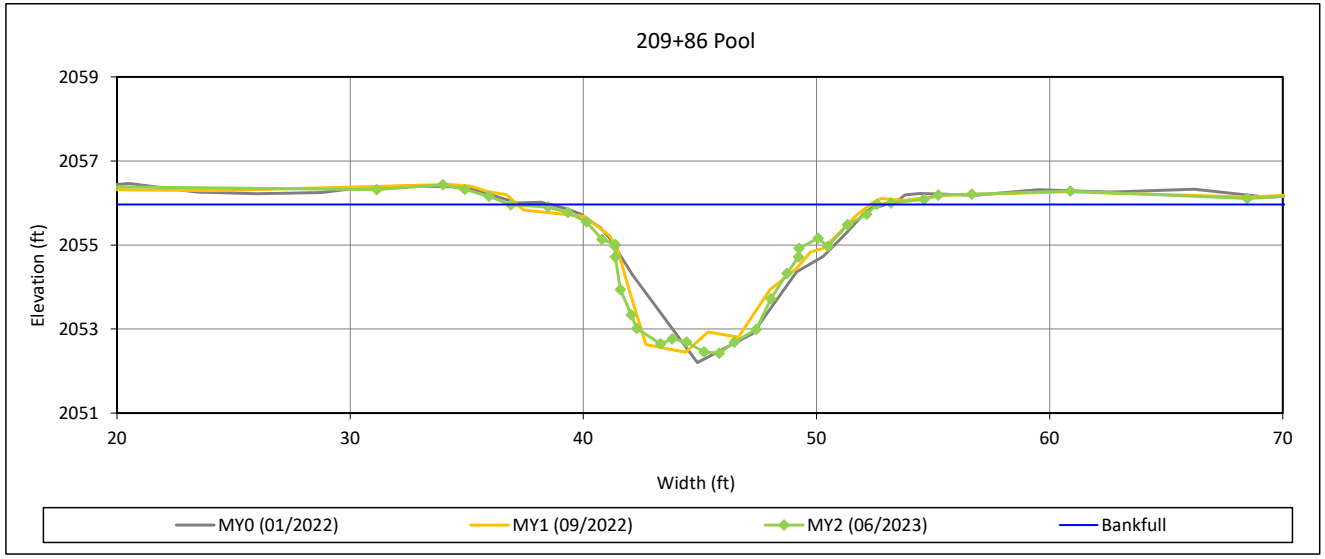
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 18-UT2



Bankfull Dimensions	
26.0	x-section area (ft.sq.)
15.7	width (ft)
1.7	mean depth (ft)
3.5	max depth (ft)
18.7	wetted perimeter (ft)
1.4	hydraulic radius (ft)
9.5	width-depth ratio

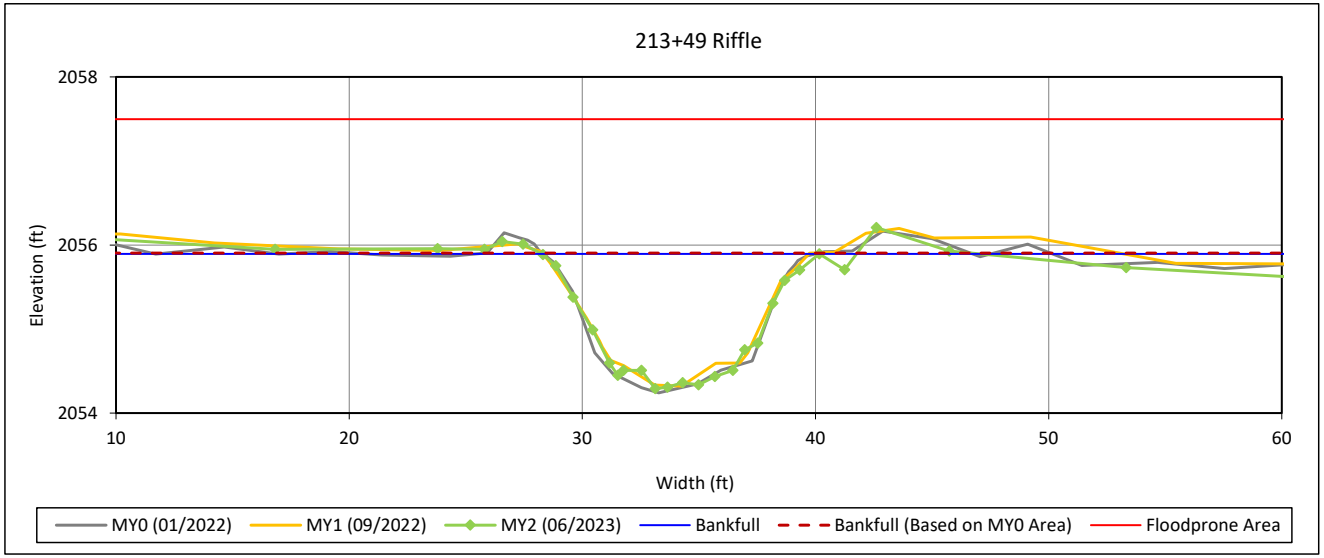
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 19-UT2



Bankfull Dimensions	
11.8	x-section area (ft.sq.)
11.9	width (ft)
1.0	mean depth (ft)
1.6	max depth (ft)
12.6	wetted perimeter (ft)
0.9	hydraulic radius (ft)
12.0	width-depth ratio
79.0	W flood prone area (ft)
6.6	entrenchment ratio
1.0	low bank height ratio

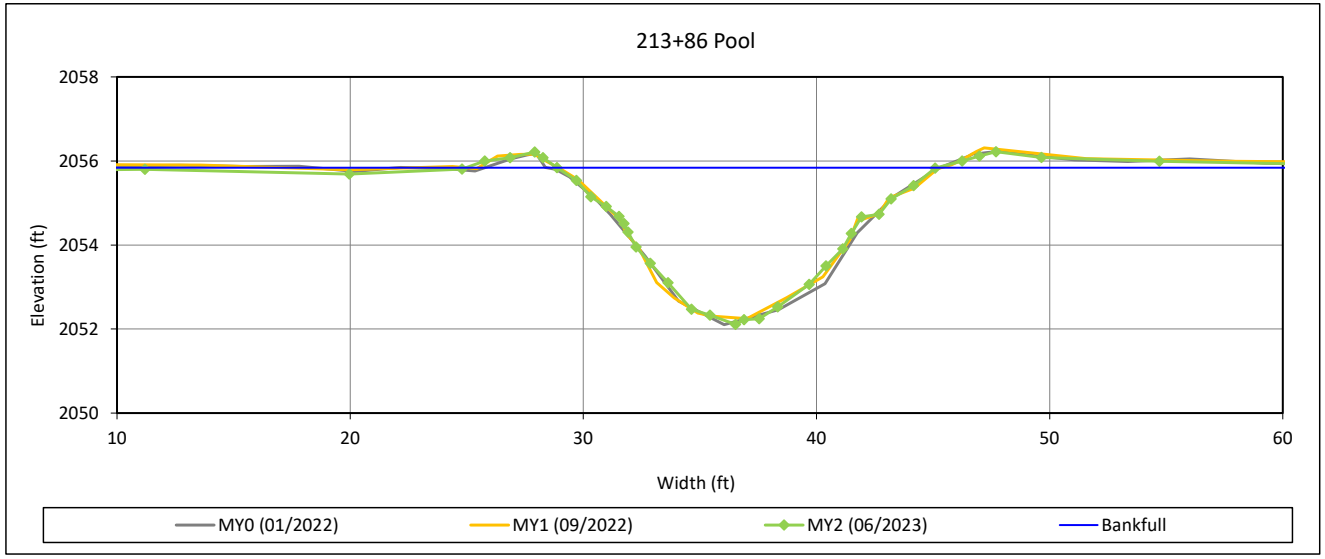
Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

Cross-Section Plots

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Cross-Section 20-UT2



Bankfull Dimensions	
32.8	x-section area (ft.sq.)
16.3	width (ft)
2.0	mean depth (ft)
3.7	max depth (ft)
18.3	wetted perimeter (ft)
1.8	hydraulic radius (ft)
8.1	width-depth ratio

Survey Date: 06/2023
Field Crew: Wildlands Engineering

View Downstream

APPENDIX D. Hydrology Data

Table 10. Bankfull Events Summary
Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Reach	MY1 (2022)	MY2 (2023)	MY3 (2024)	MY4 (2025)	MY5 (2026)	MY6 (2027)	MY7 (2028)
Banner Farm Reach 2 - CG1	2/4/2022 - 2/8/2022 3/24/2022 - 3/26/2022 5/28/2022 - 5/30/2022 7/28/2022 7/30/2022 9/6/2022 - 9/8/2022	1/25/2023 2/17/2023 7/18/2023 8/28/2023 - 8/29/2023 9/7/2023					
UT1 - CG2	2/4/2022 - 2/7/2022 3/24/2022 - 3/28/2022 5/28/2022 - 5/30/2022 7/28/2022 7/31/2022 9/5/2022 - 9/8/2022	2/17/2023 7/18/2023 8/29/2023 9/7/2023					
UT2 - CG3	2/4/2022 - 2/7/2022 3/24/2022 - 3/28/2022 5/27/2022 - 5/30/2022 7/28/2022 7/31/2022 9/5/2022 - 9/8/2022	1/25/2023 - 1/26/2023 6/21/2023 7/18/2023 8/28/2023 - 8/29/2023 9/7/2023					

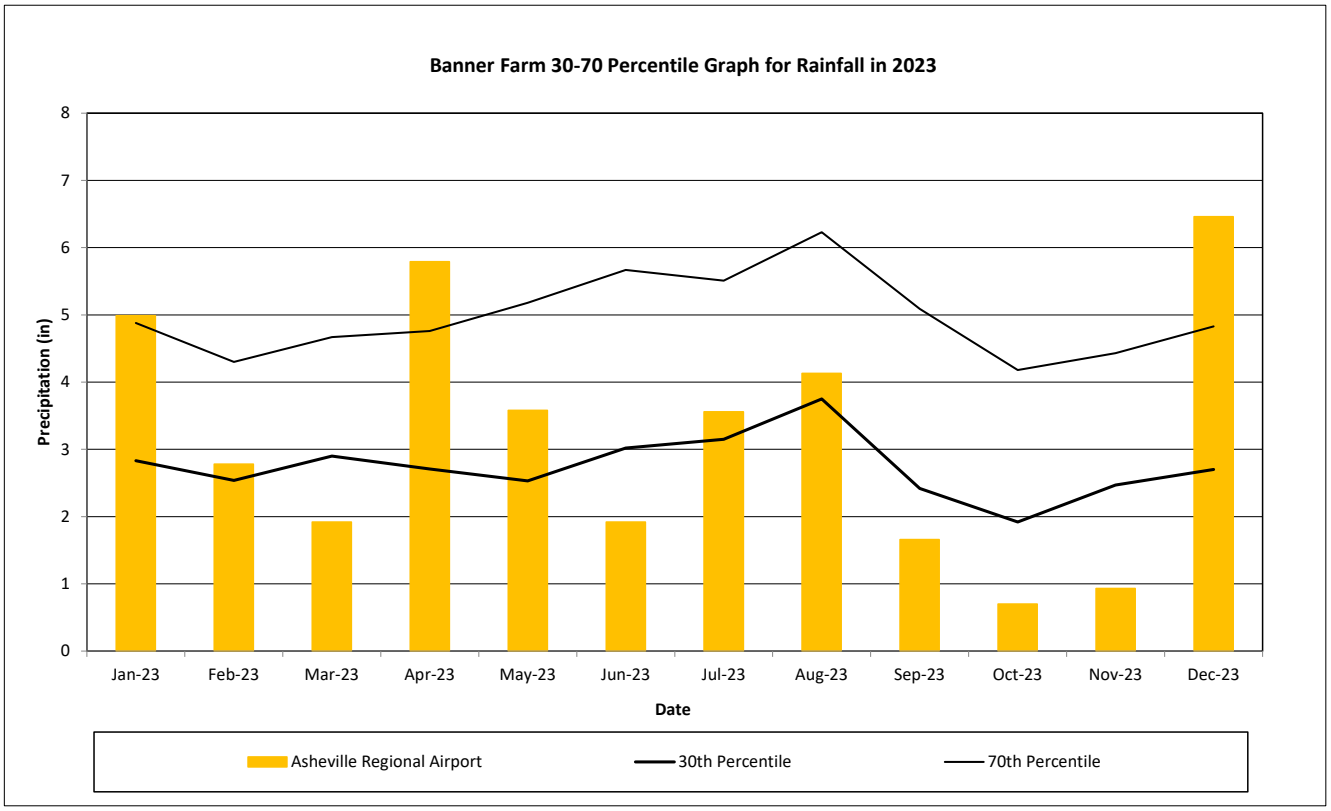
Table 11. Rainfall Summary
Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

	MY1 (2022)	MY2 (2023)	MY3 (2024)	MY4 (2025)	MY5 (2026)	MY6 (2027)	MY7 (2028)
Annual Precipitation Total [1]	49.02	38.42					
WETS 30th Percentile [2]	43.57	43.76					
WETS 70th Percentile [2]	54.78	54.95					
Normal	Normal	Below Normal					

[1] 2023 rainfall collected by NC CRONOS Station, Asheville Regional Airport, located 5 miles from the Site
[2] 30th and 70th percentile rainfall data collected from WETS station Asheville Regional Airport for 30 years prior to previous MY

