

**Fletcher-Meritor Site
(UT to Cane Creek) Stream and Wetland Restoration
Project No: 138**

Monitoring Report Year 5 of 5

Henderson County, North Carolina



Prepared for:



North Carolina Department of Environmental Quality
Division of Mitigation Services
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1.0 EXECUTIVE SUMMARY

The Fletcher-Meritor Site Stream and Wetland Restoration Project, completed in May 2012, restored 3,575 linear feet of meandering C/E-type stream along an Unnamed Tributary (UT) to Cane Creek plus 648 linear feet of a first order tributary (Tributary) to the Main Stem as well as re-establish hydrology and hydrophytic vegetation to 6.7 acres of historical wetlands. This natural channel restoration consists of a Priority II restoration that includes a bankfull bench to allow for flood attenuation before reconnecting to the natural floodplain. The riparian buffer was planted with species representing an Alluvial Forest grading to a Bottomland Forest Community (Schafale and Weakley, 1990). This stream was preserved within the 20.3 acre conservation easement.

Efforts to restore or enhance wetlands on the project site included restoring topography, hydrology, and habitats of a natural wetland system by excavating overburden/berms and filling agricultural ditches to promote an increase in ground water elevation. Following excavation, removal of drain tiles and plugging of drainage ditches, the wetland areas were planted with native hardwoods.

The project goals and objectives are listed below.

Project Goals

- Improve local water quality by reestablishing stream stability and capacity to transport watershed flows and sediment load.
- Provide additional floodplain storage by increasing the capacity of the stream to mitigate flood flows.
- Restore aquatic and riparian habitat.
- Reducing non-point source sedimentation and nutrient inputs into the project reaches.

Project Objectives

- Restore/enhance approximately 4,223 linear feet to stable stream channel morphology, supported by instream habitat and grade/bank stabilization structures. Restoration and enhancement consists of restoring the channel pattern and profile and building a floodplain bench along the reaches.
- Reestablish hydrology and hydrophytic vegetation to 6.7 acres of historic wetlands by removing overburden/berms, plugging agricultural drainage ditches, and replanting with native grasses, shrubs and trees.
- Eliminate accelerated bank erosion by creating a bankfull bench, floodplain, and laying back slopes.
- Reestablish a native riparian buffer. Revegetation of the buffer was accomplished by planting tree and shrub species for Alluvial and Bottomland Hardwood Communities.

The project has been divided into segments, which include three stream reaches and four wetland areas:

- Upper Reach Main Stem – 1796 linear feet
- Lower Reach Main Stem – 1779 linear feet
- Tributary – 648 linear feet
- Wetland A – approximately 2.92 acres
- Wetland B – approximately 1.43 acres
- Wetland C – approximately 1.34 acres
- Wetland D – approximately 0.97 acres

The project site, which is protected by a 20.3-acre permanent conservation easement held by the State of North Carolina, is situated in Henderson County in the North Carolina Mountains Physiographic

Province. The project is located in the French Broad River Basin, USGS Hydrologic Unit Code (HUC) 06010105 and NCDWQ subbasin 04-03-02. Cane Creek is a North Carolina Class C stream. The final 2014 303(d) and Integrated Report no longer lists as impaired the section of Cane Creek from Cushion Branch to the French Broad River, to which the restoration project drains (NCDEQ 2014). The restored reaches drain lands with significant non-point source impacts to water quality from agriculture, industrial/commercial development, and historical clay strip mining. Land use data indicates that more than 60 percent of the 1.1-square mile UT to Cane Creek watershed is currently pervious with a predominance of open fields/lawn/low-density residential lands, and about 40 percent is impervious commercial/institutional buildings/roads.

The vegetative success of the restoration site is based on criteria established in the USACE Stream Mitigation Guidelines (2003). Vegetation monitoring is considered successful if a minimum of 260 planted stems/acre are surviving at the end of five years. The Monitoring Year 5 (MY5) stem counts are located in Tables 7 and 9 in Appendix C. Currently, 14 of 17 vegetation plots are meeting the measures of success; however, all of the plots are meeting the five year success criteria with inclusion of the desirable volunteer species. Vegetation throughout the reach appears to be growing at acceptable rates and the mortality rate appears to be fairly low. The three plots that are not meeting success criteria include two along the tributary were not planted at the appropriate density, and the plot closest to the confluence with Cane Creek which has had backwater impacts numerous times over the monitoring years.

Numerous locations along the reaches have been noted as having sparse vegetation during previous monitoring events; however, these areas are much smaller than in previous years. These areas are illustrated on the Current Condition Plan View (CCPV) in Appendix B. In addition to these locations, a large area of cattails (*Typha latifolia*) is growing within the upper wetland area. The cattails are not posing problems to the reaches currently; however, this location provides a seed source and should be watched. Cattails have created issues when stands grow within streams by out-competing other riparian herbaceous species and creating potential areas for aggradation. One location of multiflora rose (*Rosa multiflora*) was noted near vegetation plot 9. Butterfly bush (*Buddleja davidii*) is growing in the rock along the permanent crossing. No other invasive species were noted.

There were no issues with access during the annual site reviews. In previous years there were signs of encroachment during the visits. Division of Mitigation Services (DMS) installed new signs in 2015 where farming activities were encroaching on the easement and no new areas of encroachment were noted; however, the previous farming activities continue to occur in close proximity to the easement boundary. In addition, the farm access road adjacent to the western side of the tributary reach (within the Wetland C area) is not gated. A ditch that was cut in 2014 (adjacent to the conservation easement boundary near the proposed Wetland D on the Lower Reach) appears to be partially draining the proposed wetland and thus an issue for maintaining hydrology at this location.

The reaches of the restoration project were observed to be in stable condition. The channels access their floodplain and evidence of bankfull events were observed during Year 5 monitoring. This evidence included the presence of wrack lines, sediment deposits, and the crest gauge data. In previous years the substrate has shown a gradual change to more coarse material in the Upper and Lower Reaches, although the Tributary reach still has a hard clay substrate. This is expected, as the tributary reach has little available alluvium/substrate to migrate into the system. This year, the Main Stem reaches indicate a more sandy substrate in the Upper Reach similar to the previous year, but this is likely due to the amount of ponding caused by the existing and previously-breached beaver dams. Sediment transport analysis and shear stress fall within acceptable ranges and are similar to those of the baseline condition.

Notable areas of concern occur on all project reaches. In previous years one of the greatest areas of concern were the number of beaver dams on the Main Stem reach; however, most of those have been breached and the stream system has recovered from their removal. The other notable concern is the past structure failures along the Tributary Reach. Over half of the log structures along the Tributary Reach are eroded or completely undermined during low flow periods; however, during normal and higher flows they structures appear to function as intended. The substrate along the Tributary remains clay and there doesn't appear to be any larger size particles moving into the reach. The most likely cause of the structure issues was the heavy rains received between May and December, 2013.

The temporary utility line crossing located on the Lower Reach has been removed and appears to be stable. It has been replanted since the previous year when the vegetation survivability was questionable. No issues were noted during the assessment.

Beaver activity is ongoing on the Lower Reach, which was noted in 2016 for the first time. The only remaining active beaver dams are located on the Lower Reach and beaver activity was evident in the quantity of eaten trees and shrubs.

The permanent stream crossing near Sta. 24+00 on the Upper Reach has evidence of past erosion at the access road culvert (and floodplain pipes) due to debris blockages. Removal of the upstream beavers and their dams may limit some of the debris that reaches this area in the future. In addition to potential blockages of the permanent crossing, the removal of the beaver dams resulted in recovery of channel morphology, specifically the riffle cross sections, in the majority of this reach and significantly reduced past ponding concerns.

Other areas of minor aggradation, erosion, or areas of sparse vegetation are noted in the tables, shown in the photos, and illustrated on the attached mapping. These areas do not appear to be negatively impacting the channel morphology.

Summary information/data related to the occurrence of the aforementioned items and statistics related to performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting documentation formerly found in these reports can be found in the Baseline Monitoring Report (formerly Mitigation Plan) and in the Mitigation Plan (formerly the Restoration Plan) documents available on DMS's website. All raw data supporting the tables and figures in the appendices are available from DMS upon request.

2.0 METHODOLOGY AND RESULTS

Channel stability and vegetation survival were monitored on the project site. Post restoration monitoring will occur for a minimum of five years or until the success criteria are met. The monitoring assessment was completed using submeter accuracy GPS and Trimble VRS System on March 20 and 21, 2017. This report details the results of Monitoring Year 5.

2.1 Morphometric Parameters and Channel Stability

2.1.1 Profile

The entire length of the reach was monitored by HDR using the VRS System. Multiple parameters were located including top of bank, thalweg, and water surface.

The beaver dams on the Upper Reach noted in previous years were absent in Year 5. As a result more riffles were observed this year and overall water surface slopes returned to values similar to those seen in years prior to Year 4. Pools on the Upper Reach retained similar depths and lengths as compared to previous years as well.

The beaver influences on the Lower Reach from Year 4 were also diminished in Year 5. Riffles and pools were stable overall. One item of note is that an increased number of smaller length pools were observed this year.

The Tributary profile showed similar measurements compared with Years 3 and 4. Pool depths in previous years showed a trend in increased depths. With the pool depth values for Year 5 being exceptionally close to Year 4, the increasing depth trend has leveled out.

Bankfull and water surface slopes remain consistent for the Upper and Tributary channel segments when compared to previous years of monitoring. Again, in the absence of beaver influence, we did not observe large areas of pooled water that would alter the overall trend line of the water surface profile.

2.1.2 Dimension

Nine cross sections were measured by HDR staff in March of 2017. The morphological and cross-sectional data is presented in Tables 10 and 11 in Appendix D. Results from all three cross sections on the Upper Reach showed little change from the previous year. Looking at the five year monitoring period as a whole, values for the cross sections did not greatly fluctuate after the first monitoring year. The most notable changes came in the period from baseline to Year 1.

Permanent riffle and pool cross sections for the Lower Reach continued to perform well in Year 5 and dimensions have changed little from previous years, despite the increased beaver activity noted on the Lower Reach in Year 4.

For the Tributary reach, the permanent riffles' (XSC's 7&8) trend of increasing depths has leveled out in Year 5. The permanent pool cross section (XSC9) depth and other parameters yielded results strikingly similar to the previous year as well.

2.1.3 Pattern

The pattern of the channels was obtained using VRS measurements. The location is illustrated on the CCPV map in Appendix B. No lateral movement in stream pattern was observed in Year 5 monitoring.

2.1.4 Substrate

Pebble counts were taken for Year 5 monitoring at permanent riffle cross sections on the Upper and Lower Reaches. The Wolman Pebble Count methodology was used to calculate the D50 and D84 to assess changes in particle size distributions. Pebble counts were not initially planned for this restoration and were not performed in baseline monitoring. However, due to changes in substrate seen during Year 1 monitoring, counts were performed to compare with future years. Counts were not performed on the Tributary reach due to the hard clay material making up the streambed.

The pebble count results from XSC1 and XSC3 were similar to those performed in the previous year. The D50 results showed sandy bed conditions. Based on counts over the past years, the bed material is decidedly a coarse sand in this portion of the stream.

The Lower Reach cross sections, XSC4 and XSC6, show a D50 in the medium gravel range. Values for D50 over the five year period have stayed consistent in the gravel range but with many counts (and visual observations) of larger gravels and small cobbles.

2.1.5 Sediment Transport

Shear stress values were calculated using riffle cross section measurements obtained in Year 5 monitoring. In Year 5 the shear stress values for the Upper Reach again showed the ability to easily move the D50 particle obtained from pebble counts (movable particle size predicted using Revised Shields Diagram, Rosgen, 2002). The predicted movable particle size for the Upper Reach riffle sections were 13mm and 16mm, as compared with D50 values of 0.6 mm and 0.5mm, respectively. These results remain similar to the previous year despite the area being free of beaver activity in Year 5.

The Lower Reach values for predicted movable particle size versus the D50 from pebble counts are similar, indicating stable conditions. For both riffle cross-sections (XSC4 and XSC6) the predicted movable particle size is 12mm as compared to the observed D50 of 10mm.

The Tributary reach has much higher shear stress values, mainly as a product of a high water surface slope. Predicted movable particle sizes, calculated at the two permanent riffles, indicate movable particle sizes of 53 to 61mm. The bed material is made up of hard, sticky clay that does not seem to move during high flows. Also, over the entirety of the 5-year monitoring period, there has been no evidence that sediment is being brought into the system from upstream. This lack of sediment supply along with flashy storm events has impacted in-stream structures by lifting and transporting stream structure backfill material (No. 57 stone in particular). This backfill material has been deposited on interior meander bends and other places along the reach.

2.1.6 Photo Documentation

Photos were taken at the 52 stream photo stations and 17 vegetation plots on March 20 and May 10 and 11, 2017. The locations of the photos stations and vegetation plots are noted on Figure 3 in Appendix B. The photos for monitoring Year 5 are also provided in Appendix B.

2.2 Vegetation

The Carolina Vegetation Survey (CVS) Protocol Level 2 methodology was used to sample vegetation on May 10 and 11, 2017. Monitoring was conducted on seventeen vegetation plots (3 on the tributary, 7 on the main stem Upper Reach, and 7 on the main stem Lower Reach). The 100-square meter CVS plots are permanently marked with galvanized metal pipe. The plots occur within the floodplain/riparian area with a few running upslope slightly.

According to the data collected, the average plant density among the 17 plots is 409 stems/acre with a range from 162 to 809 stems/acre. The highest plant density occurred in plot 4 with over 800 stems/acre. Currently, 14 of the plots are meeting the vegetation success criteria of 260 stems/acre. Year 5 monitoring data is provided in Appendix C. Vegetation throughout the site appears to be growing at acceptable rates and the mortality rate appears to be fairly low. Herbaceous vegetation, which has been noted as sparse during previous monitoring events, appears to be filling in with the exception of a few locations noted on the CCPV. The three plots that are not meeting interim success criteria include two along the Tributary, which may not have been planted at the appropriate density, as well as the plot closest to the confluence with Cane Creek, which has had backwater impacts numerous times since construction. During the monitoring events there has been an unknown species that was documented during the first year and had continued to be noted. This species was not identifiable in the early years; however, has been determined to be a pussy willow or goat willow (*Salix caprea*) following observation during flowering.

2.3 Hydrology

Thirty-five groundwater wells were installed in June 2013 in the proposed wetland areas to document hydrology for the remaining years of monitoring. Several of the wells have not been fully operational since their installation. Two crest gauges were installed and indicated several bankfull events, as well as evidence of bankfull events in the form of wrack lines.

Data from the groundwater monitoring stations showed 33 stations were in operation for a portion of the 2017 growing season. Well 29 was destroyed by a vehicle during monitoring Year 3 and Well 17 had been destroyed by a vehicle in Year 2. The data revealed that 29 of the 33 stations met the soil saturation criterion of groundwater being within 12 inches of the soil surface for at least 5 percent of the growing season (10 consecutive days). Two wells (24 and 26) malfunctioned during the year and didn't provide enough data to determine whether they would meet criteria. Two wells (2 and 22) are not meeting the groundwater criteria. Well 2 is located in the proposed Wetland D in which the adjacent landowner has excavated a nearby ditch which is potentially drawing down the water table. This was noted as possibly impacting this proposed wetland in the previous year. Well 22 has not met criteria since it was installed.

According to the NC Drought Monitor, the 2015 and 2016 growing seasons were mostly under drought conditions in the project vicinity. It is possible that this impacted the water table at the site, leading to the large number of wells that did not meet the hydrology criteria in 2016 (MY 4). In pulling the historic drought data for Henderson County, it became clear that 2015 (MY 3) and 2016 (MY 4) were not normal years. For example, in 2017 the drought data indicated there were 27 weeks that were normal with only 3

weeks abnormally dry or moderately dry within the growing season. In contrast, 2016 had only 6 normal weeks with the remaining 24 weeks abnormally dry to extreme drought for the growing season. Similar numbers were observed in 2015 with 21 weeks of abnormally dry to extreme drought and 9 normal weeks. Overall, it is assumed that the drought documented within those two years may have played a role in the hydrology of the wetlands for MY 4. Monitoring wells will be monitored in 2018 to gather additional data.

3.0 REFERENCES CITED

HDR Engineering, Inc. 2008. Final Stream & Wetland Restoration Plan for the Fletcher-Meritor Site (UT to Cane Creek).

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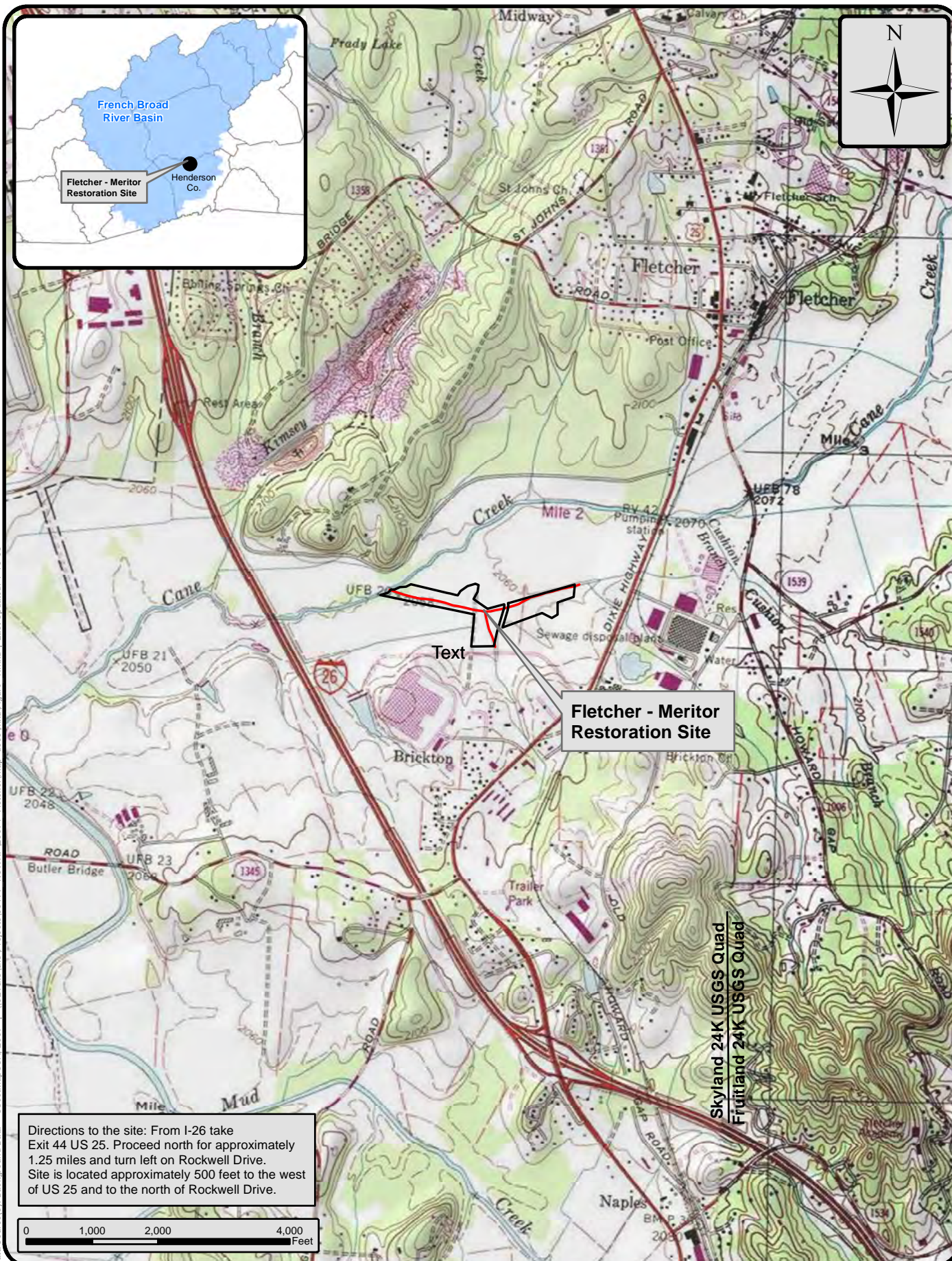
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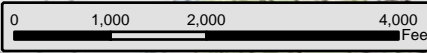
North Carolina Ecosystem Enhancement Program. 2014. Fletcher-Meritor Site (UT to Cane Creek) Stream and Wetland Restoration Monitoring Report Year 2 of 5.

U.S. Army Corps of Engineers, Wilmington District. 2003. Stream Mitigation Guidelines. North Carolina Division of Water Quality (DWQ), U.S. Environmental Protection Agency, Region IV (EPA), Natural Resources Conservation Service (NRCS) and the North Carolina Wildlife Resources Commission (WRC).

Appendix A



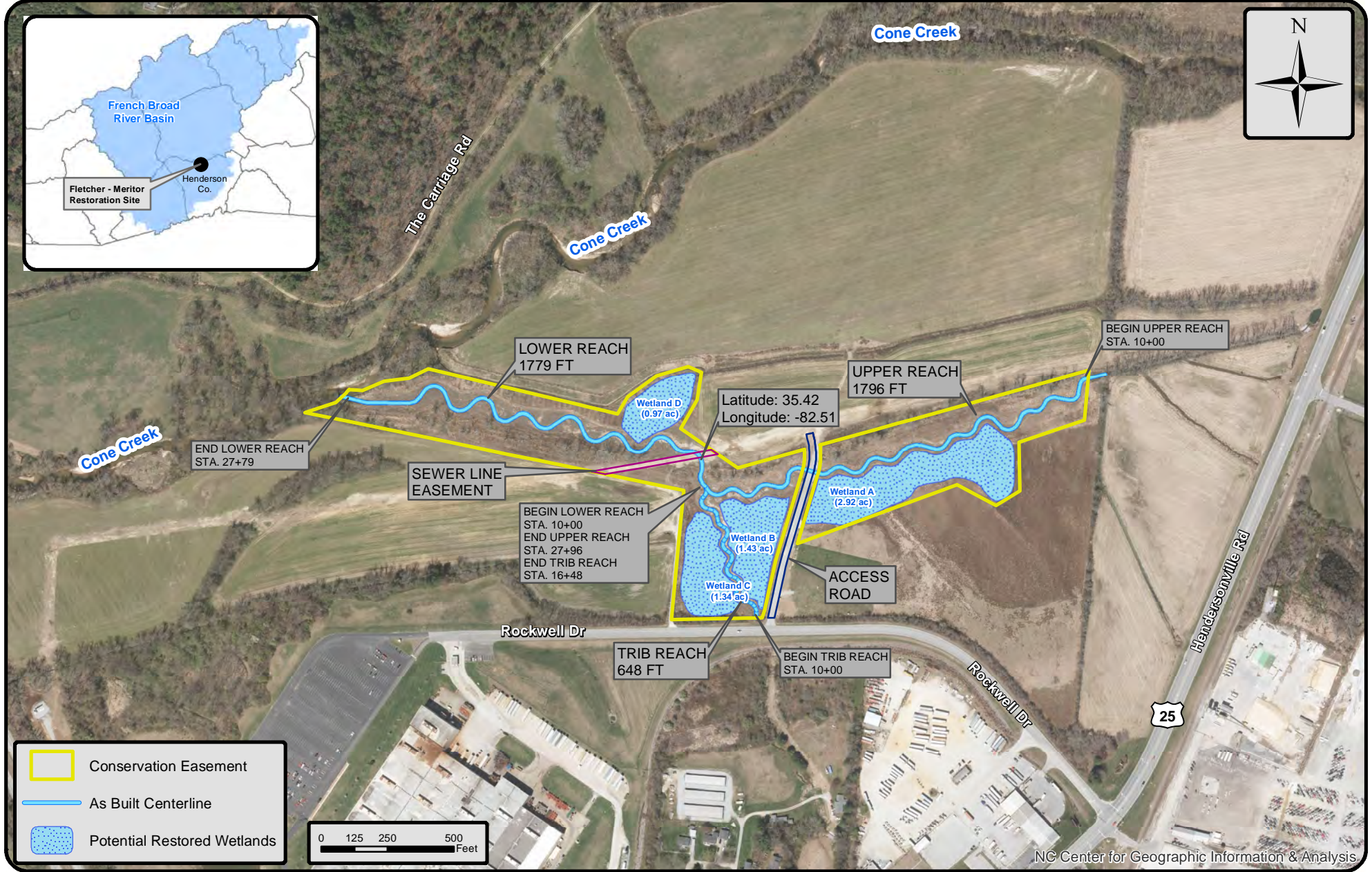
Directions to the site: From I-26 take Exit 44 US 25. Proceed north for approximately 1.25 miles and turn left on Rockwell Drive. Site is located approximately 500 feet to the west of US 25 and to the north of Rockwell Drive.



Data Source(s): Background Data - StreetMapUSA, 2007 | \NCLTGIS\GIS\Projects\09177_NCWPR\20671_Fletcher\map_docs\mxd\Figure_1.mxd | Last Updated: 1-18-08



Vicinity Map Figure 1



NC Center for Geographic Information & Analysis



Asset Map
Figure 2

Table 1a. Project Components
Fletcher-Meritor Site (UT to Cane Creek) Stream and Wetland Restoration/Project No. 138

Project Component or Reach ID	Existing Feet/Acres	Restoration Level	Approach	Footage or Acreage	Stationing	Mitigation Ratio	Mitigation Units	BMP Elements	Comment
Main Steam Upper Reach	1520 lf	R	P2	1796 lf	10+00-28+38	1:1	1796		Fully restores pattern, dimension and profile by excavating a new channel with an adjoining floodplain bench that grades to the existing ground elevation in order to partial restore flood prone conditions. A 42 foot road crossing was installed on this reach.
Main Steam Lower Reach	1320 lf	R	P2	1779 lf	10+00-27+79	1:1	1769		Fully restores pattern, dimension and profile by excavating a new channel with an adjoining floodplain bench that grades to the existing ground elevation in order to partial restore flood prone conditions. A 20 foot utility easement crosses this restoration reach. SMUs were at 1/2 credit in the area of this crossing.
Tributary	550 lf	R	P2	648 lf	10+00-16+48	1:1	648		Fully restores pattern, dimension and profile by excavating a new channel with an adjoining floodplain bench that grades to the existing ground elevation in order to partial restore flood prone conditions.
Wetland A	0 acres (TBD)	R		2.92 acres		1:1	2.92		Restores topography, hydrology, and habitats of a natural wetland system by excavating new floodplains and filling agricultural ditches to promote an increase in ground water elevation.
Wetland B	0 acres (TBD)	R		1.43 acres		1:1	1.43		Restores topography, hydrology, and habitats of a natural wetland system by excavating new floodplains and filling agricultural ditches to promote an increase in ground water elevation.
Wetland C	0 acres (TBD)	R		1.34 acres		1:1	1.34		Restores topography, hydrology, and habitats of a natural wetland system by excavating new floodplains and filling agricultural ditches to promote an increase in ground water elevation.
Wetland D	0 acres (TBD)	R		0.97 acres		1:1	0.97		Restores topography, hydrology, and habitats of a natural wetland system by excavating new floodplains and filling agricultural ditches to promote an increase in ground water elevation.

Table 1b. Component Summations
Fletcher-Meritor Site(UT to Cane Creek) Stream and Wetland Restoration/Project No. 138

Restoration Level	Stream (lf)	Stream Mitigation Units (lf)	Riparian Wetland (Ac)		Planted Area (Ac)	Potential Buffer Area (sf)	Upland (Ac)	Total Conservation Area (Ac)	BMP
			Riverine	Non-Riverine					
Main Steam Upper Reach	1796	1796	0.0	0.0					
Main Steam Lower Reach	1779	1769	0.0	0.0					
Tributary	648	648	0.0	0.0					
Wetland A	0	0	2.92						
Wetland B	0	0	1.43						
Wetland C	0	0	1.34						
Wetland D	0	0	0.97						
Totals (Feet/Acres)	4,223	4,213	6.7		18.59			20.3	

Table 2. Project Activity and Reporting History
Fletcher-Meritor Site (UT to Cane Creek) Stream and Wetland Restoration/Project No. 138

Elapsed Time Since Grading Complete: 5 yrs 0 months

Elapsed Time Since Planting Complete: 5 yrs 0 Months

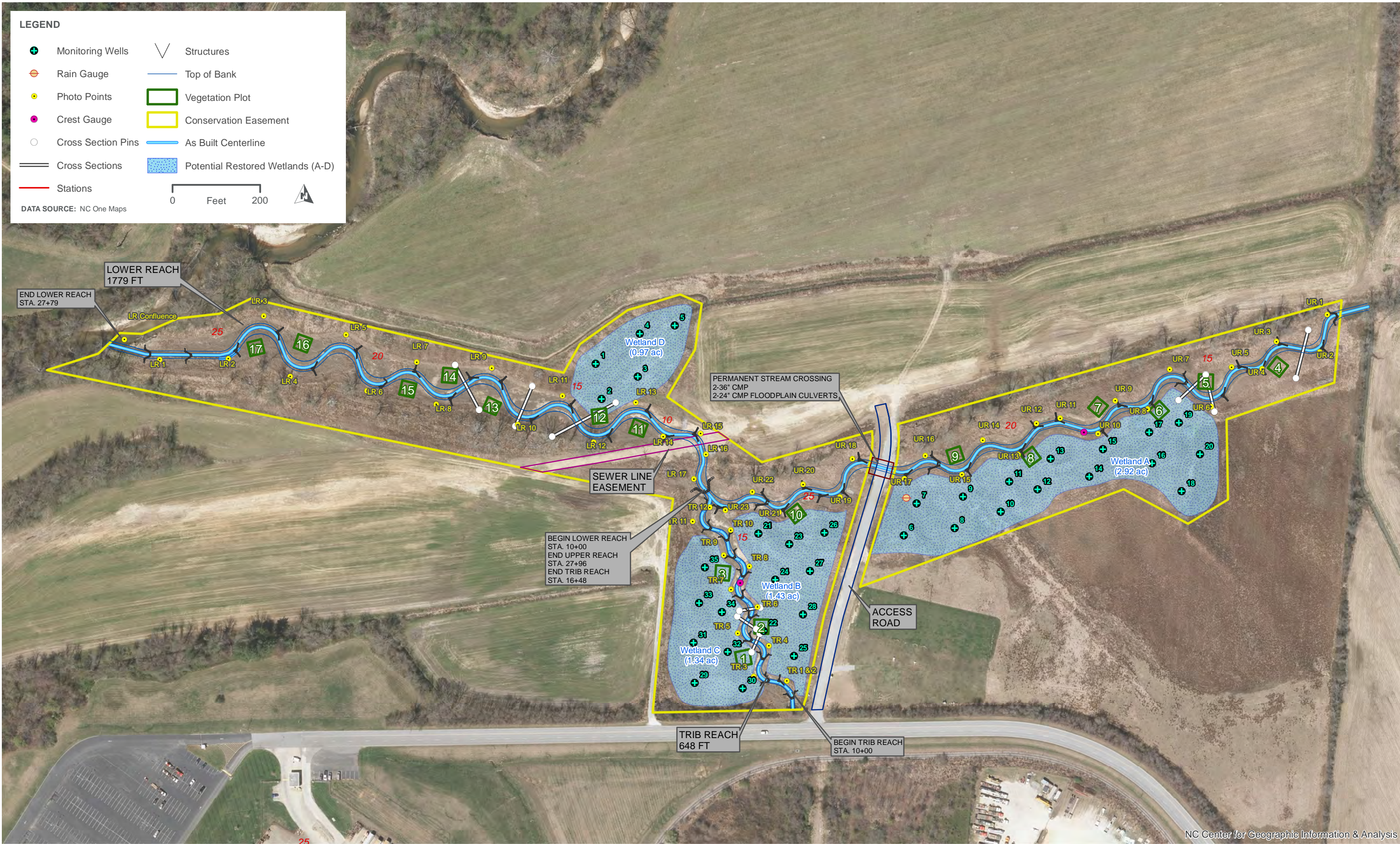
Number of Reporting Years: 5

Activity or Deliverable	Data Collection	Completion or
	Complete	Delivery
Restoration Plan	December 2007	February 15, 2008
Final Design – Construction Plans	December 2007	May 2011
Construction/Grading	NA	May 2012
Temporary Seeding	NA	Dec. 2011-April 2012
Permanent Seeding	NA	April 2012
Planting (containerized, bare root)	NA	April 2012
Final Inspection	NA	June 2012
Mitigation Plan / As-built (Year 0 Monitoring – baseline)	September 2012	May 2013
Year 1 Monitoring	May 2013	March 2014
Year 2 Monitoring	May 2014	August 2014
Utility Construction / Planting	Summer 2014	January 2015
Signage/Boundary Marking Improvements	NA	2015
Year 3 Monitoring	May 2015	January 2016
Year 4 Monitoring	March & June 2016	December 2016
Year 5 Monitoring	March & May 2017	January 2018

Table 3. Project Contacts Table	
Fletcher-Meritor Site (UT to Cane Creek) Stream and Wetland Restoration/Project No. 138	
Designer	HDR Engineering Inc. of the Carolinas 3733 National Drive, Suite 207, Raleigh, NC 27612
Primary project design POC	Jonathan Henderson, PE (919) 785-1118
Construction Contractor	Buchanan and Sons, Inc. P.O. Box 123, Whittier, NC 28789
Construction contractor POC	Chris Buchanan, (828) 497-9720
Survey Contractor	Terminus Land Surveying, PLLC 28 Bessie Drive, Fletcher, NC 28724
Survey contractor POC	Christopher J. Gagne, (828) 551-8928
Planting Contractor	HARP, Inc. 301 McCullough Drive, 4th Floor, Charlotte, NC 28262
Planting contractor POC	Alan Peoples, (704) 841-2841
Seeding Contractor	Buchanan and Sons, Inc. P.O. Box 123, Whittier, NC 28789
Contractor point of contact	Chris Buchanan, (828) 497-9720
Seed Mix Sources	Protech Environmental, Charlotte, NC Phone: (704) 676-9788
Nursery Stock Suppliers	Cure Nursery, Pittsboro, NC - (919) 542-6186 Foggy Mountain Nursery LLC, Creston, NC - (336) 384-5323 Supertree Nursery, Blenheim, SC - (800) 222-1290 Habitat and Restoration Plants, Lexington, NC - (336) 362-6776 NC Division of Forest Resources, Greensboro, NC - (919) 731-7988 Little River Nursery, McMinnville, TN - (931) 668-8000 Virginia Department of Forestry, Crimora, VA - (540) 363-5732
Monitoring Performers - Baseline	HDR Engineering Inc. of the Carolinas 3733 National Drive, Suite 207, Raleigh, NC 27612 Vickie Miller, AICP, PWS (919) 232-6637
Stream Monitoring POC	Wyatt Yelverton, PE (919) 232-6623
Vegetation Monitoring POC	Vickie Miller, AICP, PWS (919) 232-6637
Wetland Monitoring POC	NA

Table 4. Project Attribute Table							
Fletcher-Meritor Site (UT to Cane Creek) Stream and Wetland Restoration/Project No. 138							
Project County	Henderson						
Physiographic Region	Mountains						
Ecoregion	Blue Ridge (Broad Basins)						
Project River Basin	French Broad River Basin						
USGS HUC for Project (8 digit)	6010105						
NCDWQ Sub-basin for Project	04-03-02						
Within extent of EEP Watershed Plan?	No						
WRC Hab Class (Warm, Cool, Cold)	Warm						
% of project easement fenced or demarcated	100% marked with EEP easement signage						
Beaver activity observed during design phase?	No						
Restoration Component Attribute Table							
	Main Steam Upper Reach	Main Steam Lower Reach	Tributary	Wetland A	Wetland B	Wetland C	Wetland D
Drainage area (ac)	480	704	205	NA	NA	NA	NA
Stream order	2nd		1st	NA	NA	NA	NA
Restored length (feet or acreage)	1796	1779	648	2.92	1.43	1.34	0.97
Perennial or Intermittent				NA	NA	NA	NA
Watershed type (Rural, Urban, Developing etc.)	Devel.						
Watershed LULC Distribution (e.g.)							
Watershed impervious cover (%) (Commercial/Institutional Buildings/Roads)	38						
Forested	20						
Low Density Residential / Open Fields/ Lawns	28						
Medium-Density Residential	14						
NCDWQ AU/Index number	-						
NCDWQ classification	C			NA	NA	NA	NA
303d listed?	No			NA	NA	NA	NA
Upstream of a 303d listed segment?	Yes			NA	NA	NA	NA
Reasons for 303d listing or stressor	Biological Integrity (Benthos)			NA	NA	NA	NA
Total acreage of easement	20.3						
Total vegetated acreage within the easement	18.59						
Total planted acreage as part of the restoration	18.59						
Rosgen classification of pre-existing	Impaired Ditch	Impaired Ditch	Impaired Ditch	NA	NA	NA	NA
Rosgen classification of As-built	C/E4	C/E4	C/E4	NA	NA	NA	NA
Valley type	VIII	VIII	VIII	NA	NA	NA	NA
Valley slope	0.31%		0.15%	NA	NA	NA	NA
Valley side slope range (e.g. 2-3.%)	-	-		NA	NA	NA	NA
Valley toe slope range (e.g. 2-3.%)	-	-		NA	NA	NA	NA
Cowardin classification	NA			Palustrine	Palustrine	Palustrine	Palustrine
Trout waters designation	No			NA	NA	NA	NA
Species of concern, endangered etc.? (Y/N)	No						
Dominant soil series and characteristics							
Series	Comus	Codorus	Kinkora	Codorus / Kinkora	Kinkora	Kinkora	Comus / Kinkora
Depth	U	U	U	U	U	U	U
Clay%	U	U	U	U	U	U	U
K	U	U	U	U	U	U	U
T	U	U	U	U	U	U	U

