

ROY COOPER
Governor
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February 15, 2024

Sent via email: mdeangelo@res.us

Matthew Deangelo
RES

Subject: DMS Comments on the MY1 2023 Draft Report
Six Runs ID # 100170, DMS Contract # 0303-01

Matthew,

DMS received the MY1 2023 draft report on 12/22/23 and a site visit was conducted prior for an IRT as-built visit on 11/9/2023. DMS offers the following comments for the report period:

Report

1. Table of Contents - Section 1.2 does not reference Table 1 and Section 1.3 does not include reference to Tables 2 and 3.
2. Appendix A - Visual Stream Stability Assessment & Vegetation Condition Tables are not labeled Table 5 and Table 6 as described in the Table of Contents.
3. Appendix D – The Stream Stage/Flow and Groundwater Hydrographs start on March 30, 2023. In Section 1.5, project completion was March 3, 2023. Please state when gauges were installed in Sections 1.5.2 through 1.5.4.

Digital Review

1. Please include the required IRT approved wetland hydrology performance standard in the Groundwater Gauge Summary table in all future submissions. The inclusion of this standard enables the reviewer to accurately assess the project's success.

Please incorporate the revisions and responses to comment letter, one (1) hardcopy, and one (1) pdf copy along with any updated digital files that may be needed based on the comments above. If you have any questions or wish to discuss these comments further, please contact me at any time. I can be reached at (919) 218-0012, or via email at danielle.mir@deq.nc.gov

Sincerely,

A handwritten signature in blue ink, appearing to read "Danielle Mir".

Danielle Mir
Eastern Project Manager
NCDEQ Division of Mitigation Services

cc: Jamey McEachran



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February 27, 2024

Danielle Mir
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RE: DMS Comments on the MY1 Report Six Runs, Project ID #100170, DMS Contract #0303-01, RFP 16-20190303

Listed below are comments provided by DMS on February 15, 2024 regarding the Six Runs Stream and Wetland Mitigation Project Year 1 Monitoring Report and RES' responses.

Report Comments:

1. Table of Contents - Section 1.2 does not reference Table 1 and Section 1.3 does not include reference to Tables 2 and 3.
[The Table of Contents has been updated to reference the locations of Tables 1, 2, and 3 within the text.](#)
2. Appendix A - Visual Stream Stability Assessment & Vegetation Condition Tables are not labeled Table 5 and Table 6 as described in the Table of Contents.
[Tables 5 and 6 have been updated accordingly to include their respective titles.](#)
3. Appendix D – The Stream Stage/Flow and Groundwater Hydrographs start on March 30, 2023. In Section 1.5, project completion was March 3, 2023. Please state when gauges were installed in Sections 1.5.2 through 1.5.4.
[As stated in Section 1.5, project construction and planting were completed on March 3, 2023. However, all gauges were installed March 28, 2023, and the pressure transducers did not start recording data until March 30, 2023. The dates of gauge installation were added to Sections 1.5.2 through 1.5.4.](#)

Digital Comments:

1. Please include the required IRT approved wetland hydrology performance standard in the Groundwater Gauge Summary table in all future submissions. The inclusion of this standard enables the reviewer to accurately assess the project's success.
[The IRT performance standard for wetland hydrology, which states that the hydroperiod of each growing season must be at least 12%, has been included in both Tables 14 and 15 for easy reference.](#)

FINAL MONITORING YEAR 1 (MY1) REPORT **SIX RUNS STREAM AND WETLAND MITIGATION PROJECT**

Sampson County, North Carolina
Cape Fear River Basin
HUC 03030006

NCDMS Project #100170
DMS Contract #0303-01
RFP: 16-20190303
USACE Action ID: SAW-2020-01964 | DWR Project #20201798 v1



Provided by:



Resource Environmental Solutions, LLC
for Environmental Banc & Exchange, LLC

Prepared for:

NC Department of Environmental Quality
Division of Mitigation Services
1652 Mail Service Center
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February 2024

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1 Project Summary

1.1 Project Location and Description

The Six Runs Stream and Wetland Mitigation Project (Project) is located within Sampson County, approximately six and a half miles west of Faison, NC. The Project lies within the Cape Fear River Basin, North Carolina Department of Water Resources (NCDWR) sub-basin 03-06-19 and United States Geological Survey (USGS) 14-digit hydrologic unit code (HUC) 03030006110010 (Six Runs Creek Watershed; **Figure 1**). The Project was designed to help meet compensatory mitigation requirements for stream and wetland impacts in the HUC 03030006. The Project restores 5,788 linear feet (LF) and enhances 1,656 LF of stream as well as re-establishes 6.221 acres (ac), rehabilitates 4.913 ac, enhances 1.008 ac, and preserves 1.656 ac of wetlands that will ultimately provide water quality benefits and ecosystem uplift for the Project's 0.89 mi² (570 ac) drainage area.

The Project is comprised of a 30.94-acre easement located along Six Runs Creek, encompassing a portion of the Six Runs Creek floodplain and several tributaries. The Project involves Brad's Branch (a colloquial name for the primary tributary feature draining to Six Runs Creek), five of its unnamed tributaries, and riparian wetlands that all drain into Six Runs Creek which eventually drains south to the Black River. The stream and wetland mitigation components are summarized in **Table 1**. The upstream extent of the Project begins at a property boundary upstream of E Darden Road and the downstream extent ends within the Six Runs Creek swamp. The site is easily accessible from E Darden Road. Coordinates for the Project are as follows: 35.0962°, -78.2304°.

1.2 Project Components

Prior to restoration, the riparian corridors within the Project had been manipulated by agricultural practices over time, thereby adversely impacting both streams and wetlands. Most streams were degraded in varying degrees and were restored or enhanced to attain higher function. Non-jurisdictional areas of hydric soil within riparian areas were restored via re-establishment to improve both hydrologic and vegetative functions. Jurisdictional riparian wetland areas that were severely degraded in terms of vegetation and riparian function were rehabilitated to improve vegetative function and stream interaction. Other jurisdictional wetland areas that were partially forested but degraded from constant cattle pressure were enhanced to improve vegetative function. A small area of mixed, jurisdictional wetland types, including frequently inundated marsh and forested swamp, within the Six Runs floodplain, were preserved. Importantly, cattle no longer have access to the aquatic resources within the Project. These improvements to the Project will help meet the river basin needs expressed in the Division of Mitigation Services' (DMS) 2009 Cape Fear River Basin Restoration Priorities (RBRP).

Through stream restoration and enhancement, the Project presented 7,444 LF of stream mitigation, generating 6,660.599 Warm Stream Mitigation Units (SMUs). By incorporating wider buffers, the total adjusted SMUs for the Project amounted to 6,724.599 SMU (**Table 1**). Additionally, the Project presented 13.798 acres of wetland re-establishment, rehabilitation, enhancement, and preservation, generating 10.044 Riparian Wetland Mitigation Units (WMU; **Table 1**). Additional wetland areas amounting to 1.379 acres were presented that will not generate mitigation credit but are protected within the conservation easement. These asset numbers reflect those in the approved mitigation plan.

Table 1. Six Runs (#100170) Mitigation Quantities and Credits

Project Segment	Original Mitigation Plan Ft/Ac	As-Built Ft/Ac	Original Mitigation Category	Original Restoration Level	Original Mitigation Ratio (X:1)	Credits	Comments
Stream							
BB-A	452	452	Warm	E1	1.50000	301.333	Structure installation, supplemental planting, invasives treatment, livestock exclusion
BB-B	562	562	Warm	E1	1.50000	374.666	Structure installation, meander stabilization, supplemental planting, invasives treatment, livestock exclusion
BB-C	4,357	4,357	Warm	R	1.00000	4,357.000	Channel restoration, riparian planting, invasives treatment, livestock exclusion
DE2-A	231	231	Warm	E2	2.50000	92.400	ESP installation, supplemental planting, invasives treatment, livestock exclusion
DE2-B	156	156	Warm	R	1.00000	156.000	Channel restoration, riparian planting, invasives treatment, livestock exclusion
DE4-A	301	301	Warm	E2	5.00000	60.200	Supplemental planting, invasives treatment, livestock exclusion
DE4-B	992	992	Warm	R	1.00000	992.000	Channel restoration, riparian planting, invasives treatment, livestock exclusion
DE7	112	108	Warm	R	1.00000	112.000	Channel restoration, riparian planting, invasives treatment, livestock exclusion
DE8	171	171	Warm	R	1.00000	171.000	Hydrologic reconnection, channel restoration, riparian planting, invasives treatment, livestock exclusion
MT2	110	110	Warm	E2	2.50000	44.000	Supplemental planting, invasives treatment, livestock exclusion
Wetland							
WC-1	4.903	4.859	R	RH	1.50000	3.269	Reconnect to stream via stream restoration, wetland planting, livestock exclusion
WC-2	1.656	1.656	R	P	10.00000	0.166	Livestock exclusion
WD	0.010	0.009	R	RH	1.50000	0.007	Reconnect to stream via stream restoration, riparian planting, livestock exclusion
WE-1	0.411	0.410	R	E	5.00000	0.082	Supplemental planting, invasives treatment, livestock exclusion
WE-2	0.597	0.586	R	E	2.00000	0.299	Wetland planting, invasives treatment, livestock exclusion
WL	5.759	5.693	R	REE	1.00000	5.759	Stream restoration, spoil/berm removal/grading, native planting, livestock exclusion
WM	0.462	0.457	R	REE	1.00000	0.462	Stream restoration, spoil/berm removal/grading, native planting, livestock exclusion

Project Credits

Restoration Level	Stream			Riparian	Non-Rip	Coastal
	Warm	Cool	Cold	Wetland	Wetland	Marsh
Restoration	5,788.000					
Re-establishment				6.221		
Rehabilitation				3.276		
Enhancement				0.082		
Enhancement I	675.999			0.299		
Enhancement II (2.5)	136.400					
Enhancement II (5.0)	60.200					
Creation						
Preservation				0.166		

Totals 6,660.599

Non-Standard Buffer

Width Adjustment 64.00
 Total Stream Credit 6,724.599
 Total Wetland Credit 10.044

1.3 Project Goals and Objectives

Prior to construction the streams and wetlands had been significantly impacted by historic relocation and straightening of stream channels, hay production, cattle farming, and lack of riparian buffer. The past land use disturbances, absence of buffer vegetation, and current agricultural practices presented a significant opportunity for water quality and ecosystem improvements through the implementation of this Project. Through the comprehensive analysis of the Project's maximum functional uplift using the Stream Functions Pyramid Framework, specific, attainable goals and objectives are being realized by the Project. These goals clearly help to address the degraded hydrology, water quality, and habitat from agricultural practices that were identified as major watershed stressors in the DMS 2009 Cape Fear River Basin Restoration Priorities (RBRP) and within DMS' Targeted Resource Areas (TRA). Ultimately, the Project supports DMS' watershed goals listed in the Approved Mitigation Plan. The Project Summary Goals, Performance, and Results are provided below in **Table 2**. The Project Attributes are found in **Table 3**.

Table 2. Project Summary Goals, Performance, and Results

Objective	Treatment	Monitoring Metric	Success Criteria	Measurement	Cumulative Monitoring Results
Improve the transport of water from the watershed to the Project reaches in a non-erosive way and maintain appropriate wetland hydrology for Bibb and Johnston soil series	Converted land-use of some Project reaches from pasture to riparian forest. Restored and enhanced wetland hydrology through stream restoration activities and spoil removal	Groundwater wells with pressure transducers: Downloaded quarterly	Water table within 12 inches of the ground surface for 12% of growing season (approx. 31 days) <u>Growing season: 3/14 - 11/22</u>	11 groundwater wells	3/11 passed - MY1
Improve flood-bank connectivity by reducing bank height ratios and increase entrenchment ratios Maintain regular, seasonal flow in restored, intermittent streams	Reduced bank height ratios and increased entrenchment ratios by reconstructing channels to mimic reference reach conditions	Stage recorders: Inspected semiannually	Four bankfull events occurring in separate years	Continuous stage recorders on BB-C upper, DE4-A, and BB-C lower	3/3 BF Events - MY1
		Flow gauges: Inspected quarterly	30+ days of continuous flow each year	Flow gauges on BB-A, DE7, DE2-A, DE8, and MT2	4/5 passed - MY1
		Cross sections: Surveyed in MY 1, 2, 3, 5 and 7	Bank height ratio shall not exceed 1.2	36 Cross section surveys	36/36 with BHR<1.2 - MY0 36/36 with BHR<1.2 - MY1
Limit erosion rates and maintain channel stability Improve bedform diversity (pool spacing, percent riffles, etc.) Increase buffer width to 50 feet	Established a riparian buffer to reduce erosion and sediment transport into project streams. Established stable banks with livestock, erosion control matting, and other in stream structures.	As-built stream profile	N/A	N/A	Survey conducted
		Cross sections: Surveyed in MY 1, 2, 3, 5 and 7	Bank height ratio shall not exceed 1.2	36 Cross section surveys	36/36 with BHR<1.2 - MY0 36/36 with BHR<1.2 - MY1
		Visual monitoring: Performed at least semiannually	Identify and document significant stream problem areas; i.e. erosion, degradation, aggradation, etc.	Visual Assessment conducted	No problem areas - MY0 No problem areas - MY1
		Vegetation plots: Surveyed in MY 1, 2, 3, 5 and 7	MY 1-3: ≥320 trees/acre MY 5: ≥260 trees/acre (7 ft. tall) MY 7: ≥210 trees/acre (10 ft. tall)	13 fixed veg plots and 6 random plots (19 total)	19/19 passed - MY0 18/19 passed - MY1
Promote sediment filtration, nutrient cycling, and organic accumulation through natural wetland biogeochemical processes Establish native hardwood riparian buffer Protect aquatic resources in perpetuity	Restored and enhance wetland hydrology Planted a riparian buffer Established permanent conservation easement	Groundwater wells with pressure transducers: Downloaded quarterly	Water table within 12 inches of the ground surface for 12% of growing season (approx. 31 days) <u>Growing season: 3/14 - 11/22</u>	11 groundwater wells installed	3/11 passed - MY1
		Vegetation plots: Surveyed in MY 1, 2, 3, 5 and 7	MY 1-3: ≥320 trees/acre MY 5: ≥260 trees/acre (7 ft. tall) MY 7: ≥210 trees/acre (10 ft. tall)	13 fixed veg plots and 6 random plots (19 total)	19/19 passed - MY0 18/19 passed - MY1
		Visual assessment of established fencing and conservation signage: Performed at least semiannually	Inspect fencing and signage. Identify and document any damaged or missing fencing and/or signs	Visual Assessment conducted	Fencing and signage are in place - MY0 Fencing and signage are in place - MY1

Table 3. Project Attributes

Table 3. Project Attribute Table															
Project Name	Six Runs Stream and Wetland Mitigation Project														
County	Sampson														
Project Area (acres)	30.94														
Area to be planted (acres)	22.59														
Project Coordinates (latitude and longitude decimal)	35.0962°, -78.2304°														
Project Watershed Summary Information															
Physiographic Province	Rolling Coastal Plain														
River Basin	Cape Fear														
USGS Hydrologic Unit 8-	3030006														
DWR Sub-basin	03-06-19														
Project Drainage Area (acres)	570														
Project Drainage Area Percentage of Impervious Area	1%														
Land Use Classification	Agriculture, forest, residential														
Reach Summary Information															
Parameters	BB-A	BB-B	BB-C	DE2-A	DE2-B	DE3	DE4-A	DE4-B	DE7	DE8	MT2				
Pre-project length (feet)	453	572	4207	231	114	128	301	667	251	61	110				
Post-project (feet)	452	562	4357	231	156	0	301	992	112	171	110				
Valley confinement (Confined, moderately confined, unconfined)	Moderately confined	Moderately confined	Unconfined	Moderately confined	Moderately confined	NA	Unconfined	Unconfined	NA	Moderately confined	Moderately confined				
Drainage area (acres)	93	125	570	N/A	10	26	287	295	21	26	9				
Perennial, Intermittent, Ephemeral	Intermittent	Intermittent	Perennial	Intermittent	Intermittent	Intermittent	Perennial	Perennial	Intermittent	Intermittent	Intermittent				
NCDWR Water Quality Classification	C, Sw	C, Sw	C, Sw	C, Sw	C, Sw	C, Sw	C, Sw	C, Sw	C, Sw	C, Sw	C, Sw				
Dominant Stream Classification (existing)	C4/5	G4/5c	G4/5c - F4/5	E5	E5	F5	C5	G4/5c - F4/5	G5c	F5b	E4/5				
Dominant Stream Classification (proposed)	C4/5	G4/5c	C4/E4	E5	C4b	N/A	C5	C4/E4	B4a to E4	C4/E4	E4/5				
Dominant Evolutionary class (Simon) if applicable	III	III	IV	II	II	III	I	III	III	II	I				
Wetland Summary Information															
Parameters	WA	WB	WC-1	WC-2	WD	WE-1	WE-2	WF	WG	WH	WI	WJ	WK	WL	WM
Pre-project (acres)	0.081	0.057	5.146	1.656	0.016	0.849	0.767	0.348	0.002	0.057	0.204	0.123	0.034	0	0
Post-project (acres)	0.081	0.057	4.903	1.656	0.01	0.848	0.689	0.299	0.001	0.057	0.198	0.123	0.034	5.759	0.462
Wetland Type (non-riparian, riparian)	Riparian	Riparian	Riparian	Riparian	Riparian	Riparian	Riparian	Riparian	Riparian	Riparian	Riparian	Riparian	Riparian	Riparian	Riparian
Mapped Soil Series	Norfolk loamy sand	Norfolk loamy sand	Bibb and Johnston soils	Bibb and Johnston soils	Bibb and Johnston soils	Bibb and Johnston soils	Bibb and Johnston soils	Bibb and Johnston soils	Bibb and Johnston soils	Bibb and Johnston soils	Bibb and Johnston soils	Bibb and Johnston soils	Bibb and Johnston soils	Bibb and Johnston soils	Bibb and Johnston soils
Soil Hydric Status	Non-hydric	Non-hydric	Hydric	Hydric	Hydric	Hydric	Hydric	Hydric	Hydric	Hydric	Hydric	Hydric	Hydric	Hydric	Hydric
Regulatory Considerations															
Parameters	Applicable?	Resolved?	Supporting Docs?												
Water of the United States - Section 404	Yes	No	PCN												
Water of the United States - Section 401	Yes	No	PCN												
Endangered Species Act	Yes	Yes	Mitigation Plan												
Historic Preservation Act	Yes	Yes	Mitigation Plan												
Coastal Zone Management Act (CZMA or CAMA)	No	N/A	N/A												
FEMA Floodplain Compliance	Yes	No	Mitigation Plan												
Essential Fisheries Habitat	No	N/A	N/A												
DOT Right-of-way Permit	Yes	Yes	N/A												

1.4 Construction and As-Built Conditions

Project construction was completed on March 3rd, 2023, and planting was completed on March 3rd, 2023. The Six Runs Project was built to design plans and guidelines with some minor modifications. Such modifications are summarized below:

- Added several Post-Assisted Log Structures (PALS) to reaches BB-A/B;
- Swapped several brush toes for stone toes;
- Swapped two brush toes for sod mats in lower portion of reach BB-C;
- Added floodplain sills in very wet areas susceptible to erosion;
- Minor alignment change at upper segment of BB-C – This was a design revision in the Final Construction Plans. This did not result in change in LF.
- Minor alignment change at lower segment of DE7 – This was a field-adjustment to avoid an existing mature tree. This resulted in minor loss of LF.

Also, note that fencing was not surveyed in the areas surrounding reaches BB-A/B (above E Darden Rd.); however, fencing was installed and verified in the field. The missing areas will be surveyed as soon as possible and will be provided in the Final As-built Survey and Baseline Monitoring Report.

The as-built survey and record drawings are included in **Appendix F**.

There were no changes to the planting plan (Table 7 in **Appendix B**). Minor monitoring device location changes were made during as-built installation, however, the quantities remained as proposed in the Mitigation Plan.

1.5 Year 1 Monitoring Performance (MY1)

The Six Runs Year 1 Monitoring activities were performed in November 2023. All Baseline Monitoring data is presented below and in the appendices. The Project is on track to meeting stream, wetland, and vegetation interim success criteria.

1.5.1 Vegetation

Monitoring of the 13 permanent vegetation plots and six random vegetation plots was completed on November 8th, 2023. Vegetation data is in **Appendix B**, and associated photos and plot locations are in **Appendix A**. MY1 monitoring data indicates that 18 of 19 plots exceed the interim success criteria of 320 planted stems per acre. Planted stem densities ranged from 283 to 972 planted stems per acre with a mean of 586 planted stems per acre across all plots. A total of 21 planted species were documented within the plots. The average stem height in the vegetation plots was 2.0 feet. Data at one random vegetation plot, (RVP-6) located in the riparian area of reach DE4-B, represented only 283 stems per acre. This back-calculates to being one tree short of the success criterion within the plot. However, a portion of this plot was located in an existing forested area that was only supplementally planted at a much lower density. In fact, if existing, mature trees within the plot had been counted, the stem density would have exceeded the 320 stems per acre success criterion. With that said, RES will continue performing random plots in the same general area in future years.

Visual assessment of vegetation outside of the monitoring plots indicates that herbaceous vegetation is established throughout the project area (**Appendix A**). Small clusters of cattails were observed sporadically

throughout floodplain areas but are currently too small to map. However, RES is aware that they could become more widespread in the future and will assess again in 2024 and remediate, if necessary.

1.5.2 Stream Hydrology

Three stage recorders and five flow gauges were installed on March 28th, 2023, and continue to record stream hydrology events. The stage recorders are in place to document bankfull events. Two stage recorders were installed on BB-C and one was installed on DE-4.

- The stage recorder on BB-C DS (the downstream of BB-C) recorded three bankfull events in MY1 with the highest reading being 0.67 feet above the top of bank.
- The stage recorder on BB-C US (upstream of BB-C) recorded four bankfull events in MY1 with the highest reading being 0.49 feet above the top of bank.
- The stage recorder on DE4-B recorded five bankfull events in MY1 with the highest reading being 0.91 feet above the top of bank.

The flow gauges are in place to document the presence and persistence of stream flow in intermittent channels. One flow gauge was installed on each of the reaches: BB-A, MT2, DE7, DE2-B, and DE8.

- The flow gauge on BB-A documented 71 consecutive days of flow.
- The flow gauge on MT2 documented 18 consecutive days of flow.
 - o MT2 is an Enhancement II reach where cattle exclusion was the primary activity to provide functional uplift. With two consecutive dry years and data only being collected since March 30th, 2023, RES is confident that flow success criterion will be met during a normal wet season.
- The flow gauge on DE7 documented 222 consecutive days of flow.
- The flow gauge on DE2-B documented 142 consecutive days of flow.
- The flow gauge on DE8 documented 148 consecutive days of flow.

Stream hydrology data is presented in **Appendix D**, gauge locations can be found on **Figures 2a-c**, and photos are in **Appendix A**.

1.5.3 Stream Geomorphology

Geomorphology data collection for MY1 was collected on November 8th, 2023. Summary tables and cross section plots are in **Appendix C**. Overall, the MY1 cross sections relatively match the proposed design and as-built condition. MY1 conditions show that shear stress and velocities have been reduced for all restoration reaches. All reaches were designed as gravel bed channels and remain classified as gravel bed channels post-construction.

Visual assessment of the stream channel was performed to document signs of instability, such as eroding banks, structural instability, or excessive sedimentation. The channel is transporting sediment as designed and will continue to be monitored for aggradation and degradation (**Appendix C**). RES noted significant aquatic and/or wetland vegetation throughout much of the stream channels. Since construction of the stream, abnormally dry conditions have persisted while floodplain herbaceous vegetation has thrived. This combination has led to favorable conditions for in-channel vegetation to also thrive. RES feels that with adequate precipitation and future, flushing flows will alleviate some of the issue. However, RES will continue to monitor the situation and report the condition and propose remedial action, if necessary, in MY2.

1.5.4 Wetland Hydrology

Six wetland gauges were installed in wetland re-establishment areas; two were installed in wetland enhancement areas; two were installed in wetland rehabilitation areas; and one was installed in a wetland preservation area to serve as references. These gauges were installed on March 28th, 2023.

Data recorded in MY1 demonstrates consecutive hydroperiods ranging from two to 58 percent across all wetland gauges onsite. Only three of 11 wetland gauges met the 12 percent hydroperiod. GW3, GW4, GW5, GW7, and GW9 fell short of the 12 percent success criteria with hydroperiods ranging from two to seven percent. None of the wetland gauges in re-establishment areas passed while one in a rehabilitation area also did not pass. Unfortunately, there is no data to be reported for GW1, GW2, or GW11 for various reasons. GW1 appeared to be in working condition, but the data files retrieved are corrupt or there was some other malfunction with the pressure transducer data logger. RES is attempting to see if any lost data can be retrieved but will replace the transducer regardless. The transducer in GW2 had died prior to downloading. This wetland gauge has been in place for several years as it was in place to document pre-existing conditions. However, the transducer was replaced on November 8th, 2023. RES discovered the transducer in GW11 to be missing, likely from an animal or trespasser. It was also replaced on November 8th, 2023.

Though MY1 data presents generally underwhelming hydroperiods, RES does not believe this will be a trend in future years under normal rainfall conditions. The combination of two consecutive years of abnormally dry climate resulting in depressed water tables across the landscape as well as post-construction ground disturbance, has surely affected wetland hydrology. Further, according to the licensed soil scientists' hydric soil report for the Project, it is reasonable to expect lower hydroperiods in the first year:

For the first year after construction, it may be practical to expect a hydroperiod of less than 12 percent if rainfall patterns are below normal as deep soil becomes saturated and a higher groundwater table becomes established.

RES will continue to monitor wetland hydrology and will also take note of establishing hydrophytic vegetation to supplement wetland data in future monitoring reports.

Wetland gauge locations can be found in **Figures 2a-c**.

Soil characterization forms, recorded for each groundwater well, can be found in the **MY0 Baseline Monitoring Report, Appendix D**.

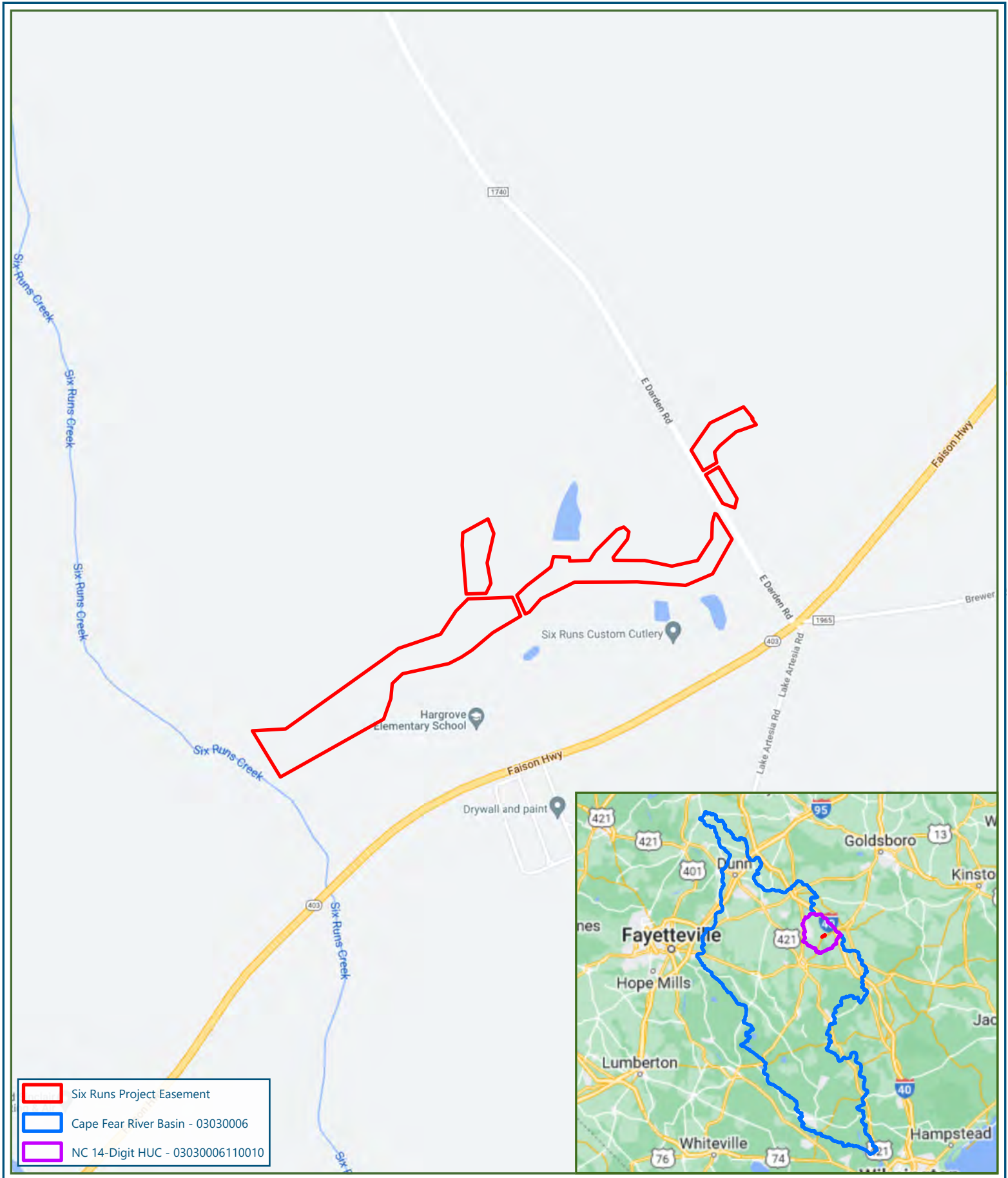
It also appears that extensively more wetland area is being restored and/or created in the riparian areas along Brad's Branch above where mitigation credit is currently being generated. RES plans to investigate these areas further in 2024 and may opt to install additional wetland gauges to document hydrology to determine potential viability for wetland mitigation.

