

**Little Beaver Creek (EEP #221)
Stream and Wetland Restoration Site
2013 Annual Monitoring Report (MY4)**

**Wake County
EEP Project No. 221
Design Firm: Earthtech
Construction Completed February 2007
Construction Repairs Completed May 2013**



September 2014

Prepared for:



**NCDENR/ Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652**

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1.0 EXECUTIVE SUMMARY

The Little Beaver Creek stream and wetland restoration project consists of 3,712 linear feet of stream restoration, 1,513 linear feet of stream preservation, and 2.4 acres of wetland restoration. Little Beaver Creek is located in Wake County southwest of Apex, North Carolina at the end of Olive Farm Road (SR 1178). Construction began in July 2005 and due to contractual issues there was a delay in the completion of the construction until 2006, which prevented planting until the dormant 2006/2007. Tropical storm Alberto caused damage in August 2008, which required repair. Collectively, this caused planting to be delayed until February 2007, the official end of construction.

Between January 14 and May 6, 2013, spot repairs were made to approximately 400 linear feet of channel, riffles were installed, existing structures were adjusted through boulder removal, unwanted/invasive plants were treated, pine and sweet gum saplings were thinned within the outer 40 feet of the 50 foot stream buffer, and supplemental planting was conducted. For specific details about the repairs, please see the *2013 Supplemental Monitoring Report* (Appendix F).

1.1 Goals and Objectives

The goals and objectives for the Little Beaver Creek (EEP #221) stream and wetland restoration are:

Goals

- Improve water quality and reduce erosion
- Improve aquatic habitat
- Re-establish connectivity of the stream with its floodplain
- Restore characteristic natural plant communities/wildlife habitat and hydrologic regime to disturbed wetlands

Objectives

- Implementation of stream stabilization techniques
- Improve aquatic habitat through the implementation of natural structures such as rootwads, rock vanes, woody debris, and the planting of a riparian buffer
- Provide aesthetic value, wildlife habitat, and bank stability through the creation or enhancement of a riparian zone with plantings
- Provide a stable stream channel that neither aggrades or degrades while maintaining its dimension, pattern, and profile, with the capacity to transport water and sediments

1.2 Vegetative Assessment

Eight vegetation monitoring plots (VP 2, 5, 7, 8, 9, 10, 11, and 14) were monitored for Monitoring Year 4 (MY4). As a result of the stream repairs in 2013, the conservation easement received supplemental plantings in March 2013. Re-grading only occurred in plots 8 and 10. A cut stump herbicidal treatment method was employed on the Loblolly Pine and Sweetgum saplings throughout the conservation easement altering plots 5, 7, 11, and 14. All plots received supplemental plantings. VP 2 remained relatively intact and undisturbed with the exception of the supplemental plantings. Please see the *2013 Supplemental Monitoring Report* for more details.

Of these eight plots, 87.5% of the plots (VP 5, 7, 8, 9, 10, 11, and 14) are meeting the vegetation success criteria; VP 2 is the only plot not meeting the success criteria. The average stems per acre for all eight monitoring plots, including natural and planted stems, is 9,141 stems per acre; the average planted stems per acre for all eight monitoring plots, excluding live stakes, is 577 stems per acre. Success criterion for planted woody species is 288 stems/acre after MY4. A mortality rate of ten percent will be allowed after MY5 (260 stems/acre). Currently the vegetation criteria are being met throughout the site with 577 planted stems/acre.

The invasive exotic, Multiflora Rose (*Rosa multiflora*) is the only notable vegetation problem areas for MY4; several stems were observed throughout the conservation easement and are identified in the Current Conditions Plan View. Other Invasive exotics within the conservation easement include Tall Fescue (*Schedonurus arundinaceus*), Gill over the Ground (*Glechoma hederacea*), Japanese Honeysuckle (*Lonicera japonica*), and Japanese Stiltgrass (*Microstegium vimineum*). Although these species have been given different ranks of severity, the functionality of the project is not expected to be impaired significantly. It is likely that all of these species were present in and adjacent to the conservation easement previous to construction. For additional information relating to vegetation, see Appendix C.

1.3 Stream Assessment

The project is divided into three separate reaches (Reach 1, Reach 2, and Reach 3) for the purposes of the design. Reach 1 and 2 consist of Priority 1 and 2 stream restoration. Priority 1 restoration involves the re-establishment of the bankfull stage at the historical floodplain elevation. Priority 2 involves the creation of a new floodplain and stream pattern with the streambed remaining at the present elevation. To accomplish this type of restoration, a combination of bedform transformation, channel dimension adjustments, pattern alterations, and structure installation was performed. Natural meander patterns were restored and grade control rock vanes and rootwads were incorporated for aquatic habitat enhancement and bed and bank stability. Tributaries were restored using Priority 2 restoration. Due to bedrock constraints, the restoration of Reach 3 below the road crossing was abandoned. This portion of Reach 3 (i.e. Reach 3b) is preserved within the permanent conservation easement.

The majority of Little Beaver Creek, Reach 1 (station 10+00-19+90), Reach 2 (19+90 to 23+50), and Reach 3 (23+50 to 38+00) remain in stable condition with some isolated minor bank erosion. The portion of Little Beaver Creek below station 38+00 to the culvert at the end of the restored reach is stable and well vegetated. Two tributaries located on the project site tie into the north bank of Little Beaver Creek. Tributary 1 is exhibiting some very minor bank scour while the majority of the channel remains in stable condition. Tributary 2 is very stable with vegetation that has established throughout the channel bed and banks.

Repairs to Little Beaver Creek were conducted between January 14 and May 6, 2014. These repairs consisted of the following; a description of stream bank and channel repairs is listed as follows by station:

- Constructed riffle installed Station 23+86 to 24+12
- Bank repair right 24+30 hole filled and matted
- Bank repair right 24+52 to 24+78 graded and some rock added to toe after soil lost in a large rain event after construction.
- Bank graded and brush toe added to right bank station 26+42 to 27+08. One boulder taken off structures at 27+55 and two boulders from structure at 27+75 used in the repair.

- Bank re-graded 27+60 to 27+75 and two boulders removed from upstream structure.
- Graded bank 27+95 to 28+18 right and removal of former beaver dam remnant debris.
- Brush toe from 28+45 to 28+75 to repair large channel blow out bank left.
- Class B stone added below structure at 28+80
- Bank right graded from 29+25 to 29+41 and 5 boulders added to the toe for reinforcement from structure at 29+45 where the boulders were removed.
- Graded bank left from 29+58 to 29+72 and matted.
- Constructed riffle added 29+92 to 30+26 and right bank graded and matted.
- Graded bank left and matted 30+86 to 31+06
- Graded bank right and rock toe added 31+33 to 31+53. Four boulders used removed from structure at 31+60.
- Graded bank right with rock toe added 31+92 to 32+12. Three boulders used from structure at 32+00.
- Proposed riffle at station 32+80 to 33+05 not constructed. The stream in this area had filled in with stone and had formed a riffle; the banks in the area were stable. No work in this area was needed.
- One boulder was removed from the structure at 33+60
- Constructed riffle added 37+85 to 38+18. Broad and deep blow out area. Banks reconstructed and one large boulder and two small added from structure at 37+30 due to the riffle due to the extreme depth of the void.
- Graded bank at 39+02 – smaller riprap used for the rock at toe due to the presence of saprolite in the area.

In accordance with the Supplemental Monitoring Report, the 2014 MY4 survey was conducted utilizing the newly established survey control points.

1.4 Wetland Assessments

Eight RDS groundwater gauges (2, 3, 4, 5, 6, 7, 8, & 9) are located within the conservation easement. By recommendation from EEP, these gauges were installed on June 25, 2008 to replace an older set of gauges. In January of 2010, four gauges (2, 3, 4, and 5) were relocated upstream to more appropriate locations. After completion of the MY3 report in spring 2010, monitoring was delayed to redesign and repair areas of the project site. MY4 did not begin until the fall of 2013, near the end of the growing season. Groundwater gauges were not downloaded between spring 2010 and fall 2013. This resulted in some data gaps in the groundwater gauge data because of gauge failure and battery exhaustion; broken gauges and exhausted batteries were replaced during the current monitoring period. In addition, one gauge (8) was missing entirely and was replaced. Five of the eight groundwater gauges (Gauge 3, 4, 5, 7, and 8) failed between the MY3 and MY4 monitoring (2009 to 2013). These gauges have been repaired and are now collecting data. Gauges 2 and 9 did not fail during the lag period between monitoring years; however they are not meeting hydrological requirements. Gauge 6 is meeting hydrological requirements. Three bankfull events have been recorded for the project site since 2008 (Table 12).

1.5 Annual Monitoring Summary

Summary information/data related to the occurrences 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 information formerly found in these reports can be found in the mitigation plan and restoration plan

documents available on EEPs website. All raw data supporting the tables and figures in the appendices is available from EEP upon request.

2.0 METHODOLOGY

Methodologies follow the current EEP monitoring report template (Version 1.5 - 06/08/12). Level II of the CVS –EEP Protocol for Recording Vegetation (Lee et al. 2008) was used for vegetation data collection. Photos were taken with a digital camera. A Trimble Geo XT handheld unit with sub-meter accuracy was used to collect monitoring feature locations and vegetation problem areas. Precipitation data were obtained from the State Climate Office of North Carolina (<http://www.nc-climate.ncsu.edu/services/request.php>) (State Climate Office of North Carolina 2012). *Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas* was the taxonomic standard used throughout vegetation data collection (Weakley 2012). Vegetation monitoring data was collected on October 24, 2014.