Appendix B



LEGEND

Monitoring Wells	Structures
Rain Gauge	Top of Bank
Photo Points	Vegetation Plot
Crest Gauge	Conservation Easement
Cross Section Pins	As Built Centerline
Cross Sections	Potential Restored Wetlands (A-D)
Stations	

0 Feet 200

DATA SOURCE: NC One Maps

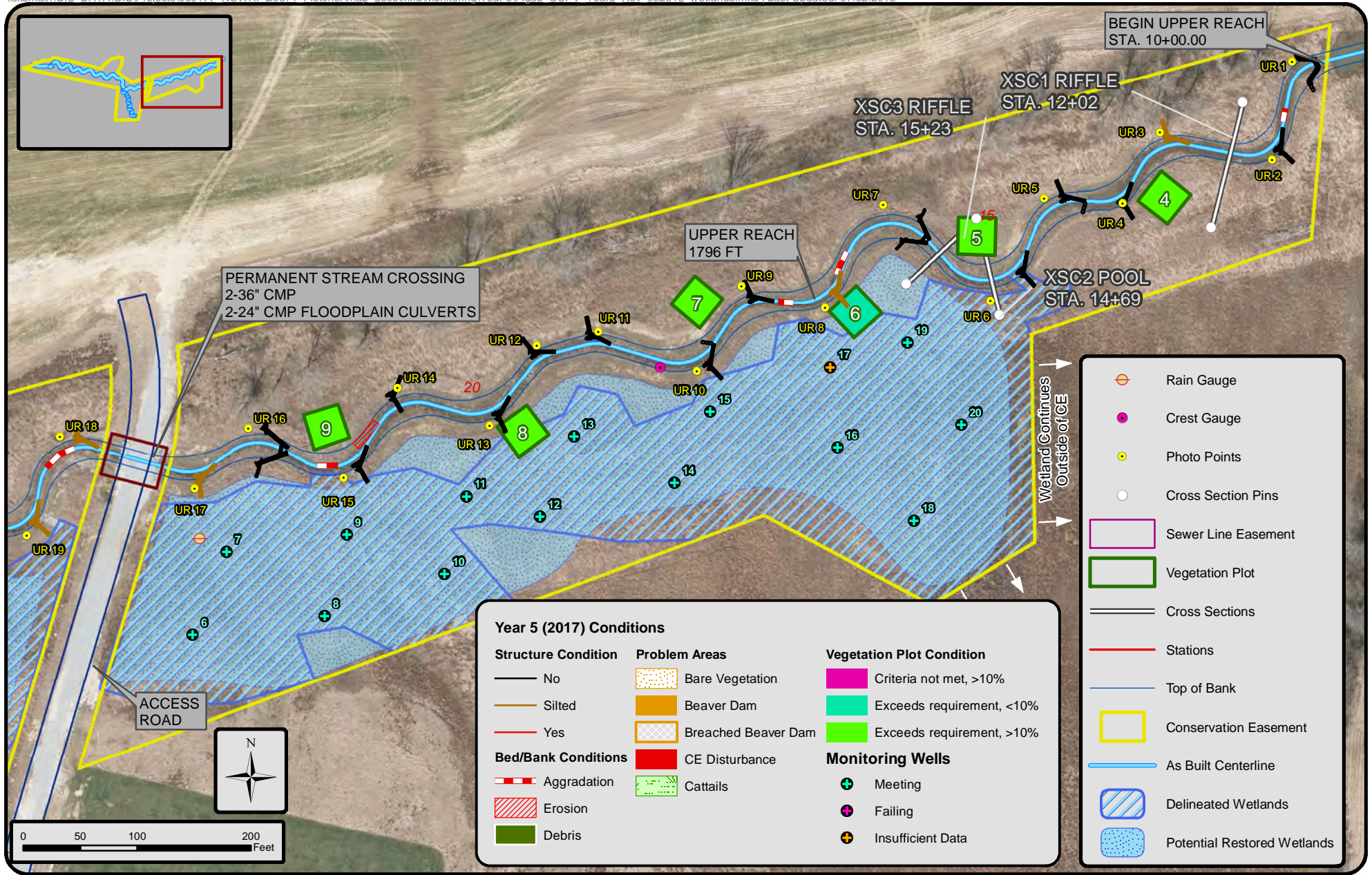
NC Center for Geographic Information & Analysis

FLETCHER-MERITOR SITE (UT TO CANE CREEK) MONITORING YEAR 5

CURRENT CONDITIONS PLAN VIEW

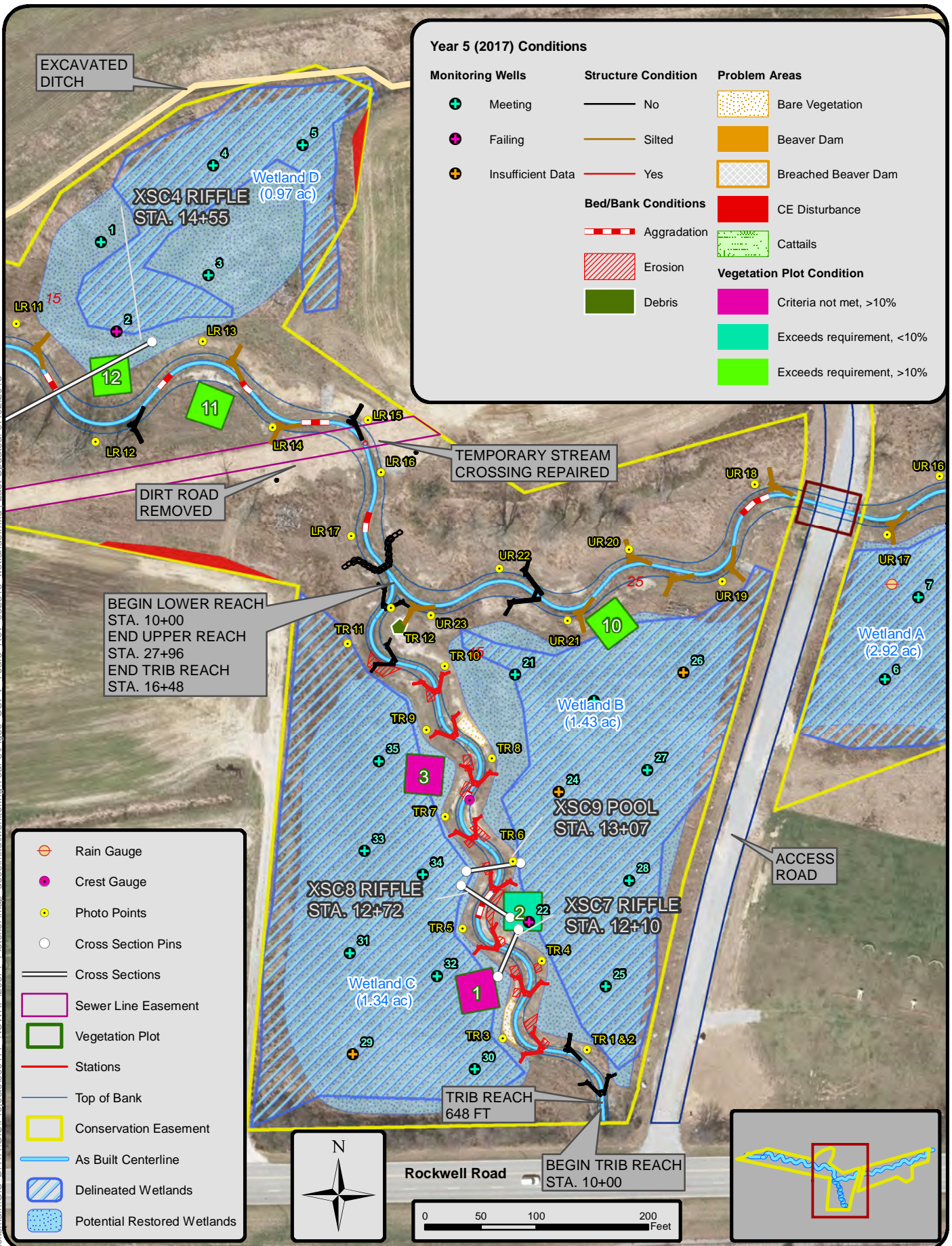
FIGURE 3A





Current Conditions Plan View
Figure 3b

\\c:\main\GIS\DATA\GIS\Projects\091777_NCWRP\20671_Fletcher\map_docs\mxd\Monitoring\Year 5\Fig3c_CCPV_Year5_Rev_032318_wetlands.mxd | Last Updated: 07.02.2018



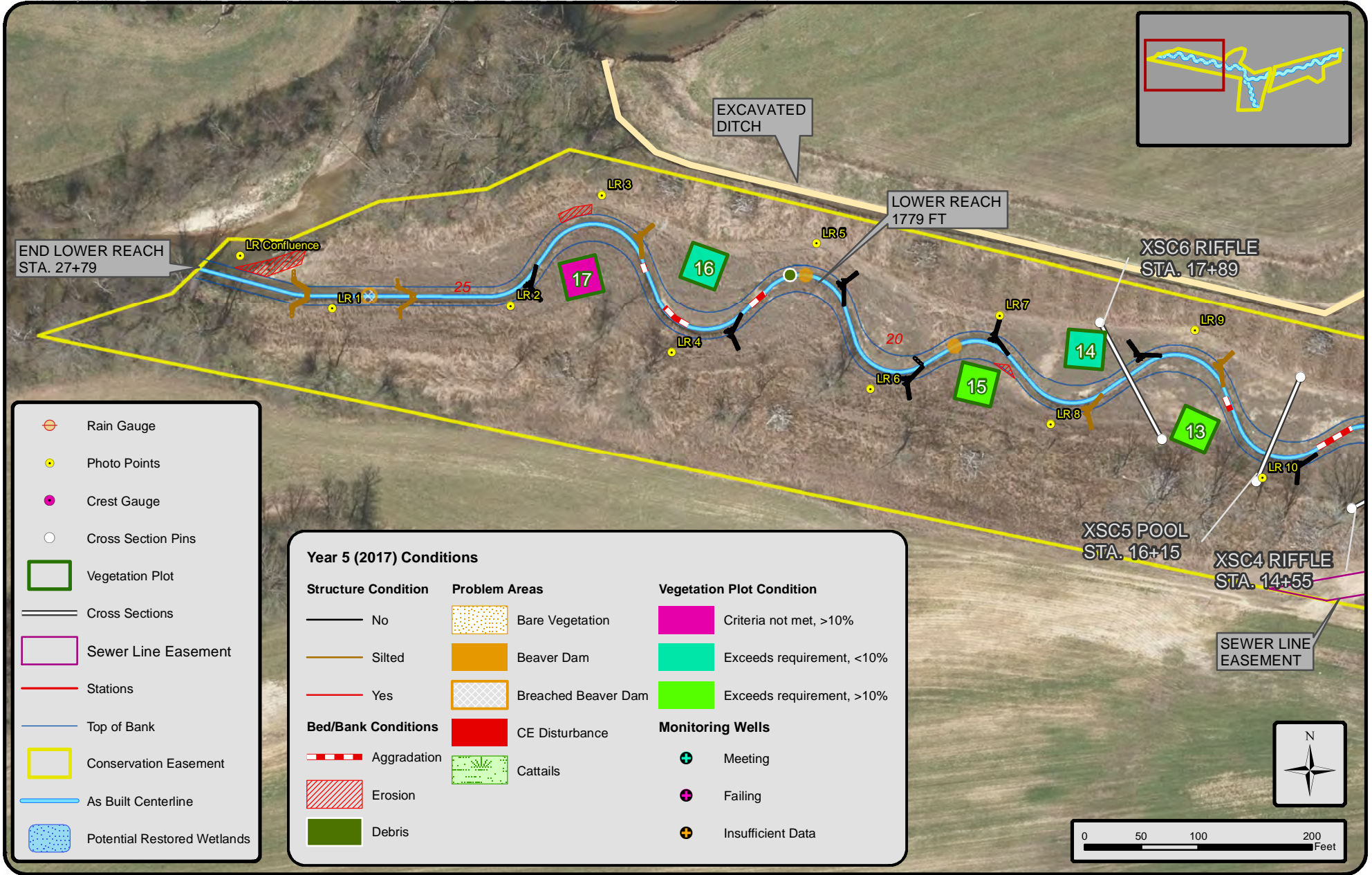
Year 5 (2017) Conditions

Monitoring Wells		Structure Condition		Problem Areas	
⊕	Meeting	—	No	⊠	Bare Vegetation
⊕	Failing	—	Silted	■	Beaver Dam
⊕	Insufficient Data	—	Yes	⊠	Breached Beaver Dam
Bed/Bank Conditions		—	Aggradation	■	CE Disturbance
▨	Erosion	▨	Erosion	■	Cattails
■	Debris	Vegetation Plot Condition		■	Criteria not met, >10%
		■	Exceeds requirement, <10%	■	Exceeds requirement, >10%

⊕	Rain Gauge
⊕	Crest Gauge
●	Photo Points
○	Cross Section Pins
—	Cross Sections
▭	Sewer Line Easement
▭	Vegetation Plot
—	Stations
—	Top of Bank
▭	Conservation Easement
—	As Built Centerline
▨	Delineated Wetlands
▨	Potential Restored Wetlands

Current Conditions Plan View
Figure 3c





Current Conditions Plan View
Figure 3d



Table 5
Reach ID
Assessed Length

Visual Stream Morphology Stability Assessment
Upper Reach
1796

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			5	96	95%			
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	16	21			76%			
		3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth \geq 1.6)	17	23					
	2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)		17	23			74%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	22	22			100%			
		2. Thalweg centering at downstream of meander (Glide)	21	21			100%			
Totals					1	28	99%	0	0	99%
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			1	28	99%			99%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%			100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	23	23			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	6	6			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	23	23			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	23	23			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio \geq 1.6 Rootwads/logs providing some cover at base-flow.	6	6			100%			

Table 5
Reach ID
Assessed Length

Visual Stream Morphology Stability Assessment
Lower Reach
1779

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			10	192	89%			
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	14	16			88%			
		3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth \geq 1.6)	12	16					
	2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)		12	16			75%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	16	16			100%			
		2. Thalweg centering at downstream of meander (Glide)	16	16			100%			
	Totals					5	111			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			4	83	98%			98%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			1	28	99%			99%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	18	18			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	4	4			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	16	17			94%			
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	17	17			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio \geq 1.6 Rootwads/logs providing some cover at base-flow.	4	4			100%			

Table 5
 Reach ID
 Assessed Length

Visual Stream Morphology Stability Assessment
 Tributary
 648

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation		
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			2	37	94%					
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%					
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	7	11			64%					
		3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth \geq 1.6)	10			11				91%	
			2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	10			11				91%	
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	11	11			100%					
		2. Thalweg centering at downstream of meander (Glide)	11	11			100%					
Totals							14	188	85%	0	0	85%
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion					14	188	85%	0	0	85%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%			100%		
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			100%		
Totals					14	188	85%	0	0	85%		
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	12	12			100%					
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	9	11			82%					
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	4	12			33%					
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	7	12			58%					
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio \geq 1.6 Rootwads/logs providing some cover at base-flow.	11	11			100%					

Table 6

Vegetation Condition Assessment

Planted Acreage¹

18.59

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.001 ac.	Pattern and Color	3	0.01	0.1%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.001 ac.	Pattern and Color	3	0.06	0.3%
Total				6	0.07	0.4%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.1 ac.	Pattern and Color	0	0.00	0.0%
Cumulative Total				6	0.07	0.4%

Easement Acreage²

20.3

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern ⁴	Areas or points (if too small to render as polygons at map scale).	none	Pattern and Color	1	0.01	0.0%
5. Easement Encroachment Areas ³	Areas or points (if too small to render as polygons at map scale).	none	Pattern and Color	0	0.00	0.0%

¹ = Enter the planted acreage within the easement. This number is calculated as the easement acreage minus any existing mature tree stands that were not subject to supplemental planting of the understory, the channel acreage, crossings or any other elements not directly planted as part of the project effort.

² = The acreage within the easement boundaries.

³ = Encroachment may occur within or outside of planted areas and will therefore be calculated against the overall easement acreage. In the event a polygon is cataloged into items 1, 2 or 3 in the table and is the result of encroachment, the associated acreage should be tallied in the relevant item (i.e., item 1,2 or 3) as well as a parallel tally in item 5.

⁴ = Invasives may occur in or out of planted areas, but still within the easement and will therefore be calculated against the overall easement acreage. Invasives of concern/interest are listed below. The list of high concern species are those with the potential to directly outcompete native, young, woody stems in the short-term (e.g. monitoring period or shortly thereafter) or affect the community structure for existing, more established tree/shrub stands over timeframes that are slightly longer (e.g. 1-2 decades). The low/moderate concern group are those species that generally do not have this capacity over the timeframes discussed and therefore are not expected to be mapped with regularity, but can be mapped, if in the judgement of the observer their coverage, density or distribution is suppressing the viability, density, or growth of planted woody stems. Decisions as to whether remediation will be needed are based on the integration of risk factors by EEP such as species present, their coverage, distribution relative to native biomass, and the practicality of treatment. For example, even modest amounts of Kudzu or Japanese Knotweed early in the projects history will warrant control, but potentially large coverages of Microstegium in the herb layer will not likely trigger control because of the limited capacities to impact tree/shrub layers within the timeframes discussed and the potential impacts of treating extensive amounts of ground cover. Those species with the "watch list" designator in gray shade are of interest as well, but have yet to be observed across the state with any frequency. Those in *red italics* are of particular interest given their extreme risk/threat level for mapping as points where isolated specimens are found, particularly early in a projects monitoring history. However, areas of discreet, dense patches will of course be mapped as polygons. The symbology scheme below was one that was found to be helpful for symbolizing invasives polygons, particularly for situations where the condition for an area is somewhere between isolated specimens and dense, discreet patches. In any case, the point or polygon/area feature can be symbolized to describe things like high or low concern and species can be listed as a map inset, in legend items if the number of species are limited or in the narrative section of the executive summary.



Upper Reach Photo Station 1 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 1 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 2 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 2 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 3 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 3 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 4 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 4 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 5 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 5 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 6 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 6 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 7 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 7 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 8 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 8 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 9 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 9 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 10 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 10 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 11 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 11 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 12 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 12 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 13 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 13 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 14 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 14 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 15 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 15 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 16 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 16 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 17 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 17 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 18 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 18 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 19 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 19 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 20 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 20 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 21 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 21 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 22 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 22 Upstream (3/20/2017 Year 5)



Upper Reach Photo Station 23 Downstream (3/20/2017 Year 5)



Upper Reach Photo Station 23 Upstream (3/20/2017 Year 5)



Confluence with Cane Creek (3/20/2017 Year 5)



Looking upstream of Confluence with Cane Creek (3/20/2017 Year 5)



Lower Reach Photo Station 1 Downstream (3/20/2017 Year 5)



Lower Reach Photo Station 1 Upstream (3/20/2017 Year 5)



Lower Reach Photo Station 2 Downstream (3/20/2017 Year 5)



Lower Reach Photo Station 2 Upstream (3/20/2017 Year 5)



Lower Reach Photo Station 3 Downstream (3/20/2017 Year 5)



Lower Reach Photo Station 3 Upstream (3/20/2017 Year 5)



Lower Reach Photo Station 4 Downstream (3/20/2017 Year 5)



Lower Reach Photo Station 4 Upstream (3/20/2017 Year 5)



Lower Reach Photo Station 5 Downstream (3/20/2017 Year 5)



Lower Reach Photo Station 5 Upstream (3/20/2017 Year 5)



Lower Reach Photo Station 6 Downstream (3/20/2017 Year 5)



Lower Reach Photo Station 6 Upstream (3/20/2017 Year 5)



Lower Reach Photo Station 7 Downstream (3/20/2017 Year 5)



Lower Reach Photo Station 7 Upstream (3/20/2017 Year 5)



Lower Reach Photo Station 8 Downstream (3/20/2017 Year 5)



Lower Reach Photo Station 8 Upstream (3/20/2017 Year 5)



Lower Reach Photo Station 9 Downstream (3/20/2017 Year 5)



Lower Reach Photo Station 9 Upstream (3/20/2017 Year 5)



Lower Reach Photo Station 10 Downstream (3/20/2017 Year 5)



Lower Reach Photo Station 10 Upstream (3/20/2017 Year 5)



Lower Reach Photo Station 11 Downstream (3/20/2017 Year 5)



Lower Reach Photo Station 11 Upstream (3/20/2017 Year 5)



Lower Reach Photo Station 12 Downstream (3/20/2017 Year 5)



Lower Reach Photo Station 12 Upstream (3/20/2017 Year 5)



Lower Reach Photo Station 13 Downstream (3/20/2017 Year 5)



Lower Reach Photo Station 13 Upstream (3/20/2017 Year 5)



Lower Reach Photo Station 14 Downstream (3/20/2017 Year 5)



Lower Reach Photo Station 14 Upstream (3/20/2017 Year 5)



Lower Reach Photo Station 15 Downstream (3/20/2017 Year 5)



Lower Reach Photo Station 15 Upstream (3/20/2017 Year 5)



Lower Reach Photo Station 16 Downstream (3/20/2017 Year 5)



Lower Reach Photo Station 16 Upstream (3/20/2017 Year 5)



Lower Reach Photo Station 17 Downstream (3/20/2017 Year 5)



Lower Reach Photo Station 17 Upstream (3/20/2017 Year 5)



Tributary Reach Photo Station 1 Downstream (3/20/2017 Year 5)



Tributary Reach Photo Station 1 Upstream (3/20/2017 Year 5)



Tributary Reach Photo Station 2 Downstream (3/22/2016 Year 4)



Tributary Reach Photo Station 2 Upstream (3/20/2017 Year 5)



Tributary Reach Photo Station 3 Downstream (3/20/2017 Year 5)



Tributary Reach Photo Station 3 Upstream (3/20/2017 Year 5)



Tributary Reach Photo Station 4 Downstream (3/20/2017 Year 5)



Tributary Reach Photo Station 4 Upstream (3/20/2017 Year 5)



Tributary Reach Photo Station 5 Downstream (3/20/2017 Year 5)



Tributary Reach Photo Station 5 Upstream (3/20/2017 Year 5)



Tributary Reach Photo Station 6 Downstream (3/20/2017 Year 5)



Tributary Reach Photo Station 6 Upstream (3/20/2017 Year 5)



Tributary Reach Photo Station 7 Downstream (3/20/2017 Year 5)



Tributary Reach Photo Station 7 Upstream (3/20/2017 Year 5)



Tributary Reach Photo Station 8 Downstream (3/20/2017 Year 5)



Tributary Reach Photo Station 8 Upstream (3/20/2017 Year 5)



Tributary Reach Photo Station 9 Downstream (3/20/2017 Year 5)



Tributary Reach Photo Station 9 Upstream (3/20/2017 Year 5)



Tributary Reach Photo Station 10 Downstream (3/20/2017 Year 5)



Tributary Reach Photo Station 10 Upstream (3/20/2017 Year 5)



Tributary Reach Photo Station 11 Downstream (3/20/2017 Year 5)



Tributary Reach Photo Station 11 Upstream (3/20/2017 Year 5)



Tributary Reach Photo Station 12 Downstream (3/20/2017 Year 5)



Tributary Reach Photo Station 12 Upstream (3/20/2017 Year 5)

Appendix C

Fletcher-Meritor Site (#138)

Year 5 (10-May-2017)

Vegetation Plot Summary Information

Plot #	Riparian Buffer Stems ¹	Stream/Wetland Stems ²	Live Stakes	Invasives	Volunteers ³	Total ⁴	Unknown Growth Form
1	n/a	4	0	21	30	19	0
2	n/a	8	0	22	17	11	0
3	n/a	4	0	1	4	7	0
4	n/a	20	0	1	26	46	0
5	n/a	14	0	11	23	27	0
6	n/a	8	0	23	36	21	0
7	n/a	18	0	5	26	39	0
8	n/a	11	0	10	106	107	0
9	n/a	9	0	2	23	30	0
10	n/a	10	0	14	18	14	0
11	n/a	12	0	0	305	317	0
12	n/a	9	0	0	84	93	0
13	n/a	10	0	3	204	211	0
14	n/a	8	0	9	318	317	0
15	n/a	15	0	0	206	221	0
16	n/a	8	0	0	269	277	0
17	n/a	4	0	0	309	313	0

Wetland/Stream Vegetation Totals

(per acre)

Plot #	Stream/Wetland Stems ²	Volunteers ³	Total ⁴	Success Criteria Met?
1	162	1214	769	No
2	324	688	445	Yes
3	162	162	283	No
4	809	1052	1862	Yes
5	567	931	1093	Yes
6	324	1457	850	Yes
7	728	1052	1578	Yes
8	445	4290	4330	Yes
9	364	931	1214	Yes
10	405	728	567	Yes
11	486	12343	12829	Yes
12	364	3399	3764	Yes
13	405	8256	8539	Yes
14	324	12869	12829	Yes
15	607	8337	8944	Yes
16	324	10886	11210	Yes
17	162	12505	12667	No
Project Avg	409	4771	4928	Yes

Riparian Buffer Vegetation Totals

(per acre)

Plot #	Riparian Buffer Stems ¹	Success Criteria Met?
1	n/a	
2	n/a	
3	n/a	
4	n/a	
5	n/a	
6	n/a	
7	n/a	
8	n/a	
9	n/a	
10	n/a	
11	n/a	
12	n/a	
13	n/a	
14	n/a	
15	n/a	
16	n/a	
17	n/a	
Project Avg	n/a	

Stem Class characteristics

- ¹Buffer Stems Native planted hardwood trees. Does NOT include shrubs. No pines. No vines.
- ²Stream/Wetland Stems Native planted woody stems. Includes shrubs, does NOT include live stakes. No vines. Excl. exotics.
- ³Volunteers Native woody stems. Not planted. No vines.
- ⁴Total Planted + volunteer native woody stems. Includes live stakes. Excl. exotics. Excl. vines.

Report Prepared By Vickie Miller
Date Prepared 3/23/2018 16:26

database name cvs-eep-entrytool-v2.3.1 Fletcher Year 5.mdb
database location R:\EEP-WRP\20671 Fletcher\Monitoring\Year 5 (2017)\Fletcher_Meritor_Site_138_2017_MY5\Support Files\Vegetation Plot Data
computer name RAL-CND5304LNJ
file size 60985344

DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT-----

Metadata Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp Frequency distribution of vigor classes listed by species.
Damage List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp Damage values tallied by type for each species.
Damage by Plot Damage values tallied by type for each plot.
Planted Stems by Plot and Spp A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and spp A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.

PROJECT SUMMARY-----

Project Code 138
project Name Fletcher-Meritor Site
Description Wetland and Stream mitigation in Henderson County, NC.
River Basin French Broad
length(ft)
stream-to-edge width (ft)
area (sq m)
Required Plots (calculated)
Sampled Plots 17

EEP Project Code 138. Project Name: Fletcher-Meritor Site

Scientific Name	Common Name	Species Type	Current																							
			138-01-0001			138-01-0002			138-01-0003			138-01-0004			138-01-0005			138-01-0006			138-01-0007			138-01-0008		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer	maple	Tree																								
Acer negundo	boxelder	Tree						1	1	1						3	3	3			7	7	9			
Acer rubrum	red maple	Tree						1					6	1	1	3			2			1			3	
Acer saccharinum	silver maple	Tree									1	1	1													
Alnus serrulata	hazel alder	Shrub																								
Betula nigra	river birch	Tree									7	7	9	2	2	2	1	1	1	3	3	3	4	4	4	
Carya	hickory	Tree																								
Cornus	dogwood	Shrub or Tree																								
Cornus amomum	silky dogwood	Shrub				2	2	2							2	2	2				1	1	1			
Cornus florida	flowering dogwood	Tree						1																		
Fraxinus pennsylvanica	green ash	Tree	2	2	16	3	3	3	3	3	4	4	4	18			1	3	3	6	3	3	19	5	5	94
Juglans nigra	black walnut	Tree											3	3	3	3	3	3			1	1	1			
Liriodendron tulipifera	tuliptree	Tree																								
Platanus occidentalis	American sycamore	Tree	1	1	1	3	3	4				5	5	7	3	3	12	4	4	12	2	2	4	1	1	3
Populus	cottonwood																									
Populus deltoides	eastern cottonwood	Tree																								
Prunus serotina	black cherry	Tree													2						1	1	1			
Pyrus	pear	Tree	1	1	1						2															
Salix	willow	Shrub or Tree																								
Salix caprea	goat willow	Exotic	6	6	21	8	8	22			1	1	1	1			11			23			5			10
Salix nigra	black willow	Tree			1																			1	1	3
Salix sericea	silky willow	Shrub																								
Sambucus canadensis	Common Elderberry	Shrub																								
Unknown		Shrub or Tree													1	1	1									
Unknown Prunus/Ilex																										
Stem count			10	10	40	16	16	33	4	4	8	21	21	47	15	15	38	8	8	44	18	18	44	11	11	117
size (ares)			1			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			4	4	5	4	4	6	2	2	4	6	6	8	7	7	9	3	3	5	7	7	9	4	4	6
Stems per ACRE			404.7	404.7	1619	647.5	647.5	1335	161.9	161.9	323.7	849.8	849.8	1902	607	607	1538	323.7	323.7	1781	728.4	728.4	1781	445.2	445.2	4735

Salix caprea was not planted or in the seed mix. Is a volunteer.

EEP Project Code 138. Project Name: Fletcher-Meritor Site

Plot Data (MY5 2017)

Scientific Name	Common Name	Species Type	138-01-0009			138-01-0010			138-01-0011			138-01-0012			138-01-0013			138-01-0014			138-01-0015			138-01-0016		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer	maple	Tree																								
Acer negundo	boxelder	Tree	1	1	3				2	2	2	2	2	2		1		3			1	1	1	1		
Acer rubrum	red maple	Tree						2					6													
Acer saccharinum	silver maple	Tree																								
Alnus serrulata	hazel alder	Shrub				1	1	1	1	1	1			2	2	2		1	1	1	1	1	1	1		
Betula nigra	river birch	Tree							3	3	303	2	2	29	2	2	202	3	3	303	3	3	203	1	1	251
Carya	hickory	Tree																								
Cornus	dogwood	Shrub or Tree																								
Cornus amomum	silky dogwood	Shrub							1	1	1	5	5	6	3	3	3	4	4	4	10	10	15	3	3	3
Cornus florida	flowering dogwood	Tree																							2	
Fraxinus pennsylvanica	green ash	Tree	3	3	21	3	3	4	2	2	2			46	1	1	1	1	1	2					8	
Juglans nigra	black walnut	Tree	1	1	1																					
Liriodendron tulipifera	tuliptree	Tree			1									2												
Platanus occidentalis	American sycamore	Tree	4	4	4	5	5	6	3	3	8			1	2	2	2			1	1	1	3	3	12	
Populus	cottonwood																									
Populus deltoides	eastern cottonwood	Tree																								
Prunus serotina	black cherry	Tree																								
Pyrus	pear	Tree				1	1	1																	2	
Salix	willow	Shrub or Tree																								
Salix caprea	goat willow	Exotic			2			14								3										
Salix nigra	black willow	Tree											1												2	
Salix sericea	silky willow	Shrub																								
Sambucus canadensis	Common Elderberry	Shrub																								
Unknown		Shrub or Tree																								
Unknown Prunus/Ilex																										
Stem count			9	9	32	10	10	28	12	12	317	9	9	93	10	10	214	8	8	326	15	15	221	8	8	277
size (ares)			1			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			4	4	6	4	4	6	6	6	6	3	3	8	5	5	7	3	3	8	4	4	5	4	4	6
Stems per ACRE			364.2	364.2	1295	404.7	404.7	1133	485.6	485.6	12829	364.2	364.2	3764	404.7	404.7	8660	323.7	323.7	13193	607	607	8944	323.7	323.7	11210

Salix caprea was not planted or in the seed mix. Is a volunteer.

EEP Project Code 138. Project Name: Fletcher-Meritor Site

Scientific Name	Common Name	Species Type	Annual Means																				
			138-01-0017			MY5 (2017)			MY4 (2016)			MY3 (2015)			MY2 (2014)			MY1 (2013)			MY0 (2012)		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer	maple	Tree																				42	
Acer negundo	boxelder	Tree				17	17	26	17	17	20	20	20	37	22	22	68	27	27	27	22	22	22
Acer rubrum	red maple	Tree				1	1	24	1	1	4	2	2	11	2	2	30			9			
Acer saccharinum	silver maple	Tree				1	1	1	1	1	1												
Alnus serrulata	hazel alder	Shrub			5	5	5	11	4	4	9	1	1	1									
Betula nigra	river birch	Tree	1	1	301	32	32	1611	33	33	982	32	32	1110	31	31	1225	29	29	832	26	26	481
Carya	hickory	Tree			1			1			1												
Cornus	dogwood	Shrub or Tree													1	1	1						
Cornus amomum	silky dogwood	Shrub	1	1	1	32	32	38	33	33	35	34	34	34	31	31	31	31	31	31	30	30	30
Cornus florida	flowering dogwood	Tree						3															
Fraxinus pennsylvanica	green ash	Tree	1	1	1	34	34	246	33	33	153	36	36	160	37	37	80	40	40	40	36	36	36
Juglans nigra	black walnut	Tree	1	1	1	9	9	9	9	9	12	9	9	11	8	8	8	7	7	7	6	6	6
Liriodendron tulipifera	tuliptree	Tree						3			1			1			1						
Platanus occidentalis	American sycamore	Tree				37	37	77	37	37	91	36	36	67	34	34	75	33	33	59	35	35	70
Populus	cottonwood															5							
Populus deltoides	eastern cottonwood	Tree							1	1	1	2	2	2	1	1	1						
Prunus serotina	black cherry	Tree				1	1	3	1	1	1			2									
Pyrus	pear	Tree				2	2	6	1	1	4												
Salix	willow	Shrub or Tree							15	15	107												
Salix caprea	goat willow	Exotic				15	15	122															
Salix nigra	black willow	Tree			3	1	1	10	1	1	5	1	1	10	1	1	11						
Salix sericea	silky willow	Shrub												2	2	2							
Sambucus canadensis	Common Elderberry	Shrub																			1	1	1
Unknown		Shrub or Tree				1	1	1	1	1	1	13	13	106	16	16	33	3	3	3	4	4	4
Unknown Prunus/Ilex												1	1	1									
Stem count			4	4	313	188	188	2192	188	188	1428	187	187	1558	186	186	1608	170	170	1008	160	160	650
size (ares)			1			17			17			17			17			17			17		
size (ACRES)			0.02			0.42			0.42			0.42			0.42			0.42			0.42		
Species count			4	4	7	14	14	17	15	15	17	12	12	15	12	12	14	7	7	8	8	8	8
Stems per ACRE			161.9	161.9	12667	447.5	447.5	5218	447.5	447.5	3399	445.2	445.2	3709	442.8	442.8	3828	404.7	404.7	2400	380.9	380.9	1547

Salix caprea was not planted or in the seed mix. Is a volunteer.