2 References

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Appendix A

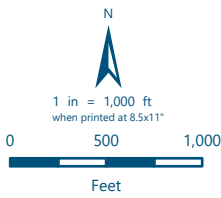
Visual Assessment Data



- Six Runs Project Easement
- Cape Fear River Basin - 03030006
- NC 14-Digit HUC - 03030006110010

Figure 1
Project Vicinity

Six Runs
Sampson County, North Carolina
78.2361°W 35.0952°N



Reference: This information is not to be used as final legal boundaries.
Data Source: USGS, GoogleMaps
Spatial Reference: NAD 1983 StatePlane North Carolina FIPS 3200



Figure 2a
Current Conditions Plan View

MY1 2023

Six Runs
Sampson County, North Carolina
78.2361°W 35.0952°N

- Recorded Easement (30.94 ac.)
- Wetland Approach**
- Re-establishment
- Rehabilitation (1.5)
- Enhancement (High) (2)
- Enhancement (Low) (5)
- Preservation (10)
- No Credit
- Stream Approach**
- Restoration
- Enhancement I (1.5)
- Enhancement II (2.5)
- Enhancement II (5)
- No Credit
- Stream Structures
- As-built Top of Bank
- Fencing

Vegetation Condition Assessment

Invasive Species	Target Community		
	Present	Marginal	Absent
Absent			
Present			



Reference: This information is not to be used as final legal boundaries.
Imagery Source: Google
Spatial Reference: NAD 1983 StatePlane North Carolina FIPS 3200 Feet
Date Exported: 12/22/2023

- Vegetation Plots**
- MY1 Fixed: >320 stems/ac.
 - MY1 Random: >320 stems/ac.
 - MY1 Random: <320 stems/ac.
 - MY0 Random Vegetation Plot
 - Cross section
 - Stage Recorder
 - Flow Gauge
- Wetland Gauges**
- >12% Hydroperiod
 - 5-11% Hydroperiod
 - <5% Hydroperiod
 - No Data

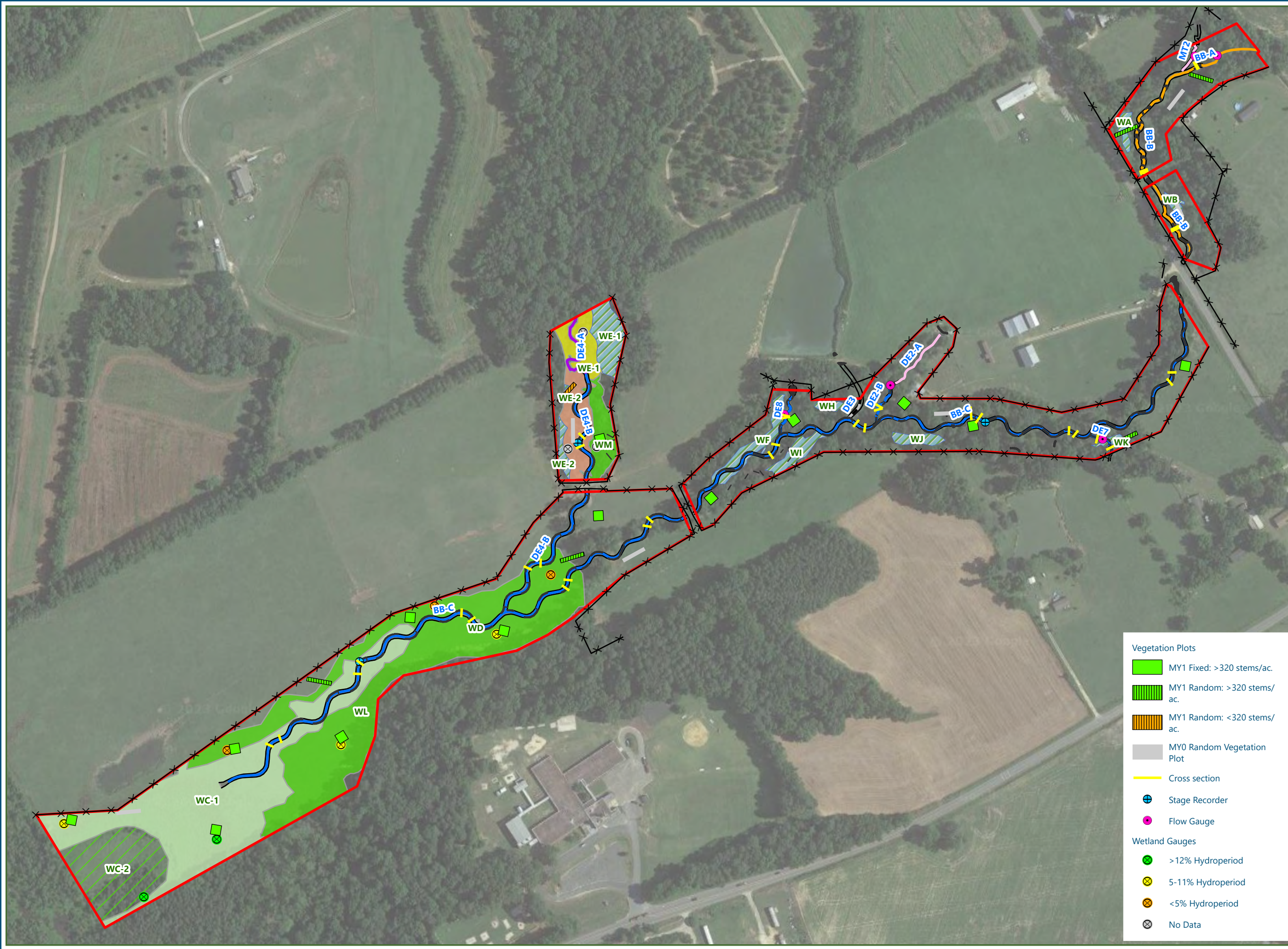
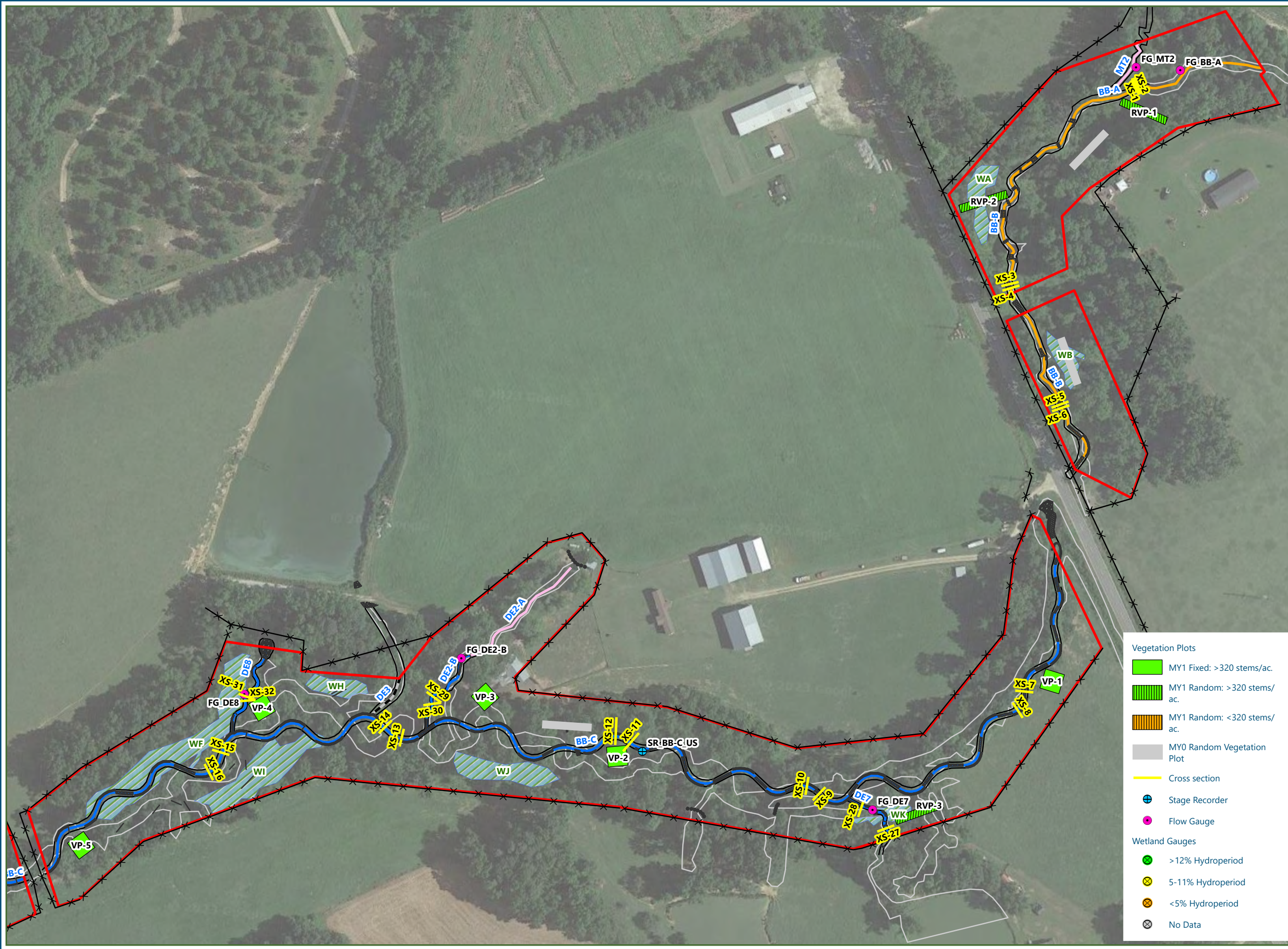


Figure 2b
Current Conditions Plan View

MY1 2023

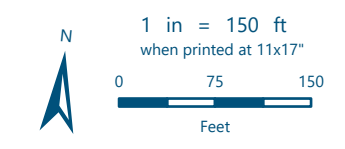
Six Runs
Sampson County, North Carolina
78.2325°W 35.097°N



- Recorded Easement (30.94 ac.)
- Wetland Approach**
- Re-establishment
- Rehabilitation (1.5)
- Enhancement (High) (2)
- Enhancement (Low) (5)
- Preservation (10)
- No Credit
- Pre-existing Top of Bank
- Stream Approach**
- Restoration
- Enhancement I (1.5)
- Enhancement II (2.5)
- Enhancement II (5)
- No Credit
- Stream Structures
- As-built Top of Bank
- Fencing

Vegetation Condition Assessment

Invasive Species	Target Community		
	Present	Marginal	Absent
Absent			
Present			



- MY1 Fixed: >320 stems/ac.
- MY1 Random: >320 stems/ac.
- MY1 Random: <320 stems/ac.
- MY0 Random Vegetation Plot
- Cross section
- Stage Recorder
- Flow Gauge
- Wetland Gauges**
- > 12% Hydroperiod
- 5-11% Hydroperiod
- <5% Hydroperiod
- No Data

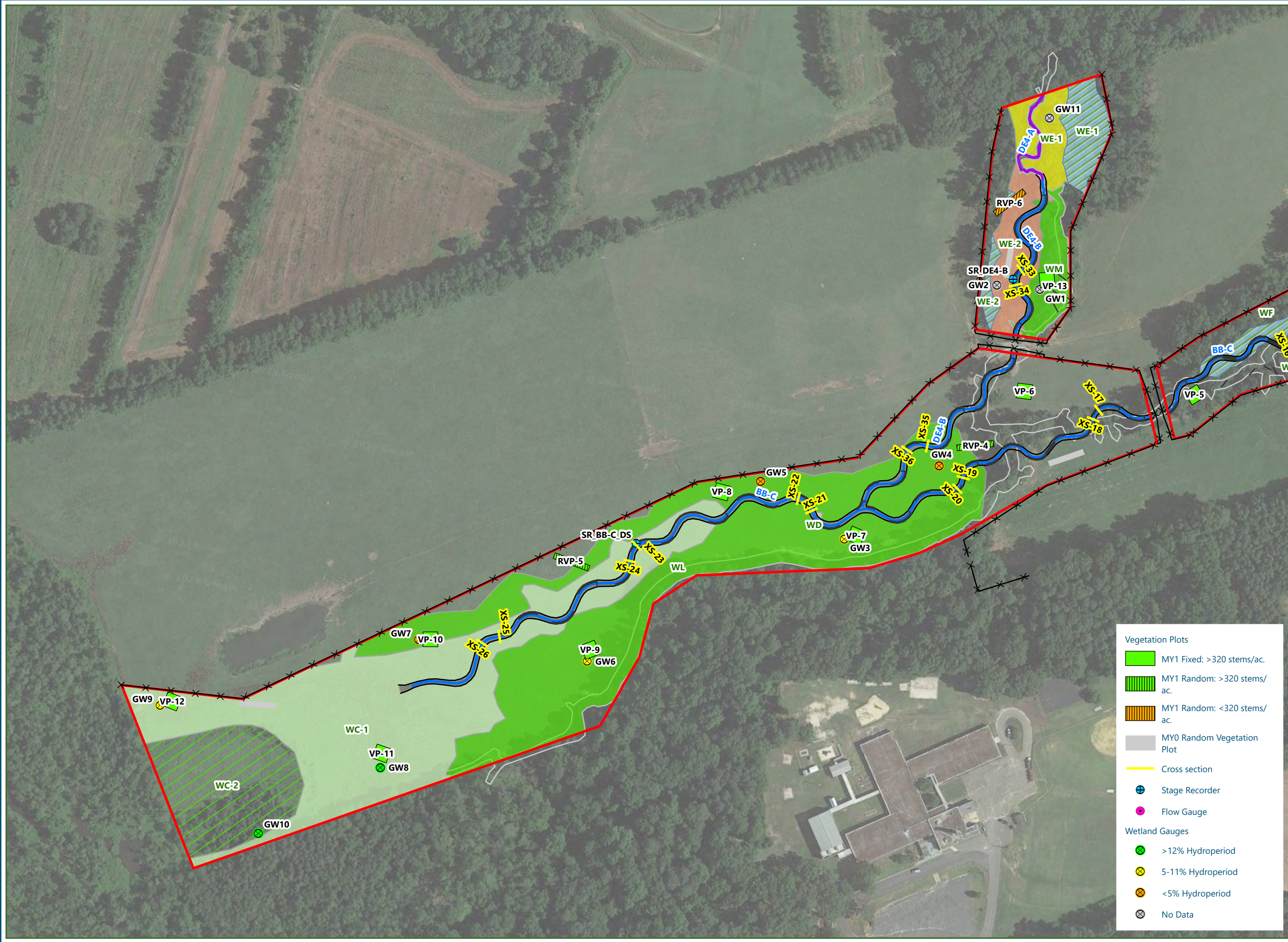
Reference: This information is not to be used as final legal boundaries.
 Imagery Source: Google
 Spatial Reference: NAD 1983 StatePlane North Carolina FIPS 3200 Feet
 Date Exported: 12/22/2023



Figure 2c
Current Conditions Plan View

MY1 2023

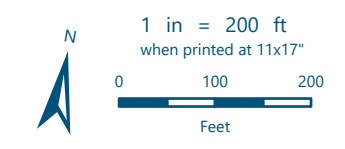
Six Runs
Sampson County, North Carolina
78.2394°W 35.094°N



- Recorded Easement (30.94 ac.)
- Wetland Approach**
- Re-establishment
- Rehabilitation (1.5)
- Enhancement (High) (2)
- Enhancement (Low) (5)
- Preservation (10)
- No Credit
- Pre-existing Top of Bank
- Stream Approach**
- Restoration
- Enhancement I (1.5)
- Enhancement II (2.5)
- Enhancement II (5)
- No Credit
- Stream Structures
- As-built Top of Bank
- Fencing

Vegetation Condition Assessment

Invasive Species	Target Community		
	Present	Marginal	Absent
Absent			
Present			



- Vegetation Plots**
- MY1 Fixed: >320 stems/ac.
- MY1 Random: >320 stems/ac.
- MY1 Random: <320 stems/ac.
- MY0 Random Vegetation Plot
- Cross section
- Stage Recorder
- Flow Gauge
- Wetland Gauges**
- >12% Hydroperiod
- 5-11% Hydroperiod
- <5% Hydroperiod
- No Data

Reference: This information is not to be used as final legal boundaries.
Imagery Source: Google
Spatial Reference: NAD 1983 StatePlane North Carolina FIPS 3200 Feet
Date Exported: 12/22/2023



Table 5. Visual Stream Morphology Assessment

Visual Stream Stability Assessment

Reach BB-A
 Assessed Stream Length 452
 Assessed Bank Length 904

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	Surface Scour/Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
Totals					0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	3	3		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	3	3		100%

Table 5. Visual Stream Morphology Assessment

Visual Stream Stability Assessment

Reach BB-B
 Assessed Stream Length 562
 Assessed Bank Length 1124

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	Surface Scour/Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
Totals					0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	8	8		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	7	7		100%

Table 5. Visual Stream Morphology Assessment

Visual Stream Stability Assessment

Reach BB-C
 Assessed Stream Length 4357
 Assessed Bank Length 8714

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	Surface Scour/Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
Totals					0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	21	21		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	58	58		100%

Table 5. Visual Stream Morphology Assessment

Visual Stream Stability Assessment

Reach MT2
 Assessed Stream Length 110
 Assessed Bank Length 220

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	Surface Scour/Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
Totals					0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	0	0		N/A
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	0	0		N/A

Table 5. Visual Stream Morphology Assessment

Visual Stream Stability Assessment

Reach DE7
 Assessed Stream Length 112
 Assessed Bank Length 224

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	Surface Scour/Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
Totals					0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	6	6		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	3	3		100%

Table 5. Visual Stream Morphology Assessment

Visual Stream Stability Assessment

Reach DE2-A

Assessed Stream Length 231

Assessed Bank Length 462

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	Surface Scour/Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
Totals					0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	0	0		N/A
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	0	0		N/A

Table 5. Visual Stream Morphology Assessment

Visual Stream Stability Assessment

Reach DE2-B
 Assessed Stream Length 156
 Assessed Bank Length 312

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	Surface Scour/Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
Totals					0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	3	3		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	2	2		100%

Table 5. Visual Stream Morphology Assessment

Visual Stream Stability Assessment

Reach DE8
 Assessed Stream Length 171
 Assessed Bank Length 342

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	Surface Scour/Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
Totals					0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	3	3		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	4	4		100%

Table 5. Visual Stream Morphology Assessment

Visual Stream Stability Assessment

Reach DE4-A
 Assessed Stream Length 301
 Assessed Bank Length 602

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	Surface Scour/Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
Totals					0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	0	0		N/A
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	0	0		N/A

Table 5. Visual Stream Morphology Assessment

Visual Stream Stability Assessment

Reach DE4-B
 Assessed Stream Length 992
 Assessed Bank Length 1984

Major Channel Category		Metric	Number Stable, Performing as Intended	Total Number in As-built	Amount of Unstable Footage	% Stable, Performing as Intended
Bank	Surface Scour/Bare Bank	Bank lacking vegetative cover resulting simply from poor growth and/or surface scour			0	100%
	Toe Erosion	Bank toe eroding to the extent that bank failure appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	100%
	Bank Failure	Fluvial and geotechnical - rotational, slumping, calving, or collapse			0	100%
Totals					0	100%
Structure	Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	7	7		100%
	Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in DMS monitoring guidance document)	15	15		100%

Table 6. Vegetation Condition Assessment

Visual Vegetation Assessment

Planted acreage 26.19

Vegetation Category	Definitions	Mapping Threshold	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	0.00	0.0%
Low Stem Density Areas*	Woody stem densities clearly below target levels based on current MY stem count criteria.	0.1 acres	0.00	0.0%
Total				
Areas of Poor Growth Rates	Planted areas where average height is not meeting current MY Performance Standard.	0.25 acres	0.00	0.0%
Cumulative Total				0.0%

Easement Acreage 30.94

Vegetation Category	Definitions	Mapping Threshold	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. Species included in summation above should be identified in report summary.	1000 SF	0.00	0.0%
Easement Encroachment Areas	Encroachment may be point, line, or polygon. Encroachment to be mapped consists of any violation of restrictions specified in the conservation easement. Common encroachments are mowing, cattle access, vehicular access. Encroachment has no threshold value as will need to be addressed regardless of impact area.	none	N/A	

Six Runs Vegetation Plot Photos (MY1)



Vegetation Plot 01 (11/8/2023)



Vegetation Plot 02 (11/8/2023)



Vegetation Plot 03 (11/8/2023)



Vegetation Plot 04 (11/8/2023)



Vegetation Plot 05 (11/8/2023)



Vegetation Plot 06 (11/7/2023)



Vegetation Plot 07 (11/7/2023)



Vegetation Plot 08 (11/7/2023)



Vegetation Plot 09 (11/7/2023)



Vegetation Plot 10 (11/7/2023)



Vegetation Plot 11 (11/7/2023)



Vegetation Plot 12 (11/7/2023)



Vegetation Plot 13 (11/7/2023)



Random Vegetation Plot 01 (11/8/2023)



Random Vegetation Plot 02 (11/8/2023)



Random Vegetation Plot 03 (11/8/2023)



Random Vegetation Plot 04 (11/7/2023)



Random Vegetation Plot 05 (11/7/2023)



Random Vegetation Plot 06 (11/7/2023)

Six Runs Crossings (MY1)



BB-B - E Darden Rd. Culvert Entrance - (11/7/2023)



BB-C – E Darden Rd. Culvert Exit (11/7/2023)



BB-C - Farm Culvert Entrance - (11/8/2023)



BB-C - Farm Culvert Exit - (11/8/2023)



DE4-B – Farm Culvert Entrance - (11/8/2023)



DE4-B – Farm Culvert Exit - (11/8/2023)

Six Runs Monitoring Device Photos (MY1)



Flow Gauge MT2 (Looking Upstream) (11/7/2023)



Flow Gauge BB-A (Looking Upstream) (11/7/2023)



Flow Gauge DE7 (Looking Upstream) (11/7/2023)



Stage Recorder BB-C_US (Looking Upstream) (11/7/2023)



Flow Gauge DE2-B (Looking Upstream) (11/7/2023)



Flow Gauge DE8 (Looking Upstream) (11/7/2023)



Stage Recorder DE4-B (Looking Downstream) (11/8/2023)



Stage Recorder BB-C_DS (Looking Upstream) (11/8/2023)



GW-01 (11/7/2023)



GW-02 (11/7/2023)



GW-03 (11/7/2023)



GW-04 (11/7/2023)



GW-05 (11/7/2023)



GW-06 (11/7/2023)



GW-07 (11/7/2023)



GW-08 (11/7/2023)



GW-09 (11/7/2023)



GW-10 (11/7/2023)



GW-11 (11/8/2023)

Appendix B

Vegetation Plot Data

Table 7. Six Runs As-Built Planting Lists

Zone 1-A & B (Wetlands and Floodplains)			
Bare Roots			
Common Name	Scientific Name	Percent Composition	QTY
Bald cypress	<i>Taxodium distichum</i>	10%	1,700
Swamp tupelo	<i>Nyssa biflora</i>	10%	1,700
Buttonbush	<i>Cephalanthus occidentalis</i>	10%	1,700
Overcup oak	<i>Quercus lyrata</i>	10%	1,700
River birch	<i>Betula nigra</i>	10%	1,700
Laurel oak	<i>Quercus laurifolia</i>	5%	900
Water hickory	<i>Carya aquatica</i>	5%	900
Hazel alder	<i>Alnus serrulata</i>	5%	900
Green ash	<i>Fraxinus pennsylvanica</i>	5%	850
American sycamore	<i>Platanus occidentalis</i>	5%	850
American elm	<i>Ulmus American</i>	5%	850
Swamp chestnut oak	<i>Quercus michauxii</i>	5%	900
Willow oak	<i>Quercus phellos</i>	5%	900
Wax myrtle	<i>Morella cerifera</i>	5%	850
		Total Bare Roots	16,400
Containerized (Zone 1-B Only)			
Bald cypress	<i>Taxodium distichum</i>	24%	70
Swamp tupelo	<i>Nyssa biflora</i>	24%	70
Buttonbush	<i>Cephalanthus occidentalis</i>	24%	70
Overcup oak	<i>Quercus lyrata</i>	28%	80
		Total Containerized	290
Live Stakes (Zone 1-B Only)			
Black willow	<i>Salix nigra</i>	66%	1,200
Hazel alder	<i>Alnus serrulata</i>	17%	300
Buttonbush	<i>Cephalanthus occidentalis</i>	17%	300
		Total Live Stakes	1,800

Zone 2 (Uplands and Slopes)			
Bare Roots			
Common Name	Scientific Name	Percent Composition	QTY
Green ash	<i>Fraxinus pennsylvanica</i>	5%	250
American sycamore	<i>Platanus occidentalis</i>	5%	250
American elm	<i>Ulmus American</i>	5%	250
Swamp chestnut oak	<i>Quercus michauxii</i>	10%	500
Willow oak	<i>Quercus phellos</i>	10%	500
Wax myrtle	<i>Morella cerifera</i>	5%	250
American hornbeam	<i>Carpinus caroliniana</i>	10%	500
Water oak	<i>Quercus nigra</i>	10%	500
White oak	<i>Quercus alba</i>	15%	800
Northern red oak	<i>Quercus rubra</i>	15%	800
Yellow poplar	<i>Liriodendron tulipifera</i>	10%	500
		Total Bare Roots	5,100

Stream Bank Live Staking			
Live Stakes			
Common Name	Scientific Name	Percent Composition	QTY
Black Willow	<i>Salix nigra</i>	40%	3,450
Buttonbush	<i>Cephalanthus occidentalis</i>	30%	2,600
Silky Dogwood	<i>Cornus amomum</i>	30%	2,600
		Total Live Stakes	8,650

Table 8. Vegetation Plot Data

Planted Acreage	26.19
Date of Initial Plant	2023-03-02
Date(s) of Supplemental Plant(s)	NA
Date(s) Mowing	2023-03-02
Date of Current Survey	2023-03-02
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		Veg Plot 7 F		Veg Plot 8 F		Veg Plot 9 F		Veg Plot 10 F		Veg Plot 11 F		Veg Plot 12 F		Veg Plot 13 F		Veg Plot 1 R	Veg Plot 2 R	Veg Plot 3 R	Veg Plot 4 R	Veg Plot 5 R	Veg Plot 6 R		
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	<i>Alnus serrulata</i>	hazel alder	Tree	FACW	5	5	1	1					3	3			2	2	4	4					4	4	1	1										
	<i>Betula nigra</i>	river birch	Tree	FACW	1	1	1	1	2	2					2	2			3	3	2	2					1	1	1	1	4	4						3
	<i>Carpinus caroliniana</i>	American hornbeam	Tree	FAC	1	1			1	1																												
	<i>Carya aquatica</i>	water hickory	Tree	OBL	2	2	2	2			3	3	1	1	1	1							2	2	2	2	1	1	2	2								
	<i>Cephalanthus occidentalis</i>	common buttonbush	Shrub	OBL	1	1	1	1									2	2	1	1			1	1	2	2	1	1			4		2	1				
	<i>Cornus amomum</i>	silky dogwood	Shrub	FACW																																		
	<i>Fraxinus pennsylvanica</i>	green ash	Tree	FACW			1	1	1	1	5	5			1	1							1	1	1	1												
	<i>Liriodendron tulipifera</i>	tuliptree	Tree	FACU																																		
	<i>Morella cerifera</i>	wax myrtle	Tree	FAC			1	1							1	1	4	4							1	1												
	<i>Nyssa aquatica</i>	water tupelo	Tree	OBL															1	1																		
	<i>Nyssa biflora</i>	swamp tupelo	Tree	OBL																																		
	<i>Platanus occidentalis</i>	American sycamore	Tree	FACW	1	1	3	3	1	1			4	4					2	2			1	1	1	1	1	1			3	4					2	
	<i>Quercus laurifolia</i>	laurel oak	Tree	FACW										2	2	3	3							1	1	1	1	1	1								1	
	<i>Quercus lyrata</i>	overcup oak	Tree	OBL	1	1	2	2										1	1	3	3	2	2	1	1	2	2	5	5	2	2					2	4	1
	<i>Quercus michauxii</i>	swamp chestnut oak	Tree	FACW	1	1																			2	2			4	4							2	
	<i>Quercus nigra</i>	water oak	Tree	FAC	1	1			1	1																												
	<i>Quercus phellos</i>	willow oak	Tree	FACW										5	5			1	1																			
	<i>Quercus rubra</i>	northern red oak	Tree	FACU			1	1	1	1															1	1	1	1			2	2						
<i>Salix nigra</i>	black willow	Tree	OBL														2	2					2	2	2	2	2	2										2
<i>Taxodium distichum</i>	bald cypress	Tree	OBL			2	2			1	1	3	3	4	4	4	4	3	3	4	4			2	2													
<i>Ulmus americana</i>	American elm	Tree	FAC			1	1	4	4					1	1			1	1																			1
Sum	Performance Standard				14	14	16	16	11	11	13	13	15	15	16	16	16	16	16	16	12	12	16	16	8	8	16	16	20	20	24	16	21	10	10	7		
Mitigation Plan Performance Standard	Current Year Stem Count				14	16	11	13	15	16	16	16	16	16	12	16	16	12	16	16	8	16	16	8	16	20	24	16	21	10	10	7						
	Stems/Acre				567	648	445	526	607	648	648	648	648	648	486	648	648	486	648	648	324	648	648	324	648	810	972	567	850	405	405	283						
	Species Count				9	11	7	4	6	8	7	8	8	7	6	11	11	6	11	11	5	8	8	5	8	10	10	4	11	5	5	4						
	Dominant Species Composition (%)				36	19	36	38	33	25	33	25	33	25	33	19	25	31	19	25	31	19	31	25	31	20	17	62	29	30	40	43						
	Average Plot Height (ft.)				2	2	2	1	2	2	2	2	2	2	3	3	3	3	3	3	2	3	3	2	3	2	2	2	2	2	2	2	2	3				
% Invasives				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Post Mitigation Plan Performance Standard	Current Year Stem Count				14	16	11	13	15	16	16	16	16	16	12	16	16	12	16	16	8	16	16	8	16	20	24	16	21	10	10	7						
	Stems/Acre				567	648	445	526	607	648	648	648	648	648	486	648	648	486	648	648	324	648	648	324	648	810	972	567	850	405	405	283						
	Species Count				9	11	7	4	6	8	7	8	8	7	6	11	11	6	11	11	5	8	8	5	8	10	10	4	11	5	5	4						
	Dominant Species Composition (%)				36	19	36	38	33	25	33	25	33	25	33	19	25	31	19	25	31	19	31	25	31	20	17	62	29	30	40	43						
	Average Plot Height (ft.)				2	2	2	1	2	2	2	2	2	2	3	3	3	3	3	3	2	3	3	2	3	2	2	2	2	2	2	2	2	3				
% Invasives				0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	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 9. Vegetation Plot Summary

Vegetation Performance Standards Summary Table												
	Veg Plot 1 F				Veg Plot 2 F				Veg Plot 3 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1	567	2	9	0	648	2	11	0	445	2	7	0
Monitoring Year 0	607	0	10	0	729	0	12	0	607	0	7	0
	Veg Plot 4 F				Veg Plot 5 F				Veg Plot 6 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1	526	1	4	0	607	2	6	0	648	2	7	0
Monitoring Year 0	810	0	8	0	688	0	6	0	729	1	7	0
	Veg Plot 7 F				Veg Plot 8 F				Veg Plot 9 F			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1	648	2	8	0	648	2	7	0	486	3	6	0
Monitoring Year 0	891	0	10	0	810	0	10	0	688	0	8	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												
Monitoring Year 1	648	3	11	0	324	2	5	0	648	3	8	0
Monitoring Year 0	810	0	13	0	648	1	10	0	688	1	9	0
	Veg Plot 13 F				Veg Plot Group 1 R				Veg Plot Group 2 R			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1	810	2	10	0	972	2	10	0	567	2	4	0
Monitoring Year 0	1012	0	10	0								
	Veg Plot Group 3 R				Veg Plot Group 4 R				Veg Plot Group 5 R			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1	850	2	11	0	405	2	5	0	405	2	5	0
Monitoring Year 0												
	Veg Plot Group 6 R											
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives								
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1	283	3	4	0								
Monitoring Year 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 Morphology Data

**Table 10: Baseline Stream Data Summary
Six Runs BB-A**

Parameter	Pre-Existing Condition (applicable)					Design		Monitoring Baseline (MY0)		
	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Riffle Only										
Bankfull Width (ft)	5.4	7.2	7.2	9.0	2		---		9.5	1
Floodprone Width (ft)	6.5	12.0	12.0	17.5	2		---		>29.9	1
Bankfull Mean Depth (ft)	0.7	1.0	1.0	1.2	2		---		0.8	1
Bankfull Max Depth (ft)	1	1.4	1.4	1.7	2		---		1.3	1
Bankfull Cross Sectional Area (ft ²)	6.3	6.4	6.4	6.4	2		---		8.0	1
Width/Depth Ratio	4.6	8.7	8.7	12.7	2		---		11.3	1
Entrenchment Ratio	1.2	1.6	1.6	2.0	2		---		>3.1	1
Bank Height Ratio	1.3	1.6	1.6	1.9	2		---		1.0	1
Max part size (mm) mobilized at bankfull										
Rosgen Classification	C4/5					---		---		
Bankfull Discharge (cfs)										
Sinuosity (ft)	1.04					---		---		
Water Surface Slope (Channel) (ft/ft)										
Other										

**Table 10: Baseline Stream Data Summary
Six Runs BB-B**

Parameter	Pre-Existing Condition (applicable)					Design		Monitoring Baseline (MY0)		
	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Riffle Only										
Bankfull Width (ft)				5.3	1		---	9.4	10.8	2
Floodprone Width (ft)				8.6	1		---	>27.6	>30.2	2
Bankfull Mean Depth (ft)				1.1	1		---			2
Bankfull Max Depth (ft)				1.3	1		---	1.1	1.8	2
Bankfull Cross Sectional Area (ft ²)				5.7	1		---	7.8	12.2	2
Width/Depth Ratio				4.8	1		---			2
Entrenchment Ratio				1.6	1		---	>2.8	>2.9	2
Bank Height Ratio				1.9	1		---	1.0	1.0	2
Max part size (mm) mobilized at bankfull										
Rosgen Classification	G4/5c					---		---		
Bankfull Discharge (cfs)										
Sinuosity (ft)	1.10					---		---		
Water Surface Slope (Channel) (ft/ft)										
Other										

**Table 10: Baseline Stream Data Summary
Six Runs BB-C**

Parameter	Pre-Existing Condition (applicable)					Design		Monitoring Baseline (MY0)		
	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Riffle Only										
Bankfull Width (ft)	7.3	10.1	8.9	15.2	4		11.8	8.5	12.7	10
Floodprone Width (ft)	9.8	14.4	10.8	26.4	4		>50	>29	>29	10
Bankfull Mean Depth (ft)	1.0	1.2	1.2	1.4	4		1.1	0.7	1.3	10
Bankfull Max Depth (ft)	1.3	1.5	1.5	1.9	4		1.6	1.1	2.0	10
Bankfull Cross Sectional Area (ft ²)	8.3	11.8	10.4	18.0	4		13.0	6.4	15.3	10
Width/Depth Ratio	5.3	8.7	8.4	12.9	4		10.7	9.5	14.0	10
Entrenchment Ratio	1.2	1.4	1.3	1.7	4		>2.2	>2.4	>2.4	10
Bank Height Ratio	1.7	2.7	2.1	5.0	4		1.0	1.0	1.0	10
Max part size (mm) mobilized at bankfull										
Rosgen Classification	G4/5c to F4/5					C4/E4		C4/E4		
Bankfull Discharge (cfs)										
Sinuosity (ft)	1.12 - 1.26					1.15 - 1.17		1.15 - 1.17		
Water Surface Slope (Channel) (ft/ft)										
Other										

**Table 10: Baseline Stream Data Summary
Six Runs DE2-B**

Parameter	Pre-Existing Condition (applicable)					Design		Monitoring Baseline (MY0)		
	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Riffle Only										
Bankfull Width (ft)				2.8	1		3.8		4.9	1
Floodprone Width (ft)				>15	1		>20		>30.1	1
Bankfull Mean Depth (ft)				0.4	1		0.4		0.4	1
Bankfull Max Depth (ft)				0.6	1		0.5		0.8	1
Bankfull Cross Sectional Area (ft ²)				1.2	1		1.4		1.8	1
Width/Depth Ratio				6.4	1		10.7		12.9	1
Entrenchment Ratio				>2.2	1		>2.2		>6.2	1
Bank Height Ratio				1.5	1		1.0		1.0	1
Max part size (mm) mobilized at bankfull										
Rosgen Classification	E5					C4b		C4b		
Bankfull Discharge (cfs)										
Sinuosity (ft)	1.07					1.12		1.12		
Water Surface Slope (Channel) (ft/ft)										
Other										