Monthly Rainfall Data

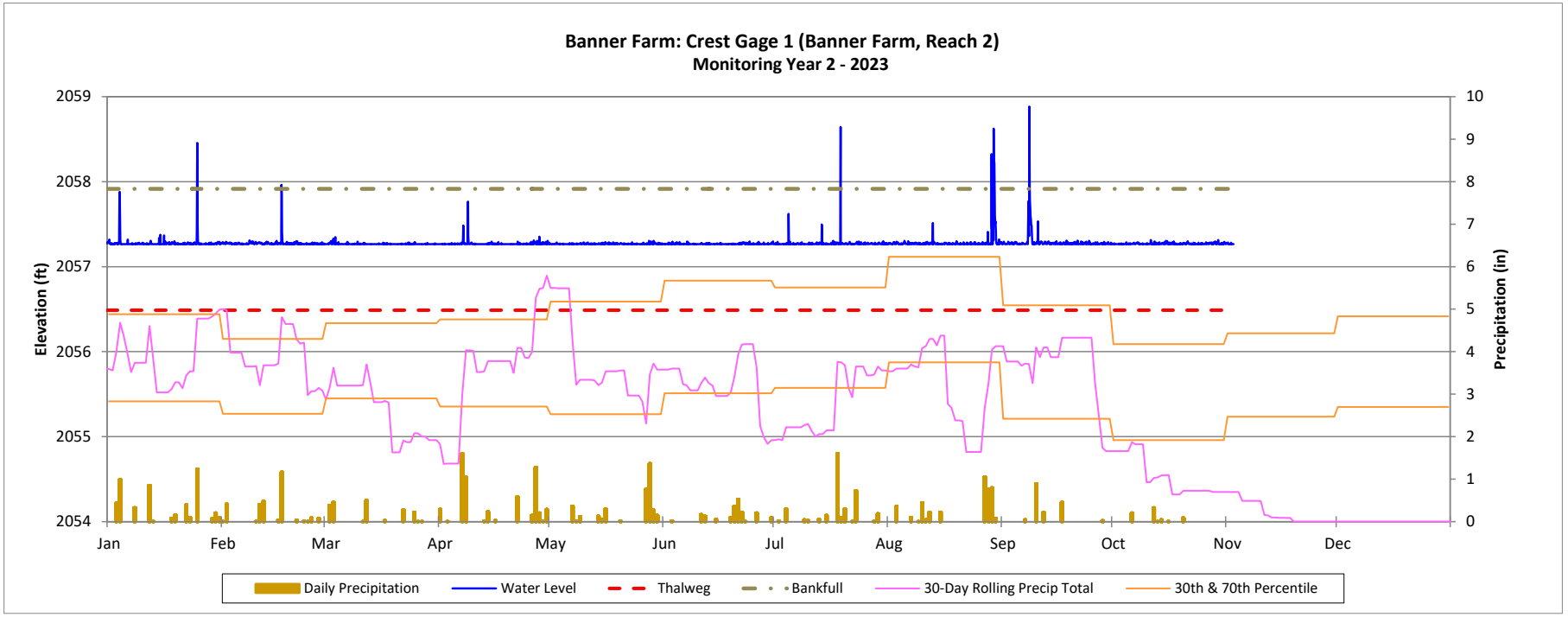
Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023



2023 rainfall collected by NC CRONOS Station, Asheville Regional Airport, located 5 miles from the Site
30th and 70th percentile rainfall data collected from WETS station Asheville Regional Airport for the prior 30 years

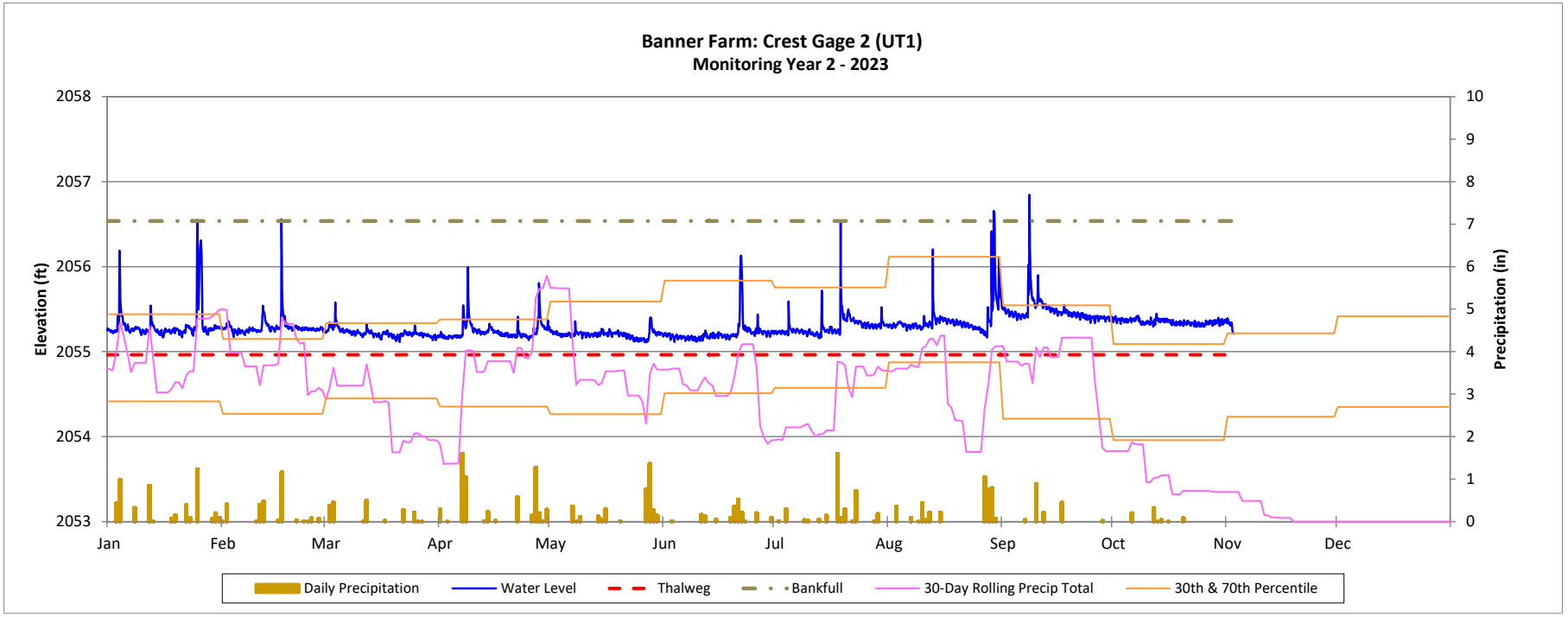
Crest Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023



Crest Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023



Crest Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

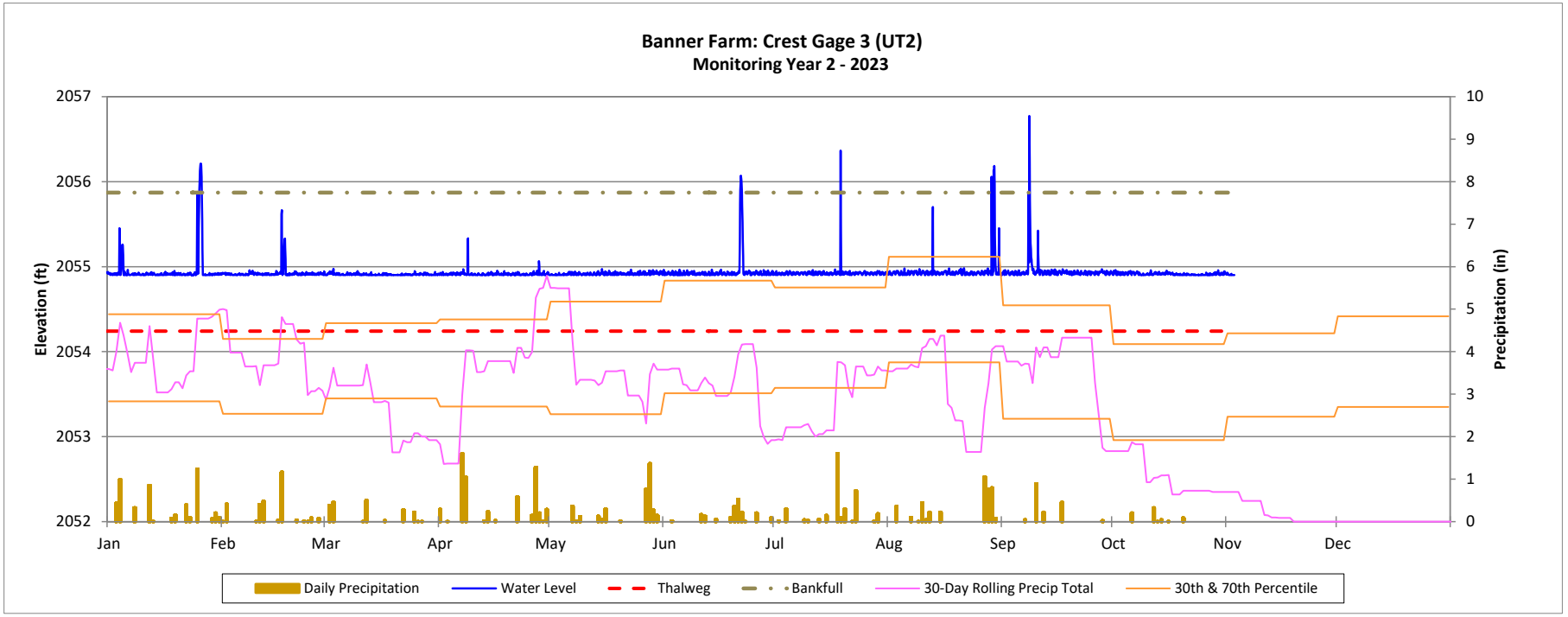


Table 12. Wetland Gage Summary

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Gage	Max. Consecutive Hydroperiod (Percentage)						
	MY1 (2022)	MY2 (2023)	MY3 (2024)	MY4 (2025)	MY5 (2026)	MY6 (2027)	MY7 (2028)
Reference	26 Days (12.1%)	4 Days (1.9%)					
1	13 Days (6.1%)	5 Days (2.3%)					
2	25 Days (11.7%)	12 Days (5.6%)					
3	16 Days (7.5%)	8 Days (3.7%)					
4	13 Days (6.1%)	5 Days (2.3%)					
5	4 Days (1.9%)	0 Days (0.0%)					
6	6 Days (2.8%)	2 Days (0.9%)					
7	4 Days (1.9%)	0 Days (0.0%)					
8	55 Days (25.7%)	36 Days (16.8%)					
9	15 Days (7.0%)	8 Days (3.7%)					
10	13 Days (6.1%)	0 Days (0.0%)					
11	20 Days (9.3%)	12 Days (5.6%)					
12	24 Days (11.2%)	12 Days (5.6%)					
13	17 Days (7.9%)	1 Days (0.5%)					
14	54 Days (25.2%)	40 Days (18.7%)					
15	14 Days (6.5%)	5 Days (2.3%)					
16	23 Days (10.7%)	11 Days (5.1%)					
17	214 Days (100.0%)	214 Days (100.0%)					
18	125 Days (58.4%)	74 Days (34.6%)					
19 [1]	N/A	214 Days (100.0%)					
20 [1]	N/A	214 Days (100.0%)					
21 [2]	N/A	12 Days (5.6%)					
22 [2]	N/A	4 Days (1.9%)					
23 [2]	N/A	0 Days (0.0%)					

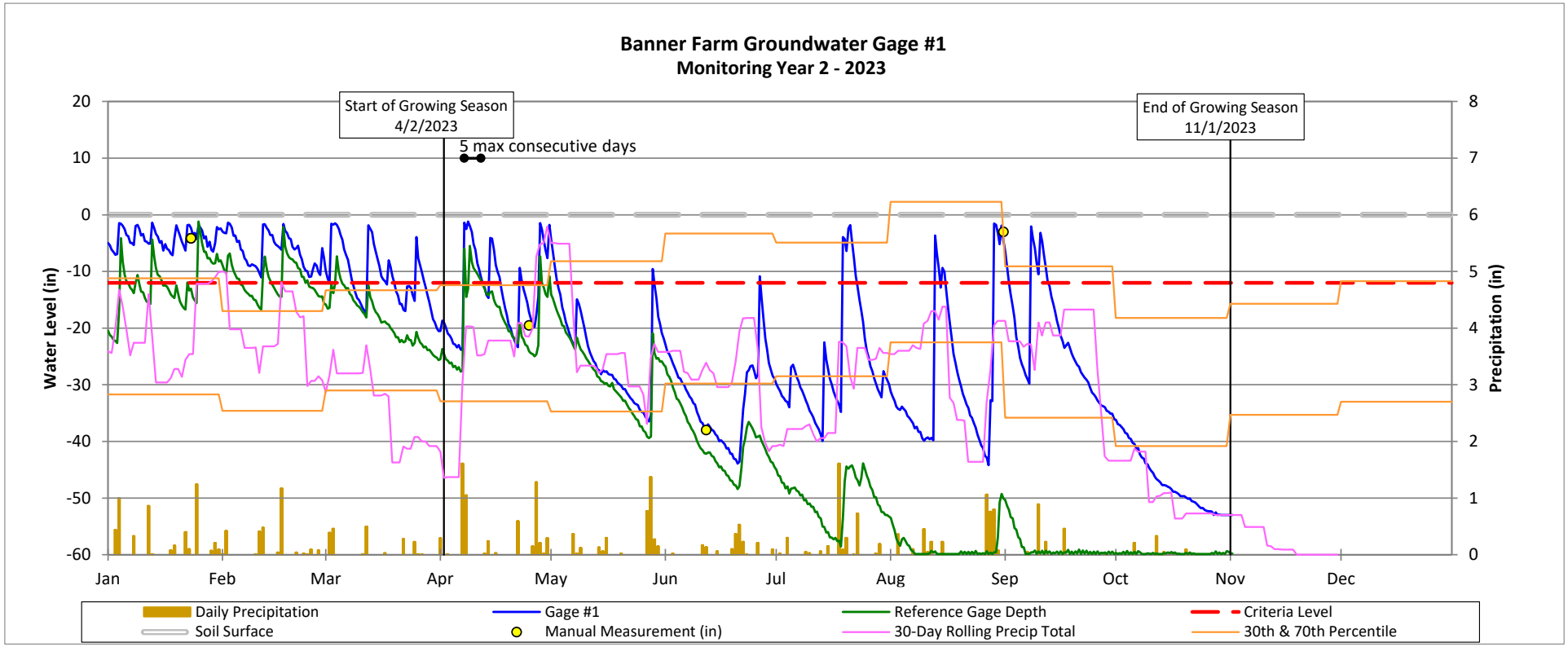
Performance Standard: **12% of the growing season (26 consecutive days)**
WETS Station: **ASHEVILLE AIRPORT, NC**
Growing Season: **4/2/2023 to 11/1/2023 (214 days)**

[1] GWG 19 and GWG 20 were installed in November 2022.
[2] GWG 21 - GWG 23 were installed in February 2023.