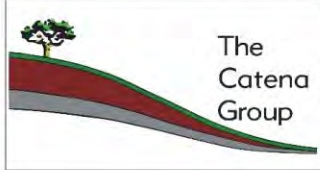
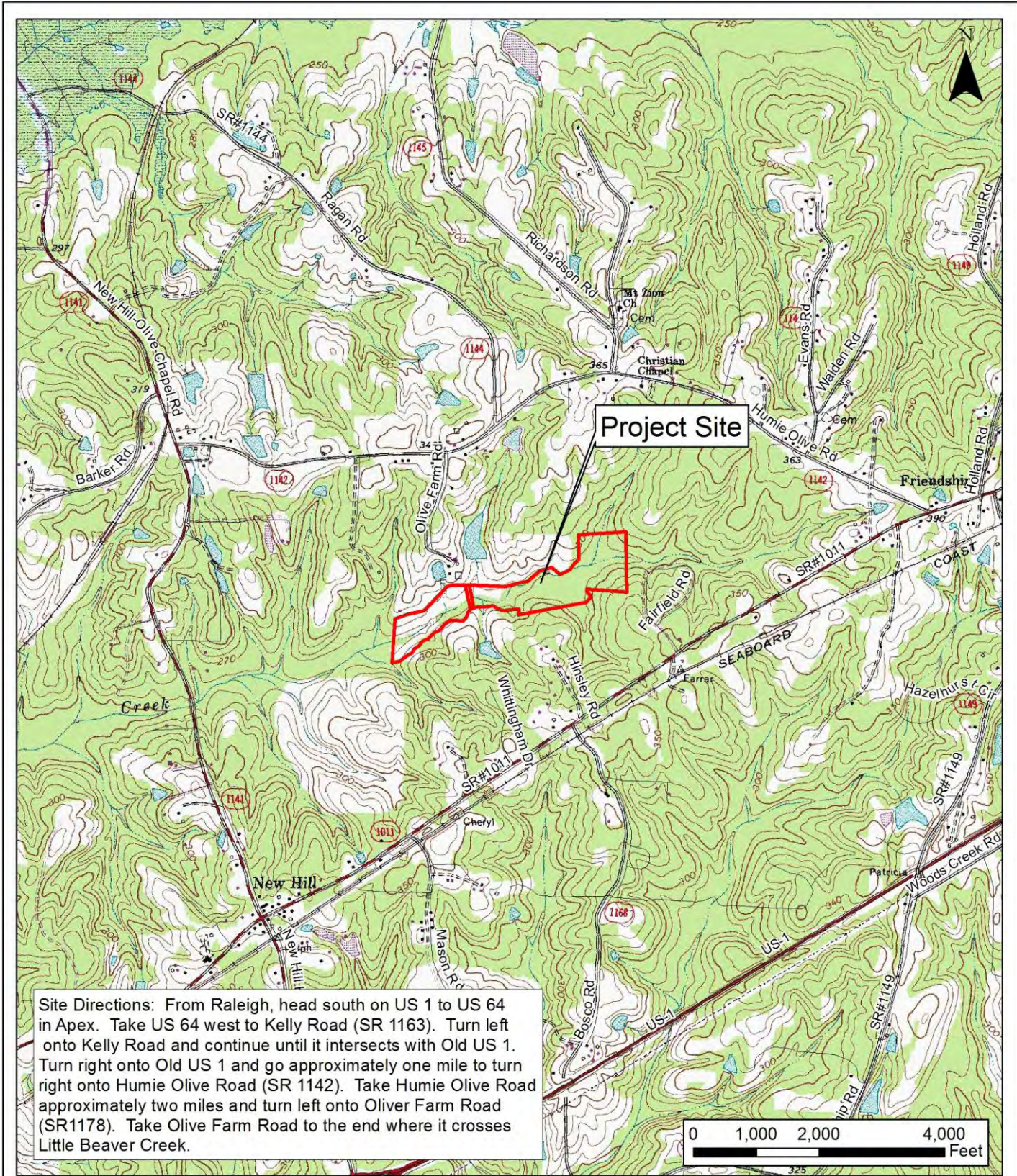
Stream monitoring was completed by utilizing total station survey along with Rosgen Level II techniques to determine stream stability and performance (Rosgen 1996). The annual cross-sectional survey included points surveyed at breaks in slope, including bankfull, inner berm, edge of water, ground shot and thalweg, if the features were present. Longitudinal profile survey was conducted for the entire length of the restored channel for all stream reaches. Measurements included thalweg, water surface, and bankfull. Existing onsite benchmarks were used for survey control. The previous monitoring surveys did not utilize survey control and were manually adjusted. The MY4 monitoring survey was conducted utilizing survey control, but due to the manual adjustment of the previous data, the MY4 data did not spatially match the previous monitoring efforts. The MY4 total station survey was supplemented with additional traditional level survey for cross sections T1, T2, 8, and portions of the longitudinal profile to maintain data integrity. Although the MY4 raw survey is coordinately correct, the data was adjusted to match the previous monitoring data. The adjustment was completed to maintain spatial congruency and does not affect the integrity or accuracy of the survey data. Photo monitoring was conducted by walking each stream reach and taking photos at each pre-determined photo point location using a digital camera. Stream monitoring was conducted on March 11-13 and April 15, 2014.

3.0 REFERENCES

- Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation, Version 4.2 (<http://cvs.bio.unc.edu/methods.htm>)
- Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, CO.
- State Climate Office of North Carolina. 2012. Apex Station Precipitation Data (*Jan 1, 2010 – Oct 31, 2012; Daily Totals*). (<http://www.nc-climate.ncsu.edu/services/request.php>)
- Weakley, A.S. 2012. *Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas*. Working draft of November 2012. University of North Carolina Herbarium, North Carolina, Botanical Garden, University of North Carolina. 1015pp.

Appendix A.

Project Vicinity Map and Background Tables



**Little Beaver Creek
Stream and Wetland Restoration Site
Site Location Map**
Wake County, North Carolina
USGS 7.5-Minute Topographic Quadrangle Map
(Newhill, NC)

Date:
April 2014

ECP Project No. 221



Figure
1

Table 1. Project Components Mitigation Credits

Little Beaver Creek /Project No. 221									
Mitigation Credits									
	Stream		Riparian Wetland		Non-Riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorus Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	3712	191	2.4	-	-	-	-	-	-
Project Components									
Project Component –or – Reach ID	Stationing/ Location	Existing Footage/ Acreage	Approach (PI, PII, etc)		Restoration–or – Restoration Equivalent	Restoration Footage or Acreage	Mitigation Ratio		
Little Beaver Creek/Reach 1 & 2	SEE CCPV	2.4 acres	N/A		2.4 acres	2.4 acres	1:1		
Little Beaver Creek/Reach 1 & 2	10+00 to 19+91/19+91 to 33+00	2300 lf	P1 & PII		2300 lf	2300 lf	1:1		
Little Beaver Creek/Reach 3a	33+00 to 40+32	732 lf	PII		732 lf	732 lf	1:1		
Little Beaver Creek/Reach 3b	48+00 to 63+13	1513lf	Preservation		Preservation	Preservation	10:1		
Tributary 1	10+00 to 13+81	381 lf	P1I		381 lf	381 lf	1:1		
Tributary 2	10+00 to 12+06	206 lf	P1I		206 lf	206 lf	1:1		
Tributary 3	10+00 to 10+93	93 lf	PII		93	93 lf	1:1		
Component Summation									
Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-Riparian Wetland (acres)	Buffer (square feet)	Upland (acres)			
		Riverine	Non-Riverine						
Restoration	3712	2.4							
Enhancement									
Enhancement I									
Enhancement II									
Creation									
Preservation	1913								
HQPreservation									
BMP Elements									
Element	Location	Purpose/Function		Notes					
BMP Elements: BR = Bioretention Cell; SF = Sand Filter; SW = Stormwater Wetland; WDP = Wet Detention Pond; DDP = Dry Detention Pond; FS = Filter Strip; S = Grassed Swale; LS = Level Spreader; NI = Natural Infiltration Area; FB = Forested Buffer									

Table 2. Project Activity and Reporting History

Little Beaver Creek Stream and Wetland Restoration Site-Project No. 221			
Activity or Reporting	Scheduled Completion	Data Collection Complete	Actual Completion Date
Restoration Plan	2003	2003	March 2003
Final Design-90%	2005	2005	2005
Construction	2005	2005	November 2005
Temporary S&E mix applied to entire project area	2005	2005	2005
Permanent seed mix applied to entire project area	2005	2005	2005
Containerized, B&B, and livestake planting	January 2007	February 2007	February 2007
Mitigation Plan/As-built (Year 0 Monitoring-baseline)	July 2006	March 2006	February 2007
Year 1 Monitoring	Fall 2006	February 2007	November 2007
Year 2 Monitoring	December 2008	Fall 2008	December 2008
Year 3 Monitoring	December 2009	May 2010	May 2010
Site Repairs	NA	NA	May 2013
Supplemental Replanting	NA	NA	May 2013
Year 4 Monitoring*	Fall 2013	October 2013; April 2014	May 2014
Year 5 Monitoring	Fall 2014	NA	NA

