

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

Monitoring Report Year 1 of 5

Henderson County, North Carolina



Prepared for:



North Carolina Department of Environmental and Natural Resources
Ecosystem Enhancement Program
1601 Mail Service Center
Raleigh, NC 27699-1601

**Construction Complete: May 2012
Data Collected: May 2013
Report Submission: March 2014**

Prepared by:



HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207
Raleigh, NC 27612-4845

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

**Monitoring Report Year 1 of 5
Henderson County, North Carolina**

TABLE OF CONTENTS

1.0	EXECUTIVE SUMMARY.....	1
2.0	Methodology.....	3
2.1	Morphometric Parameters and Channel Stability.....	3
2.1.1	Profile.....	3
2.1.2	Dimension.....	3
2.1.3	Pattern.....	4
2.1.4	Substrate.....	4
2.1.5	Sediment Transport.....	4
2.1.6	Photo Documentation.....	4
2.2	Vegetation.....	4
2.3	Hydrology.....	5
3.0	REFERENCES CITED.....	5

LIST OF APPENDICES

APPENDIX A GENERAL TABLES AND FIGURES

- Figure 1 – Vicinity Map
- Figure 2 – Asset Map
- Table 1a – Project Components
- Table 1b – Component Summations
- Table 2 – Project Activity and Reporting History
- Table 3 – Project Contacts
- Table 4 – Project Attributes

APPENDIX B VISUAL ASSESSMENT

- Figure 3a – Current Condition Plan View

Figure 3b – Current Condition Plan View
Figure 3c – Current Condition Plan View
Figure 3d – Current Condition Plan View
Table 5a – Visual Stream Morphology Stability Assessment – Upper Reach
Table 5b – Visual Stream Morphology Stability Assessment – Lower Reach
Table 5c – Visual Stream Morphology Stability Assessment - Tributary
Table 6 – Vegetation Condition Assessment
Photos – Permanent Photo Points
Photos – Vegetation Plots

APPENDIX C VEGETATION PLOT DATA

Table 7 – Vegetation Plot Mitigation Success Summary
Table 8 – CVS Vegetation Metadata
Table 9 – Vegetation Plot Data

APPENDIX D STREAM ASSESSMENT DATA

Cross-Sections with Annual Overlays
Longitudinal Profiles with Annual Overlays
Pebble Count Plots with Annual Overlays
Table 10a – Stream Data Summary – Upper Reach
Table 10b – Stream Data Summary – Lower Reach
Table 10c – Stream Data Summary – Tributary
Table 11a – Monitoring Data – Dimensional Morphology Summary

APPENDIX E HYDROLOGIC DATA

Table 12 – Verification of Bankfull Events
Groundwater Monitoring Gauge Data

1.0 EXECUTIVE SUMMARY

The Fletcher-Meritor Site Stream and Wetland Restoration Project, completed in May 2012, restored 3,617 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 4,288 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– 1838 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 that is listed on the 303(d) list as ecologically/biologically impaired upstream of US 25 (NCDWQ 2012). In addition, 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 / Land Cover data indicates that more than 60 percent of the 1.1-square mile UT to Cane Creek watershed is currently pervious with the dominance 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 will be considered successful if a minimum of 260 planted stems/acre are surviving at the end of five years. The interim measure of vegetative success for the site will be the survival of a minimum of 320 planted stems/acre in year three. The Monitoring Year 1 (MY1) stem counts are located in Tables 7 and 9 in Appendix C. Currently, 13 of 17 vegetation plots are meeting the interim measures of success. Vegetation throughout the reach appears to be growing at acceptable rates and the mortality rate appears to be fairly low. The four plots that are not meeting interim success criteria include 3 along the tributary which may not have been planted at the appropriate density and the plot closest to the confluence with Cane Creek which has had backwater impacts numerous times over the past year.

Numerous locations were noted along the reaches as having sparse vegetation during the monitoring event. This could be due to climatic reasons as well as backwater effects and deposition on the floodplain. These areas are illustrated on the Current Condition Plan View (CCPV) in Appendix B. In addition to these locations, there is a large area of cattails (*Typha latifolia*) growing within the upper wetland area. This location was not noted on the CCPV as it was found during a subsequent visit to the site. 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. No easement encroachments were noted on the project site although farming activities continue to occur in close proximity. Also, a nearby area has been grassed and maintained for a local group of model airplane enthusiasts.

The reaches of the restoration project were observed to be in stable condition. The channel's profile and cross-sections adjusted minimally from the baseline conditions. The channel accesses its floodplain and evidence of bankfull events were observed during Year 1 monitoring. This evidence included the presence of wrack lines, sediment deposits, the crest gauge, and actual event during monitoring. The substrate shows 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 to migrate into the system. Sediment transport analysis and shear stress fall within acceptable ranges and similar to those of the baseline condition.

Notable areas of potential concern along the reaches include a structure/bank failure along the lower reach at Station 21+85. This area was noted during construction as having poor soils and matting was provided at that time to help with stabilization. This area is also subject to numerous backwater events from Cane Creek and in an area where vegetation has been noted as sparse. Another area of potential concern occurs along the lower reach just below the aerial sewer line crossing and near the floodplain interceptor at Sta. 14+95. This area has a couple of issues including an approximately 10' x 10' area of bank erosion just above the floodplain interceptor. Then the interceptor itself has broken down and is potentially downcutting and creating a channel. The last major area of concern is located at the permanent stream crossing near Sta. 24+00 on the upper reach. Debris has collected in front of the culverts including the

floodplain pipes and created a blockage. This has resulted in erosion along the upstream side of the crossing as well as scour on the downstream ends of the floodplain pipes. This area is in need of maintenance along the crossing and may require future regular visits to make certain the crossing remains in place and safe. Other areas of minor aggradation or erosion are noted on the CCPV. These areas do not appear to be negatively impacting the channel morphology at this time. Vegetation was noted as sparse in several locations during the monitoring event; however, subsequent visits to the site indicate that the herbaceous cover on the site is adequate.

Several factors have been determined to be worthy of future attention on the site. These include backwater effects from Cane Creek during large precipitation events, beaver monitoring due to past removal onsite and presence upstream, vegetation planted outside the planting window as well as future plans by the Town that may impact the project area such as proposed sewer lines and development of the park with multiple uses.

Summary information/data related to the occurrence of items such as beaver or encroachment 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 EEP's website. All raw data supporting the tables and figures in the appendices is available from EEP upon request.

2.0 METHODOLOGY

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 total station on May 7, 8, and 9, 2013. This report details the results of Monitoring Year 1.

2.1 Morphometric Parameters and Channel Stability

2.1.1 Profile

The entire length of the reach was monitored by HDR using a total station. Multiple parameters were located including top of bank, thalweg, and water surface. The longitudinal profiles show that the bed features are stable. Riffles throughout the upper, lower, and tributary reaches show a general trend of becoming shorter and steeper in Year 1 as compared to baseline. However, overall channel and bankfull slopes remain consistent in comparison to the baseline condition. Pool lengths and depths remain stable and similar to baseline values as well.

In the bottom half of the lower reach, starting around Sta. 18+00, bed features become hard to distinguish due to frequent backwater effects from Cane Creek. Data collection for baseline and year 1 monitoring have both come after large rainfall events that back up water well into the lower reach as shown in the photo locations.

2.1.2 Dimension

Nine cross sections were measured by HDR staff on May 7-9, 2013. The morphological data is presented in Tables 10 and 11 in Appendix D, along with the cross-sectional data. The channel cross-section dimensions lie within the design parameters for all reaches. Comparison with baseline values, along with

visual assessment, show no excessive aggradation, degradation, or trends toward instability in the cross sections. The instances of cross sections showing aggradation occur in cross sections 1, 4, and 6.

2.1.3 Pattern

The pattern of the channel was obtained using total station. The location is illustrated on the current condition plan view map in Appendix B. No lateral movement in stream pattern was observed in Year 1 monitoring.

2.1.4 Substrate

Pebble counts were taken for Year 1 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 significant presence of 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.

2.1.5 Sediment Transport

Shear stress values calculated from Year 1 riffle data and average slope remain within acceptable values when compared to the design and baseline. As the average channel slopes and cross section dimensions remained relatively unchanged, the shear stress values fall within acceptable ranges.

2.1.6 Photo Documentation

Photos were taken at the 52 stream photo stations and 17 vegetation plots on May 7-9, 2013. The locations of the photos stations and vegetation plots are noted on Figure 3 in Appendix B. The photos for monitoring year 1 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 7 and 8, 2013. Monitoring was conducted on seventeen vegetation plots (3 on the tributary, 7 on the main stem upper reach and 7 on the main stream 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 398 stems/acre with the range from 607 to 202 stems/acre. The highest plant density occurred in plot 4 with over 600 stems/acre. Currently, 13 of the plots are meeting the interim 3-year vegetation success criteria of 320 stems/acre. Year 1 monitoring data is provided in Appendix C. Vegetation throughout the reach appears to be growing at acceptable rates and the mortality rate appears to be fairly low. Herbaceous vegetation which is sparse in the spring and noted on the CCPV was reviewed during subsequent visits to the site over the summer and found to be thriving. The four plots that are not meeting interim success criteria include 3 along the tributary which may not have been planted at the appropriate density and the plot closest to the confluence with Cane Creek which has had backwater impacts numerous times over the past year.

2.4 Hydrology

No groundwater monitoring gauges were installed onsite prior to the Year 1 monitoring; however, 35 wells were installed in June 2013 in the proposed wetland areas to document hydrology for the remaining years of monitoring. Two crest gauges were installed and indicated a couple of bankfull events as well as evidence of a bankfull event along the site in wrack lines, vegetation lying over, and ponded water on the floodplain. During the baseline monitoring a bankfull event was documented with photos on September 18, 2012 as well as during the first year monitoring on May 8, 2013.

Data from the groundwater monitoring stations showed 11 of 26 stations were in operation for a portion of the 2013 growing season. The data revealed that 8 of the 11 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 days). The on-site rain gauge did not have a full data set to cover the required time period, so a nearby NC Climate Center rain gauge (Fletcher 3W) was utilized for full rain data coverage. Above-average rainfall was recorded during the initial data period (June 25 to December 15, 2013), but a full year has not yet been covered by the dataset. During normal rainfall years most groundwater gauges are expected to meet the minimum criteria, but it is difficult to predict at this time with such a limited dataset combined with our understanding of the surface-water driven hydrology for the site.

3.0 REFERENCES CITED

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

HDR Engineering, Inc. 2011. UT to Cane Creek Stream Restoration Final Plans (90%).

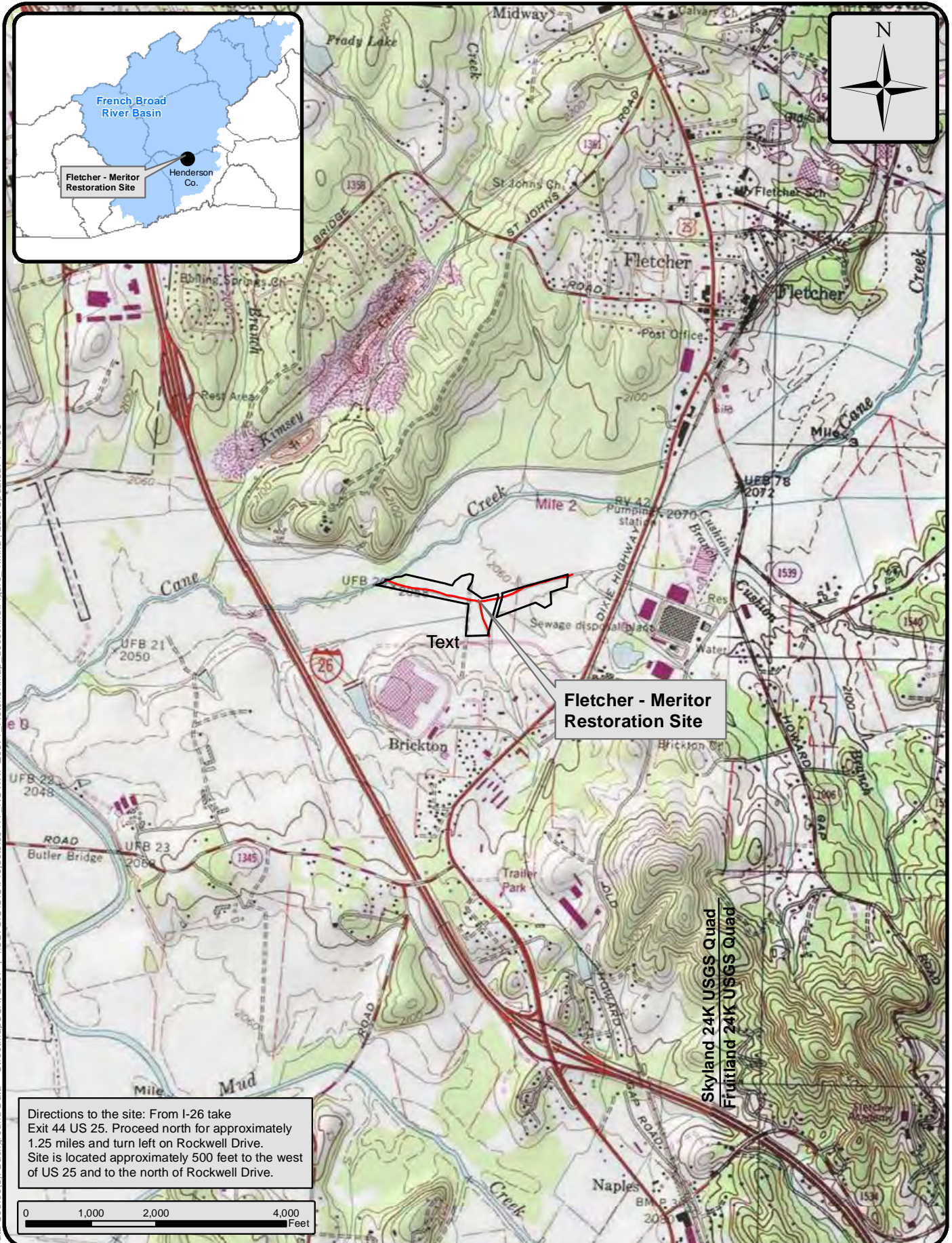
Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2006. CVS-EEP Protocol for Recording Vegetation. Version 4.0. (<http://cvs.bio.unc.edu/methods.htm>.)

North Carolina Ecosystem Enhancement Program. 2011. Baseline Monitoring Document: Format, Data Requirements, and Content Guidance.

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).

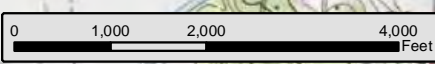
Appendix A

General Tables and Figures

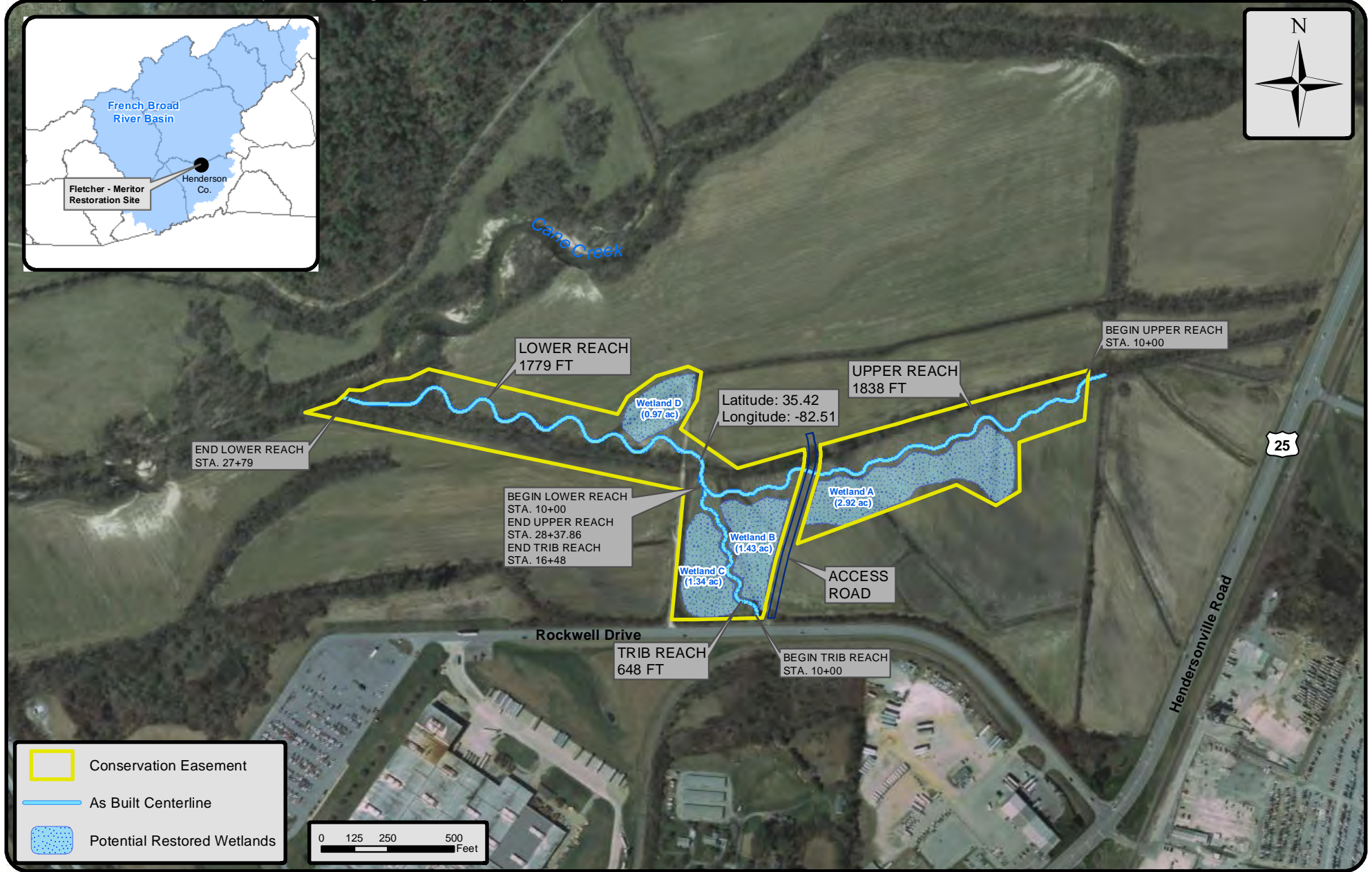


Data Source(s): Background Data - StreetMapUSA, 2007 | NCLTGIS\GIS\Projects\09177 - NC\WRP\20671 - Fletcher\map_docs\mxd\Figure_1.mxd | Last Updated: 1-18-08

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.



Vicinity Map
Figure 1



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	1838 lf	10+00-28+38	1:1	1838		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.
Main Steam Lower Reach	1320 lf	R	P2	1779 lf	10+00-27+79	1:1	1779		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.
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	1838	1838	0.0	0.0					
Main Steam Lower Reach	1779	1779	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						
(Feet/Acres)	4,265	4,265	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: 0 yrs 3 months

Elapsed Time Since Planting Complete: 0 yrs 3 Months

Number of Reporting Years: 0

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		
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

Table 3. Project Contacts Table

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

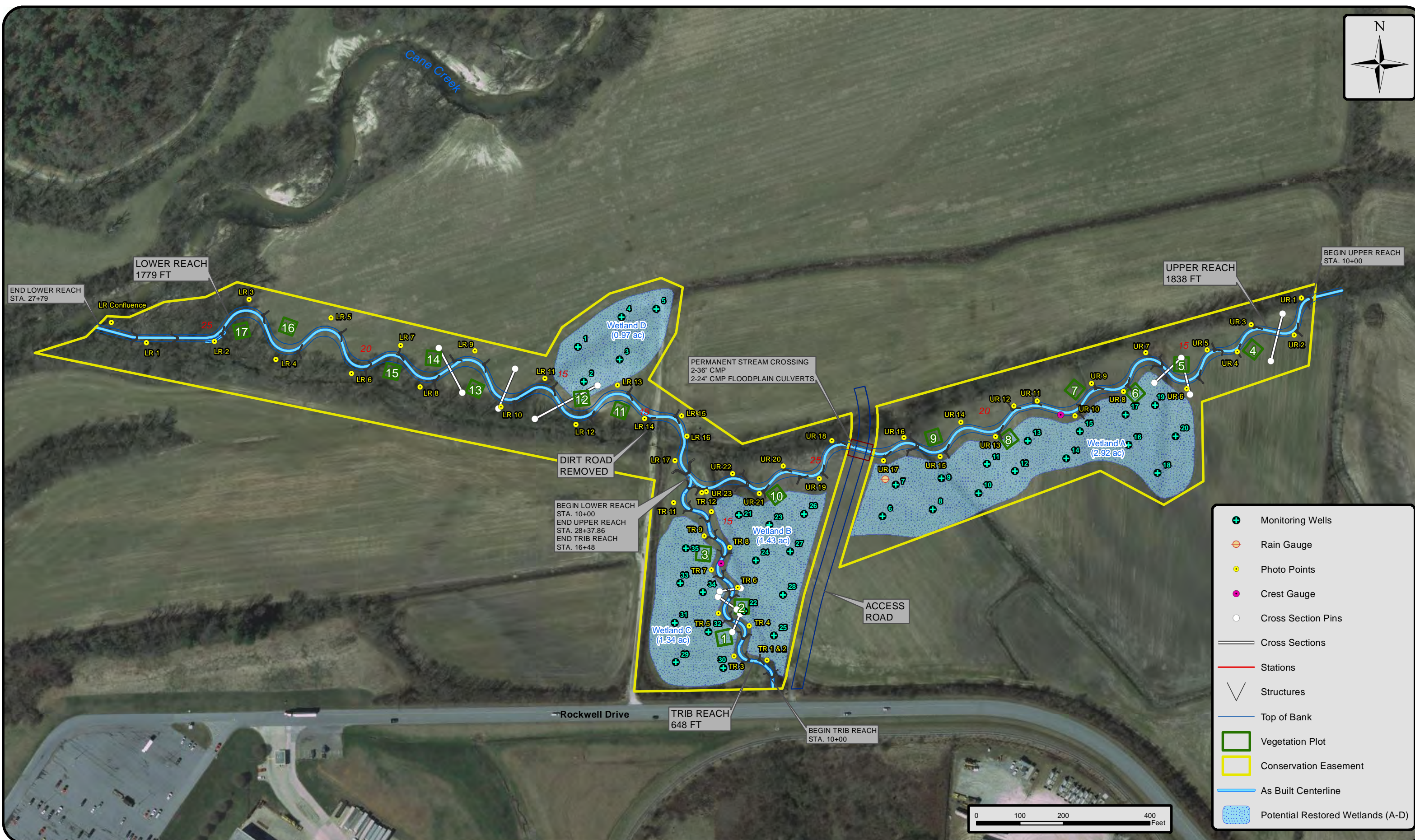
Designer	HDR Engineering Inc. of the Carolinas 3733 National Drive, Suite 207, Raleigh, NC 27612
Primary project design POC	Jonathan Henderson, PE (919) 785-1118
Construction Contractor	Buchanan and Sons, Inc. P.O. Box 123, Whittier, NC 28789
Construction contractor POC	Chris Buchanan, (828) 497-9720
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

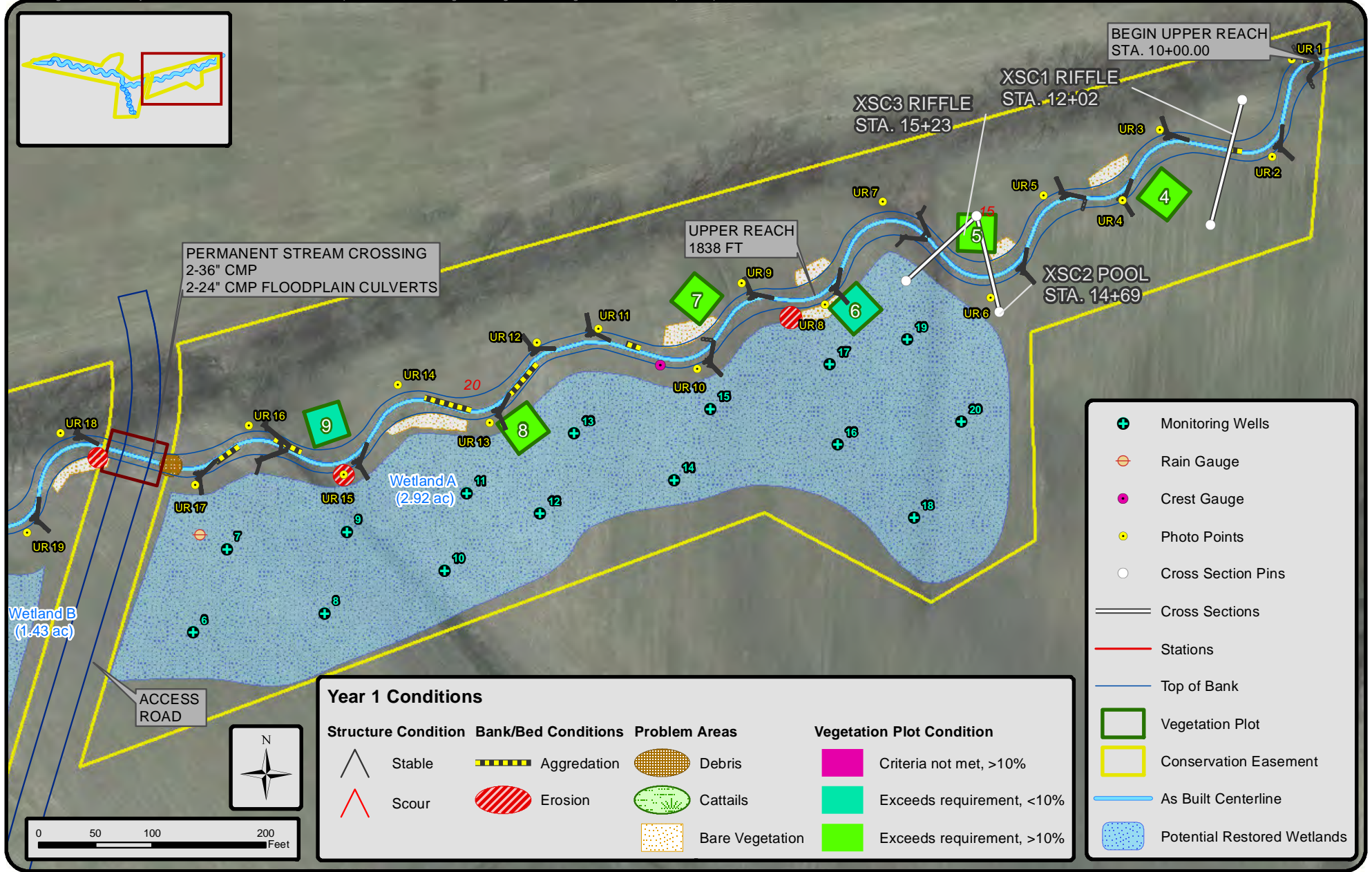
Table 4. Project Attribute Table
Fletcher-Meritor Site (UT to Cane Creek) Stream and Wetland Restoration/Project No. 138