**Table 10: Baseline Stream Data Summary
Six Runs DE4-B**

Parameter	Pre-Existing Condition (applicable)					Design		Monitoring Baseline (MY0)		
	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Riffle Only										
Bankfull Width (ft)				6.0	1		10.3	10.1	10.1	2
Floodprone Width (ft)				9.6	1		>50	>29.7	>30.1	2
Bankfull Mean Depth (ft)				1.0	1		1.0	1	1.1	2
Bankfull Max Depth (ft)				1.4	1		1.5	1.4	1.7	2
Bankfull Cross Sectional Area (ft ²)				6.3	1		10.4	10.3	10.8	2
Width/Depth Ratio				5.8	1		10.3	9.4	11.4	2
Entrenchment Ratio				1.6	1		>2.2	>2.8	>2.9	2
Bank Height Ratio				1.7	1		1.0	1	1.0	2
Max part size (mm) mobilized at bankfull										
Rosgen Classification	G4/5c to F4/4/5					C4/E4		C4/E4		
Bankfull Discharge (cfs)										
Sinuosity (ft)	1.27					1.18		1.18		
Water Surface Slope (Channel) (ft/ft)										
Other										

**Table 10: Baseline Stream Data Summary
Six Runs DE7**

Parameter	Pre-Existing Condition (applicable)					Design		Monitoring Baseline (MY0)		
	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Riffle Only										
Bankfull Width (ft)				3.2	1		3.5		4.3	1
Floodprone Width (ft)				4.2	1		>15		>29.5	1
Bankfull Mean Depth (ft)				0.3	1		0.4		0.5	1
Bankfull Max Depth (ft)				0.5	1		0.5		0.8	1
Bankfull Cross Sectional Area (ft ²)				0.9	1		1.3		2.1	1
Width/Depth Ratio				11.6	1		9.8		8.4	1
Entrenchment Ratio				1.3	1		>2.2		>6.9	1
Bank Height Ratio				2.9	1		1.0		1.0	1
Max part size (mm) mobilized at bankfull										
Rosgen Classification	G5c					B4a to E4		B4a to E4		
Bankfull Discharge (cfs)										
Sinuosity (ft)	1.01					1.05		1.05		
Water Surface Slope (Channel) (ft/ft)										
Other										

**Table 10: Baseline Stream Data Summary
Six Runs DE8**

Parameter	Pre-Existing Condition (applicable)					Design		Monitoring Baseline (MY0)		
	Min	Mean	Med	Max	n	Min	Max	Min	Max	n
Riffle Only										
Bankfull Width (ft)				5.5	1		4.5		3.9	1
Floodprone Width (ft)				8.5	1		>20		>29.9	1
Bankfull Mean Depth (ft)				0.3	1		0.4		0.3	1
Bankfull Max Depth (ft)				0.6	1		0.6		0.6	1
Bankfull Cross Sectional Area (ft ²)				1.8	1		1.8		1.3	1
Width/Depth Ratio				17.0	1		11.3		11.6	1
Entrenchment Ratio				1.5	1		>2.2		>7.6	1
Bank Height Ratio				3.5	1		1.0		1.0	1
Max part size (mm) mobilized at bankfull										
Rosgen Classification	F5b					C4/E4		C4/E4		
Bankfull Discharge (cfs)										
Sinuosity (ft)	1.11					1.14		1.14		
Water Surface Slope (Channel) (ft/ft)										
Other										

Table 11. Morphology Table

Monitoring Data - Cross Section Morphology Monitoring Summary																																			
Six Runs Stream and Wetland Mitigation Project / DMS:100170 Reaches: BB-A, BB-B, BB-C																																			
	Cross Section 1 (Riffle - BB-A)							Cross Section 2 (Pool - BB-A)							Cross Section 3 (Riffle - BB-B)							Cross Section 4 (Pool - BB-B)							Cross Section 5 (Riffle - BB-B)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	148.22	148.25						148.04	148.01						144.23	144.28						144.13	144.14						142.18	142.18					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	0.94													1.00	0.97													1.00	0.95					
Thalweg Elevation	146.95	147.00						145.23	145.26						142.41	142.37						140.94	141.07						141.06	141.06					
LTOB ² Elevation	148.22	148.17						148.04	147.99						144.23	144.22						144.13	144.03						142.18	142.13					
LTOB ² Max Depth (ft)	1.27	1.17						2.81	2.73						1.82	1.85						3.19	2.96						1.12	1.07					
LTOB ² Cross Sectional Area (ft ²)	8.00	7.30						11.70	11.60						12.20	11.50						17.20	16.10						7.80	7.30					
	Cross Section 6 (Pool - BB-B)							Cross Section 7 (Riffle - BB-C)							Cross Section 8 (Pool - BB-C)							Cross Section 9 (Riffle - BB-C)							Cross Section 10 (Pool BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	141.96	141.89						136.98	136.90						136.71	136.67						133.71	133.74						133.31	133.29					
Bank Height Ratio - Based on AB Bankfull ¹ Area								1.00	1.00													0.99	0.94												
Thalweg Elevation	140.45	140.31						135.58	135.52						134.49	134.35						132.60	132.55						130.70	130.55					
LTOB ² Elevation	141.96	141.88						136.98	136.90						136.71	136.71						133.70	133.67						133.31	132.96					
LTOB ² Max Depth (ft)	1.51	1.57						1.40	1.38						2.22	2.36						1.10	1.12						2.61	2.41					
LTOB ² Cross Sectional Area (ft ²)	9.10	8.90						7.70	7.70						10.70	11.10						6.40	5.80						12.20	9.30					
	Cross Section 11 (Riffle - BB-C)							Cross Section 12 (Pool - BB-C)							Cross Section 13 (Pool - BB-C)							Cross Section 14 (Riffle - BB-C)							Cross Section 15 (Riffle - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	130.27	130.27						129.79	129.88						126.77	126.67						126.29	126.32						123.45	123.52					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	0.98																				1.00	0.95						1.00	0.93					
Thalweg Elevation	128.99	129.02						127.65	127.96						124.66	124.39						125.12	125.17						122.11	122.26					
LTOB ² Elevation	130.27	130.25						129.79	129.81						126.77	126.72						126.29	126.26						123.45	123.43					
LTOB ² Max Depth (ft)	1.28	1.23						2.14	1.85						2.11	2.33						1.17	1.09						1.34	1.17					
LTOB ² Cross Sectional Area (ft ²)	6.90	6.70						8.60	8.10						11.90	12.40						7.10	6.50						7.50	6.70					

Note: The smaller the channel the closer the survey measurements are to their limit of reliable detection, therefore inter-annual variation in morphological measurement (as a percentage) is by default magnified as channel size decreases. Some of the variability above is the result of this factor and some is due to the large amount of depositional sediments observed.

Table 11. Morphology Table

Monitoring Data - Cross Section Morphology Monitoring Summary																																			
Six Runs Stream and Wetland Mitigation Project / DMS:100170 Reaches: BB-C, DE7, DE2-B																																			
	Cross Section 16 (Pool - BB-C)							Cross Section 17 (Pool - BB-C)							Cross Section 18 (Riffle - BB-C)							Cross Section 19 (Riffle - BB-C)							Cross Section 20 (Pool - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	123.34	123.44						119.65	119.64						119.76	119.75						117.02	117.08						116.74	116.85					
Bank Height Ratio - Based on AB Bankfull ¹ Area															1.00	0.98						1.00	1.03												
Thalweg Elevation	120.67	121.08						117.18	117.15						118.29	118.17						115.47	115.56						114.07	114.26					
LTOB ² Elevation	123.34	123.37						119.65	119.49						119.76	119.71						117.02	117.12						116.74	116.36					
LTOB ² Max Depth (ft)	2.67	2.28						2.47	2.34						1.47	1.54						1.55	1.57						2.67	2.10					
LTOB ² Cross Sectional Area (ft ²)	15.00	13.80						11.80	10.40						9.60	9.10						9.20	9.70						13.40	8.50					
	Cross Section 21 (Riffle - BB-C)							Cross Section 22 (Pool - BB-C)							Cross Section 23 (Pool - BB-C)							Cross Section 24 (Riffle - BB-C)							Cross Section 25 (Riffle - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	115.12	115.12						114.46	114.46						112.47	112.46						112.61	112.56						110.45	110.44					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	1.00																				1.00	1.01						1.00	1.06					
Thalweg Elevation	113.17	113.13						111.51	111.50						109.60	109.60						110.64	110.78						108.65	108.58					
LTOB ² Elevation	115.12	115.11						114.46	114.42						112.47	112.85						112.61	112.57						110.45	110.54					
LTOB ² Max Depth (ft)	1.95	1.99						2.95	2.92						2.87	3.25						1.97	1.79						1.80	1.96					
LTOB ² Cross Sectional Area (ft ²)	15.30	15.10						20.80	20.30						17.10	22.20						13.60	13.80						12.20	13.50					
	Cross Section 26 (Pool - BB-C)							Cross Section 27 (Pool - DE7)							Cross Section 28 (Riffle - DE7)							Cross Section 29 (Pool - DE2-B)							Cross Section 30 (Riffle - DE2-B)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	110.39	110.55						137.08	136.65						134.62	134.55						128.81	128.80						128.31	128.26					
Bank Height Ratio - Based on AB Bankfull ¹ Area															1.00	0.92													1.00	0.80					
Thalweg Elevation	107.53	107.78						135.46	135.11						133.80	133.76						127.82	127.88						127.48	127.52					
LTOB ² Elevation	110.39	110.55						137.08	137.03						134.62	134.49						128.81	128.77						128.31	128.11					
LTOB ² Max Depth (ft)	2.86	2.77						1.62	1.93						0.82	0.73						0.99	0.90						0.83	0.59					
LTOB ² Cross Sectional Area (ft ²)	23.40	23.40						4.30	6.00						2.10	1.70						1.80	1.60						1.80	1.10					

Note: The smaller the channel the closer the survey measurements are to their limit of reliable detection, therefore inter-annual variation in morphological measurement (as a percentage) is by default magnified as channel size decreases. Some of the variability above is the result of this factor and some is due to the large amount of depositional sediments observed.

Table 11. Morphology Table

Monitoring Data - Cross Section Morphology Monitoring Summary																																			
Six Runs Stream and Wetland Mitigation Project / DMS:100170 Reach: DE8, DE4-B																																			
	Cross Section 31 (Pool - DE8)							Cross Section 32 (Riffle - DE8)							Cross Section 33 (Riffle - DE4-B)							Cross Section 34 (Pool - DE4-B)							Cross Section 35 (Riffle - DE4-B)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	125.71	125.16						125.05	125.08						119.09	119.20						118.53	118.52						116.71	116.74					
Bank Height Ratio - Based on AB Bankfull ¹ Area								1.00	1.13						1.00	0.81													1.00	0.96					
Thalweg Elevation	124.18	124.13						124.46	124.47						117.65	117.83						115.99	116.07						115.02	115.04					
LTOB ² Elevation	125.71	125.24						125.05	125.16						119.09	118.94						118.53	118.52						116.71	116.67					
LTOB ² Max Depth (ft)	1.53	1.11						0.59	0.69						1.44	1.11						2.54	2.45						1.69	1.63					
LTOB ² Cross Sectional Area (ft ²)	2.40	2.80						1.30	1.70						10.30	7.40						14.60	14.70						10.80	10.00					
	Cross Section 36 (Pool - DE4-B)																																		
	MY0	MY1	MY2	MY3	MY5	MY7	MY+																												
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	115.86	115.95																																	
Bank Height Ratio - Based on AB Bankfull ¹ Area																																			
Thalweg Elevation	113.76	113.98																																	
LTOB ² Elevation	115.86	115.80																																	
LTOB ² Max Depth (ft)	2.10	1.82																																	
LTOB ² Cross Sectional Area (ft ²)	9.80	8.40																																	

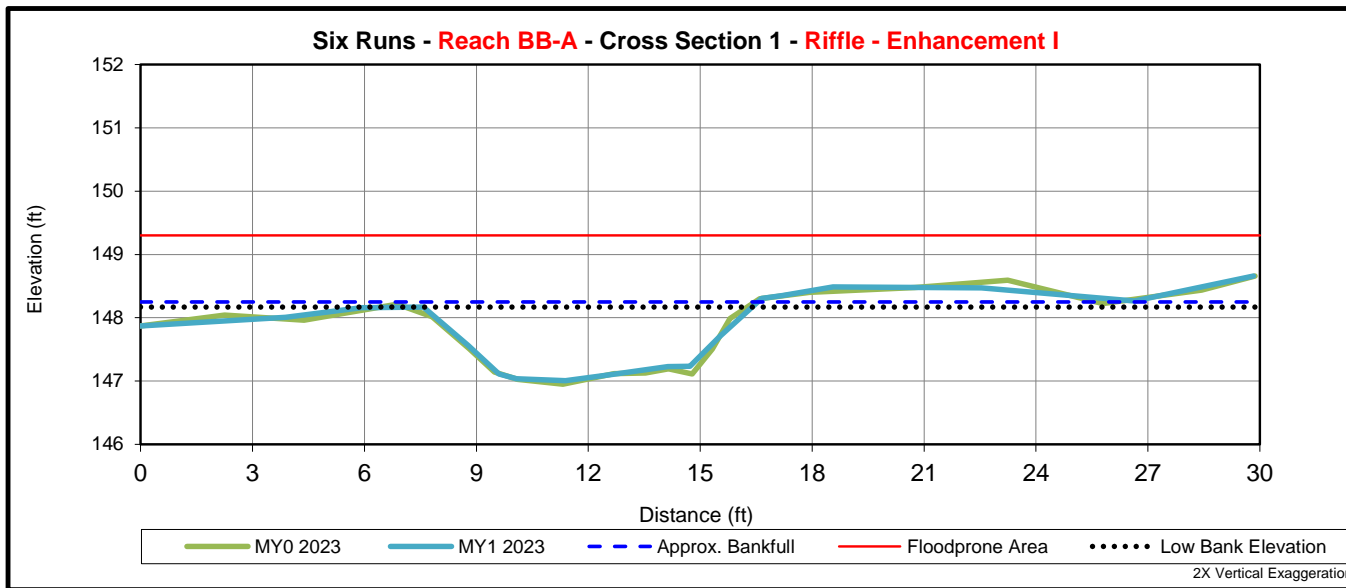
Note: The smaller the channel the closer the survey measurements are to their limit of reliable detection, therefore inter-annual variation in morphological measurement (as a percentage) is by default magnified as channel size decreases. Some of the variability above is the result of this factor and some is due to the large amount of depositional sediments observed.



Upstream



Downstream



	Cross Section 1 (Riffle - BB-A)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	148.22	148.25					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	0.94					
Thalweg Elevation	146.95	147.00					
LTOB ² Elevation	148.22	148.17					
LTOB ² Max Depth (ft)	1.27	1.17					
LTOB ² Cross Sectional Area (ft ²)	8.00	7.30					

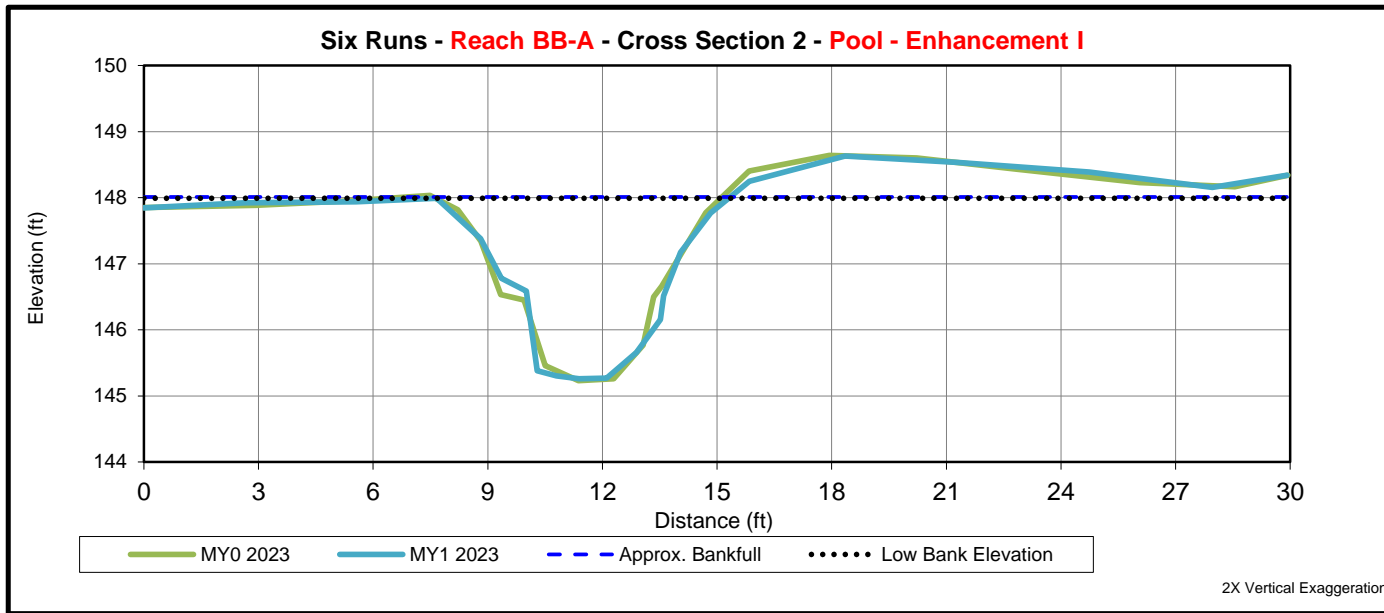
1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation
 2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 2 (Pool - BB-A)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	148.04	148.01					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	145.23	145.26					
LTOB ² Elevation	148.04	147.99					
LTOB ² Max Depth (ft)	2.81	2.73					
LTOB ² Cross Sectional Area (ft ²)	11.70	11.60					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

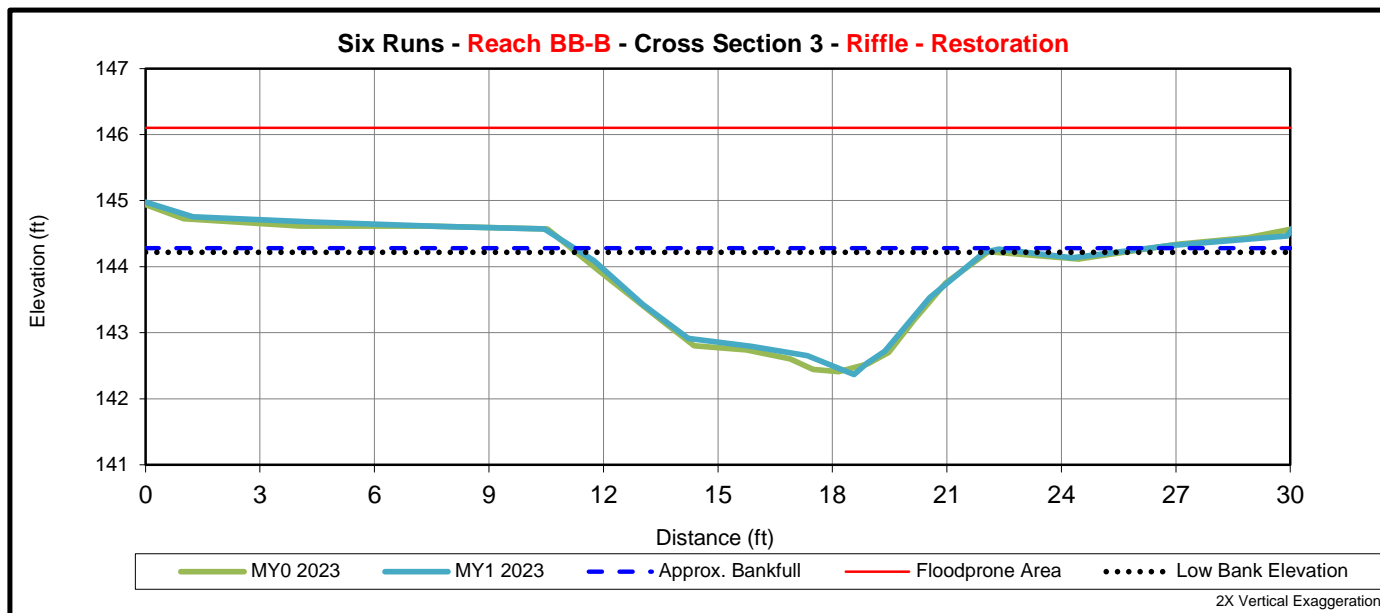
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 3 (Riffle - BB-B)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	144.23	144.28					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	0.97					
Thalweg Elevation	142.41	142.37					
LTOB ² Elevation	144.23	144.22					
LTOB ² Max Depth (ft)	1.82	1.85					
LTOB ² Cross Sectional Area (ft ²)	12.20	11.50					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

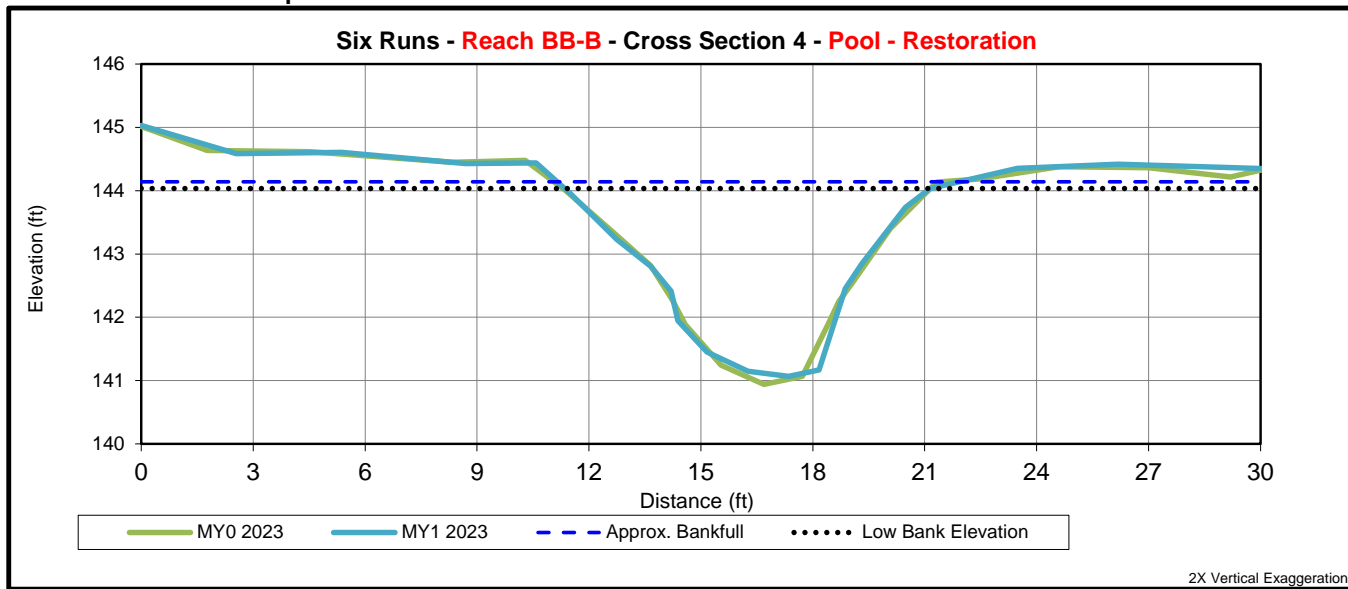
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 4 (Pool - BB-B)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	144.13	144.14					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	140.94	141.07					
LTOB ² Elevation	144.13	144.03					
LTOB ² Max Depth (ft)	3.19	2.96					
LTOB ² Cross Sectional Area (ft ²)	17.20	16.10					

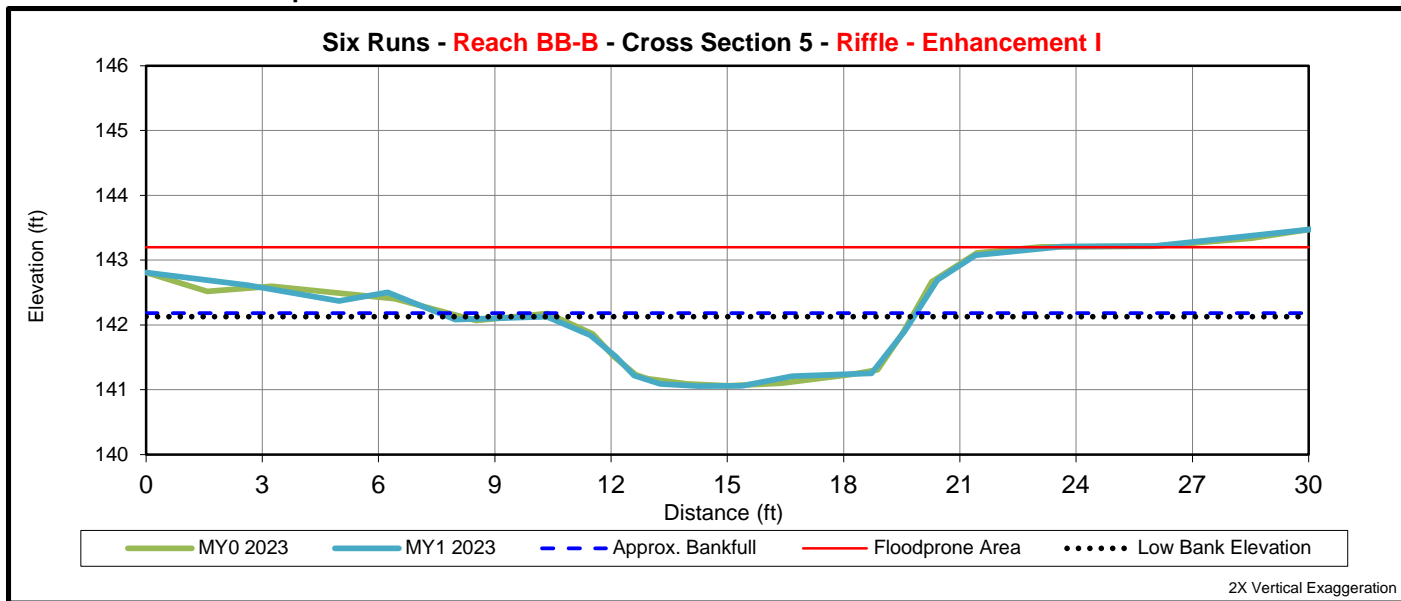
1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation
 2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 5 (Riffle - BB-B)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	142.18	142.18					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	0.95					
Thalweg Elevation	141.06	141.06					
LTOB ² Elevation	142.18	142.13					
LTOB ² Max Depth (ft)	1.12	1.07					
LTOB ² Cross Sectional Area (ft ²)	7.80	7.30					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

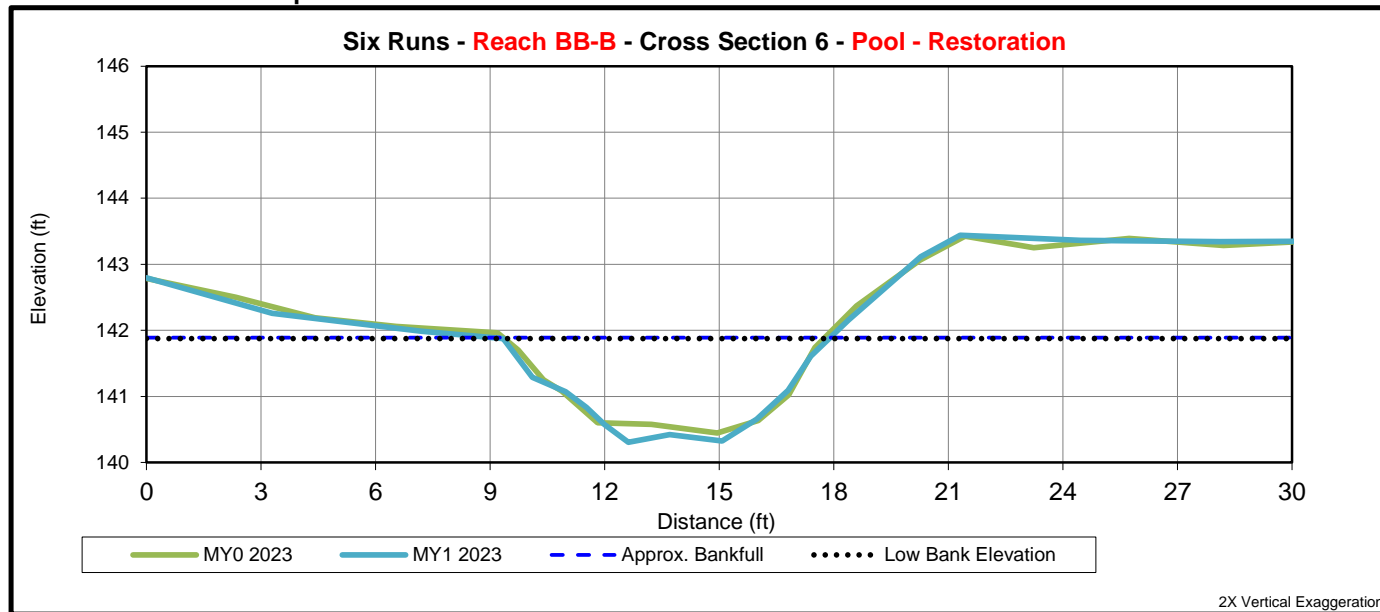
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 6 (Pool - BB-B)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	141.96	141.89					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	140.45	140.31					
LTOB ² Elevation	141.96	141.88					
LTOB ² Max Depth (ft)	1.51	1.57					
LTOB ² Cross Sectional Area (ft ²)	9.10	8.90					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

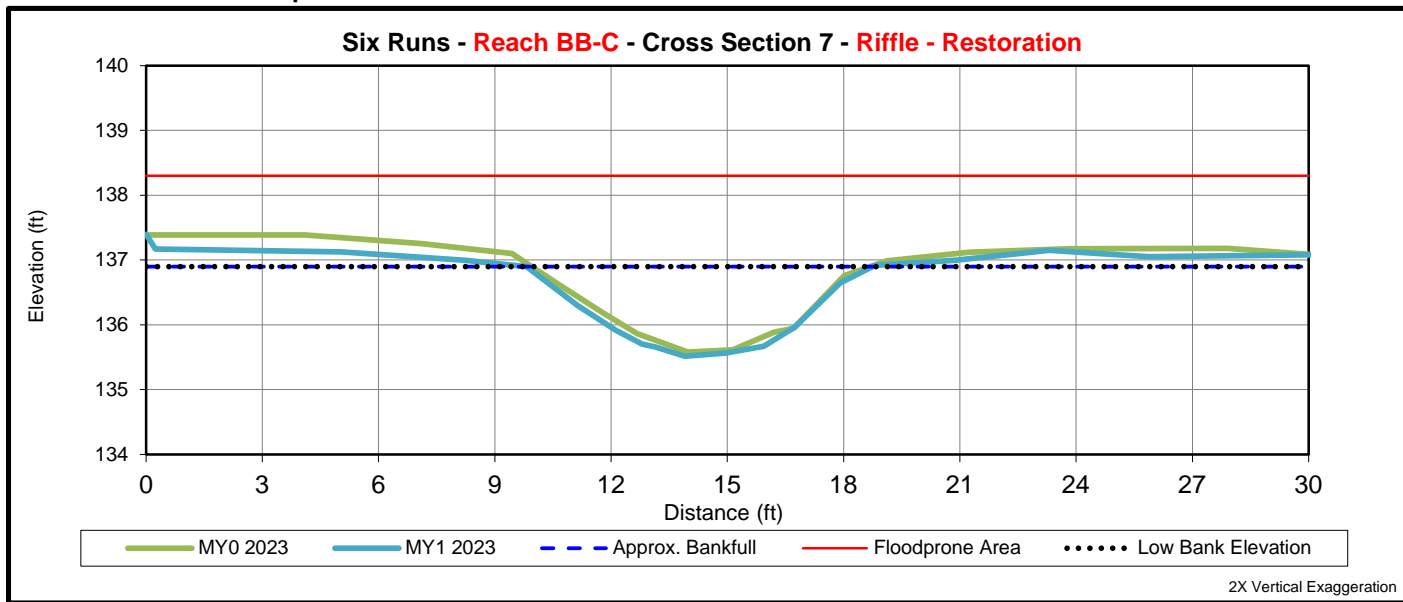
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 7 (Riffle - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	136.98	136.90					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	1.00					
Thalweg Elevation	135.58	135.52					
LTOB ² Elevation	136.98	136.90					
LTOB ² Max Depth (ft)	1.40	1.38					
LTOB ² Cross Sectional Area (ft ²)	7.70	7.70					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