* Postponed due to re-gradingactivities

Table 3. Project Contact Table

Little Beaver Creek Stream and Wetland Restoration Site-Project No. 221	
Designer POC	Earth Tech 701 Corporate Center Drive Suite 475 Raleigh, NC 27607 Bill Jenkins PE (919) 854-6200
Construction Contractor	Envirocon, Inc. 651 Corporate Circle Suite 114 Golden, CO 80401 Verne Musser (303) 215-0187
Planting Contractor POC	Seal Brothers 131 West Cleve St. Mt. Airy, NC 27030 Brain Seal (336) 786-2263
Seeding Contractor POC	Seal Brothers 131 West Cleve St. Mt. Airy, NC 27030 Brain Seal (336) 786-2263
Seed Mix Sources	Evergreen Seeding 4792 Rawls Church Rd. Fuquay-Varina, NC 27526
Nursery Stock Suppliers	Mellow March Farm 1312 Woody Store Rd. Siler City, NC 27344 (919) 742-1200
Monitoring Performers	The Catena Group 410-B Millstone Drive Hillsborough, NC 27278
Stream Monitoring	Rummel, Klepper & Kahl Consulting Engineers 900 Ridgefield Dr Raleigh, NC 27609
Vegetation Monitoring	The Catena Group 410-B Millstone Drive Hillsborough, NC 27278
Wetland Monitoring	The Catena Group 410-B Millstone Drive Hillsborough, NC 27278

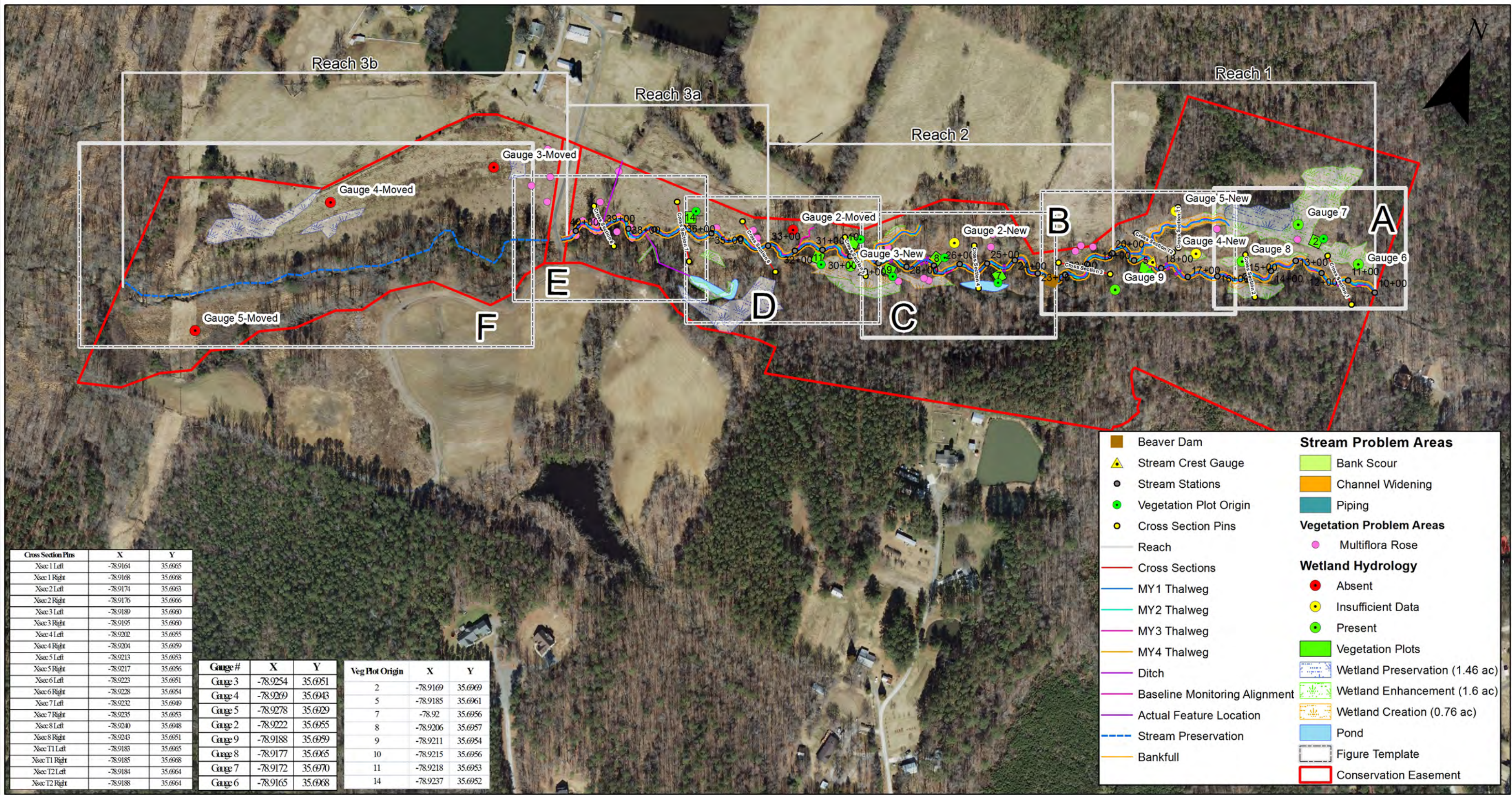
Table 4. Project Baseline Information Attributes

Little Beaver Creek Stream and Wetland Restoration Site-Project No. 221					
Project Information					
County		Wake			
Project Area (acres)		52 ac			
Project Coordinates		35.695, -78.922			
Project Watershed Summary Information					
Physiographic Province		Piedmont			
River Basin					
USGS Hydrologic Unit 8-Digit	03030002	USGS Hydrologic Unit 14-Digit	03030002060160		
NCDWQ Sub-basin for Project		030605			
Project Drainage Area (acres)		Little Beaver Creek: 1.1 sq mi			
Project Drainage Area % of Impervious Area		< 5%			
CGIA Land Use Classification		311, 323, 414, 422, 441			
Reach Summary Information					
Parameters		Reach 1	Reach 2	Reach 3a	Reach 3b
Length of reach (linear feet)		991	1309	732	1490
Valley Classification		Low Slope Alluvial Valley	Low Slope Alluvial Valley	Low Slope Alluvial Valley	Low Slope Alluvial Valley
Drainage area (acres)		391	527	658	695
NCDWQ Stream Identification Score		NA	NA	NA	NA
NCDWQ Water Quality Classification		WS-IV NSW	WS-IV NSW	WS-IV NSW	WS-IV NSW
Morphological Description (Stream Type)		C4	C4	C4	C4
Evolutionary Trend		NA	NA	NA	NA
Underlying Mapped Soils		Wehadkee silt loam	Wehadkee silt loam	Wehadkee silt loam	Wehadkee silt loam
Drainage Class		Poorly drained	Poorly drained	Poorly drained	Poorly drained
Soil Hydric Status		A	A	A	A
Slope		0.6%	0.5%	0.5%	0.5%
FEMA Classification		None	Zone AE	Zone AE	Zone AE
Native Vegetation Community		Alluvial Forests	Alluvial Forests	Alluvial Forests	Alluvial Forests
Percent Composition of Exotic Vegetation		<10%	<10%	<10%	<10%

Wetland Summary Information			
Parameters	Wetlands 1	Wetland 2	Wetland 3
Size of Wetland (acres)	2.4		
Wetland Type (non-riparian, riparian riverine, or non-riparian)	Riparian		
Mapped Soil Series	Wehadkee silt loam		
Drainage Class	Poorly drained		
Soil Hydric Status	Yes		
Source of Hydrology	Precipitation, flooding, water table		
Hydrologic Impairment	Low Water table		
Native Vegetation Community	Headwater Wetland Type		
Percent Composition of Exotic Vegetation	0	0	0
Regulatory Considerations			
Regulation	Applicable?	Resolved?	Supporting Documents
Waters of the US - Section 404	Yes	NA	See Permit Application
Waters of the US - Section 401	Yes	NA	See Permit Application
Endangered Species Act	No	NA	NA
Historic Preservation Act	No	NA	NA
CZMA/CAMA	No	NA	NA
FEMA Floodplain Compliance	Yes	NA	See Mitigation Plan
Essential Fisheries Habitat	No	NA	NA

Appendix B.