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)	1838	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

Visual Assessment



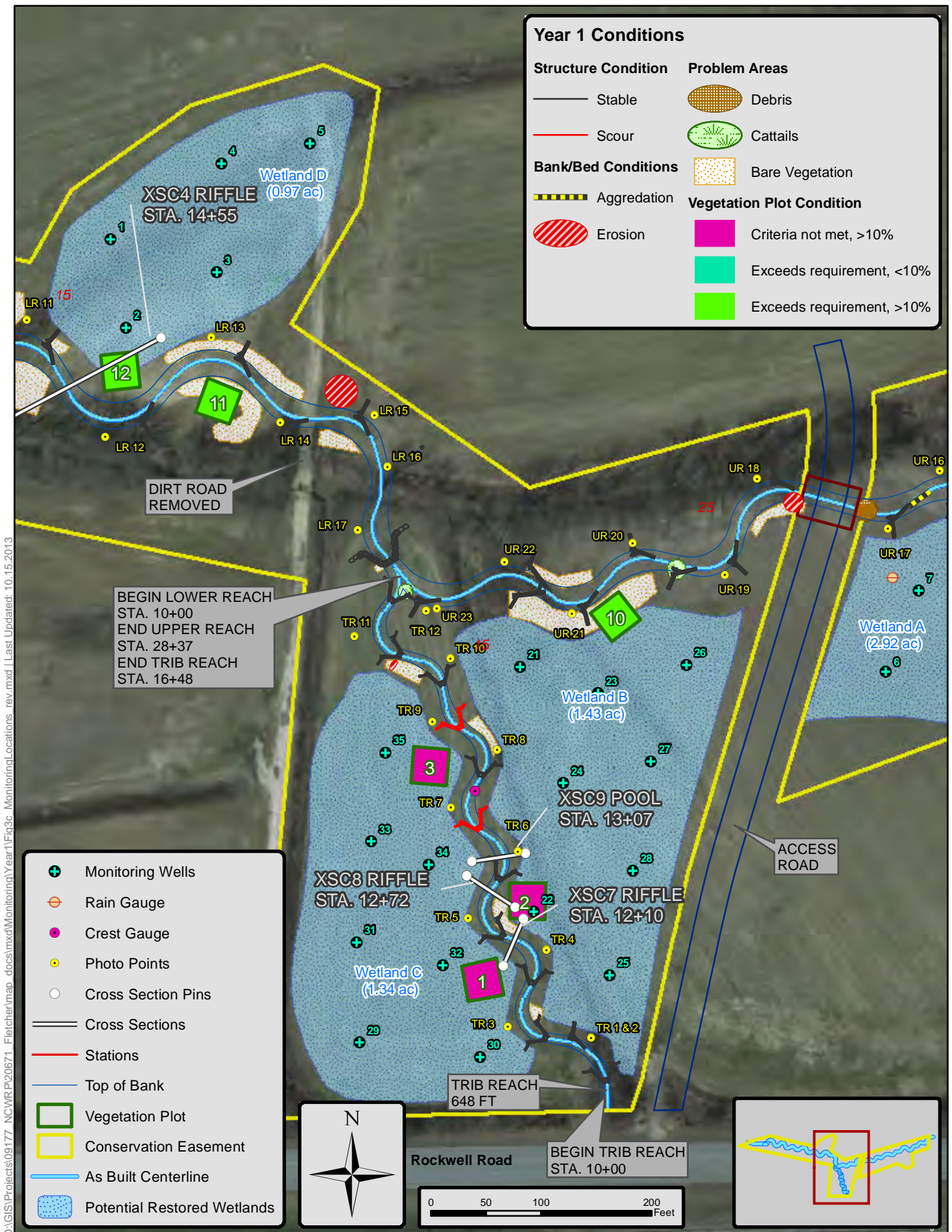


Current Conditions Plan View

Figure 3b

Year 1 Conditions

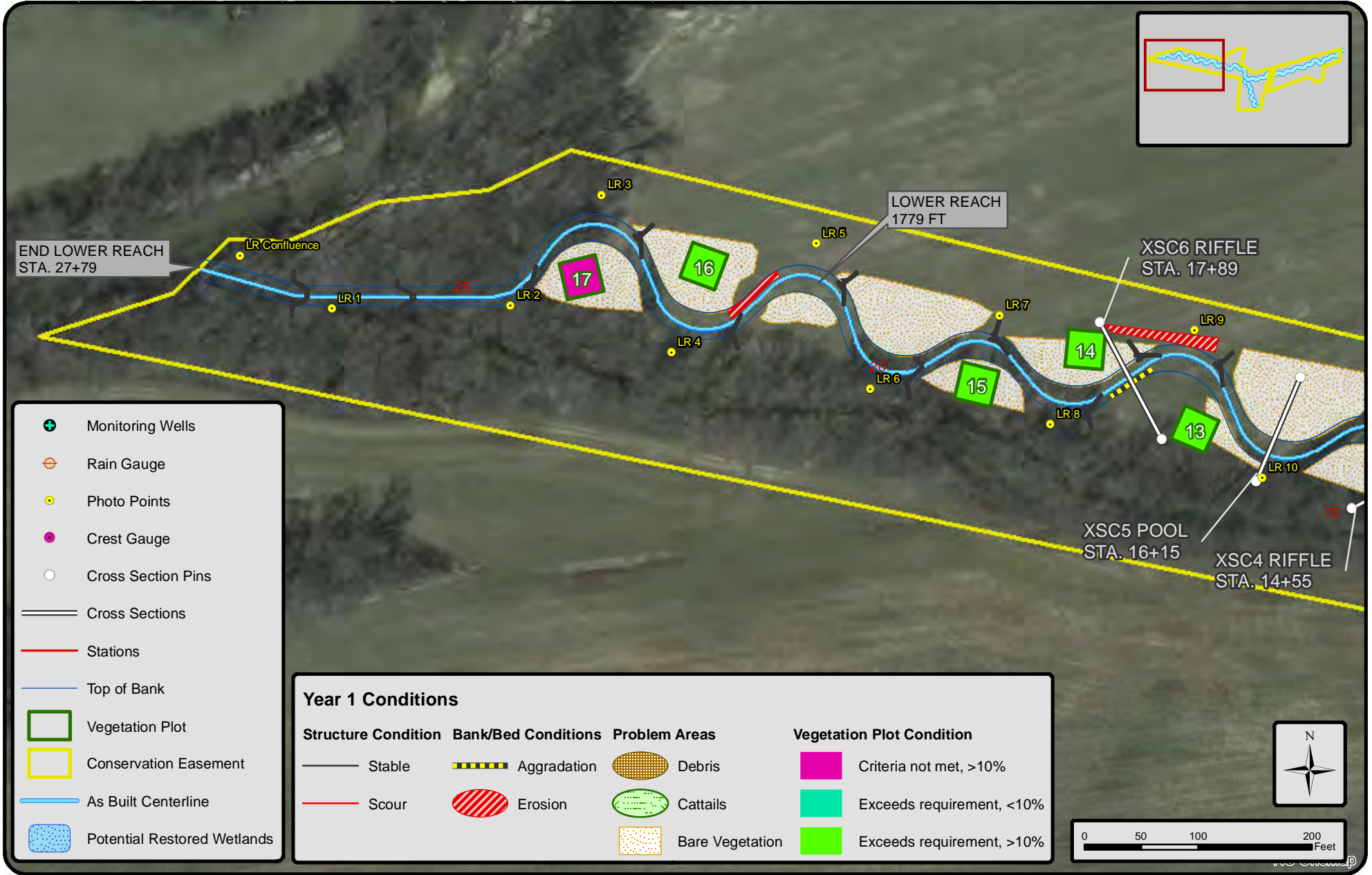
Structure Condition	Problem Areas
Stable	Debris
Scour	Cattails
Bank/Bed Conditions	Vegetation Plot Condition
Aggradation	Criteria not met, >10%
Erosion	Exceeds requirement, <10%
	Exceeds requirement, >10%



D:\GIS\Projects\09177 - NCWRP\20671 - Fletcher\map_docs\mxd\Monitoring\Year1\Fig3c_MonitoringLocations_rev.mxd | Last Updated: 10.15.2013

- Monitoring Wells
- Rain Gauge
- Crest Gauge
- Photo Points
- Cross Section Pins
- Cross Sections
- Stations
- Top of Bank
- Vegetation Plot
- Conservation Easement
- As Built Centerline
- 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
 1838

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)			7	163	91%			
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	21	21			100%			
		3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth \geq 1.6)	23	23					
	2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)		23	23			100%			
	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										
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			3	154	96%			96%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT 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										
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)			1	43	98%			
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	15	16			94%			
		3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth \geq 1.6)	16	16					
	4. Thalweg Position	2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	16	16			100%			
		1. Thalweg centering at upstream of meander bend (Run)	16	16			100%			
		2. Thalweg centering at downstream of meander (Glide)	16	16			100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			13	511	86%			86%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT 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					13	511	86%	0	0	86%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	17	17			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.	17	17			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)	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)			0	0	100%			
		2. <u>Degradation</u> - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	11	11			100%			
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth \geq 1.6)	11	11			100%			
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	11	11			100%			
	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										
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			1	42	97%	0	0	97%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT 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										
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.	12	12			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)	12	12			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.	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	28	1.05	5.6%
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	0	0.00	0.0%
Total				28	1.05	5.6%
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				28	1.05	5.6%

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	0	0.00	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 (5/7/2013 Year 1)



Upper Reach Photo Station 1 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 2 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 2 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 3 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 3 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 4 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 4 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 5 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 5 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 6 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 6 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 7 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 7 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 8 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 8 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 9 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 9 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 10 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 10 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 11 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 11 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 12 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 12 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 13 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 13 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 14 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 14 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 15 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 15 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 16 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 16 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 17 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 17 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 18 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 18 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 19 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 19 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 20 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 20 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 21 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 21 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 22 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 22 Upstream (5/7/2013 Year 1)



Upper Reach Photo Station 23 Downstream (5/7/2013 Year 1)



Upper Reach Photo Station 23 Upstream (5/7/2013 Year 1)



Confluence with Cane Creek (5/08/2013 Year 1)



Looking upstream of Confluence with Cane Creek (5/08/2013 Year 1)



Lower Reach Photo Station 1 Downstream (6/25/2013 Year 1)



Lower Reach Photo Station 1 Upstream (6/25/2013 Year 1)



Lower Reach Photo Station 2 Downstream (6/25/2013 Year 1)



Lower Reach Photo Station 2 Upstream (6/25/2013 Year 1)



Lower Reach Photo Station 3 Downstream (5/08/2013 Year 1)



Lower Reach Photo Station 3 Upstream (5/08/2013 Year 1)



Lower Reach Photo Station 4 Downstream (5/08/2013 Year 1)



Lower Reach Photo Station 4 Upstream (5/08/2013 Year 1)



Lower Reach Photo Station 5 Downstream (5/08/2013 Year 1)



Lower Reach Photo Station 5 Upstream (5/08/2013 Year 1)



Lower Reach Photo Station 6 Downstream (5/08/2013 Year 1)



Lower Reach Photo Station 6 Upstream (5/08/2013 Year 1)



Lower Reach Photo Station 7 Downstream (5/08/2013 Year 1)



Lower Reach Photo Station 7 Upstream (5/08/2013 Year 1)



Lower Reach Photo Station 8 Downstream (5/08/2013 Year 1)



Lower Reach Photo Station 8 Upstream (5/08/2013 Year 1)



Lower Reach Photo Station 9 Downstream (5/08/2013 Year 1)



Lower Reach Photo Station 9 Upstream (5/08/2013 Year 1)



Lower Reach Photo Station 10 Downstream (5/08/2013 Year 1)



Lower Reach Photo Station 10 Upstream (5/08/2013 Year 1)



Lower Reach Photo Station 11 Downstream (5/08/2013 Year 1)



Lower Reach Photo Station 11 Upstream (5/08/2013 Year 1)



Lower Reach Photo Station 12 Downstream (5/07/2013 Year 1)



Lower Reach Photo Station 12 Upstream (5/07/2013 Year 1)



Lower Reach Photo Station 13 Downstream (5/08/2013 Year 1)



Lower Reach Photo Station 13 Upstream (5/08/2013 Year 1)



Lower Reach Photo Station 14 Downstream (5/07/2013 Year 1)



Lower Reach Photo Station 14 Upstream (5/07/2013 Year 1)



Lower Reach Photo Station 15 Downstream (5/07/2013 Year 1)



Lower Reach Photo Station 15 Upstream (5/07/2013 Year 1)



Lower Reach Photo Station 16 Downstream (5/07/2013 Year 1)



Lower Reach Photo Station 16 Upstream (5/07/2013 Year 1)



Lower Reach Photo Station 17 Downstream (5/07/2013 Year 1)



Lower Reach Photo Station 17 Upstream (5/07/2013 Year 1)



Tributary Reach Photo Station 1 & 2 Downstream (5/08/2013 Year 1)



Tributary Reach Photo Station 1 & 2 Upstream (5/08/2013 Year 1)



Tributary Reach Photo Station 3 Downstream (5/08/2013 Year 1)



Tributary Reach Photo Station 3 Upstream (5/08/2013 Year 1)



Tributary Reach Photo Station 4 Downstream (5/08/2013 Year 1)



Tributary Reach Photo Station 4 Upstream (5/08/2013 Year 1)



Tributary Reach Photo Station 5 Downstream (5/08/2013 Year 1)



Tributary Reach Photo Station 5 Upstream (5/08/2013 Year 1)



Tributary Reach Photo Station 6 Downstream (5/08/2013 Year 1)



Tributary Reach Photo Station 6 Upstream (5/08/2013 Year 1)



Tributary Reach Photo Station 7 Downstream (5/08/2013 Year 1)



Tributary Reach Photo Station 7 Upstream (5/08/2013 Year 1)



Tributary Reach Photo Station 8 Downstream (5/08/2013 Year 1)



Tributary Reach Photo Station 8 Upstream (5/08/2013 Year 1)



Tributary Reach Photo Station 9 Downstream (5/08/2013 Year 1)



Tributary Reach Photo Station 9 Upstream (5/08/2013 Year 1)



Tributary Reach Photo Station 10 Downstream (5/08/2013 Year 1)



Tributary Reach Photo Station 10 Upstream (5/08/2013 Year 1)



Tributary Reach Photo Station 11 Downstream (5/08/2013 Year 1)



Tributary Reach Photo Station 11 Upstream (5/08/2013 Year 1)



Tributary Reach Photo Station 12 Downstream (5/08/2013 Year 1)



Tributary Reach Photo Station 12 Upstream (5/08/2013 Year 1)



Vegetation Plot 1 – 10m x 10m (5/07/2013 Year 1)



Vegetation Plot 2 – 10m x 10m (5/07/2013 Year 1)



Vegetation Plot 3 – 10m x 10m (5/07/2013 Year 1)



Vegetation Plot 4 – 10m x 10m (5/07/2013 Year 1)



Vegetation Plot 5 – 10m x 10m (5/08/2013 Year 1)



Vegetation Plot 6 – 10m x 10m (5/08/2013 Year 1)



Vegetation Plot 7 – 10m x 10m (6/25/2013 Year 1)



Vegetation Plot 8 – 10m x 10m (5/08/2013 Year 1)



Vegetation Plot 9 – 10m x 10m (5/08/2013 Year 1)



Vegetation Plot 10 – 10m x 10m (5/08/2013 Year 1)



Vegetation Plot 11 – 10m x 10m (5/08/2013 Year 1)



Vegetation Plot 12 – 10m x 10m (5/08/2013 Year 1)



Vegetation Plot 13 – 10m x 10m (5/08/2013 Year 1)



Vegetation Plot 14 – 10m x 10m (5/08/2013 Year 1)



Vegetation Plot 15 – 10m x 10m (6/25/2013 Year 1)



Vegetation Plot 16 – 10m x 10m (5/08/2013 Year 1)



Vegetation Plot 17 – 10m x 10m (5/08/2013 Year 1)

Appendix C

Vegetation Plot Data

Fletcher-Meritor Site (#138)
Year 1 (07-May-2013 to 08-May-2013)
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	5	0	0	0	6	0
2	n/a	7	0	0	0	7	0
3	n/a	5	0	0	0	5	0
4	n/a	15	0	0	0	16	0
5	n/a	11	0	0	5	16	0
6	n/a	8	0	0	6	14	0
7	n/a	14	0	0	0	15	0
8	n/a	10	0	0	1	11	0
9	n/a	8	0	0	1	9	0
10	n/a	10	0	0	3	13	0
11	n/a	10	0	0	204	214	0
12	n/a	10	0	0	13	23	0
13	n/a	12	0	0	50	62	0
14	n/a	12	0	0	103	115	0
15	n/a	14	0	0	200	214	0
16	n/a	9	0	0	52	61	0
17	n/a	7	0	0	200	207	0

Wetland/Stream Vegetation Totals (per acre)

Plot #	Stream/Wetland Stems ²	Volunteers ³	Total ⁴	Success Criteria Met?
1	202	0	243	No
2	283	0	283	No
3	202	0	202	No
4	607	0	647	Yes
5	445	202	647	Yes
6	324	243	567	Yes, barely
7	567	0	607	Yes
8	405	40	445	Yes
9	324	40	364	Yes, barely
10	405	121	526	Yes
11	405	8256	8660	Yes
12	405	526	931	Yes
13	486	2023	2509	Yes
14	486	4168	4654	Yes
15	567	8094	8660	Yes
16	364	2104	2469	Yes
17	283	8094	8377	No
Project Avg	398	1995	2400	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

³Volunteers Native woody stems. Not planted. No vines.

⁴Total Planted + volunteer native woody stems. Includes live stakes. Excl. exotics. Excl. vines.

Report Prepared By
Date Prepared

Vickie Miller
10/15/2013 14:28

database name
database location
computer name
file size

cvs-eeep-entrytool-v2.3.1 Fletcher.mdb
R:\EEEP-WRP\20671 Fletcher\Monitoring\Year1\Vegetation
RALE-12116343
51904512

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
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; d

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

natural/volunteer stems.

dead and missing stems are excluded.

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

Scientific Name	Common Name	Species Type	Curr																							
			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 negundo	boxelder	Tree							1	1	1				3	3	3				6	6	6	1	1	1
Acer rubrum	red maple	Tree																								1
Betula nigra	river birch	Tree	1	1	1				1	1	1	4	4	4	1	1	1	1	1	1	2	2	2	4	4	4
Cornus amomum	silky dogwood	Shrub													1	1	1				1	1	1			
Fraxinus pennsylvanica	green ash	Tree	2	2	2	4	4	4	3	3	3	6	6	6				3	3	3	3	3	3	4	4	4
Juglans nigra	black walnut	Tree	1	1	1							1	1	1	3	3	3				1	1	1			
Platanus occidentalis	American sycamore	Tree	1	1	1	3	3	3				4	4	4	3	3	8	4	4	10	1	1	1	1	1	1
Sambucus canadensis	Common Elderberry	Shrub																								
Unknown		Shrub or Tree	1	1	1							1	1	1							1	1	1			
Stem count			6	6	6	7	7	7	5	5	5	16	16	16	11	11	16	8	8	14	15	15	15	10	10	11
size (ares)			1			1			1			1			1			1			1					
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02					
Species count			5	5	5	2	2	2	3	3	3	5	5	5	5	5	5	3	3	3	7	7	7	4	4	5
Stems per ACRE			242.8	242.8	242.8	283.3	283.3	283.3	202.3	202.3	202.3	647.5	647.5	647.5	445.2	445.2	647.5	323.7	323.7	566.6	607	607	607	404.7	404.7	445.2

Color for Density

Exceeds requirements by 10%

Exceeds requirements, but by less than 10%

Fails to meet requirements, by less than 10%

Fails to meet requirements by more than 10%

rent Plot Data (MY1 2013)																								Annual Means											
138-01-0009			138-01-0010			138-01-0011			138-01-0012			138-01-0013			138-01-0014			138-01-0015			138-01-0016			138-01-0017			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	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
1	1	1	1	1	1	2	2	2	3	3	3	2	2	2	1	1	1				2	2	2	4	4	4	27	27	27	22	22	22			
					3															5						9									
			1	1	1	3	3	203	2	2	15	2	2	52	3	3	103	3	3	203	1	1	41			200	29	29	832	26	26	481			
						1	1	1	5	5	5	5	5	5	4	4	4	10	10	10	3	3	3	1	1	1	31	31	31	30	30	30			
3	3	3	3	3	3	2	2	2				1	1	1	4	4	4							2	2	2	40	40	40	36	36	36			
1	1	1																									7	7	7	6	6	6			
3	3	4	5	5	5	2	2	6				2	2	2			3	1	1	1	3	3	10				33	33	59	35	35	70			
																														1	1	1			
																											3	3	3	4	4	4			
8	8	9	10	10	13	10	10	214	10	10	23	12	12	62	12	12	115	14	14	214	9	9	61	7	7	207	170	170	1008	160	160	650			
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17	17	17	17	17	17			
0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.42	0.42	0.42	0.42	0.42	0.42			
4	4	4	4	4	5	5	5	5	3	3	3	5	5	5	4	4	5	3	3	3	4	4	5	3	3	4	7	7	8	8	8	8			
323.7	323.7	364.2	404.7	404.7	526.1	404.7	404.7	8660	404.7	404.7	930.8	485.6	485.6	2509	485.6	485.6	4654	566.6	566.6	8660	364.2	364.2	2469	283.3	283.3	8377	404.7	404.7	2400	380.9	380.9	1547			

Appendix D

Stream Assessment Data

Station	Elevation
0	2061.432
0.01	2061.099
25.89	2060.922
43.99	2060.447
57.6	2059.166
59.95	2058.862
62.19	2057.841
62.83	2057.618
63.61	2057.122
64.51	2056.952
65.77	2056.913
66.38	2056.893
67.17	2056.975
67.89	2057.54
68.34	2057.387
68.8	2057.133
69.68	2057.285
70.6	2058.098
71.92	2058.339
73.16	2058.706
74.58	2059.306
87.65	2060.372
91.05	2060.88
102.23	2061.333
115.1	2061.584
115.21	2062.009

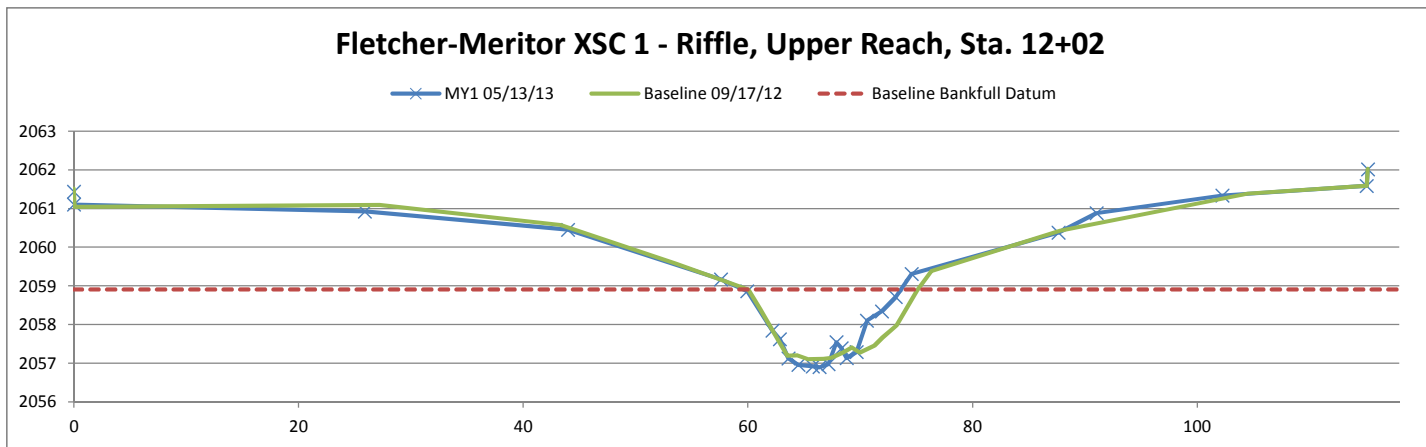
Reach	Fletcher-Meritor, Upper Reach
River Basin	French Broad
Cross Section ID	XSC-1, Riffle, Upper Reach, 12+02
Drainage Area (Sq Mi)	0.75
Date	5/13/2013
Observers	V. Miller, B. Steffen, W. Yelverton