Vegetation Plot 1 – 10m x 10m (5/11/2017 Year 5)



Vegetation Plot 2 – 10m x 10m (5/11/2017 Year 5)



Vegetation Plot 3 – 10m x 10m (5/11/2017 Year 5)



Vegetation Plot 4 – 10m x 10m (5/11/2017 Year 5)



Vegetation Plot 5 – 10m x 10m (5/11/2017 Year 5)



Vegetation Plot 6 – 10m x 10m (5/11/2017 Year 5)



Vegetation Plot 7 – 10m x 10m (5/11/2017 Year 5)



Vegetation Plot 8 – 10m x 10m (5/11/2017 Year 5)



Vegetation Plot 9 – 10m x 10m (5/11/2017 Year 5)



Vegetation Plot 10 – 10m x 10m (5/11/2017 Year 5)



Vegetation Plot 11 – 10m x 10m (5/11/2017 Year 5)



Vegetation Plot 12 – 10m x 10m (5/11/2017 Year 5)



Vegetation Plot 13 – 10m x 10m (5/11/2017 Year 5)



Vegetation Plot 14 – 10m x 10m (5/11/2017 Year 5)



Vegetation Plot 15 – 10m x 10m (5/11/2017 Year 5)



Vegetation Plot 16 – 10m x 10m (5/11/2017 Year 5)



Vegetation Plot 17 – 10m x 10m (5/11/2017 Year 5)

Appendix D

Station	Elevation
0.00	2061.45
0.08	2061.09
1.84	2060.98
9.65	2061.02
13.75	2060.95
15.21	2060.88
17.61	2060.76
21.53	2060.83
28.32	2060.87
31.13	2060.79
40.00	2060.76
43.82	2060.56
48.90	2060.17
53.57	2059.59
56.73	2059.33
59.51	2059.22
61.09	2058.75
61.57	2058.56
62.33	2057.99
62.99	2057.62
63.52	2057.38
63.75	2057.15
63.89	2056.90
64.40	2056.76
64.76	2056.74
65.10	2056.62
65.32	2056.49
65.74	2056.63
66.19	2056.68
66.69	2056.73
67.01	2056.90
67.25	2057.29
67.81	2057.73
69.21	2057.82
70.62	2058.29
72.01	2058.91
74.96	2059.42
84.24	2060.30
88.29	2060.38
91.66	2060.88
108.40	2061.59
115.10	2061.52
115.21	2061.99

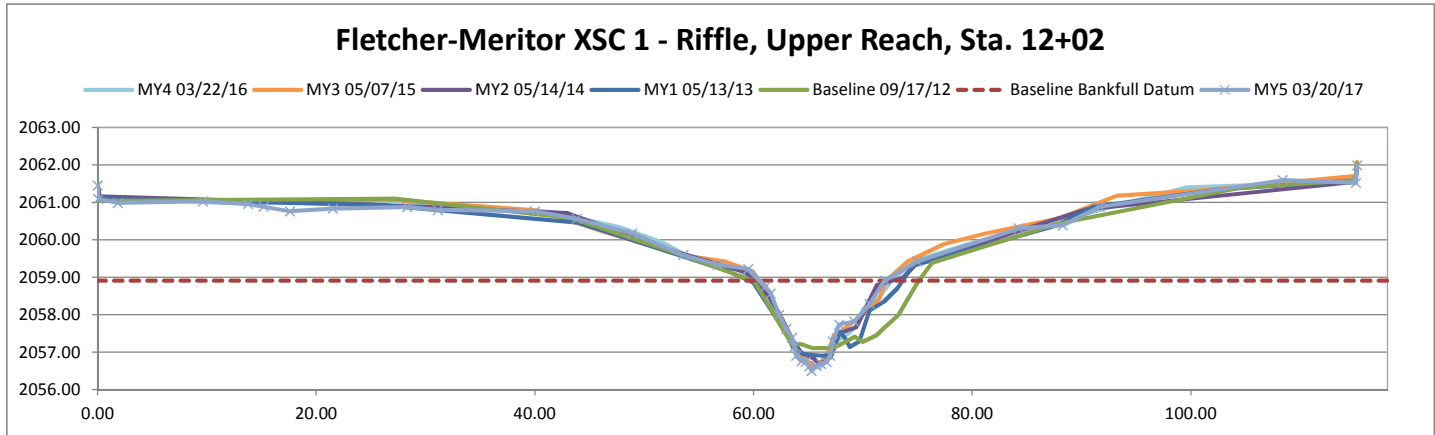
Reach	Fletcher-Meritor, Upper Reach
River Basin	French Broad
Cross Section ID	XSC-1, Riffle, Upper Reach, 12+02
Drainage Area (Sq Mi)	0.75
Date	3/20/2017
Observers	V. Miller, W. Yelverton, K. Bell

SUMMARY DATA	
Bankfull Elevation, ft	2058.90
Bankfull Cross Sectional Area, ft²	14.00
Bankfull Width, ft	11.40
Max Depth at Bankfull, ft	2.41
Mean Depth at Bankfull, ft	1.23
Width/Depth Ratio	9.28
Flood Prone Width, ft	101.80
Flood Prone Area Elevation, ft	2061.31
Entrenchment Ratio	8.93
Bank Height Ratio	1.13



Stream Type C/E4

Sta. 12+02 Looking Downstream



Station	Elevation
0.00	2060.95
0.08	2060.43
4.11	2060.45
8.22	2060.37
13.59	2059.97
16.83	2059.64
19.79	2059.26
21.87	2058.98
22.92	2058.86
24.09	2058.57
24.86	2058.27
25.71	2058.18
26.30	2057.71
26.89	2057.14
27.24	2056.93
27.75	2055.78
28.27	2055.65
28.95	2055.88
29.45	2055.81
29.80	2055.85
30.27	2056.08
30.55	2056.01
31.12	2056.07
32.14	2056.18
32.47	2057.12
32.79	2057.56
33.18	2058.03
34.61	2058.35
35.66	2058.41
40.68	2058.42
44.23	2058.72
47.39	2059.27
50.91	2059.49
58.86	2060.42
59.51	2060.53
68.08	2060.55
70.95	2060.72
75.30	2060.68
84.32	2060.51
85.20	2060.55
85.20	2060.88

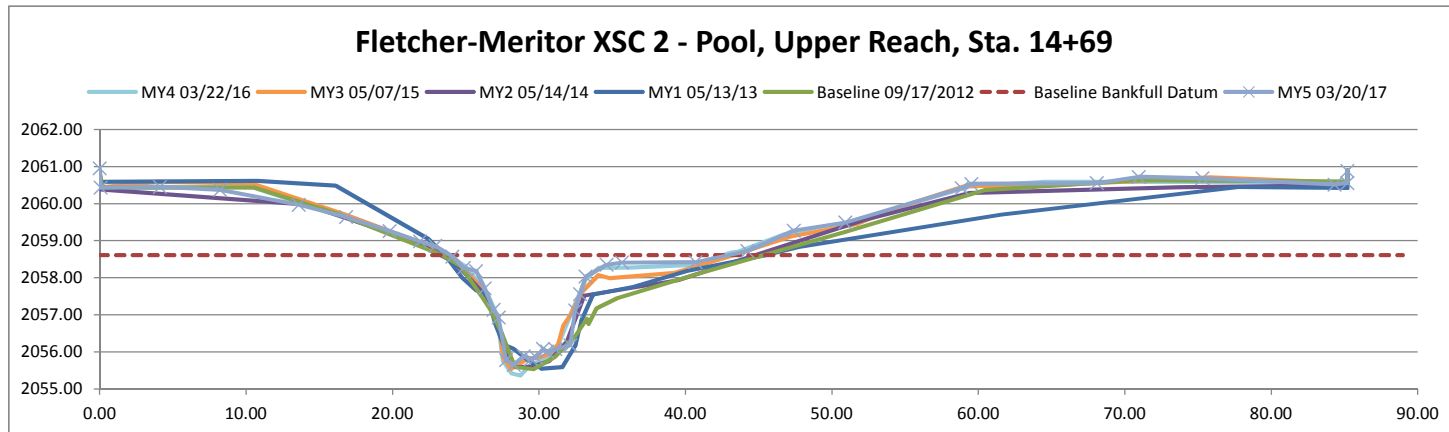
Reach	Fletcher-Meritor, Upper Reach
River Basin	French Broad
Cross Section ID	XSC-2, Pool, Upper Reach, 14+69
Drainage Area (Sq Mi)	0.75
Date	3/20/2017
Observers	V. Miller, W. Yelverton, K. Bell

SUMMARY DATA	
Bankfull Elevation, ft	2058.61
Bankfull Cross Sectional Area, ft²	18.40
Bankfull Width, ft	19.00
Max Depth at Bankfull, ft	2.96
Mean Depth at Bankfull, ft	0.97
Width/Depth Ratio	19.62
Flood Prone Width, ft	>86.00
Flood Prone Area Elevation, ft	2061.57
Entrenchment Ratio	>4.00
Bank Height Ratio	0.93



Stream Type C/E4

Sta. 14+69 Looking Downstream



Station	Elevation
0.00	2061.22
0.13	2060.78
6.27	2060.98
12.74	2060.79
17.06	2060.39
20.30	2059.87
26.58	2059.16
31.97	2058.73
34.04	2057.84
35.41	2057.63
36.21	2056.8
36.42	2056.62
36.60	2056.34
37.20	2056.24
37.77	2056.2
38.68	2056.09
39.08	2056.2
39.41	2056.1
39.88	2056.37
40.40	2056.42
40.82	2056.64
41.26	2056.9
41.63	2057.12
42.24	2057.38
42.84	2057.46
43.79	2057.97
44.67	2058.24
46.16	2058.84
52.07	2059.24
61.17	2060.06
69.63	2060.65
74.80	2060.7
79.68	2060.58
84.70	2060.67
85.20	2060.88

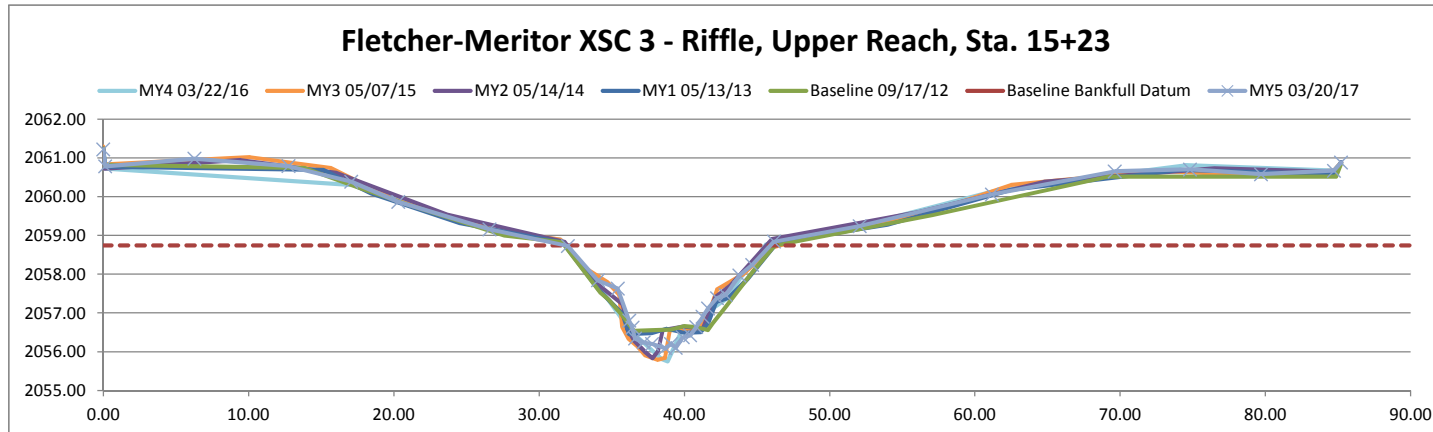
Reach	Fletcher-Meritor, Upper Reach
River Basin	French Broad
Cross Section ID	XSC-3, Riffle, Upper Reach, 15+23
Drainage Area (Sq Mi)	0.75
Date	3/20/2017
Observers	V. Miller, W. Yelverton, K. Bell

SUMMARY DATA	
Bankfull Elevation, ft	2058.74
Bankfull Cross Sectional Area, ft²	19.90
Bankfull Width, ft	14.07
Max Depth at Bankfull, ft	2.65
Mean Depth at Bankfull, ft	1.41
Width/Depth Ratio	9.95
Flood Prone Width, ft	>86.00
Flood Prone Area Elevation, ft	2061.39
Entrenchment Ratio	>6.00
Bank Height Ratio	1.00



Stream Type C/E4

Sta. 15+23, Looking Downstream



Station	Elevation
0.00	2058.80
0.07	2058.43
0.09	2058.41
2.62	2058.10
8.21	2056.92
13.69	2055.79
17.35	2055.05
21.64	2054.67
32.72	2054.61
44.89	2054.04
54.46	2053.81
56.98	2053.55
58.90	2053.55
59.70	2053.11
60.65	2052.62
61.87	2052.17
62.65	2051.70
63.29	2051.18
63.57	2051.15
64.01	2051.03
64.40	2051.05
64.93	2051.07
65.61	2051.11
66.01	2051.36
66.68	2051.39
67.27	2051.58
68.04	2051.81
69.09	2052.03
69.39	2052.28
70.51	2052.56
71.64	2052.73
72.21	2052.94
73.46	2053.32
74.06	2053.45
75.33	2053.94
77.49	2054.00
81.97	2054.21
87.87	2054.34
99.53	2054.64
110.68	2054.75
126.63	2054.83
138.27	2055.03
143.90	2055.73
150.46	2056.66
159.04	2057.83
167.81	2058.09
167.84	2058.34

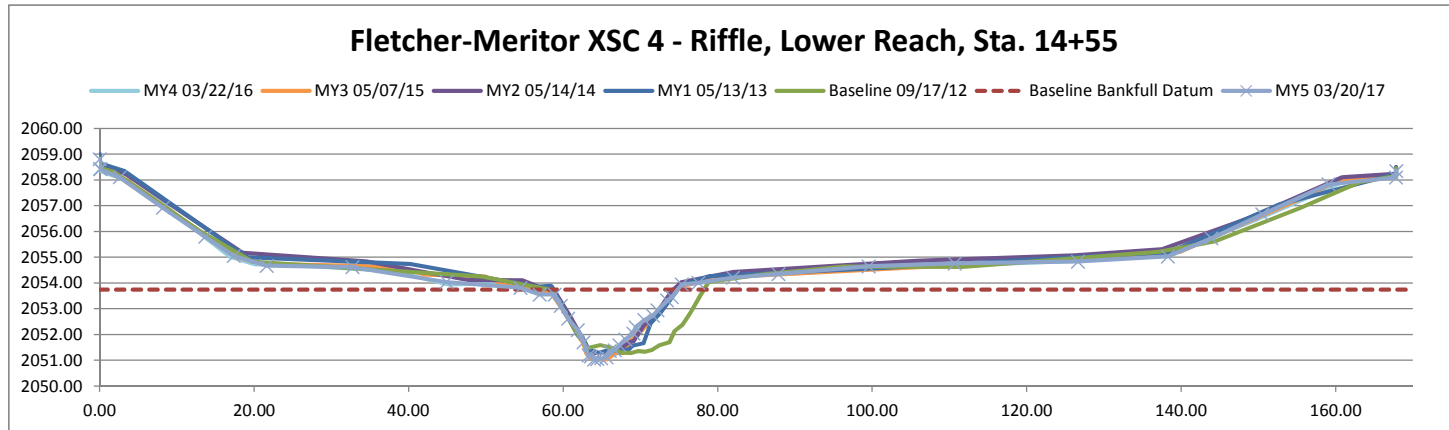
Reach	Fletcher-Meritor, Lower Reach
River Basin	French Broad
Cross Section ID	XSC-4 Riffle, Lower Reach, 14+55
Drainage Area (Sq Mi)	1.1
Date	3/20/2017
Observers	V. Miller, W. Yelverton, K. Bell

SUMMARY DATA	
Bankfull Elevation, ft	2053.74
Bankfull Cross Sectional Area, ft²	24.58
Bankfull Width, ft	19.67
Max Depth at Bankfull, ft	2.71
Mean Depth at Bankfull, ft	1.25
Width/Depth Ratio	15.74
Flood Prone Width, ft	138.50
Flood Prone Area Elevation, ft	2056.45
Entrenchment Ratio	7.04
Bank Height Ratio	0.93



Stream Type C/E4

Sta. 14+55 Looking Downstream



Station	Elevation
0.00	2058.70
0.14	2058.31
2.23	2057.63
5.02	2056.48
8.14	2055.36
11.56	2053.97
13.36	2053.83
15.37	2053.47
16.77	2053.31
17.83	2052.89
18.49	2052.47
18.91	2052.29
19.93	2051.59
20.24	2050.80
20.64	2050.24
21.23	2050.07
22.24	2049.97
23.36	2050.00
24.51	2050.10
25.72	2050.24
26.32	2050.21
26.81	2050.40
27.04	2051.89
27.57	2052.35
28.43	2052.58
29.85	2052.74
33.50	2052.82
37.69	2052.85
42.22	2053.31
47.79	2053.75
51.93	2053.95
64.85	2054.27
76.92	2054.21
85.39	2054.27
89.78	2054.83
91.26	2055.61
94.37	2056.67
98.25	2058.02
99.56	2058.15
99.85	2058.72

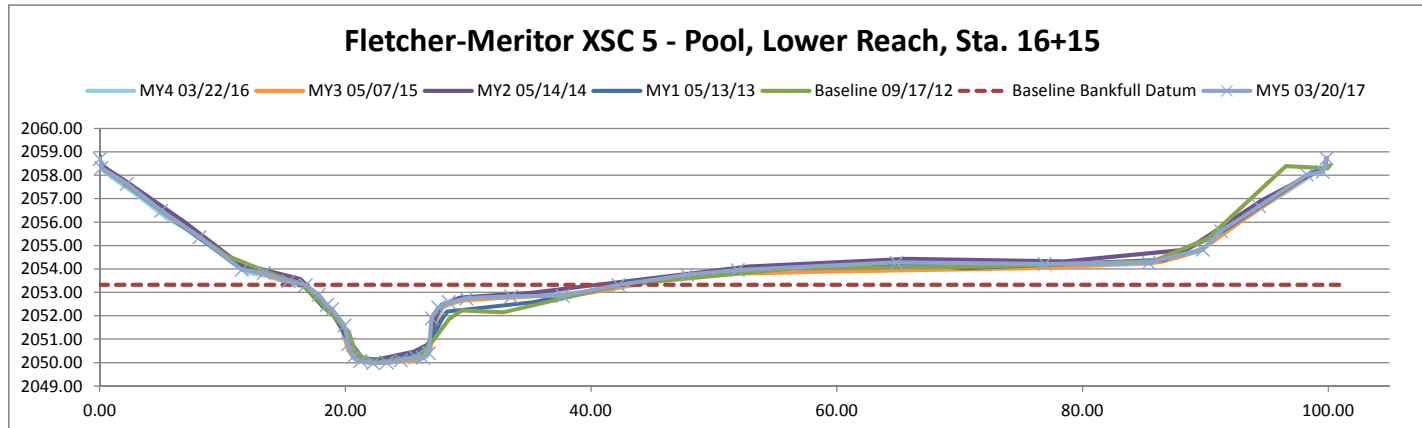
Reach	Fletcher-Meritor, Lower Reach
River Basin	French Broad
Cross Section ID	XSC-5, Pool, Lower Reach, 16+15
Drainage Area (Sq Mi)	1.1
Date	3/20/2017
Observers	V. Miller, W. Yelverton, K. Bell

SUMMARY DATA	
Bankfull Elevation, ft	2053.32
Bankfull Cross Sectional Area, ft²	31.98
Bankfull Width, ft	25.66
Max Depth at Bankfull, ft	3.35
Mean Depth at Bankfull, ft	1.25
Width/Depth Ratio	20.59
Flood Prone Width, ft	85.20
Flood Prone Area Elevation, ft	2056.67
Entrenchment Ratio	3.32
Bank Height Ratio	1.00



Stream Type C/E4

Sta. 16+15 Looking Downstream



Station	Elevation
0.00	2058.06
0.13	2057.73
1.91	2057.49
4.39	2056.94
7.47	2056.31
9.66	2055.70
12.04	2054.98
13.50	2054.58
15.69	2054.11
17.33	2053.87
27.75	2053.49
37.84	2053.35
44.94	2053.41
49.60	2053.26
52.37	2053.16
53.67	2053.09
55.03	2052.76
55.89	2052.68
56.65	2052.34
57.11	2052.34
57.95	2051.71
58.72	2051.33
60.52	2051.33
61.54	2051.20
62.01	2051.13
62.69	2050.91
62.98	2050.84
63.18	2050.66
63.74	2050.50
64.11	2050.45
64.60	2050.35
65.00	2050.36
65.35	2050.29
65.87	2050.34
66.56	2050.61
66.97	2050.92
68.03	2051.85
69.33	2052.40
71.36	2052.97
73.37	2053.07
77.10	2053.18
84.77	2053.30
92.89	2053.15
98.53	2053.26
101.86	2053.31
106.81	2054.16
108.95	2053.73
110.79	2055.32
115.36	2056.88
115.57	2057.44

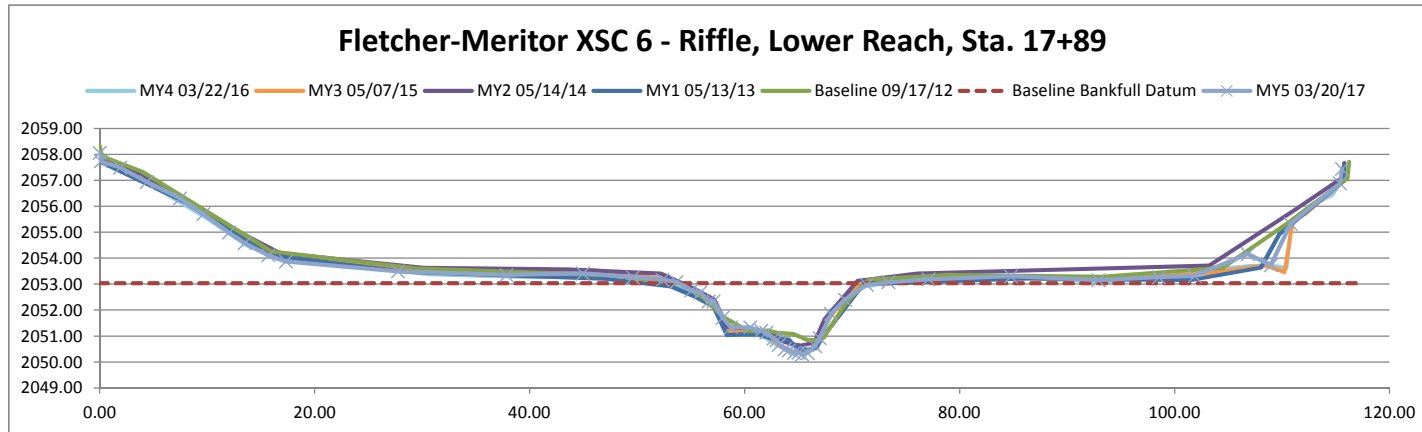
Reach	Fletcher-Meritor, Lower Reach
River Basin	French Broad
Cross Section ID	XSC-6, Riffle, Lower Reach, 17+89
Drainage Area (Sq Mi)	1.1
Date	3/20/2017
Observers	V. Miller, W. Yelverton, K. Bell

SUMMARY DATA	
Bankfull Elevation, ft	2053.03
Bankfull Cross Sectional Area, ft²	24.70
Bankfull Width, ft	18.65
Max Depth at Bankfull, ft	2.74
Mean Depth at Bankfull, ft	1.32
Width/Depth Ratio	14.08
Flood Prone Width, ft	102.70
Flood Prone Area Elevation, ft	2055.77
Entrenchment Ratio	5.51
Bank Height Ratio	0.98



Stream Type C/E4

Sta. 17+89 Looking Downstream



Station	Elevation
0.00	2061.55
0.13	2061.27
3.88	2061.28
6.49	2061.08
10.13	2060.28
13.03	2059.59
15.57	2059.49
18.85	2059.26
19.53	2058.81
20.04	2057.97
21.06	2057.75
21.57	2057.57
21.90	2057.43
22.16	2057.22
22.56	2057.03
23.05	2056.81
23.27	2056.89
23.52	2057.14
23.99	2057.18
24.67	2057.29
25.15	2057.31
25.46	2058.02
26.08	2058.28
27.46	2058.43
28.80	2058.75
29.84	2059.24
30.99	2059.27
32.54	2059.32
33.22	2059.89
35.82	2060.17
38.53	2060.72
41.03	2060.78
45.96	2060.78
46.05	2060.99

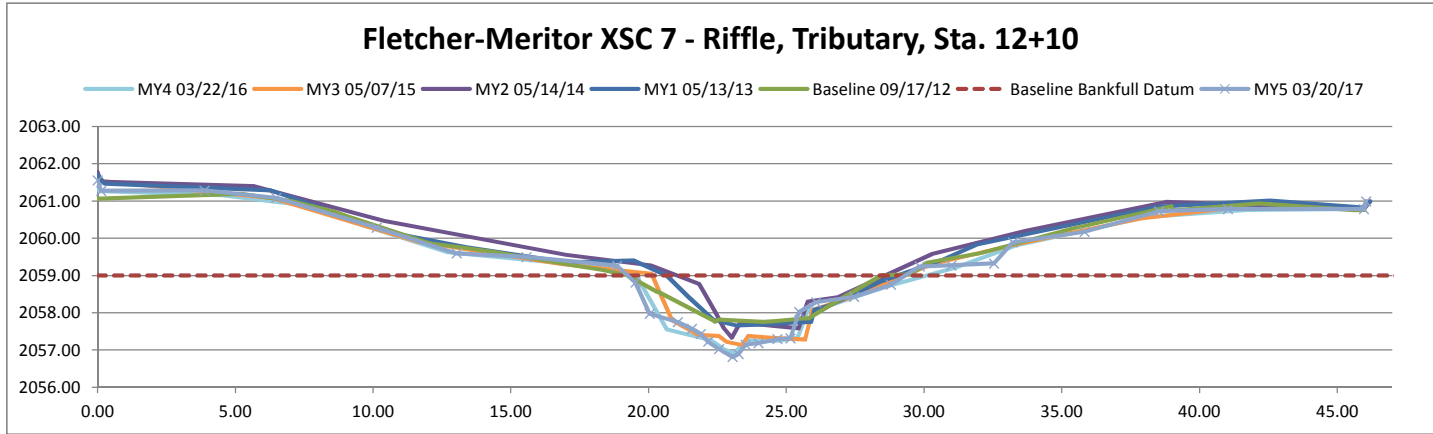
Reach	Fletcher-Meritor, Tributary
River Basin	French Broad
Cross Section ID	XSC-7, Riffle, Tributary, 12+10
Drainage Area (Sq Mi)	0.32
Date	3/20/2017
Observers	V. Miller, W. Yelverton, K. Bell

SUMMARY DATA	
Bankfull Elevation, ft	2059.00
Bankfull Cross Sectional Area, ft²	11.18
Bankfull Width, ft	10.09
Max Depth at Bankfull, ft	2.19
Mean Depth at Bankfull, ft	1.11
Width/Depth Ratio	9.11
Flood Prone Width, ft	>46.05
Flood Prone Area Elevation, ft	2061.19
Entrenchment Ratio	>4.56
Bank Height Ratio	1.12



Stream Type C/E4

Sta. 12+10 Looking Downstream



Station	Elevation
0.00	2060.91
0.13	2060.61
3.63	2060.60
8.44	2060.58
10.03	2060.43
12.25	2059.88
14.53	2059.33
17.19	2058.65
18.62	2058.70
19.69	2058.53
20.28	2058.40
21.15	2057.99
21.86	2057.64
22.93	2057.52
23.66	2056.20
24.14	2056.17
24.66	2056.21
25.07	2056.40
25.50	2056.45
26.34	2056.28
26.75	2056.38
27.32	2056.54
27.84	2057.30
28.43	2057.36
29.08	2057.55
29.65	2057.76
30.15	2058.63
31.55	2058.79
33.45	2059.16
37.27	2059.67
40.96	2060.35
44.07	2060.55
49.27	2060.42
52.19	2060.66
52.39	2060.98

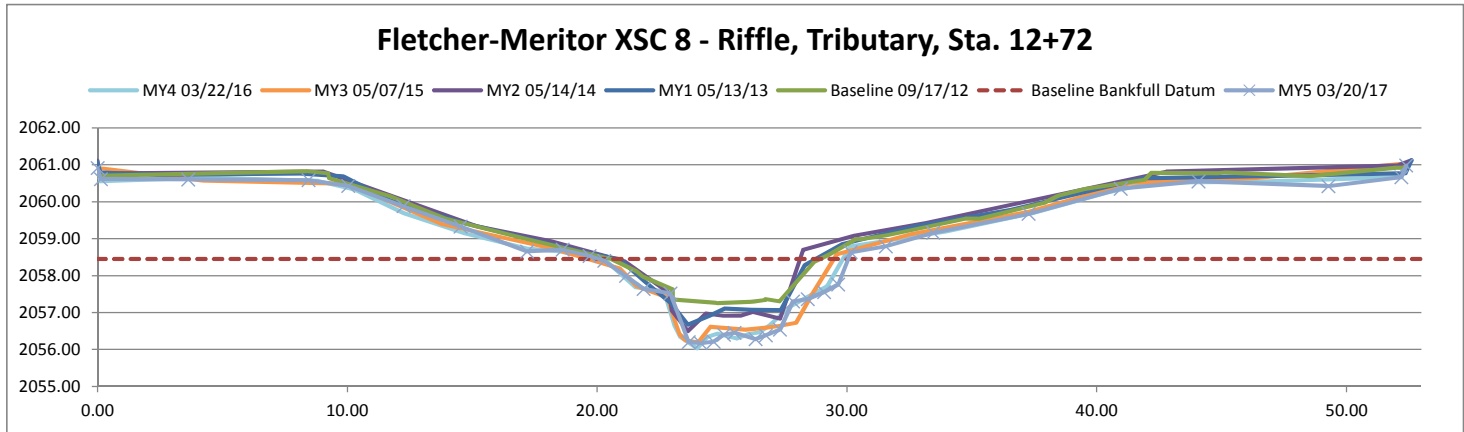
Reach	Fletcher-Meritor, Tributary
River Basin	French Broad
Cross Section ID	XSC-8, Riffle, Tributary, 12+72
Drainage Area (Sq Mi)	0.32
Date	3/20/2017
Observers	V. Miller, W. Yelverton, K. Bell

SUMMARY DATA	
Bankfull Elevation, ft	2058.45
Bankfull Cross Sectional Area, ft ²	13.23
Bankfull Width, ft	10.00
Max Depth at Bankfull, ft	2.28
Mean Depth at Bankfull, ft	1.32
Width/Depth Ratio	7.56
Flood Prone Width, ft	52.16
Flood Prone Area Elevation, ft	2060.73
Entrenchment Ratio	5.22
Bank Height Ratio	0.98



Stream Type C/E4

Sta. 12+72 Looking Downstream



Station	Elevation
0.00	2060.83
0.06	2060.44
3.30	2060.71
6.62	2060.32
9.56	2060.15
11.91	2059.60
14.76	2058.49
17.27	2058.13
20.01	2057.96
21.24	2058.00
24.98	2057.52
26.27	2057.57
26.82	2057.51
27.83	2057.14
28.94	2056.10
29.79	2054.70
30.80	2054.52
31.48	2054.47
32.00	2054.56
32.81	2054.76
33.36	2055.03
33.71	2055.48
34.22	2057.29
35.13	2057.64
36.26	2057.91
38.40	2058.19
41.22	2058.93
43.75	2059.78
45.93	2060.41
47.68	2060.57
49.57	2060.35
49.69	2060.88

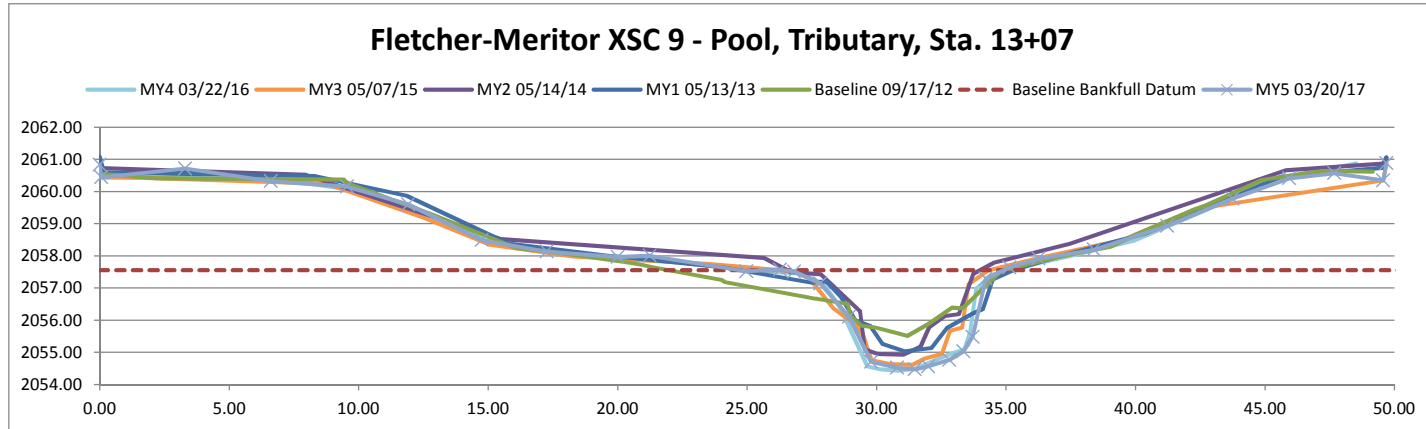
Reach	Fletcher-Meritor, Tributary
River Basin	French Broad
Cross Section ID	XSC-9, Pool, Tributary, 13+07
Drainage Area (Sq Mi)	0.32
Date	3/20/2017
Observers	V. Miller, W. Yelverton, K. Bell

SUMMARY DATA	
Bankfull Elevation, ft	2057.55
Bankfull Cross Sectional Area, ft²	15.00
Bankfull Width, ft	9.45
Max Depth at Bankfull, ft	3.08
Mean Depth at Bankfull, ft	1.59
Width/Depth Ratio	5.95
Flood Prone Width, ft	35.00
Flood Prone Area Elevation, ft	2060.63
Entrenchment Ratio	3.70
Bank Height Ratio	0.99

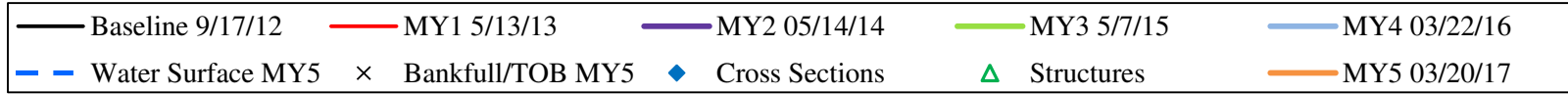
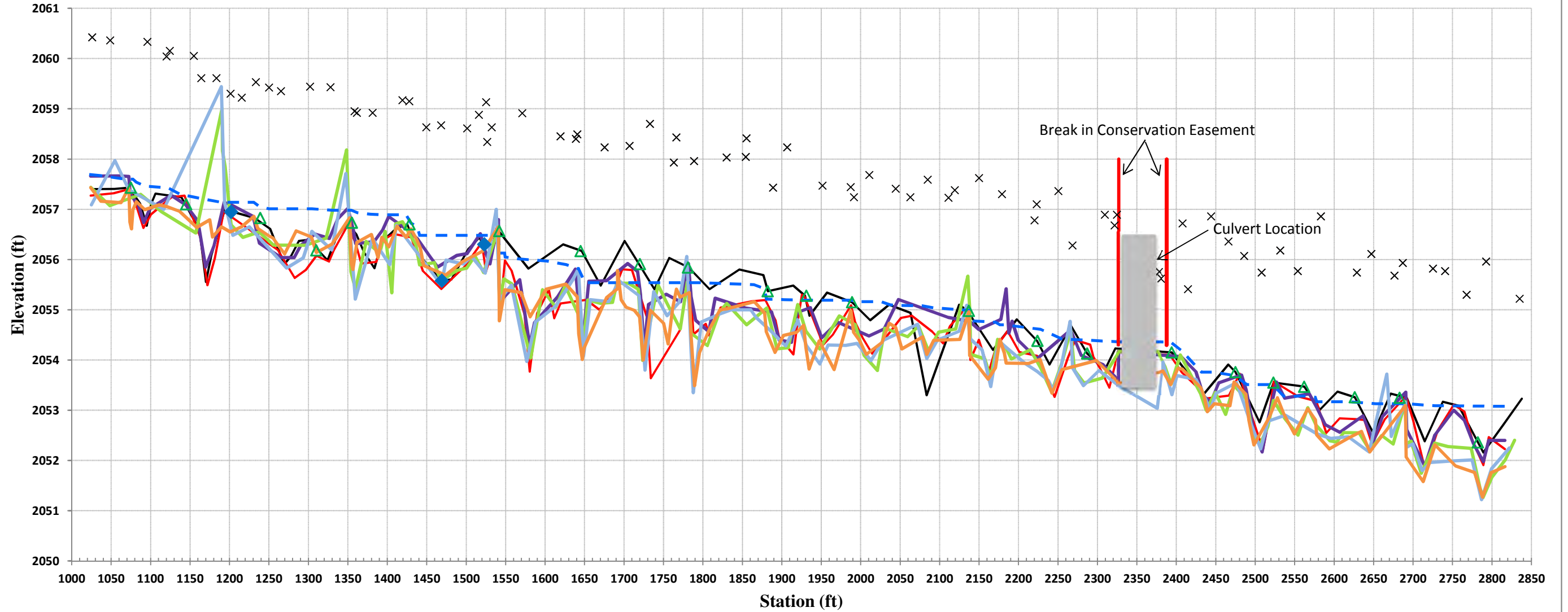