Visual Assessment Data

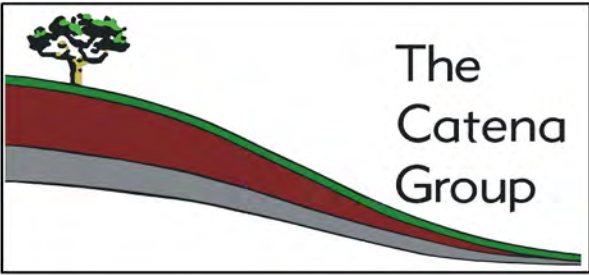


Cross Section Pins	X	Y
Xsec 1 Left	-78.9164	35.6965
Xsec 1 Right	-78.9168	35.6968
Xsec 2 Left	-78.9174	35.6963
Xsec 2 Right	-78.9176	35.6966
Xsec 3 Left	-78.9189	35.6960
Xsec 3 Right	-78.9195	35.6960
Xsec 4 Left	-78.9202	35.6955
Xsec 4 Right	-78.9204	35.6959
Xsec 5 Left	-78.9213	35.6953
Xsec 5 Right	-78.9217	35.6956
Xsec 6 Left	-78.9223	35.6951
Xsec 6 Right	-78.9228	35.6954
Xsec 7 Left	-78.9232	35.6949
Xsec 7 Right	-78.9235	35.6953
Xsec 8 Left	-78.9240	35.6948
Xsec 8 Right	-78.9243	35.6951
Xsec T1 Left	-78.9183	35.6965
Xsec T1 Right	-78.9185	35.6968
Xsec T2 Left	-78.9184	35.6964
Xsec T2 Right	-78.9188	35.6964

Gauge #	X	Y
Gauge 3	-78.9254	35.6951
Gauge 4	-78.9269	35.6943
Gauge 5	-78.9278	35.6929
Gauge 2	-78.9222	35.6955
Gauge 9	-78.9188	35.6959
Gauge 8	-78.9177	35.6965
Gauge 7	-78.9172	35.6970
Gauge 6	-78.9165	35.6968

Veg Plot Origin	X	Y
2	-78.9169	35.6969
5	-78.9185	35.6961
7	-78.92	35.6956
8	-78.9206	35.6957
9	-78.9211	35.6954
10	-78.9215	35.6956
11	-78.9218	35.6953
14	-78.9237	35.6952

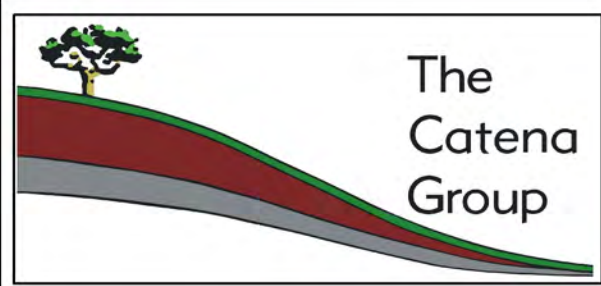
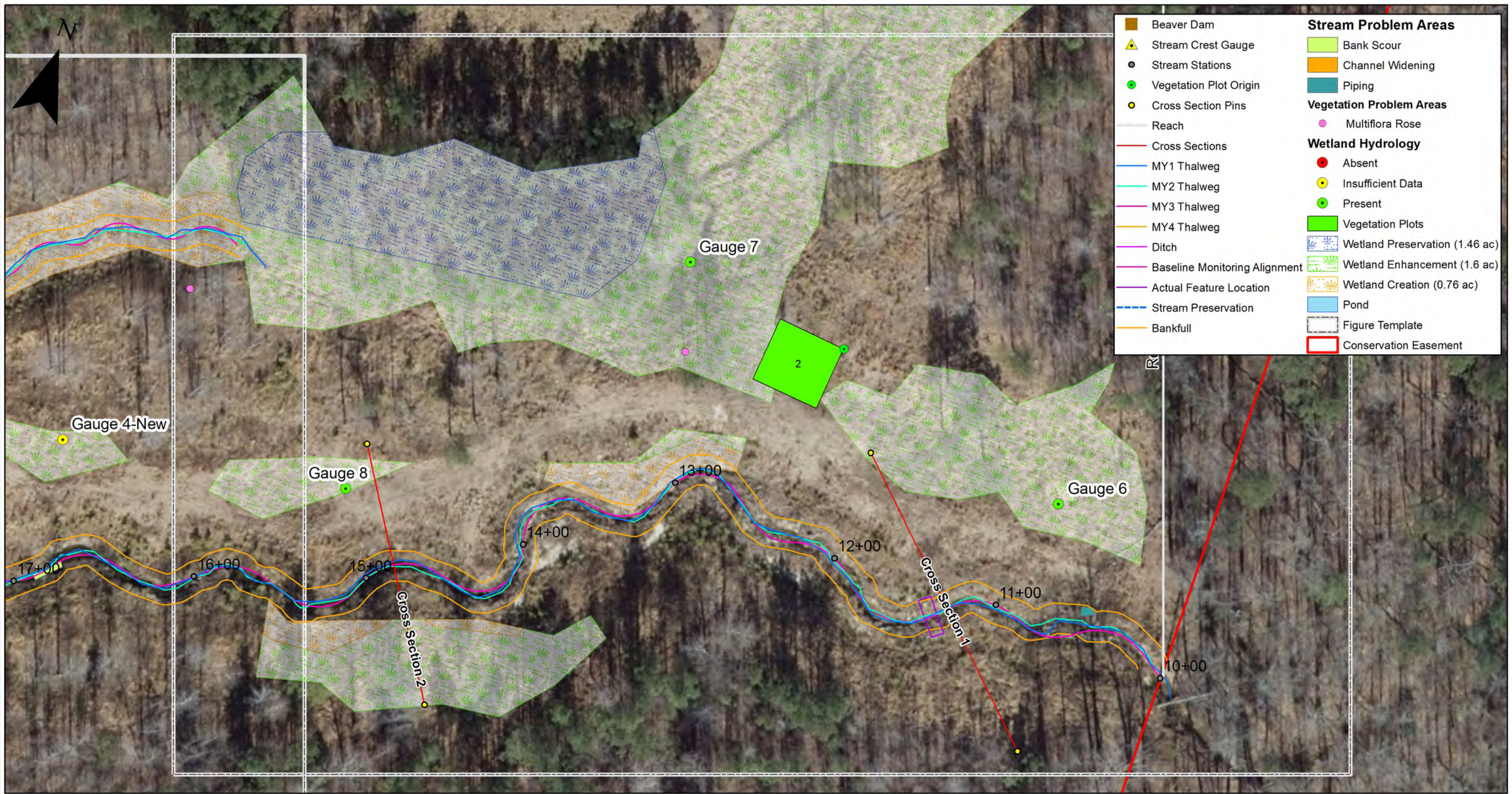
Beaver Dam	Stream Problem Areas
Stream Crest Gauge	Bank Scour
Stream Stations	Channel Widening
Vegetation Plot Origin	Piping
Cross Section Pins	Vegetation Problem Areas
Reach	Multiflora Rose
Cross Sections	Wetland Hydrology
MY1 Thalweg	Absent
MY2 Thalweg	Insufficient Data
MY3 Thalweg	Present
MY4 Thalweg	Vegetation Plots
Ditch	Wetland Preservation (1.46 ac)
Baseline Monitoring Alignment	Wetland Enhancement (1.6 ac)
Actual Feature Location	Wetland Creation (0.76 ac)
Stream Preservation	Pond
Bankfull	Figure Template
	Conservation Easement



Little Beaver Creek
Stream and Wetland Restoration
 MY-04 Current Conditions Plan View
 Wake County, North Carolina

0 200 400 Feet	
EEP Project No.:	Date:
221	September 2014

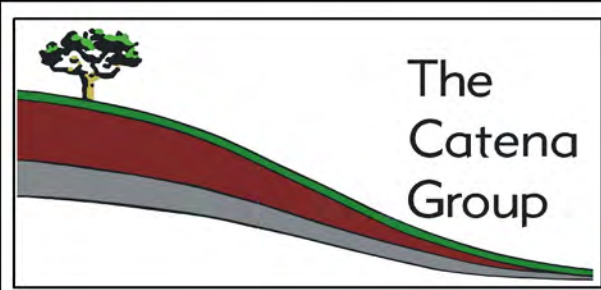
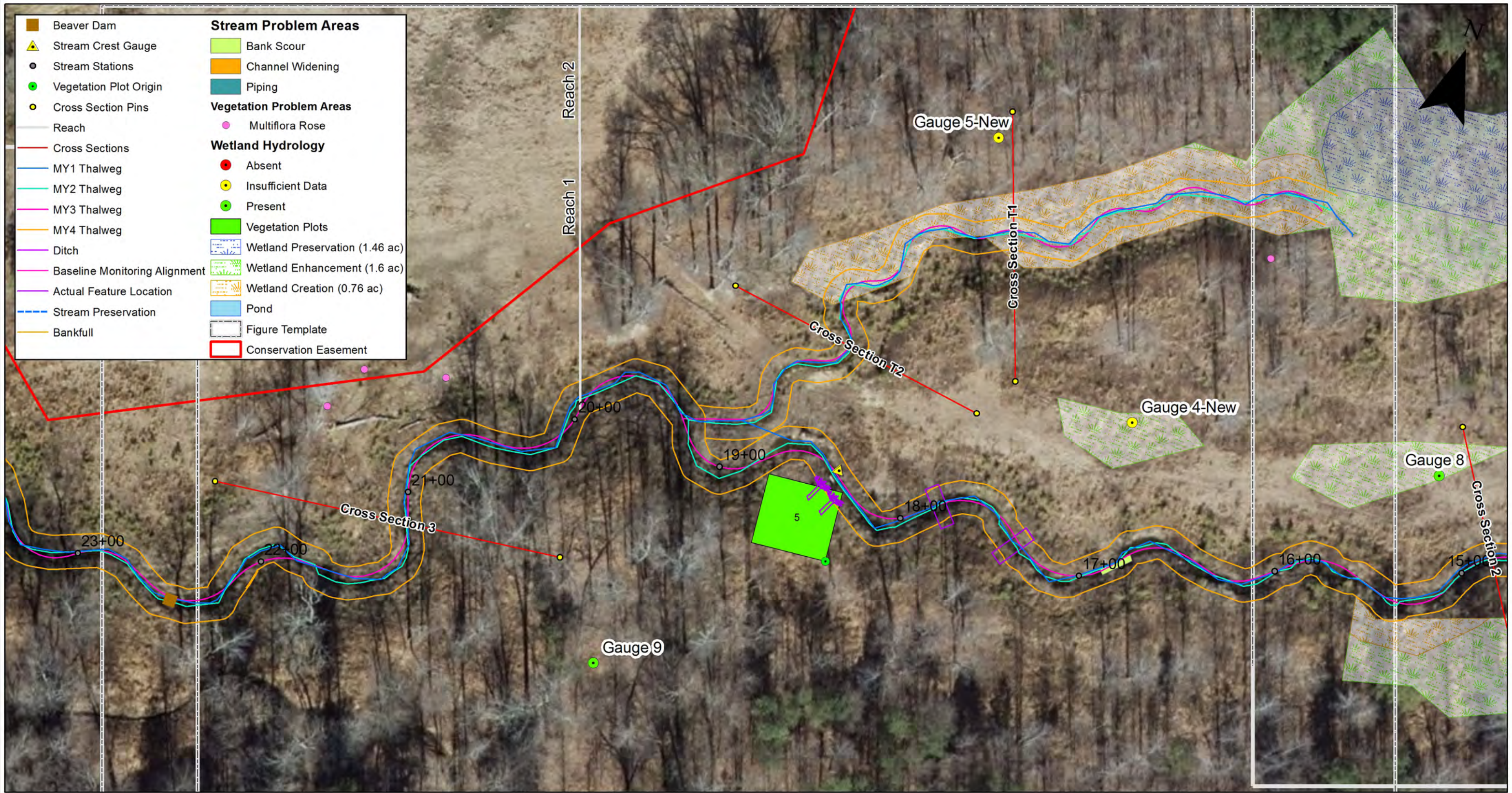
Figure Key