SUMMARY DATA	
Bankfull Elevation, ft	2058.90
Bankfull Cross Sectional Area, ft ²	16.70
Bankfull Width, ft	14.00
Max Depth at Bankfull, ft	2.01
Mean Depth at Bankfull, ft	1.19
Width/Depth Ratio	11.74
Flood Prone Width, ft	65.20
Flood Prone Area Elevation	2060.91
Entrenchment Ratio	4.70
Bank Height Ratio	0.99



Stream Type C/E4

Sta. 12+02 Looking Downstream



Station	Elevation
0	2060.891
0.08	2060.58
10.76	2060.613
16.15	2060.483
22.41	2059.057
23.66	2058.575
24.77	2057.992
25.69	2057.663
26.43	2057.543
27.02	2056.739
27.58	2056.202
28.3	2056.081
29.08	2055.829
30.19	2055.543
31.6	2055.587
32.5	2056.187
32.89	2056.825
33.68	2057.545
36.41	2057.748
40.12	2058.183
45.38	2058.6
47.75	2058.832
61.56	2059.703
77.73	2060.444
85.2	2060.418
85.2	2060.89

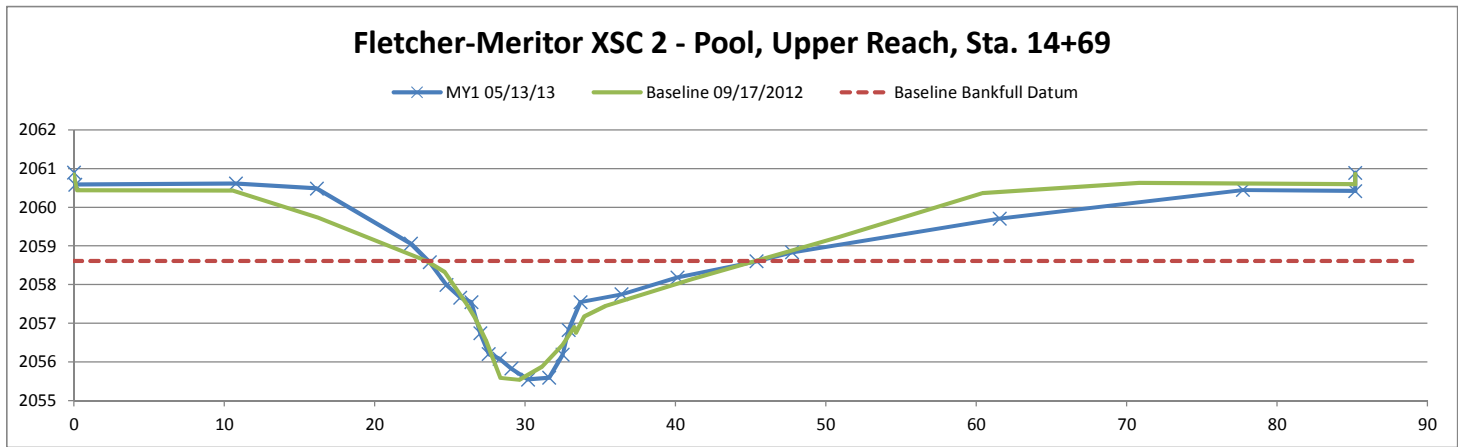
Reach	Fletcher-Meritor, Upper Reach
River Basin	French Broad
Cross Section ID	XSC-2, Pool, Upper Reach, 14+69
Drainage Area (Sq Mi)	0.75
Date	5/13/2013
Observers	V. Miller, B. Steffen, W. Yelverton

SUMMARY DATA	
Bankfull Elevation, ft	2058.61
Bankfull Cross Sectional Area, ft²	25.80
Bankfull Width, ft	21.90
Max Depth at Bankfull, ft	3.07
Mean Depth at Bankfull, ft	1.18
Width/Depth Ratio	18.59
Flood Prone Width, ft	>86.00
Flood Prone Area Elevation	2061.68
Entrenchment Ratio	>4.00
Bank Height Ratio	1.15



Stream Type C/E4

Sta. 14+69 Looking Downstream



Station	Elevation
0	2061.21
0.13	2060.77
15.16	2060.68
18.44	2060.09
24.54	2059.31
31.62	2058.82
34.08	2057.61
35.73	2056.97
36.2	2056.45
37.71	2056.48
38.78	2056.59
40.03	2056.48
41.11	2056.50
41.65	2056.73
42.18	2057.28
43.08	2057.39
44.35	2057.88
46.42	2058.83
54	2059.27
62.48	2060.17
74.09	2060.69
84.83	2060.58
85.2	2060.89

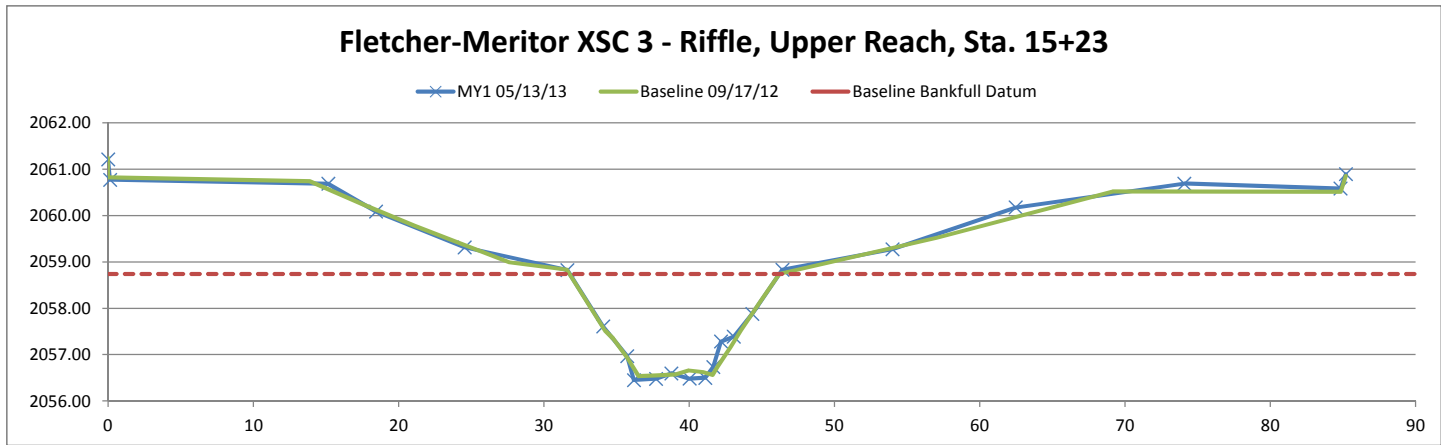
Reach	Fletcher-Meritor, Upper Reach
River Basin	French Broad
Cross Section ID	XSC-3, Riffle, Upper Reach, 15+23
Drainage Area (Sq Mi)	0.75
Date	5/13/2013
Observers	V. Miller, B. Steffen, W. Yelverton

SUMMARY DATA	
Bankfull Elevation, ft	2058.74
Bankfull Cross Sectional Area, ft²	21.20
Bankfull Width, ft	14.40
Max Depth at Bankfull, ft	2.29
Mean Depth at Bankfull, ft	1.47
Width/Depth Ratio	9.78
Flood Prone Width, ft	>86.00
Flood Prone Area Elevation	2061.03
Entrenchment Ratio	>6.00
Bank Height Ratio	1.03



Stream Type C/E4

Sta. 15+23, Looking Downstream



Station	Elevation
0	2059.011
0.1	2058.64
3.22	2058.349
19.09	2054.988
40.21	2054.726
56.77	2053.852
58.43	2053.887
61.96	2051.947
62.79	2051.729
63.21	2051.434
63.68	2051.374
64.63	2051.281
66.04	2051.422
67.67	2051.379
68.57	2051.433
68.95	2051.567
70.42	2051.663
71.3	2052.436
72.56	2052.828
75.29	2053.918
78.85	2054.253
102.45	2054.596
126.52	2055.01
138.25	2055.168
152.87	2057.068
167.81	2058.234
167.84	2058.486

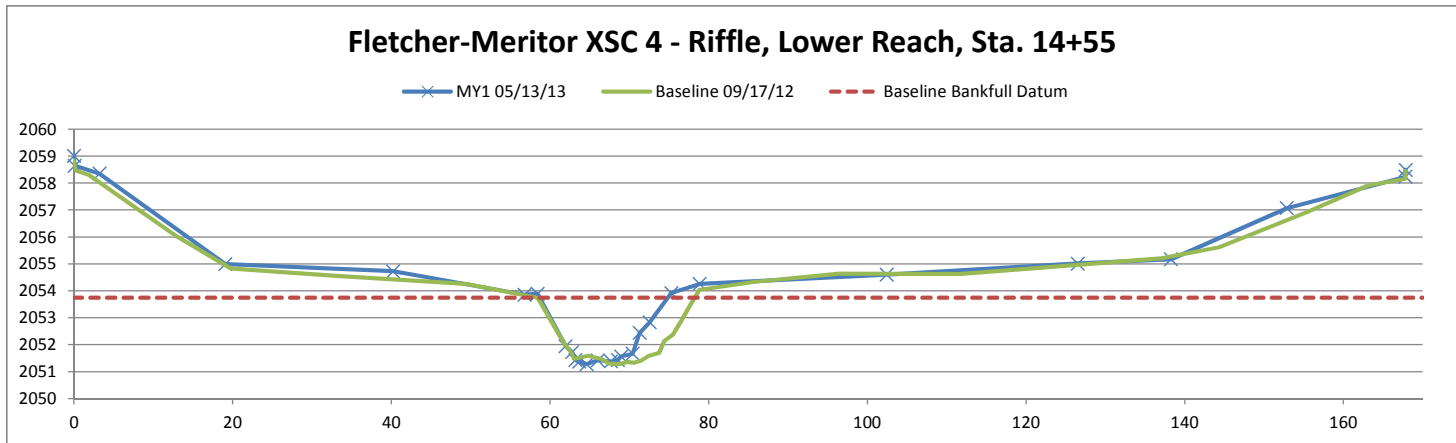
Reach	Fletcher-Meritor, Lower Reach
River Basin	French Broad
Cross Section ID	XSC-4 Riffle, Lower Reach, 14+55
Drainage Area (Sq Mi)	1.1
Date	5/13/2013
Observers	V. Miller, B. Steffen, W. Yelverton

SUMMARY DATA	
Bankfull Elevation, ft	2053.74
Bankfull Cross Sectional Area, ft²	26.00
Bankfull Width, ft	16.10
Max Depth at Bankfull, ft	2.46
Mean Depth at Bankfull, ft	1.61
Width/Depth Ratio	9.97
Flood Prone Width, ft	132.80
Flood Prone Area Elevation	2056.20
Entrenchment Ratio	8.20
Bank Height Ratio	1.04



Stream Type C/E4

Sta. 14+55 Looking Downstream



Station	Elevation
0	2058.808
0.16	2058.381
6.3	2055.999
11.59	2054.024
14.28	2053.736
16.55	2053.321
18.14	2052.395
19.04	2052.02
20.11	2051.116
21.33	2050.225
21.92	2050.104
22.81	2050.113
24.11	2050.131
25	2050.254
26.25	2050.456
27.16	2051.114
27.76	2051.775
28.28	2052.182
35.27	2052.582
43.48	2053.456
54.56	2053.996
65.58	2054.237
70.37	2054.021
86.6	2054.387
91.16	2055.533
98.43	2058.038
99.73	2058.346
99.85	2058.716

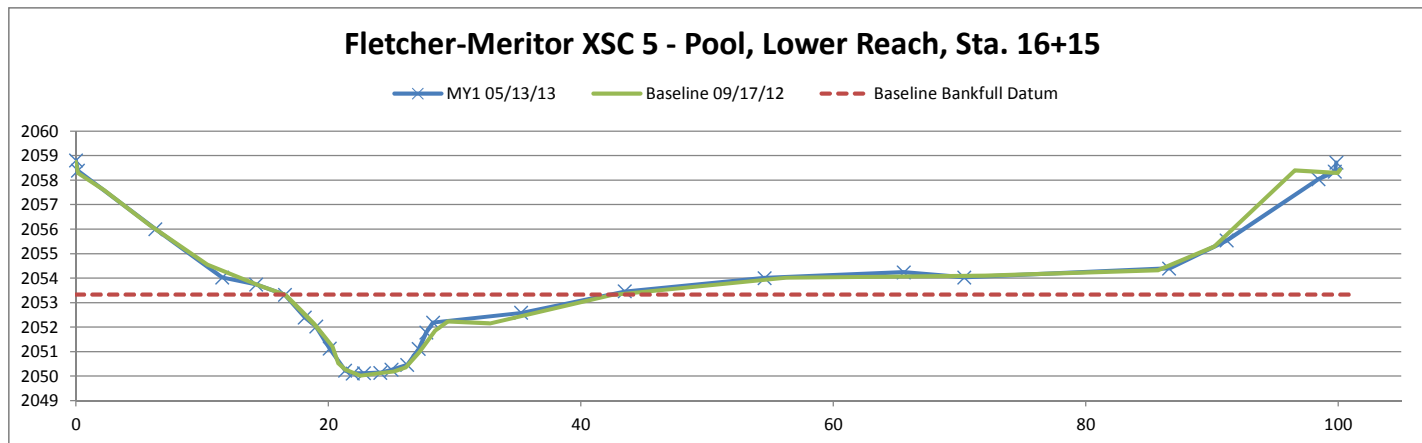
Reach	Fletcher-Meritor, Lower Reach
River Basin	French Broad
Cross Section ID	XSC-5, Pool, Lower Reach, 16+15
Drainage Area (Sq Mi)	1.1
Date	5/13/2013
Observers	V. Miller, B. Steffen, W. Yelverton

SUMMARY DATA	
Bankfull Elevation, ft	2053.32
Bankfull Cross Sectional Area, ft ²	35.50
Bankfull Width, ft	25.70
Max Depth at Bankfull, ft	3.22
Mean Depth at Bankfull, ft	1.38
Width/Depth Ratio	18.61
Flood Prone Width, ft	84.30
Flood Prone Area Elevation	2056.54
Entrenchment Ratio	3.30
Bank Height Ratio	0.65



Stream Type C/E4

Sta. 16+15 Looking Downstream



Station	Elevation
0	2058.1
0.08	2057.715
7.92	2056.178
15.83	2054.112
28.87	2053.463
47	2053.206
53.2	2052.909
55.43	2052.516
57.08	2052.143
58.38	2051.028
59.86	2051.058
61.42	2051.045
62.67	2050.888
64.14	2050.856
64.9	2050.494
65.85	2050.473
66.68	2050.534
67.18	2050.934
67.98	2051.34
71.12	2053.032
72.82	2053.019
86.26	2053.218
101.46	2053.15
108.02	2053.633
109.76	2054.926
115.69	2056.968
115.79	2057.549

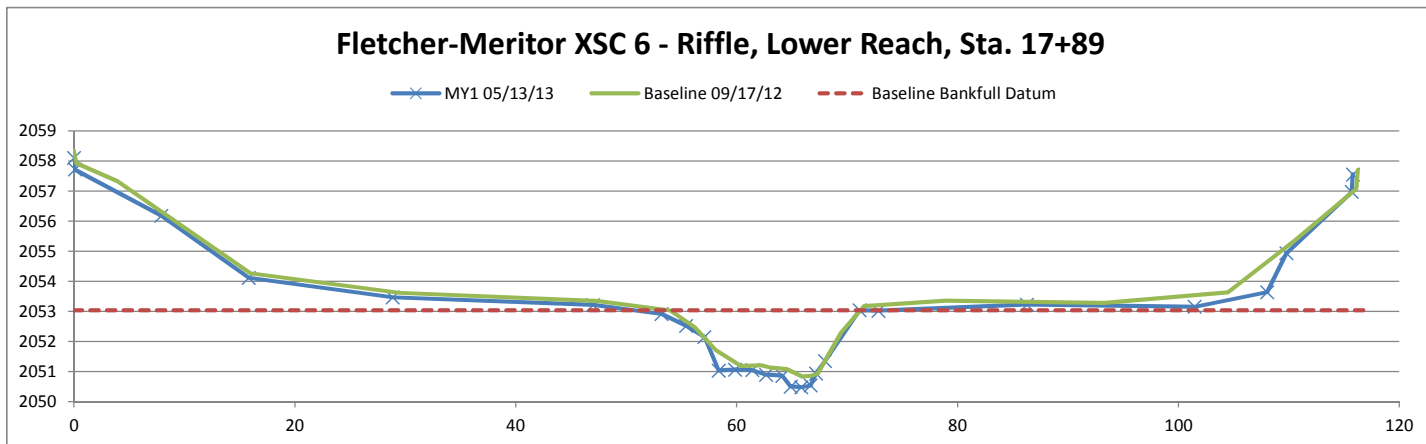
Reach	Fletcher-Meritor, Lower Reach
River Basin	French Broad
Cross Section ID	XSC-6, Riffle, Lower Reach, 17+89
Drainage Area (Sq Mi)	1.1
Date	5/13/2013
Observers	V. Miller, B. Steffen, W. Yelverton

SUMMARY DATA	
Bankfull Elevation, ft	2053.03
Bankfull Cross Sectional Area, ft²	27.30
Bankfull Width, ft	22.60
Max Depth at Bankfull, ft	2.56
Mean Depth at Bankfull, ft	1.21
Width/Depth Ratio	18.71
Flood Prone Width, ft	101.50
Flood Prone Area Elevation	2055.59
Entrenchment Ratio	4.50
Bank Height Ratio	1.00



Stream Type C/E4

Sta. 17+89 Looking Downstream



Station	Elevation
0	2061.703
0.26	2061.459
6.29	2061.284
10.9	2060.117
13.39	2059.761
17.09	2059.349
19.47	2059.402
20.66	2058.999
21.47	2058.415
22.36	2057.808
22.67	2057.747
23.21	2057.658
24.18	2057.682
25.28	2057.732
25.9	2057.75
26.02	2058.078
26.57	2058.198
28.43	2058.838
30.69	2059.424
31.91	2059.827
38.46	2060.842
42.56	2061.009
45.97	2060.814
46.2	2060.988

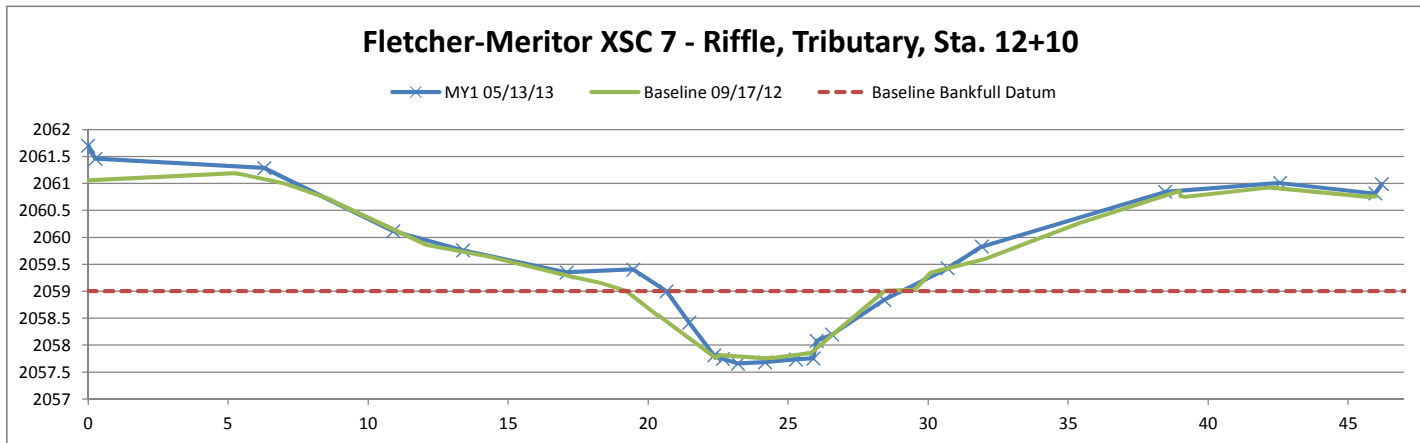
Reach	Fletcher-Meritor, Tributary
River Basin	French Broad
Cross Section ID	XSC-7, Riffle, Tributary, 12+10
Drainage Area (Sq Mi)	0.32
Date	5/13/2013
Observers	V. Miller, B. Steffen, W. Yelverton

SUMMARY DATA	
Bankfull Elevation, ft	2059.00
Bankfull Cross Sectional Area, ft²	7.20
Bankfull Width, ft	8.40
Max Depth at Bankfull, ft	1.34
Mean Depth at Bankfull, ft	0.86
Width/Depth Ratio	9.90
Flood Prone Width, ft	25.20
Flood Prone Area Elevation	2060.34
Entrenchment Ratio	3.00
Bank Height Ratio	1.30



Stream Type C/E4

Sta. 12+10 Looking Downstream



Station	Elevation
0	2061.068
0.11	2060.787
2.43	2060.729
8.11	2060.761
9.85	2060.681
11.7	2060.041
14.7	2059.417
17.61	2058.943
19.82	2058.582
20.89	2058.448
21.9	2057.841
22.96	2057.253
23.64	2056.669
24.5	2056.91
25.09	2057.104
26.2	2057.07
27.35	2057.058
28.31	2058.279
29.82	2058.854
32.8	2059.345
36.55	2059.777
41.83	2060.628
49.42	2060.726
52.35	2060.771
52.6	2061.126

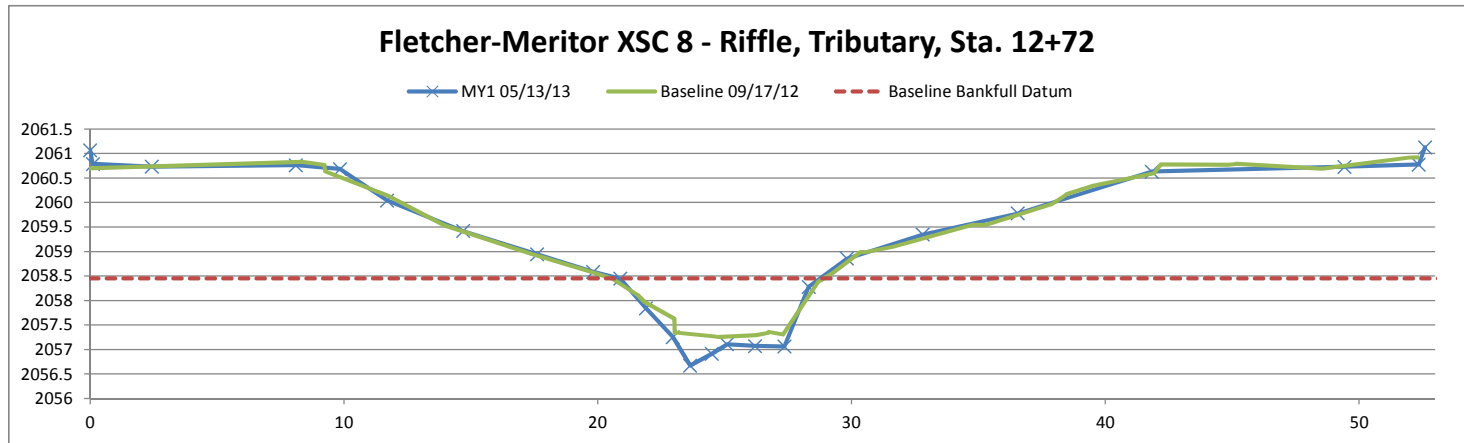
Reach	Fletcher-Meritor, Tributary
River Basin	French Broad
Cross Section ID	XSC-8, Riffle, Tributary, 12+72
Drainage Area (Sq Mi)	0.32
Date	5/13/2013
Observers	V. Miller, B. Steffen, W. Yelverton

SUMMARY DATA	
Bankfull Elevation, ft	2058.45
Bankfull Cross Sectional Area, ft²	8.40
Bankfull Width, ft	7.90
Max Depth at Bankfull, ft	1.78
Mean Depth at Bankfull, ft	1.06
Width/Depth Ratio	7.43
Flood Prone Width, ft	28.20
Flood Prone Area Elevation	2060.23
Entrenchment Ratio	3.60
Bank Height Ratio	1.00



Stream Type C/E4

Sta. 12+72 Looking Upstream



Station	Elevation
0	2061.07
0.17	2060.582
8.34	2060.476
11.85	2059.867
15.77	2058.382
19.58	2058.008
24.11	2057.637
27.52	2057.164
28.06	2057.203
28.63	2056.711
29.18	2056
29.76	2055.817
30.23	2055.262
31.08	2055.037
32.12	2055.132
32.72	2055.759
33.71	2056.211
34.11	2056.343
34.49	2057.275
35.29	2057.564
37.19	2058.018
40.42	2058.706
45.62	2060.455
49.57	2060.736
49.69	2061.06