Criteria Met
Criteria Not Met: Days greater or equal to reference gage
Criteria Not Met: Days less than reference gage

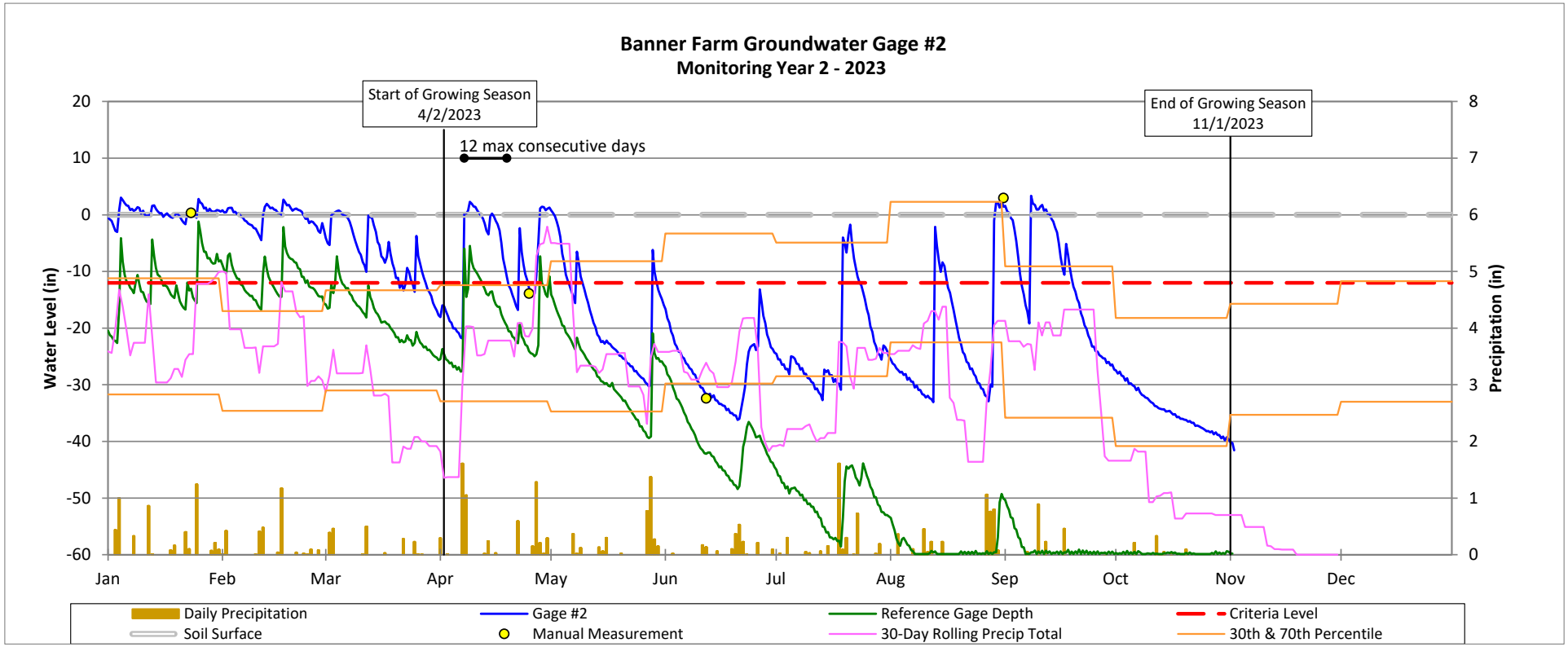
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



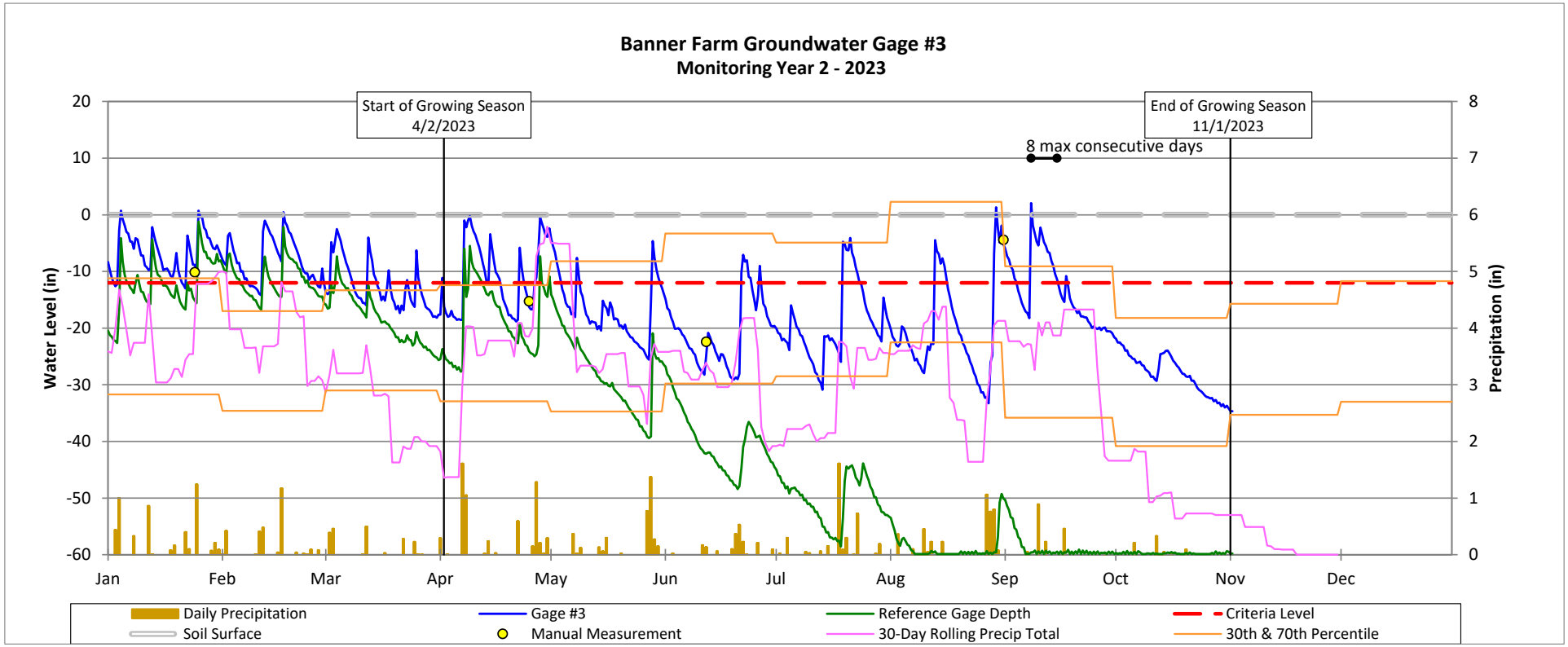
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



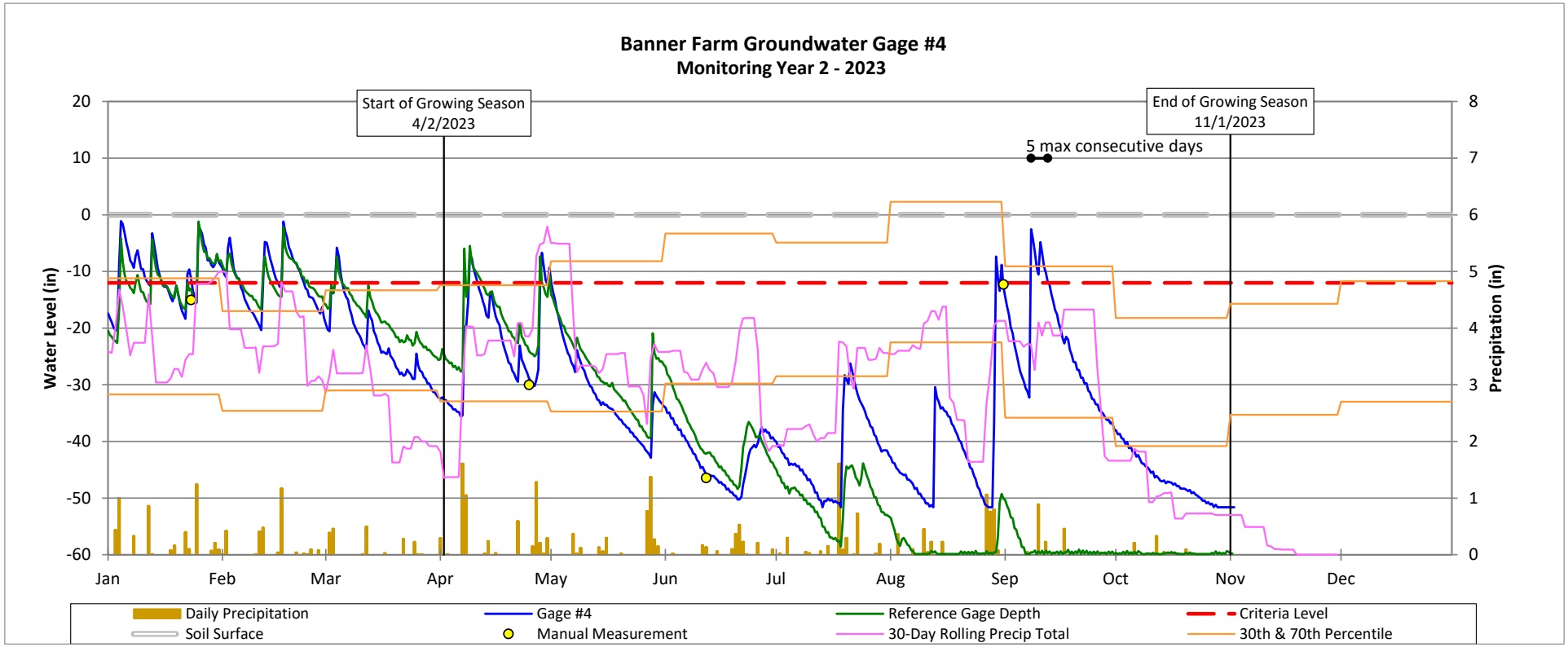
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



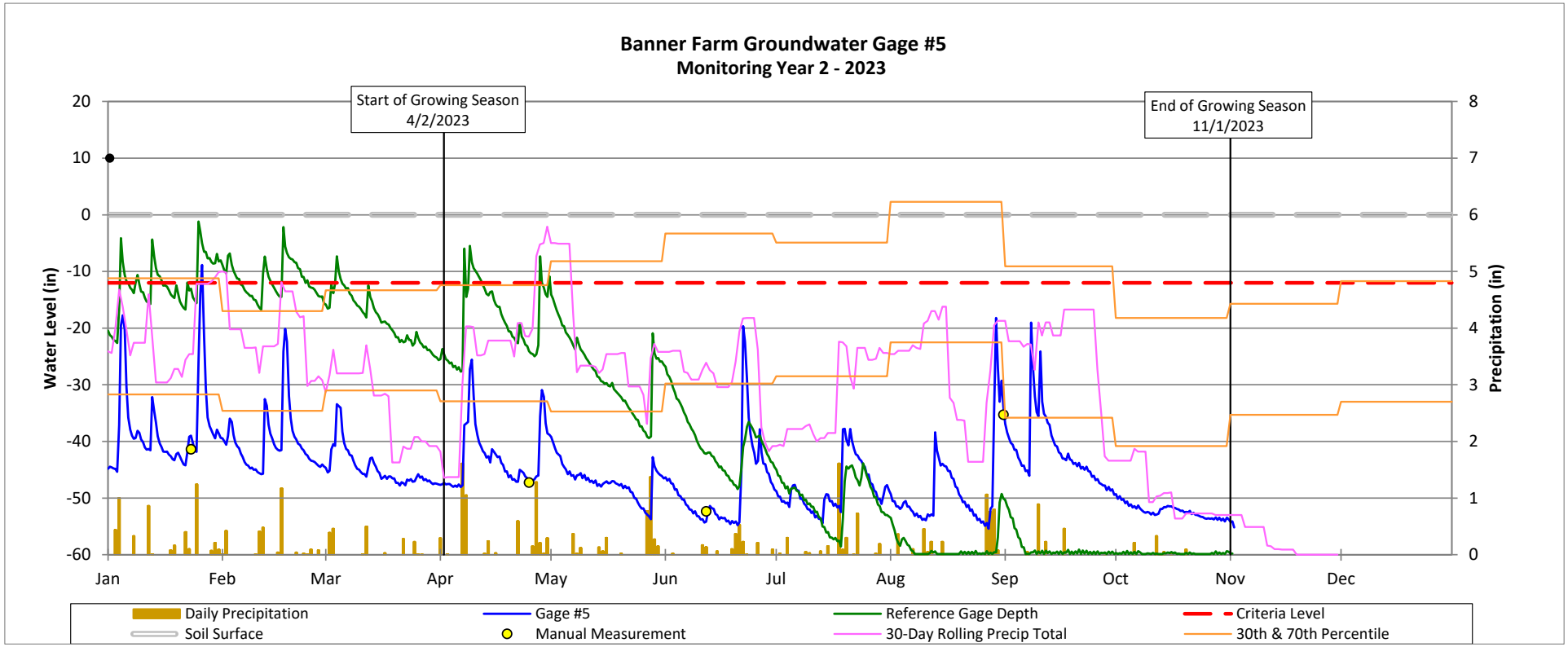
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