Little Beaver Creek
Stream and Wetland Restoration
 MY-04 Current Conditions Plan View
 Wake County, North Carolina

0 30 60 Feet	
EEP Project No.: 221	Date: September 2014

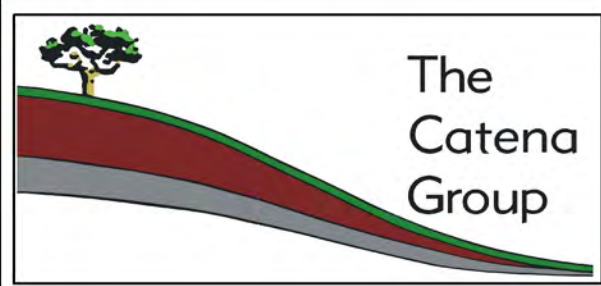
Figure
A



Little Beaver Creek
Stream and Wetland Restoration
 MY-04 Current Conditions Plan View
 Wake County, North Carolina

0 30 60 Feet 	
EEP Project No.:	Date:
221	September 2014

Figure
B

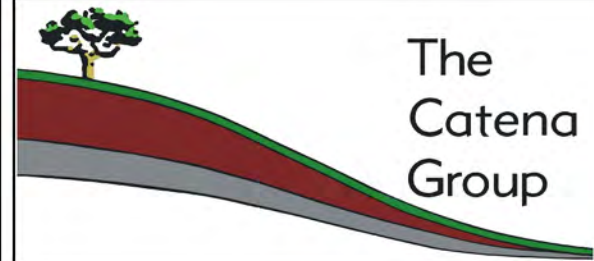
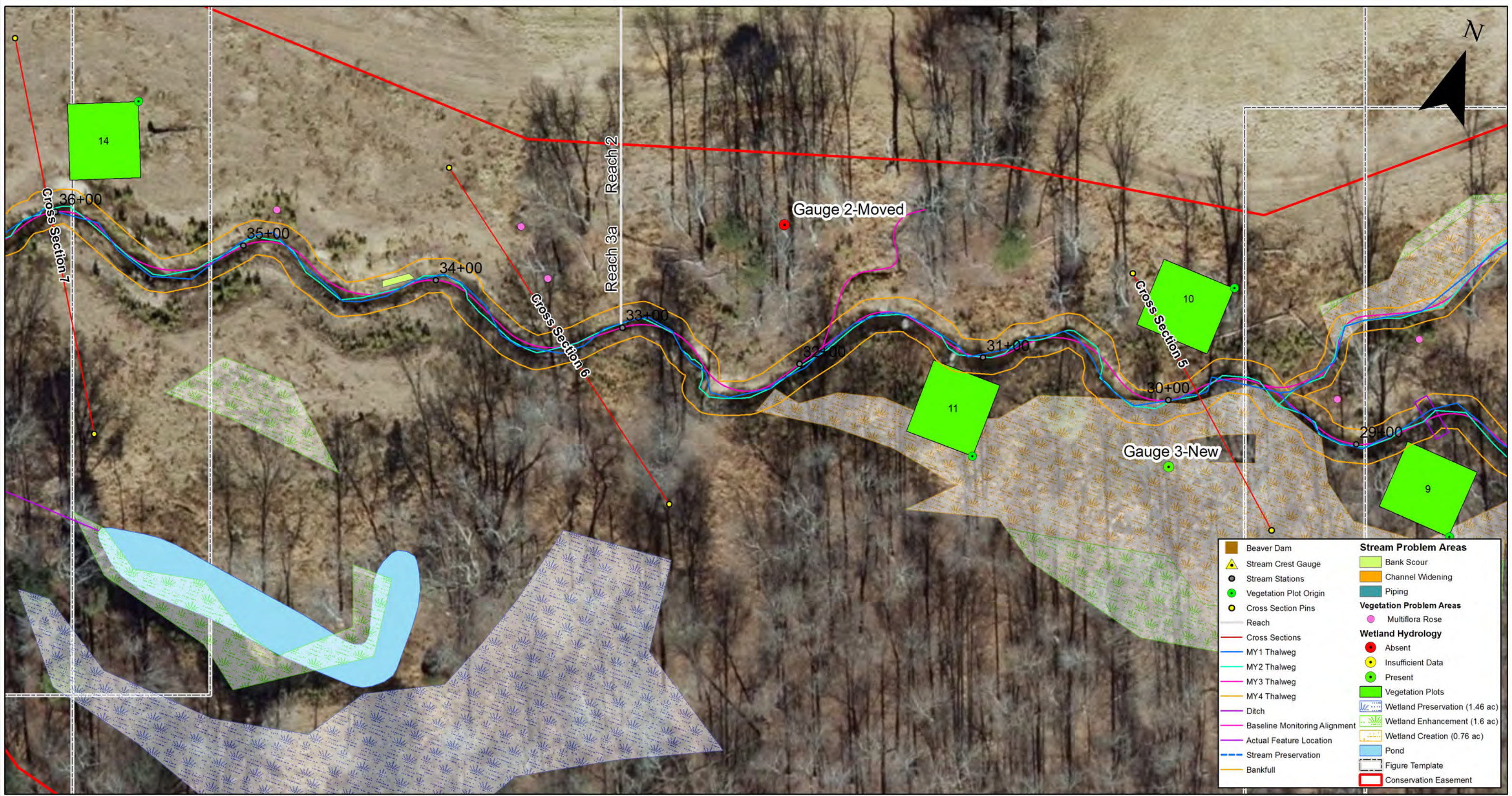


Little Beaver Creek
Stream and Wetland Restoration
 MY-04 Current Conditions Plan View
 Wake County, North Carolina

0 30 60 Feet

 EEP Project No.: Date:
 221 September 2014

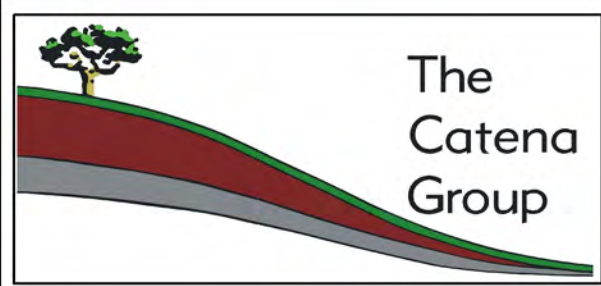
Figure
C



**Little Beaver Creek
Stream and Wetland Restoration**
MY-04 Current Conditions Plan View
Wake County, North Carolina

0 30 60 Feet	
EEP Project No.:	Date:
221	September 2014

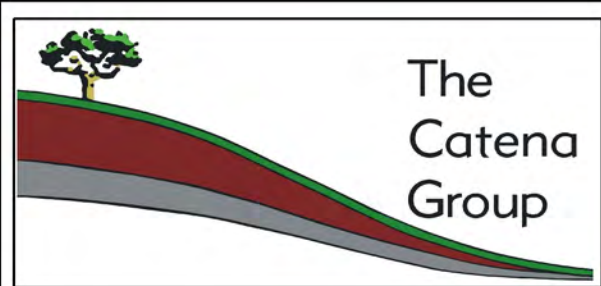
Figure
D



**Little Beaver Creek
Stream and Wetland Restoration**
MY-04 Current Conditions Plan View
Wake County, North Carolina

0 30 60 Feet	
EEP Project No.: 221	Date: September 2014

Figure
E



**Little Beaver Creek
Stream and Wetland Restoration**
MY-04 Current Conditions Plan View
Wake County, North Carolina

0 62.5 125 Feet	
EEP Project No.:	Date:
221	September 2014

Figure
F

Table 5. Visual Stream Morphology Stability Assessment Table
Reach ID – 1, 2, 3A
Assessed Length – 3032 LF