Stream Type C/E4

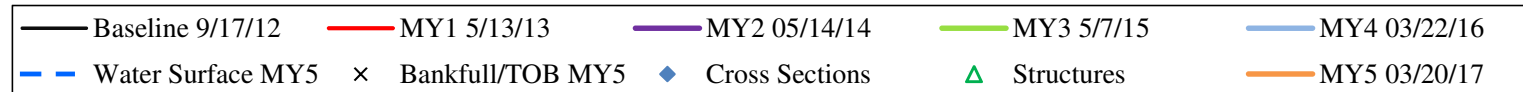
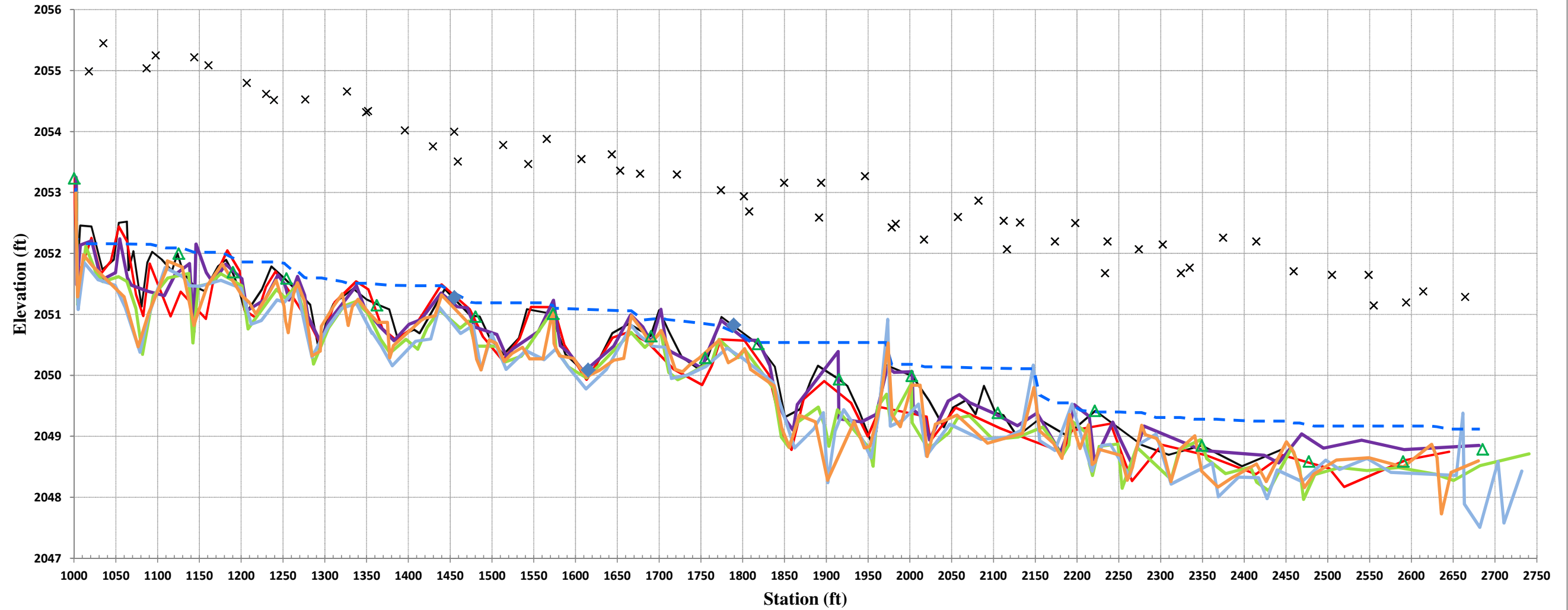
Sta. 13+07 Looking Downstream



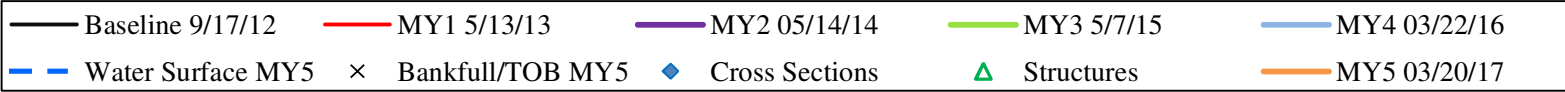
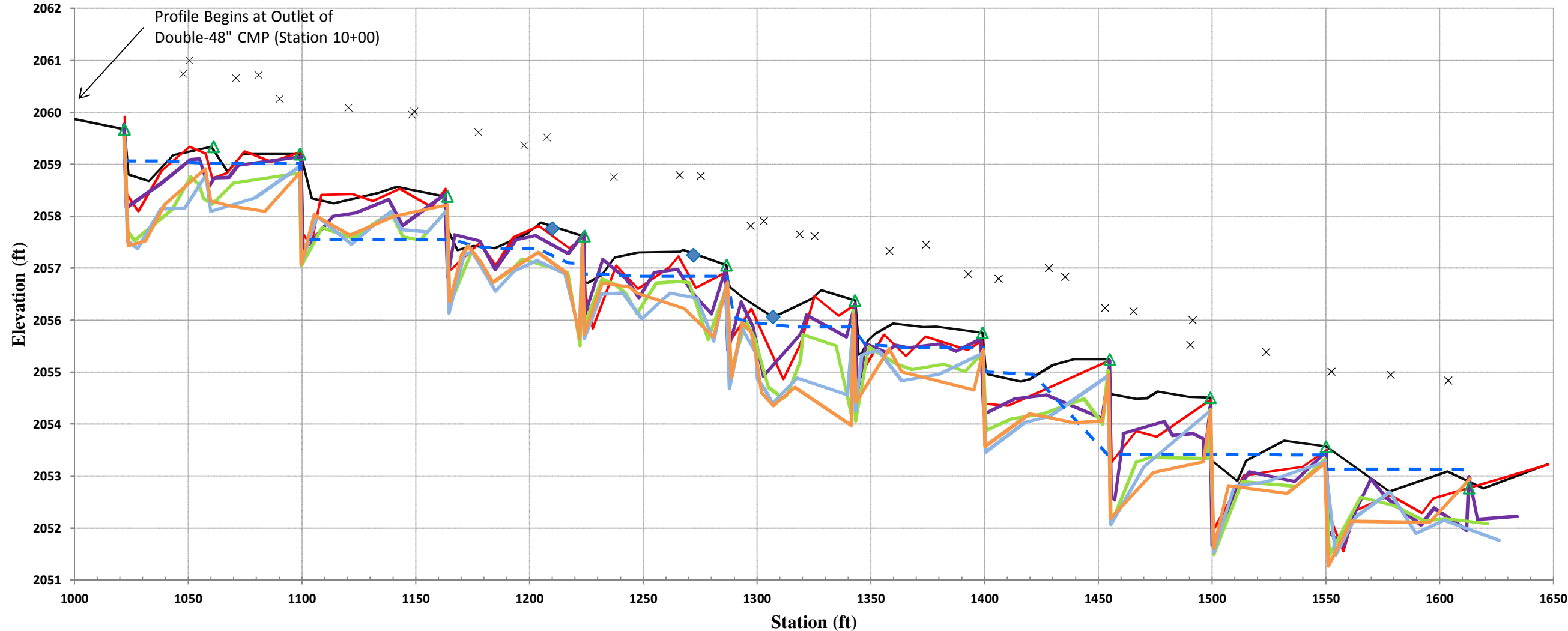
**Longitudinal Profile
Fletcher - Upper Reach
Project Number - 138
Station 10+25.00 - 28+37.86**



**Longitudinal Profile
Fletcher - Lower Reach
Project Number - 138
Station 10+00.00 - 26+45.00**



**Longitudinal Profile
Fletcher - Tributary
Project Number - 138
Station 10+00.00 - 1647.65**



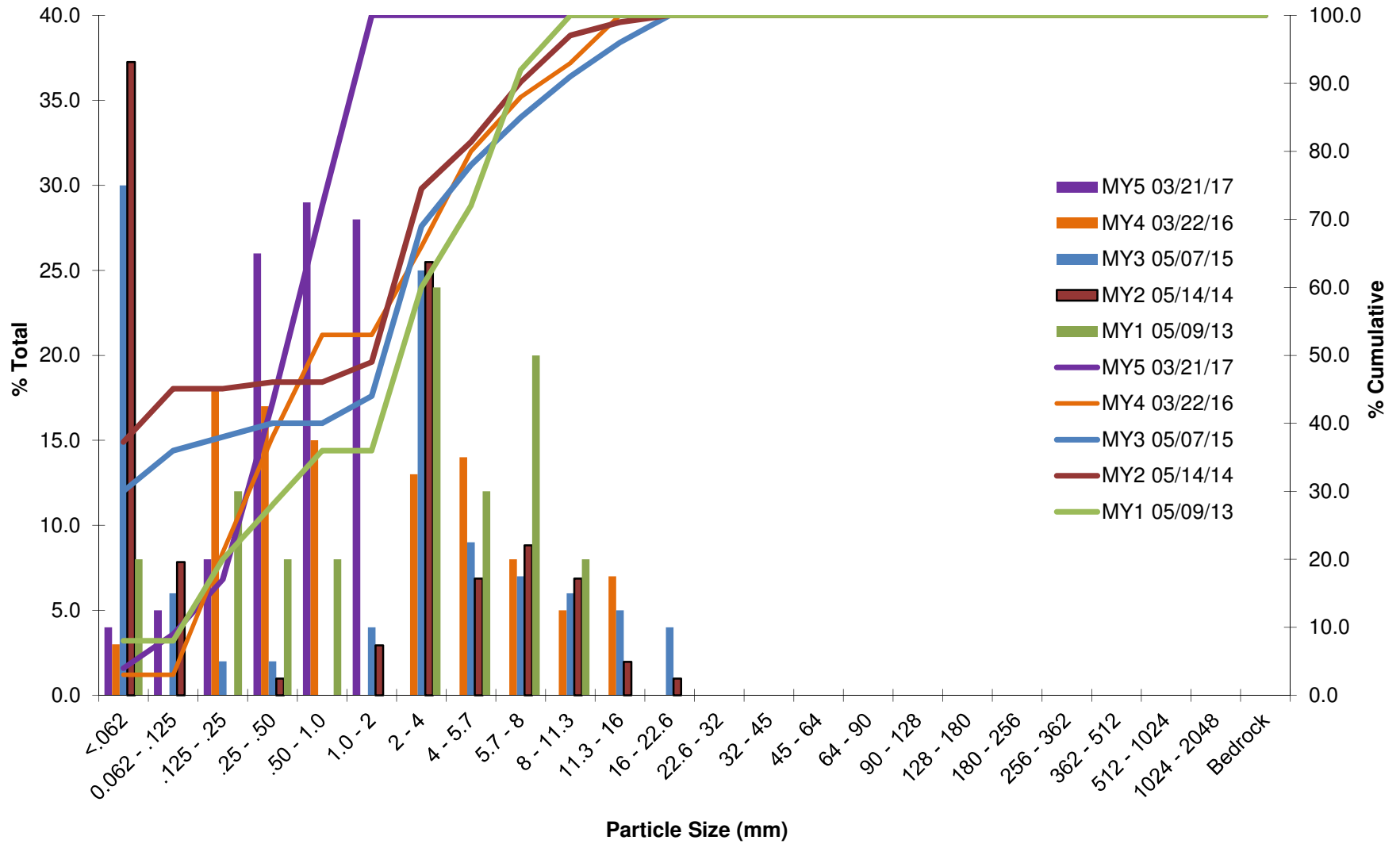
Fletcher - Upper Reach XSC-1 Riffle-Pebble Count

Location: STA 12+02

Inches	Particle	Millimeters		Count	%Total	% Cum.
	Silt/Clay	<.062	SILT/CLAY	4	4.0	4.0
	Very Fine	0.062 - .125	S A N D	5	5.0	9.0
	Fine	.125 - .25		8	8.0	17.0
	Medium	.25 - .50		26	26.0	43.0
	Coarse	.50 - 1.0		29	29.0	72.0
.04 - .08	Very Coarse	1.0 - 2		28	28.0	100.0
.08 - .16	Very Fine	2 - 4	G R A V E L	0	0.0	100.0
.16 - .22	Fine	4 - 5.7		0	0.0	100.0
.22 - .31	Fine	5.7 - 8		0	0.0	100.0
.31 - .44	Medium	8 - 11.3		0	0.0	100.0
.44 - .63	Medium	11.3 - 16		0	0.0	100.0
.63 - .89	Coarse	16 - 22.6		0	0.0	100.0
.89 - 1.26	Coarse	22.6 - 32		0	0.0	100.0
1.26 - 1.77	Very Coarse	32 - 45		0	0.0	100.0
1.77 - 2.5	Very Coarse	45 - 64		0	0.0	100.0
2.5 - 3.5	Small	64 - 90	C O B B L E	0	0.0	100.0
3.5 - 5.0	Small	90 - 128		0	0.0	100.0
5.0 - 7.1	Large	128 - 180		0	0.0	100.0
7.1 - 10.1	Large	180 - 256		0	0.0	100.0
10.1 - 14.3	Small	256 - 362	B O U L D E R	0	0.0	100.0
14.3 - 20	Small	362 - 512		0	0.0	100.0
20 - 40	Medium	512 - 1024		0	0.0	100.0
40 - 80	Large - Very Lg	1024 - 2048		0	0.0	100.0
	Bedrock	Bedrock		0	0.0	100.0
Total Counted				100		

Summary Data	MY5	MY4	MY3	MY2	MY1
D50	0.6	0.9	2.4	2.1	3
D84	1.3	6.9	7.7	6.5	7
D95	1.8	12	15	10	9

Pebble count at XSC-1-Riffle



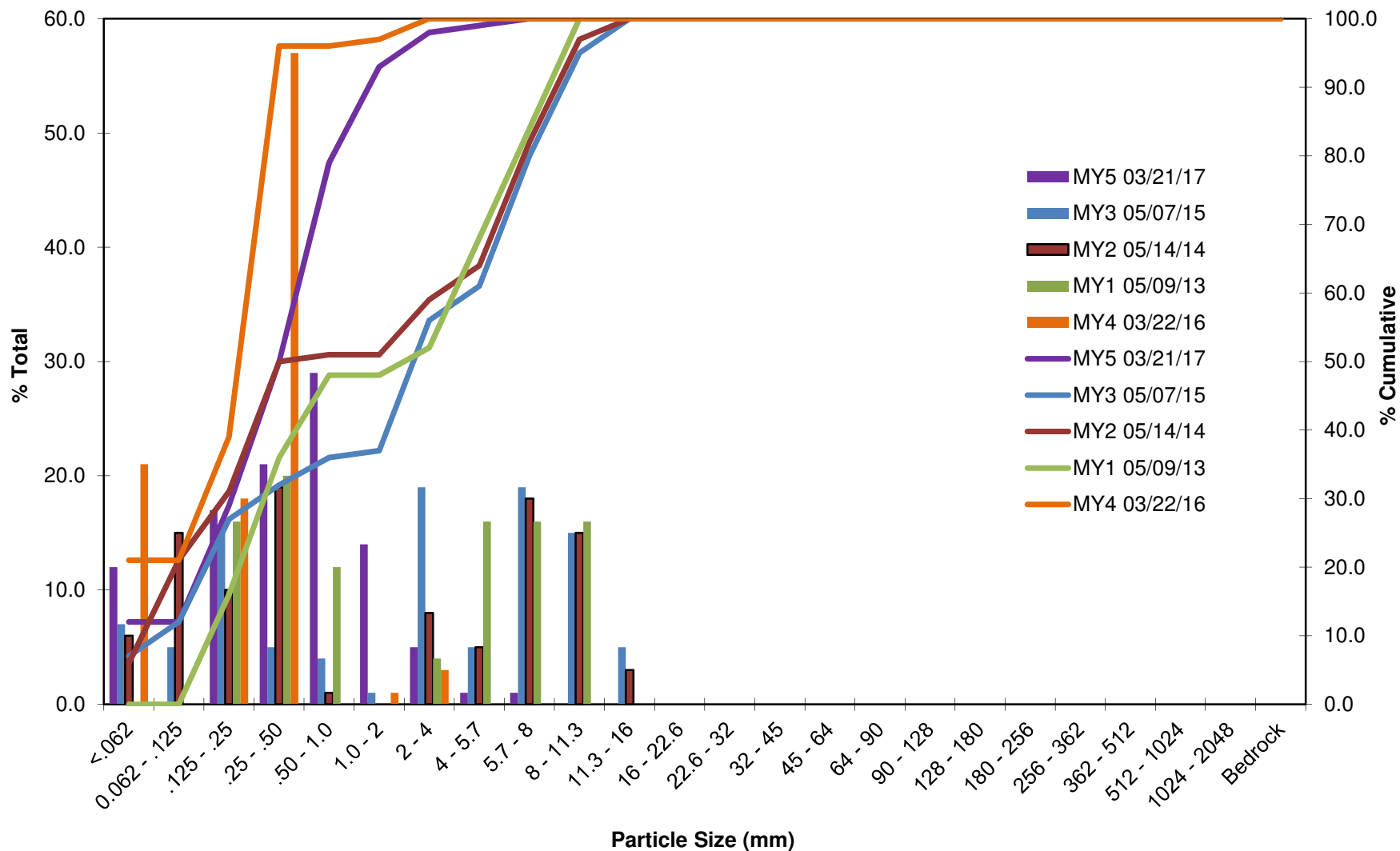
Fletcher -Upper Reach - XSC-3 Riffle Pebble Count

Location: STA 15+23

Inches	Particle	Millimeters		Count	%Total	% Cum.
	Silt/Clay	<.062	SILT/CLAY	12	12.0	12.0
	Very Fine	0.062 - .125	S A N D	0	0.0	12.0
	Fine	.125 - .25		17	17.0	29.0
	Medium	.25 - .50		21	21.0	50.0
	Coarse	.50 - 1.0		29	29.0	79.0
.04 - .08	Very Coarse	1.0 - 2		14	14.0	93.0
.08 - .16	Very Fine	2 - 4	G R A V E L	5	5.0	98.0
.16 - .22	Fine	4 - 5.7		1	1.0	99.0
.22 - .31	Fine	5.7 - 8		1	1.0	100.0
.31 - .44	Medium	8 - 11.3		0	0.0	100.0
.44 - .63	Medium	11.3 - 16		0	0.0	100.0
.63 - .89	Coarse	16 - 22.6		0	0.0	100.0
.89 - 1.26	Coarse	22.6 - 32		0	0.0	100.0
1.26 - 1.77	Very Coarse	32 - 45		0	0.0	100.0
1.77 - 2.5	Very Coarse	45 - 64		0	0.0	100.0
2.5 - 3.5	Small	64 - 90	C O B B L E	0	0.0	100.0
3.5 - 5.0	Small	90 - 128		0	0.0	100.0
5.0 - 7.1	Large	128 - 180		0	0.0	100.0
7.1 - 10.1	Large	180 - 256		0	0.0	100.0
10.1 - 14.3	Small	256 - 362	B O U L D E R	0	0.0	100.0
14.3 - 20	Small	362 - 512		0	0.0	100.0
20 - 40	Medium	512 - 1024		0	0.0	100.0
40 - 80	Large - Very Lg	1024 - 2048		0	0.0	100.0
	Bedrock	Bedrock		0	0.0	100.0
Total Counted				100		

Summary Data	MY5	MY4	MY3	MY2	MY1
D50	0.5	0.3	3.2	0.5	3
D84	1.3	0.4	8.7	8.3	8
D95	2.6	0.5	11	11	10

Pebble count at XSC-3-Riffle



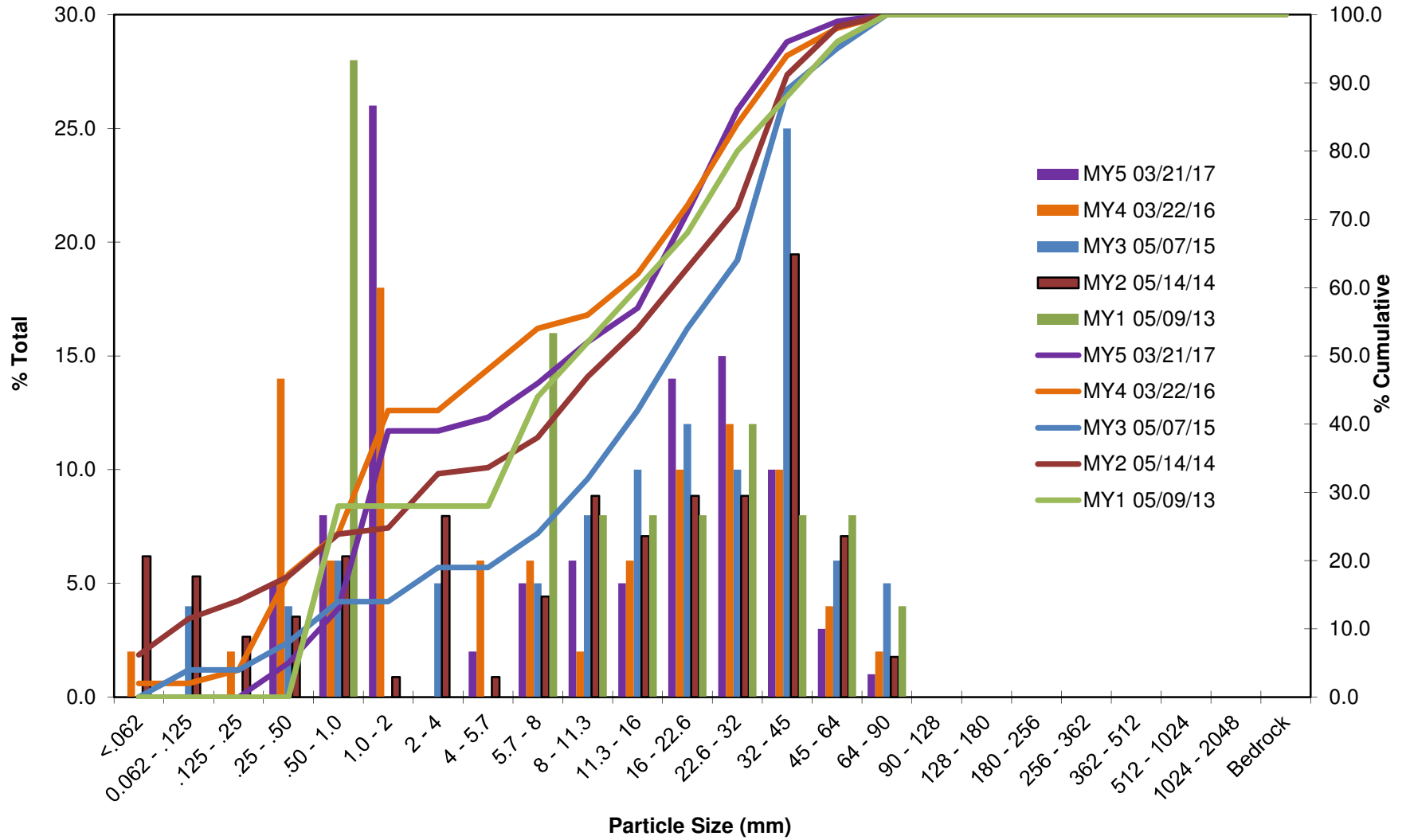
Fletcher -Lower Reach - XSC-4 Riffle Pebble Count

Location: STA 14+55

Inches	Particle	Millimeters		Count	%Total	% Cum.
	Silt/Clay	<.062	SILT/CLAY	0	0.0	0.0
	Very Fine	0.062 - .125	S A N D	0	0.0	0.0
	Fine	.125 - .25		0	0.0	0.0
	Medium	.25 - .50		5	5.0	5.0
	Coarse	.50 - 1.0		8	8.0	13.0
.04 - .08	Very Coarse	1.0 - 2		26	26.0	39.0
.08 - .16	Very Fine	2 - 4	G R A V E L	0	0.0	39.0
.16 - .22	Fine	4 - 5.7		2	2.0	41.0
.22 - .31	Fine	5.7 - 8		5	5.0	46.0
.31 - .44	Medium	8 - 11.3		6	6.0	52.0
.44 - .63	Medium	11.3 - 16		5	5.0	57.0
.63 - .89	Coarse	16 - 22.6		14	14.0	71.0
.89 - 1.26	Coarse	22.6 - 32		15	15.0	86.0
1.26 - 1.77	Very Coarse	32 - 45		10	10.0	96.0
1.77 - 2.5	Very Coarse	45 - 64		3	3.0	99.0
2.5 - 3.5	Small	64 - 90	C O B B L E	1	1.0	100.0
3.5 - 5.0	Small	90 - 128		0	0.0	100.0
5.0 - 7.1	Large	128 - 180		0	0.0	100.0
7.1 - 10.1	Large	180 - 256		0	0.0	100.0
10.1 - 14.3	Small	256 - 362	B O U L D E R	0	0.0	100.0
14.3 - 20	Small	362 - 512		0	0.0	100.0
20 - 40	Medium	512 - 1024		0	0.0	100.0
40 - 80	Large - Very Lg	1024 - 2048		0	0.0	100.0
	Bedrock	Bedrock		0	0.0	100.0
Total Counted				100		

Summary Data	MY5	MY4	MY3	MY2	MY1
D50	10	7	20	13	10
D84	30	32	42	40	38
D95	43	49	64	54	61

Pebble count at XSC-4-Riffle



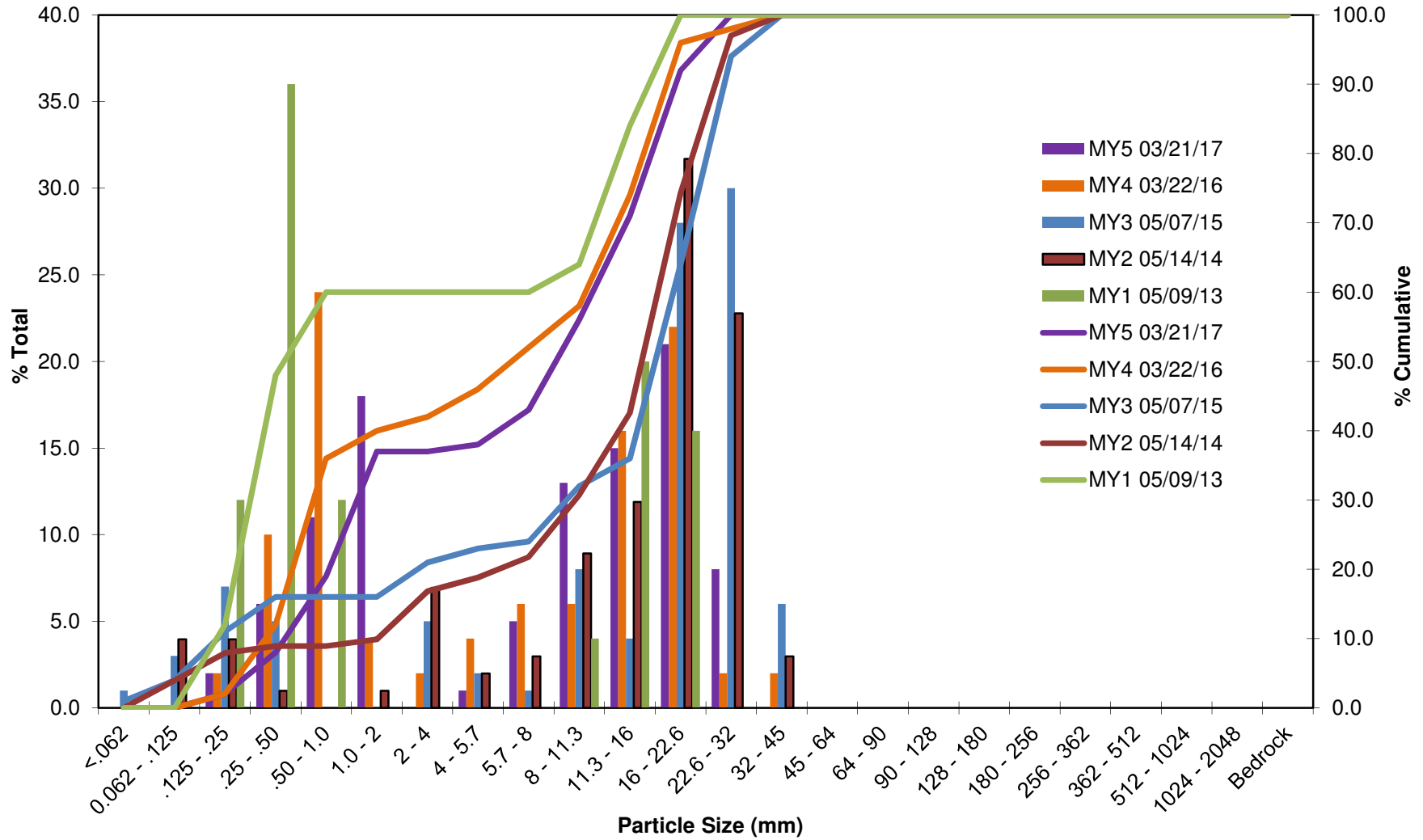
Fletcher -Lower Reach - XSC-6 Riffle Pebble Count

Location: STA 17+89

Inches	Particle	Millimeters		Count	%Total	% Cum.
	Silt/Clay	<.062	SILT/CLAY	0	0.0	0.0
	Very Fine	0.062 - .125	S A N D	0	0.0	0.0
	Fine	.125 - .25		2	2.0	2.0
	Medium	.25 - .50		6	6.0	8.0
	Coarse	.50 - 1.0		11	11.0	19.0
.04 - .08	Very Coarse	1.0 - 2		18	18.0	37.0
.08 - .16	Very Fine	2 - 4	G R A V E L	0	0.0	37.0
.16 - .22	Fine	4 - 5.7		1	1.0	38.0
.22 - .31	Fine	5.7 - 8		5	5.0	43.0
.31 .44	Medium	8 - 11.3		13	13.0	56.0
.44 - .63	Medium	11.3 - 16		15	15.0	71.0
.63 - .89	Coarse	16 - 22.6		21	21.0	92.0
.89 - 1.26	Coarse	22.6 - 32		8	8.0	100.0
1.26 - 1.77	Very Coarse	32 - 45		0	0.0	100.0
1.77 - 2.5	Very Coarse	45 - 64		0	0.0	100.0
2.5 - 3.5	Small	64 - 90	C O B B L E	0	0.0	100.0
3.5 - 5.0	Small	90 - 128		0	0.0	100.0
5.0 - 7.1	Large	128 - 180		0	0.0	100.0
7.1 - 10.1	Large	180 - 256		0	0.0	100.0
10.1 - 14.3	Small	256 - 362	B O U L D E R	0	0.0	100.0
14.3 - 20	Small	362 - 512		0	0.0	100.0
20 - 40	Medium	512 - 1024		0	0.0	100.0
40 - 80	Large - Very Lg	1024 - 2048		0	0.0	100.0
	Bedrock	Bedrock		0	0.0	100.0
Total Counted				100		

Summary Data	MY5	MY4	MY3	MY2	MY1
D50	10	7	19	17	0.6
D84	19	18	28	26	16
D95	25	22	34	31	20

Pebble count at XSC-6-Riffle



**Exhibit Table 10a. Monitoring Data - Stream Reach Data Summary
Fletcher-Meritor (UT to Cane Creek) Stream and Wetland Restoration/Proj. No. 138 - Upper Reach (1838 feet)**