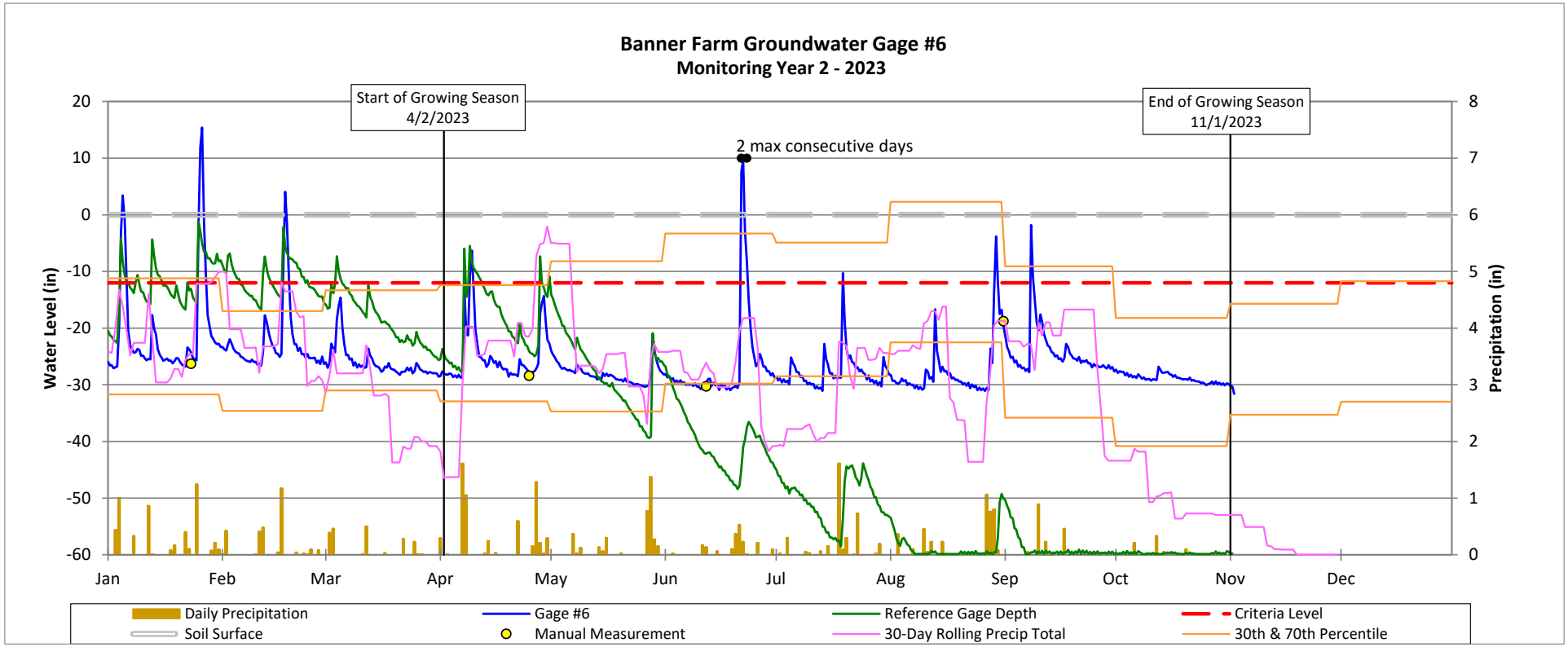
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



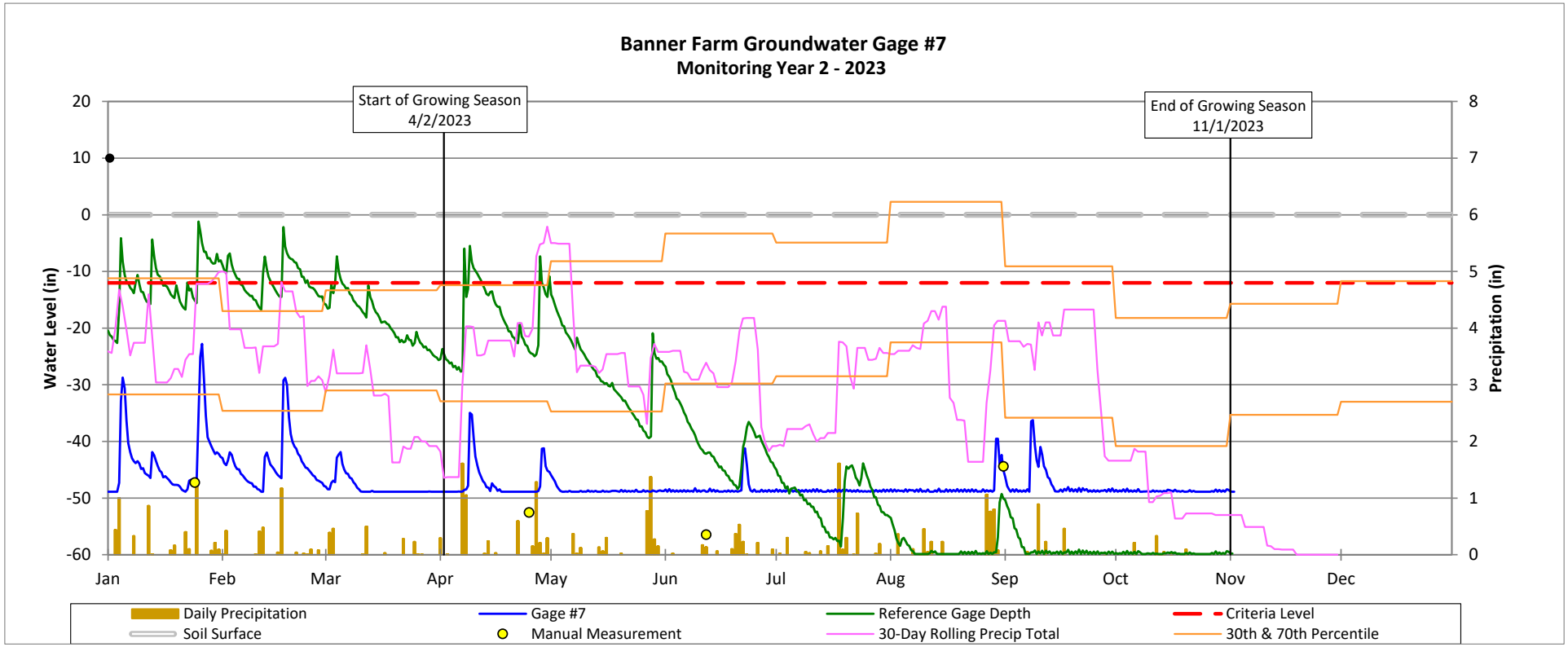
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Creation



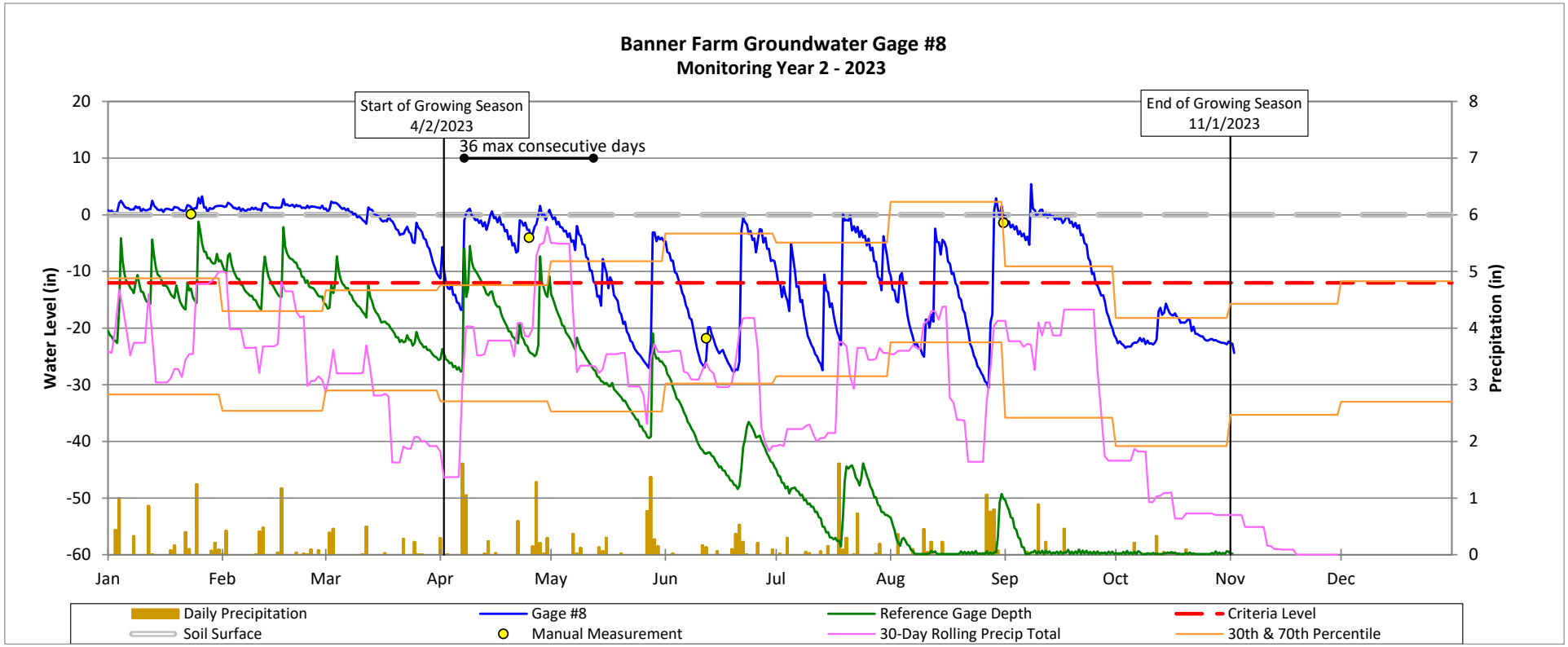
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



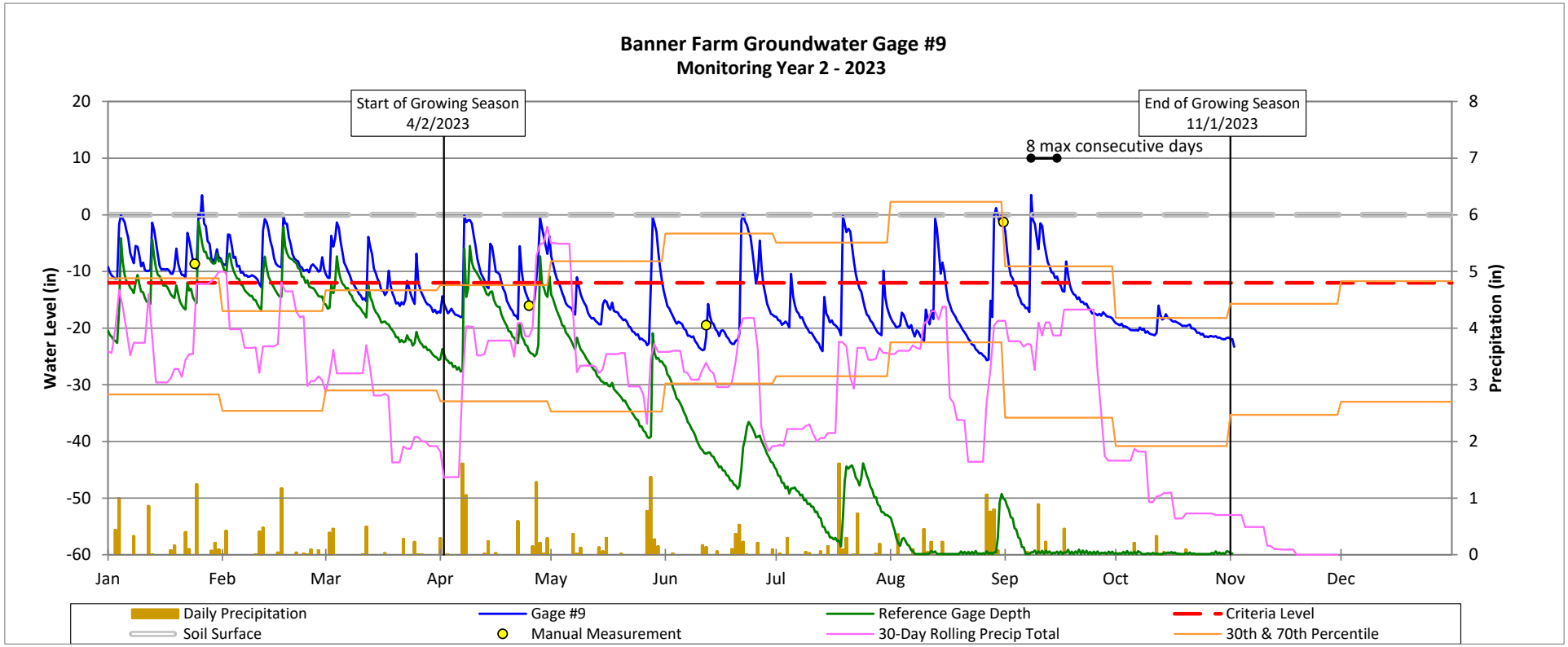
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



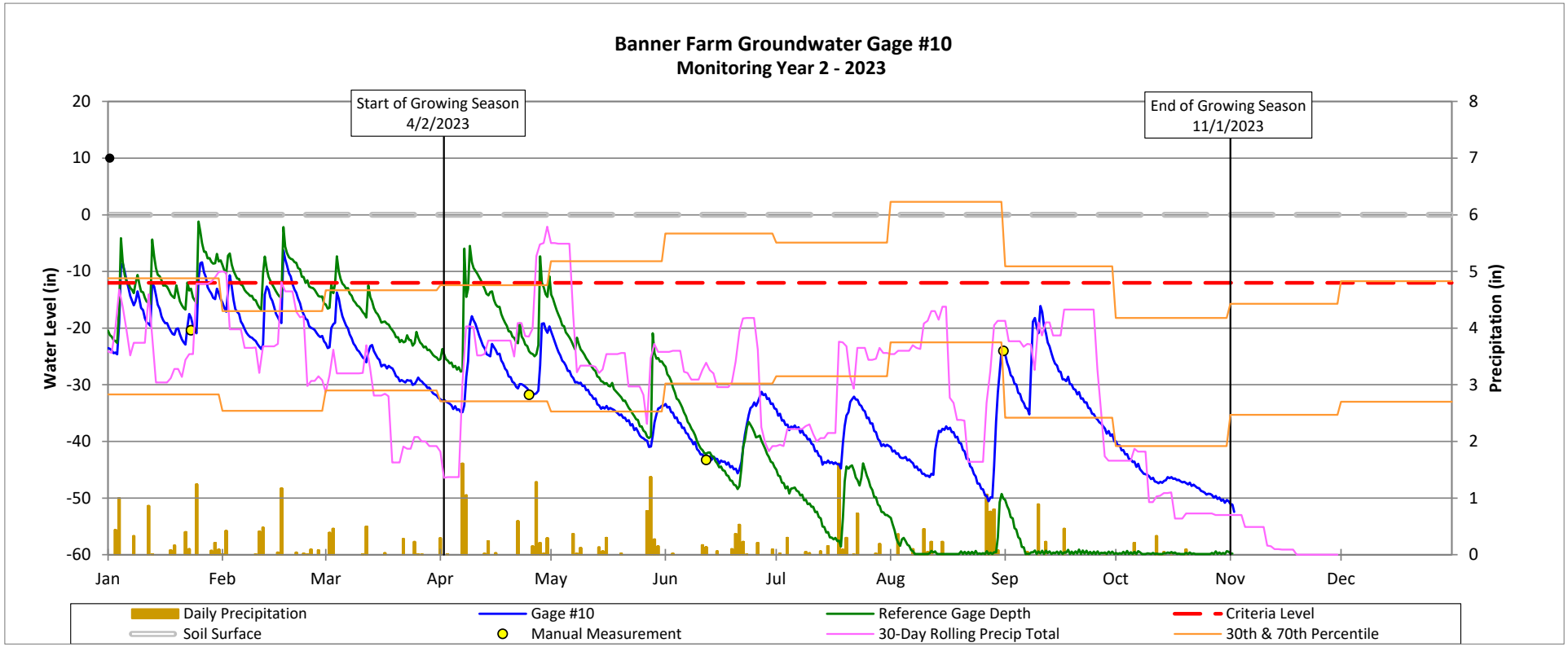
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