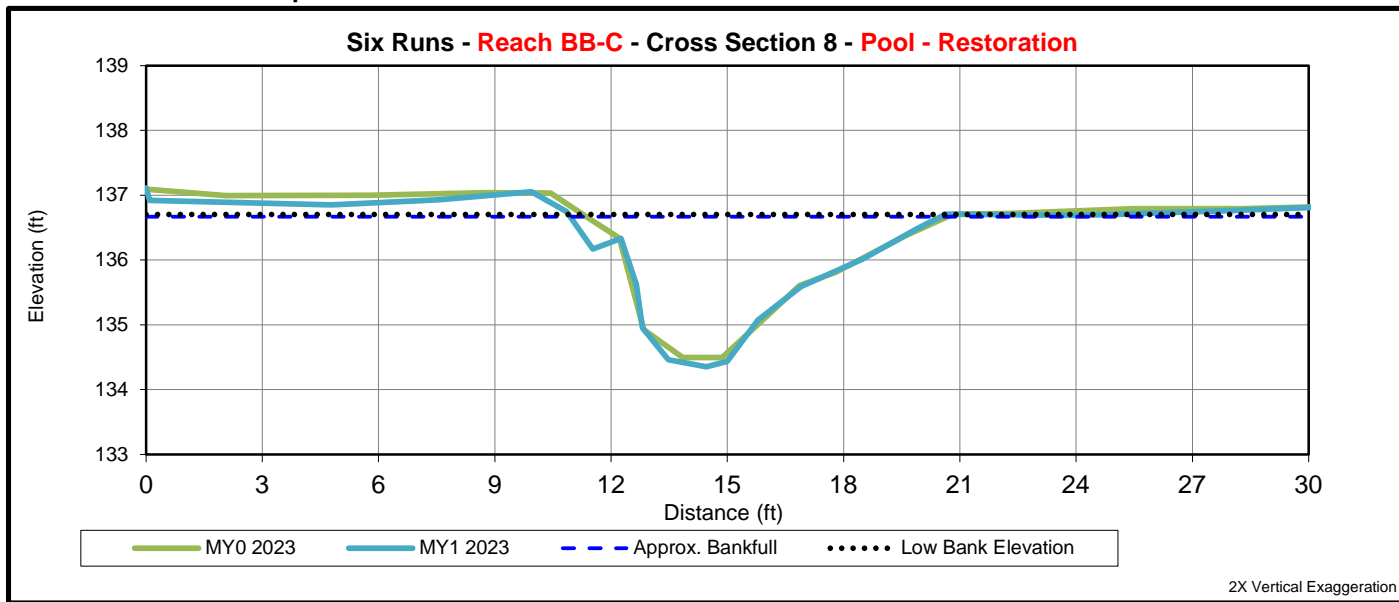
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 8 (Pool - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	136.71	136.67					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	134.49	134.35					
LTOB ² Elevation	136.71	136.71					
LTOB ² Max Depth (ft)	2.22	2.36					
LTOB ² Cross Sectional Area (ft ²)	10.70	11.10					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

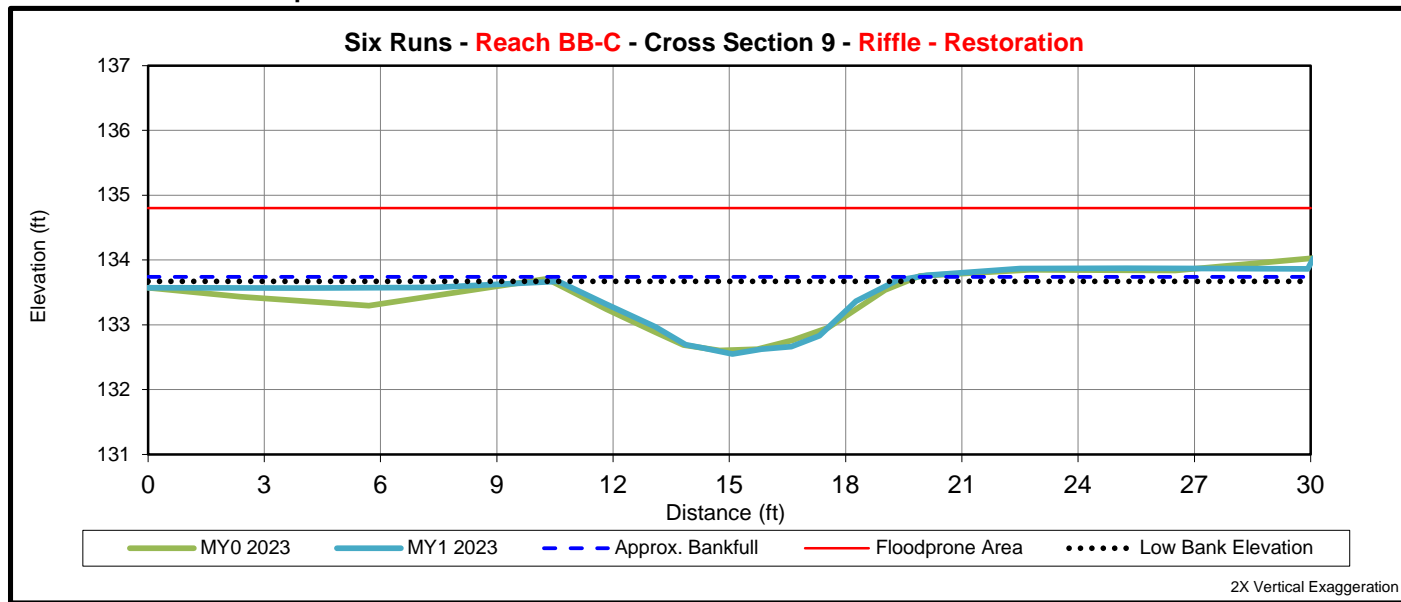
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 9 (Riffle - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	133.71	133.74					
Bank Height Ratio - Based on AB Bankfull ¹ Area	0.99	0.94					
Thalweg Elevation	132.60	132.55					
LTOB ² Elevation	133.70	133.67					
LTOB ² Max Depth (ft)	1.10	1.12					
LTOB ² Cross Sectional Area (ft ²)	6.40	5.80					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

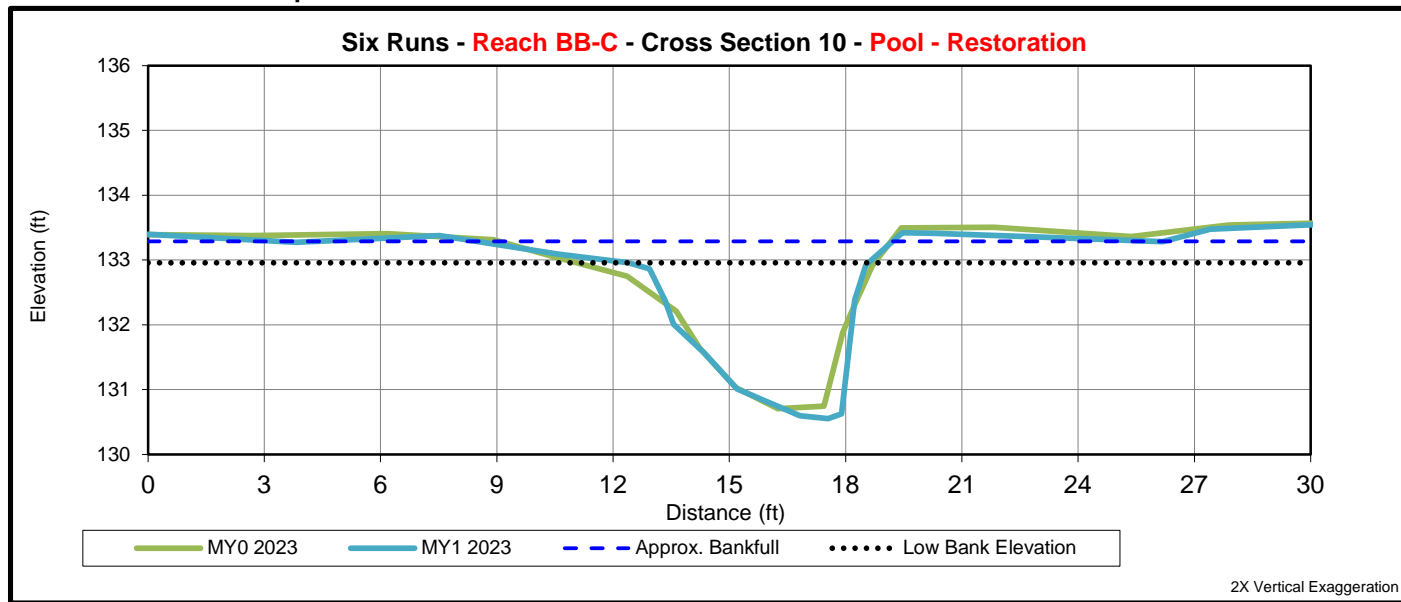
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 10 (Pool BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	133.31	133.29					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	130.70	130.55					
LTOB ² Elevation	133.31	132.96					
LTOB ² Max Depth (ft)	2.61	2.41					
LTOB ² Cross Sectional Area (ft ²)	12.20	9.30					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

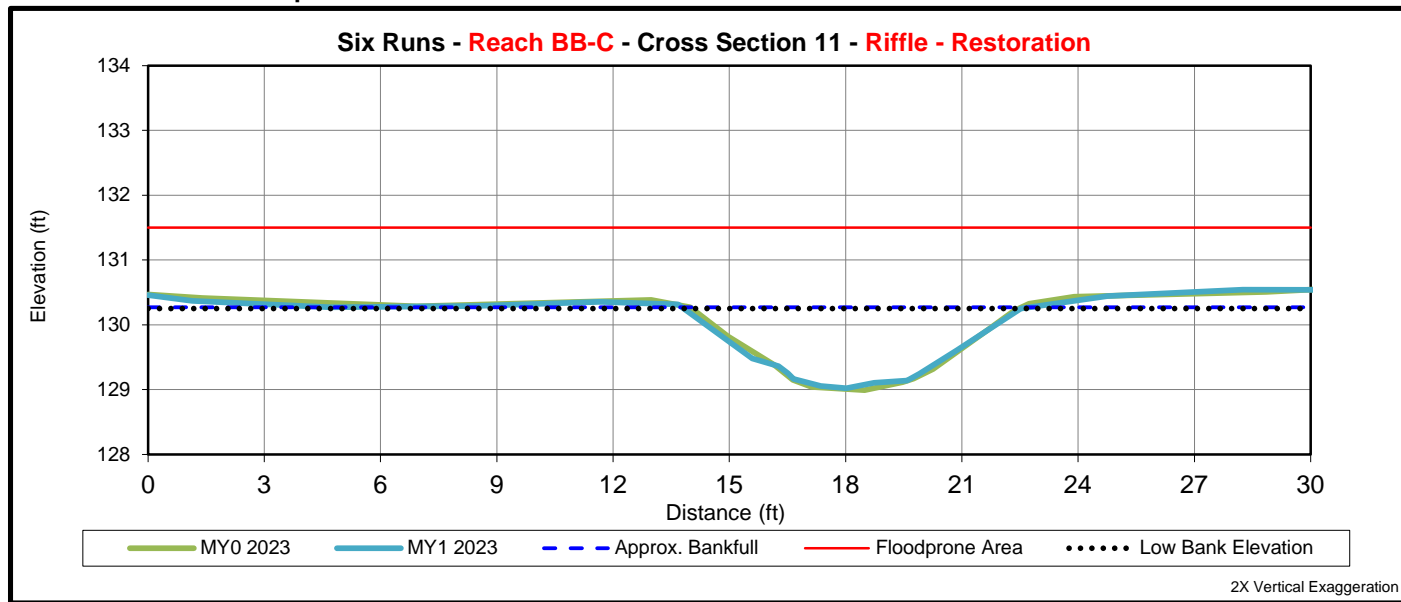
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 11 (Riffle - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	130.27	130.27					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	0.98					
Thalweg Elevation	128.99	129.02					
LTOB ² Elevation	130.27	130.25					
LTOB ² Max Depth (ft)	1.28	1.23					
LTOB ² Cross Sectional Area (ft ²)	6.90	6.70					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

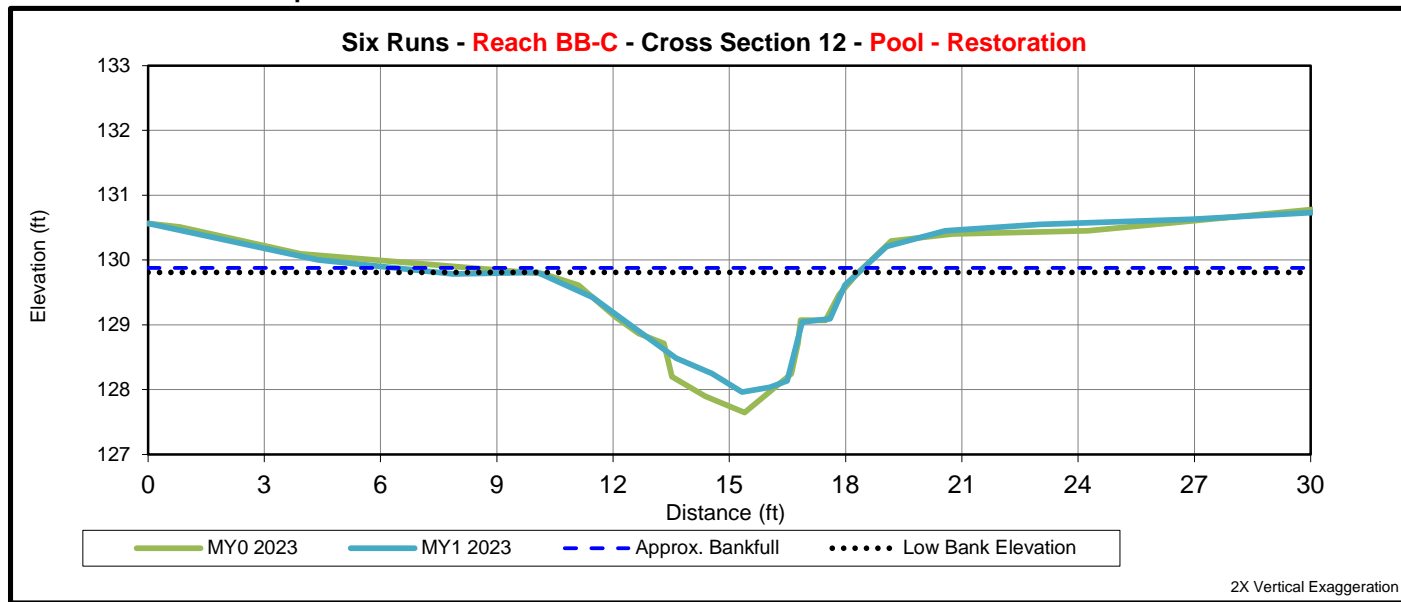
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 12 (Pool - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	129.79	129.88					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	127.65	127.96					
LTOB ² Elevation	129.79	129.81					
LTOB ² Max Depth (ft)	2.14	1.85					
LTOB ² Cross Sectional Area (ft ²)	8.60	8.10					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

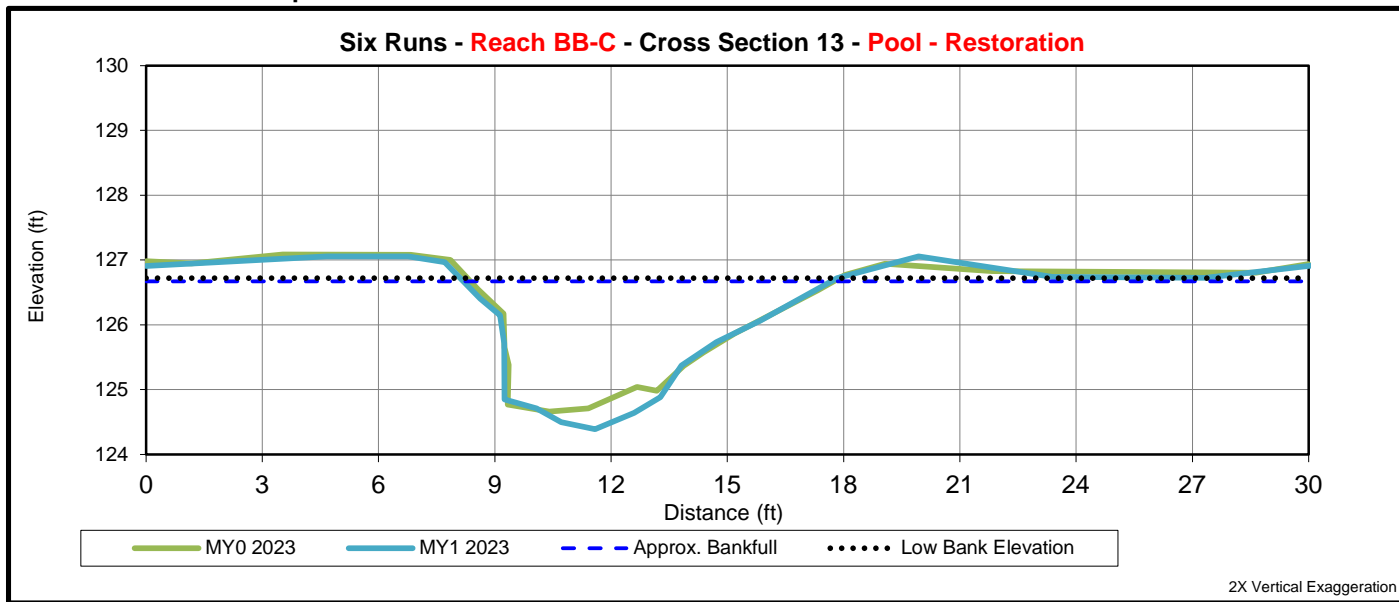
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 13 (Pool - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	126.77	126.67					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	124.66	124.39					
LTOB ² Elevation	126.77	126.72					
LTOB ² Max Depth (ft)	2.11	2.33					
LTOB ² Cross Sectional Area (ft ²)	11.90	12.40					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

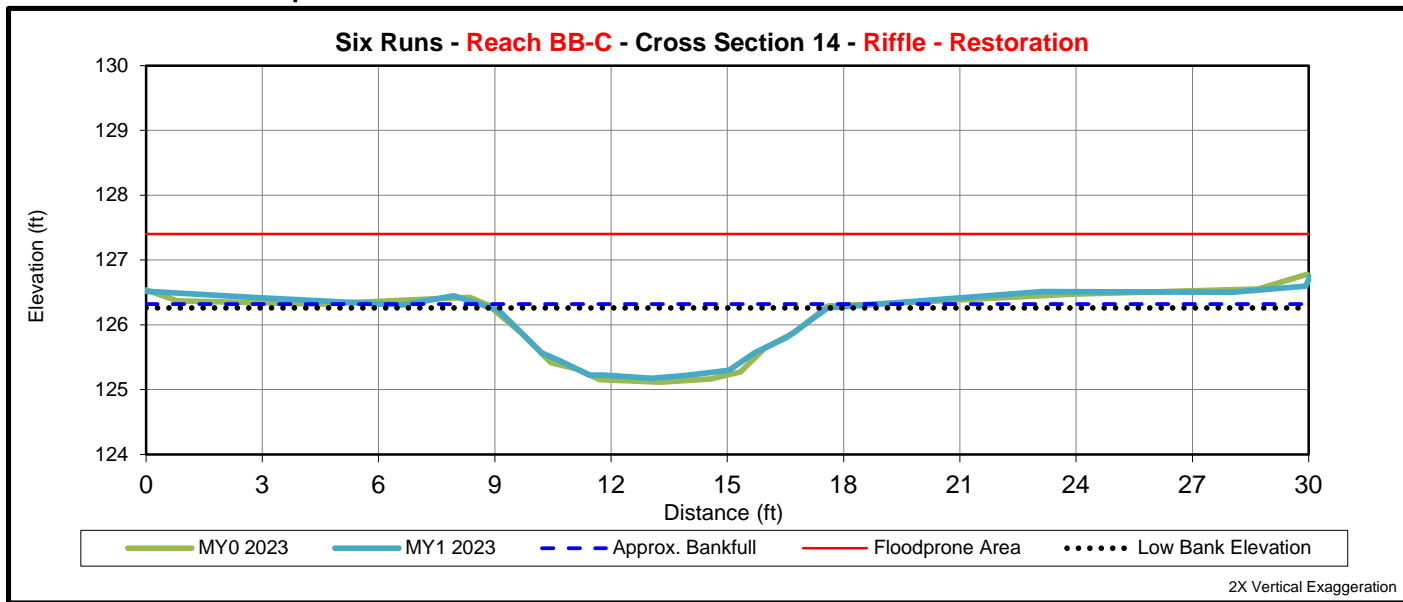
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 14 (Riffle - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	126.29	126.32					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	0.95					
Thalweg Elevation	125.12	125.17					
LTOB ² Elevation	126.29	126.26					
LTOB ² Max Depth (ft)	1.17	1.09					
LTOB ² Cross Sectional Area (ft ²)	7.10	6.50					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

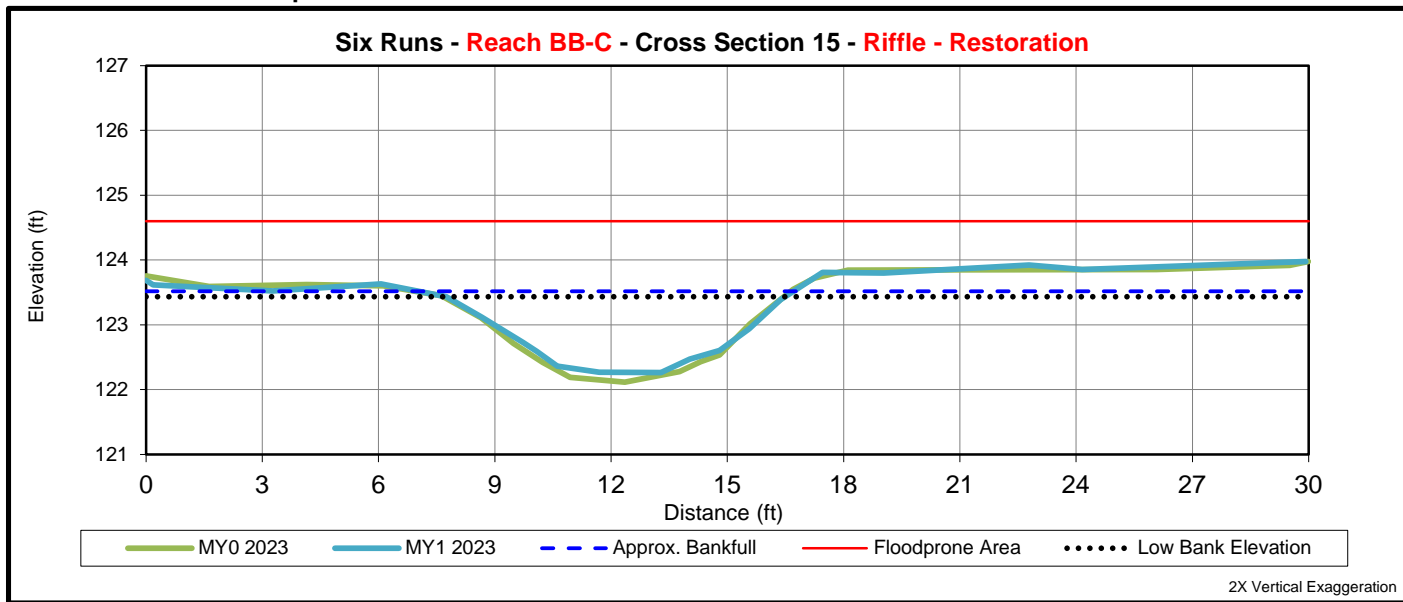
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 15 (Riffle - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	123.45	123.52					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	0.93					
Thalweg Elevation	122.11	122.26					
LTOB ² Elevation	123.45	123.43					
LTOB ² Max Depth (ft)	1.34	1.17					
LTOB ² Cross Sectional Area (ft ²)	7.50	6.70					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

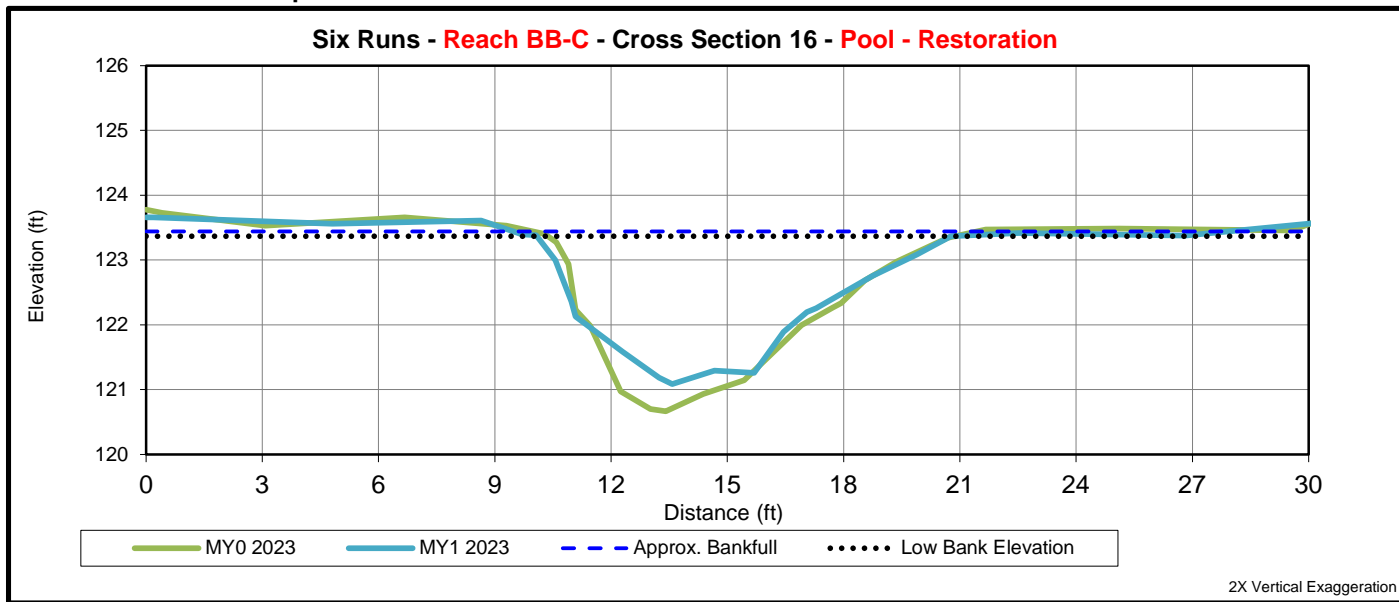
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 16 (Pool - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	123.34	123.44					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	120.67	121.08					
LTOB ² Elevation	123.34	123.37					
LTOB ² Max Depth (ft)	2.67	2.28					
LTOB ² Cross Sectional Area (ft ²)	15.00	13.80					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

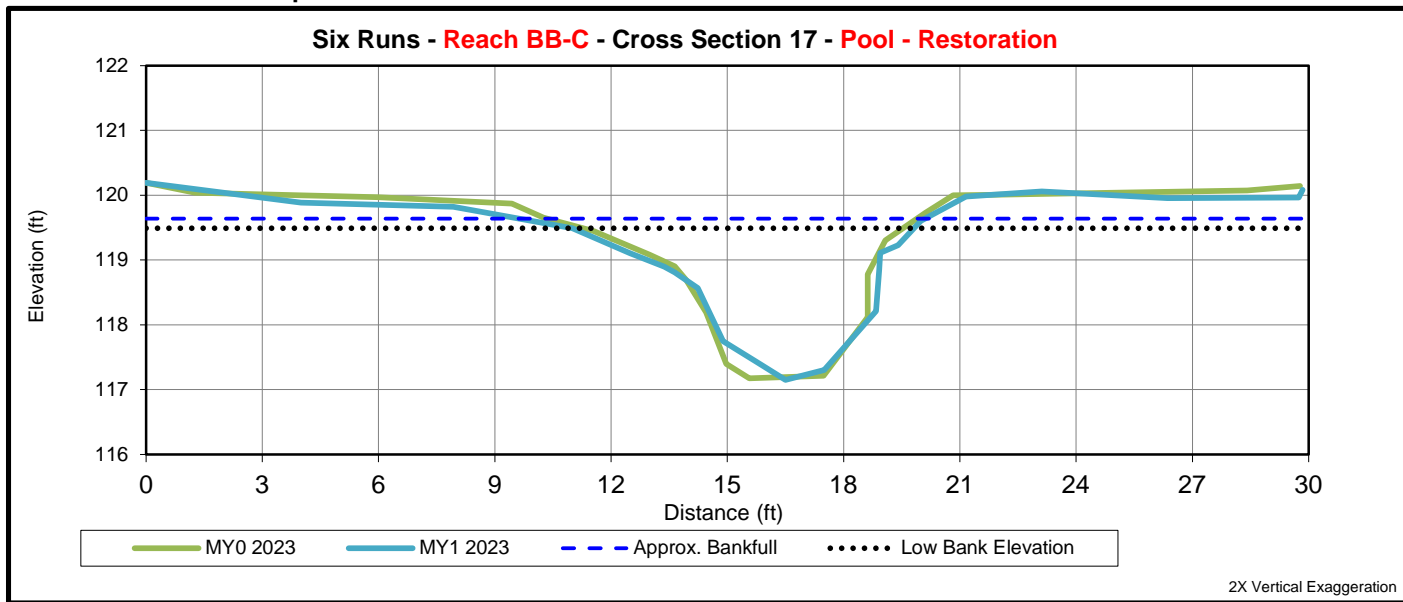
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 17 (Pool - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	119.65	119.64					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	117.18	117.15					
LTOB ² Elevation	119.65	119.49					
LTOB ² Max Depth (ft)	2.47	2.34					
LTOB ² Cross Sectional Area (ft ²)	11.80	10.40					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

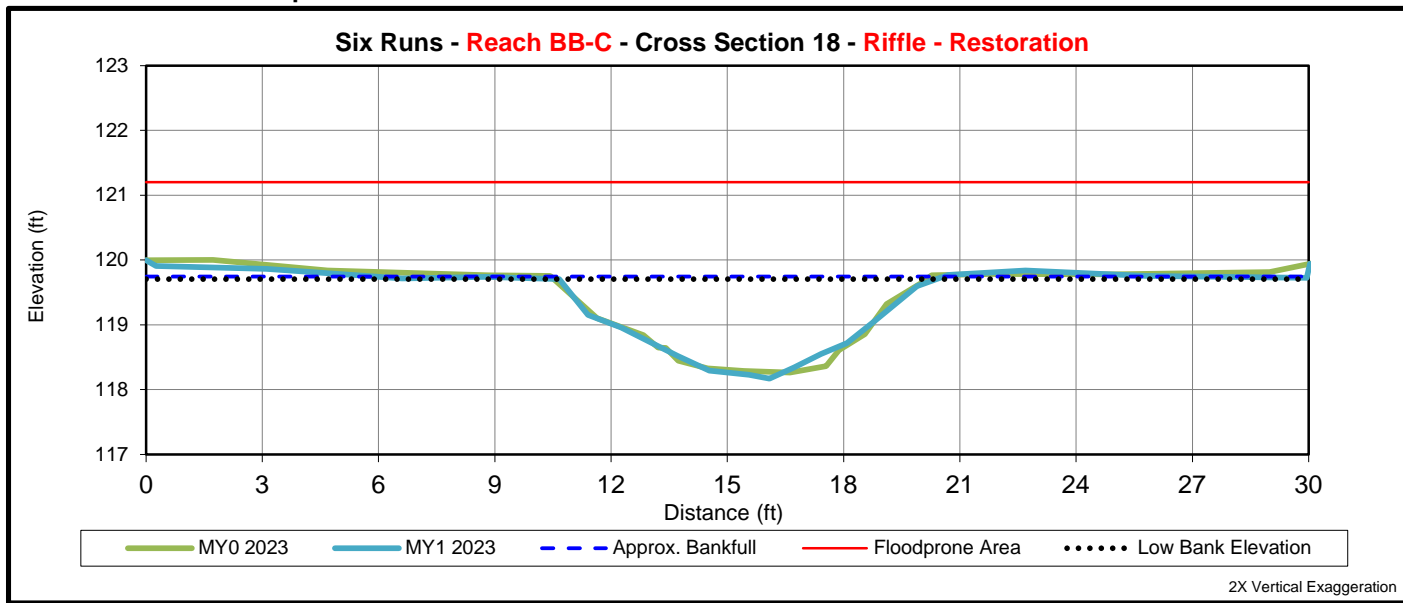
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 18 (Riffle - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	119.76	119.75					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	0.98					
Thalweg Elevation	118.29	118.17					
LTOB ² Elevation	119.76	119.71					
LTOB ² Max Depth (ft)	1.47	1.54					
LTOB ² Cross Sectional Area (ft ²)	9.60	9.10					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