Parameter	Baseline						MY-1						MY-2						MY-3						MY-4						MY-5					
	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n
Dimension and Substrate - Riffle only																																				
Bankfull Width (ft)	14.50	14.80		15.10		2	14.00	14.20		14.40		2	12.60	13.15		13.70		2	11.60	13.20		14.80		2	12.30	13.05		13.80		2	11.40	12.74		14.07		2
Floodprone Width (ft)	53.00			>86.00		2	65.20			>86.00		2	>86.00			98.40		2	>86.00			94.40		2	>86.00			96.90		2	>86.00			101.80		2
Bankfull Mean Depth (ft)	1.26	1.37		1.47		2	1.19	1.33		1.47		2	1.13	1.30		1.47		2	1.22	1.31		1.39		2	1.20	1.39		1.57		2	1.23	1.32		1.41		2
¹ Bankfull Max Depth (ft)	1.80	2.00		2.20		2	2.01	2.15		2.29		2	2.23	2.57		2.91		2	2.29	2.62		2.95		2	2.30	2.65		2.99		2	2.41	2.53		2.65		2
Bankfull Cross Sectional Area (ft ²)	19.10	20.20		21.30		2	16.70	18.95		21.20		2	14.20	17.15		20.10		2	14.20	14.50		14.80		2	14.70	18.15		21.60		2	14.00	16.95		19.90		2
Width/Depth Ratio	9.87	10.91		11.94		2	9.78	10.76		11.74		2	9.34	10.26		11.18		2	9.48	10.08		10.68		2	8.82	9.56		10.29		2	9.28	9.62		9.95		2
Entrenchment Ratio	3.50			>6.00		2	4.70			>6.00		2	>6.00			7.81		2	>6.00			8.14		2	>6.00			7.88		2	>6.00			8.93		2
¹ Bank Height Ratio	1.00	1.00		1.00		2	0.99	1.01		1.03		2	0.95	0.99		1.03		2	0.99	1.02		1.05		2	1.01	1.02		1.02		2	0.98	1.06		1.14		2
Profile																																				
Riffle Length (ft)	11.48	25.61	23.29	45.54	14.93	6	5.05	15.63	15.69	30.45	6.75	16	6.09	12.22	10.87	21.75	5.02	12	7.76	15.12	14.70	26.01	6.29	6	6.57	12.38	11.29	24.39	7.02	5	3.51	10.03	9.77	23.26	5.28	16
Riffle Slope (ft/ft)	0.0025	0.0075	0.0040	0.0203	0.7100	6	0.0014	0.0069	0.0056	0.0143	0.0039	16	0.0027	0.0126	0.0092	0.0266	0.0087	12	0.0065	0.0150	0.0145	0.0264	0.0066	6	0.0018	0.0091	0.0084	0.0220	0.0078	5	0.0029	0.0140	0.0107	0.0412	0.011	16
Pool Length (ft)	14.20	28.75	21.87	63.10	18.63	6	16.08	26.33	26.06	45.58	7.52	22	18.83	37.53	32.47	72.47	17.89	12	11.42	27.82	28.01	42.64	9.34	14	13.02	26.97	27.34	50.92	9.85	17	5.22	18.29	15.77	33.91	10.98	23
Pool Max depth (ft)	2.63	2.93	2.83	3.56	0.36	6	2.89	3.48	3.40	5.08	0.50	22	2.50	3.32	3.32	3.94	0.49	12	3.12	3.63	3.52	4.68	0.44	14	3.14	3.81	3.56	5.02	0.57	17	2.92	3.82	3.85	4.7	0.53	23
Pool Spacing (ft)	61.00	70.58	68.71	89.47	21.50	5	48.97	72.69	72.45	139.12	20.52	18	54.28	96.85	92.86	153.10	30.88	10	54.52	72.12	71.04	88.50	10.68	10	44.79	78.29	76.80	121.81	23.01	14	25.49	73.52	60.83	100.15	38.54	22
Pattern																																				
Channel Beltwidth (ft)	33.00	48.40	44.80	75.00	11.08	22																														
Radius of Curvature (ft)	30.00	37.70	40.00	40.00	4.30	22																														
Rc:Bankfull width (ft/ft)	2.03	2.55	2.70	2.70	0.29	22																														
Meander Wavelength (ft)	101.00	129.70	130.00	180.00	16.68	21																														
Meander Width Ratio	2.22	3.27	3.03	5.03	0.75	22																														
Additional Reach Parameters																																				
Rosgen Classification	C/E4						C/E4						C/E4						C/E5						C/E4						C/E5					
Channel Thalweg length (ft)	1838						1838						1838						1838						1838						1838					
Sinuosity (ft)	1.18						1.18						1.18						1.18						1.18						1.18					
Water Surface Slope (Channel) (ft/ft)	0.0025						0.0025						0.0027						0.0033						0.0034						0.0027					
BF slope (ft/ft)	0.0027						0.0025						0.0028						0.0028						0.0029						0.0026					
³ Ri% / Ru% / P% / G% / S%																																				
³ SC% / Sa% / G% / C% / B% / Be%																																				
³ d16 / d35 / d50 / d84 / d95 /																																				
² % of Reach with Eroding Banks							4						3						3						2						1					
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Exhibit Table 10b. Monitoring Data - Stream Reach Data Summary
Fletcher-Meritor (UT to Cane Creek) Stream and Wetland Restoration/Proj. No. 138 - Lower Reach (1779 feet)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-4						MY-5					
	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n
Dimension and Substrate - Riffle only																																				
Bankfull Width (ft)	17.20	18.49		19.77		2	16.10	19.35		22.60		2	15.50	15.80		16.10		2	17.70	17.75		17.80		2	17.30	18.50		19.70		2	18.65	19.16		19.67		2
Floodprone Width (ft)	97.90	117.63		137.36		2	101.50	117.20		132.80		2	98.50	115.50		132.50		2	102.00	120.15		138.30		2	102.60	120.65		138.70		2	102.70	120.60		138.50		2
Bankfull Mean Depth (ft)	1.36	1.56		1.75		2	1.21	1.41		1.61		2	1.39	1.46		1.53		2	1.40	1.44		1.48		2	1.28	1.39		1.49		2	1.25	1.29		1.32		2
¹ Bankfull Max Depth (ft)	2.20	2.34		2.47		2	2.46	2.51		2.56		2	2.39	2.43		2.47		2	2.65	2.68		2.71		2	2.70	2.70		2.70		2	2.71	2.73		2.74		2
Bankfull Cross Sectional Area (ft ²)	23.40	28.95		34.50		2	26.00	26.65		27.30		2	22.40	23.05		23.70		2	25.00	25.60		26.20		2	25.20	25.50		25.80		2	24.58	24.64		24.70		2
Width/Depth Ratio	11.32	11.99		12.65		2	9.97	14.34		18.71		2	10.14	10.86		11.57		2	11.96	12.32		12.67		2	11.60	13.50		15.40		2	14.08	14.91		15.74		2
Entrenchment Ratio	5.69	6.32		6.95		2	4.50	6.35		8.20		2	6.12	7.34		8.55		2	5.73	6.77		7.81		2	5.21	6.62		8.02		2	5.51	6.28		7.04		2
¹ Bank Height Ratio	1.00	1.00		1.00		2	1.00	1.02		1.04		2	1.04	1.05		1.05		2	0.97	0.98		0.99		2	0.94	0.98		1.01		2	0.93	0.97		1.01		2
Profile																																				
Riffle Length (ft)	7.73	23.60	24.49	43.50	11.37	10	9.66	20.98	19.59	33.68	8.34	8	7.10	13.65	12.21	30.00	6.29	14	7.98	16.62	14.15	34.20	7.57	14	8.76	16.65	16.75	25.37	6.23	9	4.35	11.85	9.09	35.44	7.67	20
Riffle Slope (ft/ft)	0.0035	0.0094	0.0094	0.0172	0.4000	10	0.0013	0.0099	0.0080	0.0309	0.0096	8	0.0036	0.0115	0.0090	0.0267	0.0070	14	0.0010	0.0087	0.0080	0.0142	0.0035	14	0.0022	0.0061	0.0060	0.0111	0.0032	9	0.0015	0.0117	0.0067	0.0699	0.0149	20
Pool Length (ft)	22.25	37.41	38.04	56.23	11.18	10	16.53	36.61	37.07	57.69	11.80	12	19.43	39.46	42.71	64.25	14.61	10	11.13	31.06	25.58	62.56	17.33	14	11.53	39.30	37.24	65.91	17.95	13	8.05	25.03	15.86	82.32	19.89	16
Pool Max depth (ft)	3.13	3.44	3.42	3.85	0.22	10	3.39	3.74	3.66	4.22	0.26	12	3.11	3.45	3.47	3.85	0.23	10	3.06	3.78	3.76	4.52	0.40	14	3.48	3.93	3.94	4.58	0.34	13	3.05	3.77	3.68	4.57	0.45	16
Pool Spacing (ft)	44.30	74.46	82.61	90.34	16.55	7	53.27	90.62	89.29	130.65	23.89	12	75.37	102.42	94.74	139.50	26.67	8	34.23	84.98	74.46	139.12	36.67	12	59.93	99.33	98.43	143.64	28.58	11	24.75	81.80	89.43	153.52	34.28	14
Pattern																																				
Channel Beltwidth (ft)	36.00	65.30	69.00	83.00	13.68	16																														
Radius of Curvature (ft)	35.00	42.20	45.00	45.00	3.64	16																														
Rc:Bankfull width (ft/ft)	1.89	2.28	2.43	2.43	0.20	16																														
Meander Wavelength (ft)	128.00	167.70	172.00	193.00	18.30	12																														
Meander Width Ratio	1.95	3.53	3.73	4.49	0.74	16																														
Additional Reach Parameters																																				
Rosgen Classification	C/E4						C/E4						C/E4						C/E5						C/E4						C/E4					
Channel Thalweg length (ft)	1779						1779						1779						1779						1779						1779					
Sinuosity (ft)	1.23						1.23						1.23						1.23						1.23						1.23					
Water Surface Slope (Channel) (ft/ft)	0.0027						0.0022						0.0021						0.0021						0.0017						0.0022					
BF slope (ft/ft)	0.0024						0.0026						0.0023						0.0025						0.0023						0.0024					
³ Ri% / Ru% / P% / G% / S%																																				
³ SC% / Sa% / G% / C% / B% / Be%																																				
³ d16 / d35 / d50 / d84 / d95 /																																				
² % of Reach with Eroding Banks							14						3						3						2						0					
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Exhibit Table 10c. Monitoring Data - Stream Reach Data Summary
Fletcher-Meritor (UT to Cane Creek) Stream and Wetland Restoration/Proj. No. 138 - Tributary (648 feet)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-4						MY-5					
	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n
Dimension and Substrate - Riffle only																																				
Bankfull Width (ft)	8.33	8.79		9.24		2	7.90	8.15		8.40		2	7.40	7.50		7.60		2	9.20	9.55		9.90		2	9.90	10.40		10.80		2	10.00	10.05		10.09		2
Floodprone Width (ft)	22.32	23.62		24.91		2	25.20	26.70		28.20		2	27.40	28.30		29.20		2	34.02	39.51		45.00		2	37.22	44.61		52.00		2	37.20	44.68		52.16		2
Bankfull Mean Depth (ft)	0.82	0.83		0.83		2	0.86	0.96		1.06		2	0.80	0.98		1.15		2	1.12	1.20		1.27		2	1.07	1.19		1.31		2	1.11	1.22		1.32		2
¹ Bankfull Max Depth (ft)	1.19	1.22		1.25		2	1.34	1.56		1.78		2	1.67	1.82		1.96		2	1.87	2.07		2.26		2	2.09	2.26		2.42		2	2.19	2.24		2.28		2
Bankfull Cross Sectional Area (ft ²)	6.80	7.22		7.63		2	7.20	7.80		8.40		2	6.10	7.30		8.50		2	10.30	11.45		12.60		2	11.60	12.30		13.00		2	11.18	12.21		13.23		2
Width/Depth Ratio	10.21	10.70		11.19		2	7.43	8.67		9.90		2	6.44	7.96		9.47		2	7.78	8.00		8.22		2	7.54	8.80		10.06		2	7.56	8.34		9.11		2
Entrenchment Ratio	2.68	2.69		2.70		2	3.00	3.30		3.60		2	3.61	3.78		3.95		2	3.70	4.13		4.55		2	3.45	4.35		5.25		2	3.69	4.46		5.22		2
¹ Bank Height Ratio	1.00	1.00		1.00		2	1.00	1.15		1.30		2	0.97	1.07		1.16		2	0.89	0.96		1.03		2	0.97	1.03		1.09		2	0.98	1.01		1.03		2
Profile																																				
Riffle Length (ft)	13.84	18.32	18.80	21.90	2.89	9	7.12	11.92	11.85	18.65	4.00	7	4.10	8.67	6.61	17.57	5.14	7	3.68	7.60	4.76	20.13	6.22	8	4.21	8.37	9.61	12.19	3.40	7	3.44	6.19	5.37	12.61	3.69	5
Riffle Slope (ft/ft)	0.0087	0.0142	0.0144	0.0220	0.5800	9	0.0043	0.0168	0.0164	0.0365	0.0110	6	0.0117	0.0223	0.0224	0.0307	0.0064	7	0.0048	0.0226	0.0168	0.0612	0.0199	8	0.0029	0.0101	0.0042	0.0304	0.0102	7	0.0023	0.0110	0.1090	0.0255	0.0090	5
Pool Length (ft)	13.03	22.26	17.58	36.76	9.30	10	11.93	19.42	18.89	30.90	5.52	11	11.47	15.70	13.06	27.45	5.25	9	10.90	15.36	13.72	25.08	4.70	8	6.64	15.50	15.12	28.12	6.71	10	5.15	10.33	8.40	19.62	5.23	10
Pool Max depth (ft)	1.45	1.89	1.93	2.40	0.32	10	2.38	2.88	2.90	3.39	0.39	8	2.31	2.81	2.72	3.44	0.37	9	2.69	3.28	3.24	4.22	0.54	9	2.72	3.49	3.43	4.12	0.51	10	2.70	3.33	3.24	4.39	0.48	10
Pool Spacing (ft)	36.53	52.91	56.00	60.11	9.09	9	27.34	55.55	57.06	78.07	15.28	10	35.86	54.00	53.54	77.56	12.96	8	31.53	51.44	52.94	63.56	12.03	6	28.46	53.88	53.95	76.54	15.15	7	19.01	58.61	50.28	100.65	28.91	9
Pattern																																				
Channel Beltwidth (ft)	26.00	39.20	38.00	55.00	8.33	10																														
Radius of Curvature (ft)	25.00	25.00	25.00	25.00	0.00	12																														
Rc:Bankfull width (ft/ft)	2.84	2.84	2.84	2.84	0.00	12																														
Meander Wavelength (ft)	77.00	92.90	96.00	102.00	8.63	10																														
Meander Width Ratio	2.96	4.46	4.32	6.26	0.95	10																														
Additional Reach Parameters																																				
Rosgen Classification	C/E4						C/E4						C/E4						C/E4						C/E4											
Channel Thalweg length (ft)	648						648						648						648						648											
Sinuosity (ft)	1.22						1.22						1.22						1.22						1.22											
Water Surface Slope (Channel) (ft/ft)	0.0114						0.0118						0.0119						0.0112						0.0112											
BF slope (ft/ft)	0.0118						0.0120						0.0116						0.0116						0.0112											
³ Ri% / Ru% / P% / G% / S%																																				
³ SC% / Sa% / G% / C% / B% / Be%																																				
³ d16 / d35 / d50 / d84 / d95 /																																				
² % of Reach with Eroding Banks							3						19						19						18											
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Fletcher-Meritor (UT to Cane Creek) Stream and Wetland Restoration/Proj. No. 138 - Upper Reach (1838 ft), Lower Reach (1779 ft), Tributary (648 ft)

	Cross Section 1 (Upper, Riffle)							Cross Section 2 (Upper, Pool)							Cross Section 3 (Upper, Riffle)							Cross Section 4 (Lower, Riffle)							Cross Section 5 (Lower, Pool)						
Based on fixed baseline bankfull elevation ¹	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	2058.90	2058.90	2058.90	2058.90	2058.90	2058.90		2058.61	2058.61	2058.61	2058.61	2058.61	2058.61		2058.74	2058.74	2058.74	2058.74	2058.74	2058.74		2053.74	2053.74	2053.74	2053.74	2053.74	2053.74		2053.32	2053.32	2053.32	2053.32	2053.32	2053.32	
Bankfull Width (ft)	15.10	14.00	12.60	11.60	12.30	11.40		21.90	21.90	21.40	19.50	18.80	19.00		14.50	14.40	13.70	14.80	13.80	14.07		19.77	16.10	15.50	17.70	17.30	19.67		26.16	25.70	23.60	27.10	27.20	25.66	
Floodprone Width (ft)	53.00	65.20	98.40	94.40	96.90	101.80		>86.00	>86.00	>86.00	>86.00	>86.00	>86.00		>86.00	>86.00	>86.00	>86.00	>86.00	>86.00		137.36	132.80	132.50	138.30	138.70	138.50		83.70	84.30	83.00	84.90	85.60	85.20	
Bankfull Mean Depth (ft)	1.26	1.19	1.13	1.22	1.20	1.23		1.25	1.18	1.17	1.08	1.05	0.97		1.47	1.47	1.47	1.39	1.57	1.41		1.75	1.61	1.53	1.48	1.49	1.25		1.45	1.38	1.23	1.25	1.24	1.25	
Bankfull Max Depth (ft)	1.80	2.01	2.23	2.29	2.30	2.41		3.10	3.07	3.03	3.08	3.25	2.96		2.20	2.29	2.91	2.95	2.99	2.65		2.47	2.46	2.47	2.71	2.70	2.71		3.31	3.22	3.19	3.34	3.37	3.35	
Bankfull Cross Sectional Area (ft ²)	19.10	16.70	14.20	14.20	14.70	14.00		27.40	25.80	25.10	21.00	19.70	18.40		21.30	21.20	20.10	20.50	21.60	19.90		34.50	26.00	23.70	26.20	25.80	24.58		37.88	35.50	29.00	33.80	33.80	31.98	
Bankfull Width/Depth Ratio	11.94	11.74	11.18	9.48	10.29	9.28		17.50	18.59	18.25	18.11	17.94	19.62		9.87	9.78	9.34	10.68	8.82	9.95		11.32	9.97	10.14	11.96	11.60	15.74		18.07	18.61	19.21	21.73	21.89	20.59	
Bankfull Entrenchment Ratio	3.50	4.70	7.81	8.14	7.88	8.93		>4.00	>4.00	>4.00	>4.00	>4.00	>4.00		>6.00	>6.00	>6.00	>6.00	>6.00	>6.00		6.95	8.20	8.55	7.81	8.02	7.04		3.20	3.30	3.52	3.13	3.15	3.32	
Bankfull Bank Height Ratio	1.00	0.99	0.95	0.99	1.02	1.13		1.00	1.15	0.94	1.06	0.90	0.93		1.00	1.03	1.03	1.05	1.01	1.00		1.00	1.04	1.05	0.99	1.01	0.93		1.00	1.00	1.08	0.98	1.01	1.00	
Based on current/developing bankfull feature²																																			
Record elevation (datum) used																																			
Bankfull Width (ft)																																			
Floodprone Width (ft)																																			
Bankfull Mean Depth (ft)																																			
Bankfull Max Depth (ft)																																			
Bankfull Cross Sectional Area (ft ²)																																			
Bankfull Width/Depth Ratio																																			
Bankfull Entrenchment Ratio																																			
Bankfull Bank Height Ratio																																			
Cross Sectional Area between end pins (ft ²)																																			
d50 (mm)																																			
	Cross Section 6 (Lower, Riffle)							Cross Section 7 (Tributary, Riffle)							Cross Section 8 (Tributary, Riffle)							Cross Section 9 (Tributary, Pool)													
Based on fixed baseline bankfull elevation ¹	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	2053.03	2053.03	2053.03	2053.03	2053.03	2053.03		2059.00	2059.00	2059.00	2059.00	2059.00	2059.00		2058.45	2058.45	2058.45	2058.45	2058.45	2058.45		2057.55	2057.55	2057.55	2057.55	2057.55	2057.55								
Bankfull Width (ft)	17.20	22.60	16.10	17.80	19.70	18.65		9.24	8.40	7.60	9.20	10.80	10.09		8.33	7.90	7.40	9.90	9.90	10.00		12.81	10.50	7.40	8.10	10.10	9.45								
Floodprone Width (ft)	97.90	101.50	98.50	102.00	102.60	102.70		24.91	25.20	27.40	34.02	37.22	>46.05		22.32	28.20	29.20	45.00	52.00	52.16		25.89	31.00	32.60	34.70	35.30	35.00								
Bankfull Mean Depth (ft)	1.36	1.21	1.39	1.40	1.28	1.32		0.83	0.86	0.80	1.12	1.07	1.11		0.82	1.06	1.15	1.27	1.31	1.32		0.93	1.13	1.32	1.60	1.49	1.59								
Bankfull Max Depth (ft)	2.20	2.56	2.39	2.65	2.70	2.74		1.25	1.34	1.67	1.87	2.09	2.19		1.19	1.78	1.96	2.26	2.42	2.28		2.04	2.51	2.62	2.94	3.12	3.08								
Bankfull Cross Sectional Area (ft ²)	23.40	27.30	22.40	25.00	25.20	24.70		7.63	7.20	6.10	10.30	11.60	11.18		6.80	8.40	8.50	12.60	13.00	13.23		11.96	11.90	9.80	13.00	15.00	15.00								
Bankfull Width/Depth Ratio	12.65	18.71	11.57	12.67	15.40	14.08		11.19	9.90	9.47	8.22	10.06	9.11		12.21	7.43	6.44	7.78	7.54	7.56		13.71	9.26	5.59	5.05	6.80	5.95								
Bankfull Entrenchment Ratio	5.69	4.50	6.12	5.73	5.21	5.51		2.70	3.00	3.61	3.70	3.45	>4.56		2.68	3.60	3.95	4.55	5.25	5.22		2.02	2.90	4.41	4.28	3.50	3.70								
Bankfull Bank Height Ratio	1.00	1.00	1.04	0.97	0.94	0.98		1.00	1.30	1.16	1.03	1.09	1.12		1.00	1.00	0.97	0.89	0.97	0.98		1.00	0.89	0.95	0.98	0.96	0.99								
Based on current/developing bankfull feature²																																			
Record elevation (datum) used																																			
Bankfull Width (ft)																																			
Floodprone Width (ft)																																			
Bankfull Mean Depth (ft)																																			
Bankfull Max Depth (ft)																																			
Bankfull Cross Sectional Area (ft ²)																																			
Bankfull Width/Depth Ratio																																			
Bankfull Entrenchment Ratio																																			
Bankfull Bank Height Ratio																																			
Cross Sectional Area between end pins (ft ²)																																			
d50 (mm)																																			

1 = Widths and depths for monitoring resurvey will be based on the baseline bankfull datum regardless of dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannot acquire the datum used for prior years this must be discussed with EEP. If this cannot be resolved in time for a given years report submission a footnote in this should be included that states: "It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in a future submission based on a consistent datum if determined to be necessary."

2 = Based on the elevation of any dominant depositional feature that develops and is observed at the time of survey. If the baseline datum remains the only significant depositional feature then these two sets of dimensional parameters will be equal, however, if another depositional feature of significance develops above or below the baseline bankfull datum then this should be tracked and quantified in these cells.

Appendix E

Table 12. Verification of Bankfull Events			
Fletcher Meritor Site (UT to Cane Creek)/ 138 Segment/Reach: feet			
Date of Data Collection	Date of Occurrence	Method	Photo
9/18/2012	9/18/2012	Visual observation of bankfull event during monitoring	
5/7/2013	5/6/2013 - 5/7/2013	Visual observation of bankfull event during monitoring	
5/7/2013	Unknown	Stream gauges	
5/13/2014	Unknown	Stream gauges (3 events on the tributary reach and 2 on the main reach)	See below
5/7/2015	Unknown	Stream gauges and observation of bankfull event debris	See below
3/22/2016	Unknown	Stream gauges and observation of bankfull event debris	See below
5/10/2017	Unknown	Stream gauges and observation of bankfull event debris	See below





Table 13. Wetland Gauge Attainment Data

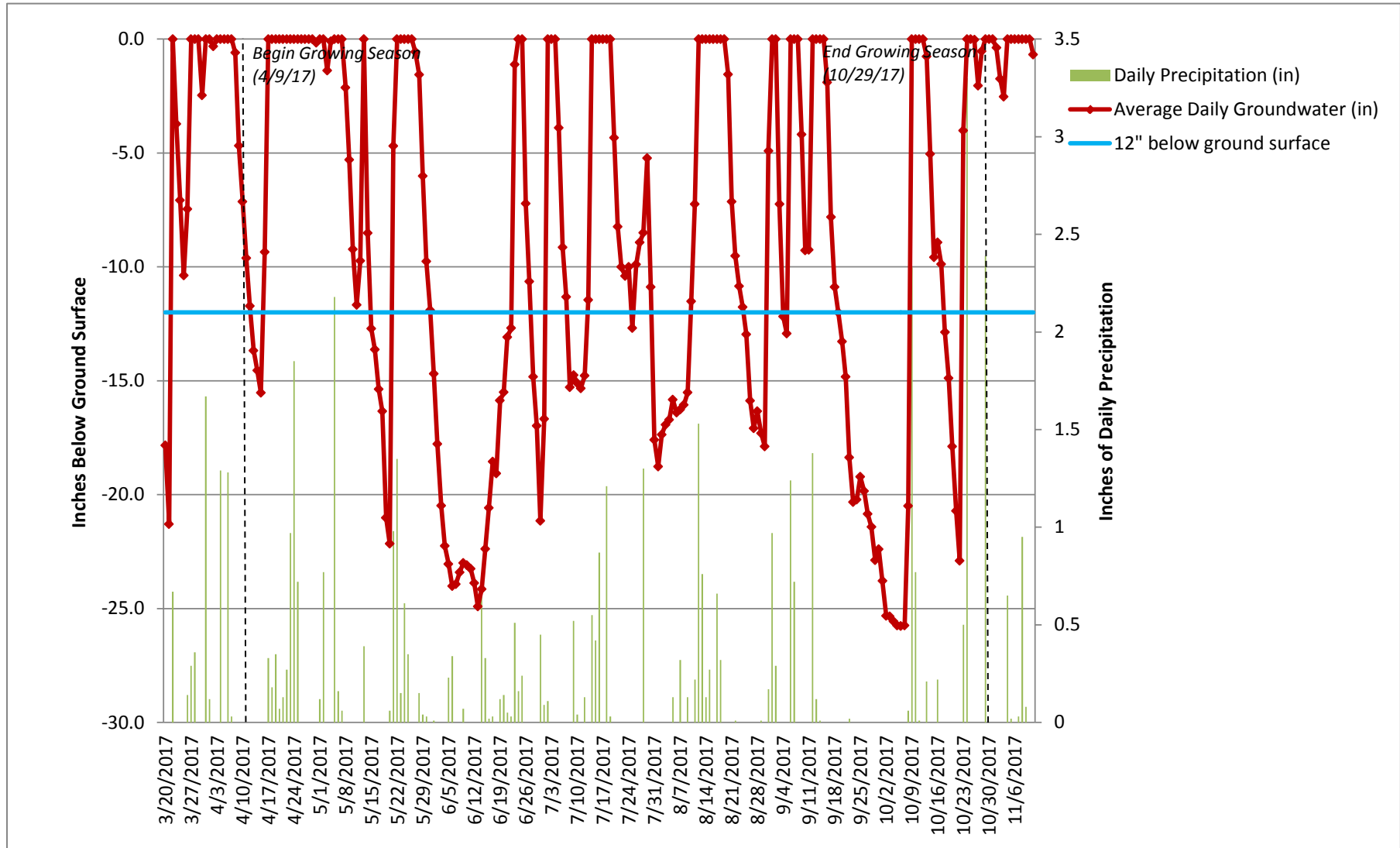
Gauge	Summary of Groundwater Gauge Results for Years 1 to 5				
	Success Criteria Achieved / Max Consecutive Days During Growing Season				
	(Percentage)				
	Year 1 (2013)	Year 2 (2014)	Year 3 (2015)	Year 4 (2016)	Year 5 (2017)
1	-	No / 9 4%	Yes / 14 7%	No / 6 3%	Yes / 29 14%
2	-	Yes / 18 9%	Yes / 17 8%	No / 1 1%	No / 8 4%
3	-	No / 4 2%	No / 7 3%	No / 3 2%	Yes / 11 5%
4	-	-	Yes / 10 5%	No / 6 3%	Yes / 23 11%
5	Yes / 19 9%	No / 3 2%	No / 8 4%	No / 4 2%	Yes / 10 5%
6	-	Yes / 26 13%	Yes / 22 11%	Yes / 10 5%	Yes / 36 18%
7	-	Yes / 26 13%	Yes / 76 37%	Yes / 13 6%	Yes / 38 19%
8	Yes / 63 31%	Yes / 19 9%	Yes / 31 15%	Yes / 14 7%	Yes / 55 27%
9	-	Yes / 18 9%	Yes / 22 11%	Yes / 11 5%	Yes / 41 20%
10	Yes / 17 8%	Yes / 29 14%	Yes / 34 17%	Yes / 17 8%	Yes / 116 57%
11	-	No / 6 3%	Yes / 13 6%	No / 5 2%	Yes / 22 11%
12	-	Yes / 26 13%	Yes / 23 11%	No / 9 4%	Yes / 29 14%
13	-	Yes / 17 8%	Yes / 25 12%	Yes / 10 5%	Yes / 30 15%
14	-	Yes / 18 9%	Yes / 25 12%	No / 8 4%	Yes / 25 12%
15	-	Yes / 17 8%	Yes / 27 13%	No / 9 4%	Yes / 25 12%
16	-	Yes / 20 10%	Yes / 34 17%	Yes / 28 14%	Yes / 176 86%
17	-	-	-	-	-
18	Yes / 24 12%	Yes / 28 14%	Yes / 34 17%	Yes / 14 7%	Yes / 62 30%
19	-	Yes / 16 8%	Yes / 22 11%	No / 7 3%	Yes / 37 18%
20	Yes / 25 12%	Yes / 33 16%	Yes / 36 18%	Yes / 18 9%	Yes / 64 31%

Gauge	Summary of Groundwater Gauge Results for Years 1 to 5				
	Success Criteria Achieved / Max Consecutive Days During Growing Season				
	(Percentage)				
	Year 1 (2013)	Year 2 (2014)	Year 3 (2015)	Year 4 (2016)	Year 5 (2017)
21	Yes / 40 20%	Yes / 12 6%	Yes / 20 10%	No / 7 3%	Yes / 24 12%
22	-	No / 4 2%	No / 3 2%	No / 4 2%	No / 5 2%
23	-	-	Yes / 10 5%	No / 7 3%	Yes / 24 12%
24	-	Yes / 26 13%	Yes / 20 10%	No / 8 4%	-
25	-	Yes / 13 6%	No / 9 4%	No / 5 2%	Yes / 13 6%
26	-	Yes / 28 14%	Yes / 10 5%	No / 4 2%	-
27	-	Yes / 29 14%	Yes / 23 11%	Yes / 11 5%	Yes / 31 15%
28	-	-	No / 8 4%	No / 4 2%	Yes / 13 6%
29	Yes / 19 9%	No / 5 2%	-	-	-
30	-	Yes / 26 13%	Yes / 23 11%	No / 6 3%	Yes / 30 15%
31	-	-	Yes / 10 5%	Yes / 69 34%	Yes / 28 14%
32	-	Yes / 16 8%	Yes / 22 10%	No / 6 3%	Yes / 23 11%
33	-	Yes / 18 9%	Yes / 21 10%	No / 7 3%	Yes / 24 12%
34	Yes / 16 8%	Yes / 15 7%	Yes / 21 10%	No / 8 4%	Yes / 94 46%
35	-	Yes / 38 19%	Yes / 29 14%	Yes / 10 5%	Yes / 32 16%

A blank cell indicates that there was not enough data to determine if the well was meeting the hydrology criteria for that year.

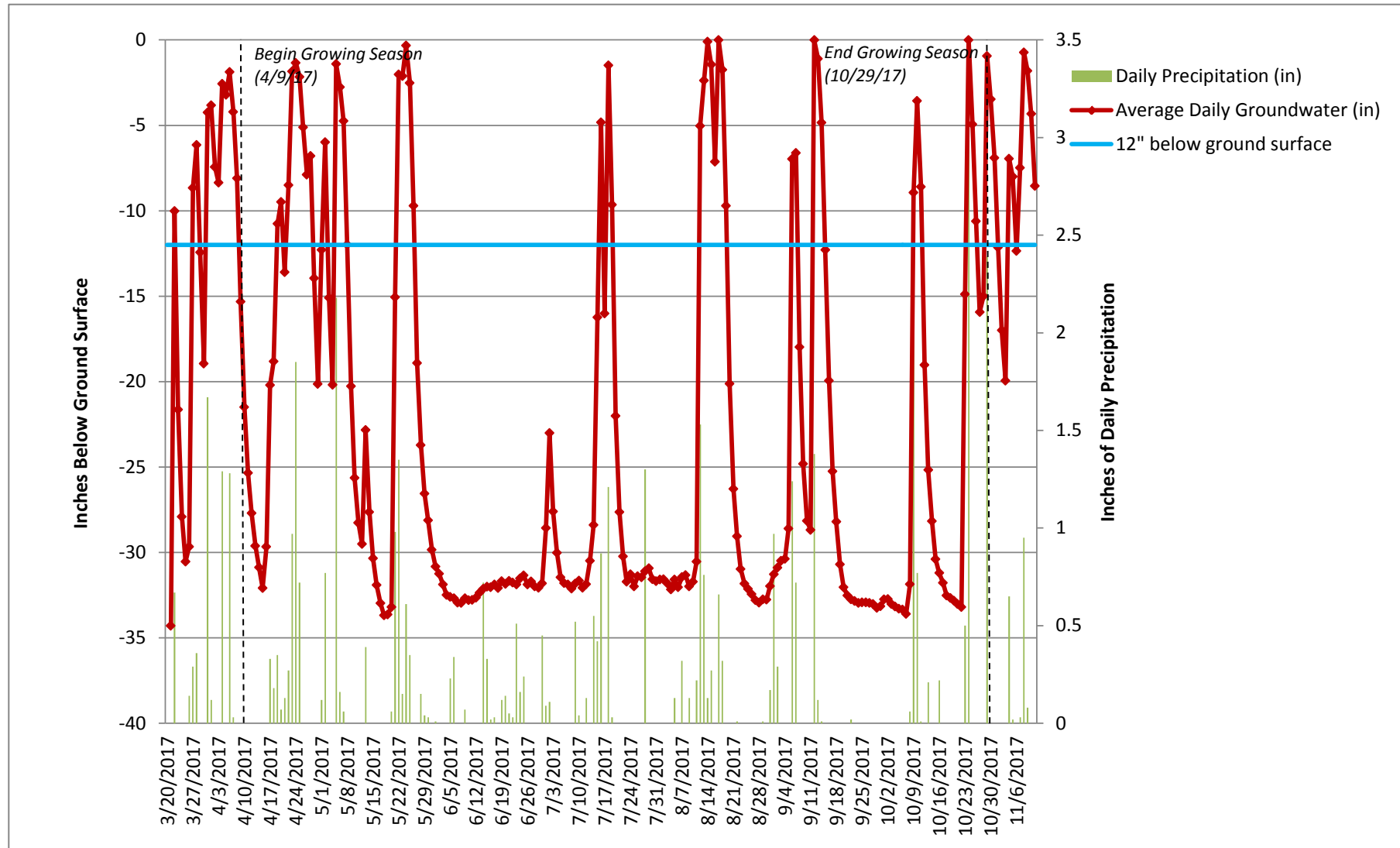
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 13D4CA2A
 Gauge ID: 1



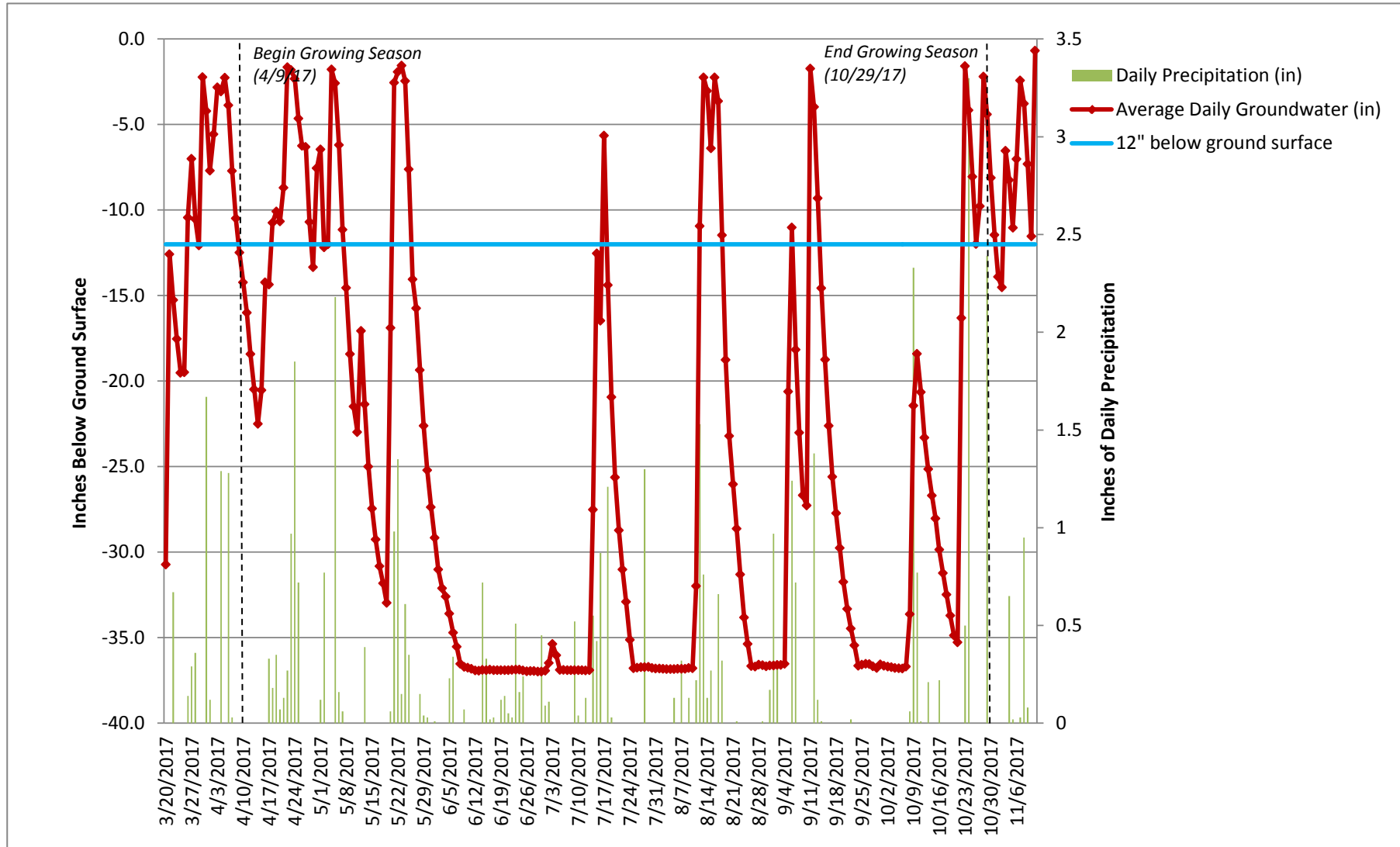
Project: Fletcher-Meritor
EEP Project ID: 138
Wetland Component: Project Riparian Wetlands
Growing Season: April 9-October 29
Units: Inches
Gauge Type: Groundwater

Gauge ID : 11311987
2



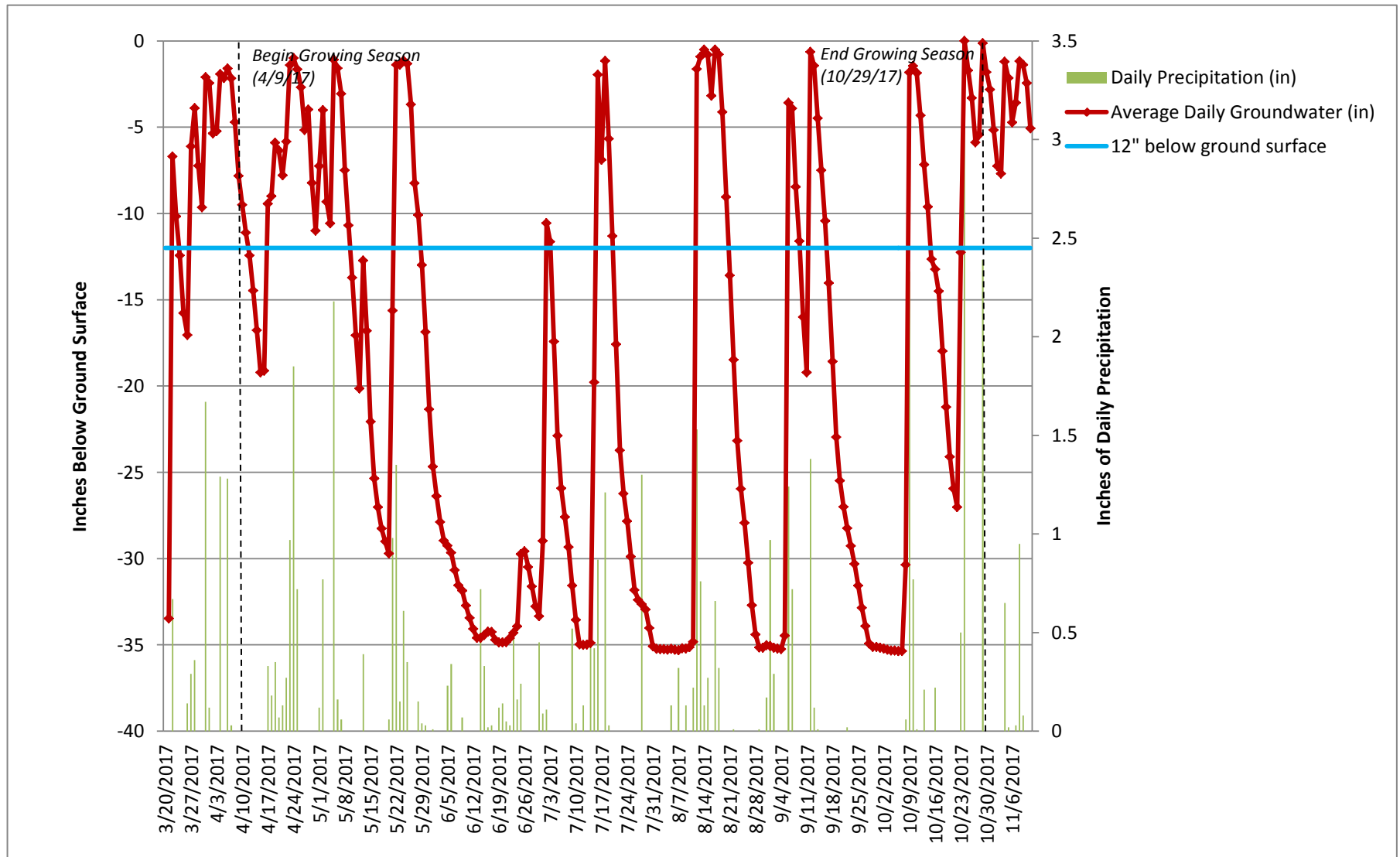
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 1130DD07
 Gauge ID: 3