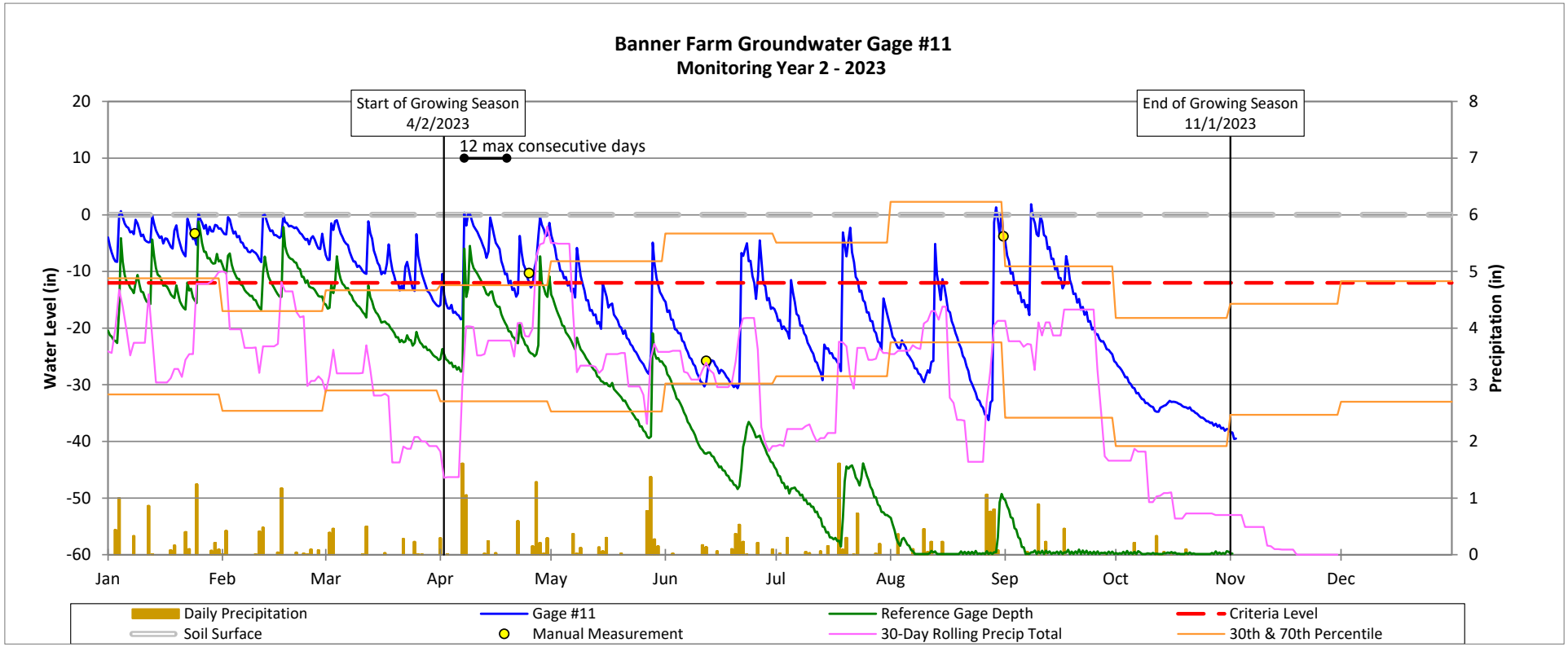
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



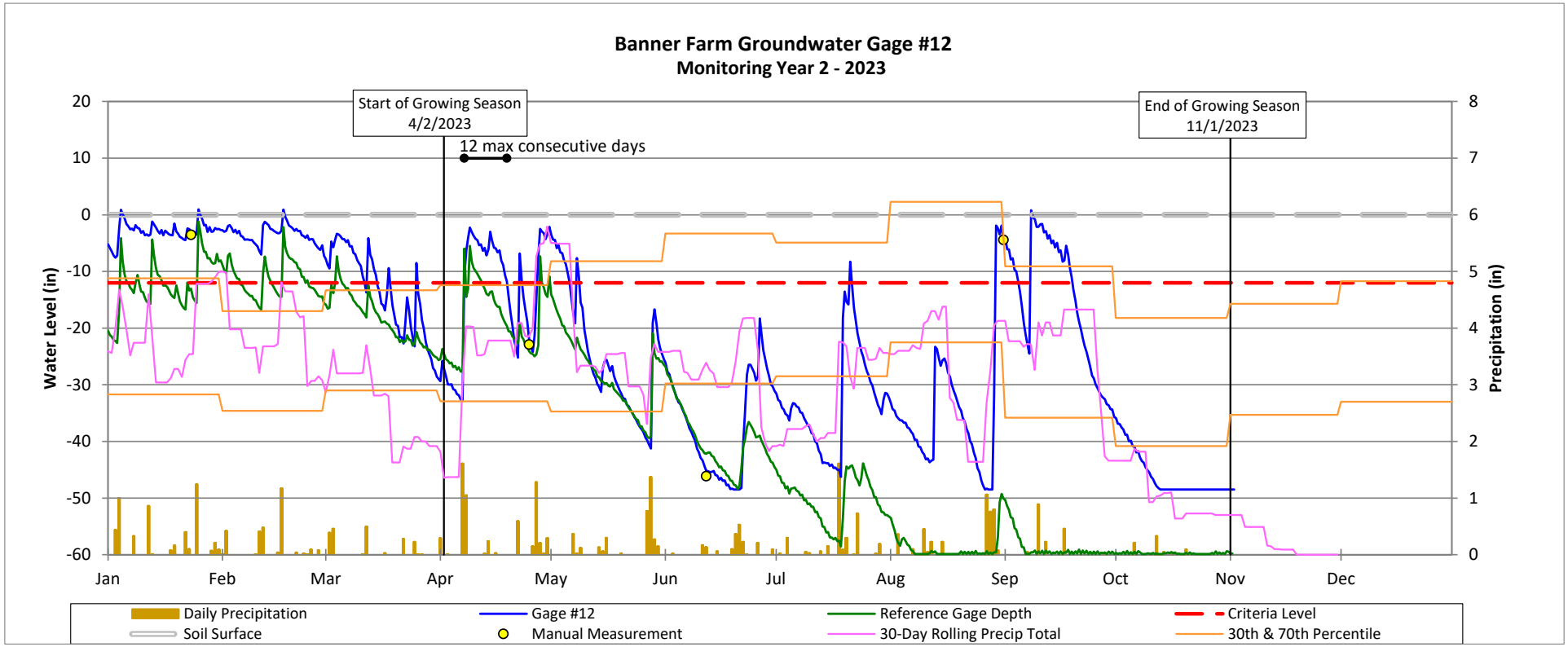
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



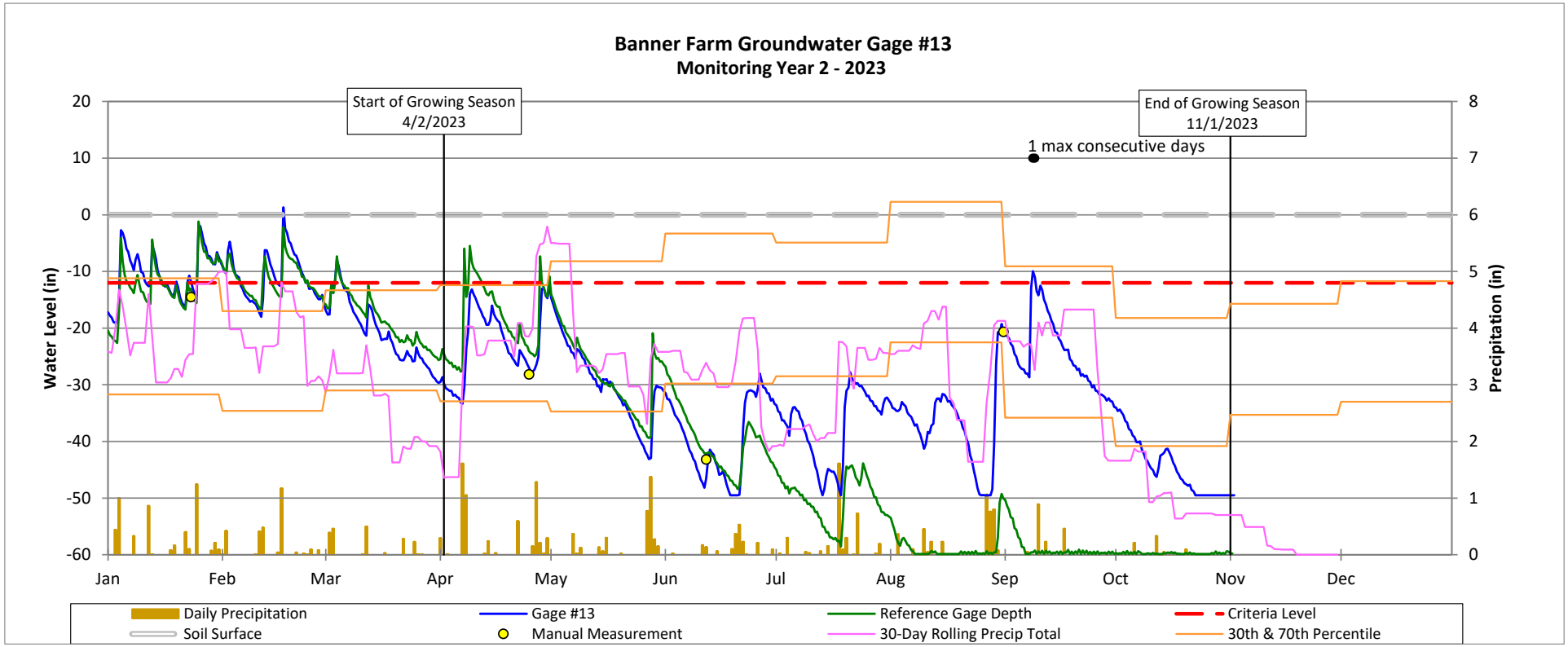
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



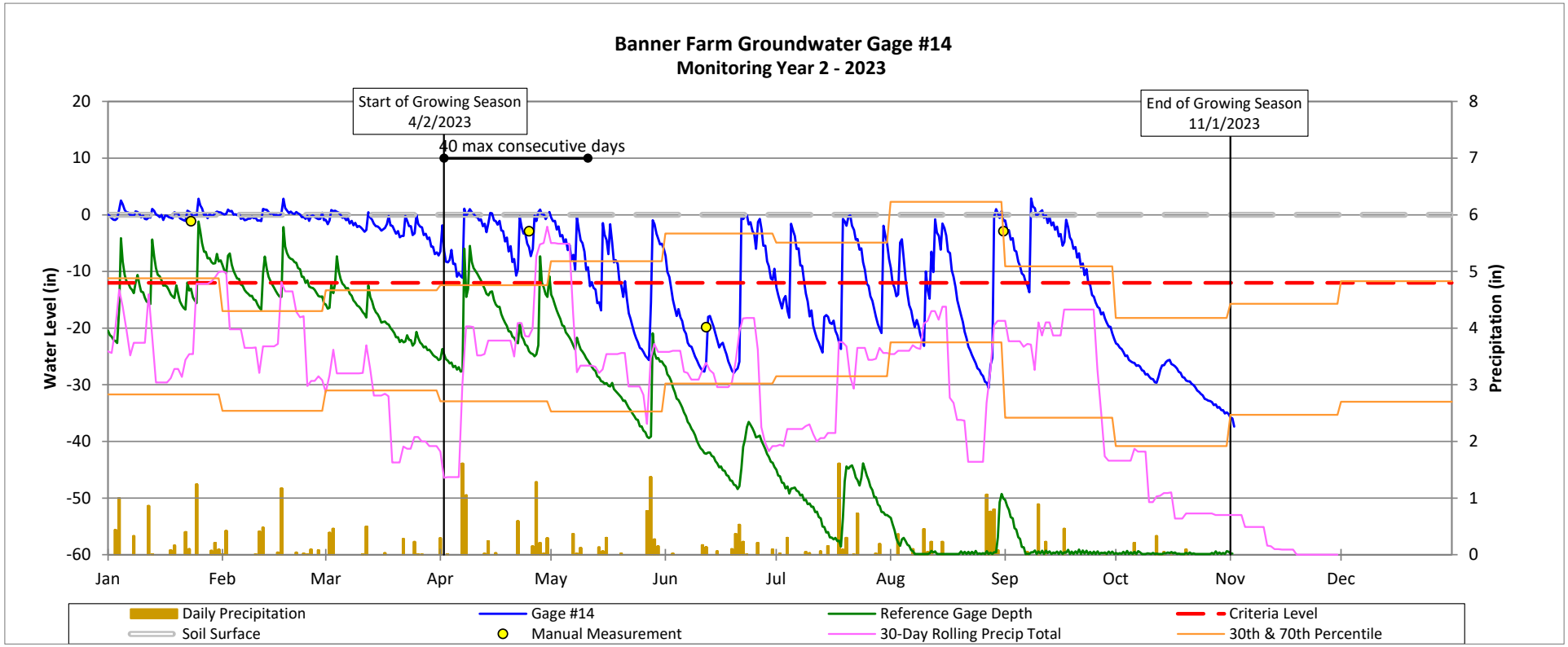
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