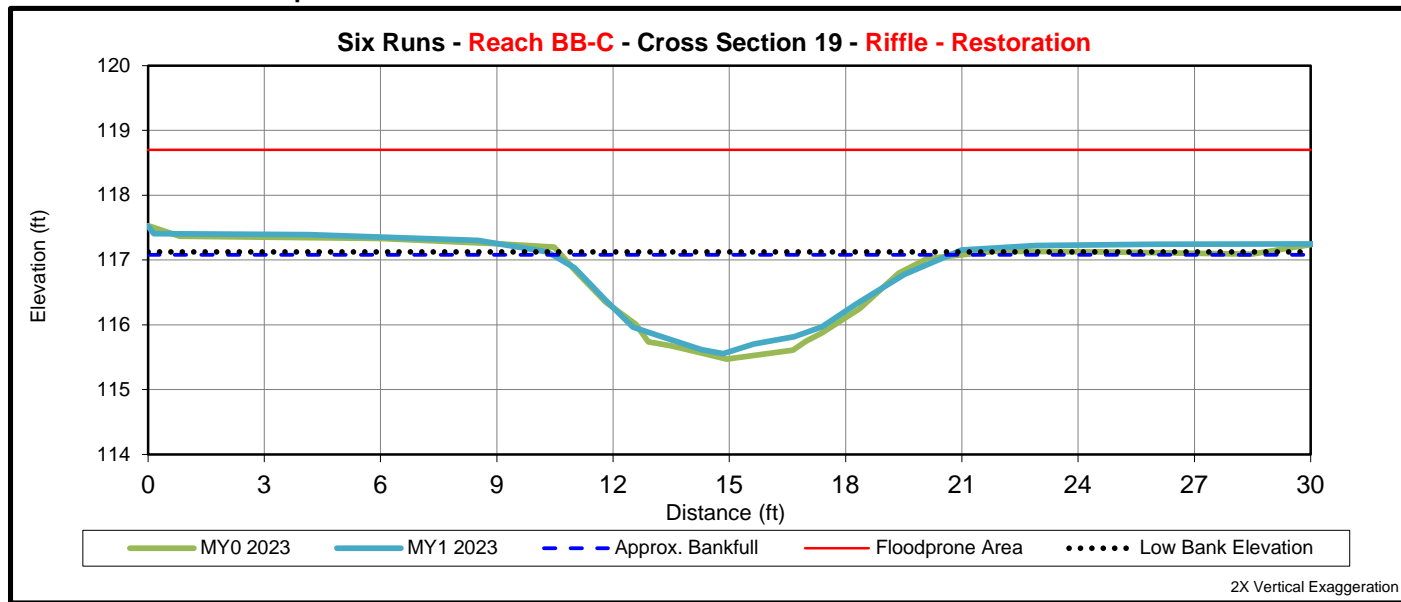
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 19 (Riffle - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	117.02	117.08					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	1.03					
Thalweg Elevation	115.47	115.56					
LTOB ² Elevation	117.02	117.12					
LTOB ² Max Depth (ft)	1.55	1.57					
LTOB ² Cross Sectional Area (ft ²)	9.20	9.70					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

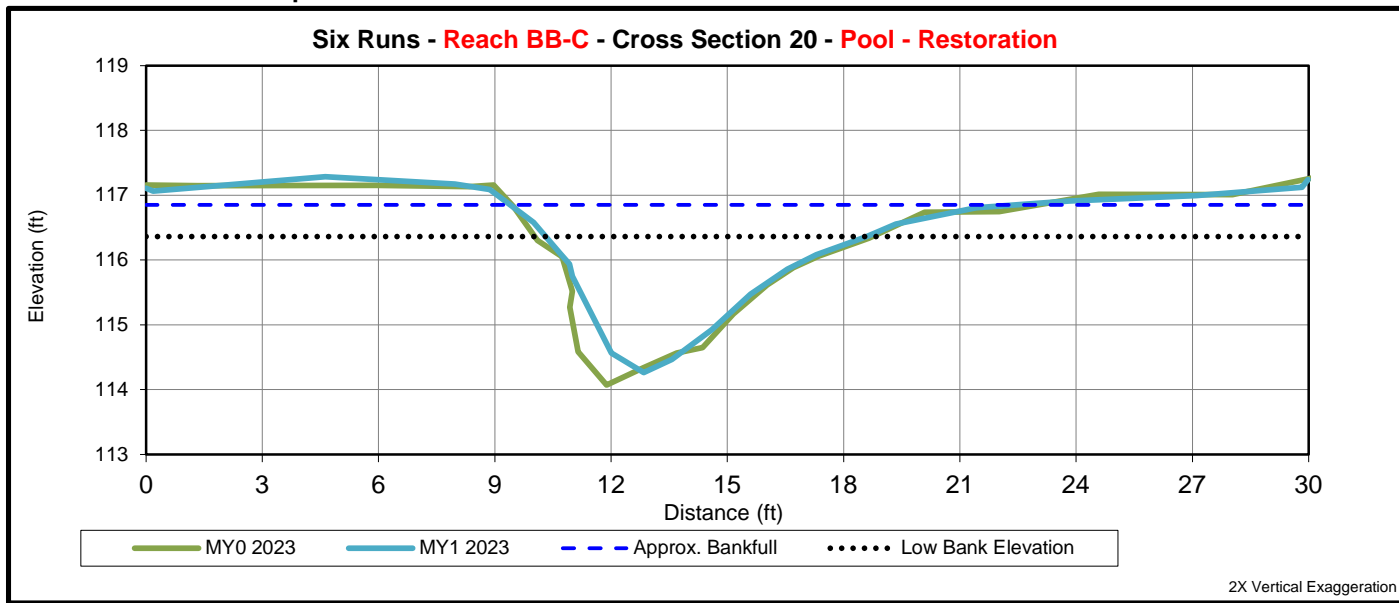
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 20 (Pool - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	116.74	116.85					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	114.07	114.26					
LTOB ² Elevation	116.74	116.36					
LTOB ² Max Depth (ft)	2.67	2.10					
LTOB ² Cross Sectional Area (ft ²)	13.40	8.50					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

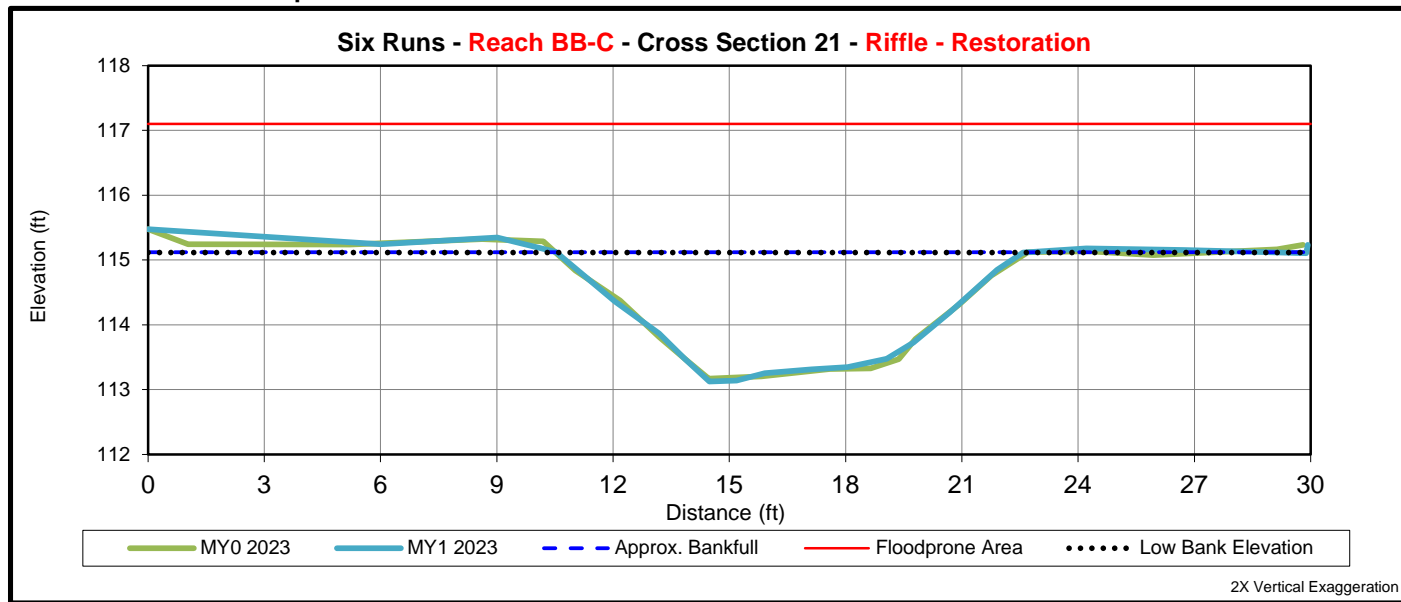
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 21 (Riffle - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	115.12	115.12					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	1.00					
Thalweg Elevation	113.17	113.13					
LTOB ² Elevation	115.12	115.11					
LTOB ² Max Depth (ft)	1.95	1.99					
LTOB ² Cross Sectional Area (ft ²)	15.30	15.10					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

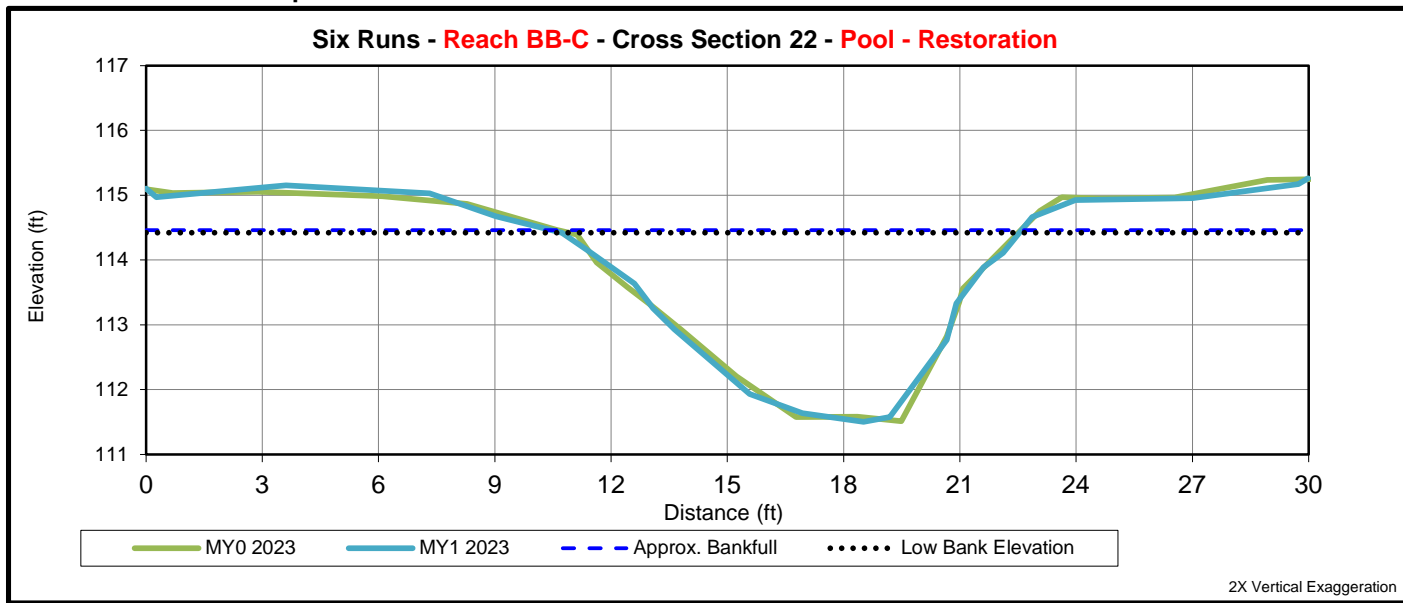
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 22 (Pool - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	114.46	114.46					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	111.51	111.50					
LTOB ² Elevation	114.46	114.42					
LTOB ² Max Depth (ft)	2.95	2.92					
LTOB ² Cross Sectional Area (ft ²)	20.80	20.30					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

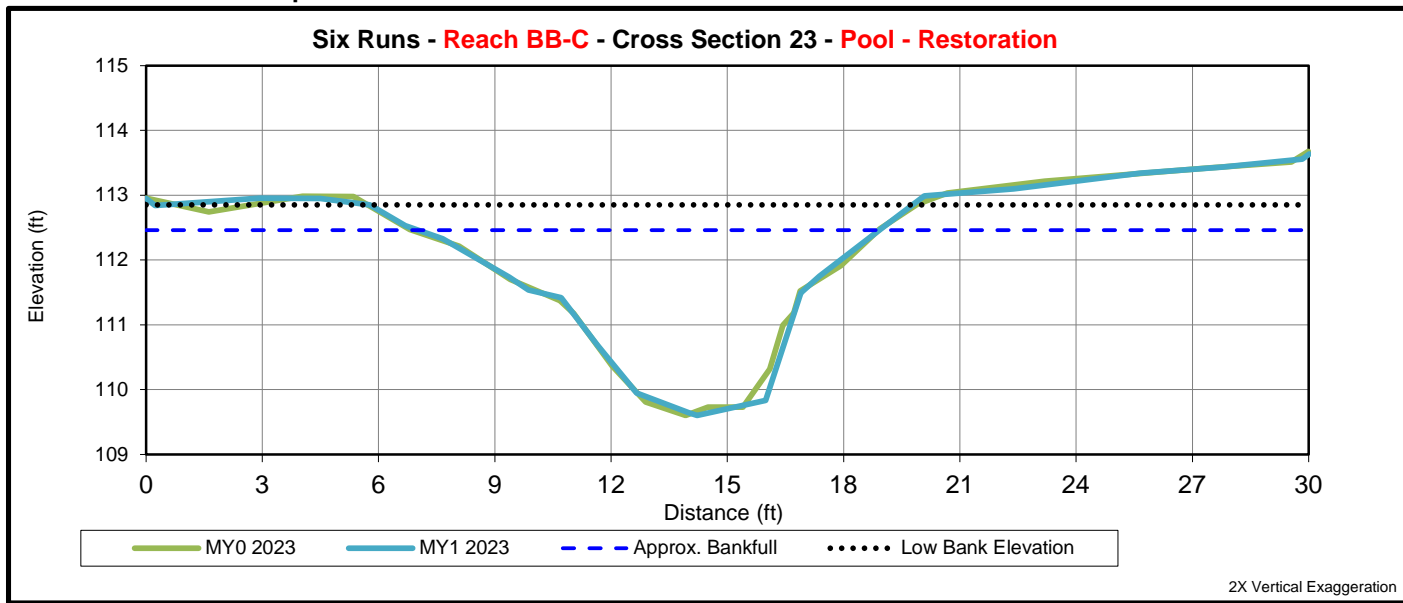
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 23 (Pool - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	112.47	112.46					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	109.60	109.60					
LTOB ² Elevation	112.47	112.85					
LTOB ² Max Depth (ft)	2.87	3.25					
LTOB ² Cross Sectional Area (ft ²)	17.10	22.20					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

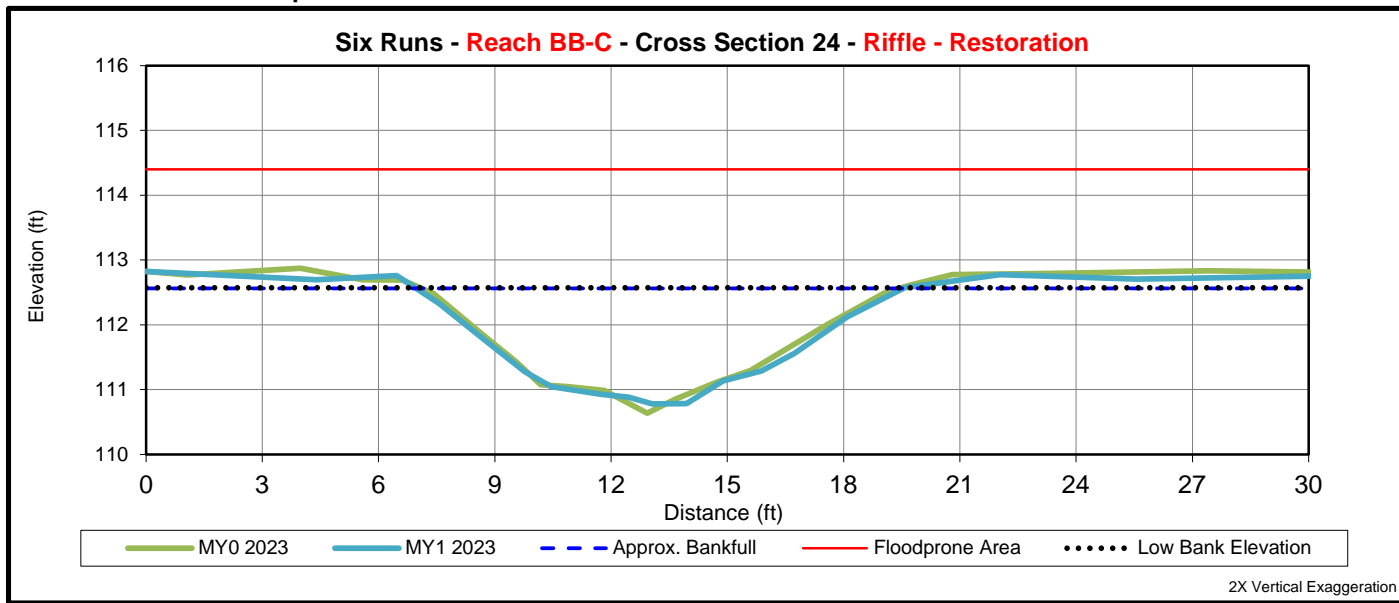
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 24 (Riffle - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	112.61	112.56					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	1.01					
Thalweg Elevation	110.64	110.78					
LTOB ² Elevation	112.61	112.57					
LTOB ² Max Depth (ft)	1.97	1.79					
LTOB ² Cross Sectional Area (ft ²)	13.60	13.80					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

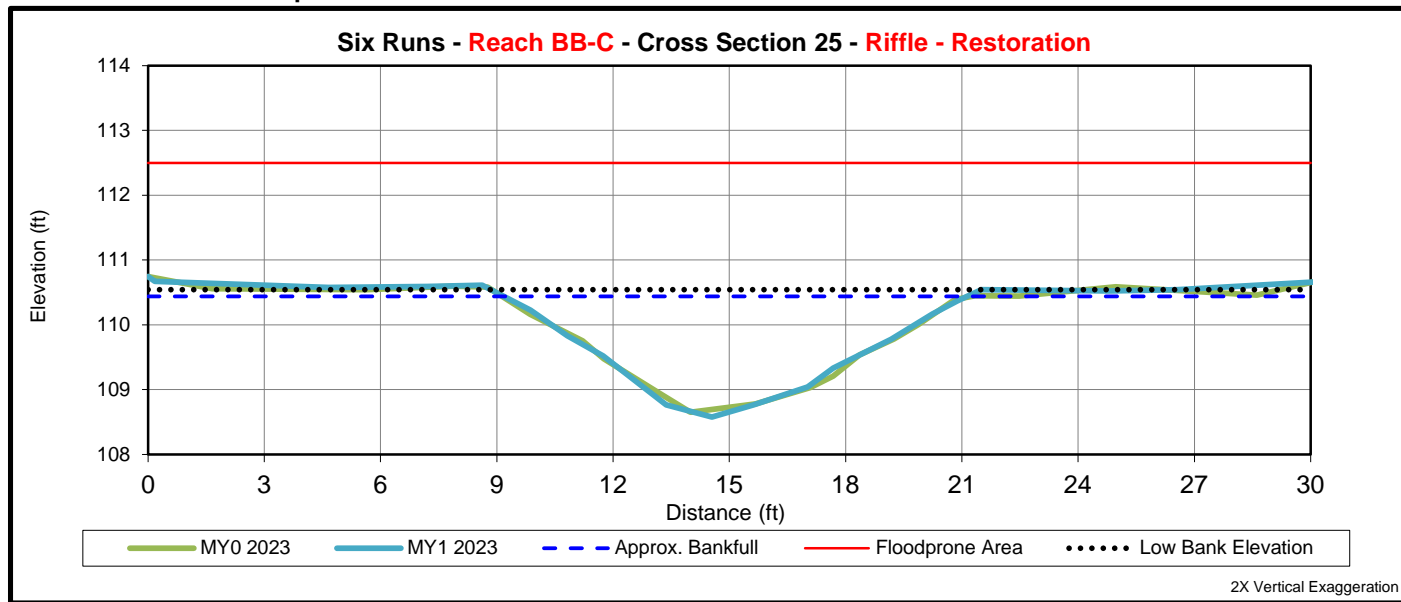
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 25 (Riffle - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	110.45	110.44					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	1.06					
Thalweg Elevation	108.65	108.58					
LTOB ² Elevation	110.45	110.54					
LTOB ² Max Depth (ft)	1.80	1.96					
LTOB ² Cross Sectional Area (ft ²)	12.20	13.50					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

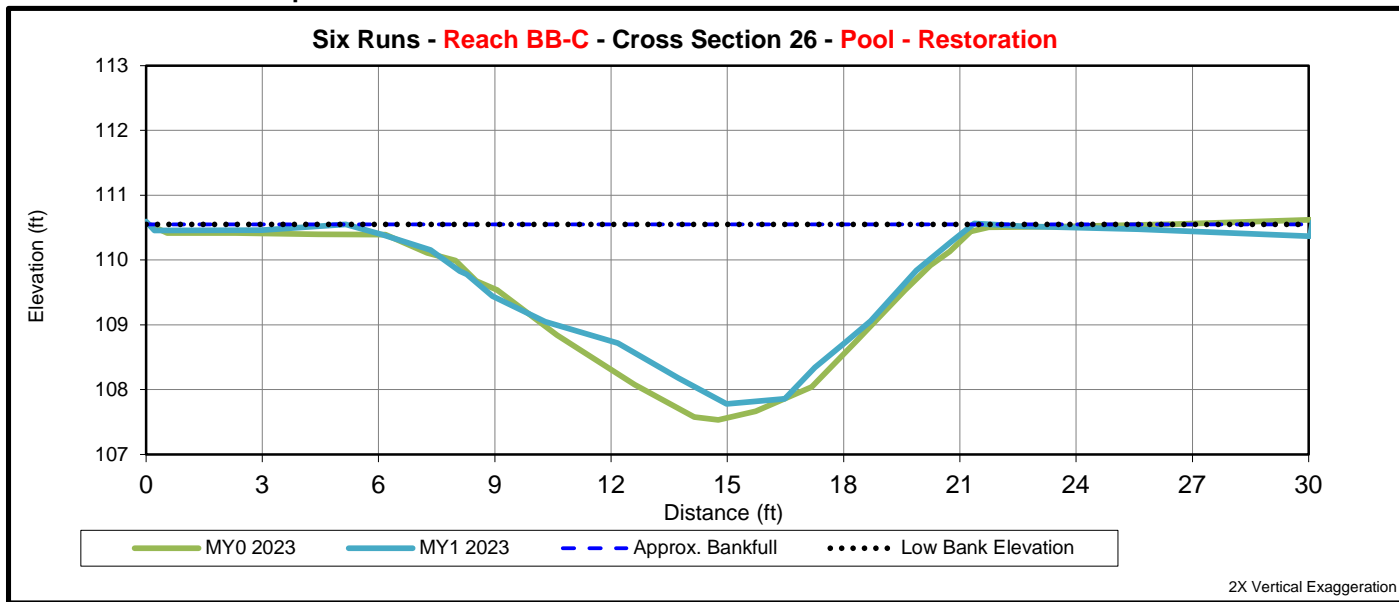
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 26 (Pool - BB-C)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	110.39	110.55					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	107.53	107.78					
LTOB ² Elevation	110.39	110.55					
LTOB ² Max Depth (ft)	2.86	2.77					
LTOB ² Cross Sectional Area (ft ²)	23.40	23.40					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

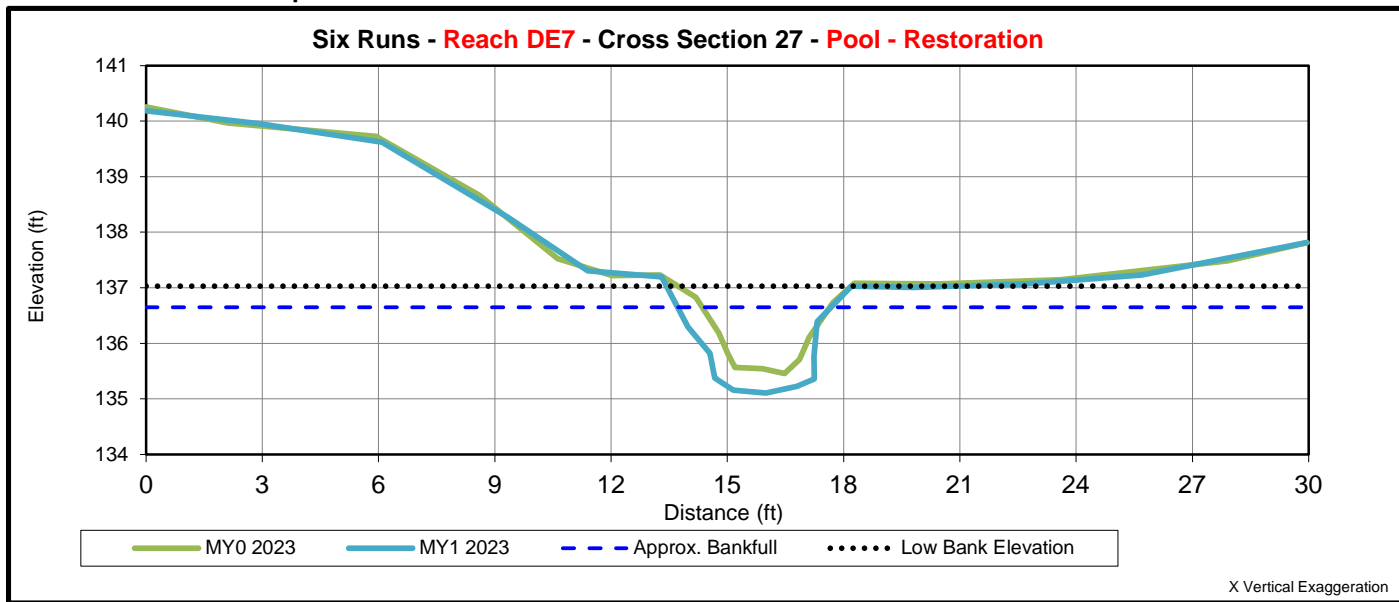
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 27 (Pool - DE7)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	137.08	136.65					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	135.46	135.11					
LTOB ² Elevation	137.08	137.03					
LTOB ² Max Depth (ft)	1.62	1.93					
LTOB ² Cross Sectional Area (ft ²)	4.30	6.00					

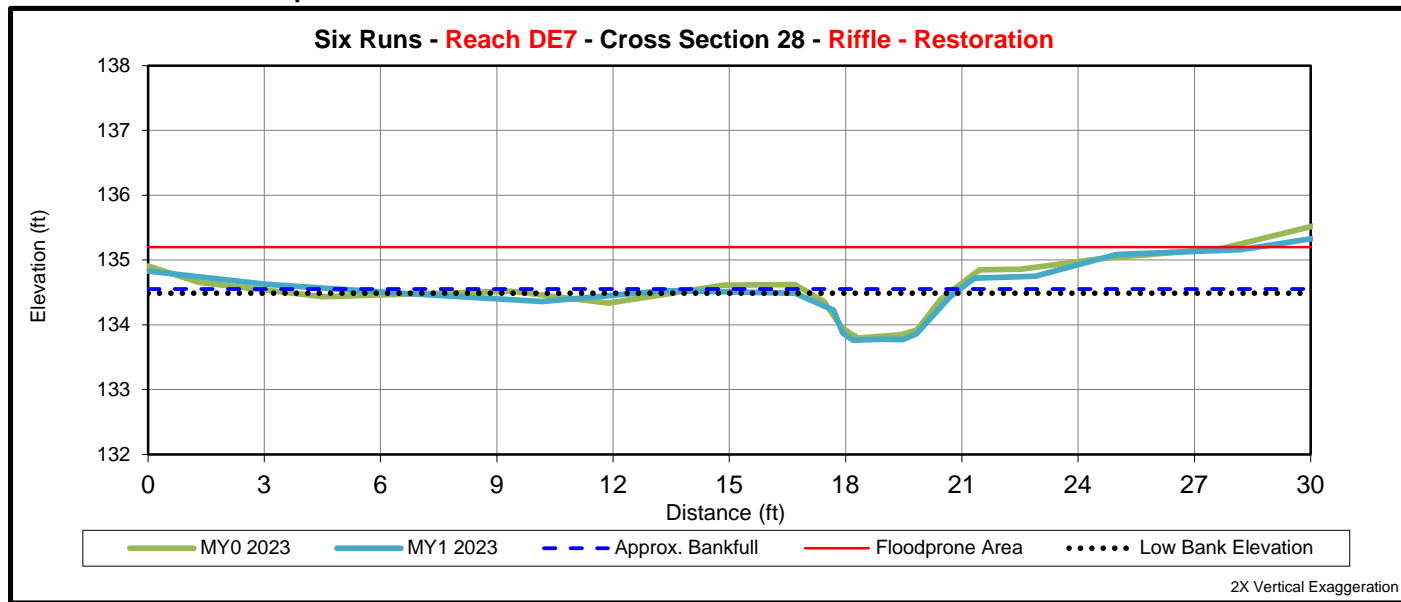
1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation
 2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 28 (Riffle - DE7)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	134.62	134.55					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	0.92					
Thalweg Elevation	133.80	133.76					
LTOB ² Elevation	134.62	134.49					
LTOB ² Max Depth (ft)	0.82	0.73					
LTOB ² Cross Sectional Area (ft ²)	2.10	1.70					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

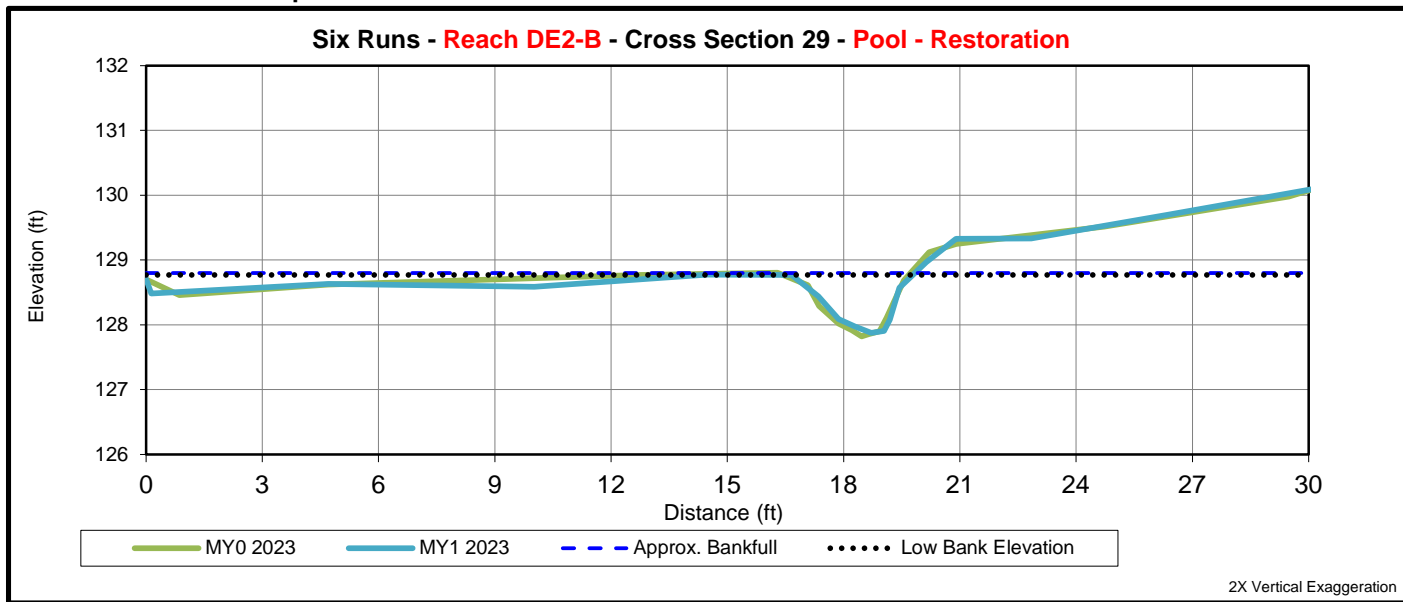
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 29 (Pool - DE2-B)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	128.81	128.80					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	127.82	127.88					
LTOB ² Elevation	128.81	128.77					
LTOB ² Max Depth (ft)	0.99	0.90					
LTOB ² Cross Sectional Area (ft ²)	1.80	1.60					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