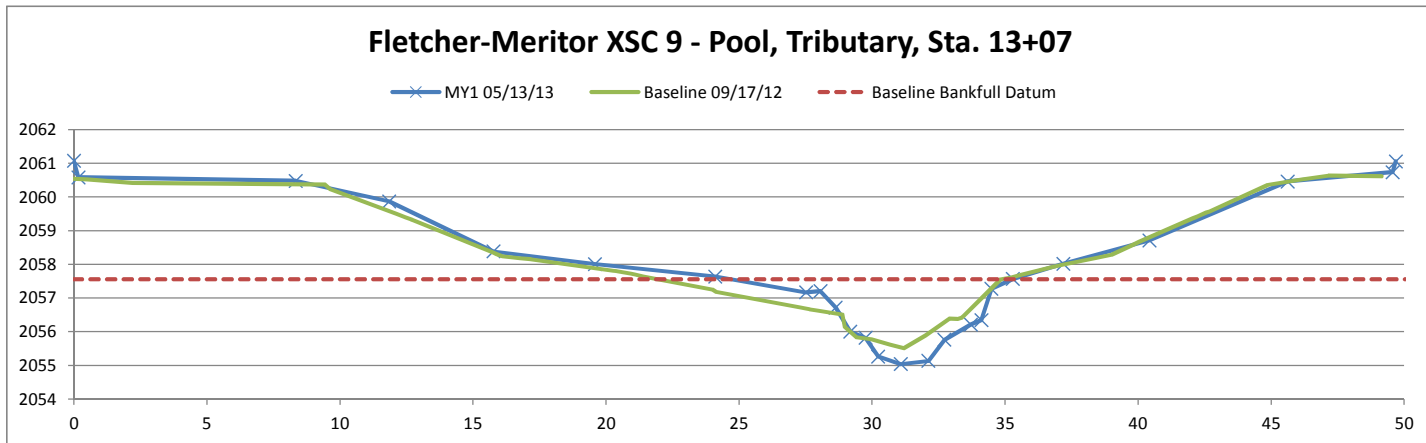
Reach	Fletcher-Meritor, Tributary
River Basin	French Broad
Cross Section ID	XSC-9, Pool, Tributary, 13+07
Drainage Area (Sq Mi)	0.32
Date	5/13/2013
Observers	V. Miller, B. Steffen, W. Yelverton

SUMMARY DATA	
Bankfull Elevation, ft	2057.55
Bankfull Cross Sectional Area, ft²	11.90
Bankfull Width, ft	10.50
Max Depth at Bankfull, ft	2.51
Mean Depth at Bankfull, ft	1.13
Width/Depth Ratio	9.26
Flood Prone Width, ft	31.00
Flood Prone Area Elevation	2060.06
Entrenchment Ratio	2.90
Bank Height Ratio	0.86

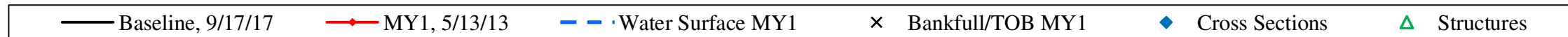
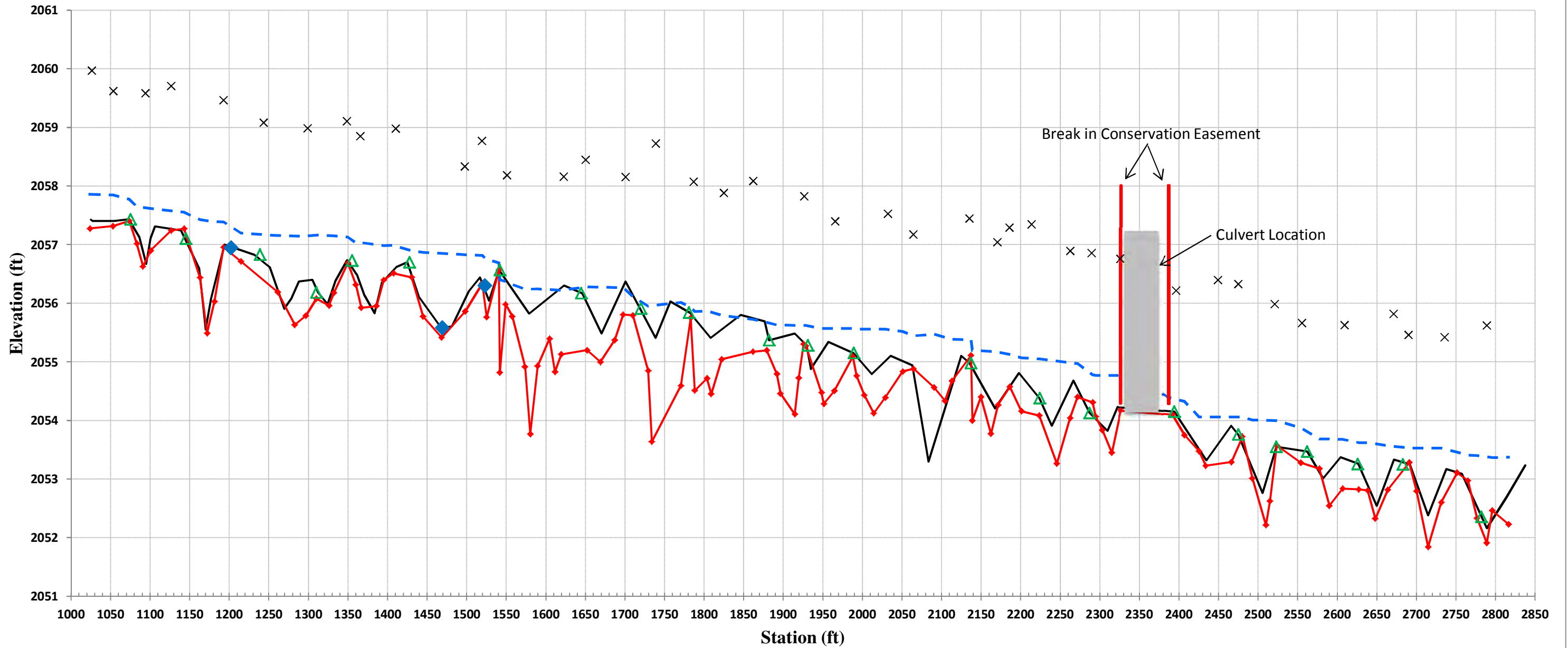


Stream Type C/E4

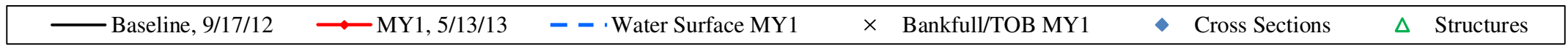
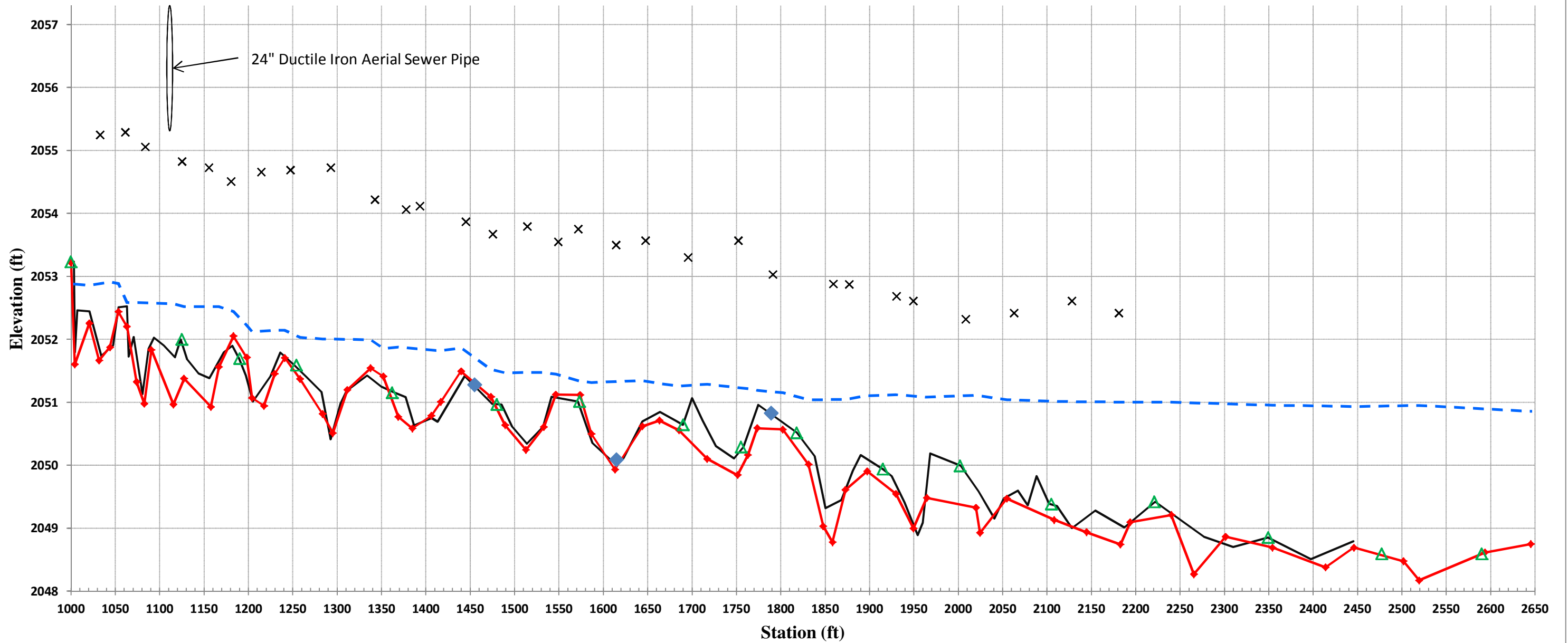
Sta. 13+07 Looking Downstream



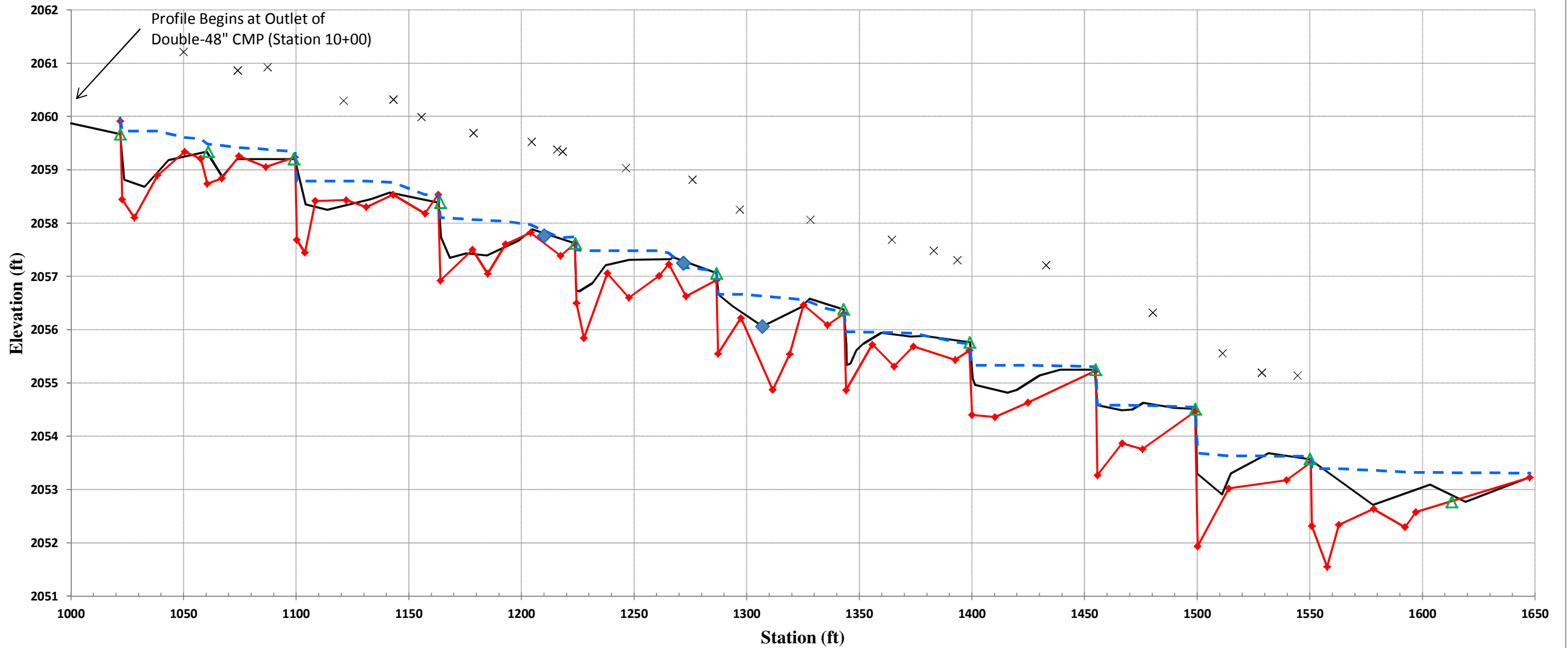
**Longitudinal Profile
Fletcher - Upper Reach
Project Number - 138
Station 10+25.00 - 28+37.86**



**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**



Baseline, 9/17/12
 MY1 5/13/13
 Water Surface MY1
 x Bankfull/TOB MY1
 Cross Sections
 Structures

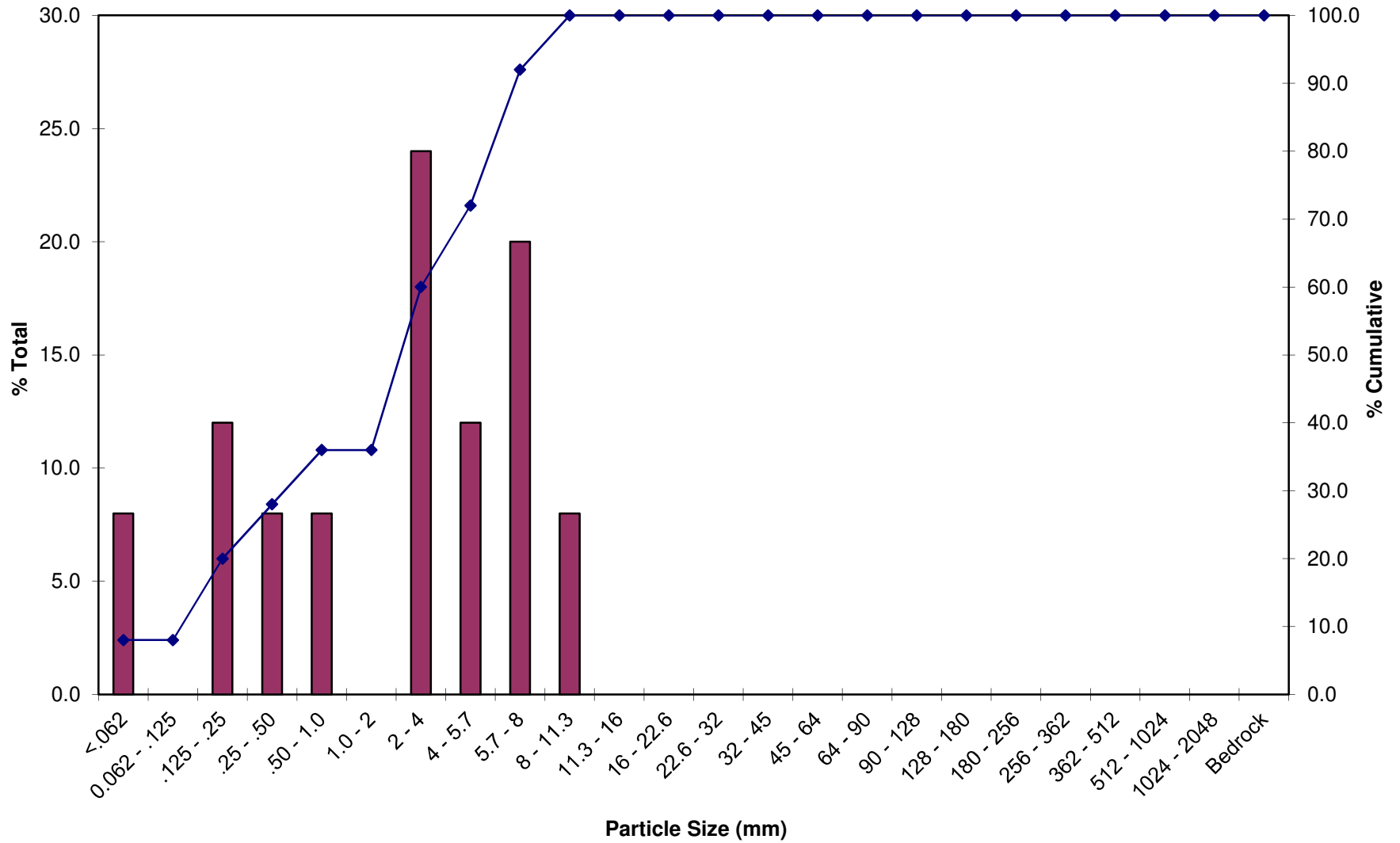
Fletcher - Upper Reach - XSC-1 Riffle-Pebble Count

Location: STA 12+02

Inches	Particle	Millimeters		Count	%Total	% Cum.
	Silt/Clay	<.062	SILT/CLAY	8	8.0	8.0
	Very Fine	0.062 - .125	S A N D	0	0.0	8.0
	Fine	.125 - .25		12	12.0	20.0
	Medium	.25 - .50		8	8.0	28.0
	Coarse	.50 - 1.0		8	8.0	36.0
.04 - .08	Very Coarse	1.0 - 2		0	0.0	36.0
.08 - .16	Very Fine	2 - 4	G R A V E L	24	24.0	60.0
.16 - .22	Fine	4 - 5.7		12	12.0	72.0
.22 - .31	Fine	5.7 - 8		20	20.0	92.0
.31 - .44	Medium	8 - 11.3		8	8.0	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	
D50	3
D84	7
D95	9

Pebble count at XSC-1-Riffle, Upper Reach Sta. 12+02



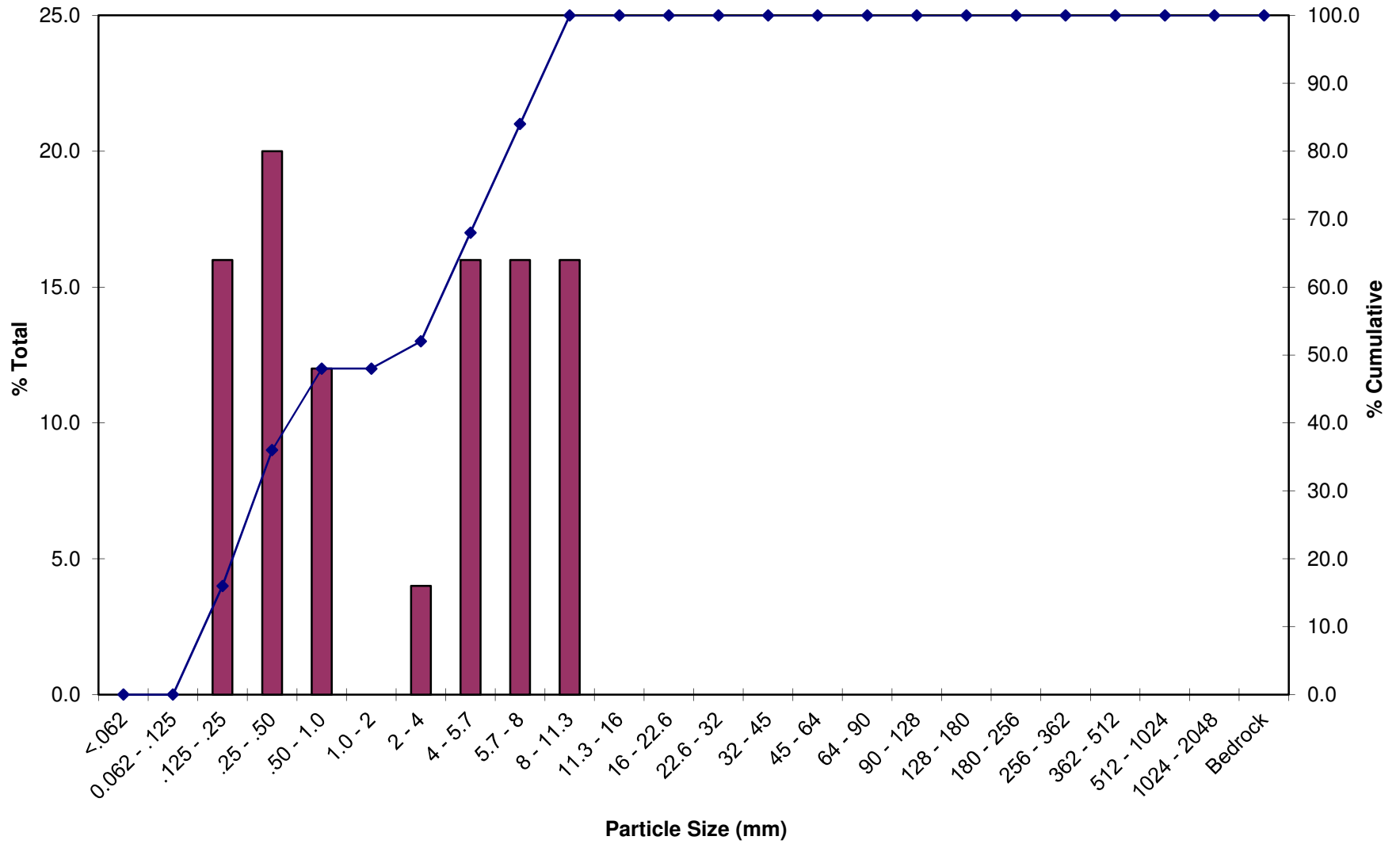
Fletcher - Upper Reach - XSC-3 Riffle Pebble Count

Location: STA 15+23

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		16	16.0	16.0
	Medium	.25 - .50		20	20.0	36.0
	Coarse	.50 - 1.0		12	12.0	48.0
.04 - .08	Very Coarse	1.0 - 2		0	0.0	48.0
.08 - .16	Very Fine	2 - 4	G R A V E L	4	4.0	52.0
.16 - .22	Fine	4 - 5.7		16	16.0	68.0
.22 - .31	Fine	5.7 - 8		16	16.0	84.0
.31 - .44	Medium	8 - 11.3		16	16.0	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	
D50	3
D84	8
D95	10

Pebble count at XSC-3-Riffle, Upper Reach Sta. 15+23



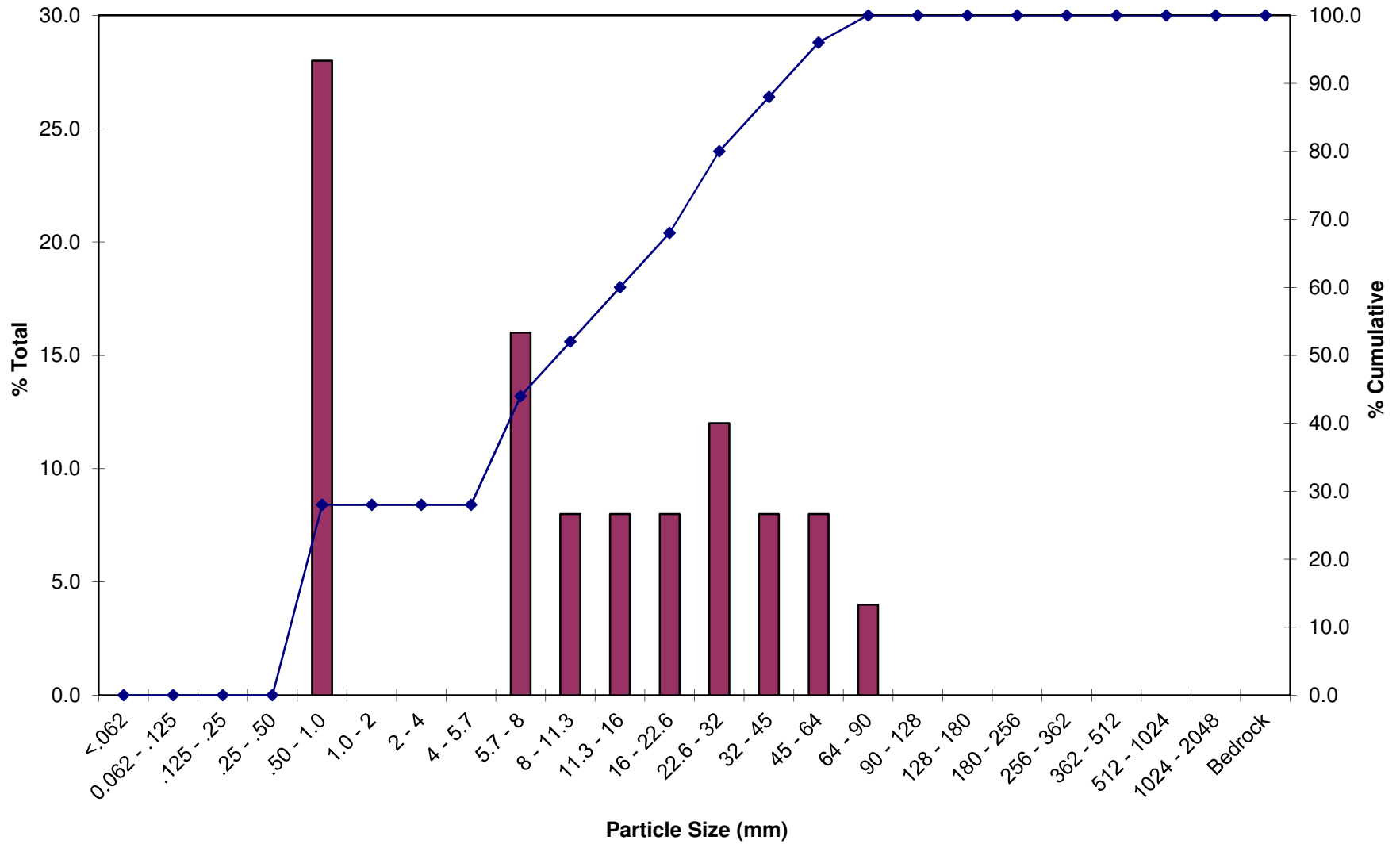
Fletcher - Lower Reach - XSC-4 Riffle Pebble Count