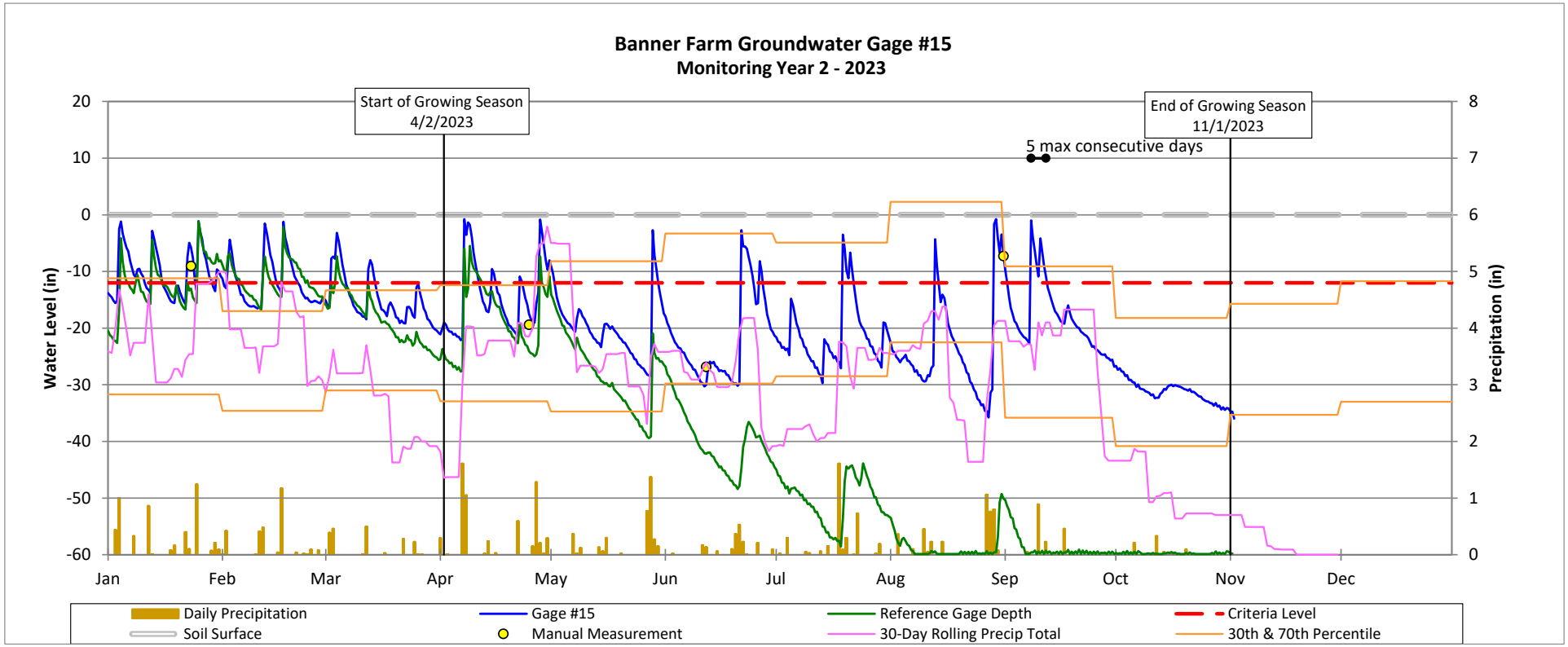
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



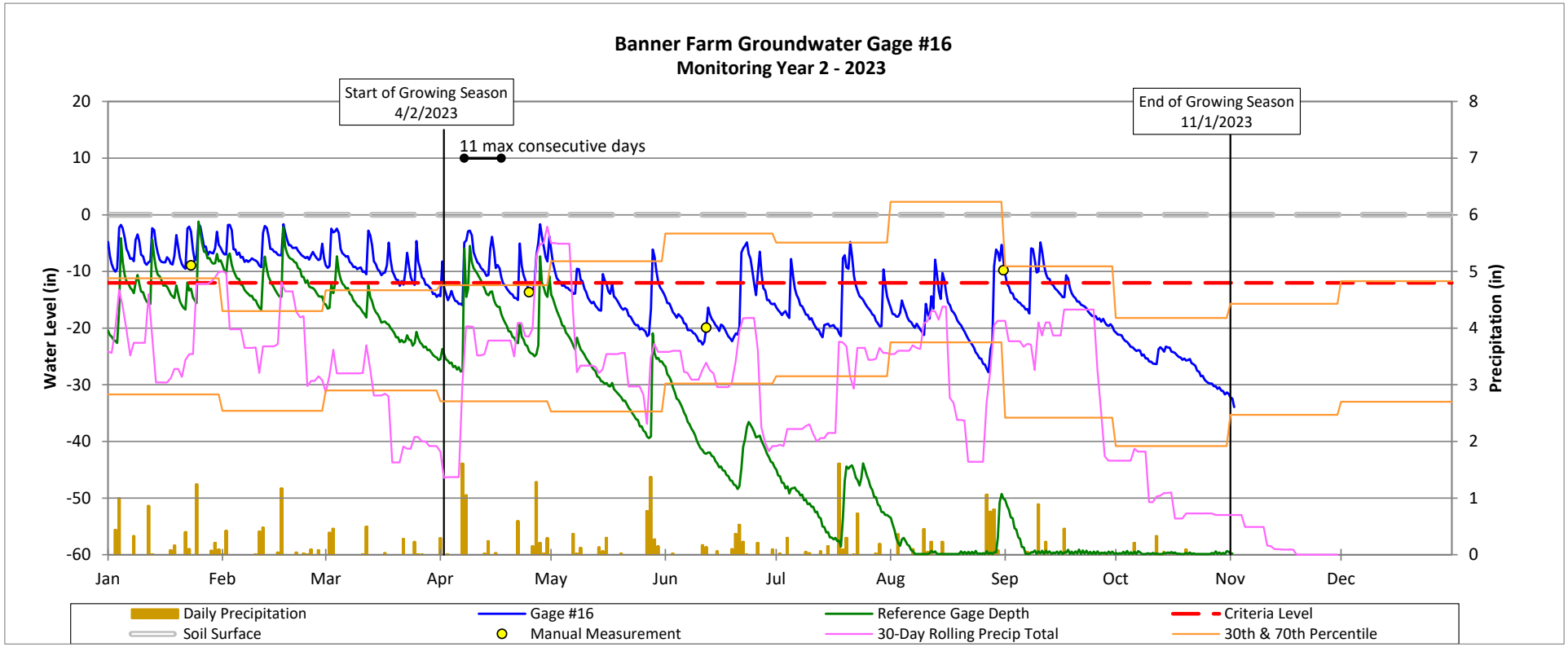
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



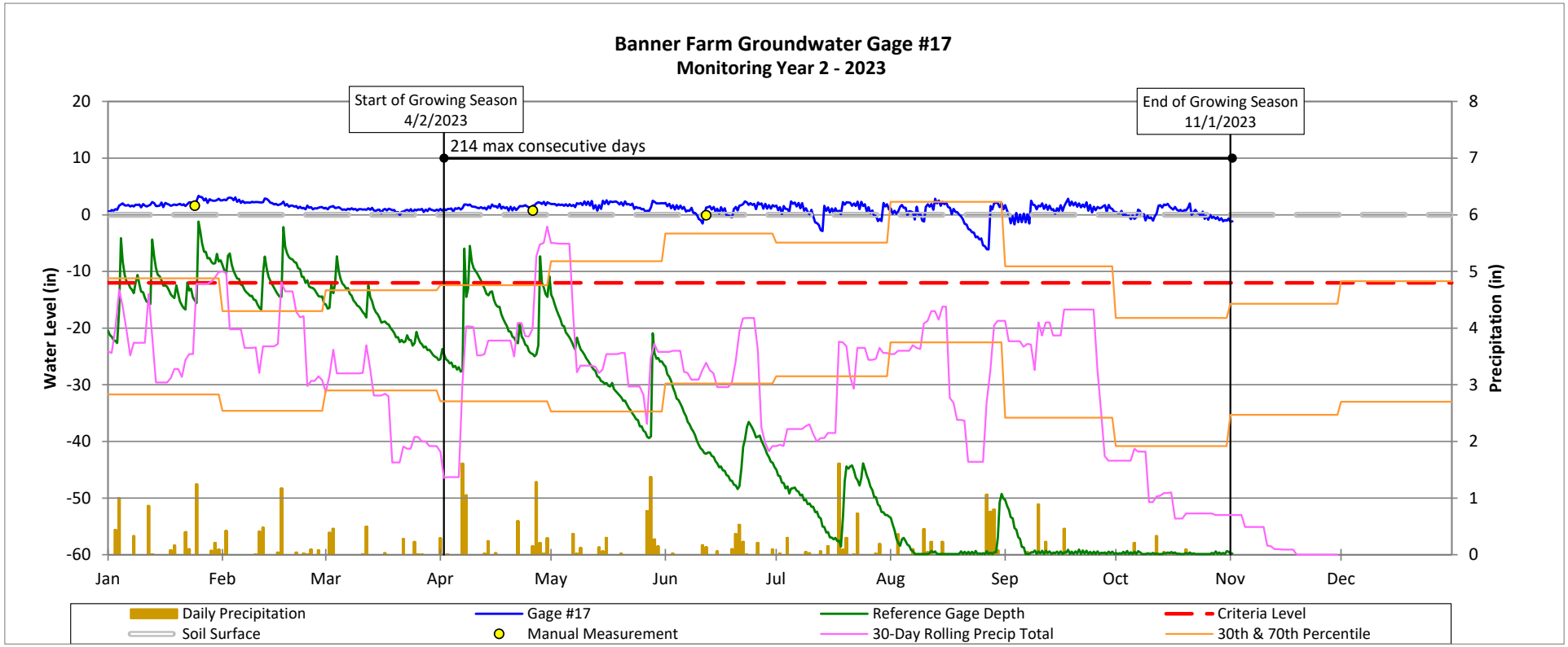
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



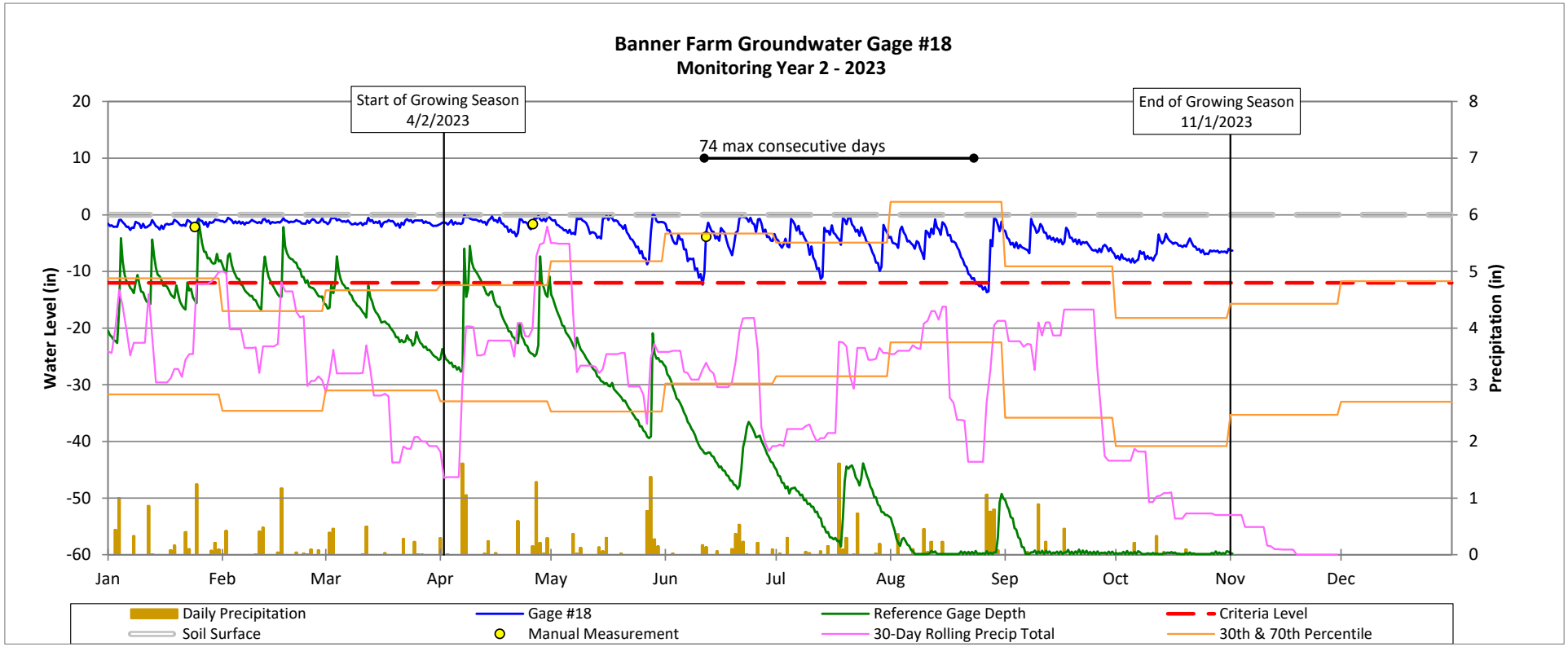
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Rehabilitation



Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Rehabilitation



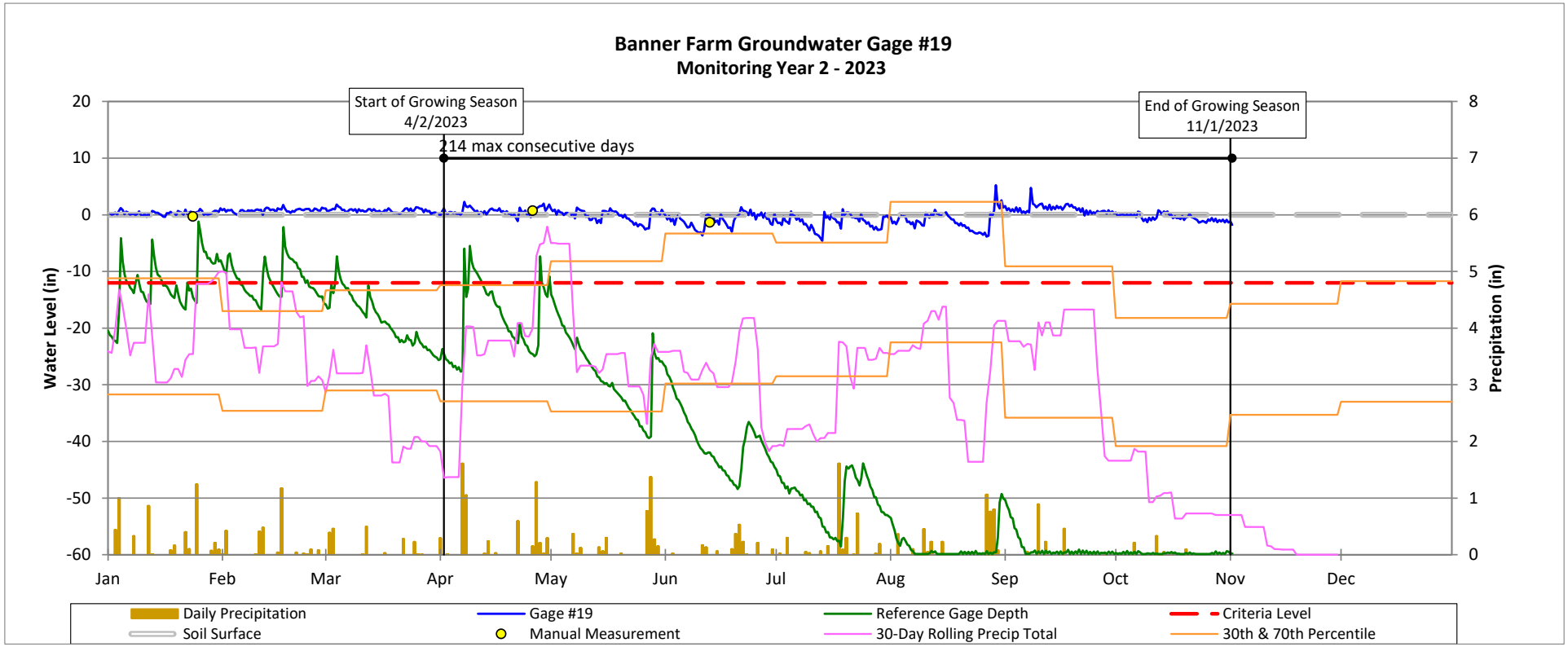
Groundwater Gage Plot

Banner Farm Mitigation Site

DMS Project No. 100062

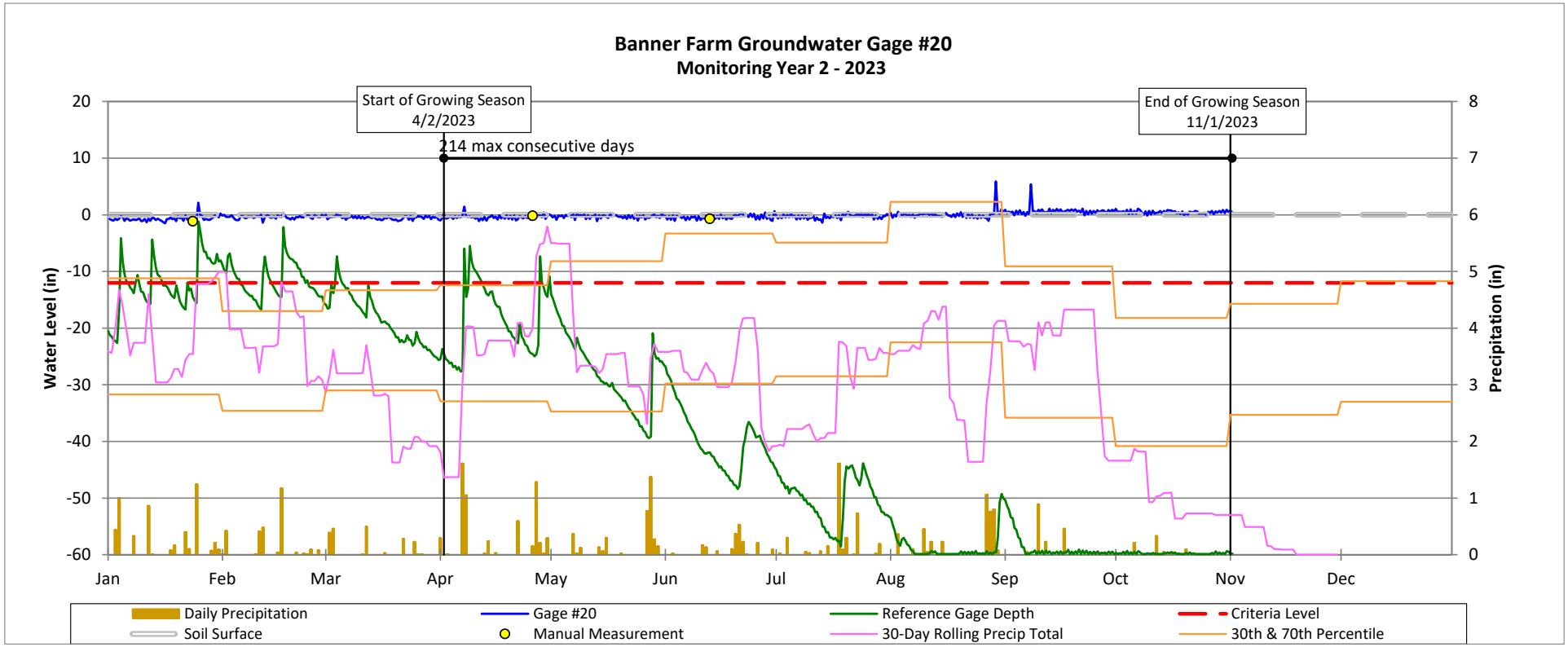
Monitoring Year 2 - 2023

Wetland Creation



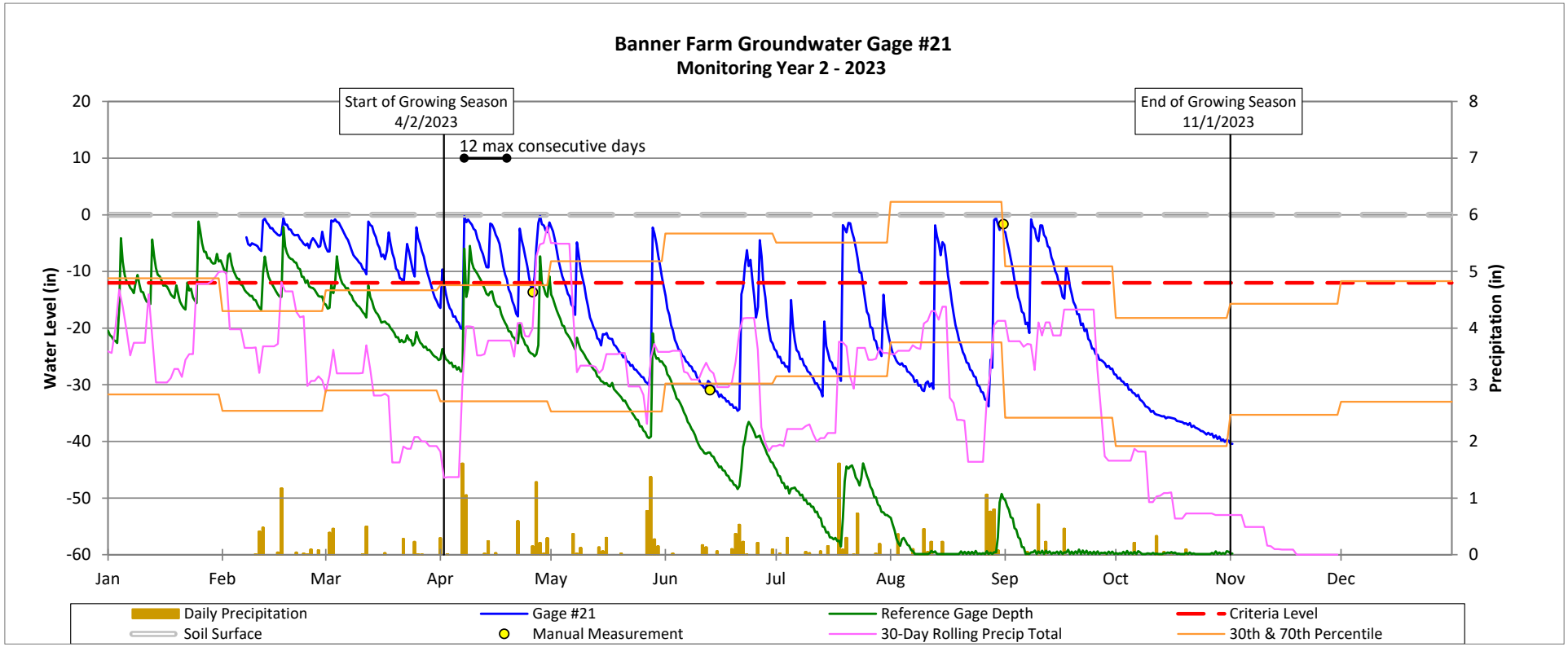
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Creation



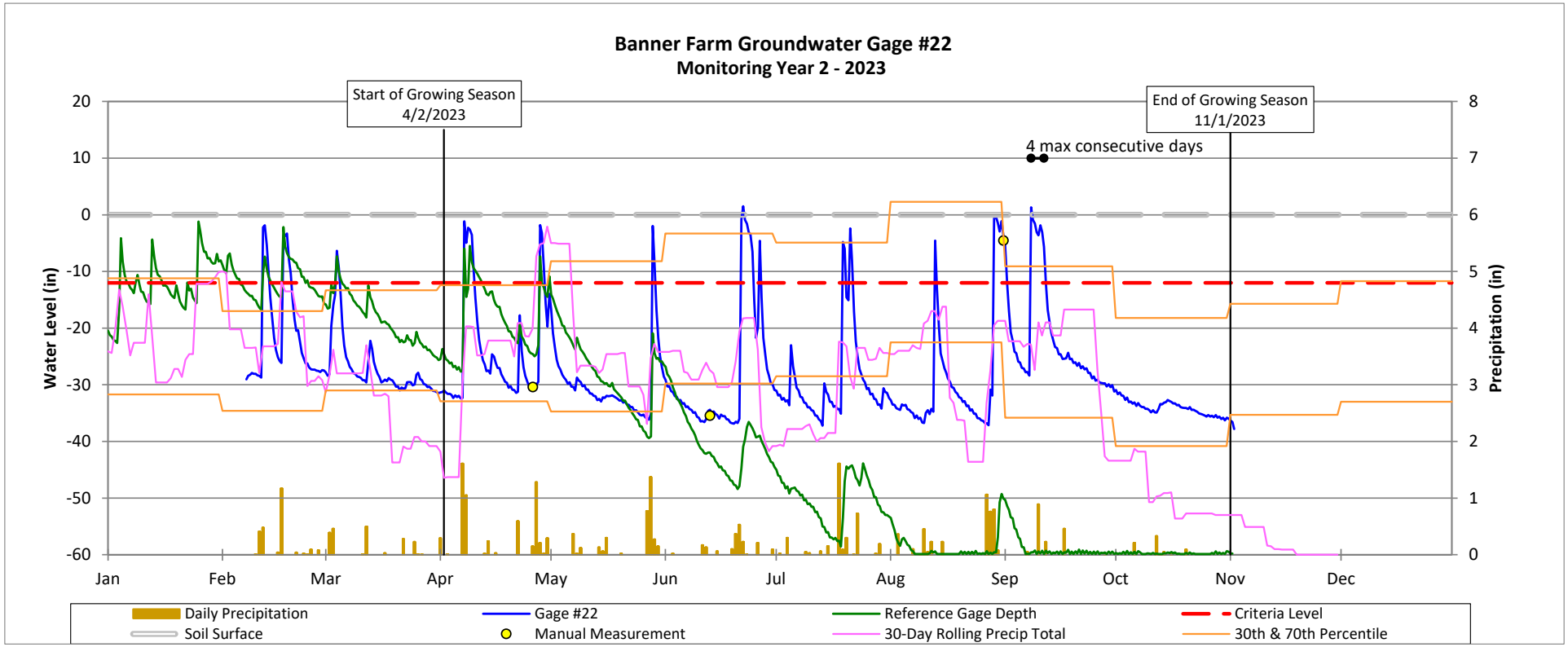
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



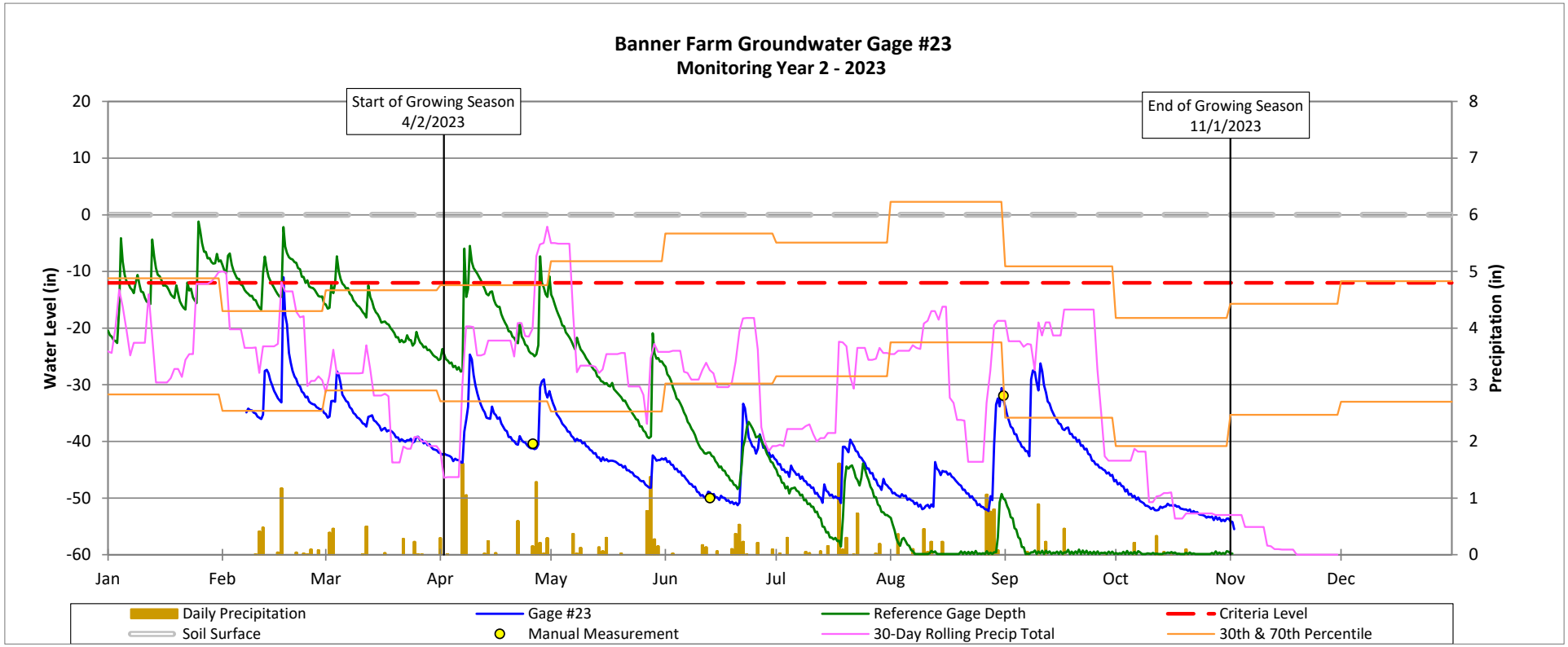
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