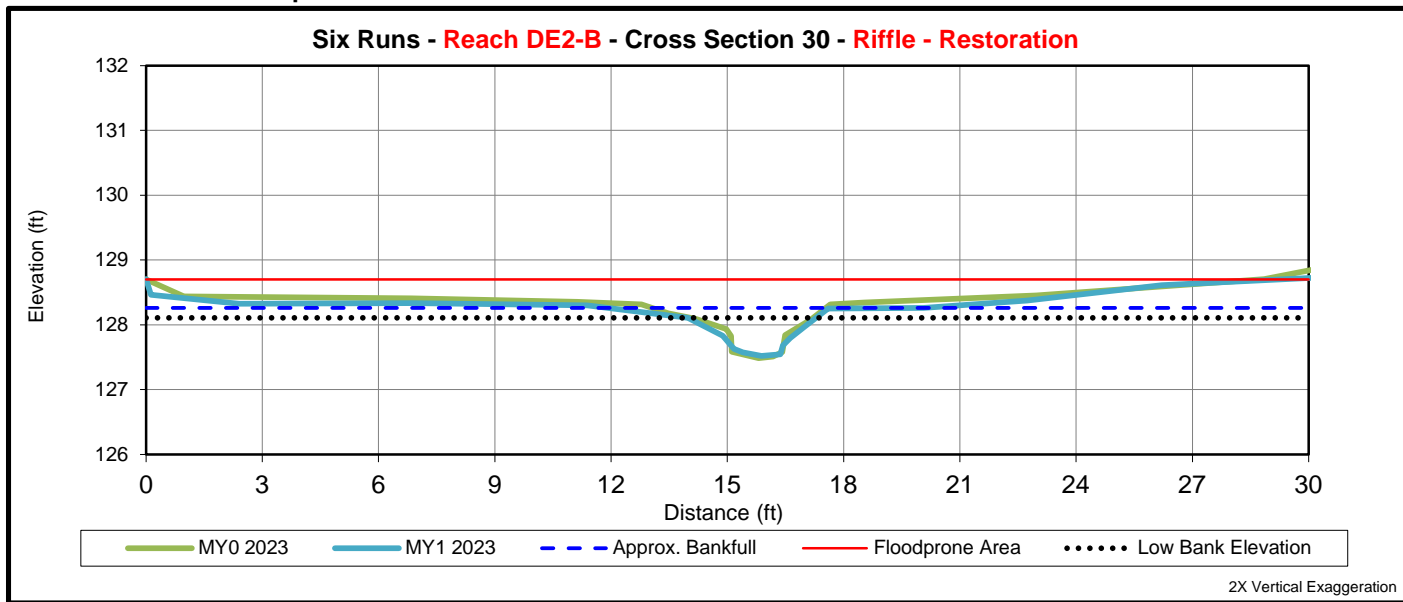
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 30 (Riffle - DE2-B)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	128.31	128.26					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	0.80					
Thalweg Elevation	127.48	127.52					
LTOB ² Elevation	128.31	128.11					
LTOB ² Max Depth (ft)	0.83	0.59					
LTOB ² Cross Sectional Area (ft ²)	1.80	1.10					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

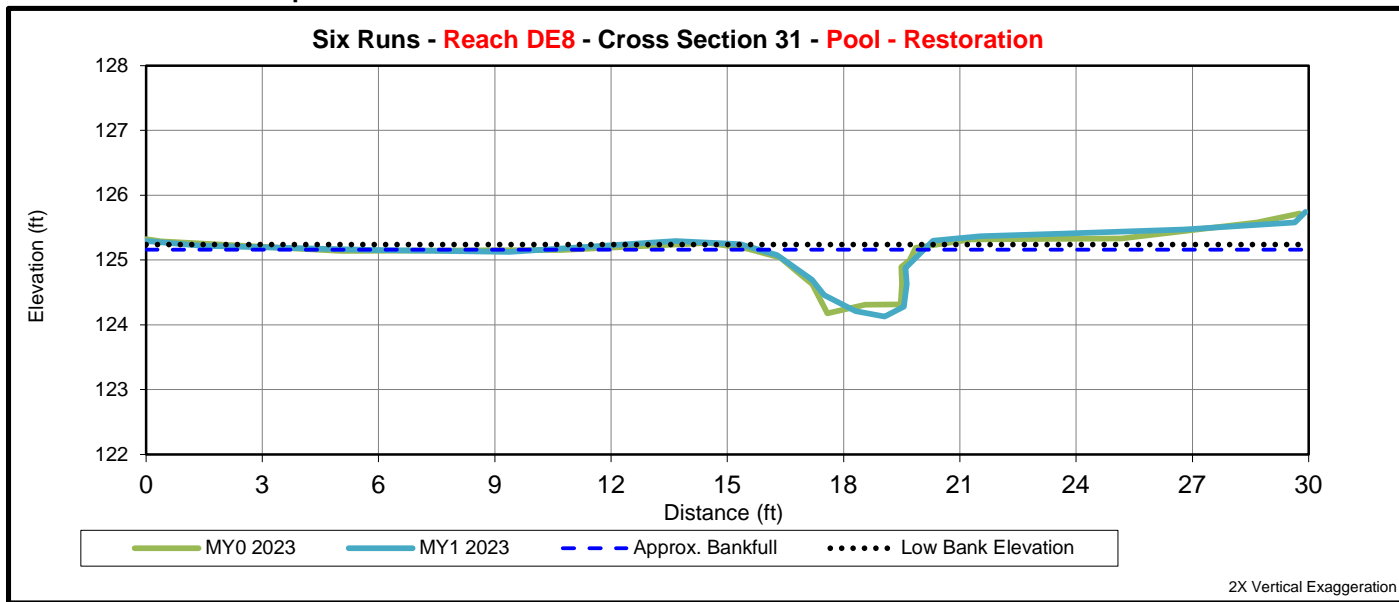
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 31 (Pool - DE8)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	125.71	125.16					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	124.18	124.13					
LTOB ² Elevation	125.71	125.24					
LTOB ² Max Depth (ft)	1.53	1.11					
LTOB ² Cross Sectional Area (ft ²)	2.40	2.80					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

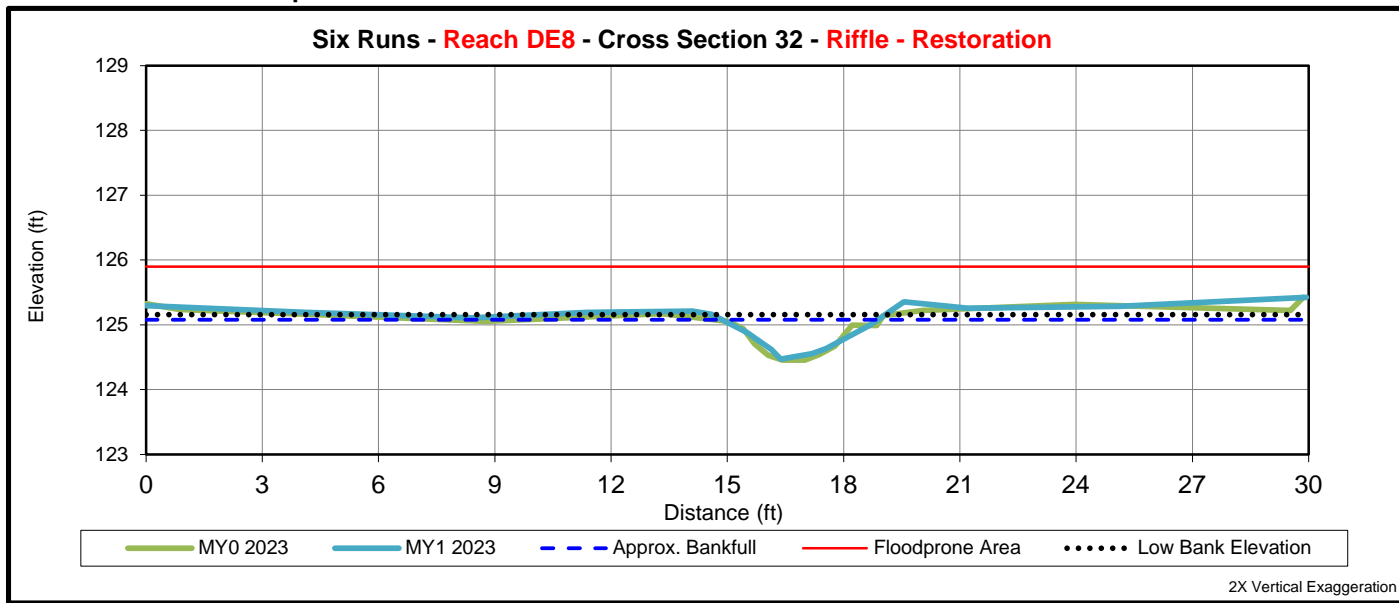
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 32 (Riffle - DE8)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	125.05	125.08					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	1.13					
Thalweg Elevation	124.46	124.47					
LTOB ² Elevation	125.05	125.16					
LTOB ² Max Depth (ft)	0.59	0.69					
LTOB ² Cross Sectional Area (ft ²)	1.30	1.70					

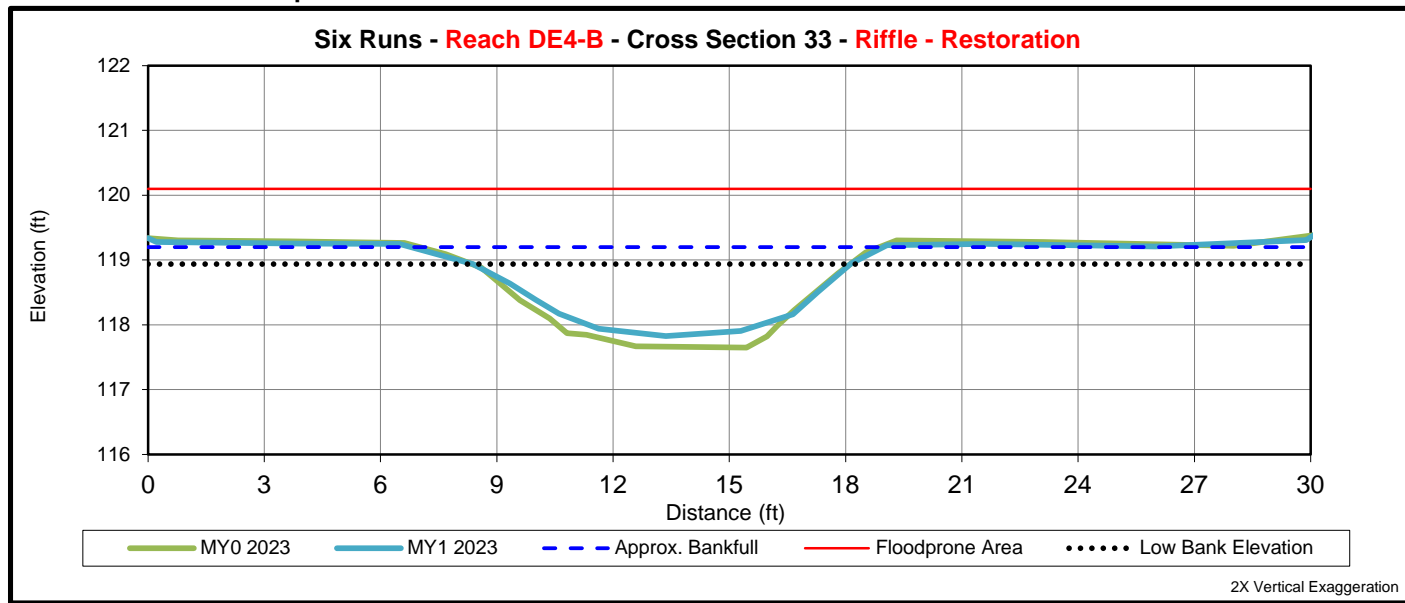
1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation
 2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 33 (Riffle - DE4-B)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	119.09	119.20					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	0.81					
Thalweg Elevation	117.65	117.83					
LTOB ² Elevation	119.09	118.94					
LTOB ² Max Depth (ft)	1.44	1.11					
LTOB ² Cross Sectional Area (ft ²)	10.30	7.40					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

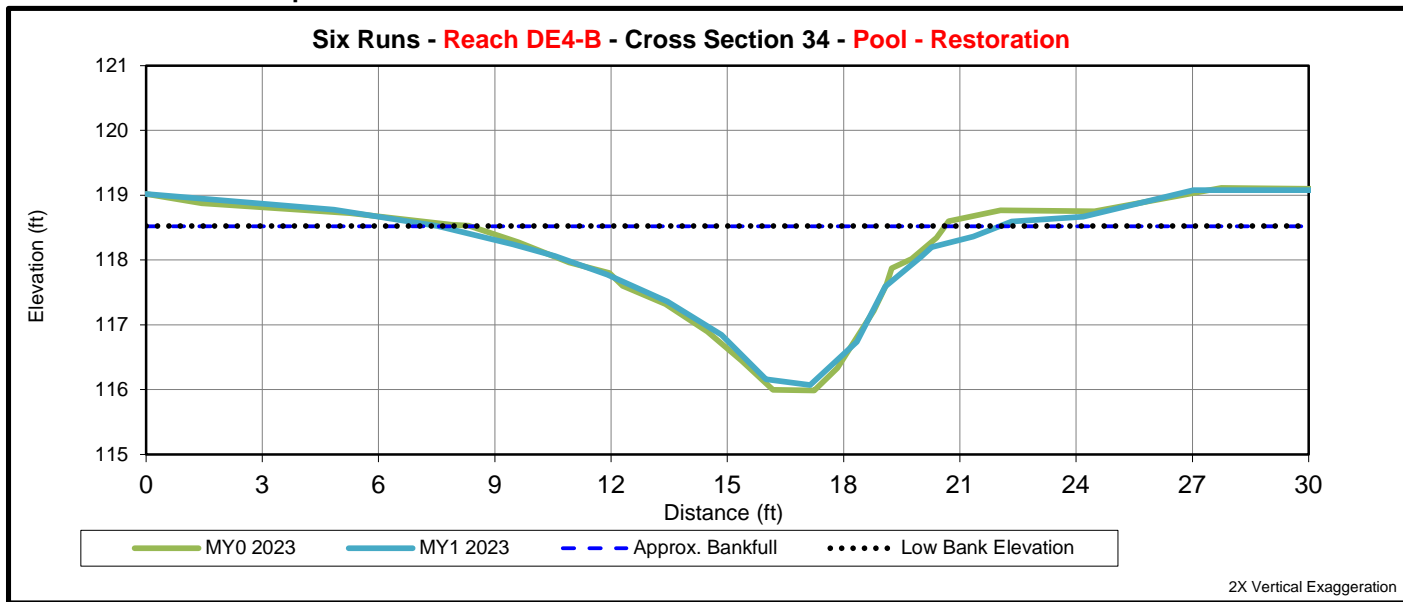
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 34 (Pool - DE4-B)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	118.53	118.52					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	115.99	116.07					
LTOB ² Elevation	118.53	118.52					
LTOB ² Max Depth (ft)	2.54	2.45					
LTOB ² Cross Sectional Area (ft ²)	14.60	14.70					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

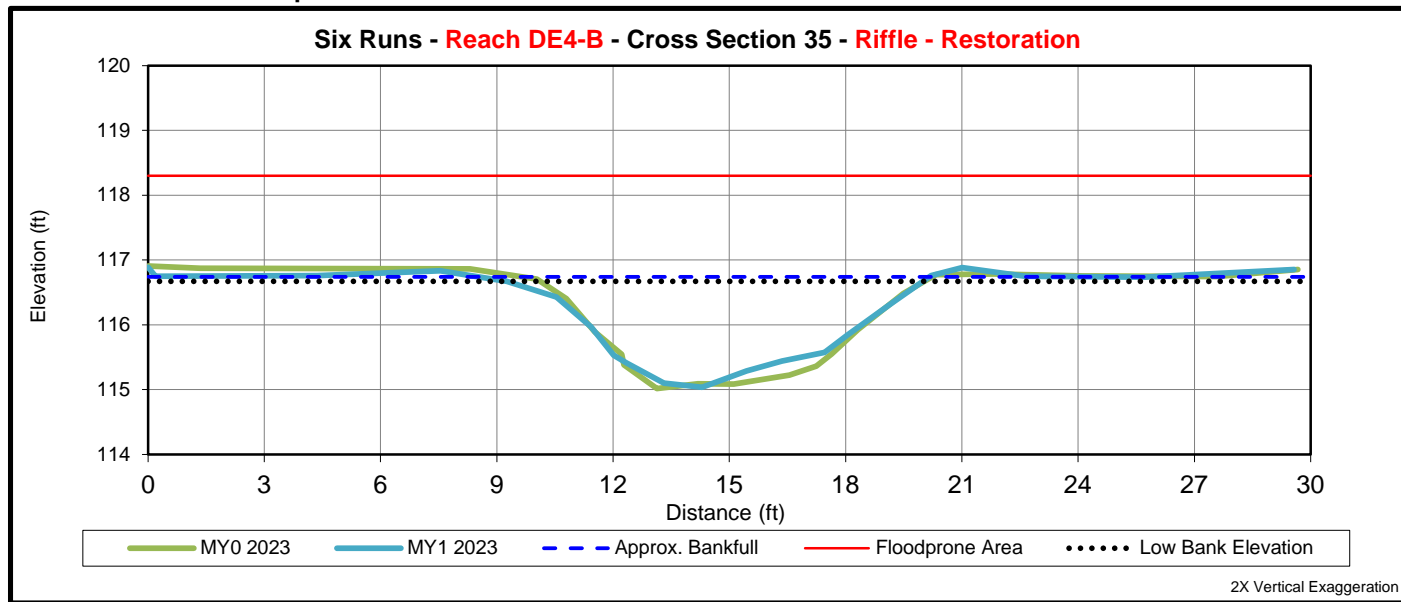
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 35 (Riffle - DE4-B)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	116.71	116.74					
Bank Height Ratio - Based on AB Bankfull ¹ Area	1.00	0.96					
Thalweg Elevation	115.02	115.04					
LTOB ² Elevation	116.71	116.67					
LTOB ² Max Depth (ft)	1.69	1.63					
LTOB ² Cross Sectional Area (ft ²)	10.80	10.00					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

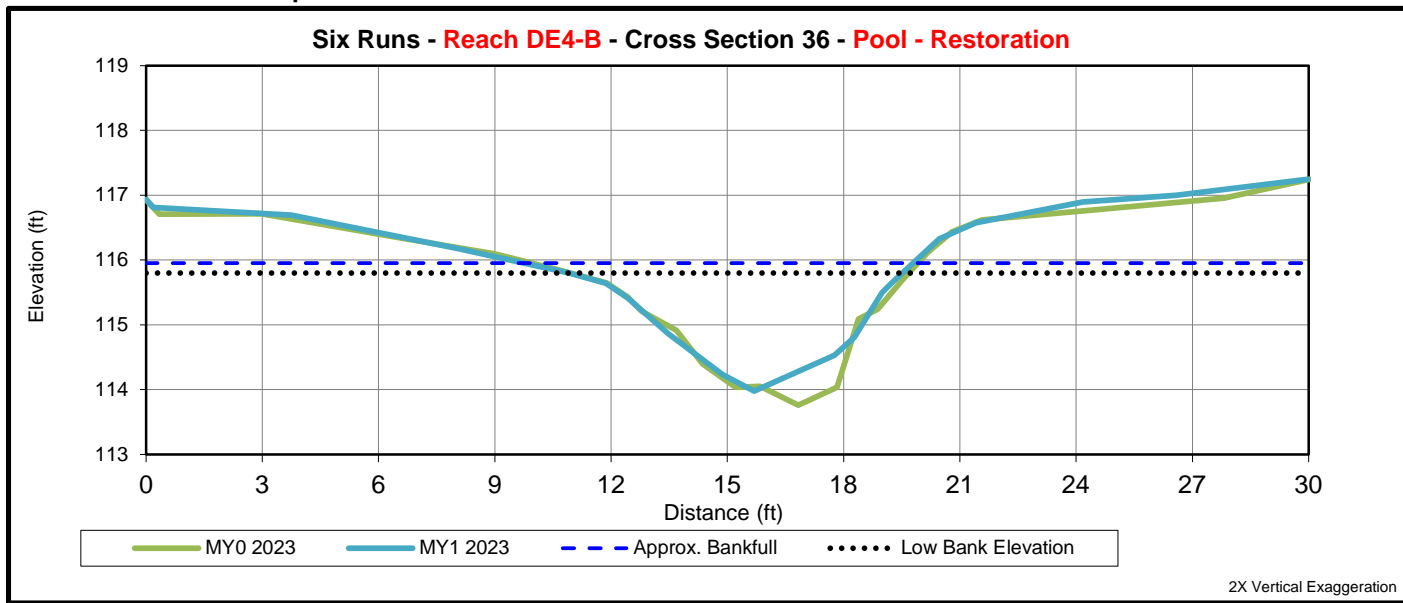
2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation



Upstream



Downstream



	Cross Section 36 (Pool - DE4-B)						
	MY0	MY1	MY2	MY3	MY5	MY7	MY+
Bankfull Elevation (ft) - Based on AB-Bankfull ¹ Area	115.86	115.95					
Bank Height Ratio - Based on AB Bankfull ¹ Area							
Thalweg Elevation	113.76	113.98					
LTOB ² Elevation	115.86	115.80					
LTOB ² Max Depth (ft)	2.10	1.82					
LTOB ² Cross Sectional Area (ft ²)	9.80	8.40					

1 - Uses the as-built cross sectional area as the basis for adjusting each subsequent years bankfull elevation

2 - Uses the current years low top of bank as the basis for adjusting each subsequent years bankfull elevation

Appendix D

Hydrologic Data

Table 12. 2023 Rainfall Summary

Month	Average	Normal Limits		Project Location Precipitation*
		30 Percent	70 Percent	
January	3.65	2.49	4.36	3.81
February	3.28	2.20	3.93	3.56
March	3.52	2.48	4.17	2.55
April	3.34	2.15	4.02	4.51
May	4.05	2.71	4.84	2.40
June	4.83	3.36	5.74	4.57
July	5.82	4.39	6.79	9.66
August	5.55	3.97	6.56	7.31
September	6.49	3.60	7.92	4.22
October	3.32	1.87	4.04	1.27
November	3.28	1.85	3.99	4.13
December	3.38	2.26	4.05	-
Total Annual **	50.50	45.96	55.11	47.98
Above Normal Limits	Below Normal Limits			

WETS Station: Clinton, NC. Approximately 16 miles from the site.

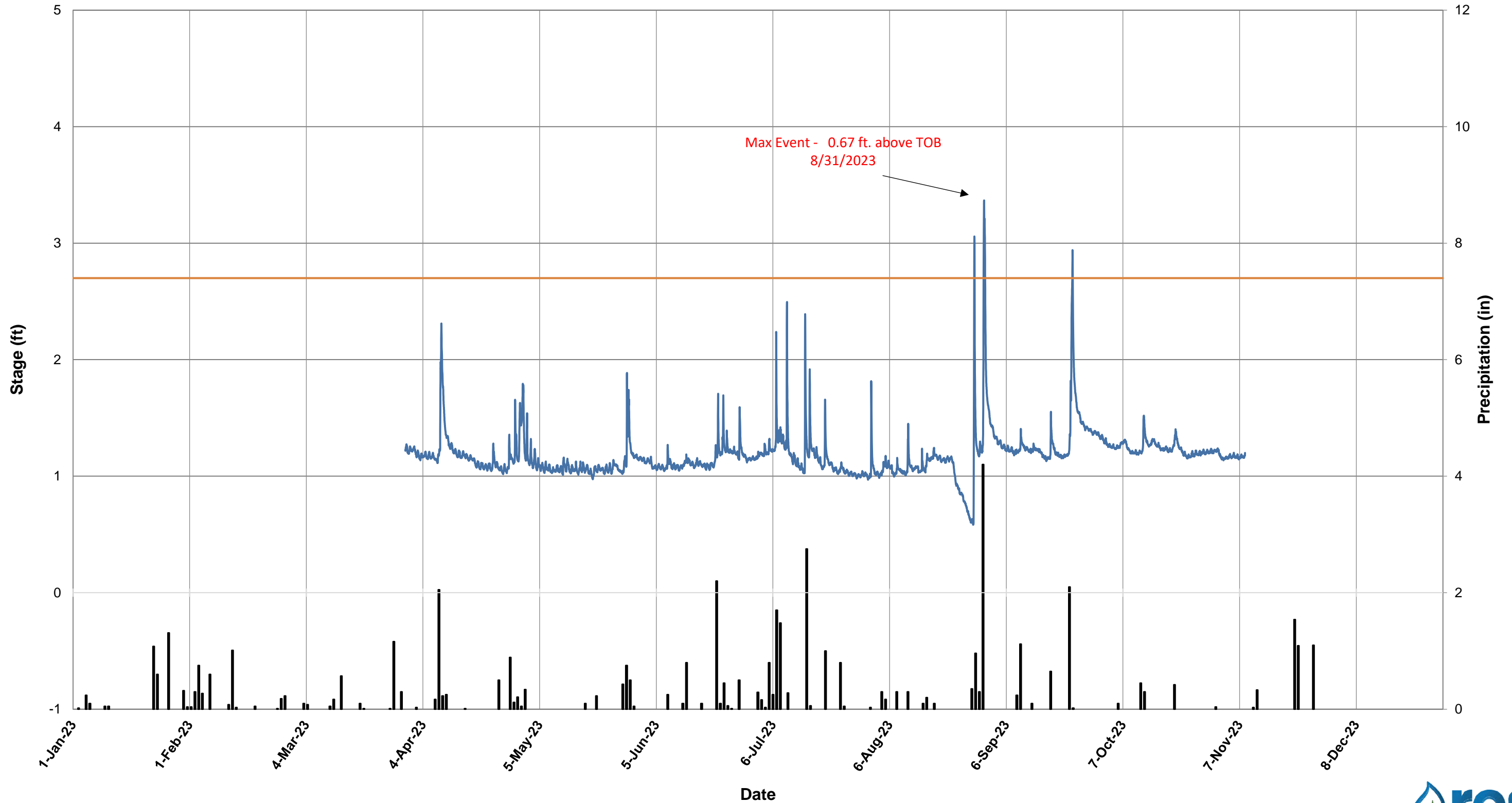
*Project Location Precipitation is a location-weighted average of surrounding gauged data retrieved by the USACE Antecedent Precipitation Tool. Gauges used include Clinton 1.5 NE, Clinton 2 NE, Clinton 4.5 SSE, Clinton 5.8 SW, Clinton 10.6 N, Garland 4 SW, Mount Olive 2.4 SW, Newton Grove 2.6 SSE, Smithfield, Wallace 1 SE, and Warsaw 5 E.

**Total Annual represents the average total precipitation, annually, as calculated by the 30-year period.

Table 13. Documentation of Geomorphically Significant Flow Events

Year	Bankfull Events	Maximum Height Over Bankfull (ft)	Estimated Date of Highest Event	
Stage Recorder BB-C DS				
MY1 2023	3	0.67	8/31/2023	
Stage Recorder BB-C US				
MY1 2023	4	0.49	8/31/2023	
Stage Recorder DE4-B				
MY1 2023	5	0.91	8/31/2023	
Year	Flow Events	Maximum Consecutive Flow Days	Cummlative Flow Days	Highest Consecutive Flow Range
Flow Gauge BB-A				
MY1 2023	7	71	123	8/28/23 - 11/7/23
Flow Gauge DE2-B				
MY1 2023	2	142	214	3/30/23 - 8/19/23
Flow Gauge DE7				
MY1 2023	1	222	222	3/30/23 - 11/7/23
Flow Gauge DE8				
MY1 2023	2	148	217	3/30/23 - 8/23/23
Flow Gauge MT2				
MY1 2023	5	18	30	3/30/23 - 4/17/23

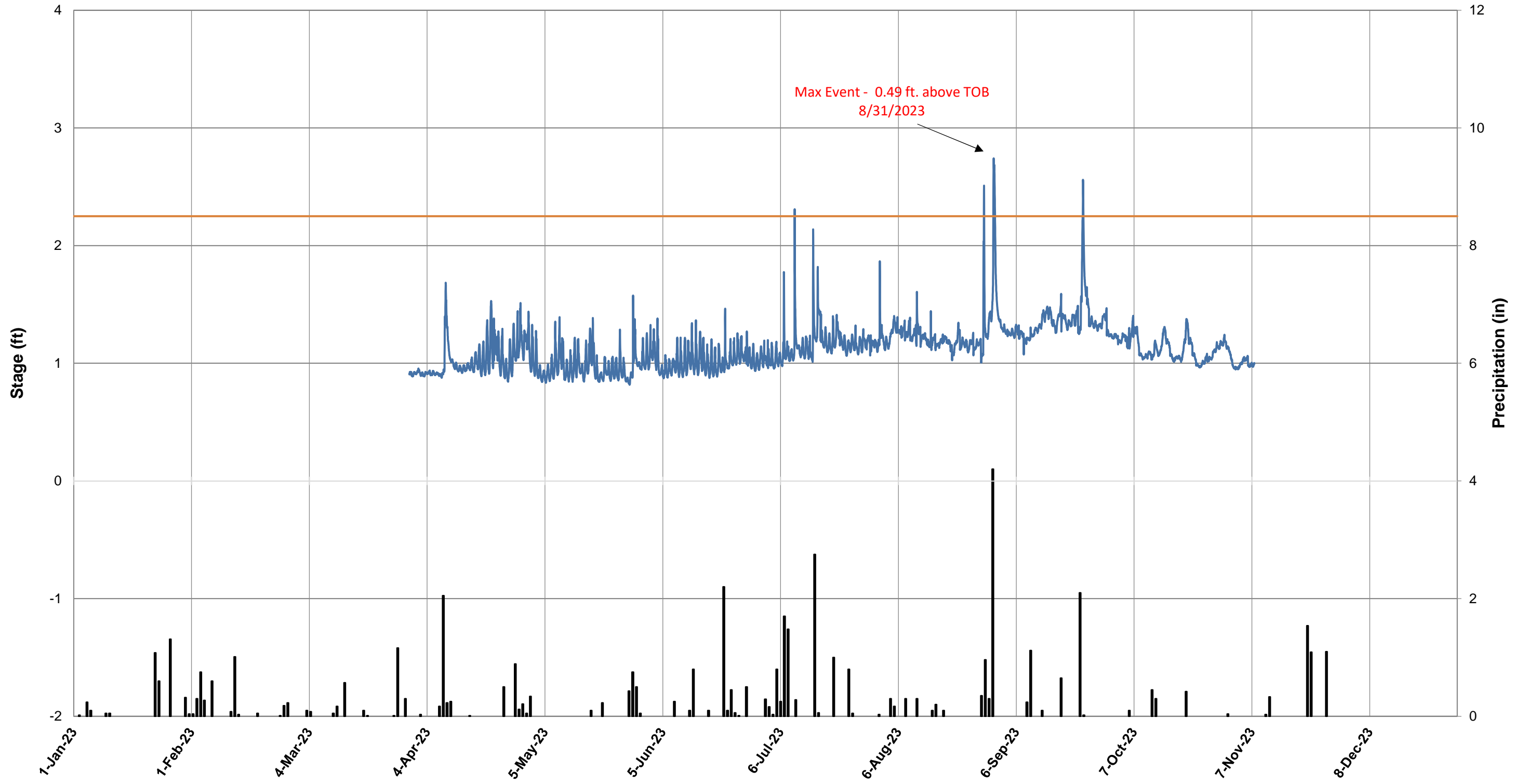
Six Runs MY1 BB-C DS Stage Recorder Graph



■ Daily Precip (in) — SR BB-C DS — Top of Bank



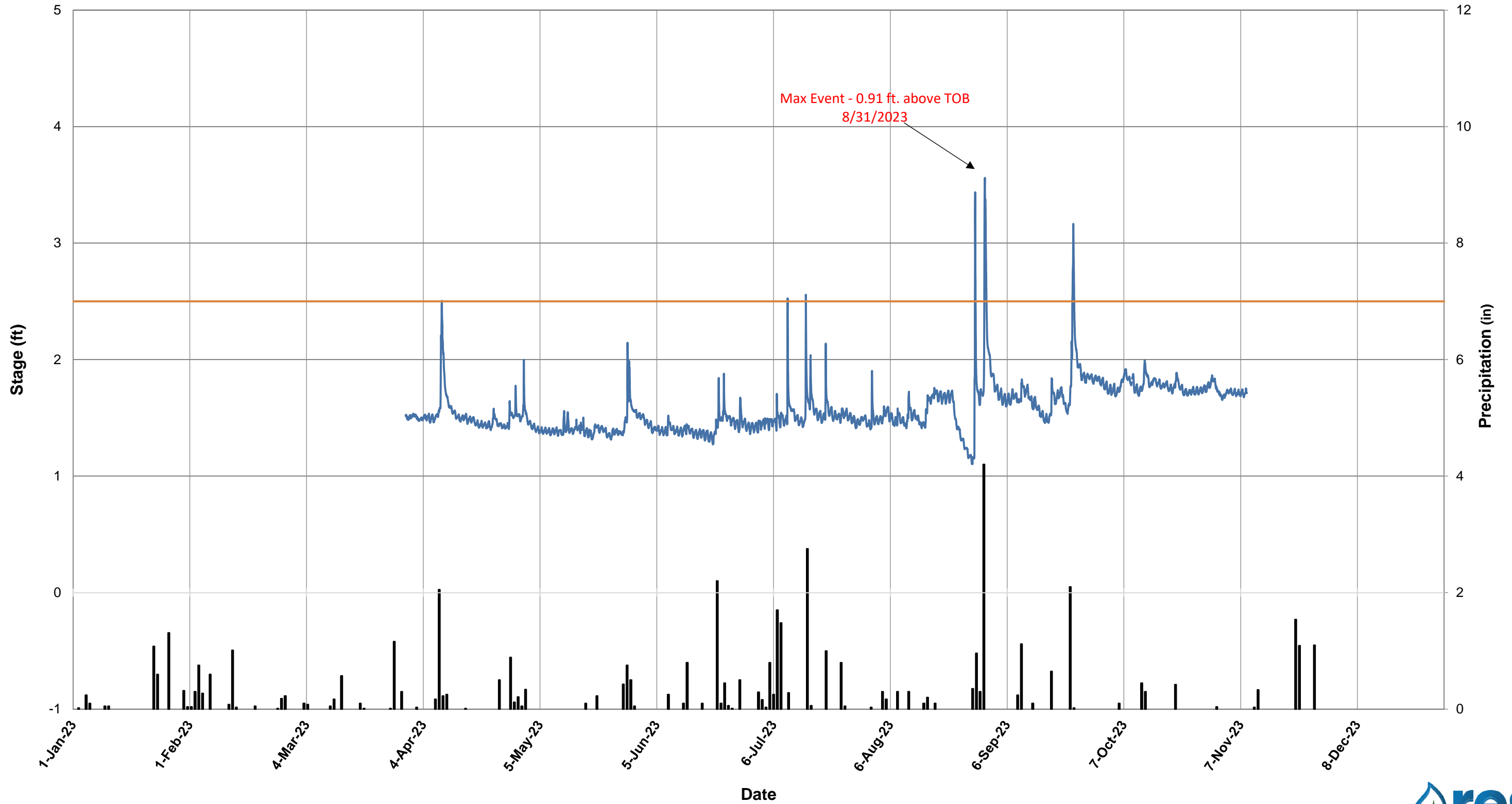
Six Runs MY1 BB-C US Stage Recorder Graph