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		0	0.0	0.0
	Coarse	.50 - 1.0		28	28.0	28.0
.04 - .08	Very Coarse	1.0 - 2		0	0.0	28.0
.08 - .16	Very Fine	2 - 4	G R A V E L	0	0.0	28.0
.16 - .22	Fine	4 - 5.7		0	0.0	28.0
.22 - .31	Fine	5.7 - 8		16	16.0	44.0
.31 - .44	Medium	8 - 11.3		8	8.0	52.0
.44 - .63	Medium	11.3 - 16		8	8.0	60.0
.63 - .89	Coarse	16 - 22.6		8	8.0	68.0
.89 - 1.26	Coarse	22.6 - 32		12	12.0	80.0
1.26 - 1.77	Very Coarse	32 - 45		8	8.0	88.0
1.77 - 2.5	Very Coarse	45 - 64		8	8.0	96.0
2.5 - 3.5	Small	64 - 90	C O B B L E	4	4.0	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	
D50	10
D84	38
D95	61

Pebble count at XSC-4-Riffle, Lower Reach Sta. 14+55



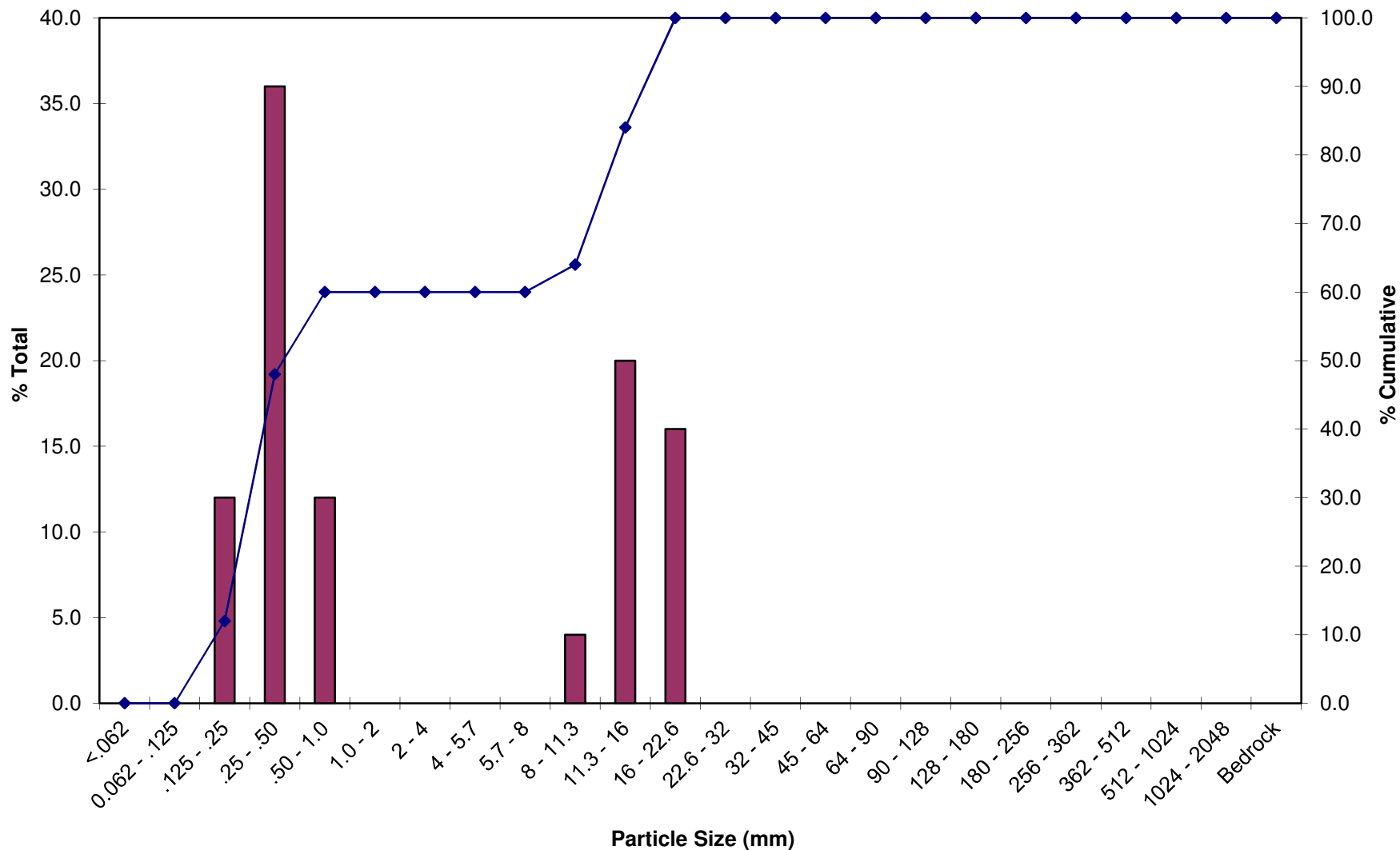
Fletcher - Lower Reach - XSC-6 Riffle Pebble Count

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		12	12.0	12.0
	Medium	.25 - .50		36	36.0	48.0
	Coarse	.50 - 1.0		12	12.0	60.0
.04 - .08	Very Coarse	1.0 - 2		0	0.0	60.0
.08 - .16	Very Fine	2 - 4	G R A V E L	0	0.0	60.0
.16 - .22	Fine	4 - 5.7		0	0.0	60.0
.22 - .31	Fine	5.7 - 8		0	0.0	60.0
.31 .44	Medium	8 - 11.3		4	4.0	64.0
.44 - .63	Medium	11.3 - 16		20	20.0	84.0
.63 - .89	Coarse	16 - 22.6		16	16.0	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	
D50	0.6
D84	16
D95	20

Pebble count at XSC-6-Riffle, Lower Reach Sta. 17+89



**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																								
Floodprone Width (ft)	53.00			>86.00		2	65.20			>86.00		2																								
Bankfull Mean Depth (ft)	1.26	1.37		1.47		2	1.19	1.33		1.47		2																								
¹ Bankfull Max Depth (ft)	1.80	2.00		2.20		2	2.01	2.15		2.29		2																								
Bankfull Cross Sectional Area (ft ²)	19.10	20.20		21.30		2	16.70	18.95		21.20		2																								
Width/Depth Ratio	9.87	10.91		11.94		2	9.78	10.76		11.74		2																								
Entrenchment Ratio	3.50			>6.00		2	4.70			>6.00		2																								
¹ Bank Height Ratio	1.00	1.00		1.00		2	0.99	1.01		1.03		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																								
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																								
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																								
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																								
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																								
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																													
Channel Thalweg length (ft)	1838						1838																													
Sinuosity (ft)	1.18						1.18																													
Water Surface Slope (Channel) (ft/ft)	0.0025						0.0025																													
BF slope (ft/ft)	0.0027						0.0025																													
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																													
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					
Dimension and Substrate - Riffle only	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
Bankfull Width (ft)	17.20	18.49		19.77		2	16.10	19.35		22.60		2																								
Floodprone Width (ft)	97.90	117.63		137.36		2	101.50	117.20		132.80		2																								
Bankfull Mean Depth (ft)	1.36	1.56		1.75		2	1.21	1.41		1.61		2																								
¹ Bankfull Max Depth (ft)	2.20	2.34		2.47		2	2.46	2.51		2.56		2																								
Bankfull Cross Sectional Area (ft ²)	23.40	28.95		34.50		2	26.00	26.65		27.30		2																								
Width/Depth Ratio	11.32	11.99		12.65		2	9.97	14.34		18.71		2																								
Entrenchment Ratio	5.69	6.32		6.95		2	4.50	6.35		8.20		2																								
¹ Bank Height Ratio	1.00	1.00		1.00		2	1.00	1.02		1.04		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																								
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																								
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																								
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																								
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																								
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																													
Channel Thalweg length (ft)	1779						1779																													
Sinuosity (ft)	1.23						1.23																													
Water Surface Slope (Channel) (ft/ft)	0.0027						0.0022																													
BF slope (ft/ft)	0.0024						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							3																													
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																								
Floodprone Width (ft)	22.32	23.62		24.91		2	25.20	26.70		28.20		2																								
Bankfull Mean Depth (ft)	0.82	0.83		0.83		2	0.86	0.96		1.06		2																								
¹ Bankfull Max Depth (ft)	1.19	1.22		1.25		2	1.34	1.56		1.78		2																								
Bankfull Cross Sectional Area (ft ²)	6.80	7.22		7.63		2	7.20	7.80		8.40		2																								
Width/Depth Ratio	10.21	10.70		11.19		2	7.43	8.67		9.90		2																								
Entrenchment Ratio	2.68	2.69		2.70		2	3.00	3.30		3.60		2																								
¹ Bank Height Ratio	1.00	1.00		1.00		2	1.00	1.15		1.30		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																								
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																								
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																								
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																								
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																								
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																													
Channel Thalweg length (ft)	648						648																													
Sinuosity (ft)	1.22						1.22																													
Water Surface Slope (Channel) (ft/ft)	0.0114						0.0118																													
BF slope (ft/ft)	0.0118						0.0120																													
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							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

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 elevation¹	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						2058.61	2058.61						2058.74	2058.74						2053.74	2053.74						2053.32	2053.32					
Bankfull Width (ft)	15.10	14.00						21.90	21.90						14.50	14.40						19.77	16.10						26.16	25.70					
Floodprone Width (ft)	53.00	65.20						>86.00	>86.00						>86.00	>86.00						137.36	132.80						83.70	84.30					
Bankfull Mean Depth (ft)	1.26	1.19						1.25	1.18						1.47	1.47						1.75	1.61						1.45	1.38					
Bankfull Max Depth (ft)	1.80	2.01						3.10	3.07						2.20	2.29						2.47	2.46						3.31	3.22					
Bankfull Cross Sectional Area (ft ²)	19.10	16.70						27.40	25.80						21.30	21.20						34.50	26.00						37.88	35.50					
Bankfull Width/Depth Ratio	11.94	11.74						17.50	18.59						9.87	9.78						11.32	9.97						18.07	18.61					
Bankfull Entrenchment Ratio	3.50	4.70						>4.00	>4.00						>6.00	>6.00						6.95	8.20						3.20	3.30					
Bankfull Bank Height Ratio	1.00	0.99						1.00	1.15						1.00	1.03						1.00	1.04						1.00	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 elevation¹	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						2059.00	2059.00						2058.45	2058.45						2057.55	2057.55												
Bankfull Width (ft)	17.20	22.60						9.24	8.40						8.33	7.90						12.81	10.50												
Floodprone Width (ft)	97.90	101.50						24.91	25.20						22.32	28.20						25.89	31.00												
Bankfull Mean Depth (ft)	1.36	1.21						0.83	0.86						0.82	1.06						0.93	1.13												
Bankfull Max Depth (ft)	2.20	2.56						1.25	1.34						1.19	1.78						2.04	2.51												
Bankfull Cross Sectional Area (ft ²)	23.40	27.30						7.63	7.20						6.80	8.40						11.96	11.90												
Bankfull Width/Depth Ratio	12.65	18.71						11.19	9.90						12.21	7.43						13.71	9.26												
Bankfull Entrenchment Ratio	5.69	4.50						2.70	3.00						2.68	3.60						2.02	2.90												
Bankfull Bank Height Ratio	1.00	1.00						1.00	1.30						1.00	1.00						1.00	0.89												
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

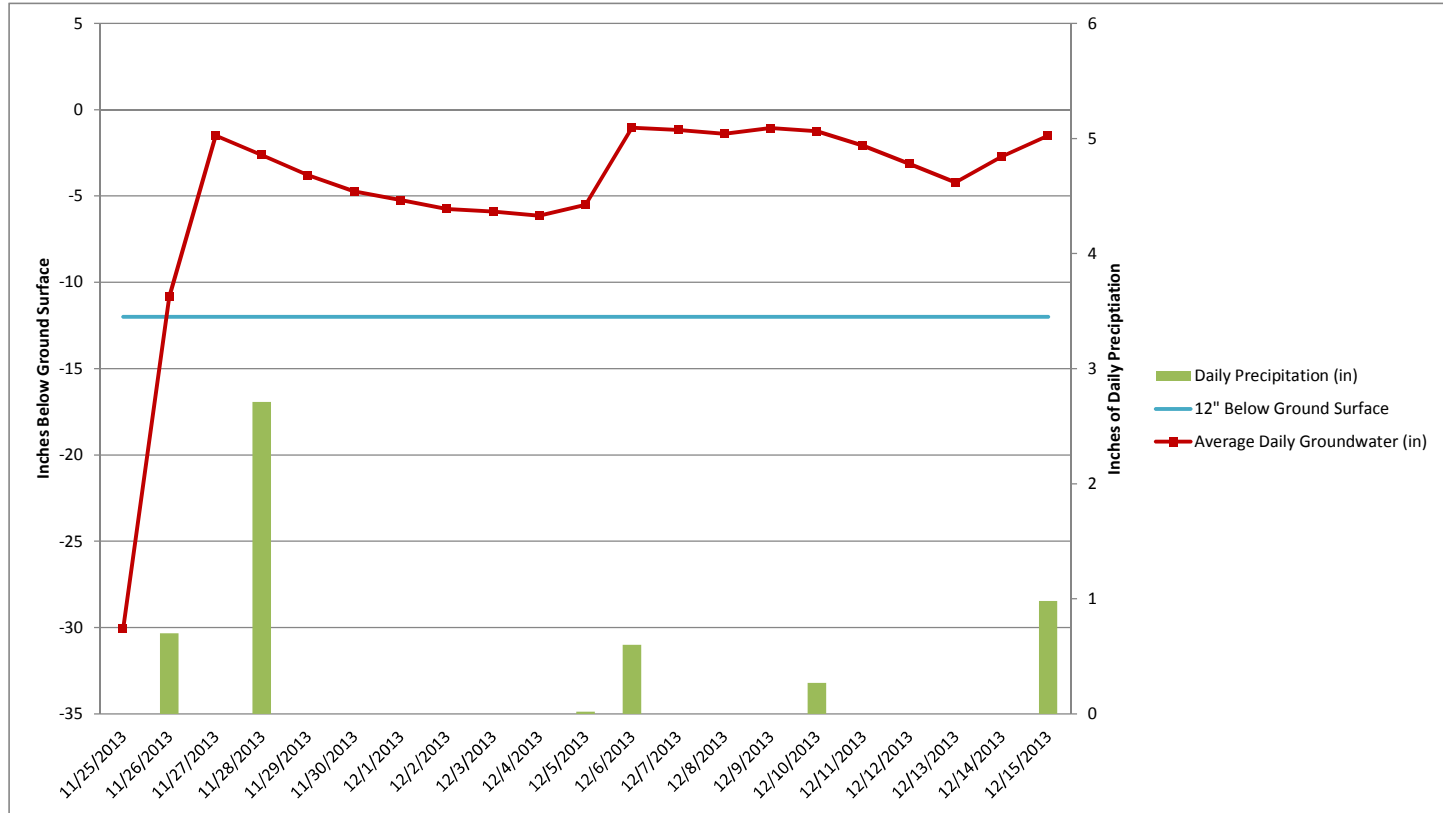
Hydrologic Data

Table 12. Verification of Bankfull Events

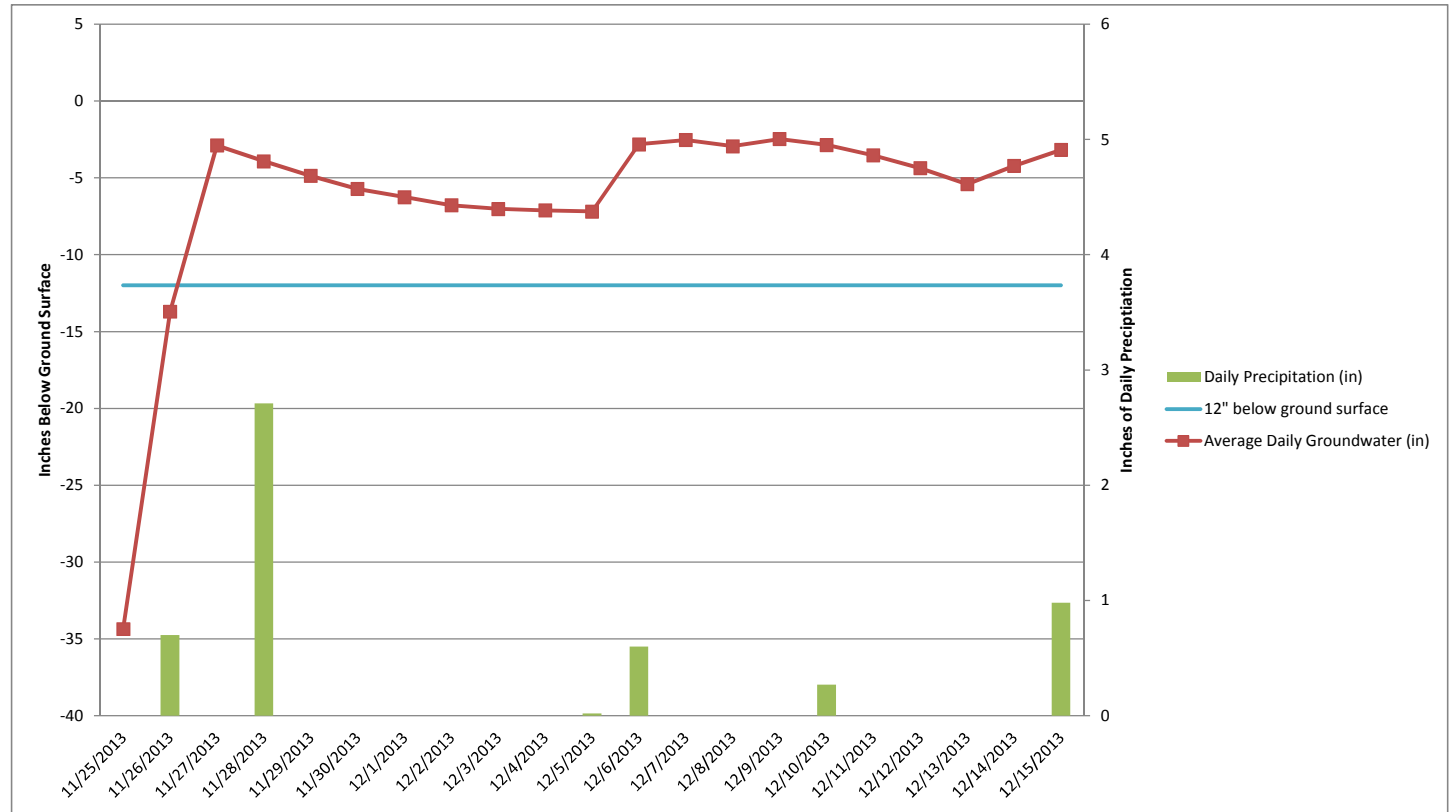
Fletcher Meritor Site (UT to Cane Creek)/ 138 Segment/Reach: feet

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	

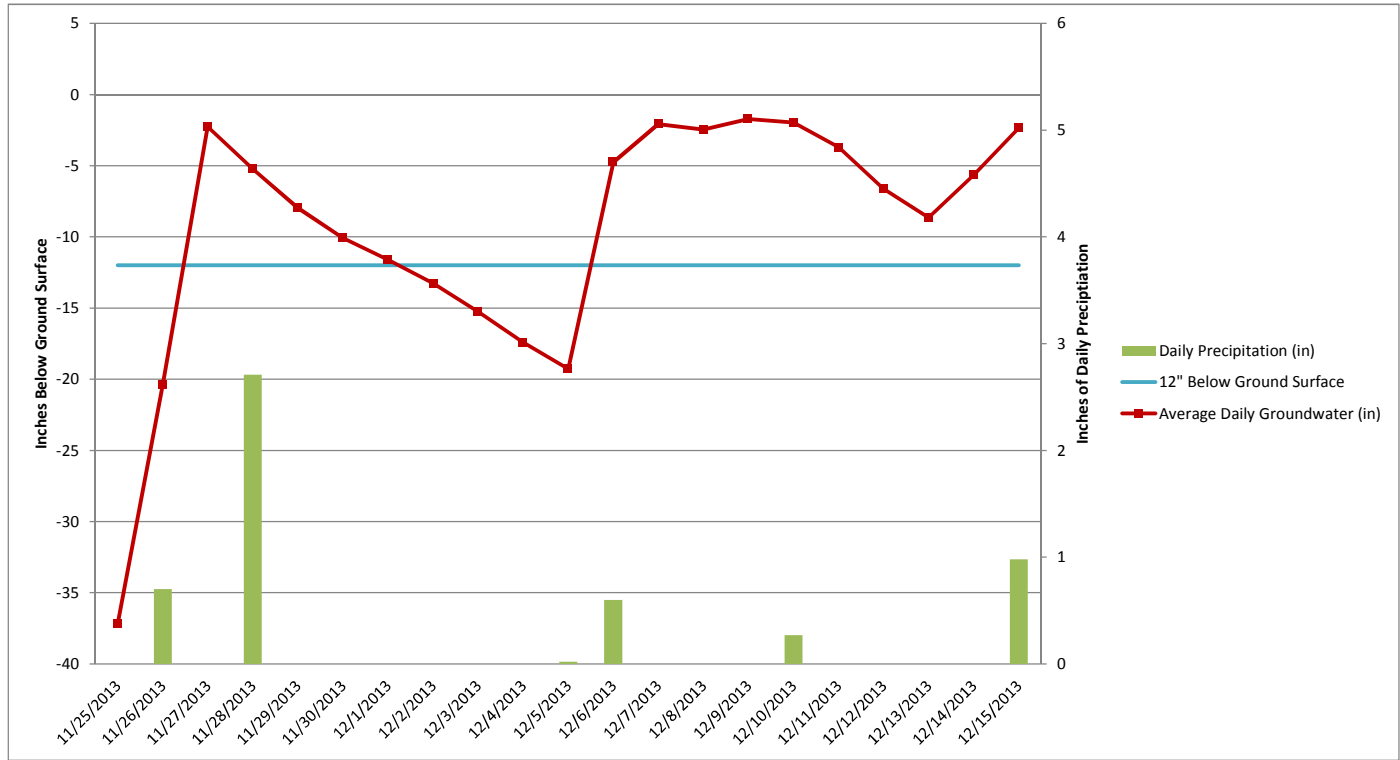
Ecotone Unit: Level Logger
Serial Number: 000013D4CA2A
Probe Number: 000013D4CA2A
Log Read: 12/15/2013 13:18:57
Fletcher-Meritor Well #1



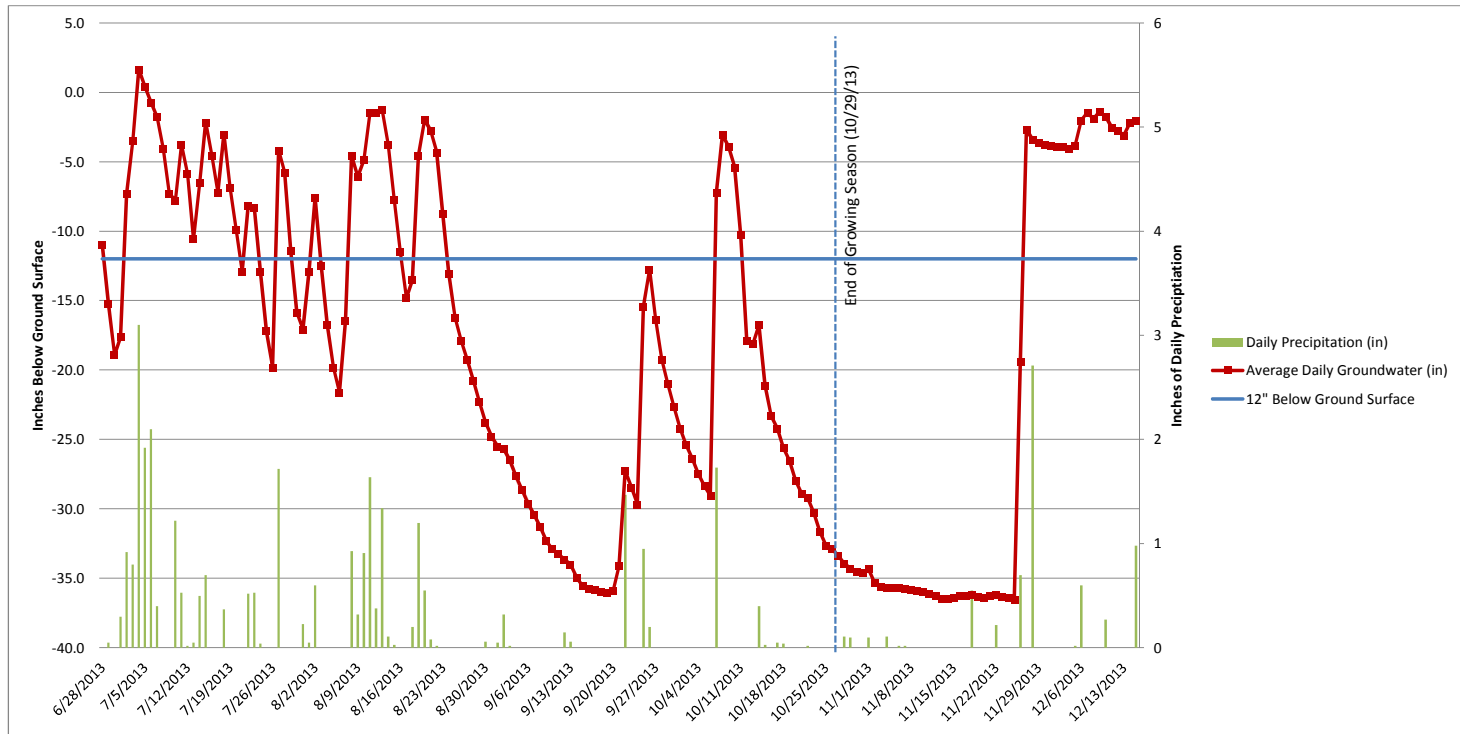
Ecotone Unit: Level Logger
Serial Number: 000011311987
Probe Number: 000011311987
Log Read: 12/15/2013 13:15:03
Fletcher-Meritor Well #2