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	% 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. Sediment Deposition			0	0	100%			
		2. Degradation			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate	58	64			91%			
	3. Meander Pool Condition	1. Depth	52	64			81%			
		2. Length	55	64			86%			
	4. Thalweg Condition	1. Thalweg at upstream of meander bend	51	64			80%			
2. Thalweg centering at downstream of meander		52	64	81%						
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover from poor growth and/or scour and erosion					5	55	98%	
	2. Undercut	Banks undercut/overhanging			0	0	100%			100%
	3. Mass Wasting	Bank slumping, caving, or collapse			1	17	99%			99%
				Totals	5	72	97%			97%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	24	25			96%			
	2. Grade Control	Grade Control exhibiting maintenance of grade across the sill	34	34			100%			
	2a. Piping	Structures Lacking any substantial flow underneath sills or arms	24	25			96%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%	N/A	N/A			N/A			
	4. Habitat	Pool forming structures maintaining – Max Pool Depth: Mean Bankfull Depth Ratio \geq 1.6 Rootwads/logs providing some cover at base flow.	N/A	N/A			N/A			

Reach ID – Tributary 1
Assessed Length – 381 LF

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	% 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. Sediment Deposition			0	0	100%			
		2. Degradation			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate	9	11			81%			
	3. Meander Pool Condition	1. Depth	9	11			81%			
		2. Length	10	11			90%			
	4. Thalweg Condition	1. Thalweg at upstream of meander bend	11	11			100%			
2. Thalweg centering at downstream of meander		11	11	100%						
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover from poor growth and/or scour and erosion					0	0	100%	
	2. Undercut	Banks undercut/overhanging			0	0	100%			100%
	3. Mass Wasting	Bank slumping, caving, or collapse			0	0	100%			100%
				Totals	0	0	100%			100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs	2	2			100%			
	2. Grade Control	Grade Control exhibiting maintenance of grade across the sill	2	2			100%			
	2a. Piping	Structures Lacking any substantial flow underneath sills or arms	N/A	N/A			N/A			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%	N/A	N/A			N/A			
	4. Habitat	Pool forming structures maintaining – Max Pool Depth: Mean Bankfull Depth Ratio \geq 1.6 Rootwads/logs providing some cover at base flow.	N/A	N/A			N/A			

Table 6. Vegetation Condition Assessment Table

Planted Acreage – 5 acres

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Multiflora Rose	Very Limited Cover of both woody and herbaceous material	0.1 ac	Pink Circle with dot	39 points	NA	NA
TOTAL						
CUMULATIVE TOTAL						

Easement Acreage – 52 acres

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons on map scale)	1000 sq ft	See CCPV Legend	NA	NA	NA
2. Easement Encroachment Areas	Areas or points (if too small to render as polygons on map scale)	NA	See CCPV Legend	NA	NA	NA

Stream Station Photos

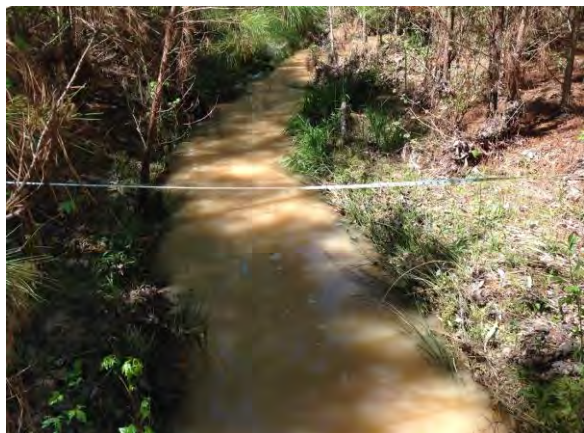


Photo 1. Reach 1, 2, 3 - CS-1 Looking Upstream



Photo 2. Reach 1, 2, 3 - CS-2 Looking Upstream



Photo 3. Reach 1, 2, 3 - CS-3 Looking Upstream



Photo 4. Reach 1, 2, 3 - CS-4 Looking Upstream



Photo 5. Reach 1, 2, 3 - CS-5 Looking Upstream



Photo 6. Reach 1, 2, 3 - CS-6 Looking Upstream



Photo 7. Reach 1, 2, 3 - CS-7 Looking Upstream



Photo 8. Reach 1, 2, 3 - CS-8 Looking Upstream



Photo 9. Tributary 1 - CS-T1 Looking Upstream



Photo 10. Tributary 1 - CS-T2 Looking Upstream

Vegetation Monitoring Plot Photos



Vegetation Plot 2



Vegetation Plot 5



Vegetation Plot 7



Vegetation Plot 8



Vegetation Plot 9



Vegetation Plot 10



Vegetation Plot 11



Vegetation Plot 14

Appendix C.

Vegetation Plot Data

Table 7. Vegetation Plot Success by Project Asset Type

Plot #	Riparian Buffer Stems ¹	Stream/Wetland Stems ²	Live Stakes	Invasives	Volunteers ³	Total ⁴	Unknown Growth Form
0002	n/a	4	0	0	155	159	0
0005	n/a	32	0	0	478	510	0
0007	n/a	20	0	0	496	517	1
0008	n/a	10	0	0	63	73	0
0009	n/a	12	0	0	276	288	0
0010	n/a	14	0	0	50	64	0
0011	n/a	12	0	0	142	154	0
0014	n/a	10	0	0	32	42	0

Wetland/Stream Vegetation Totals				Riparian Buffer Vegetation Totals			
(per acre)							
Plot #	Stream/Wetland Stems ²	Volunteers ³	Total ⁴	Success Criteria Met?		Riparian Buffer Stems ¹	Success Criteria Met?
0002	162	6273	6435	No		n/a	~
0005	1295	19344	20639	Yes		n/a	~
0007	809	20072	20922	Yes		n/a	~
0008	405	2550	2954	Yes		n/a	~
0009	486	11169	11655	Yes		n/a	~
0010	567	2023	2590	Yes		n/a	~
0011	486	5747	6232	Yes		n/a	~
0014	405	1295	1700	Yes		n/a	~
Project Avg	577	8559	9141	Yes		n/a	~

Stem Class

¹Buffer Stems

Characteristics

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.

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%

Appendix D.
Stream Survey Data

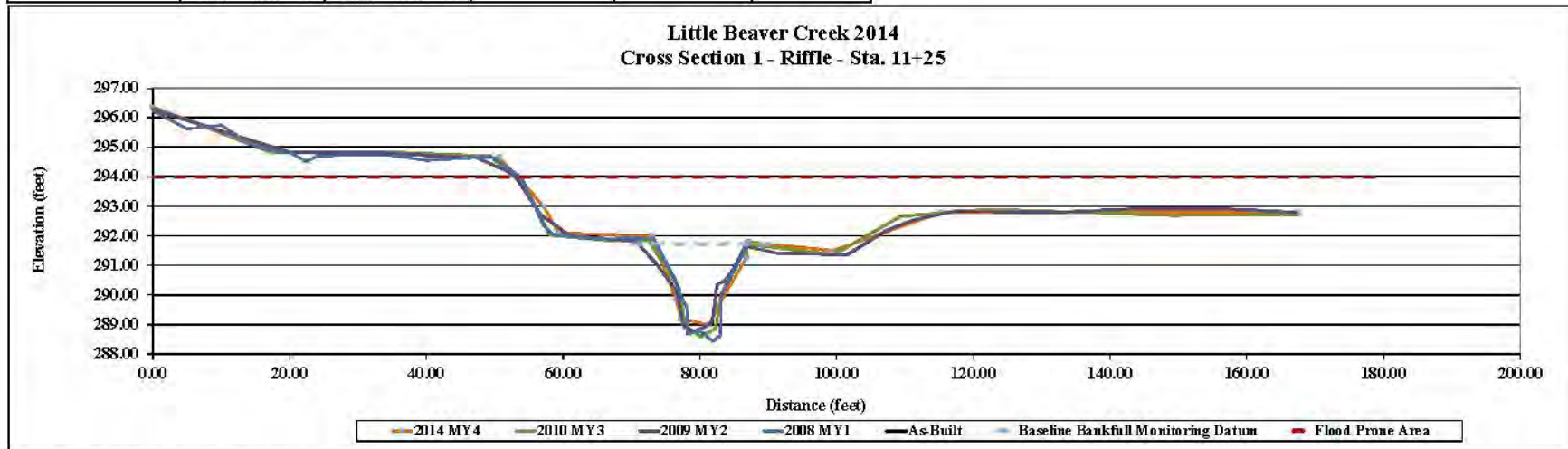
Figures: Cross-sections with Annual Overlays