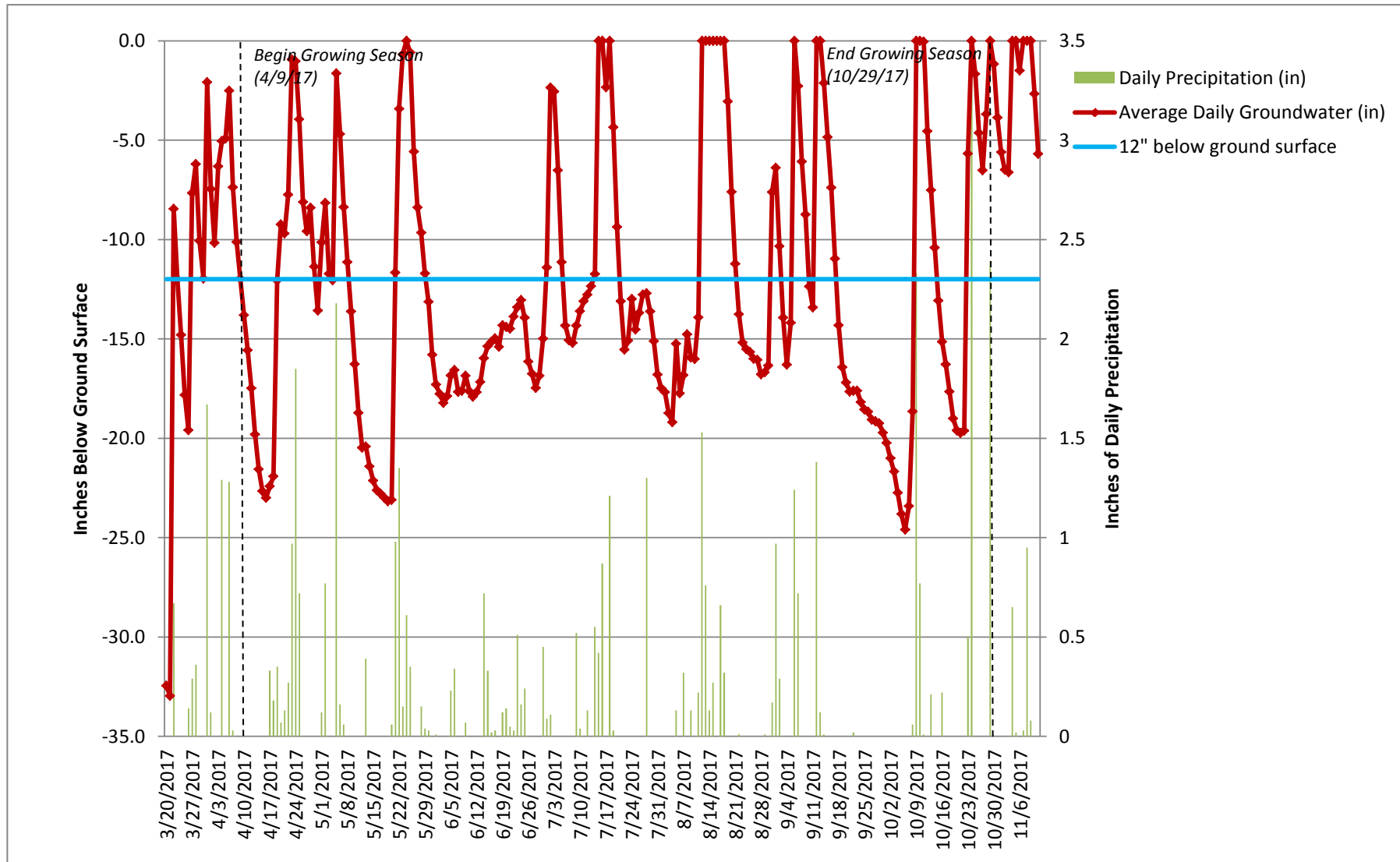
Project: Fletcher-Meritor
EEP Project ID: 138
Wetland Component: Project Riparian Wetlands
Growing Season: April 9-October 29
Units: Inches
Gauge Type: Groundwater

Serial #: 14E17875
Gauge ID: 4



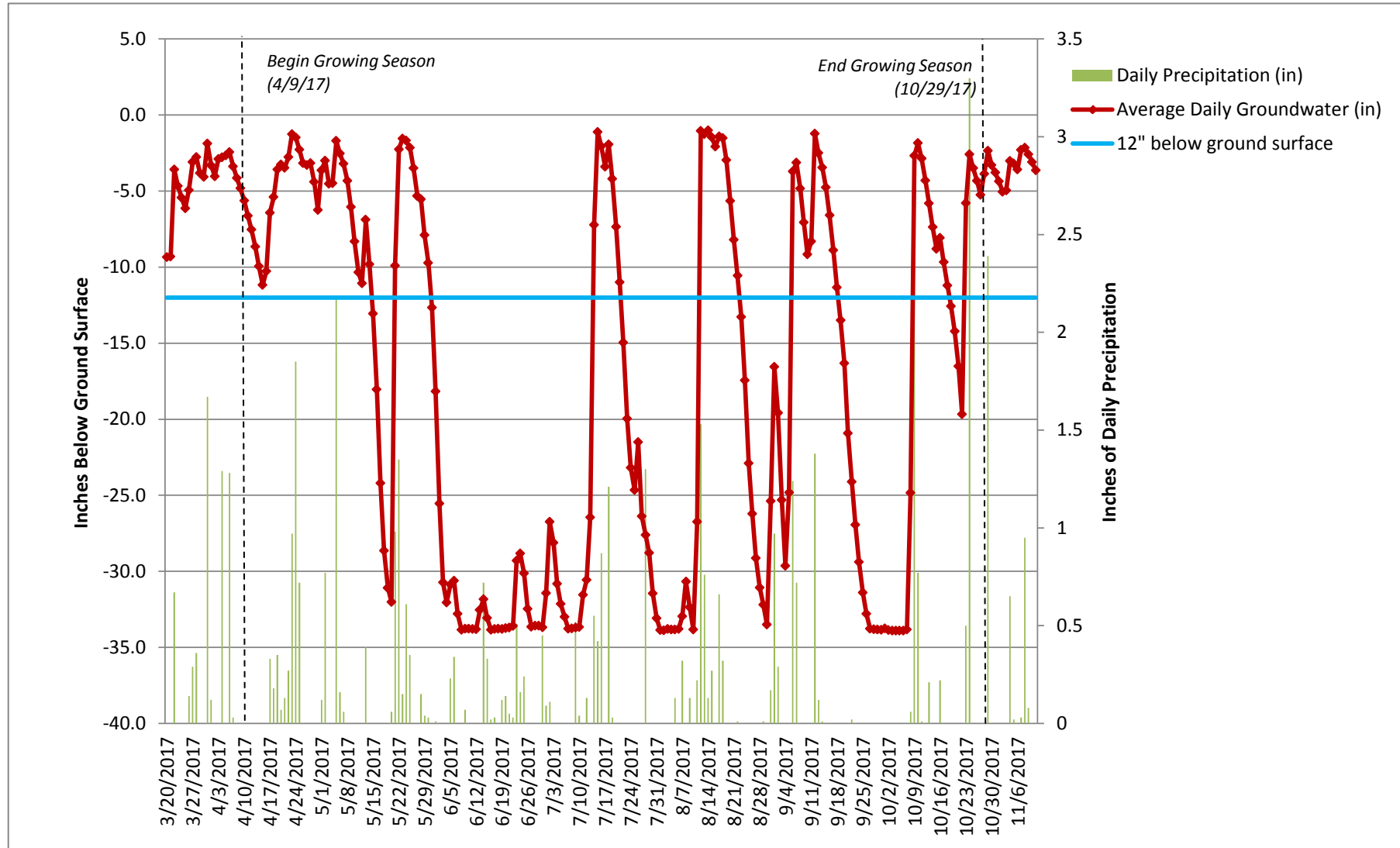
Project: Fletcher-Meritor
EEP Project ID: 138
Wetland Component: Project Riparian Wetlands
Growing Season: April 9-October 29
Units: Inches
Gauge Type: Groundwater

Serial #: 138BE816
Gauge ID: 5



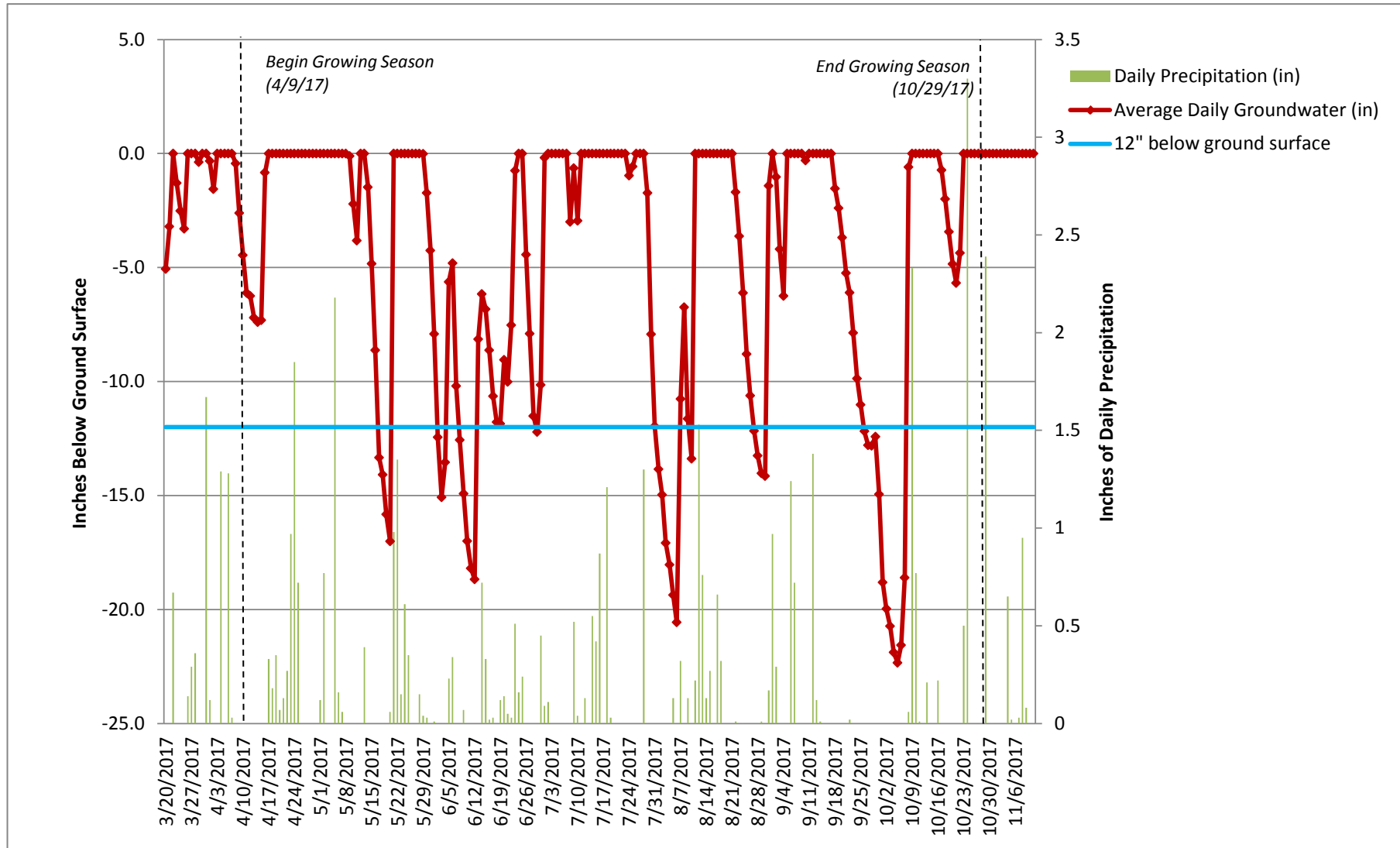
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 11313B57
 Gauge ID: 6



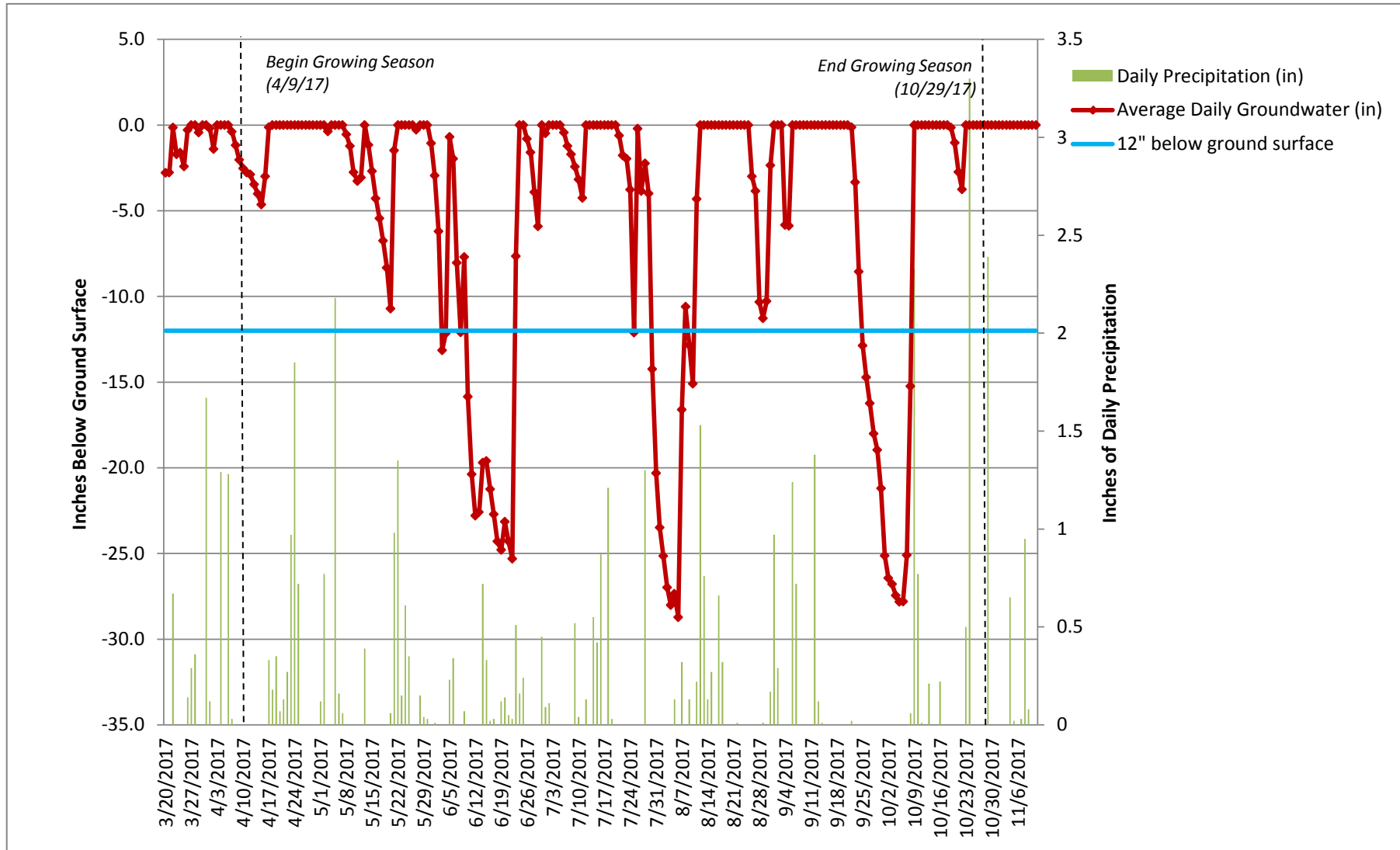
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 9BEA475
 Gauge ID: 7



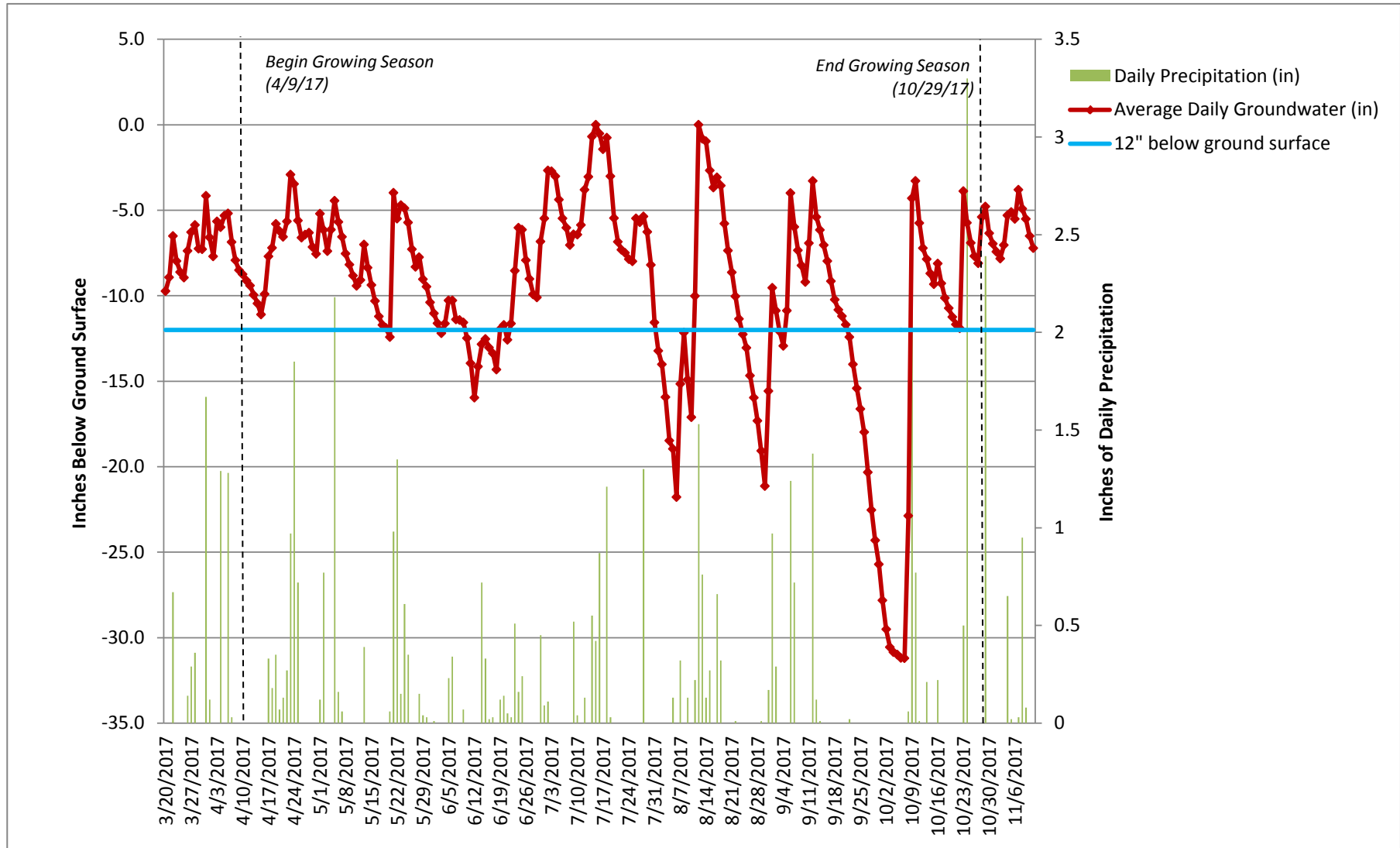
Project: Fletcher-Meritor
EEP Project ID: 138
Wetland Component: Project Riparian Wetlands
Growing Season: April 9-October 29
Units: Inches
Gauge Type: Groundwater

Serial #: 9BEBF83
Gauge ID: 8



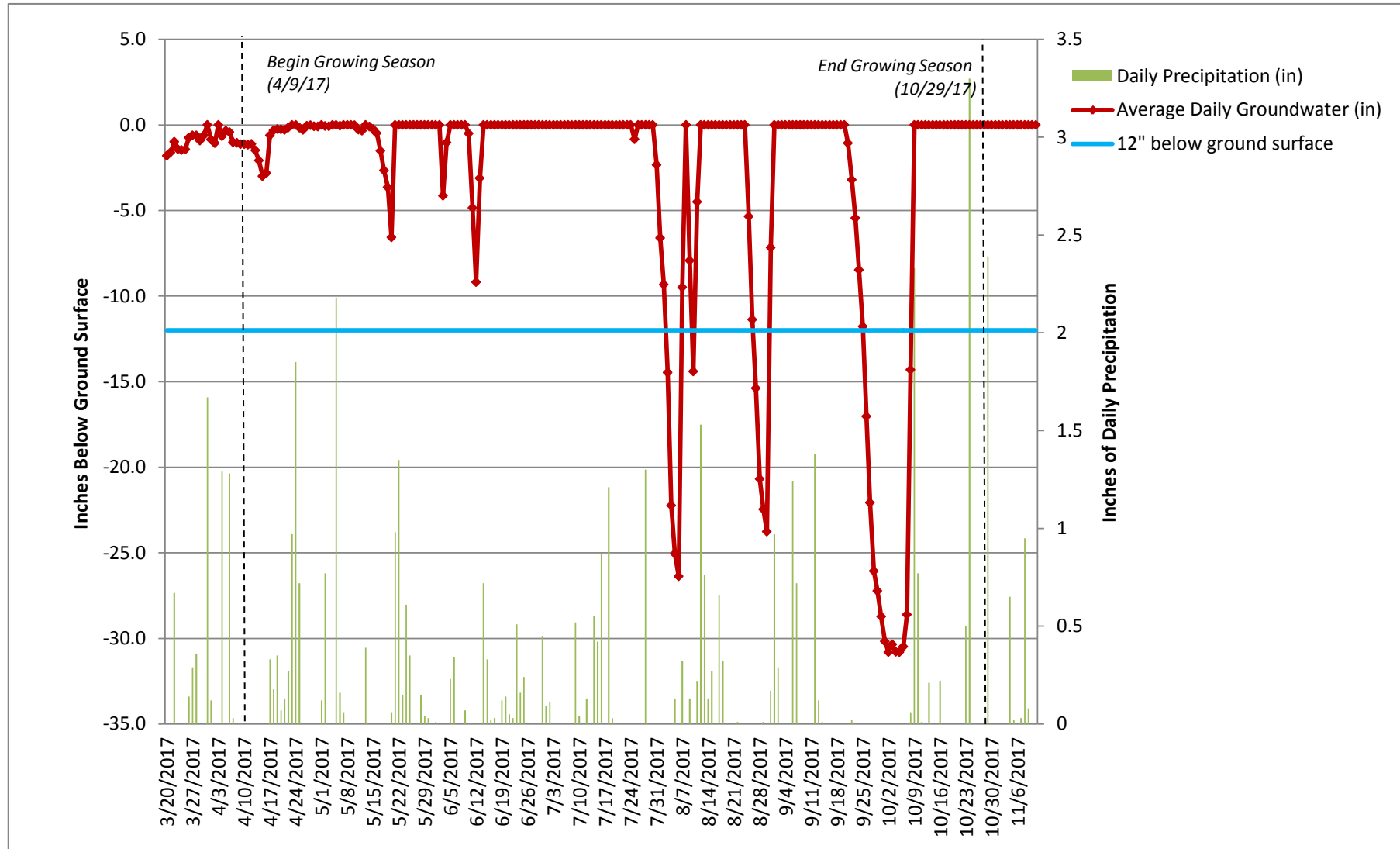
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: EBD106E
 Gauge ID: 9



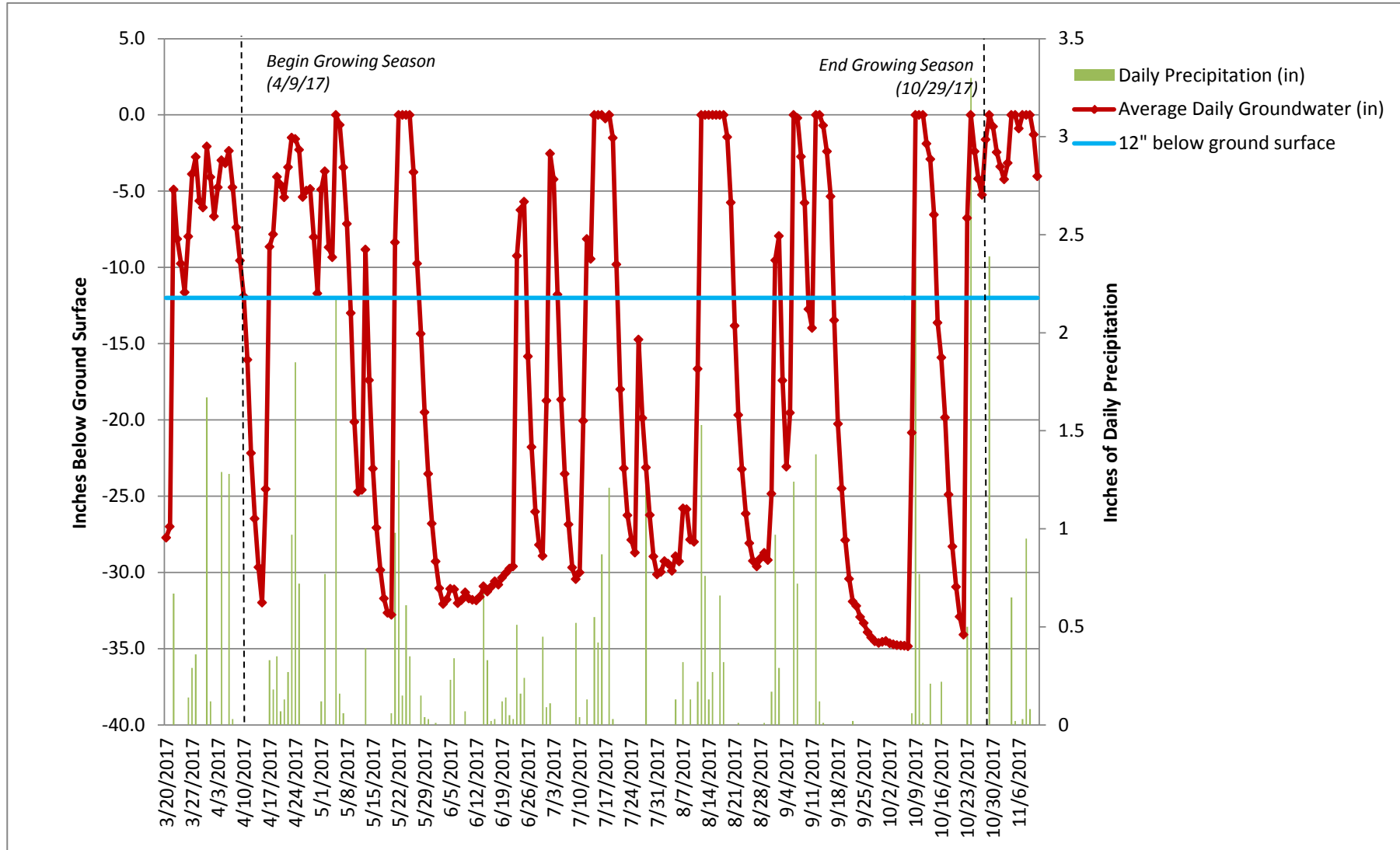
Project: Fletcher-Meritor
EEP Project ID: 138
Wetland Component: Project Riparian Wetlands
Growing Season: April 9-October 29
Units: Inches
Gauge Type: Groundwater

Serial #: 10FACBB4
Gauge ID: 10



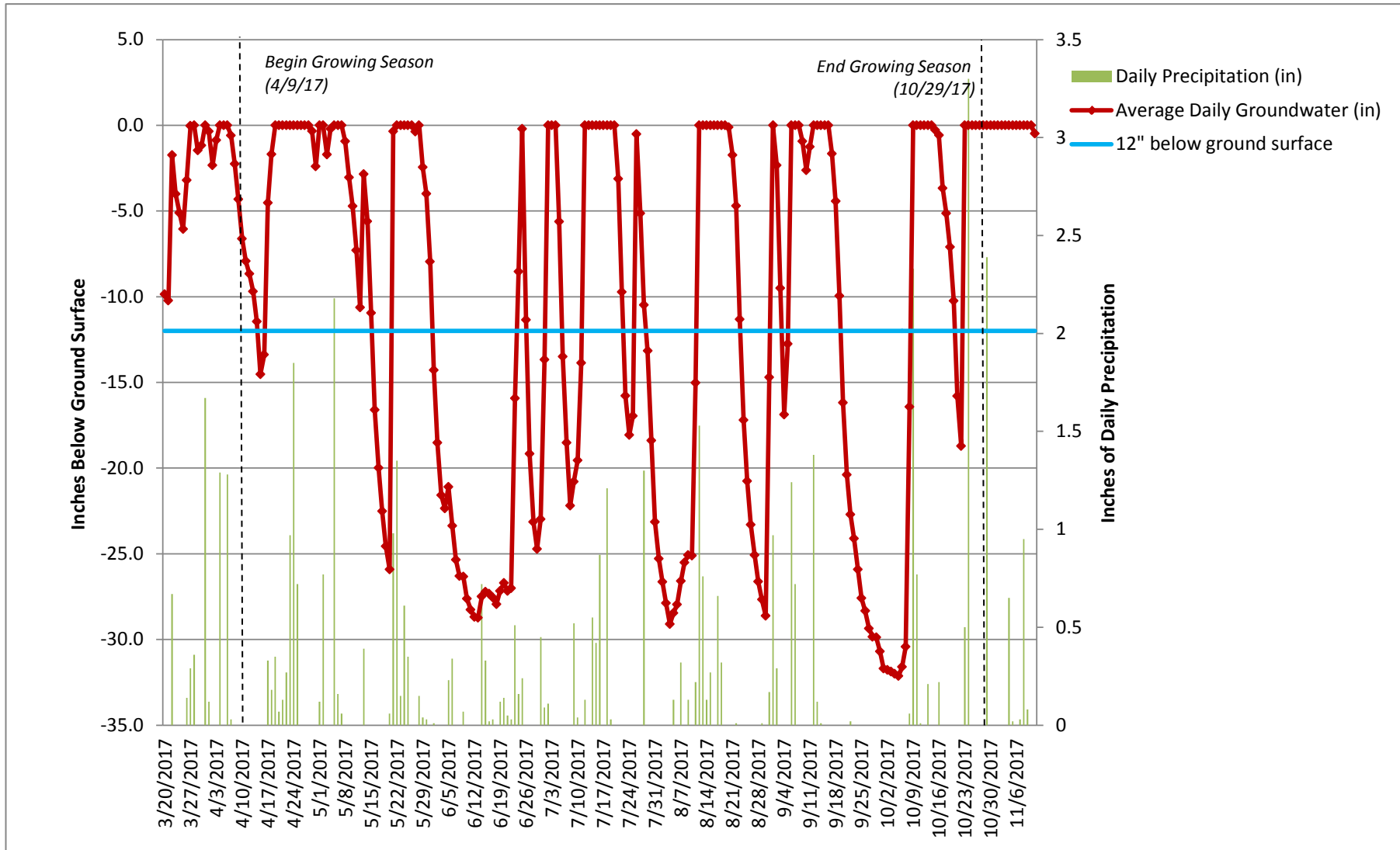
Project: Fletcher-Meritor
EEP Project ID: 138
Wetland Component: Project Riparian Wetlands
Growing Season: April 9-October 29
Units: Inches
Gauge Type: Groundwater

Serial #: AB37304
Gauge ID: 11



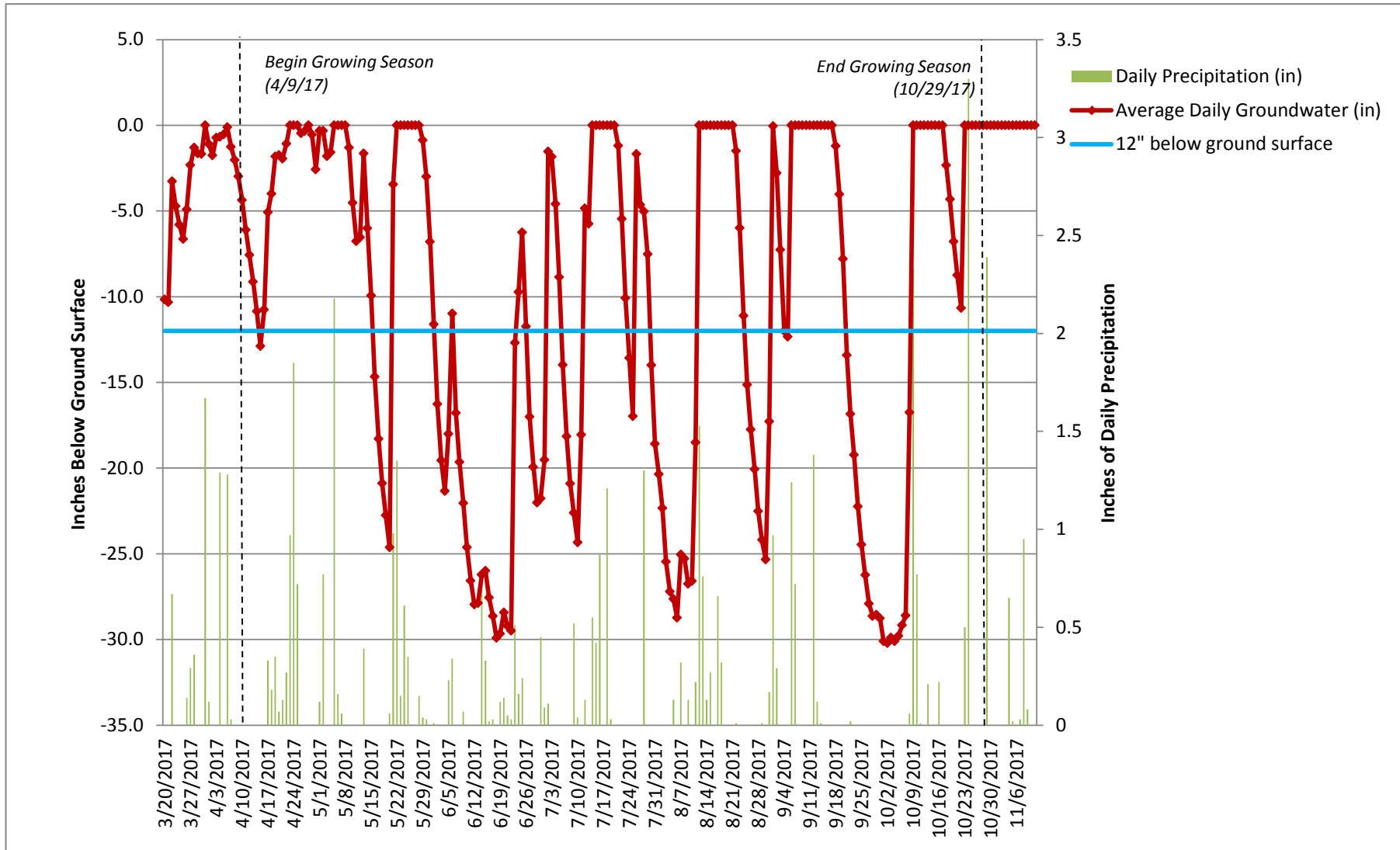
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 10FAA7C4
 Gauge ID: 12



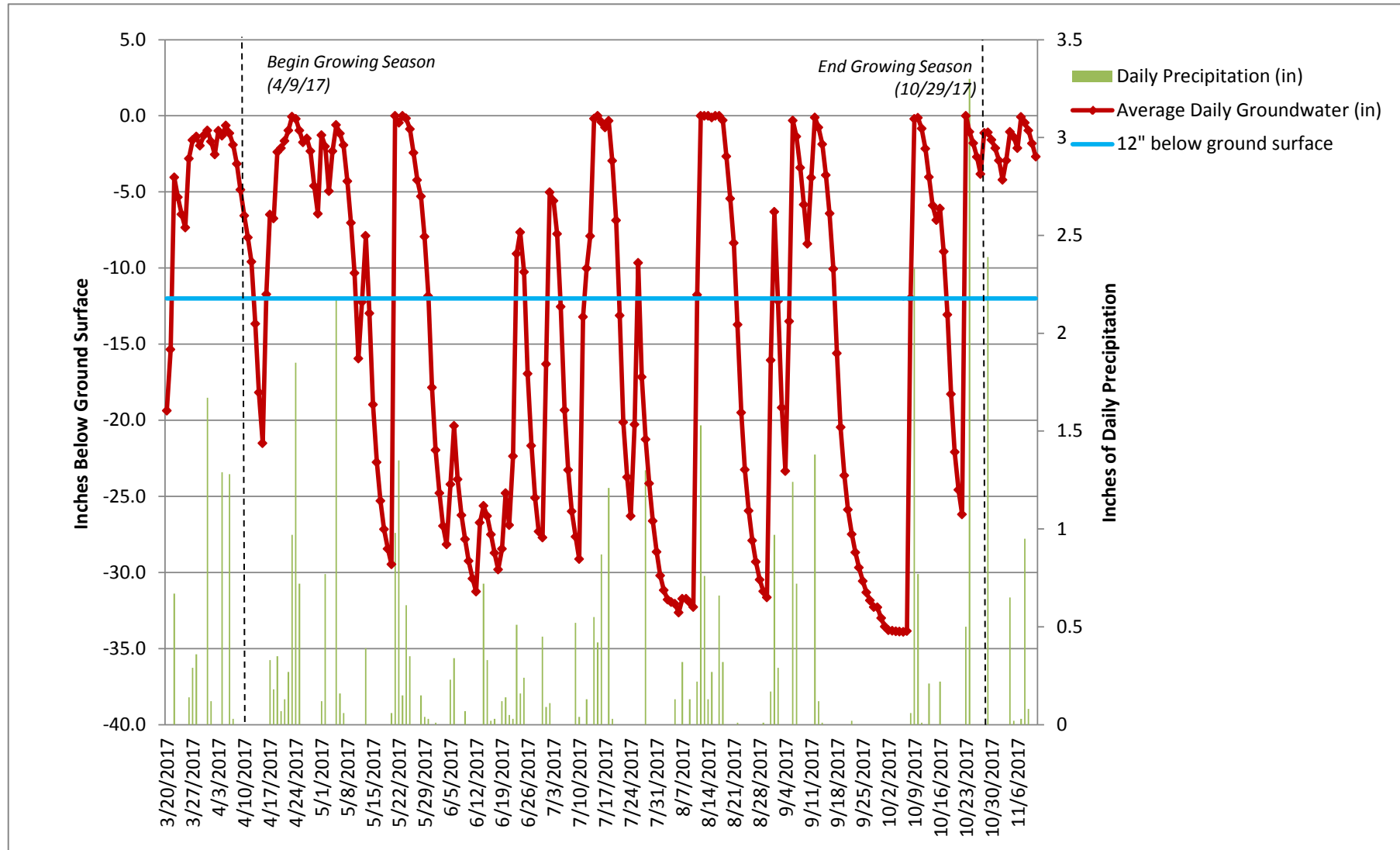
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 10FADD4C / A278DE1
 Gauge ID: 13