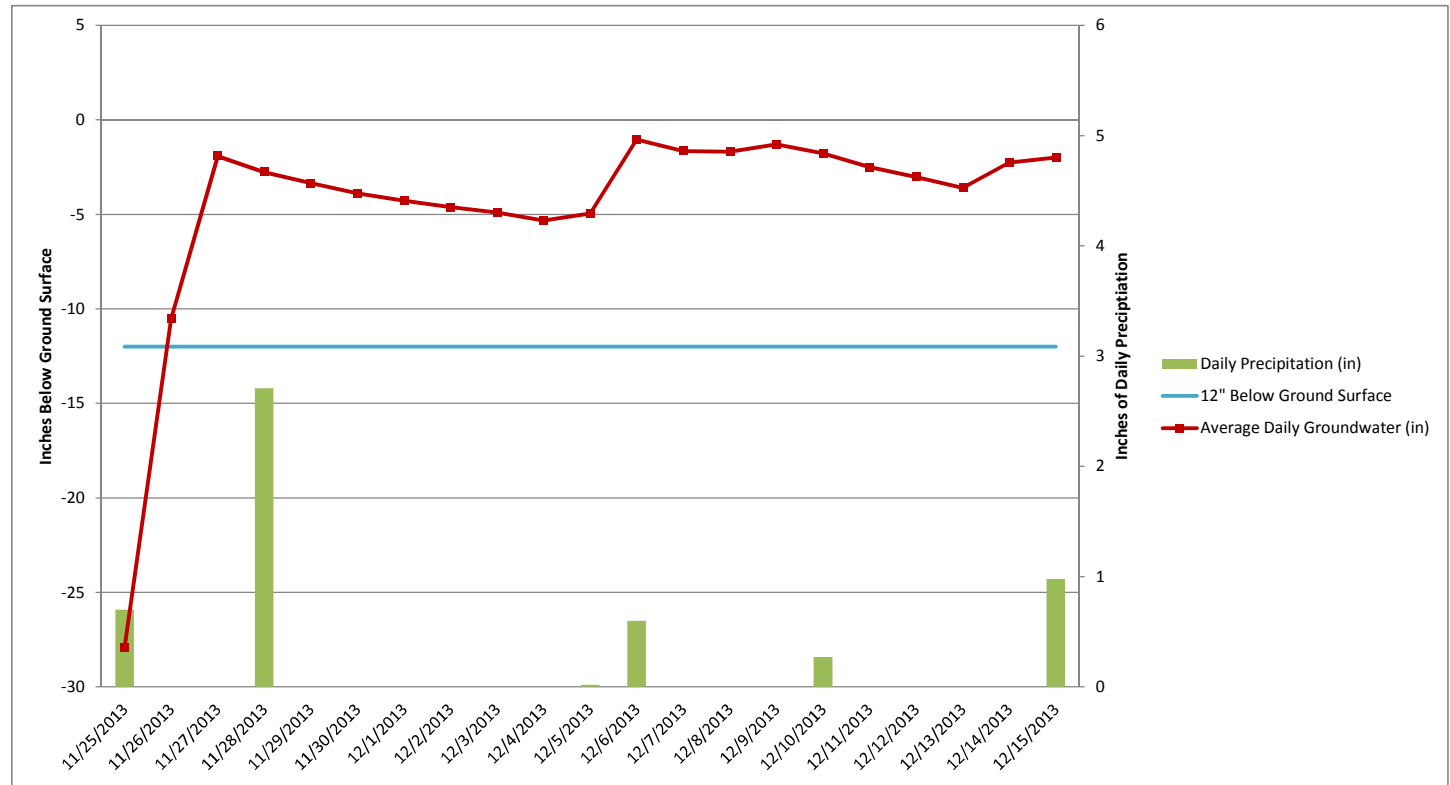
Ecotone Unit: Level Logger
Serial Number: 00001130DD07
Probe Number: 00001130DD07
Log Read: 12/15/2013 13:22:17
Fletcher-Meritor Well #3



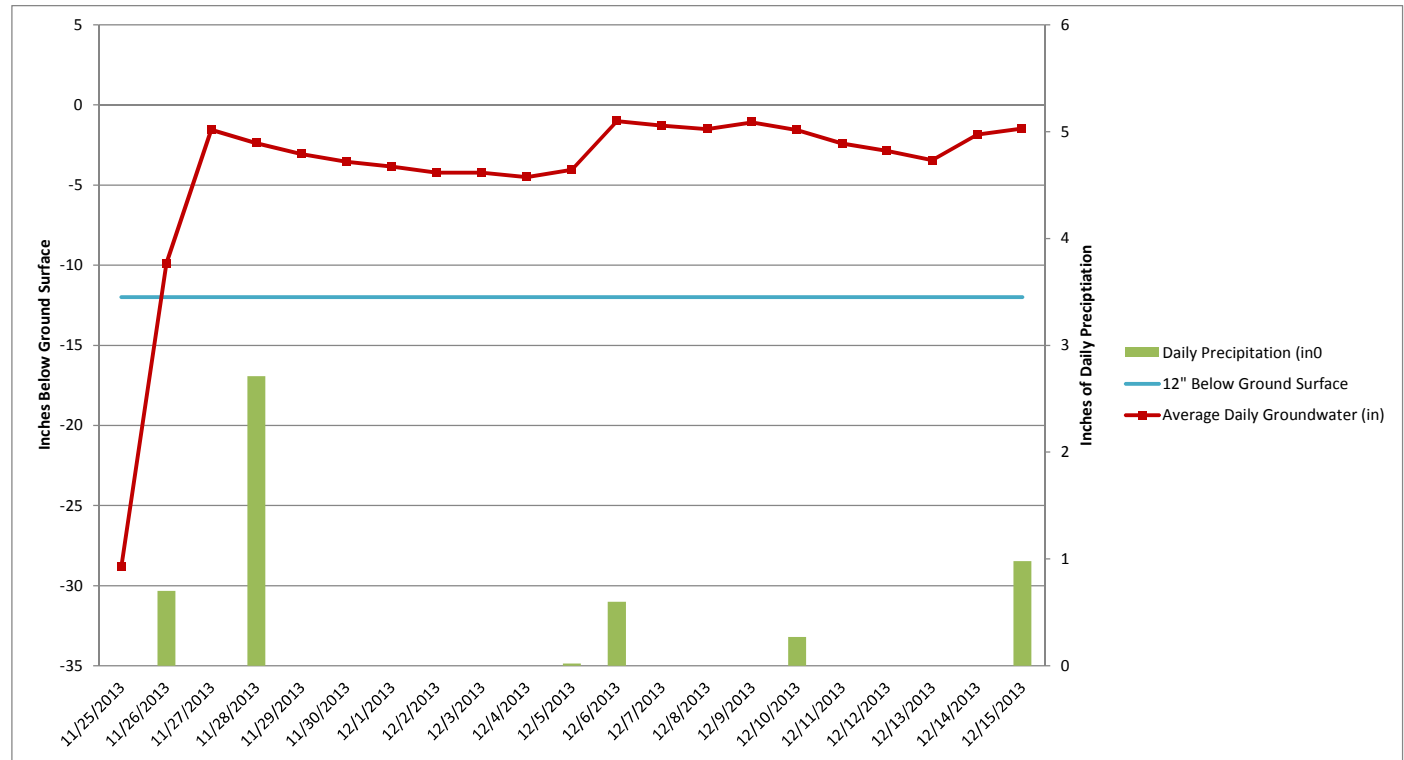
Ecotone Unit: Level Logger
Serial Number: 0000138BE816
Probe Number: 0000138BE816
Log Read: 12/15/2013 13:26:42
Fletcher-Meritor Well #5



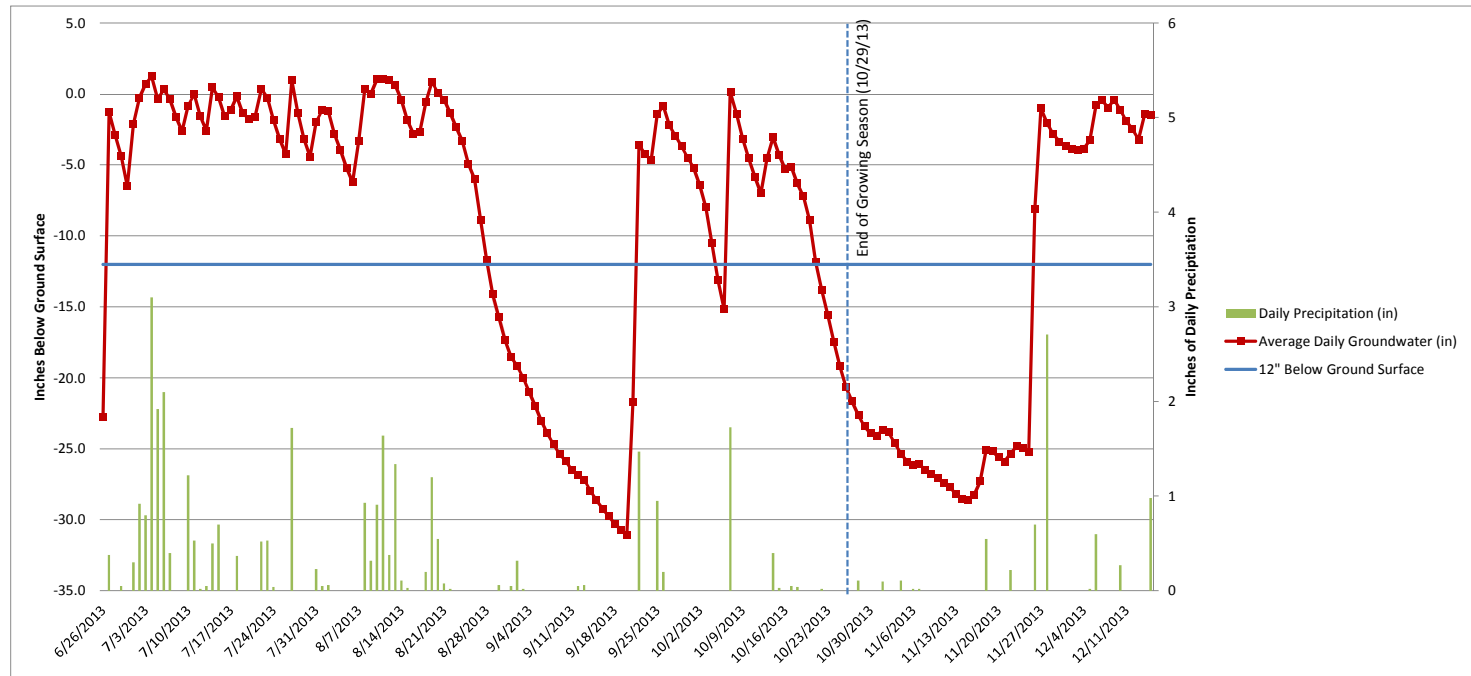
Ecotone Unit: Level Logger
Serial Number: 000011313B57
Probe Number: 000011313B57
Log Read: 12/15/2013 14:14:43
Fletcher-Meritor Well #6



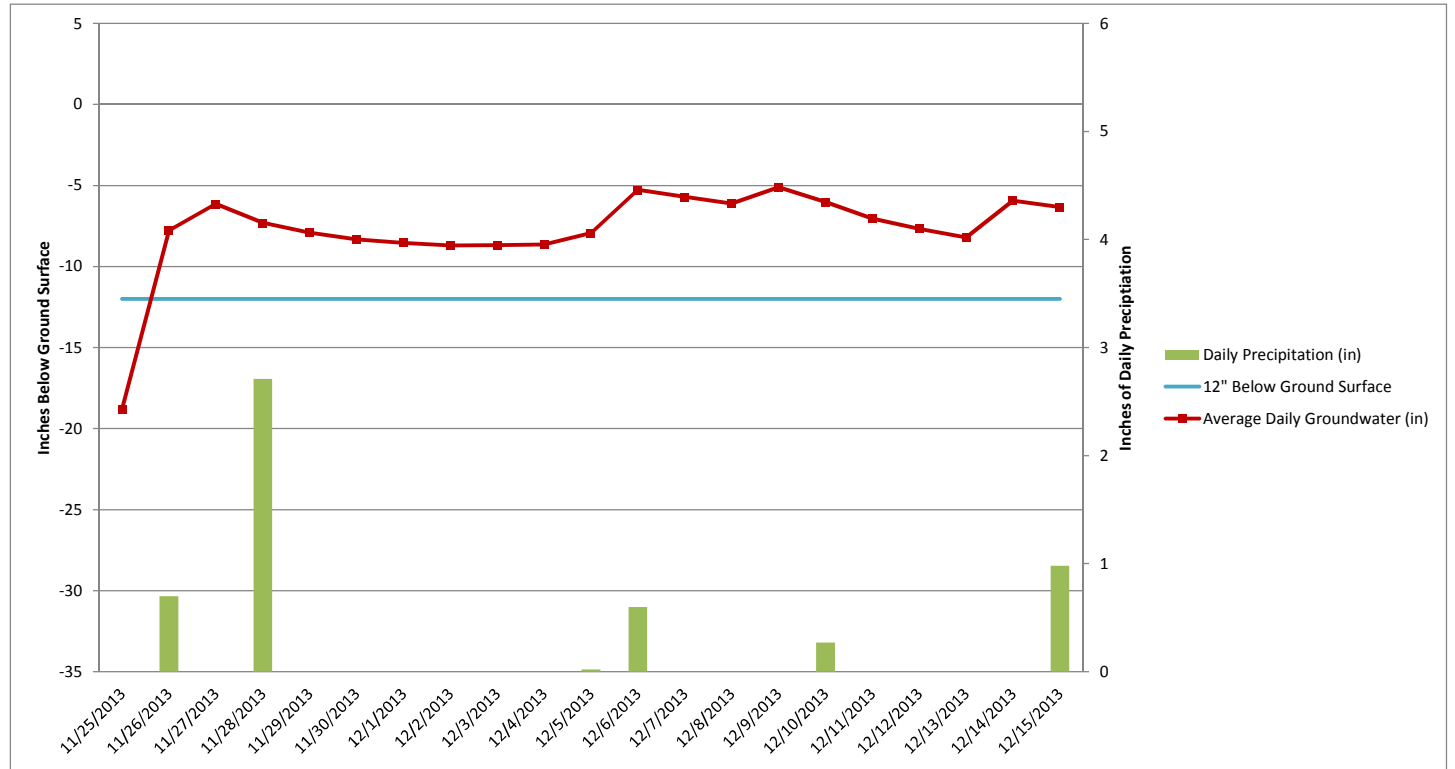
Ecotone Unit: Level Logger
Serial Number: 000009BEA475
Probe Number: 000001D33719
Log Read: 12/15/2013 14:11:44
Fletcher-Meritor Well #7



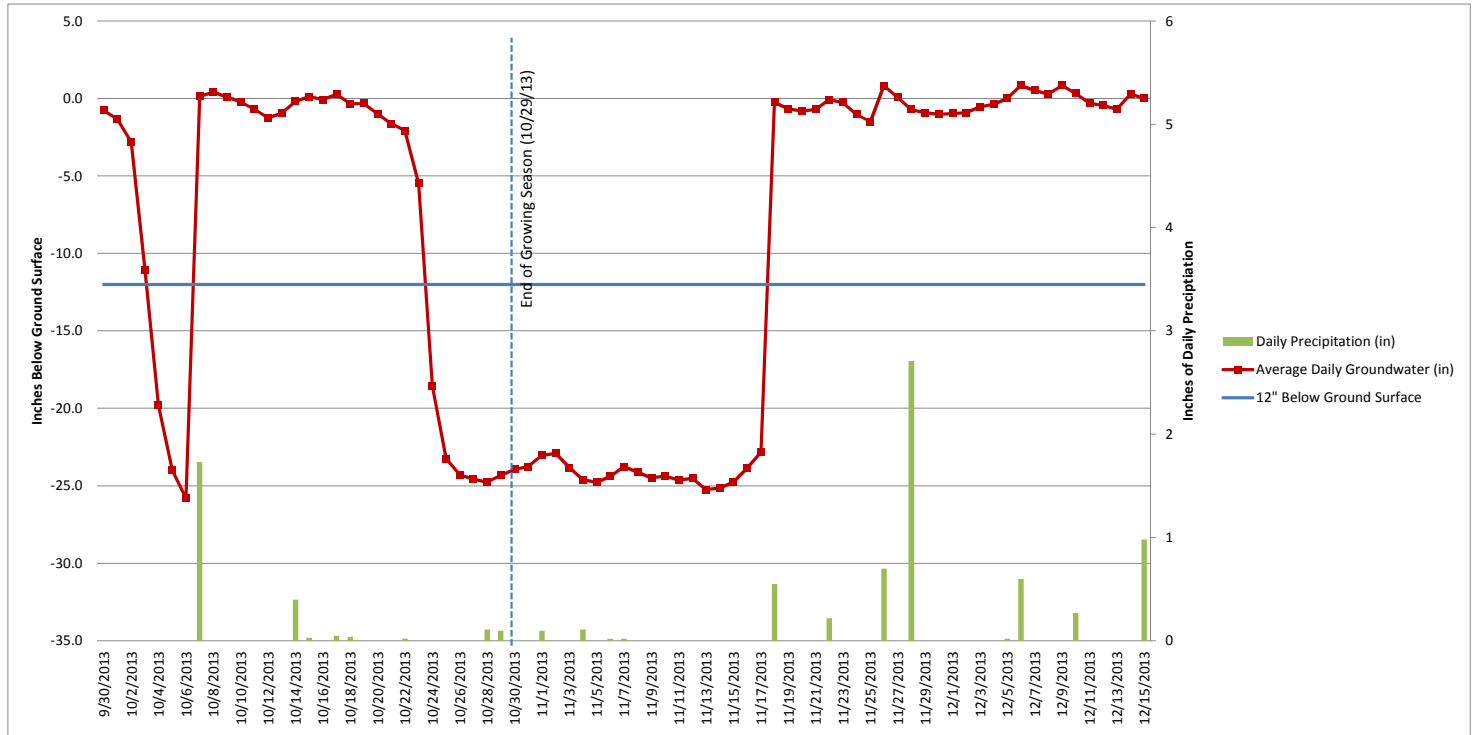
Ecotone Unit: Level Logger
Serial Number: 000009BEBF83
Probe Number: 000001305C6C
Log Read: 12/15/2013 14:17:13
Fletcher-Meritor Well #8



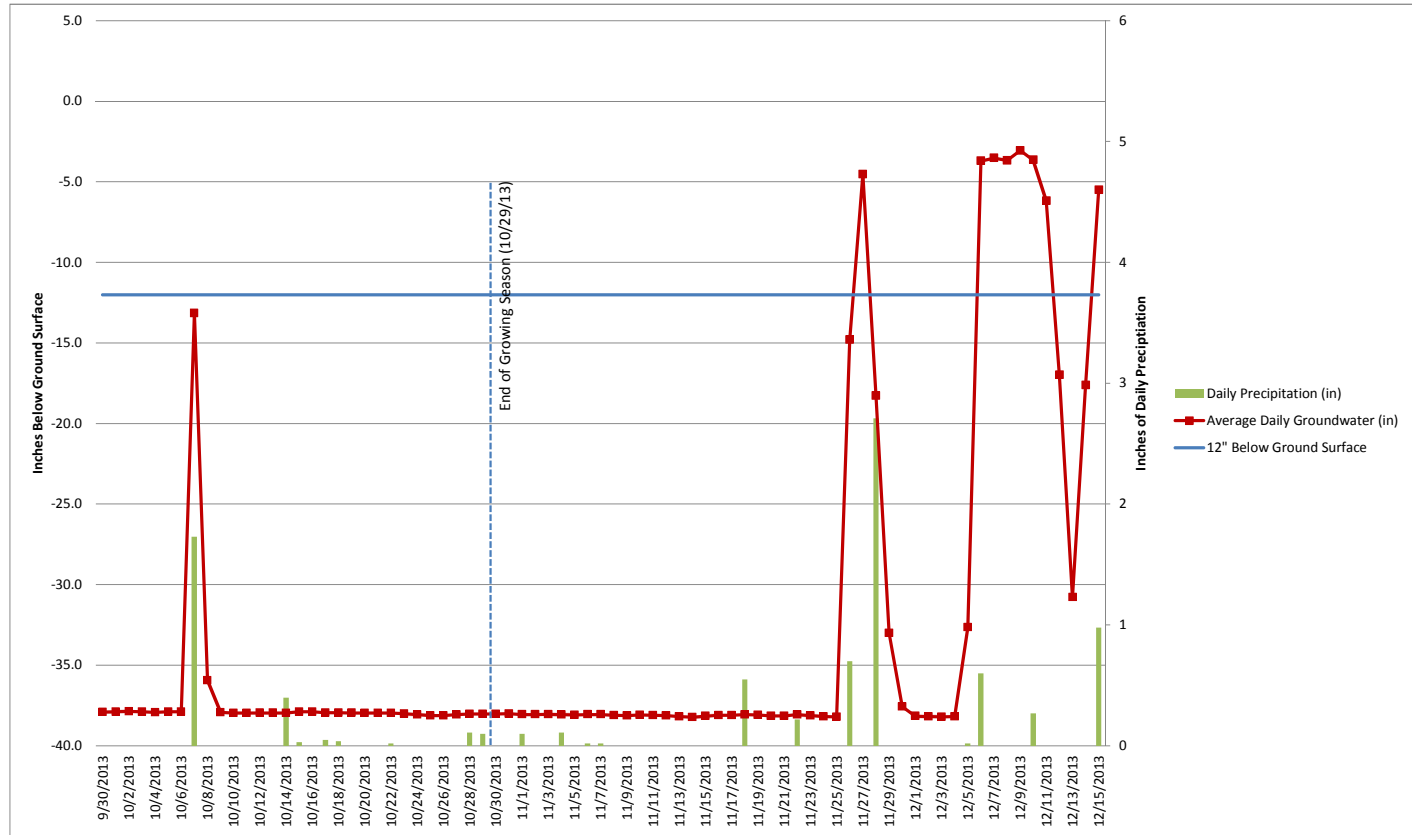
Ecotone Unit: Level Logger
Serial Number: 00000EBD106E
Probe Number: 00000EBD106E
Log Read: 12/15/2013 14:19:20
Fletcher-Meritor Well #9



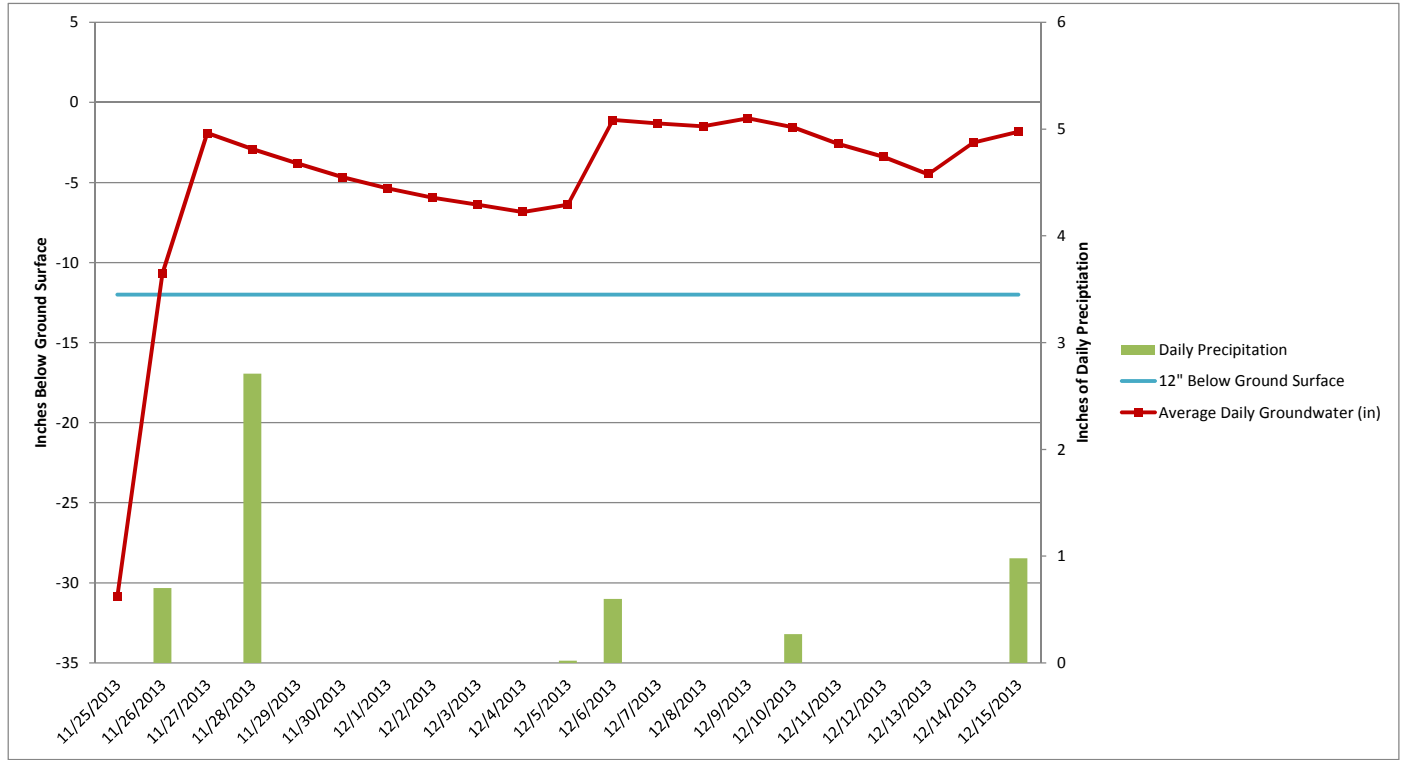
Ecotone Unit: Level Logger
Serial Number: 000010FACBB4
Probe Number: 000010FACBB4
Log Read: 12/15/2013 14:22:47
Fletcher-Meritor Well #10