Project Name Little Beaver Creek, MY4
 Watershed
 Cross Section 1
 Drainage Area NA
 Date Mar-14
 Crew Boggs, Stafford

Photo of Cross-Section 1 - Riffle - Looking Upstream

Picture Taken April 16, 2014

As-Built Survey*			2008 2008 MY1			2009 2009 MY2			2010 2010 MY3			2014 2014 MY4			2015 2015 MY5			Summary Data	
Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Bankfull Elev.	BF Area
			0.00	296.22		0.00	296.27	LPIN	0.00	296.36	X 1 LP	0.00	296.35					291.72	24.9
			5.00	295.63		11.04	295.47		7.24	295.73		18.55	294.85					25.1	
			10.00	295.75		20.11	294.83		17.43	294.82		30.60	294.66					294	
			14.00	295.13		31.79	294.84		33.70	294.85		57.20	292.99					116	
			17.00	294.91		41.33	294.71		49.41	294.70		59.30	292.10					2.7	
			20.00	294.83		47.43	294.65		54.44	293.66		73.00	291.99					1	
			22.50	294.51		53.75	294.10		58.05	292.03		76.50	289.86					25.2	
			24.00	294.71		56.75	292.71		66.00	291.85		77.30	289.20					4.6	
			29.00	294.74		60.95	292.00		72.45	291.86	EKF	81.38	288.99					1	
			35.00	294.73		70.38	291.82	EKF	77.04	290.21		82.81	289.69					1	
			40.00	294.56		73.54	291.09		77.81	288.96		86.80	291.25					4.6	
			49.50	294.69		76.60	290.15	Toe L	80.17	288.59	TW	87.00	291.80					1	
			54.00	293.96		77.65	288.93		82.30	288.87		99.50	291.50					1	
			57.00	292.42		79.11	288.77	TW	83.23	290.10		115.20	292.80					1	
			58.50	292.04		80.98	288.95		86.73	291.72	EKF	167.50	292.80					1	
			65.00	291.90		81.84	289.10		99.57	291.37								1	
			70.00	291.93		82.52	290.33	TOER	109.31	292.67								1	
			73.30	291.90	BKF	83.73	290.51		122.20	292.90								1	
			76.30	290.55		84.94	290.89		148.91	292.70								1	
			77.20	289.96		86.67	291.65	EKF	167.52	292.72	X 1 RP							1	
			78.00	289.62		91.51	291.41											1	
			78.20	289.38	low	101.45	291.36											1	
			78.20	288.67		107.37	292.20											1	
			80.00	288.81		111.16	292.53											1	
			81.00	288.59		117.06	292.83											1	
			81.90	288.44	TW	131.38	292.79											1	
			83.00	288.64		142.99	292.91											1	
			83.10	289.97		155.43	292.93											1	
			87.20	291.79	BKF	167.26	292.80	EPIN										1	



*This cross section was moved after H2O, therefore MY3 is not represented on this plot.

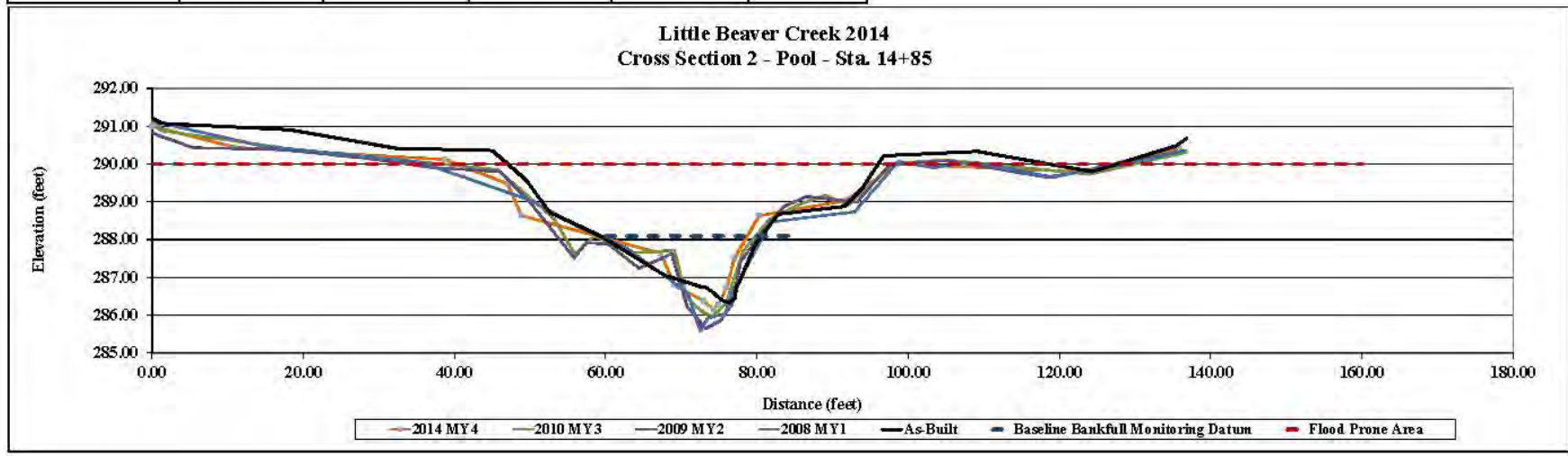
Project Name Little Beaver Creek, MY4
 Watershed
 Cross Section 2
 Drainage Area NA
 Date Mar-14
 Crew Boggs, Stafford

Photo of Cross-Section 2 - Pool - Looking Upstream

Picture Taken April 16, 2014

As-Built Survey			2008			2009			2010			2014			2015		
As-Built Survey			2008 MY1			2009 MY2			2010 MY3			2014 MY4			2015 MY5		
Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes
0.00	291.21	RPN2	1.09	291.08	X2	-5.43	291.41	LP	-5.68	291.68	X2 LP	0.00	291.00				
1.30	291.08		14.60	290.47	X2	-1.41	290.92		1.01	291.03		11.06	290.44				
18.20	290.91		35.30	290.06	X2	5.39	290.43		0.94	290.89		38.74	290.12				
32.22	290.42		50.13	289.04	X2	16.54	290.39		24.89	290.21		47.02	289.48				
44.98	290.36		56.52	288.32	X2	27.09	290.19		37.38	290.02		48.80	288.63				
49.49	289.57		62.63	287.79	X2BKF	36.76	289.91		45.67	289.85		67.31	287.63				
52.54	288.73		70.82	286.60	X2EDW	45.94	289.80		53.11	288.56		69.05	286.79				
59.60	288.06		72.48	285.58	X2TW	50.49	288.86		55.88	287.61		72.91	286.38				
67.81	287.05		73.53	285.93	X2	55.83	287.51		58.30	288.10	BKF	74.20	286.16				
72.53	286.76		75.79	286.04	X2TW	57.40	287.92		63.27	287.65		74.95	286.29				
73.26	286.73	LEW	76.62	286.56	X2EDW	60.40	287.88	BKFL	69.04	287.72		75.95	286.72				
74.06	286.62		81.88	288.47	X2BKF	64.38	287.24		70.61	286.49		77.04	287.51				
75.34	286.40		92.90	288.74	X2	68.73	287.63		72.48	286.13		80.27	288.63				
76.30	286.34		98.70	290.07	X2	70.72	286.25	TOEL	74.06	285.96	TW	91.70	289.03				
77.04	286.45		103.32	289.90	X2	73.21	285.64	TW	75.99	286.36		98.55	290.00				
77.25	286.73		108.64	290.05	X2	75.22	285.87		78.15	287.69		122.60	289.80				
77.73	286.89		118.77	289.67	X2	76.71	286.29	TOER	81.65	288.54	BKF	136.00	290.40				
79.78	287.88		128.76	289.99	X2	77.83	287.42		85.67	288.94							
82.83	288.67	BKF	136.62	290.36	X2RPN	80.81	288.23		89.09	289.17							
91.59	288.88					83.53	288.87	BKFL R	92.10	288.92							
94.00	289.39					86.56	289.14		97.87	290.01							
96.74	290.22					93.19	288.99		104.92	290.11							
109.15	290.33					97.55	289.98		123.94	289.73							
124.33	289.80					105.23	290.09		136.86	290.32	X2 RP						
135.39	290.48					118.77	289.64										
136.86	290.68					136.62	290.36	RP									

Summary Data	
Bankfull Elev.	288.1
BF Area	20.1
BF Width	12.2
Flood Prone Elev.	290
Flood Prone Width	88.2
Max Depth	1.9
Mean Depth	0.8
W/D Ratio	24.7
ER	4.4
Bank Height Ratio	
Stream Type	CS