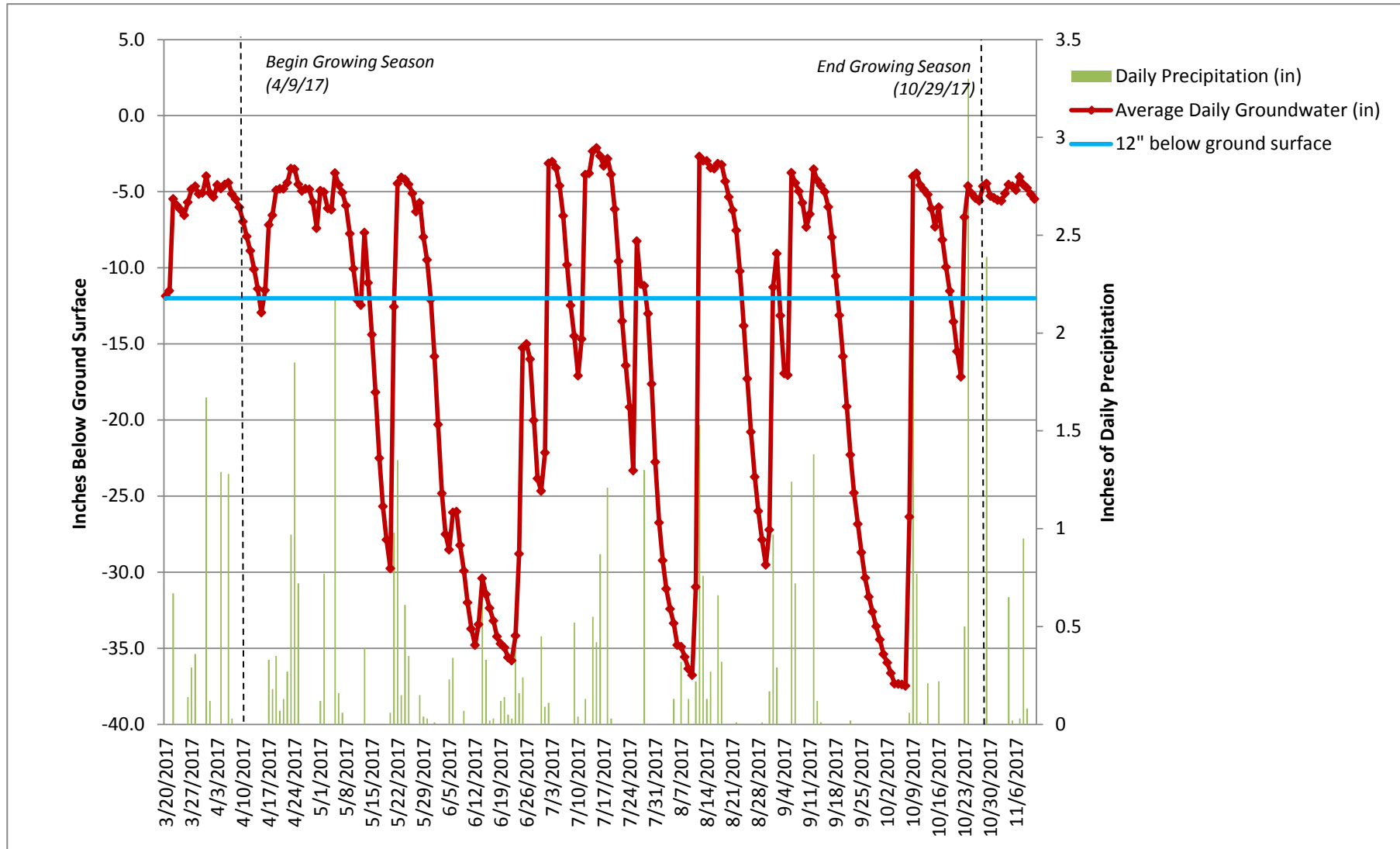
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: A28ABB0
 Gauge ID: 14



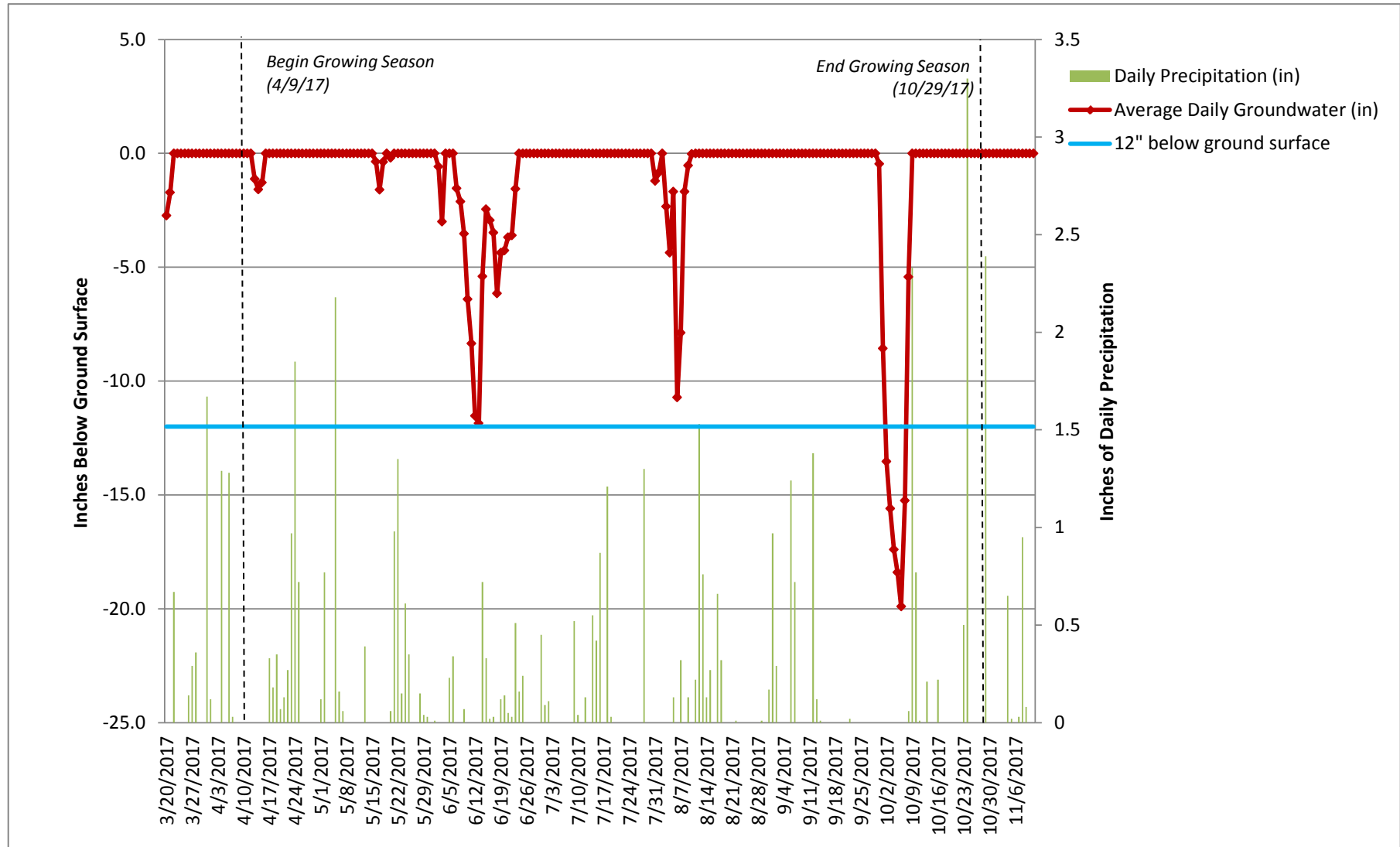
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 9DE54F2
 Gauge ID: 15



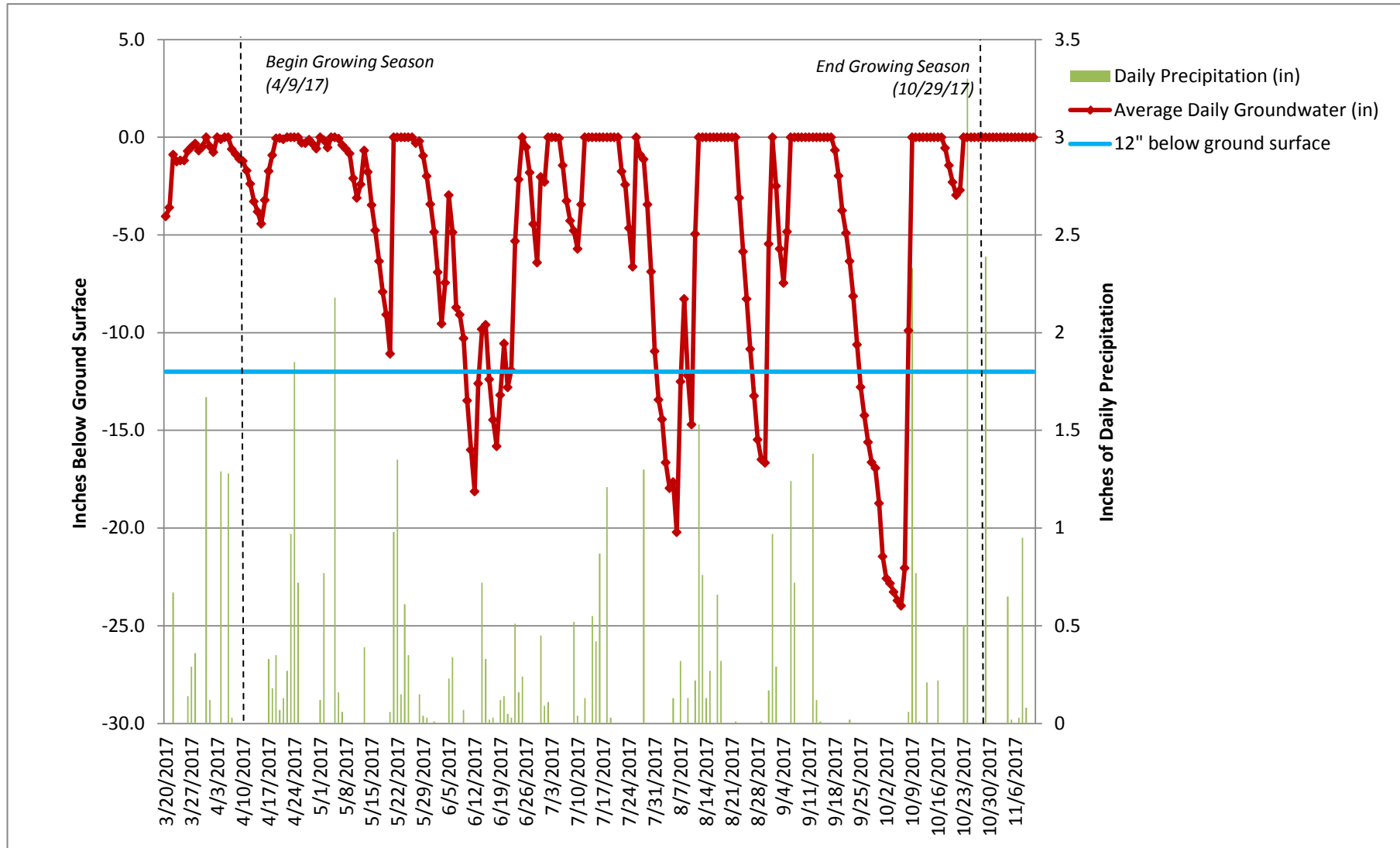
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 138BD91E / 1130EA33
 Gauge ID: 16



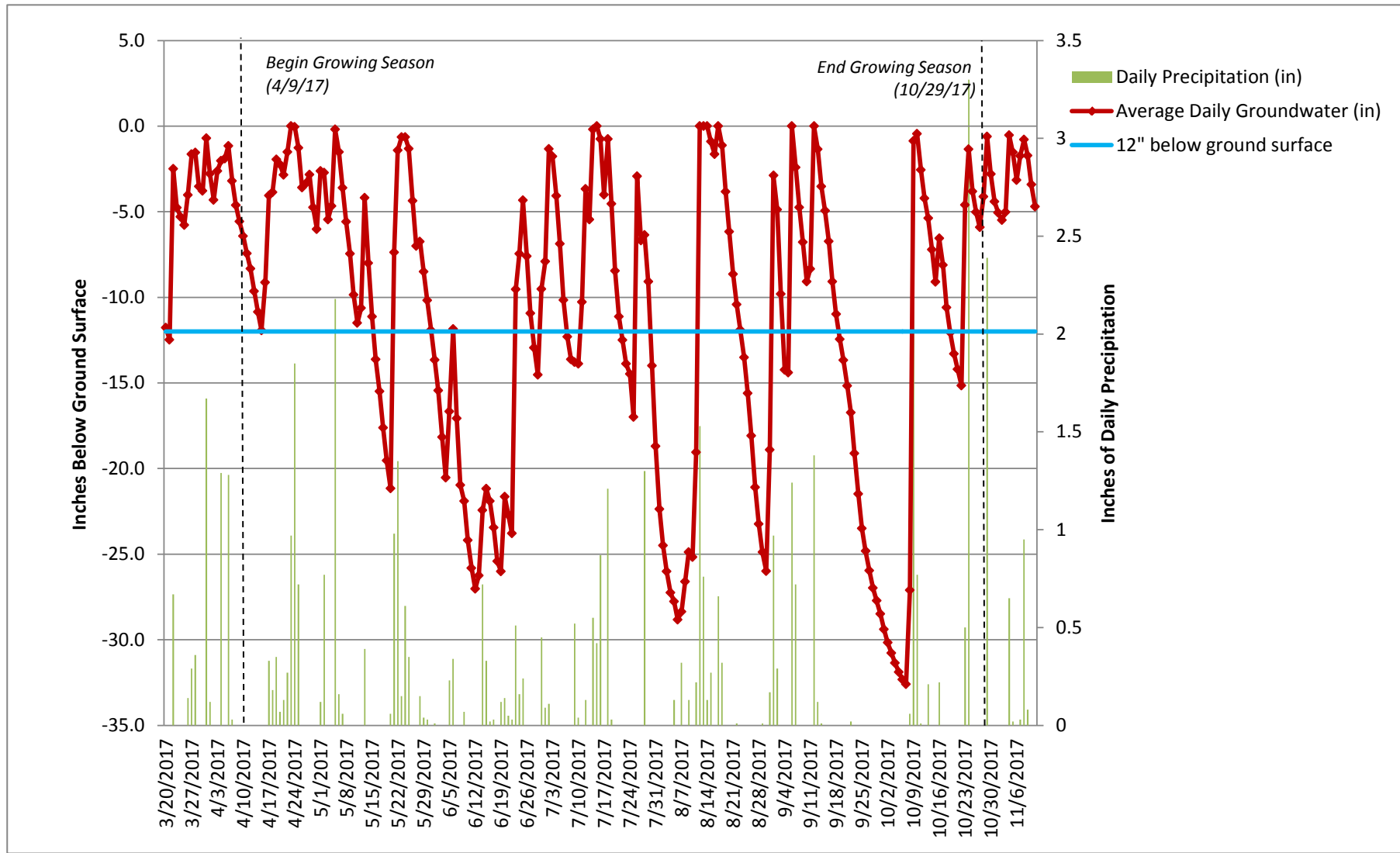
Project: Fletcher-Meritor
EEP Project ID: 138
Wetland Component: Project Riparian Wetlands
Growing Season: April 9-October 29
Units: Inches
Gauge Type: Groundwater

Serial #: 9BEBFCFO
Gauge ID: 18



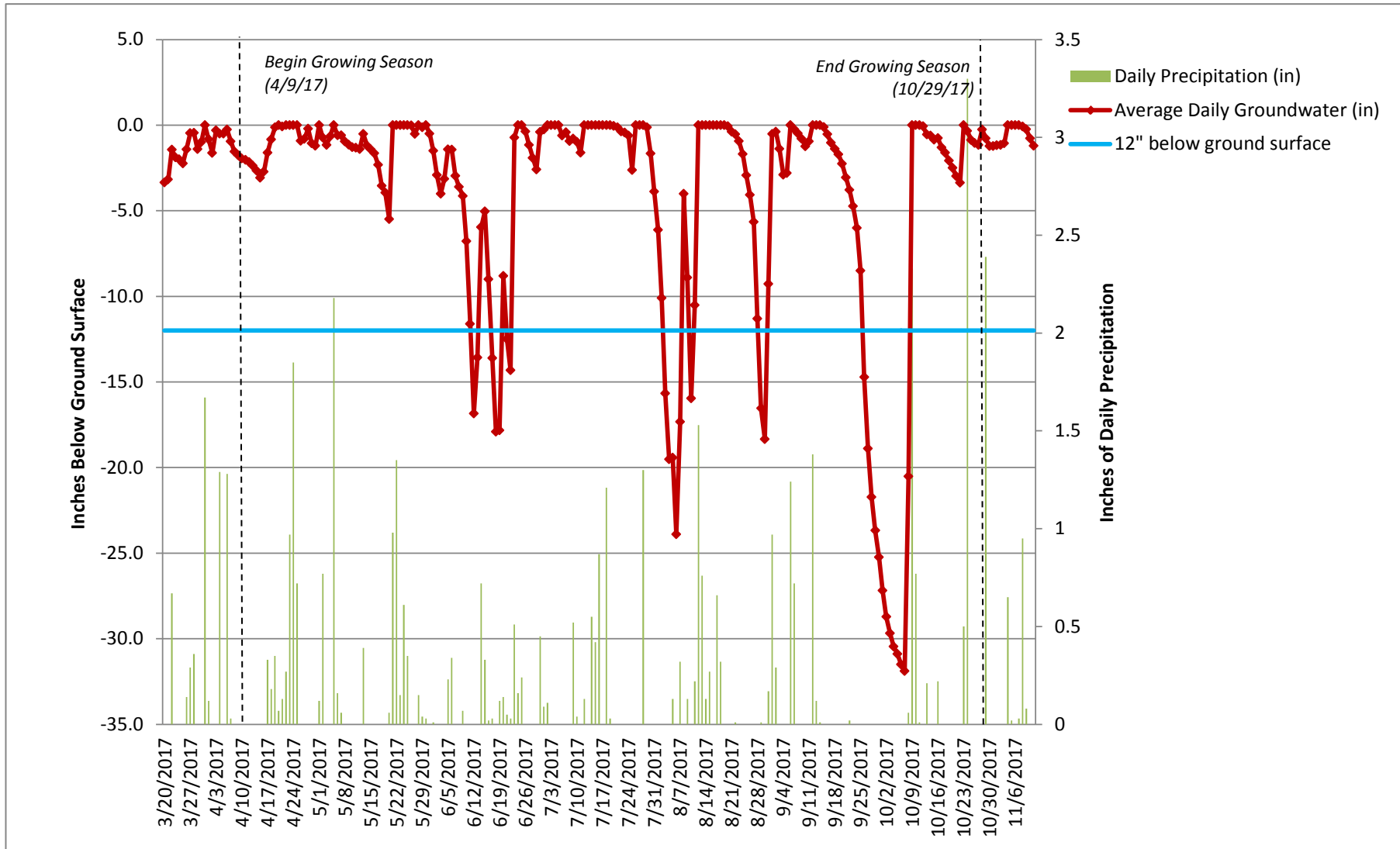
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 136ACA3C
 Gauge ID: 19



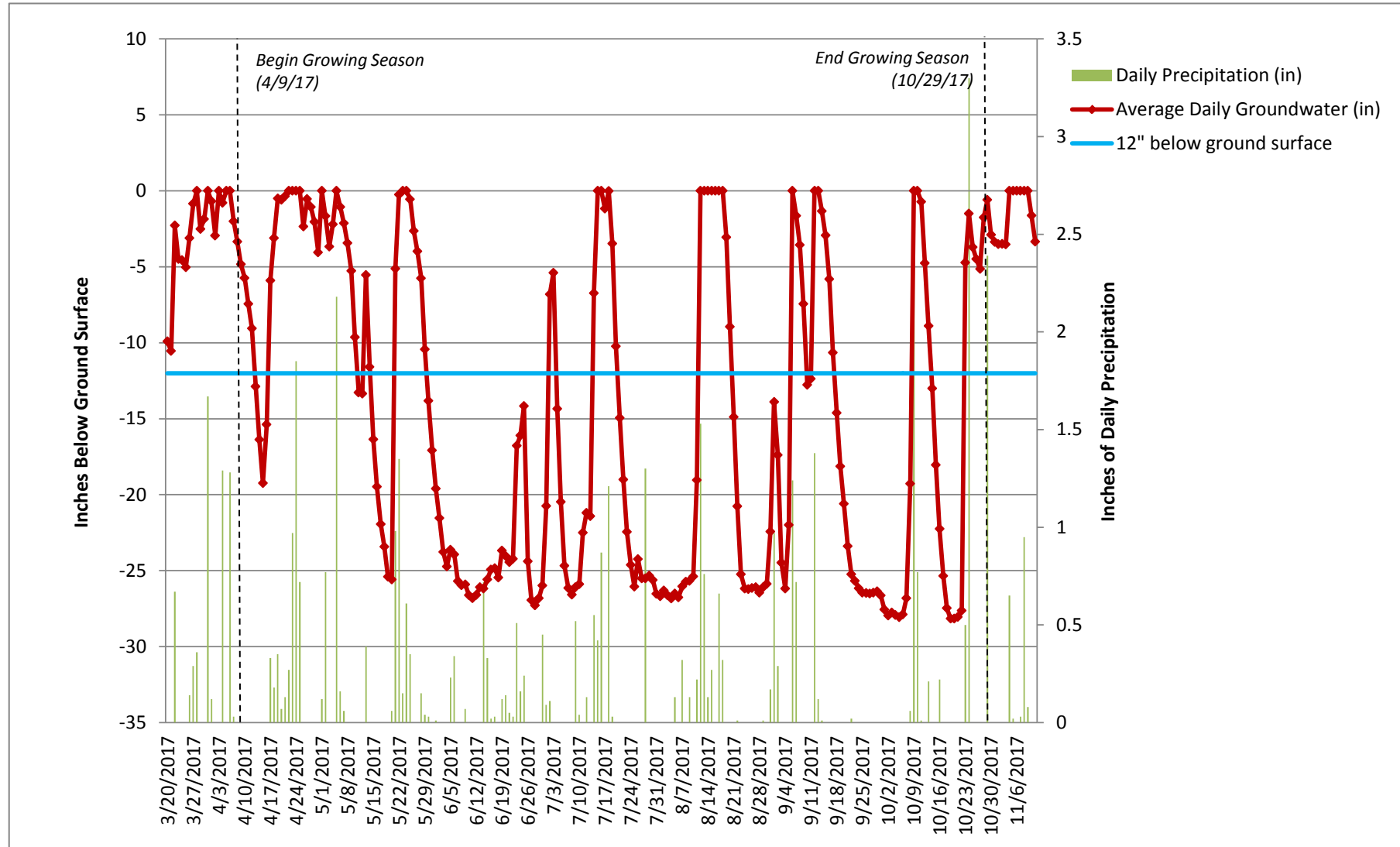
Project: Fletcher-Meritor
EEP Project ID: 138
Wetland Component: Project Riparian Wetlands
Growing Season: April 9-October 29
Units: Inches
Gauge Type: Groundwater

Serial #: B651924
Gauge ID: 20



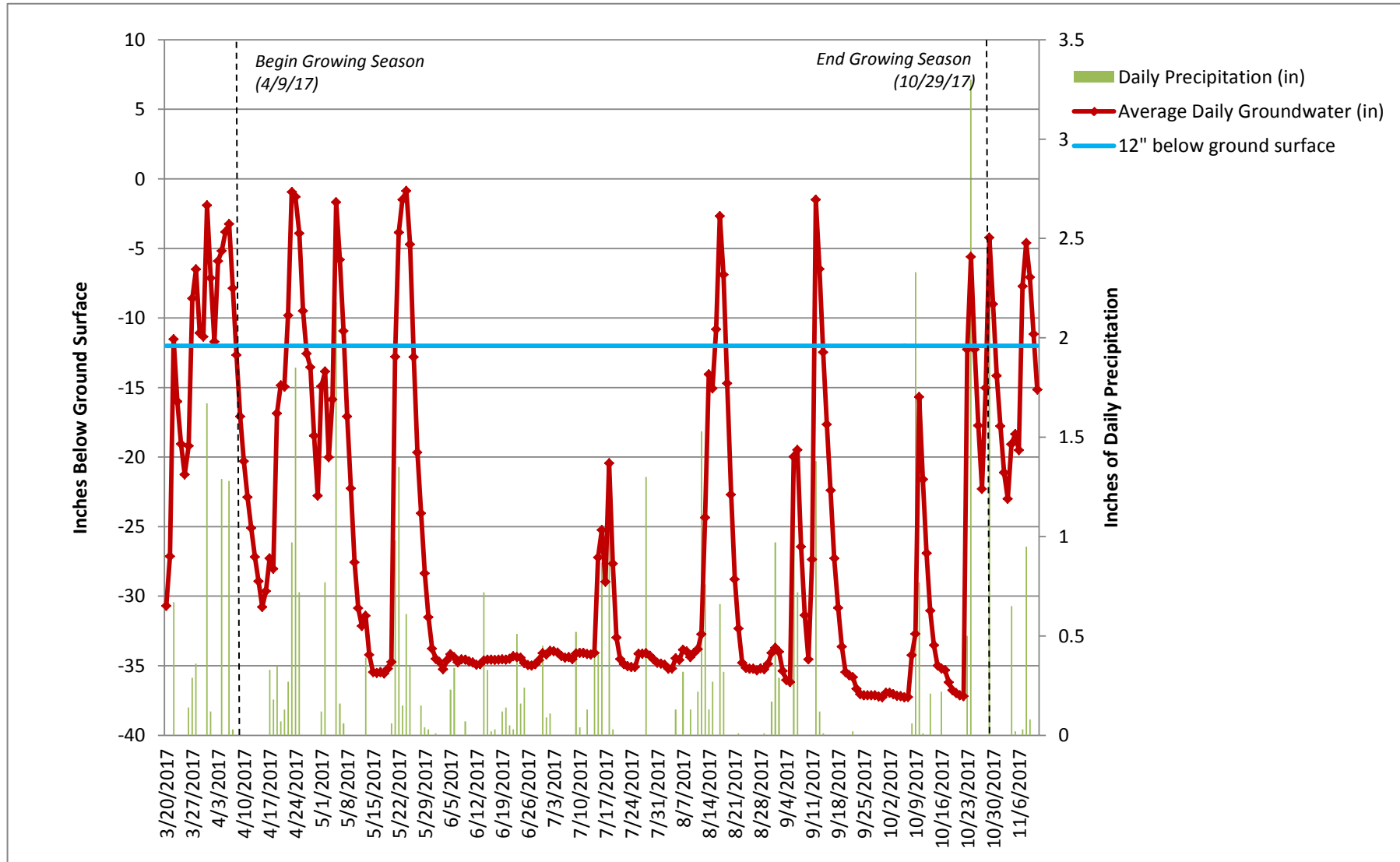
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 138BB5AA
 Gauge ID: 21



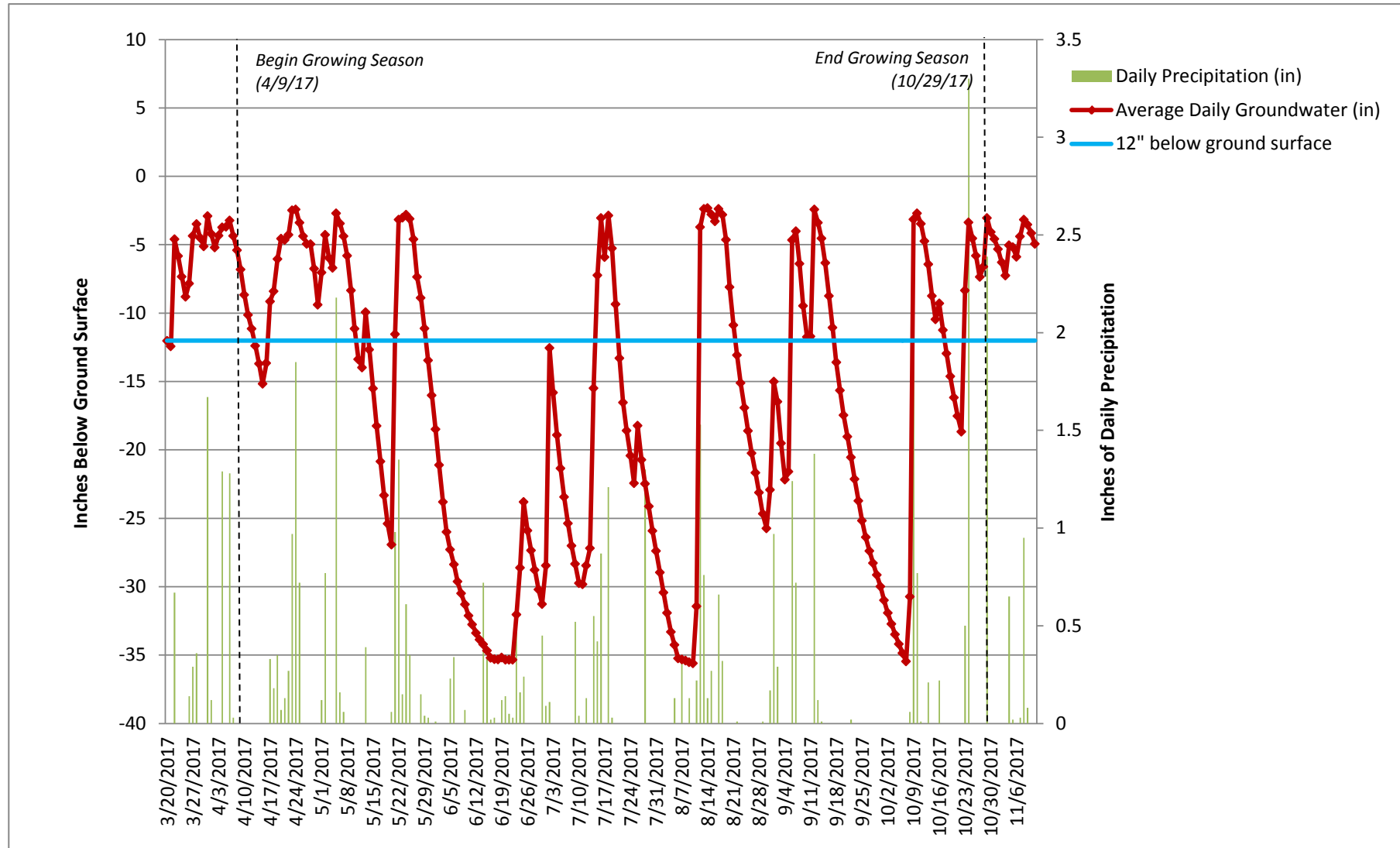
Project: Fletcher-Meritor
EEP Project ID: 138
Wetland Component: Project Riparian Wetlands
Growing Season: April 9-October 29
Units: Inches
Gauge Type: Groundwater

Serial #: 11312837
Gauge ID: 22



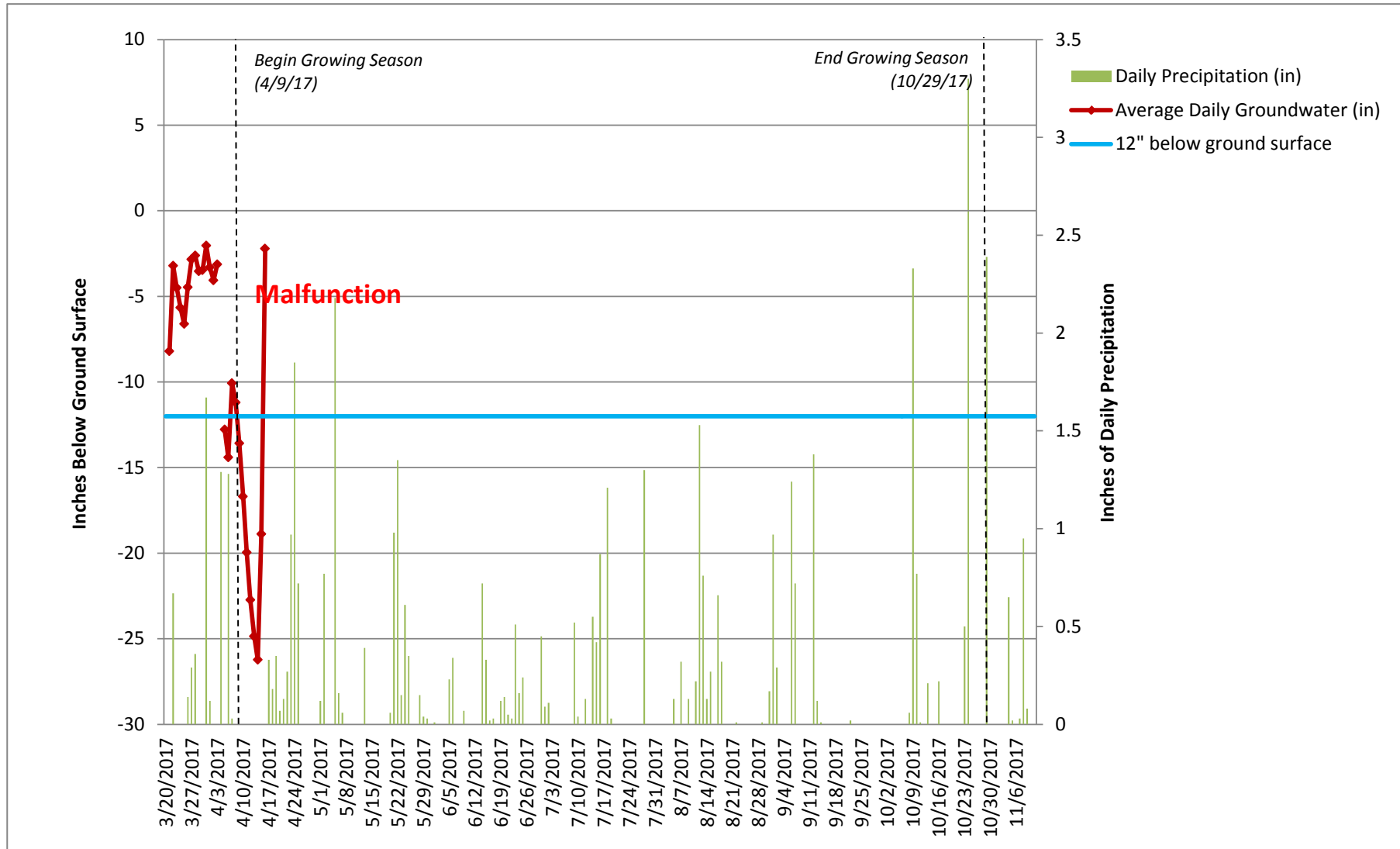
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 182727 / EDB96D7
 Gauge ID: 23