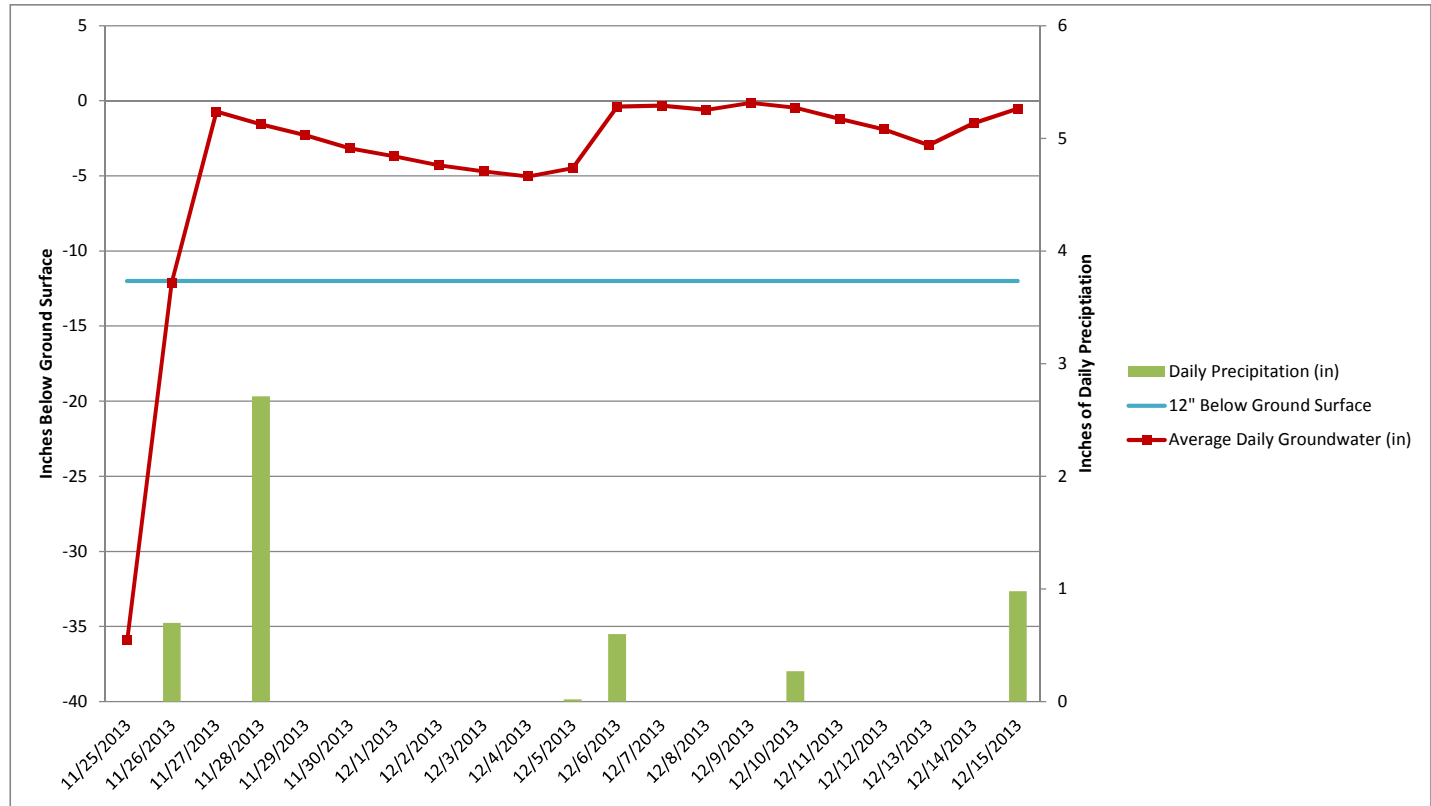
Ecotone Unit: Level Logger
Serial Number: 00000AB37304
Probe Number: 000001D32887
Log Read: 12/15/2013 14:28:49
Fletcher-Meritor Well #11



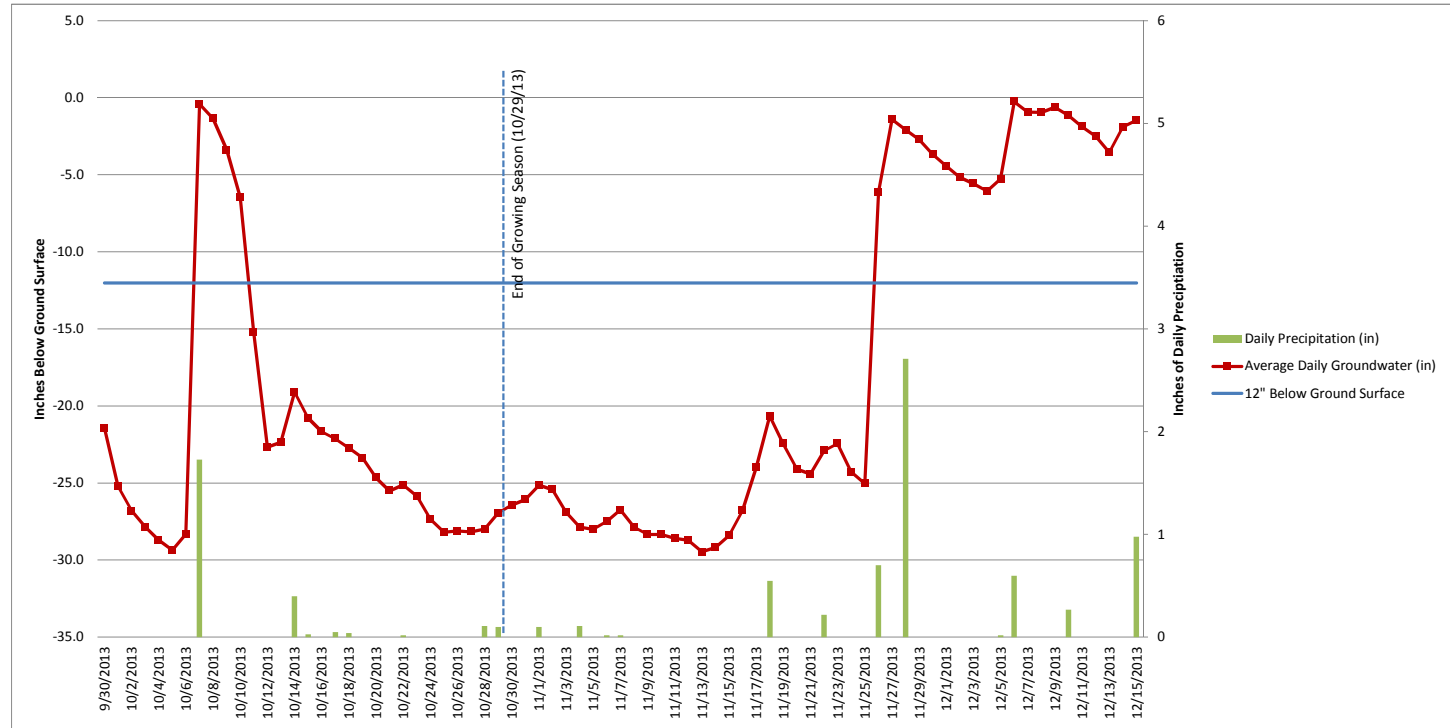
Ecotone Unit: Level Logger
Serial Number: 000010FAA7C4
Probe Number: 000010FAA7C4
Log Read: 12/15/2013 14:34:02
Fletcher-Meritor Well #12



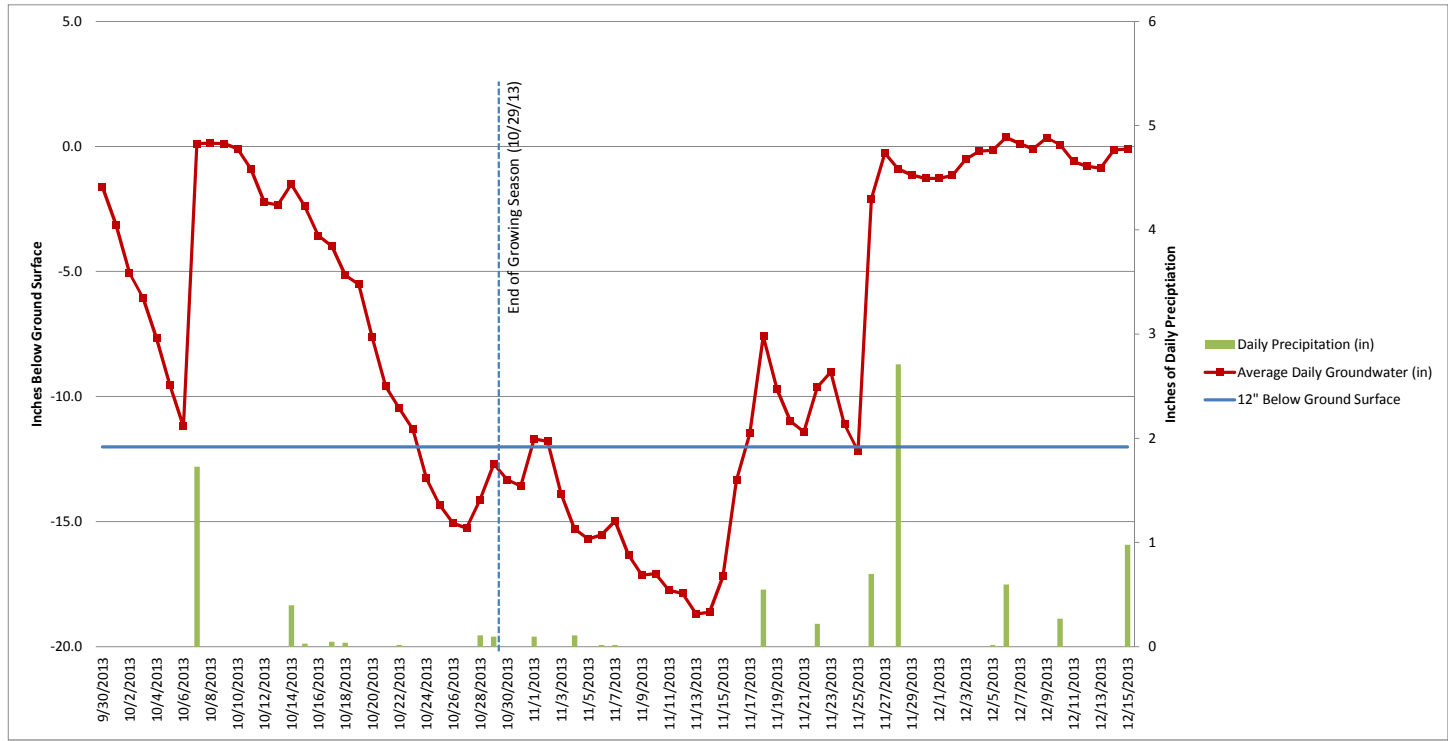
Ecotone Unit: Level Logger
Serial Number: 000010FADD4D
Probe Number: 000010FADD4D
Log Read: 12/15/2013 14:36:16
Fletcher-Meritor Well #13



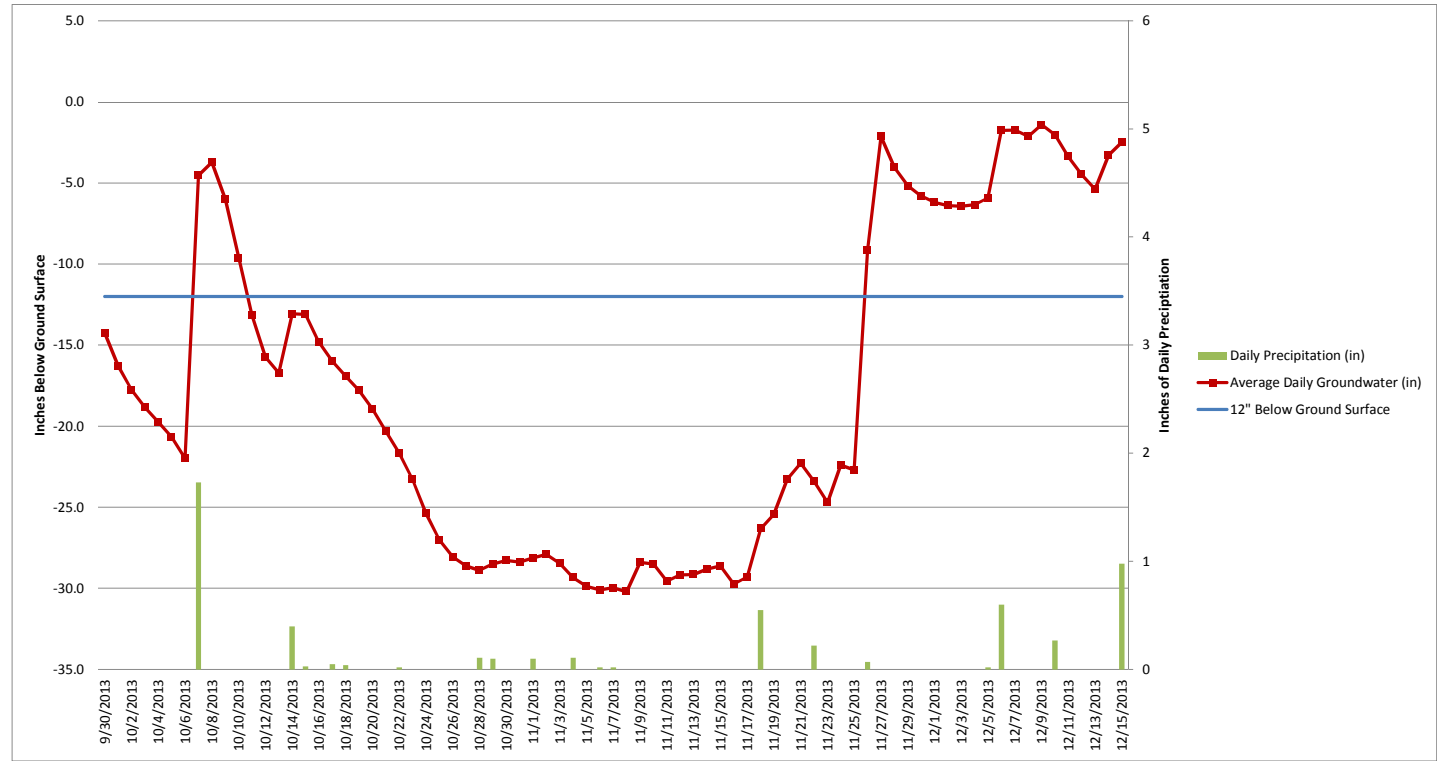
Ecotone Unit: Level Logger
Serial Number: 00000A28AB80
Probe Number: 000001D36705
Log Read: 12/15/2013 14:38:37
Fletcher-Meritor Well #14



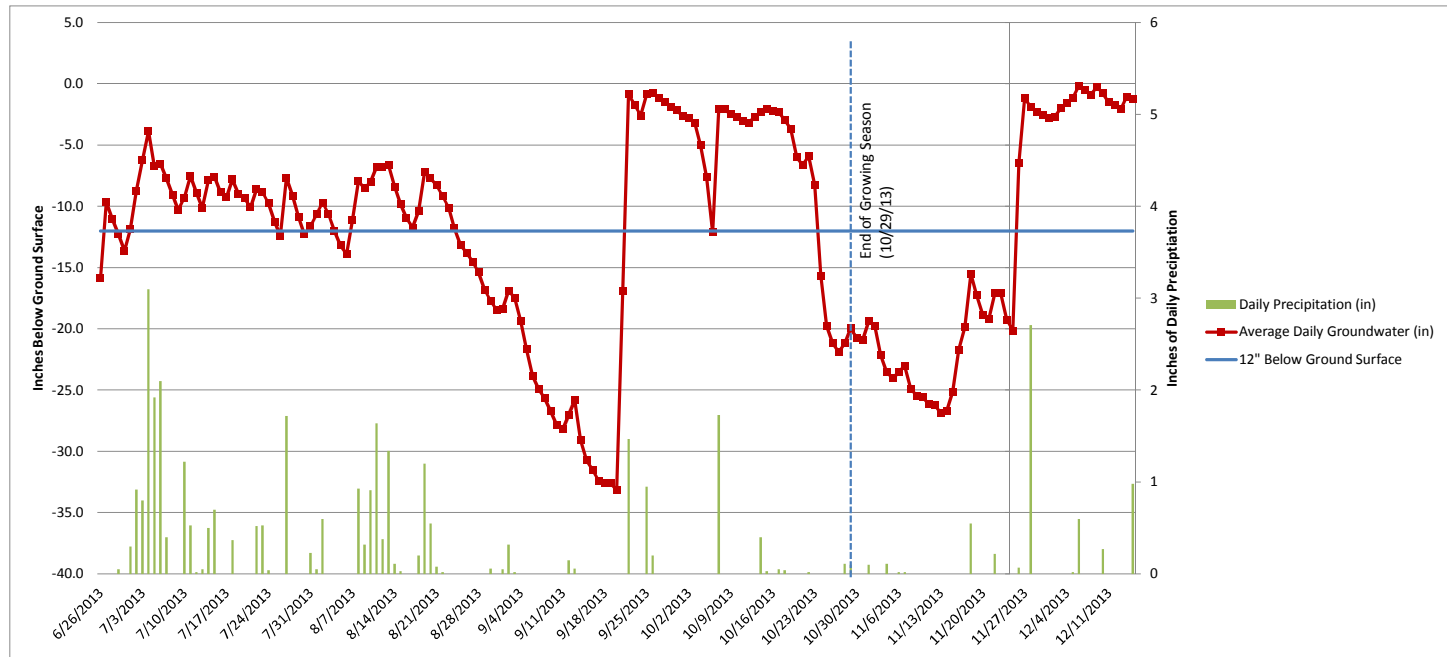
Ecotone Unit: Level Logger
Serial Number: 00009BEBF0
Probe Number: 00001D332D4
Log Read: 12/15/2013 14:50:07
Fletcher-Meritor Well #18



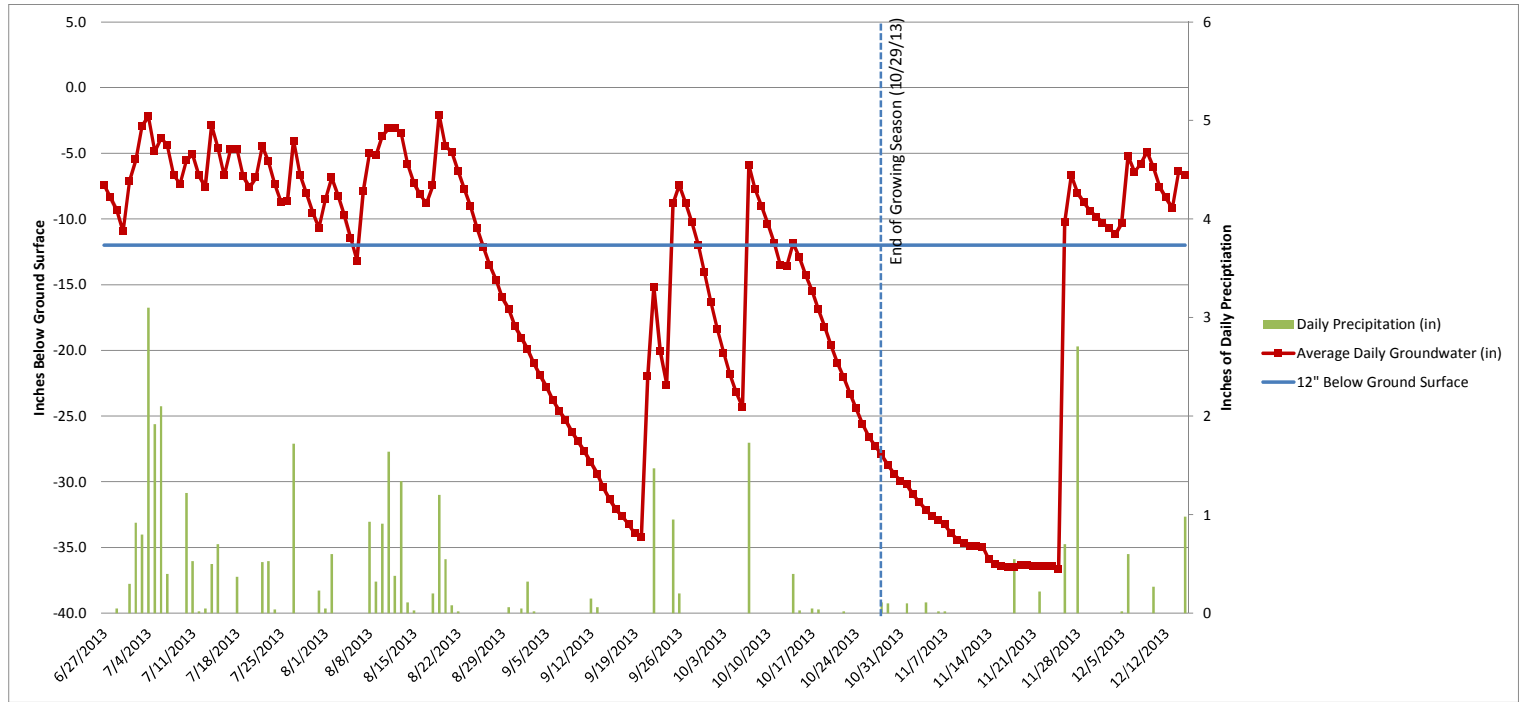
Ecotone Unit: Level Logger
Serial Number: 0000136ACA3C
Probe Number: 0000136ACA3C
Log Read: 12/15/2013 14:58:27
Fletcher-Meritor Well #19



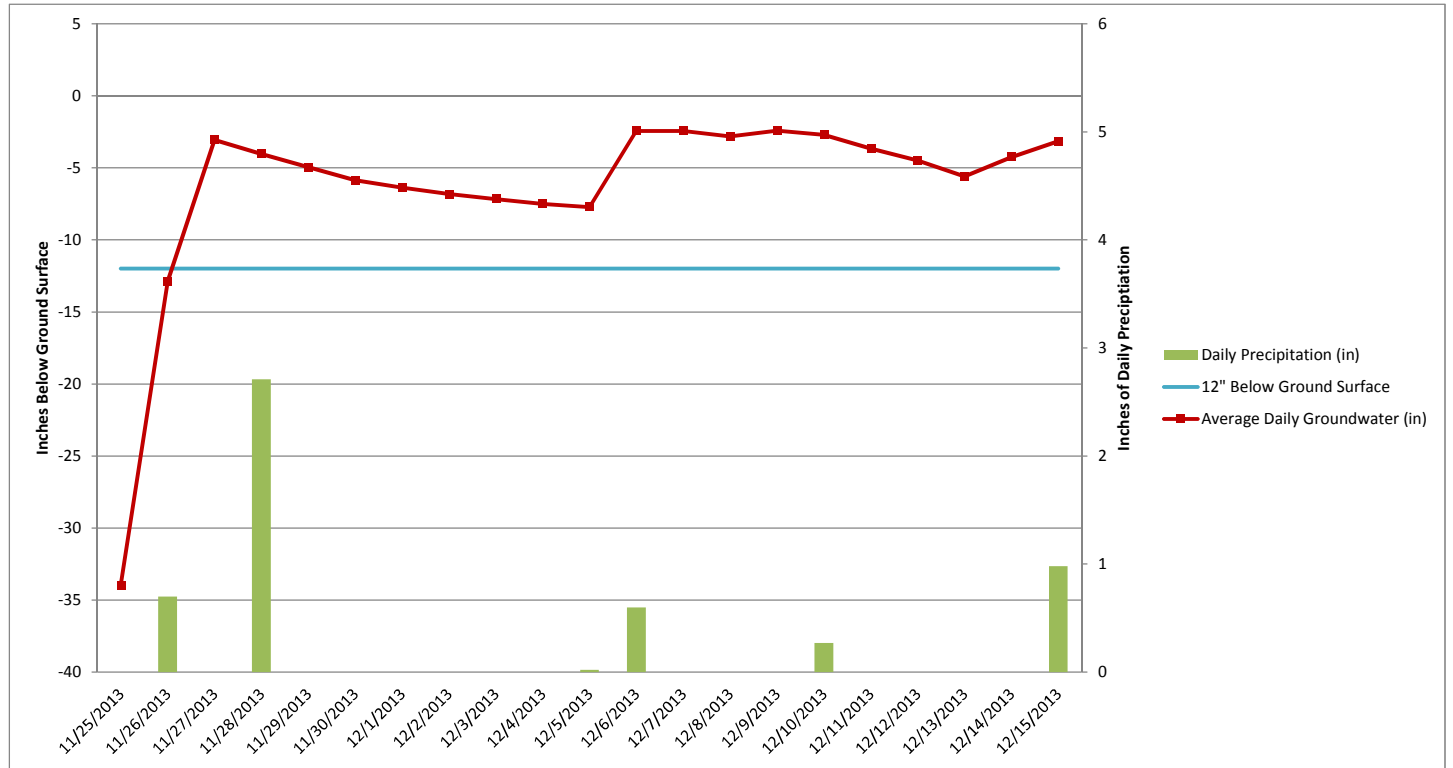
Ecotone Unit: Level Logger
Serial Number: 00000B651924
Probe Number: 000001D31E29
Log Read: 12/15/2013 14:56:11
Fletcher-Meritor Well #20