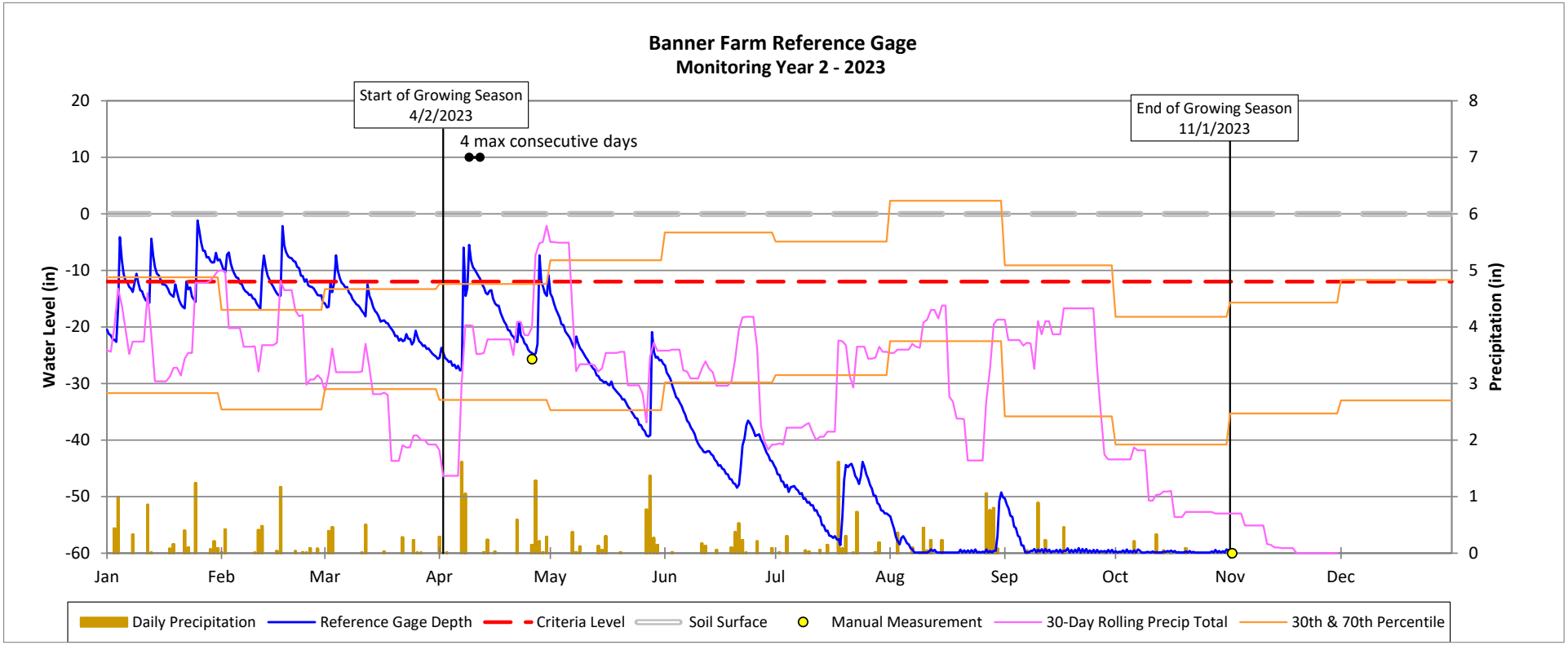
Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Wetland Re-establishment



Groundwater Gage Plot

Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023
Reference Wetland

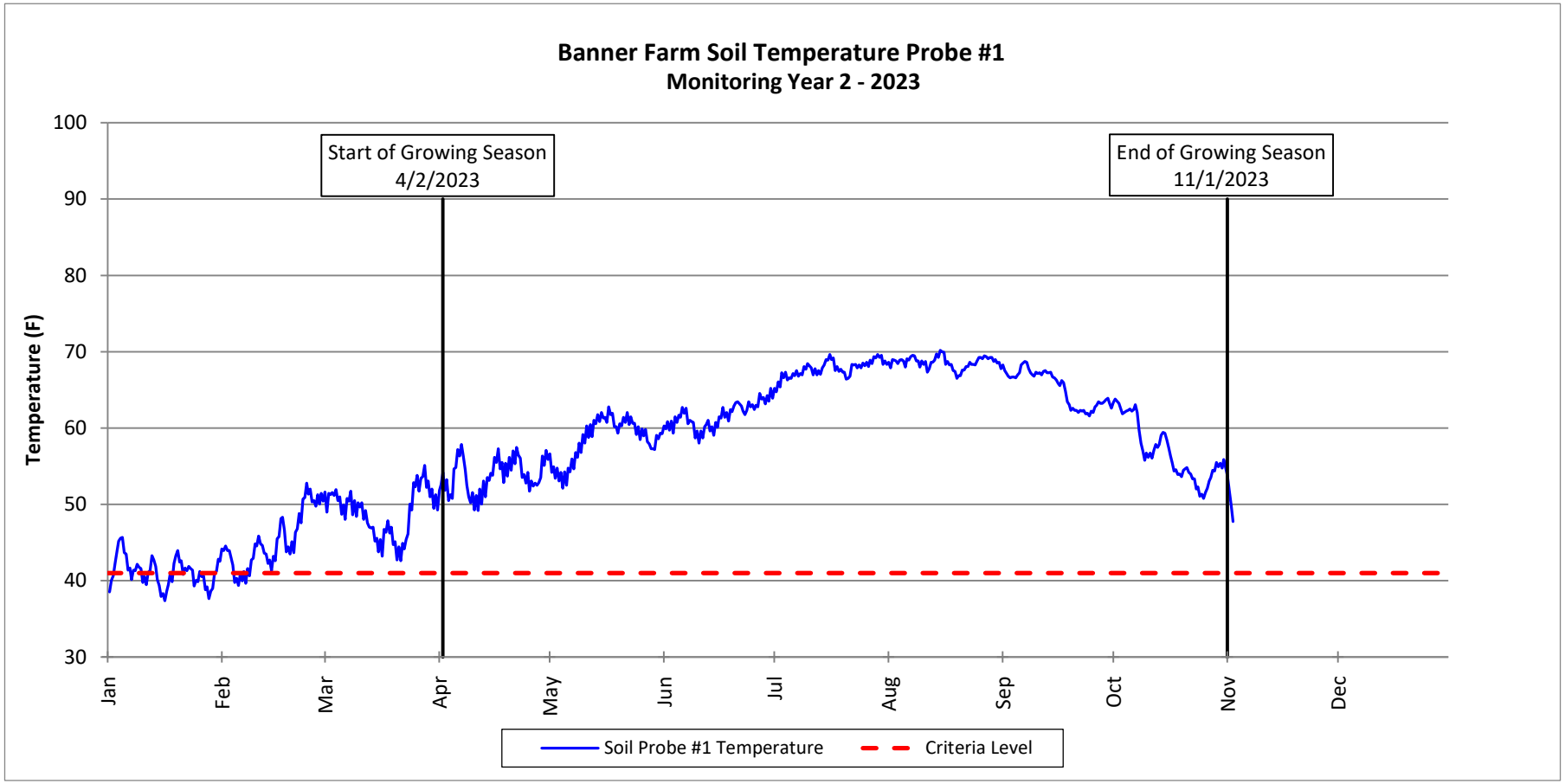


Soil Temperature Probe Plot

Banner Farm Mitigation Site

DMS Project No. 100062

Monitoring Year 2 - 2023

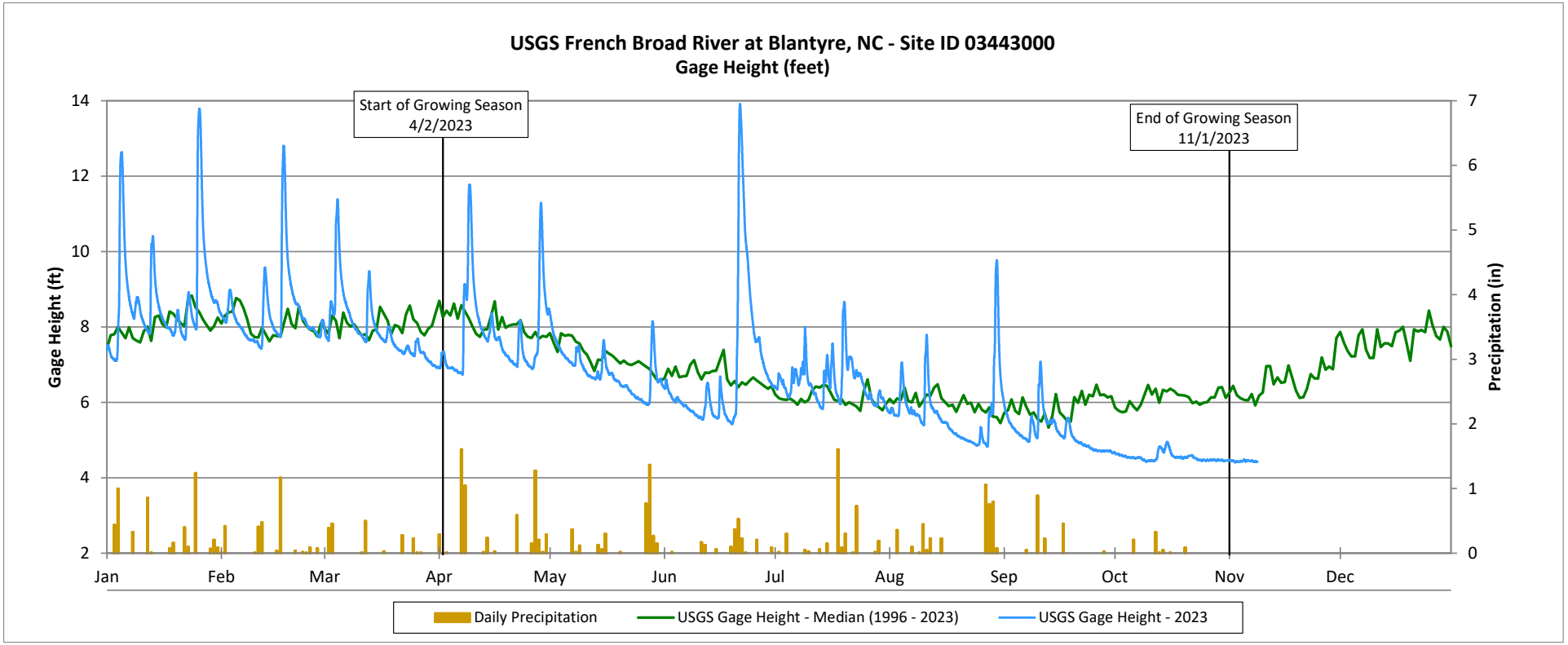


French Broad River Gage Height Plot

Banner Farm Mitigation Site

DMS Project No. 100062

Monitoring Year 2 - 2023



APPENDIX E. Project Timeline and Contact Information

Table 13. Project Activity and Reporting History
Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Activity or Deliverable		Data Collection Complete	Task Completion or Deliverable Submission
Project Instituted		N/A	April 2018
Mitigation Plan Approved		June 2020	June 2020
Construction (Grading) Completed		N/A	November 2021
Planting Completed		N/A	February 2022
As-Built Survey Completed		February 2022	February 2022
Baseline Monitoring Document (Year 0)	Stream Survey	February - March 2022	April 2022
	Vegetation Survey	February 2022	
Invasive Species Treatments		May, September, October 2022	November 2022
Stream Repair		October 2022	October 2022
Supplemental Herbaceous Plug Planting		September 2022	September 2022
Conservation Easement Boundary Maintenance		May, September, November 2022	November 2022
Year 1 Monitoring	Stream Survey	October 2022	November 2022
	Vegetation Survey	September 2022	
Invasive Species Treatments		March, April, May 2023	May 2023
Stream Bank Hand Repair		February 2023	February 2023
Supplemental plantings, soil amendments, and seeding		February - July 2023	July 2023
Conservation Easement Boundary Maintenance		January, May 2023	May 2023
Year 2 Monitoring	Stream Survey	June 2023	November 2023
	Vegetation Survey	July 2023	
Year 3 Monitoring	Stream Survey		
	Vegetation Survey		
Year 4 Monitoring			
Year 5 Monitoring	Stream Survey		
	Vegetation Survey		
Year 6 Monitoring			
Year 7 Monitoring	Stream Survey		
	Vegetation Survey		

Table 14. Project Contact Table
Banner Farm Mitigation Site
DMS Project No. 100062
Monitoring Year 2 - 2023

Designer Eric Neuhaus, PE	**Wildlands Engineering, Inc.** 167-B Haywood Rd. Asheville, NC 28806 828-774-5547
Construction Contractor	**Main Stream Earthwork, Inc.** 631 Camp Dan Valley Rd Reidsville, NC 27320
Monitoring Performers Monitoring, POC	**Wildlands Engineering, Inc.** Mimi Caddell 828-774-5547 x107