■ Daily Precip (in) — SR BB-C US — Top of Bank



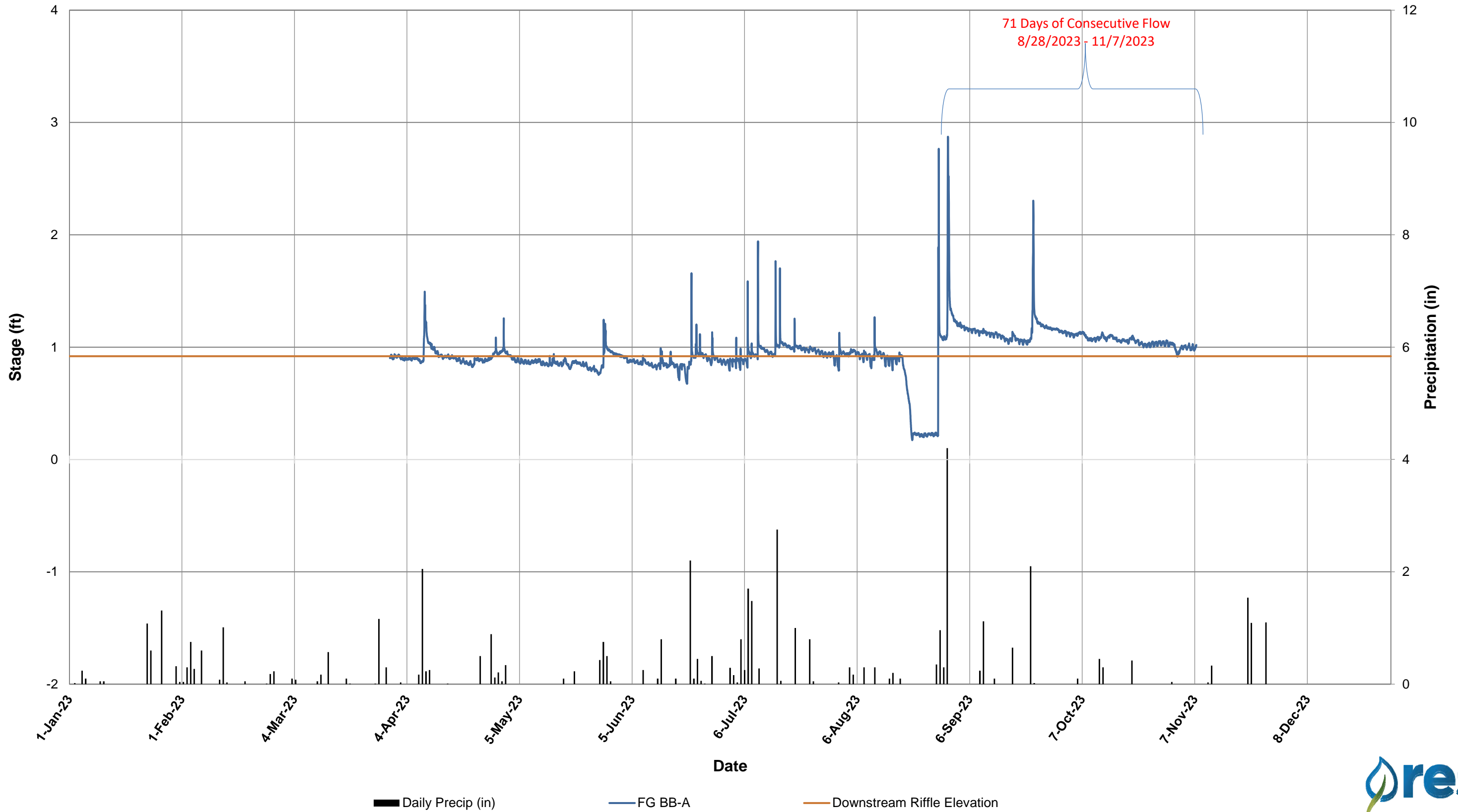
Six Runs MY1 DE4-B Stage Recorder Graph



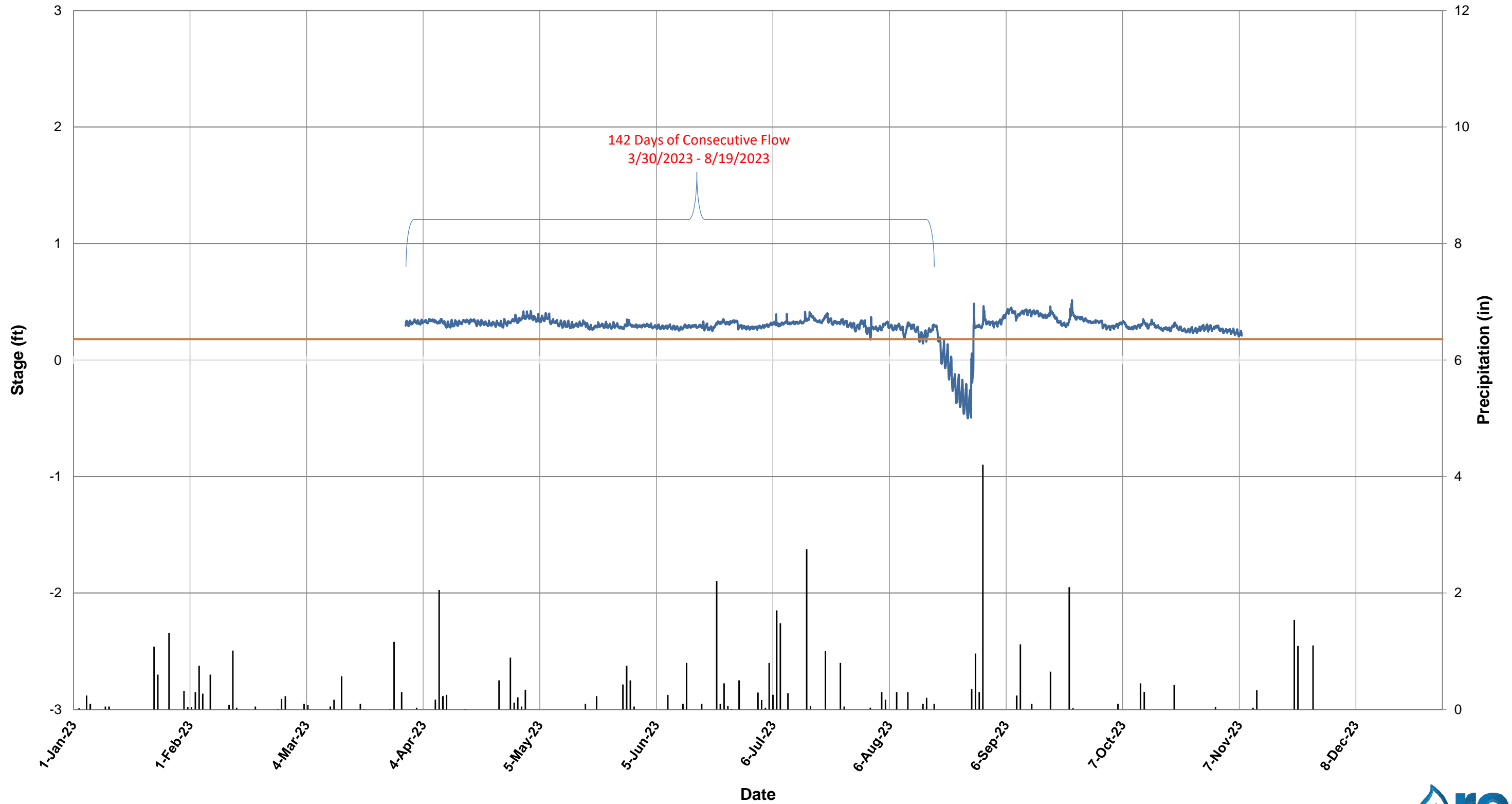
■ Daily Precip (in) — SR DE4-B — Top of Bank



Six Runs MY1 BB-A Flow Gauge Graph



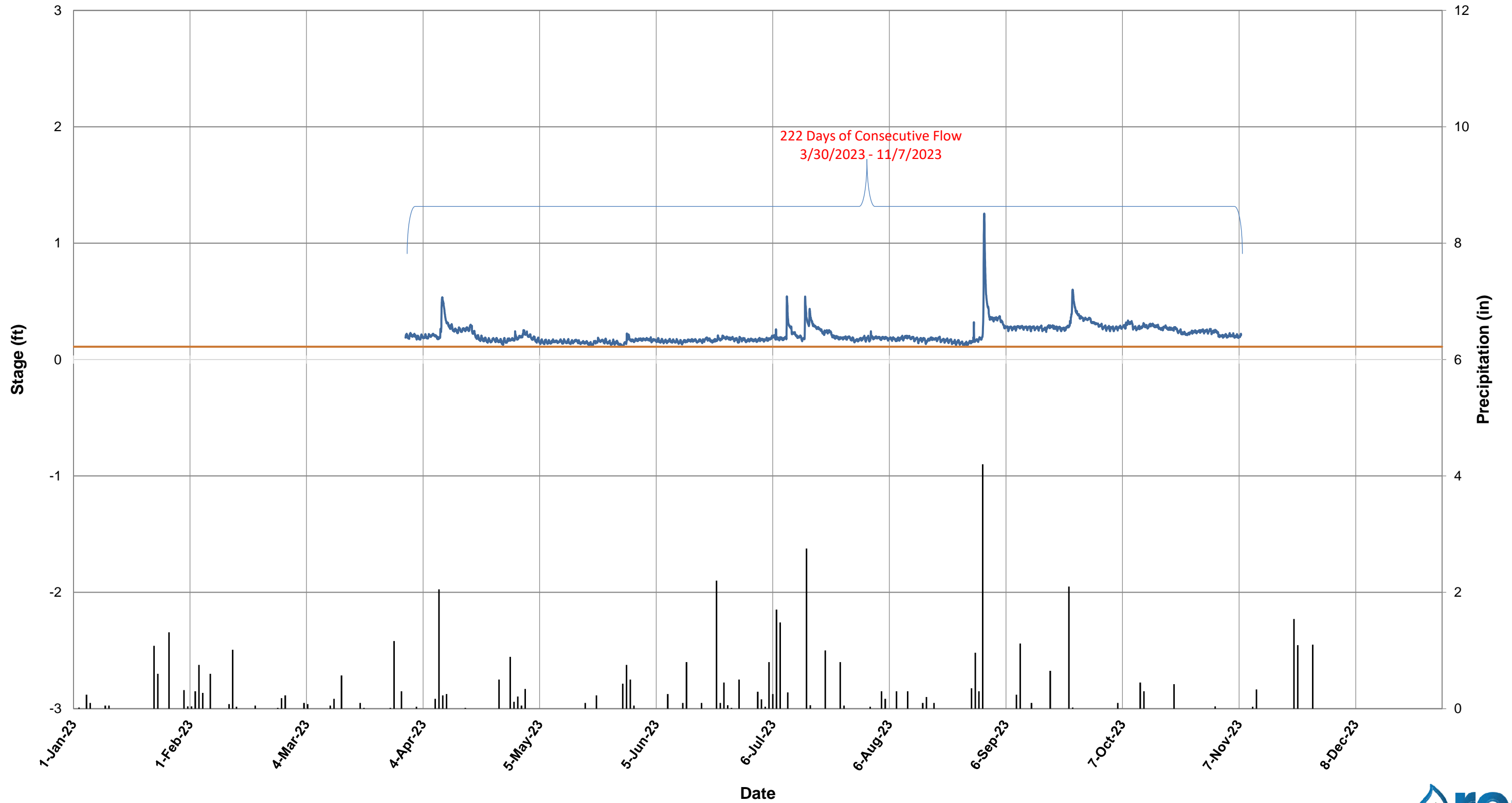
Six Runs MY1 DE2-B Flow Gauge Graph



■ Daily Precip (in) — FG DE2-B — Downstream Riffle Elevation



Six Runs MY1 DE7 Flow Gauge Graph



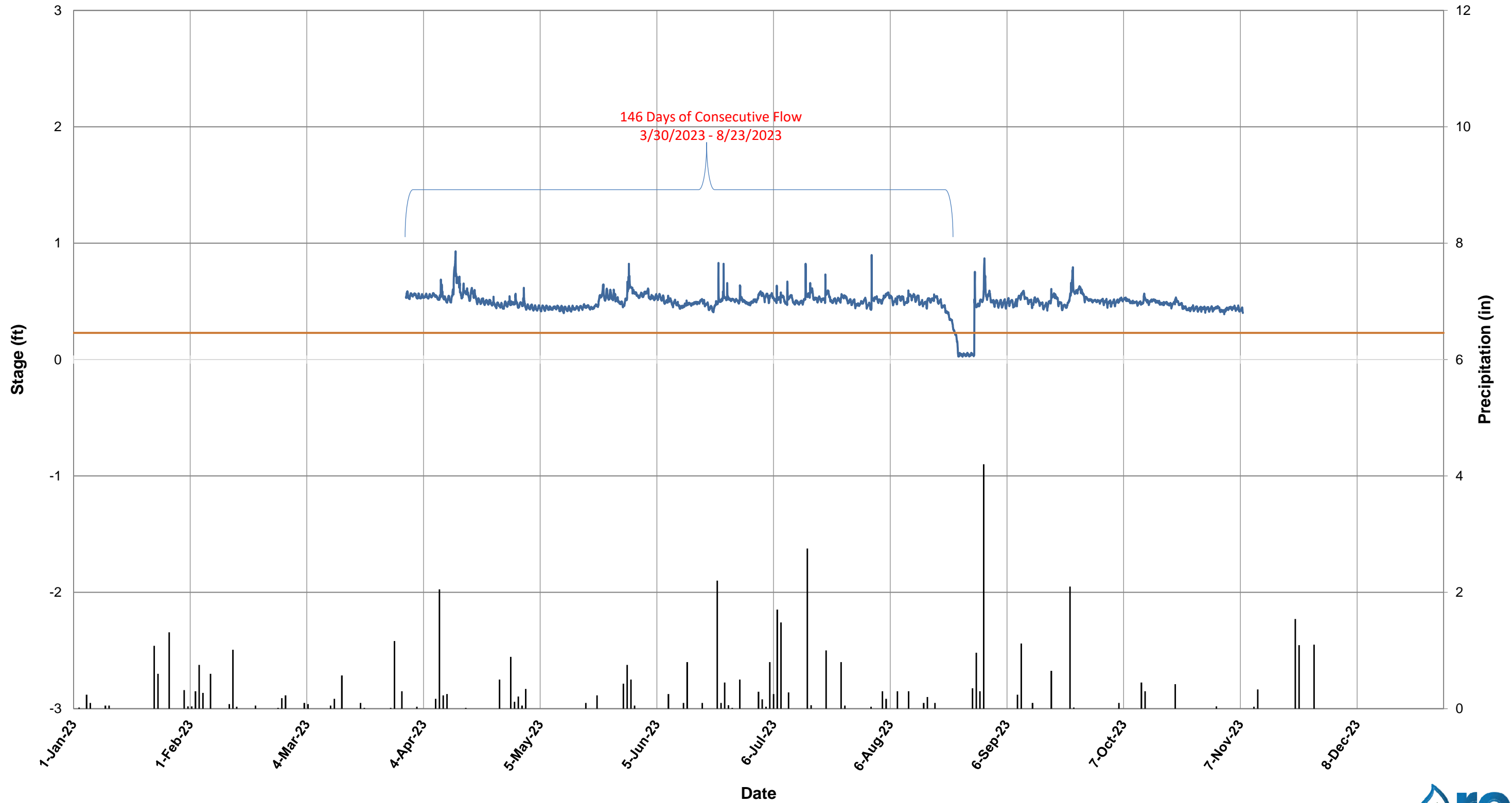
■ Daily Precip (in)

— FG DE7

— Downstream Riffle Elevation



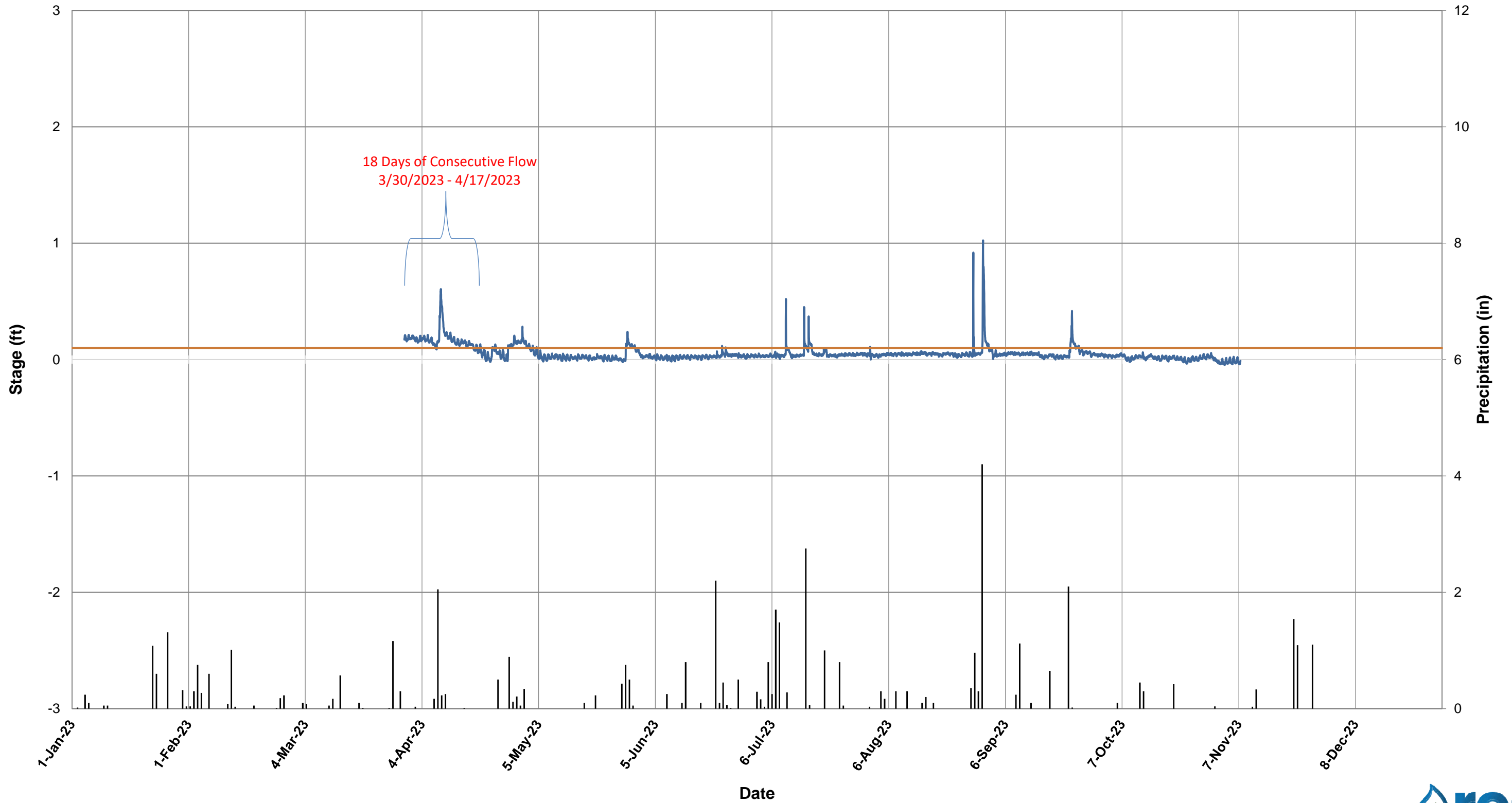
Six Runs MY1 DE8 Flow Gauge Graph



■ Daily Precip (in) — FG DE8 — Downstream Riffle Elevation



Six Runs MY1 MT2 Flow Gauge Graph



■ Daily Precip (in)

— FG MT2

— Downstream Riffle Elevation



Table 14.

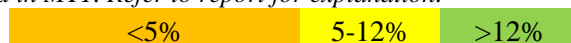
2023 Max Hydroperiod (Growing Season 14-Mar through 22-Nov, 253 days)					
Success criteria: ≥12% growing season hydroperiod					
Well ID	Consecutive		Cumulative		Occurrences
	Days	Hydroperiod (%)	Days	Hydroperiod (%)	
GW1*	-	-	-	-	-
GW2*	-	-	-	-	-
GW3	18	7	61	24	13
GW4	5	2	29	11	9
GW5	5	2	39	15	12
GW6	36	14	79	31	9
GW7	8	3	46	18	11
GW8	71	28	201	79	8
GW9	19	7	89	35	16
GW10	149	58	221	87	2
GW11*	-	-	-	-	-

*No data was collected in MY1. Refer to report for explanation.

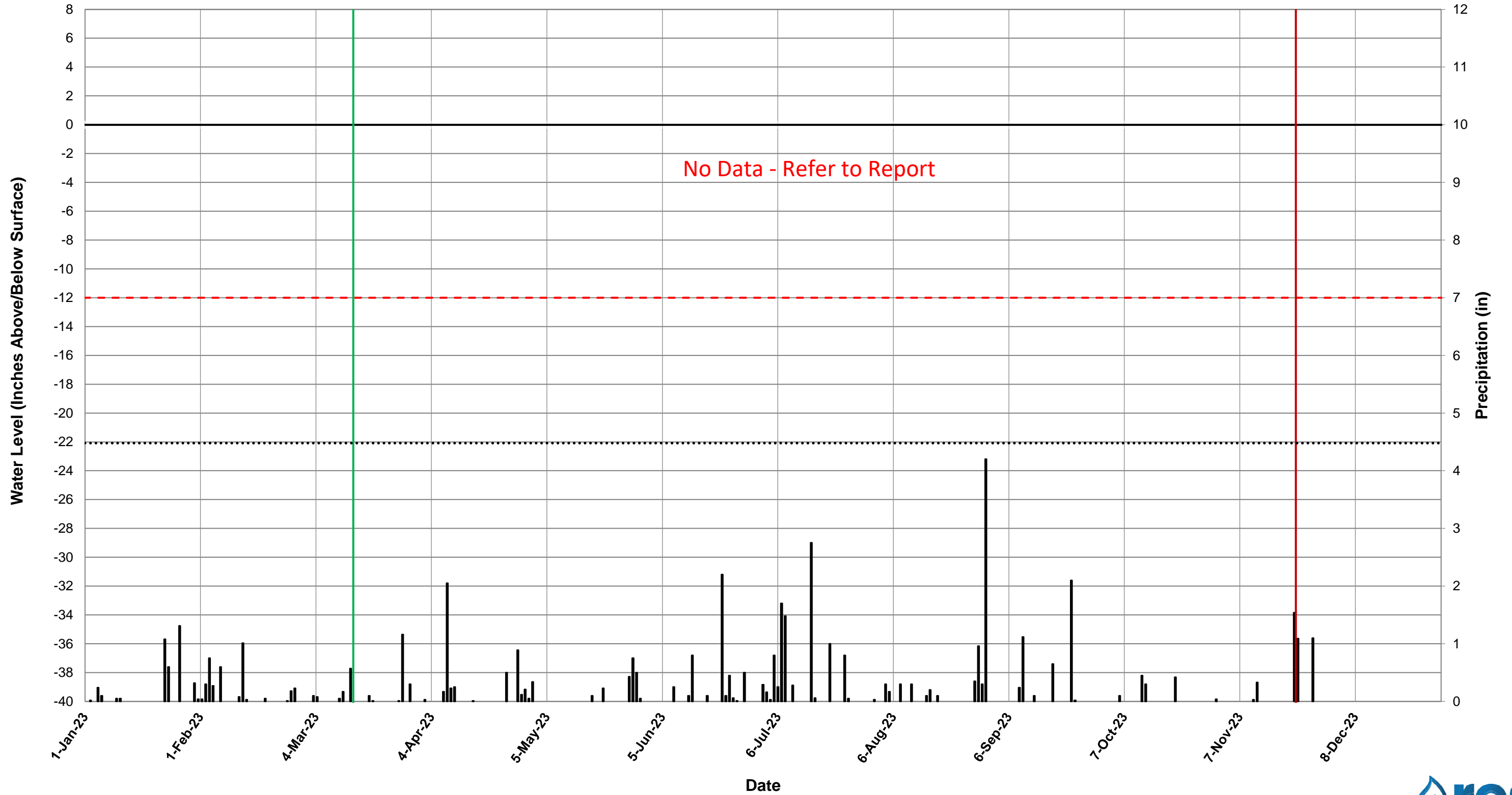
Table 15.

Summary of Groundwater Monitoring Results									
Six Runs									
Success criteria: ≥12% growing season hydroperiod									
Well ID	Wetland ID	Approach	Hydroperiod (%)						
			Year 1 (2023)	Year 2 (2024)	Year 3 (2025)	Year 4 (2026)	Year 5 (2027)	Year 6 (2028)	Year 7 (2029)
GW1*	WM	Re-establishment	-						
GW2*	WE-2	Enhancement (High)	-						
GW3	WL	Re-establishment	7						
GW4	WL	Re-establishment	2						
GW5	WL	Re-establishment	2						
GW6	WL	Rehabilitation	14						
GW7	WL	Re-establishment	3						
GW8	WC-1	Rehabilitation	28						
GW9	WC-1	Rehabilitation	7						
GW10	WC-2	Preservation	58						
GW11*	WE-1	Enhancement (Low)	-						

*No data was collected in MY1. Refer to report for explanation.



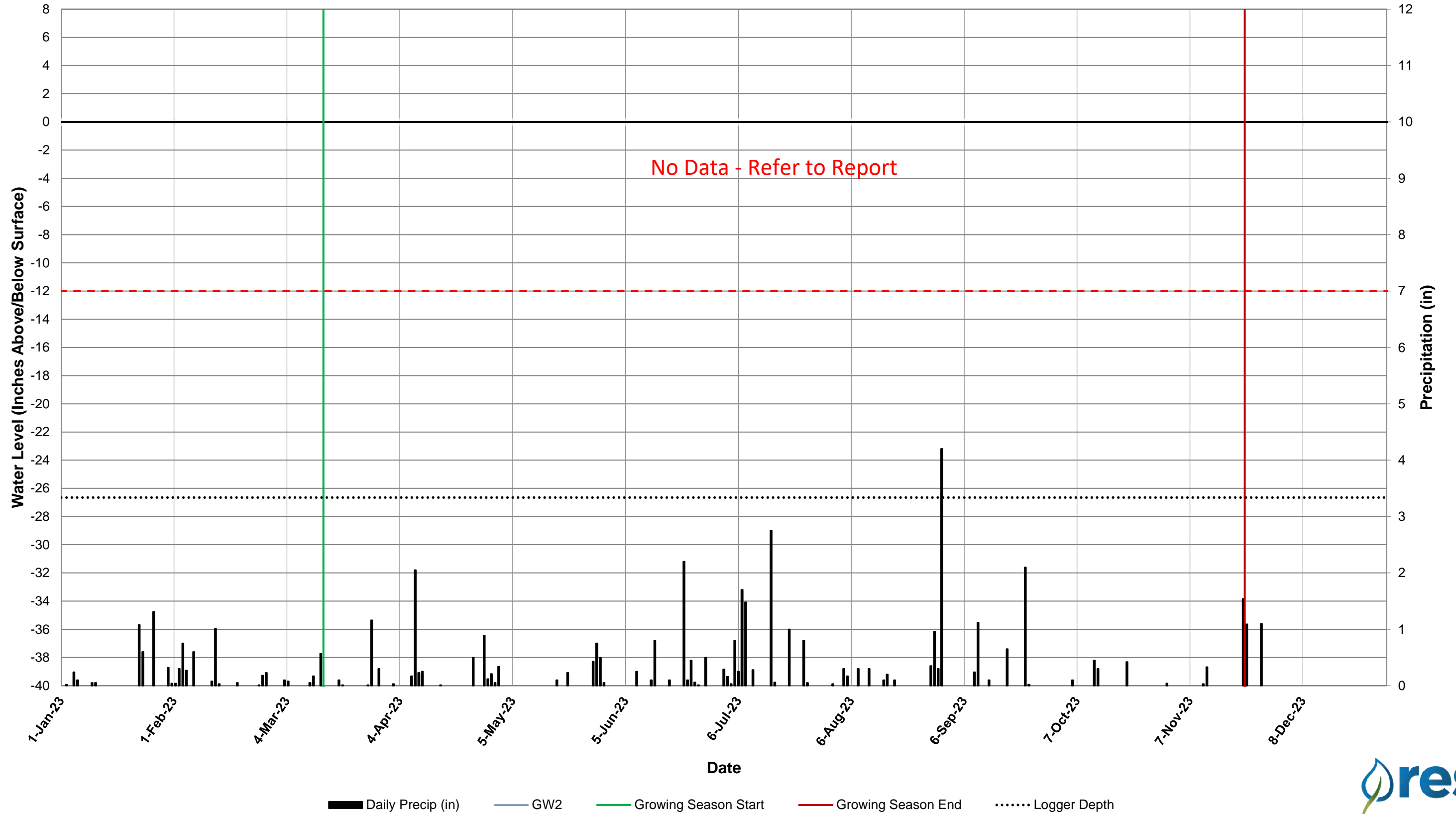
Six Runs MY1 GW1



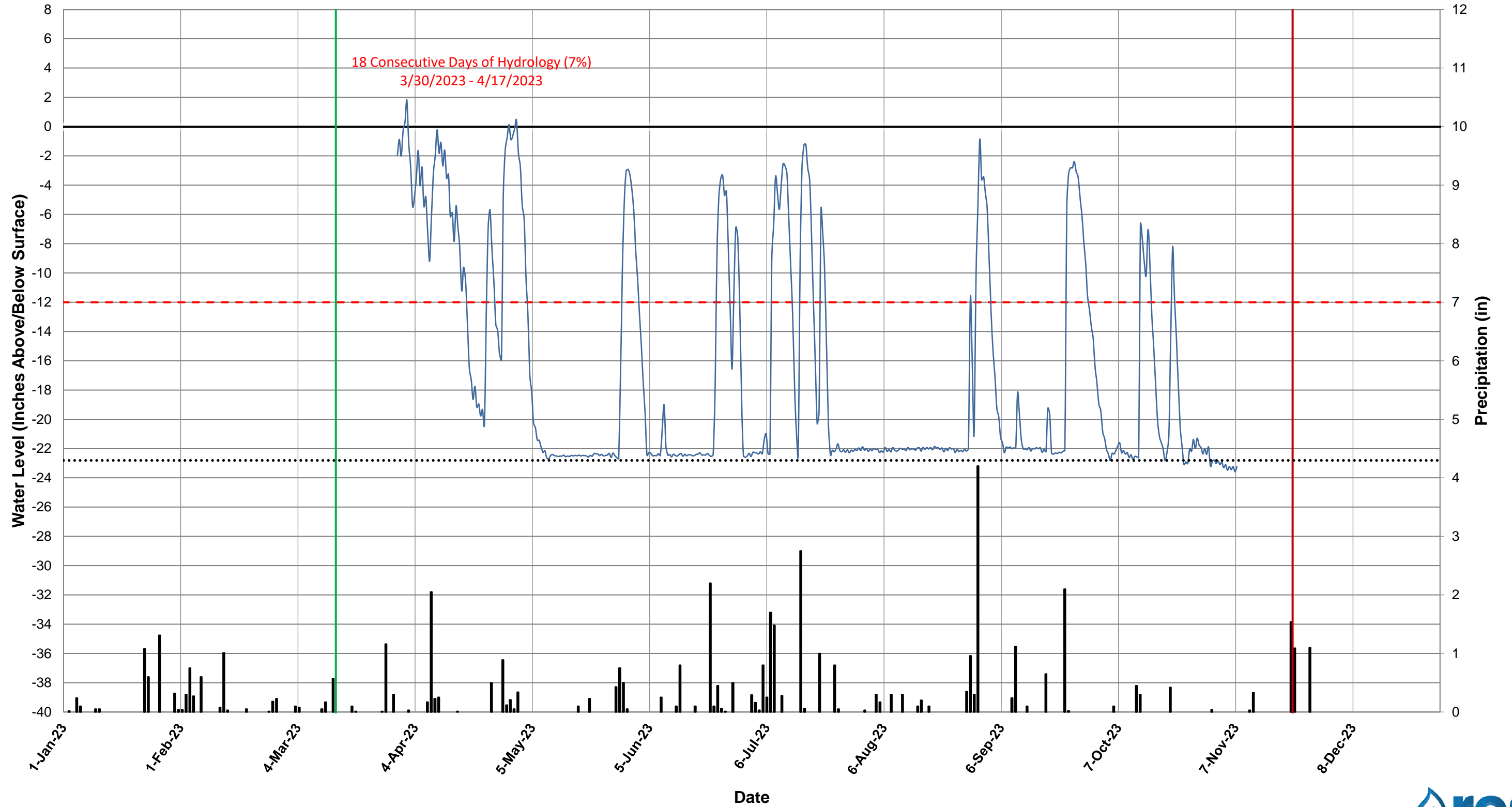
■ Daily Precip (in) — GW1 — Growing Season Start — Growing Season End Logger Depth