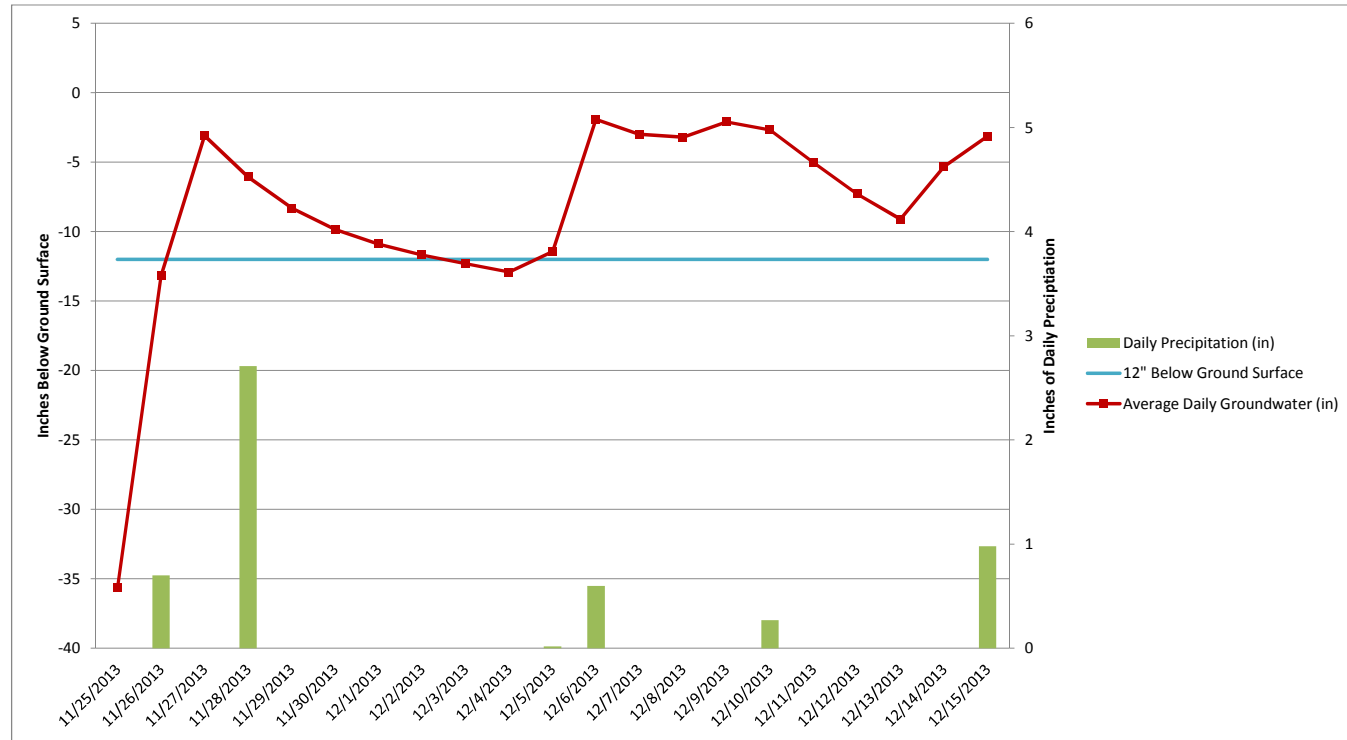
Ecotone Unit: Level Logger
Serial Number: 0000138BB5AA
Probe Number: 0000138BB5AA
Log Read: 12/15/2013 13:59:54
Fletcher-Meritor Well #21



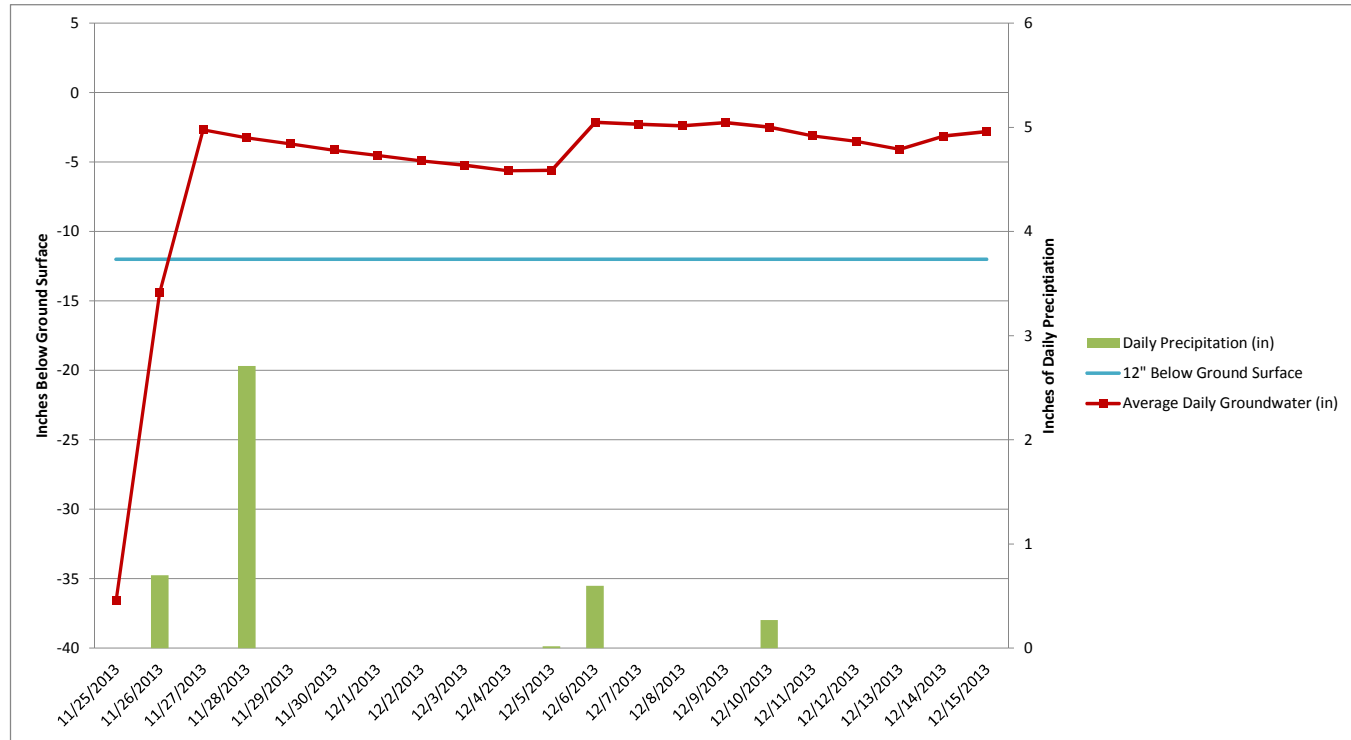
Ecotone Unit: Level Logger
Serial Number: 00001314D206
Probe Number: 00001314D206
Log Read: 12/15/2013 13:53:14
Fletcher-Meritor Well #24



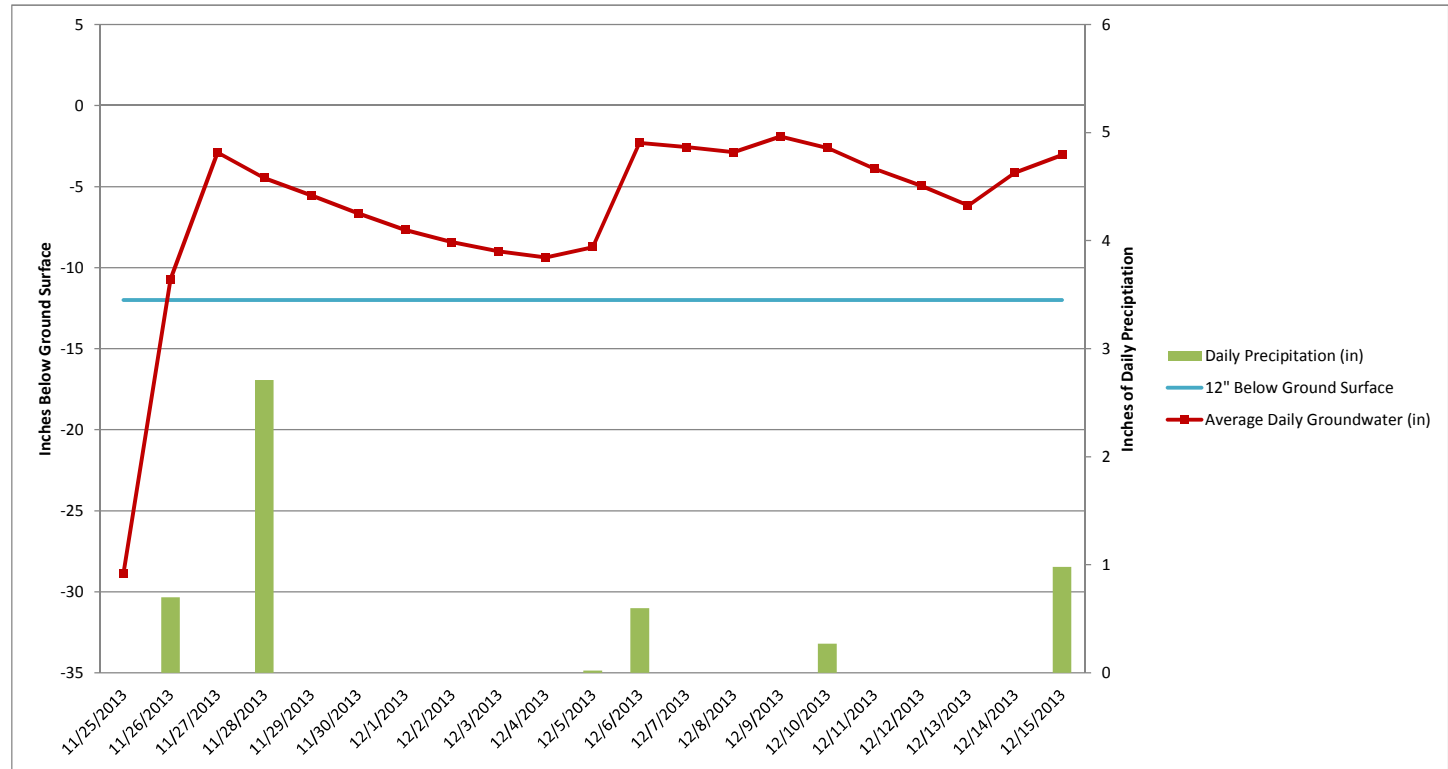
Ecotone Unit: Level Logger
Serial Number: 000009BEBF22
Probe Number: 000001304897
Log Read: 12/15/2013 13:46:35
Fletcher-Meritor Well #25



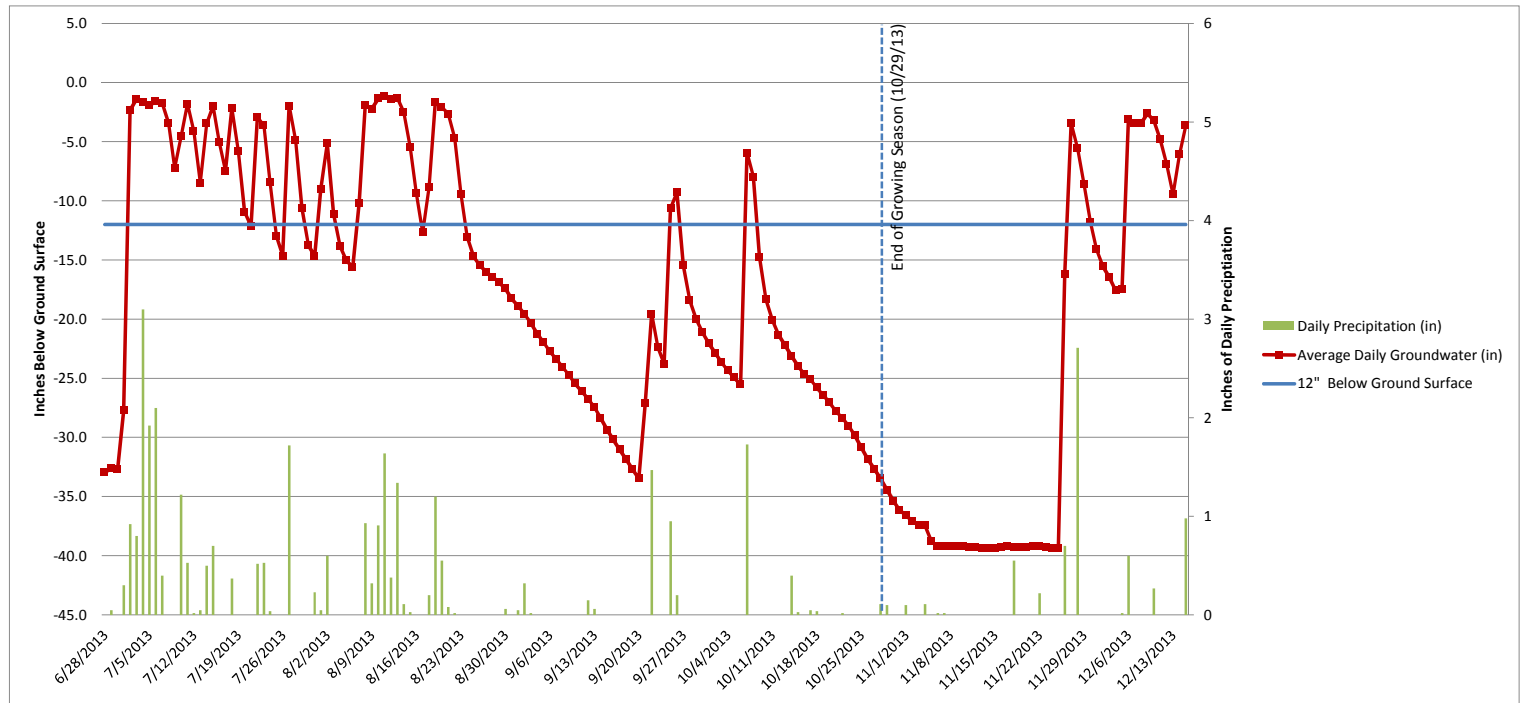
Ecotone Unit: Level Logger
Serial Number: 00001314D1F1
Probe Number: 00001314D1F1
Log Read: 12/15/2013 13:56:46
Fletcher-Meritor Well #26



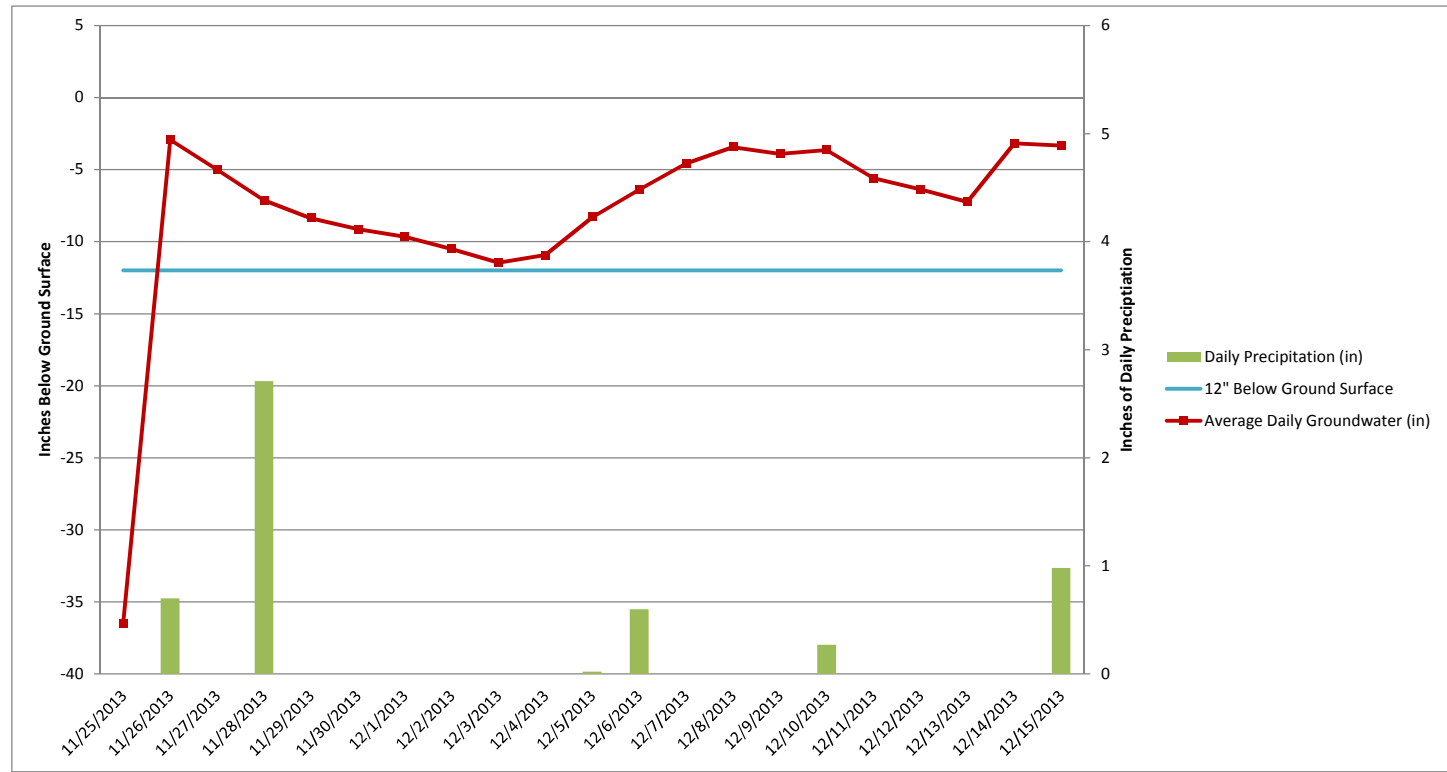
Ecotone Unit: Level Logger
Serial Number: 0000113118F8
Probe Number: 0000113118F8
Log Read: 12/15/2013 14:03:09
Fletcher-Meritor Well #27



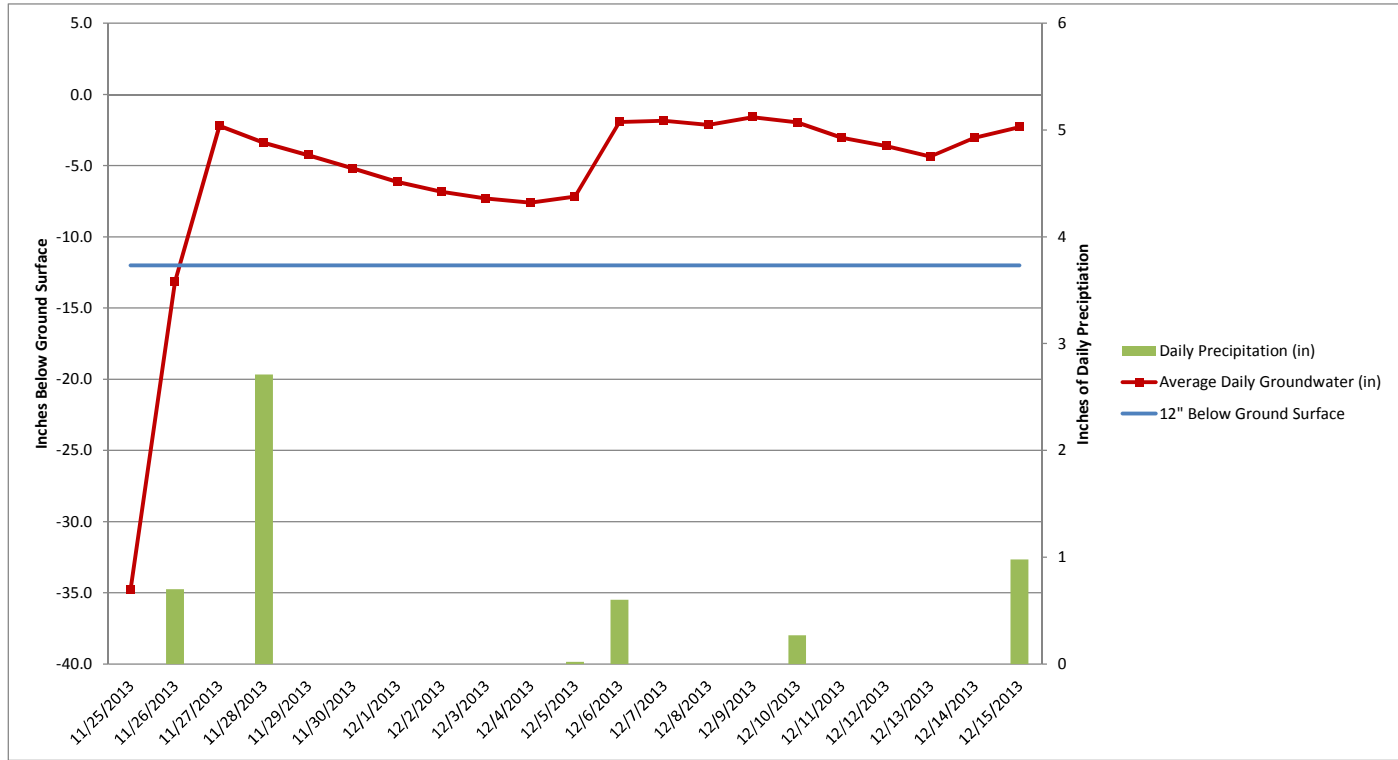
Ecotone Unit: Level Logger
Serial Number: 000009DE69AB
Probe Number: 000001303427
Log Read: 12/15/2013 13:42:22
Fletcher-Meritor Well #29



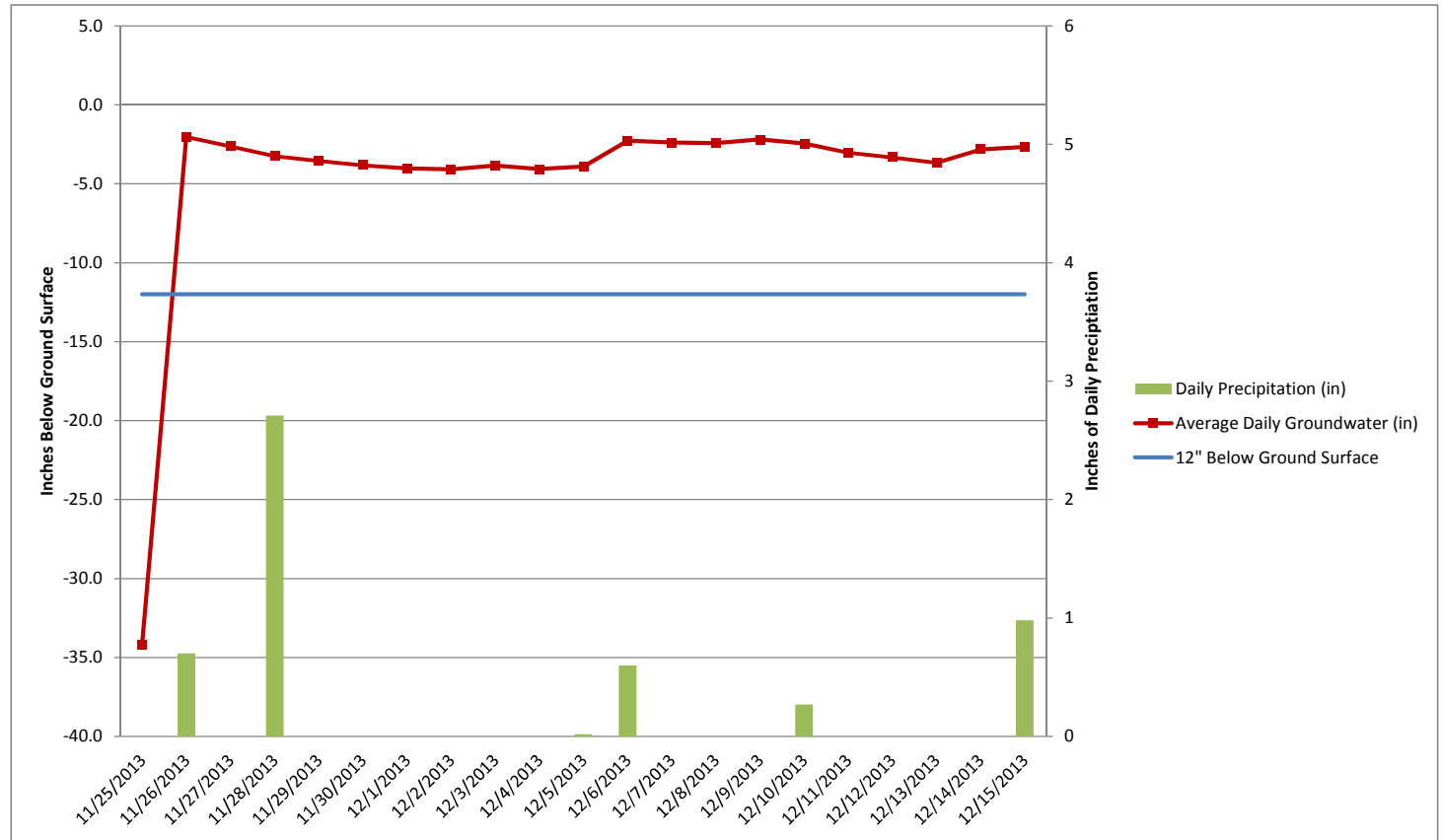
Ecotone Unit: Level Logger
Serial Number: 0000138BE066
Probe Number: 0000138BE066
Log Read: 12/15/2013 13:40:27
Fletcher-Meritor Well #30



Ecotone Unit: Level Logger
Serial Number: 00000EBDD9B0
Probe Number: 00000EBDD9B0
Log Read: 12/15/2013 13:38:06
Fletcher-Meritor Well #32



Ecotone Unit: Level Logger
Serial Number: 00000EBDCF48
Probe Number: 00000EBDCF48
Log Read: 12/15/2013 13:34:39
Fletcher-Meritor Well #33



Ecotone Unit: Level Logger
Serial Number: 00000EBDB81A
Probe Number: 00000EBDB81A
Log Read: 12/15/2013 13:36:15
Fletcher-Meritor Well #34