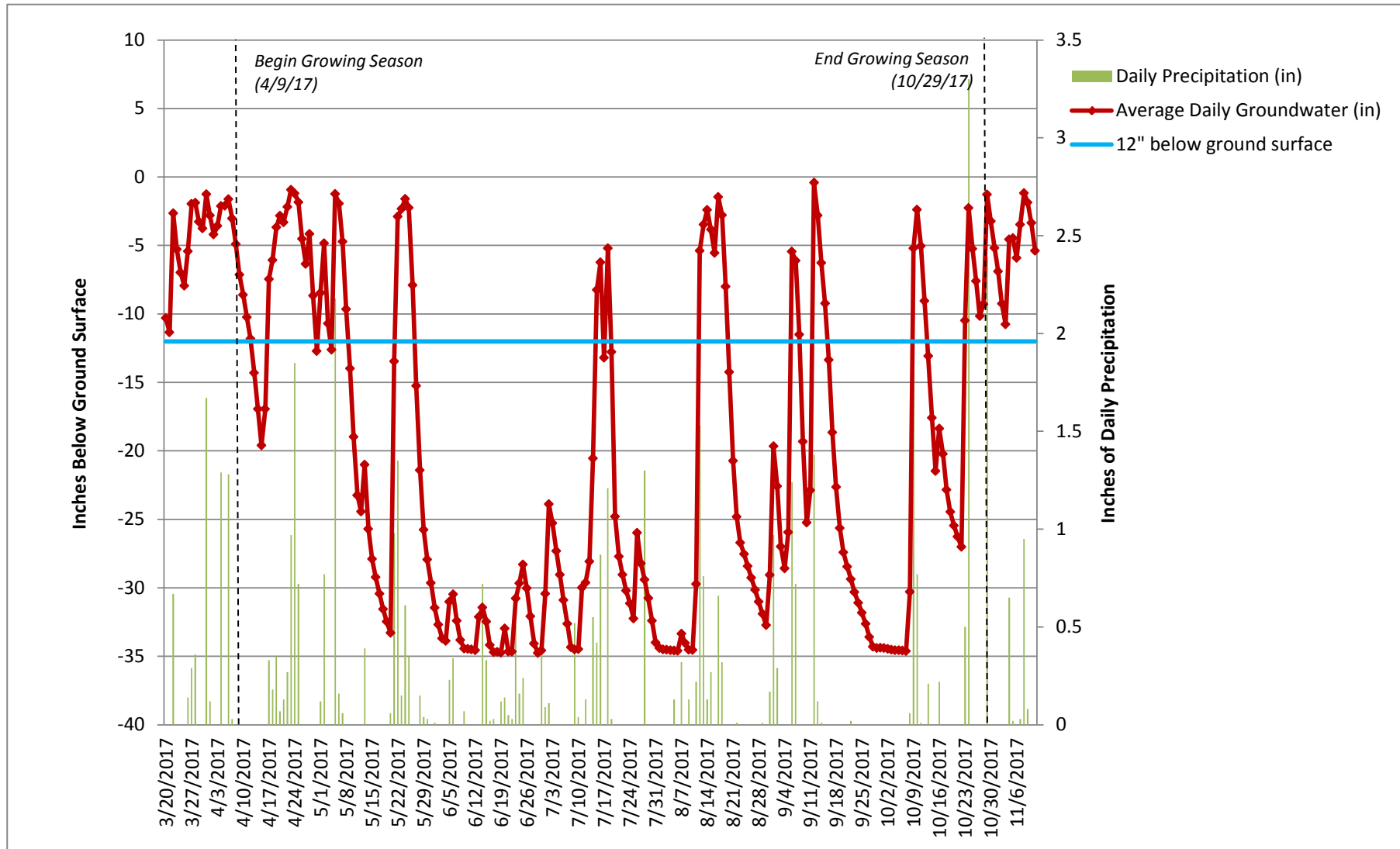
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 1314D206
 Gauge ID: 24



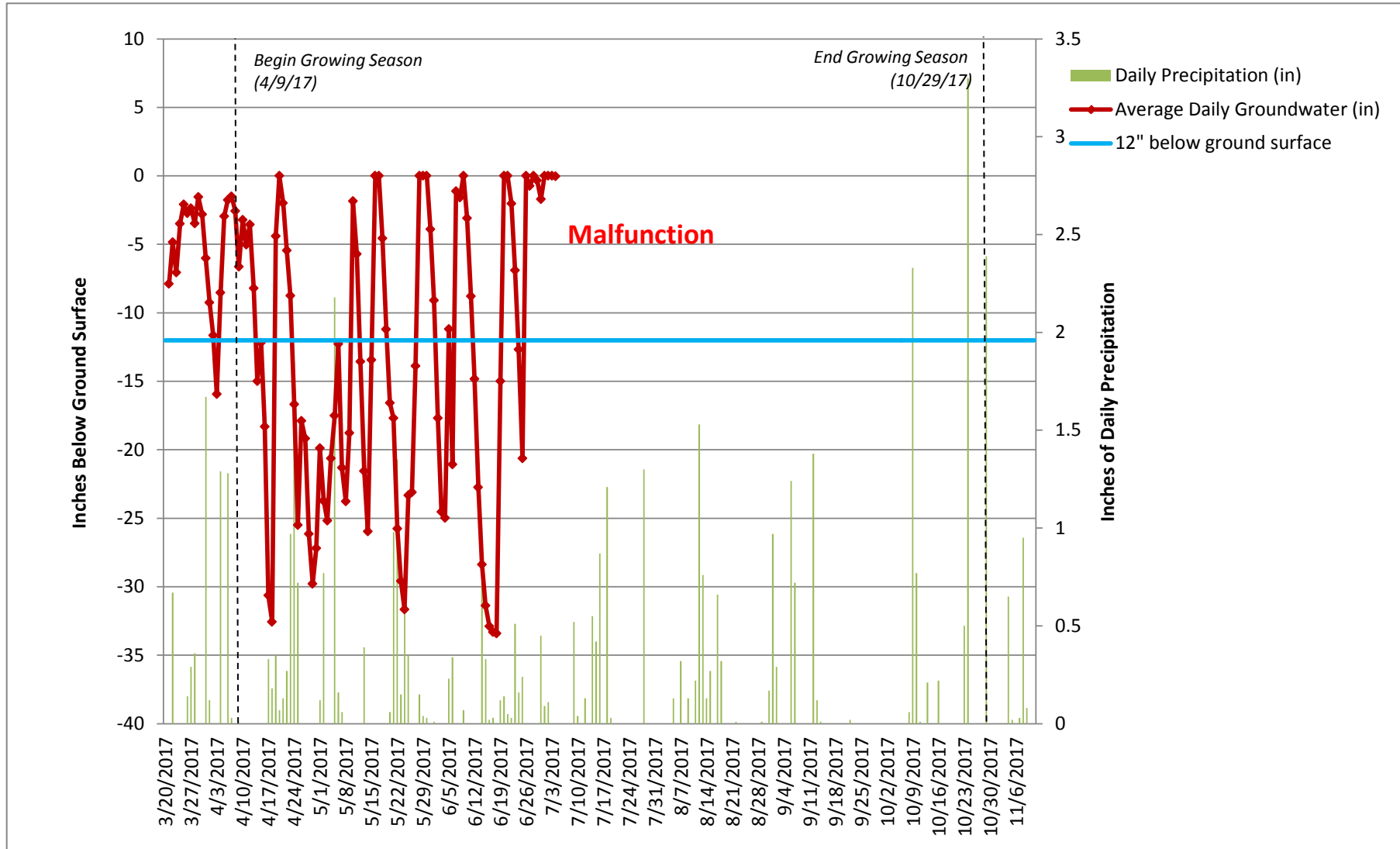
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 9BEBF22 / 13D4B149
 Gauge ID: 25



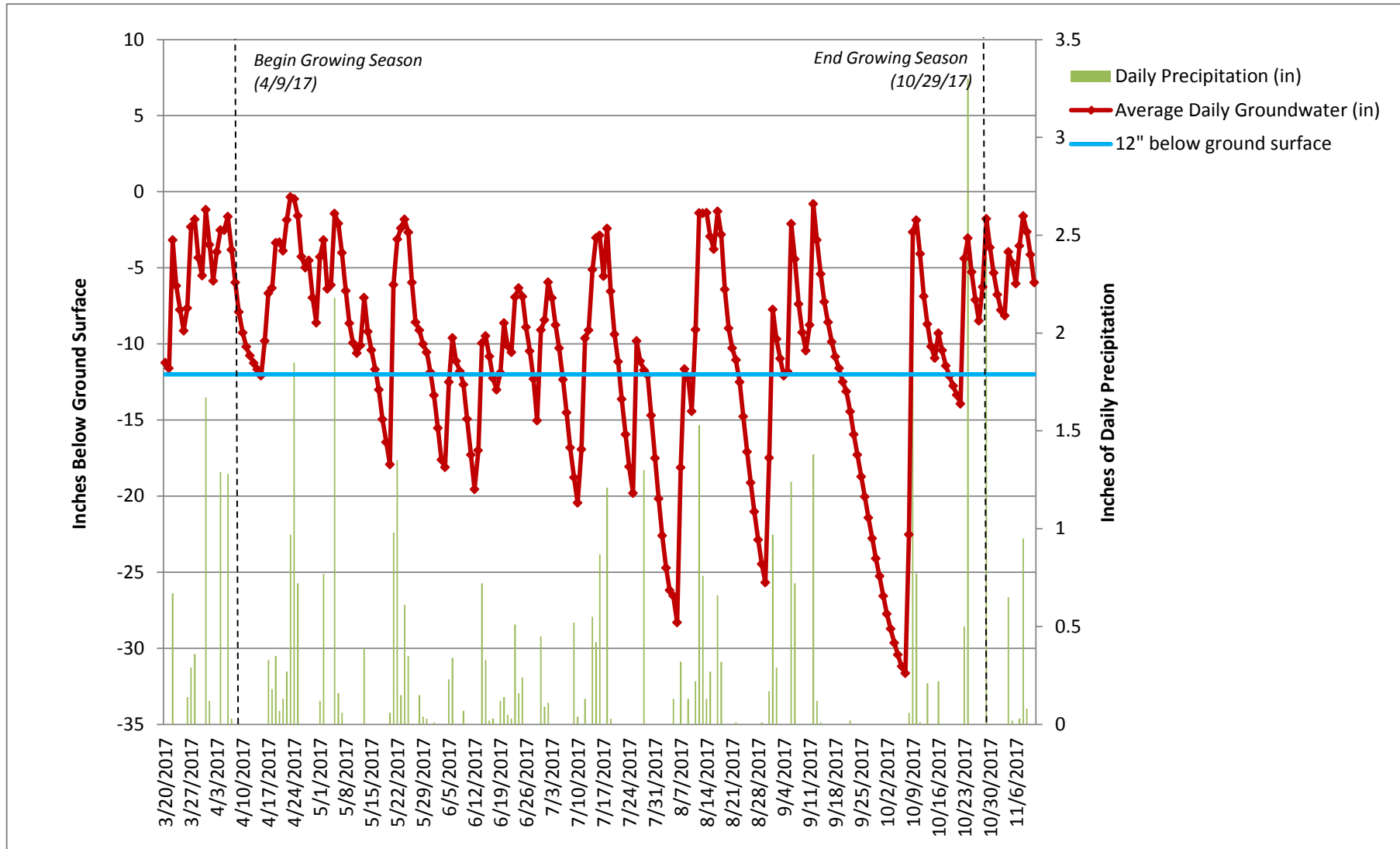
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 1314D1F1 / 1130FAA2
 Gauge ID: 26



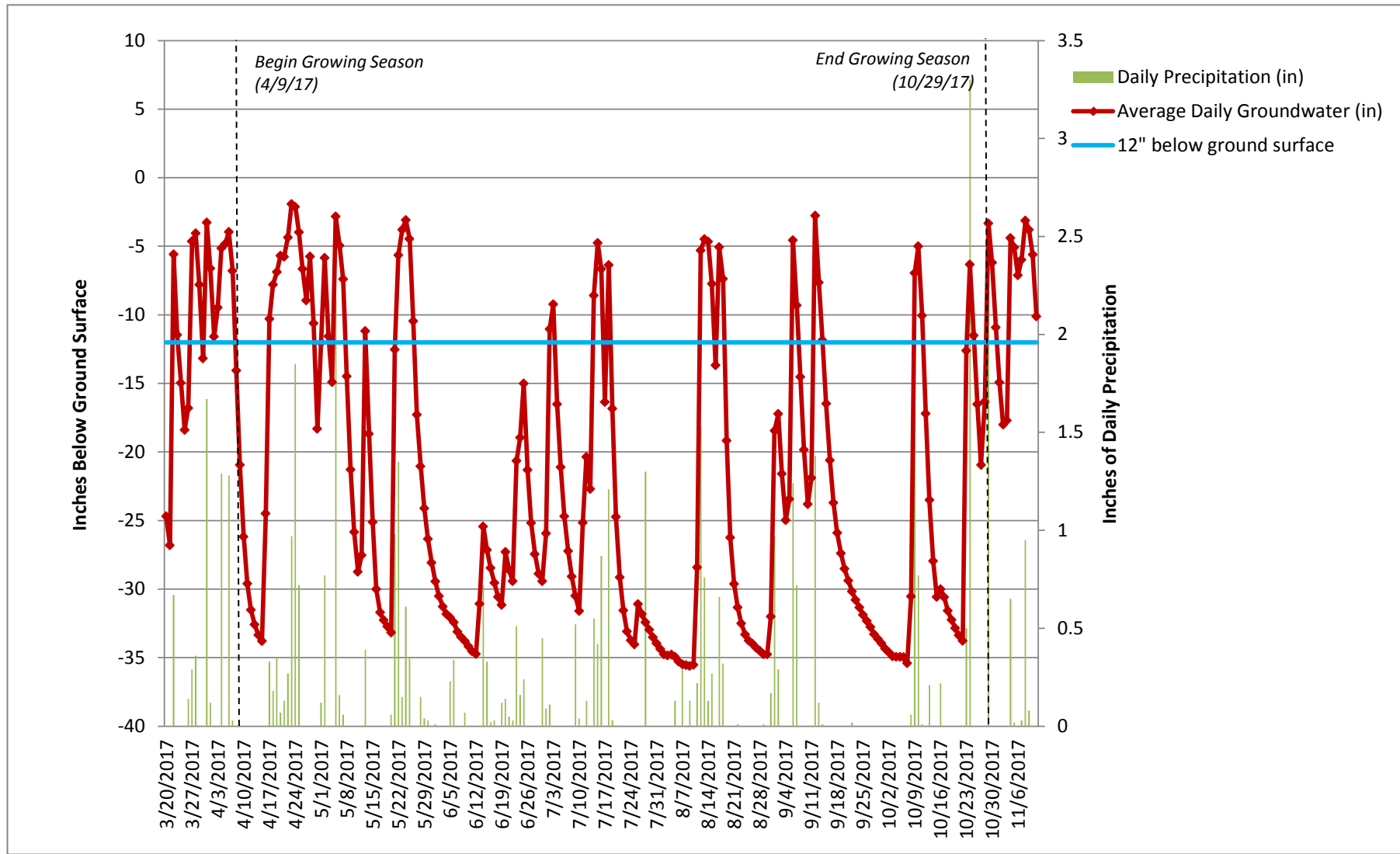
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 113118F8 / 14E1603B
 Gauge ID: 27



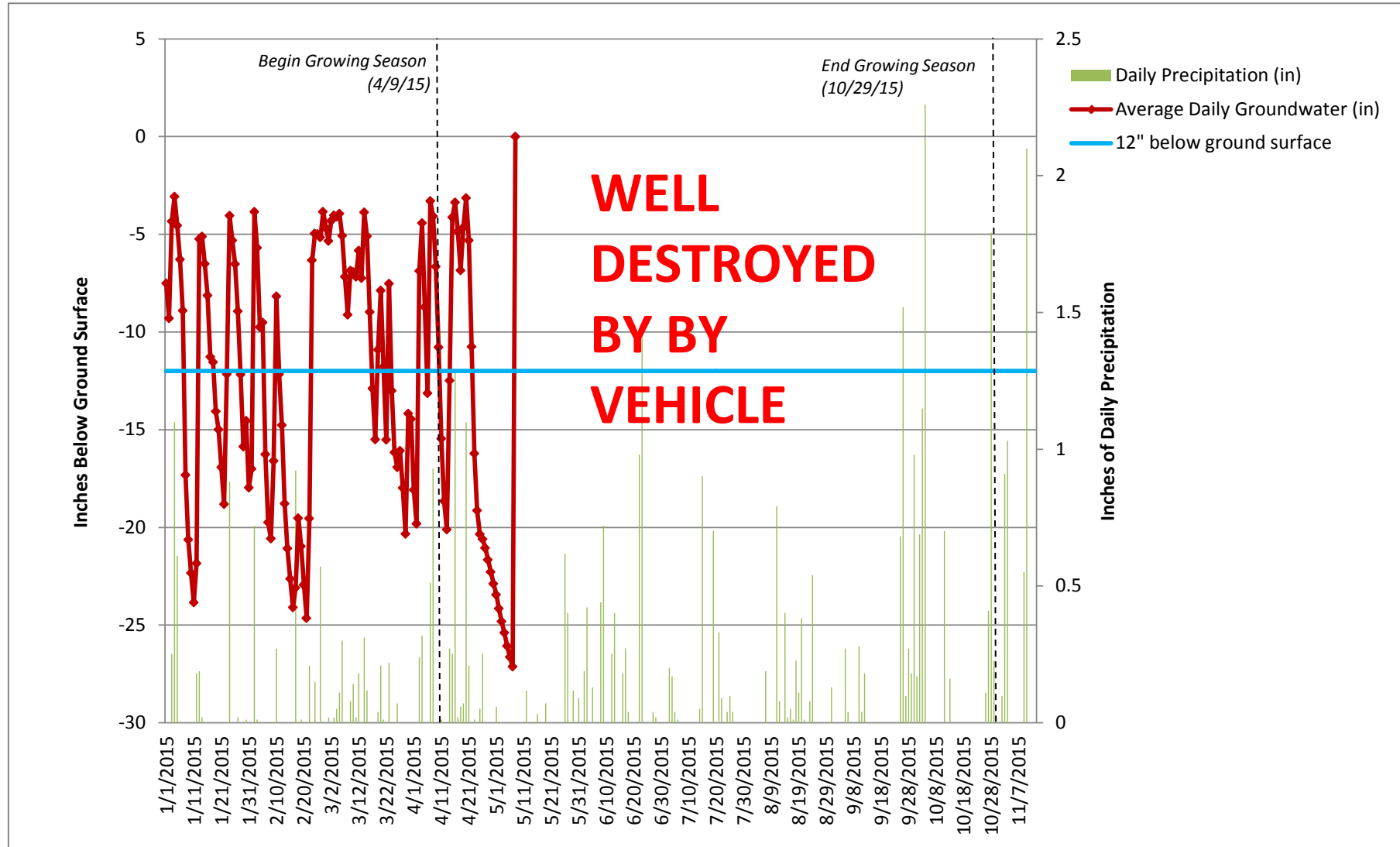
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 9BEA4DB / 9BEA426
 Gauge ID: 28



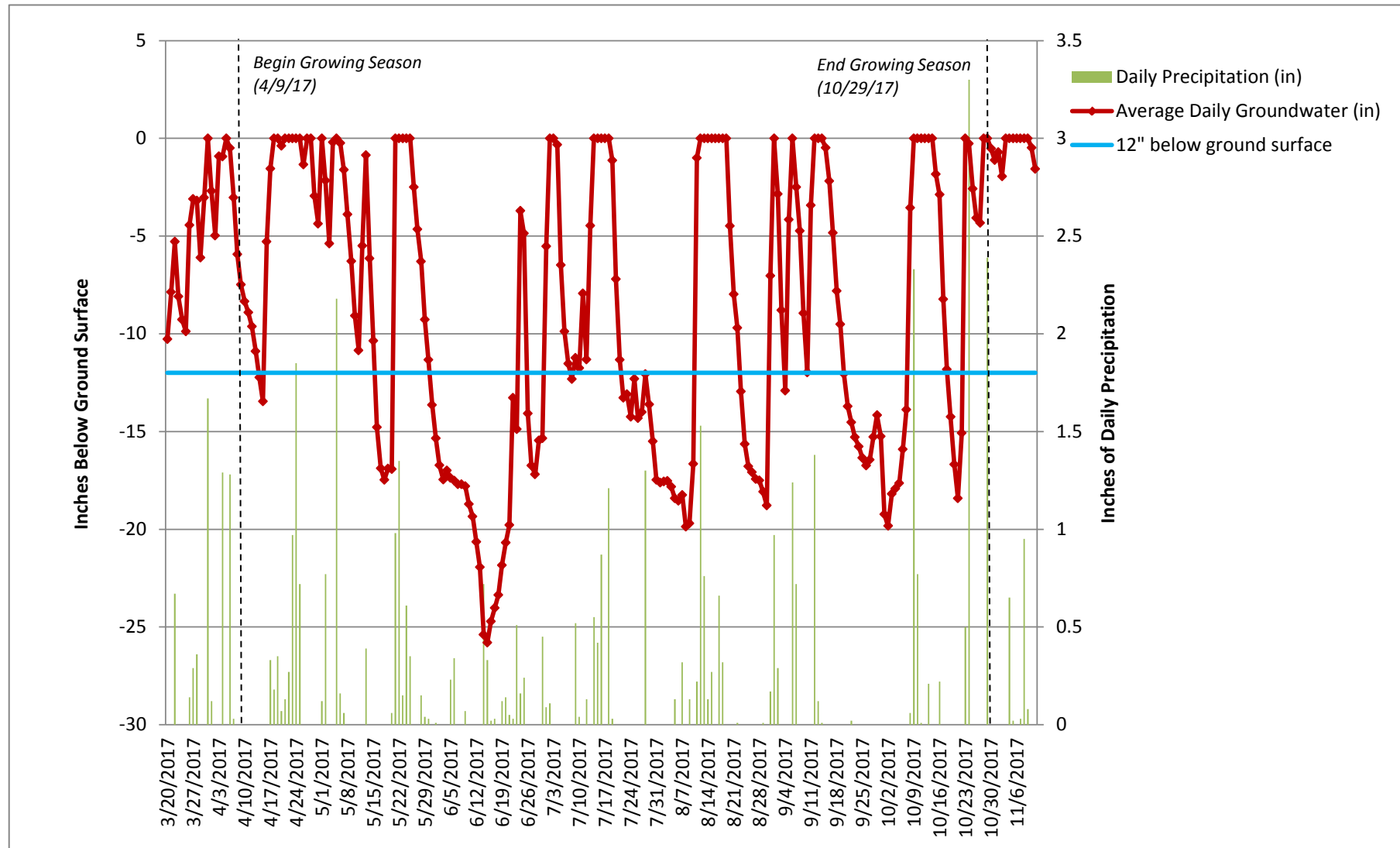
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 9DE69AB
 Gauge ID: 29



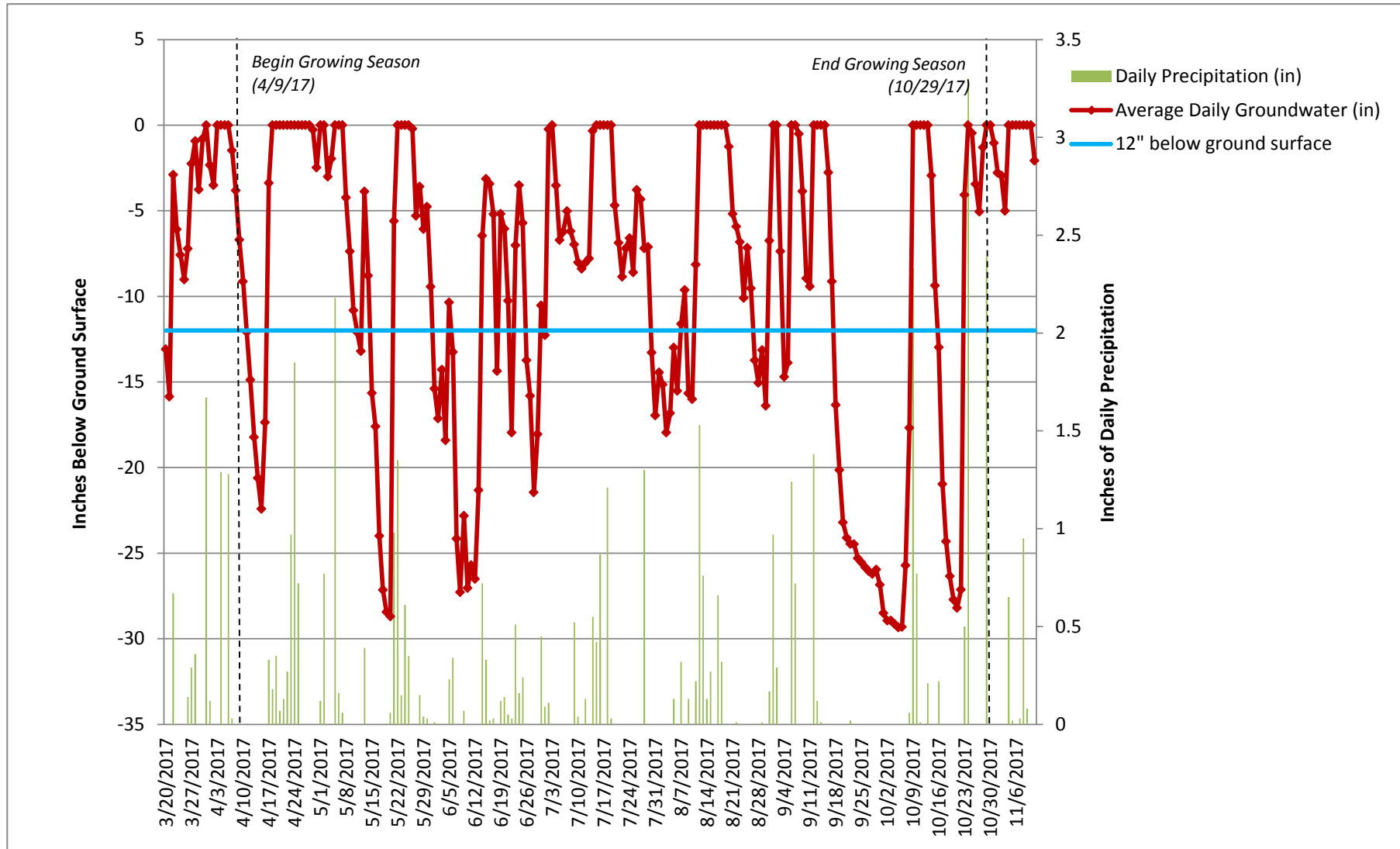
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 138BEO66
 Gauge ID: 30



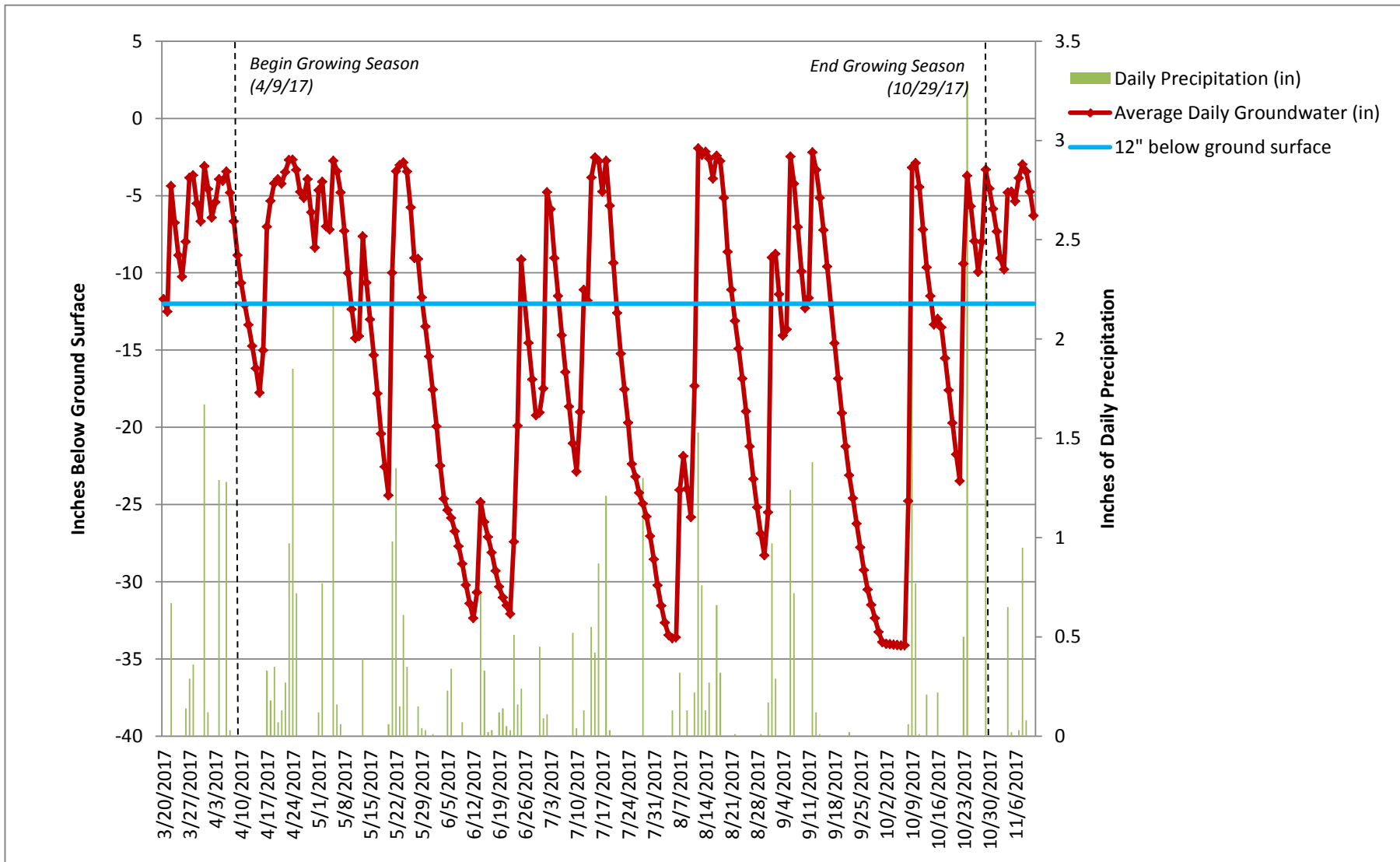
Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 182724 / 13D4CFD5
 Gauge ID: 31



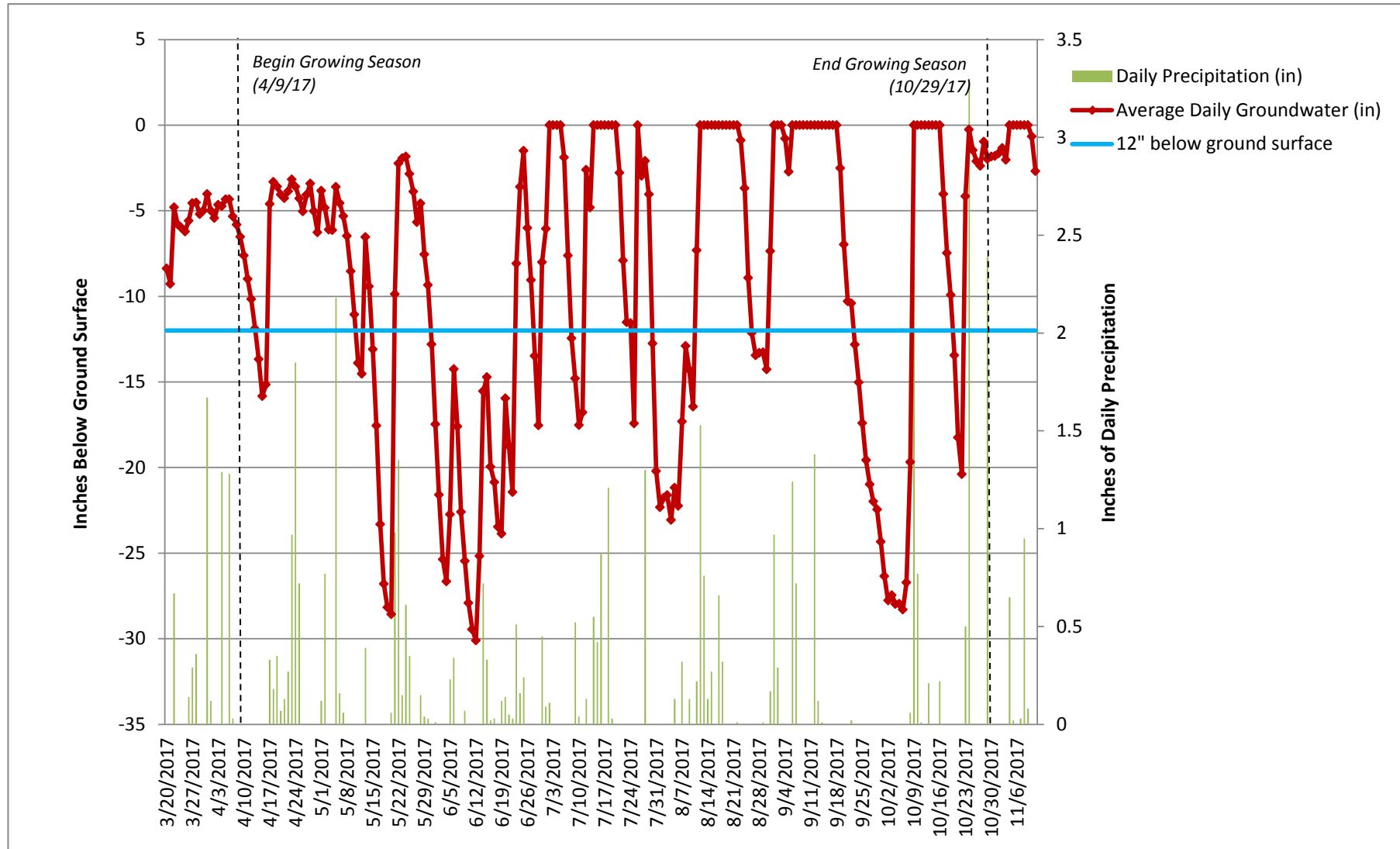
Project: Fletcher-Meritor
EEP Project ID: 138
Wetland Component: Project Riparian Wetlands
Growing Season: April 9-October 29
Units: Inches
Gauge Type: Groundwater

Serial #: EBDD9BO
Gauge ID: 32



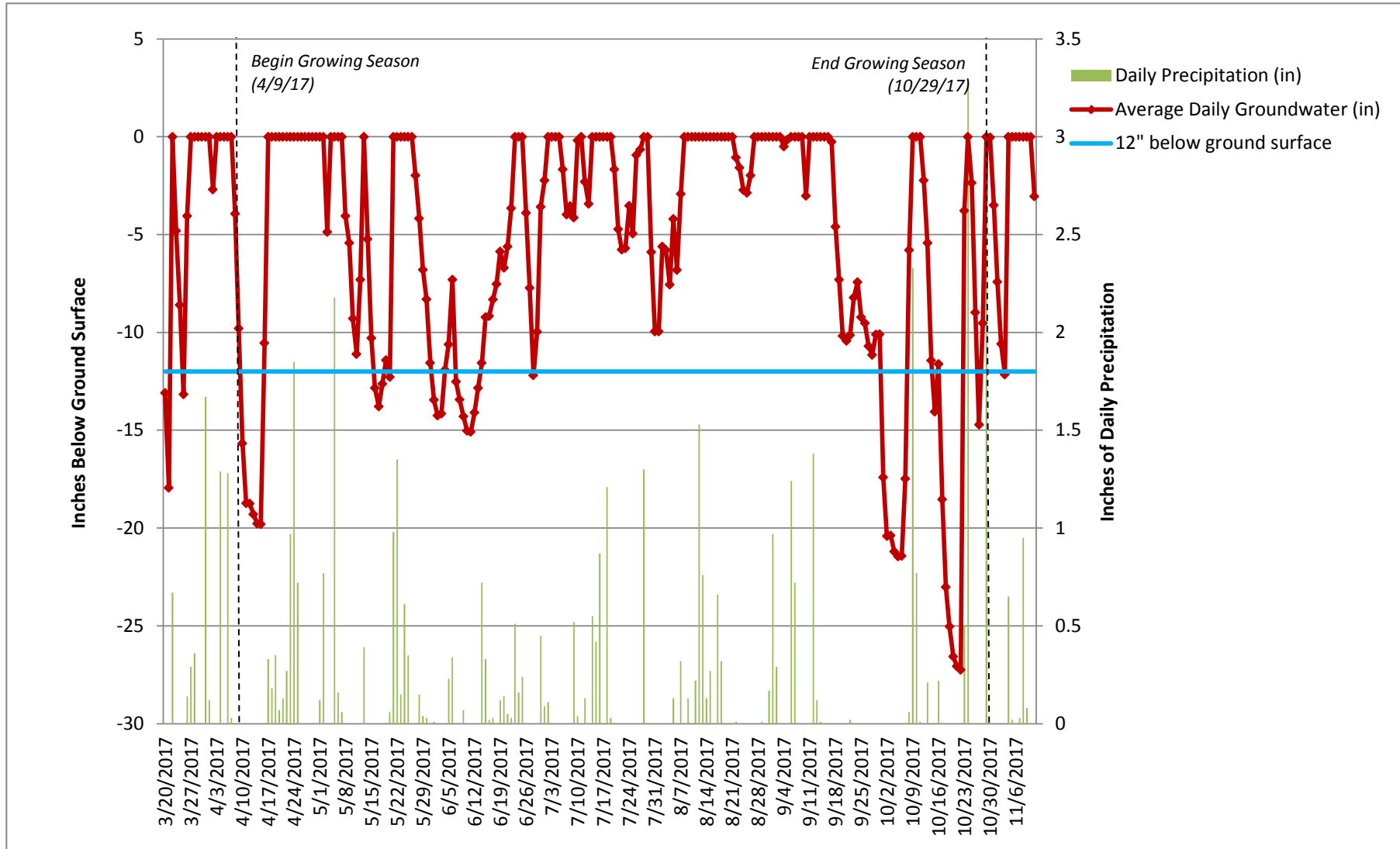
Project: Fletcher-Meritor
EEP Project ID: 138
Wetland Component: Project Riparian Wetlands
Growing Season: April 9-October 29
Units: Inches
Gauge Type: Groundwater

Serial #: EBDCF48
Gauge ID: 33



Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: EBDB81A
 Gauge ID: 34



Project: Fletcher-Meritor
 EEP Project ID: 138
 Wetland Component: Project Riparian Wetlands
 Growing Season: April 9-October 29
 Units: Inches
 Gauge Type: Groundwater

 Serial #: 174146 / 14E153D2
 Gauge ID: 35