Six Runs MY1 GW2



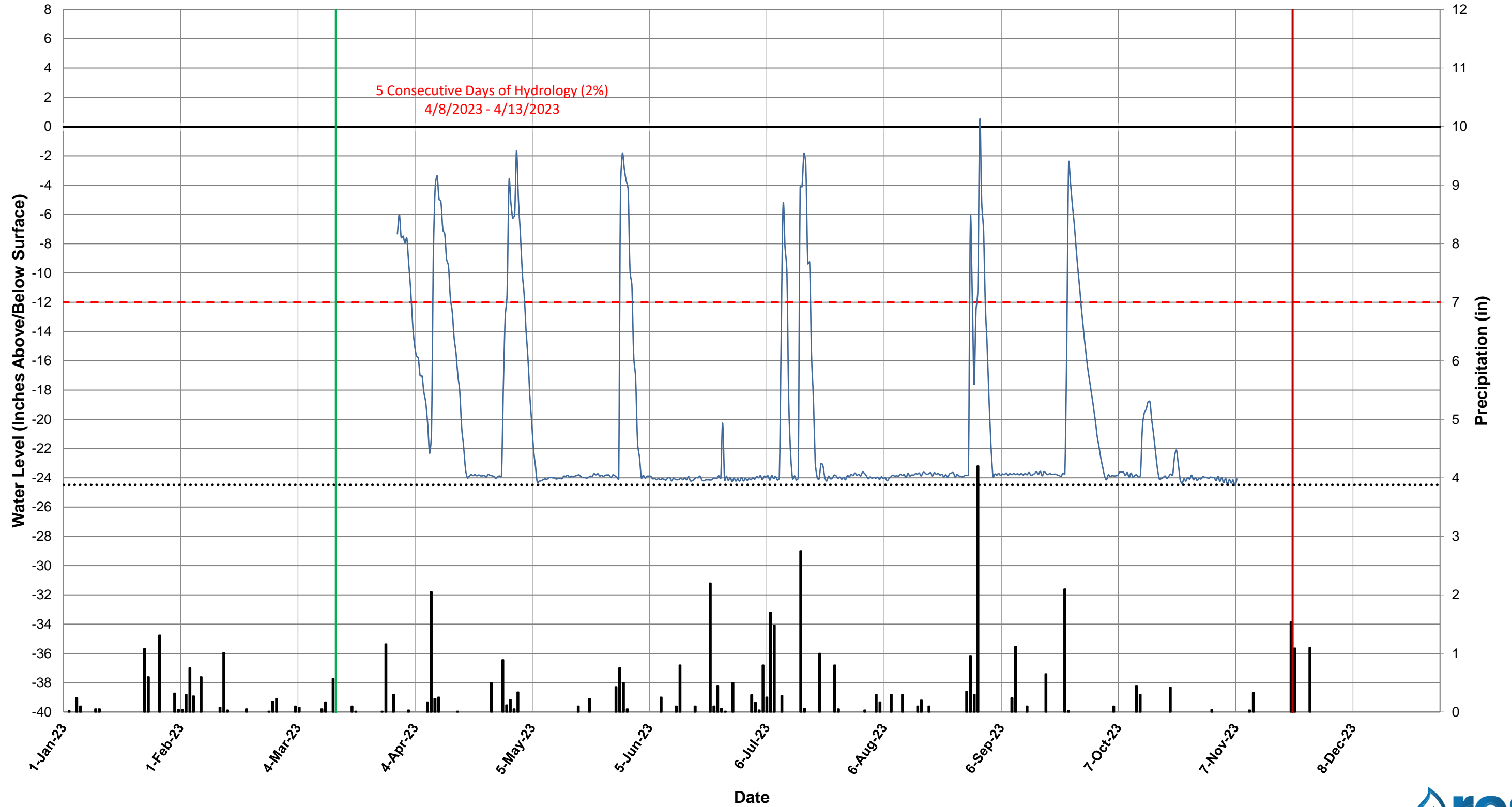
Six Runs MY1 GW3



■ Daily Precip (in) — GW3 — Growing Season Start — Growing Season End Logger Depth



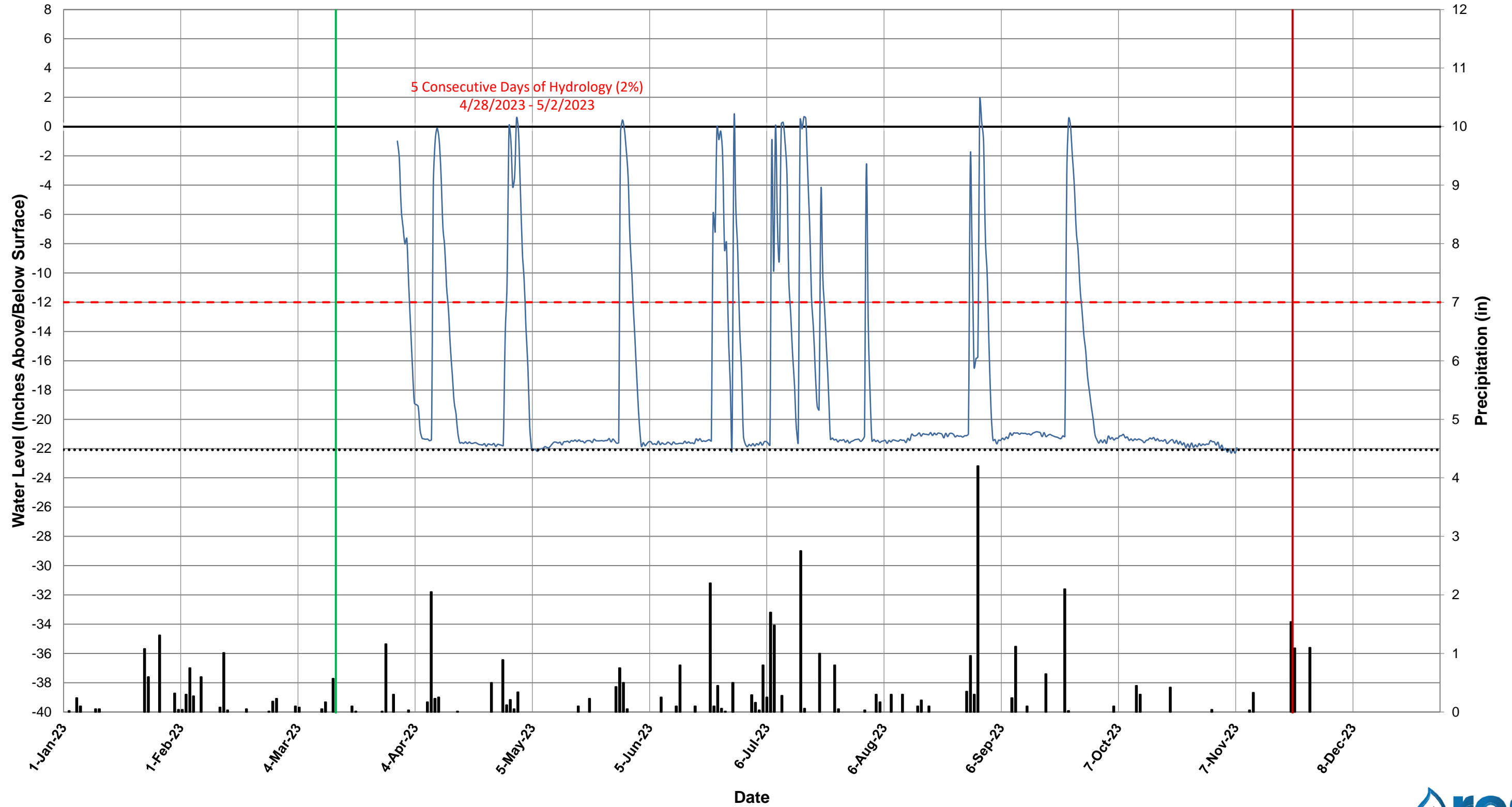
Six Runs MY1 GW4



■ Daily Precip (in) — GW4 — Growing Season Start — Growing Season End Logger Depth



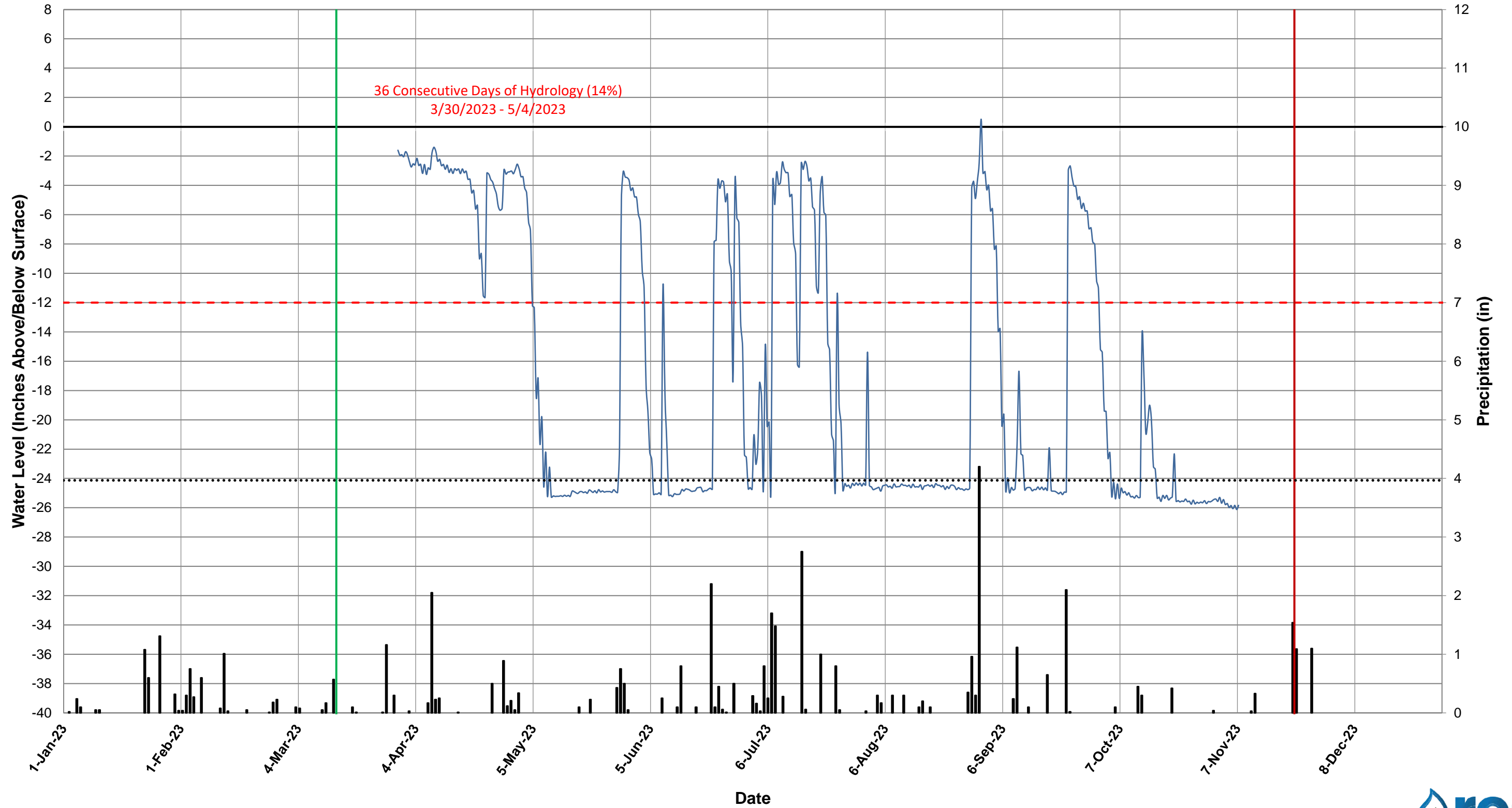
Six Runs MY1 GW5



■ Daily Precip (in) — GW5 — Growing Season Start — Growing Season End Logger Depth



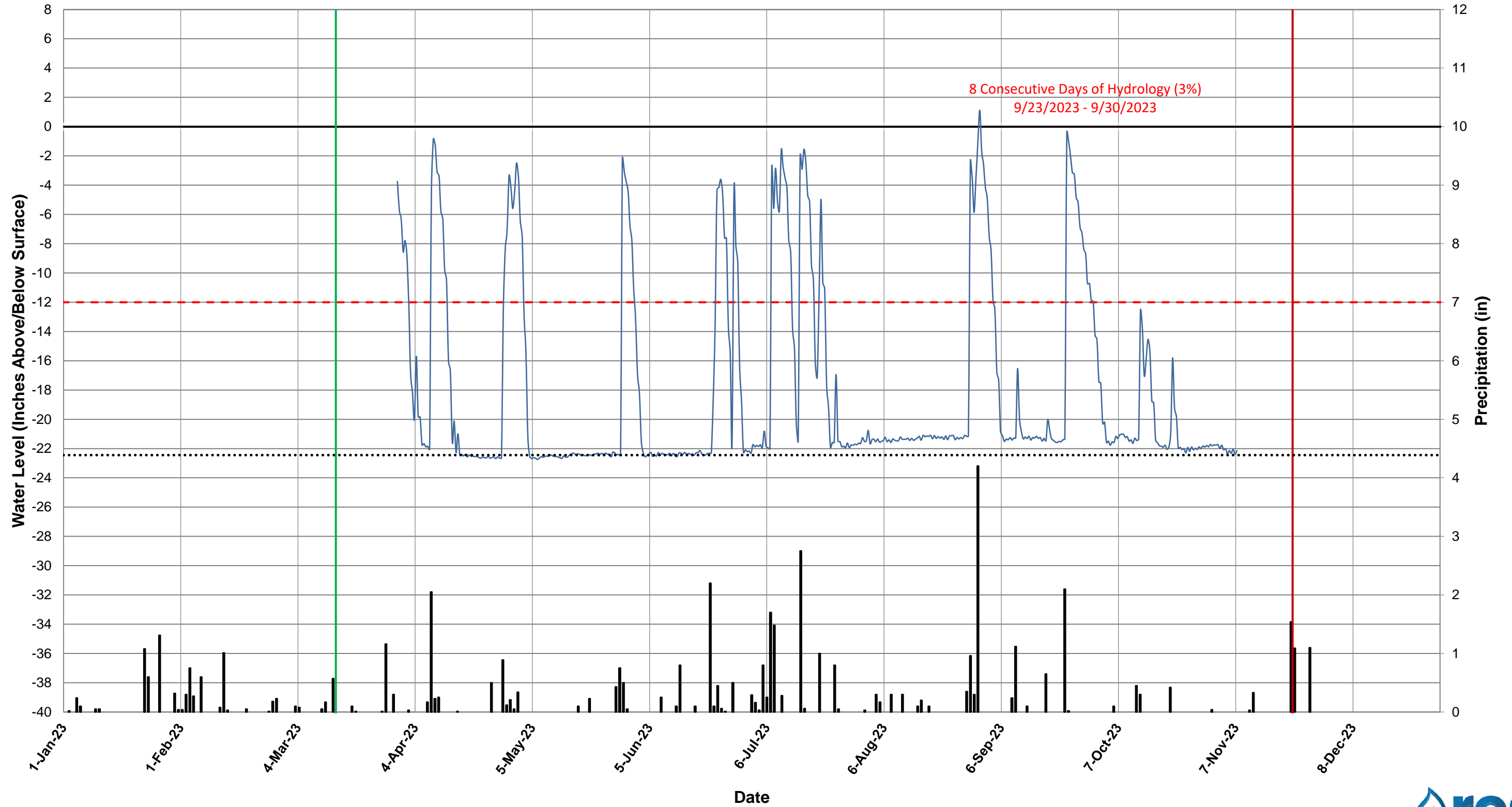
Six Runs MY1 GW6



■ Daily Precip (in) — GW6 — Growing Season Start — Growing Season End Logger Depth



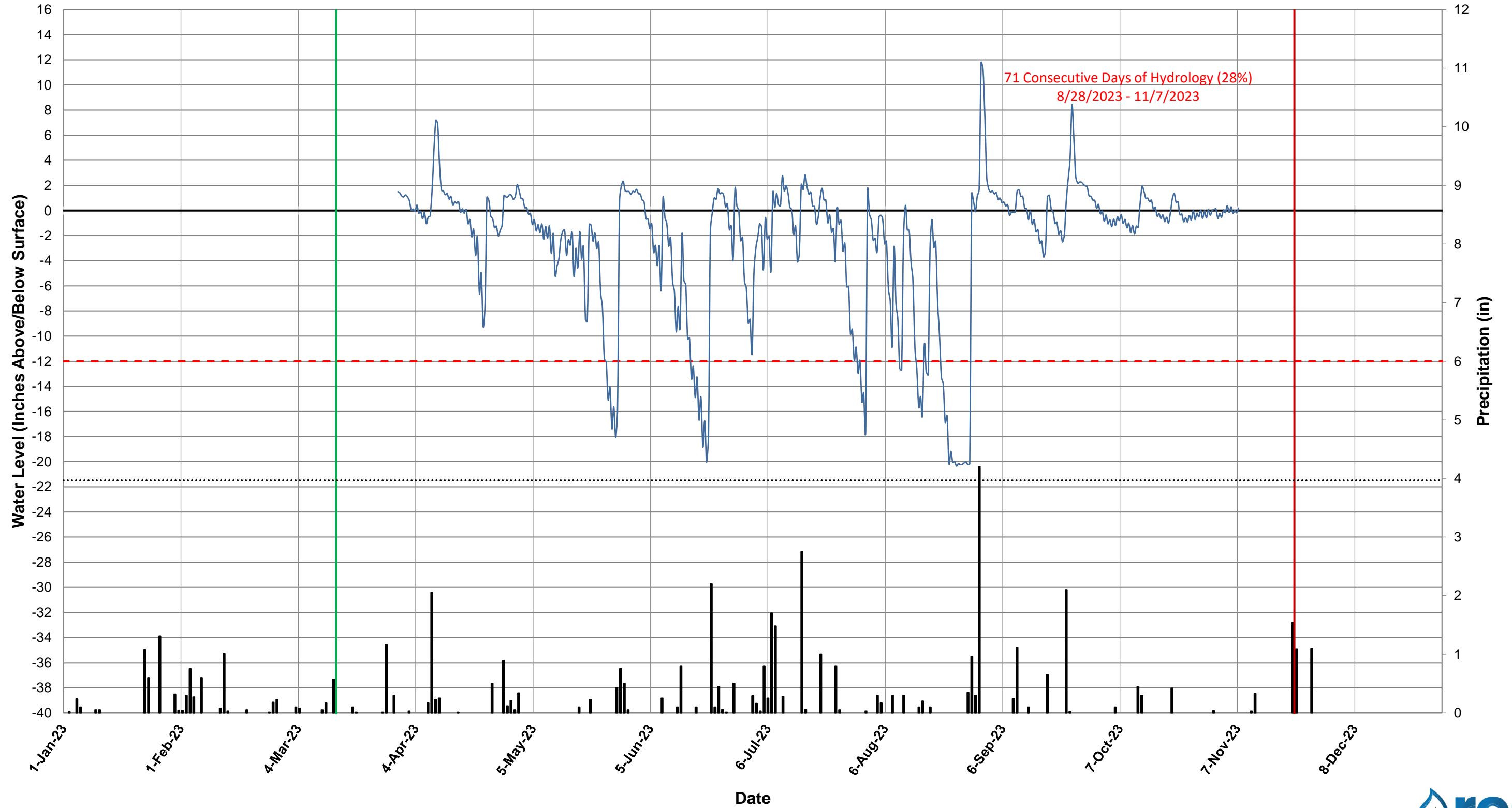
Six Runs MY1 GW7



■ Daily Precip (in) — GW7 — Growing Season Start — Growing Season End Logger Depth



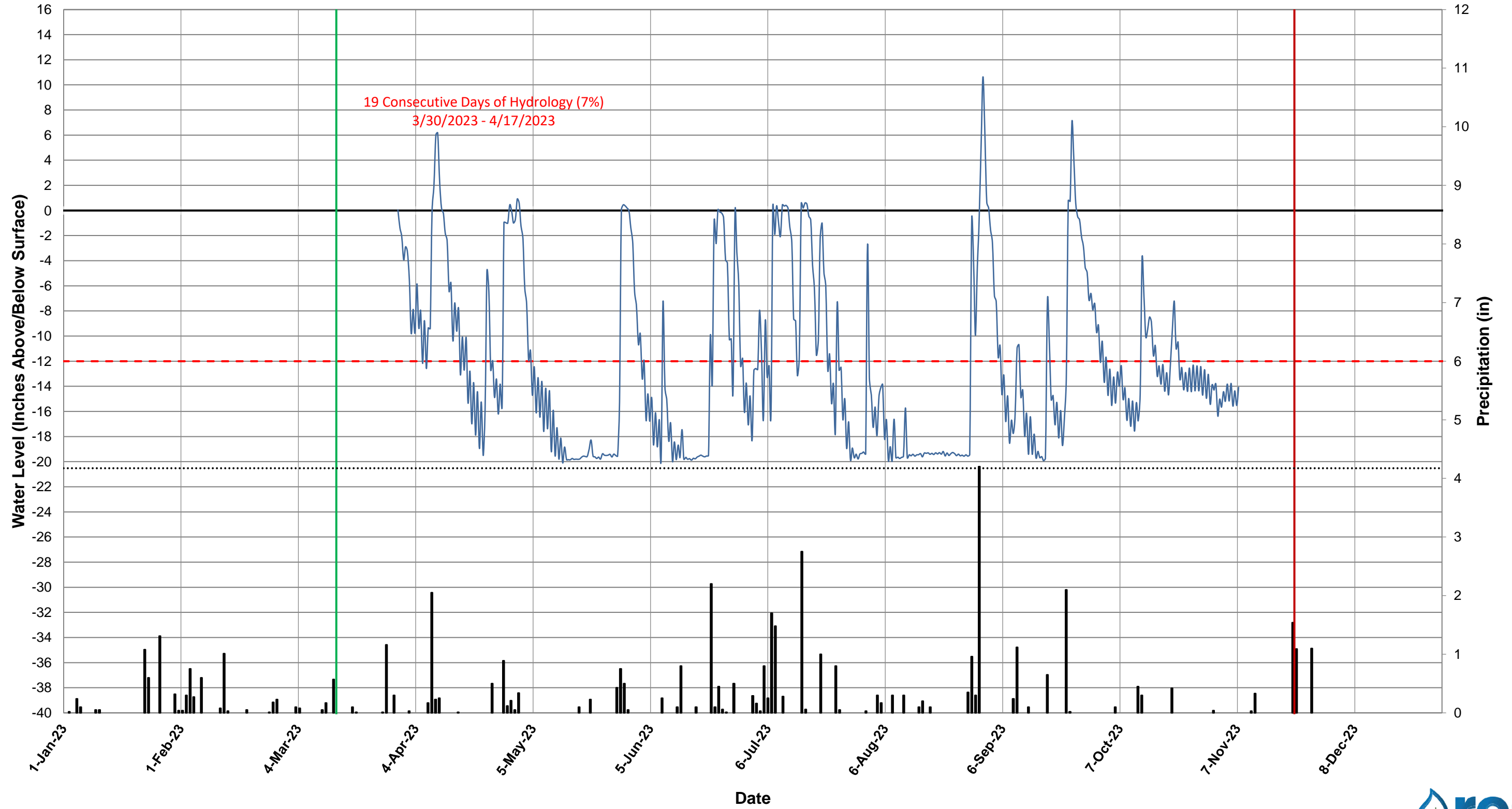
Six Runs MY1 GW8



■ Daily Precip (in) — GW8 — Growing Season Start — Growing Season End Logger Depth



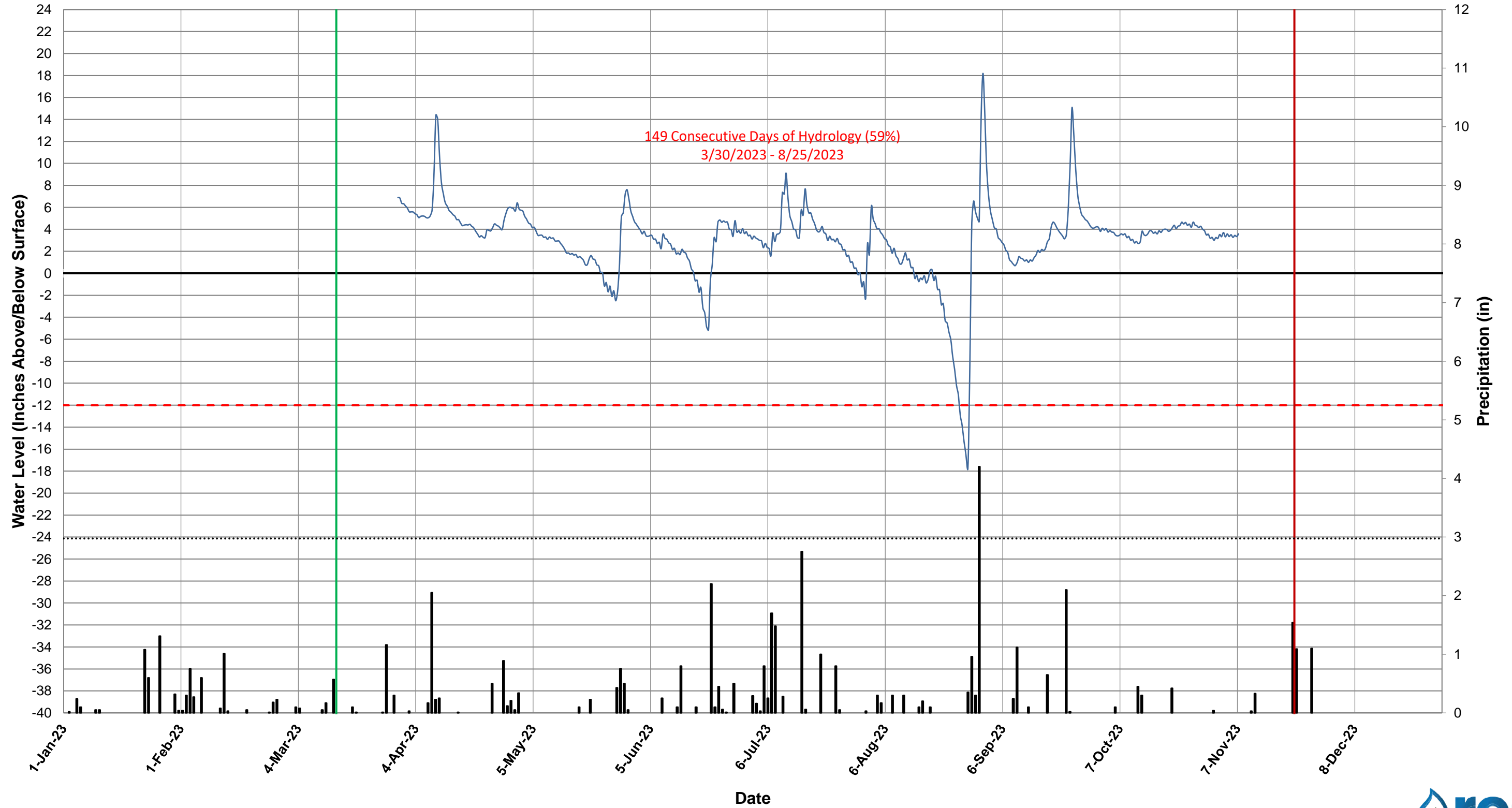
Six Runs MY1 GW9



■ Daily Precip (in) — GW9 — Growing Season Start — Growing Season End Logger Depth



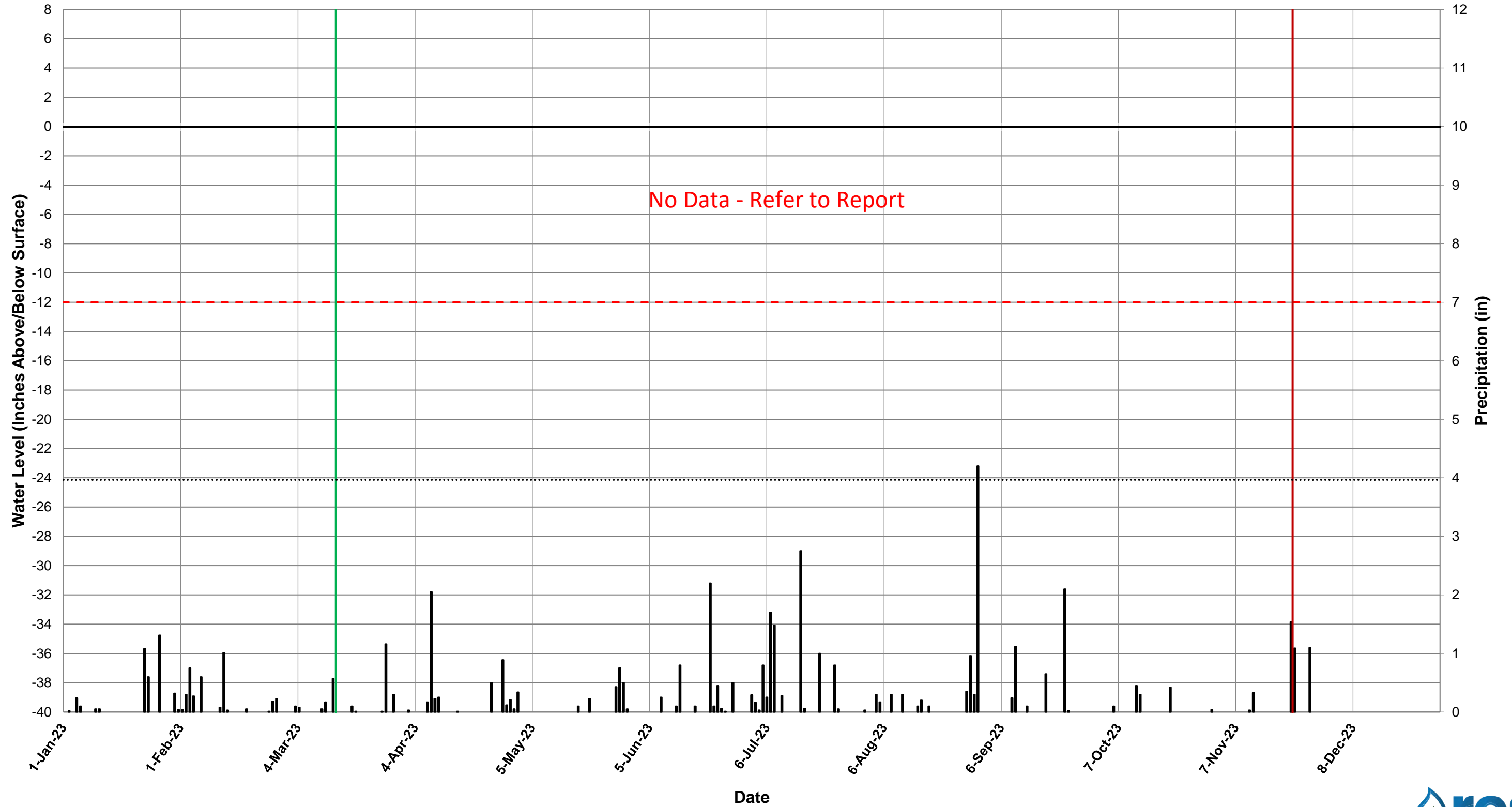
Six Runs MY1 GW10



■ Daily Precip (in) — GW10 — Growing Season Start — Growing Season End Logger Depth



Six Runs MY1 GW11



■ Daily Precip (in) — GW11 — Growing Season Start — Growing Season End Logger Depth



Appendix E
Project Timeline and
Contact Information

Table 4. Project Timeline and Contact Information

Activity or Deliverable	Data Collection Complete	Task Completion or Deliverable Submission
Project Instituted	NA	Oct-20
Mitigation Plan Approved	NA	Jul-22
Construction (Grading) Completed	NA	Mar-23
Planting Completed	NA	Mar-23
As-built Survey Completed	NA	Aug-23
MY-0 Baseline Report	XS Monitoring - 3/30/2023 VP Monitoring - 3/23/2023	Aug-23
MY-1 Report	XS Monitoring - 11/8/2023 VP Monitoring - 11/8/2023	Dec-23

Project Name/Number	
Provider	RES / 3600 Glenwood Ave., Suite 100, Raleigh, NC 27612
Mitigation Provider POC	Jamey Mceachran (919) 623-9889
Designer	RES / 3600 Glenwood Ave., Suite 100, Raleigh, NC 27612
Primary project design POC	Frasier Mullen, PE (919) 412-3866
Construction Contractor	RES / 3600 Glenwood Ave., Suite 100, Raleigh, NC 27612
Construction contractor POC	Daniel Burnette