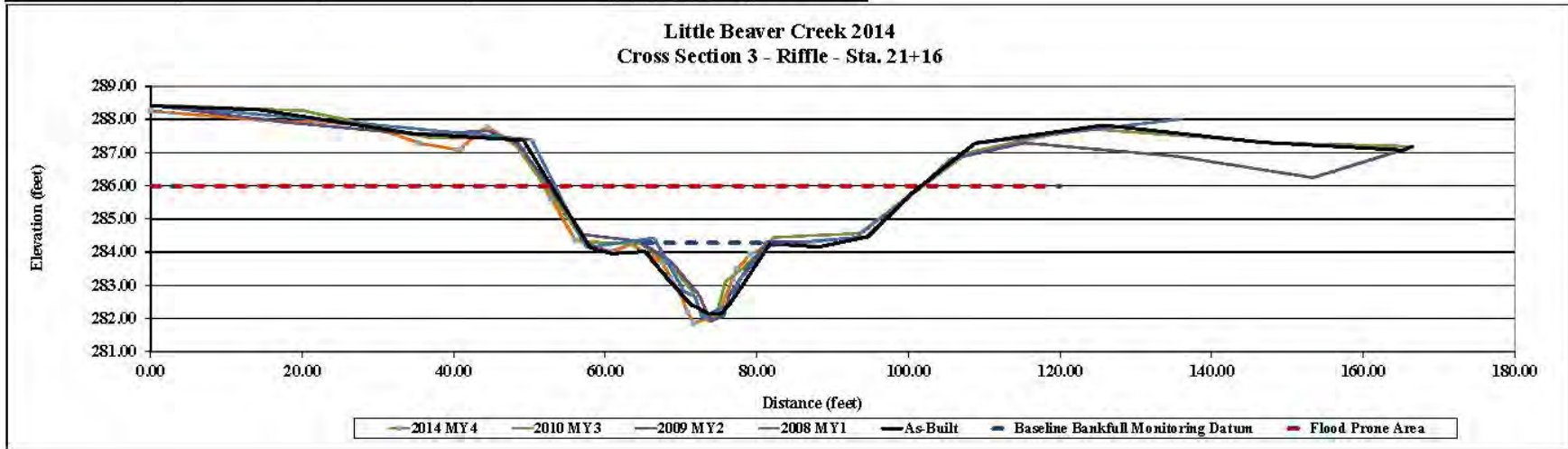
Project Name Little Beaver Creek, MY4
 Watershed
 Cross Section 3
 Drainage Area NA
 Date Mar-14
 Crew Boggs, Stafford

Photo of Cross-Section 3 - Riffle - Looking Upstream

Picture Taken April 16, 2014

As-Built Survey			2008			2009			2010			2014			2015		
As-Built Survey			2008 MY1			2009 MY2			2010 MY3			2014 MY4			2015 MY5		
Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes
0.00	288.44	LPNB	0.04	288.44	XSL	0.00	288.44	RP	0.60	288.44	X3LP	0.00	288.26				
0.55	288.40		26.60	287.91	XS3	17.30	287.93		20.16	288.27		14.69	287.97				
14.19	288.30		50.26	287.39	XS3	34.63	287.56		36.88	287.46		22.01	287.91				
24.61	287.58		57.46	284.15	XS3	44.52	287.66		47.43	287.47		28.20	287.87				
49.17	287.38		66.40	284.43	XS3	48.45	287.29		57.25	284.32		35.37	287.28				
53.76	285.66		70.36	282.82	KS3BKF	57.10	284.54		64.79	284.25	BKF	40.67	287.08				
57.99	284.14		71.88	282.65	S3EDW	64.33	284.34	BKF	68.97	283.53		44.32	287.79				
60.86	283.96		72.75	282.01	XS3TW	68.70	283.71		71.45	282.81		49.14	287.10				
65.21	284.02	BKF	74.54	282.24	XS3	72.44	282.68	TOEL	72.74	282.12		52.83	285.61				
68.45	283.14		76.51	282.43	S3EDW	75.24	282.23		73.69	281.91	TW	56.02	284.38				
71.36	282.41		77.86	283.23	KS3BKF	74.01	281.95	TW	74.68	282.09		60.70	284.01				
71.83	282.37	LEW	81.70	284.22	XS3	75.66	282.10		75.79	283.12		63.47	284.23				
72.49	282.28		92.96	284.43	XS3	76.30	282.70	TOE R	78.39	283.56		67.49	283.68				
73.70	282.14		108.81	287.28	XS3	78.40	283.40		82.24	284.45	BKF	68.68	283.20				
75.36	282.17		135.88	288.01	XS3	81.19	284.31	BKF	93.50	284.57		69.79	282.82				
76.15	282.37	REW				85.97	284.31		107.80	287.00		70.83	282.19				
77.44	282.78					94.40	284.48		122.63	287.74		71.63	281.88				
81.73	284.25					105.56	286.81		148.82	287.30		73.61	282.01				
88.16	284.16					115.27	287.30		166.50	287.19	X3RP	75.20	282.32				
94.69	284.47					135.36	286.90					76.79	283.20				
100.36	285.77					153.35	286.25					77.33	283.48				
108.79	287.29					166.66	287.19	RP				79.12	283.95				
125.76	287.82											82.27	284.23				
146.55	287.31											87.47	284.20				
165.22	287.08											93.61	284.50				
166.39	287.18	RPNB										100.47	286.16				
												112.10	287.32				
												136.17	287.46				
												166.50	287.15				

Summary Data	
Bankfull Elev.	284.29
BF Area	21.4
BF Width	32
Flood Prone Elev.	286
Flood Prone Width	55.7
Max Depth	2.4
Mean Depth	0.7
W/D Ratio	47.9
ER	1.7
Bank Height Ratio	1
Stream Type	C5

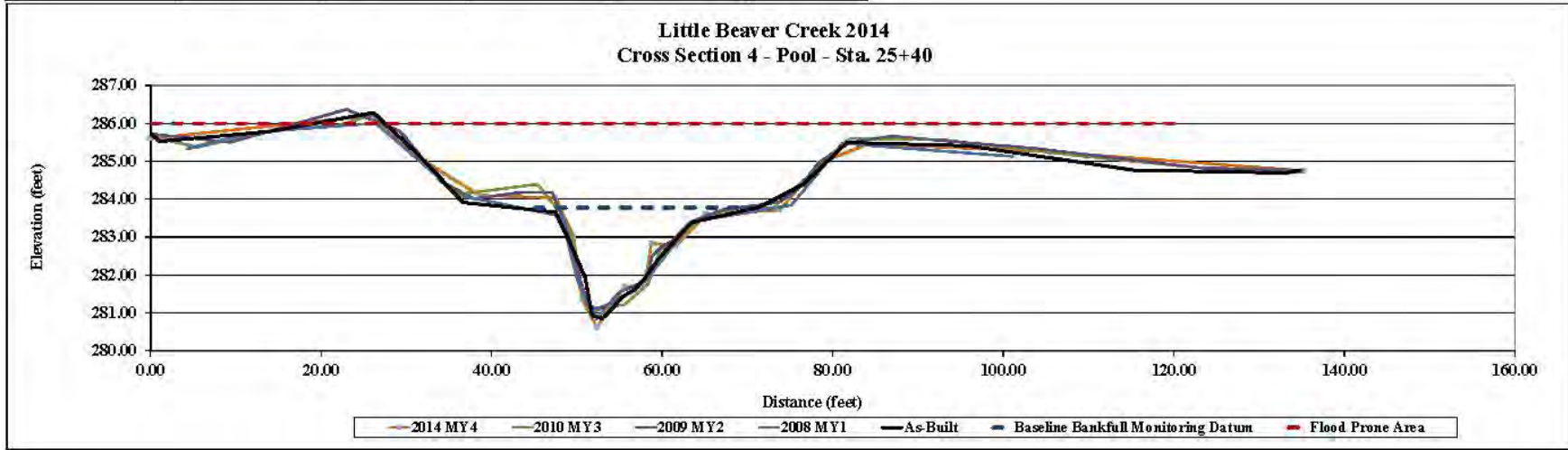


Project Name Little Beaver Creek, MY4
 Watershed
 Cross Section 4
 Drainage Area NA
 Date Mar-14
 Crew Boggs, Stafford

Photo of Cross-Section 4 - Pool - Looking Upstream

Picture Taken April 16, 2014

As-Built Survey			2008			2009			2010			2014			2015		
As-Built Survey			2008 MY1			2009 MY2			2010 MY3			2014 MY4			2015 MY5		
Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes
0.00	285.74	RPN4	4.38	285.33	XS4	0.00	285.72	LP	0.00	285.66	X4 LP	0.00	285.60				
1.03	285.52		11.69	285.75	XS4	9.32	285.50		5.43	285.37		25.85	286.20				
13.94	285.78		26.39	286.01	XS4	22.94	286.36		16.39	285.92		32.10	285.00				
26.12	286.28		36.19	284.10	XS4	29.27	285.78		21.65	285.91		38.50	284.10				
31.29	285.20		48.17	283.55	XS4EKF	34.09	284.46		26.06	286.23		47.50	284.03				
36.08	283.91		50.03	281.89	S4EOW	37.89	284.01		31.90	285.18		49.61	283.00				
47.48	283.66		52.31	280.85	XS4TW	43.16	284.17		35.72	284.12		50.53	281.38				
49.14	282.86		54.91	281.55	XS4TW	47.07	284.18	EKF	45.34	284.39	EKF	52.32	280.62				
50.99	281.92	LEW	57.97	281.83	S4EOW	48.47	283.44		48.44	283.53		55.49	281.68				
51.77	280.93		63.56	283.40	XS4EKF	50.26	281.96	TOEL	49.47	282.95		57.65	281.76				
53.91	280.85		75.15	283.84	XS4	51.28	281.21		50.28	281.68		58.20	282.04				
53.97	281.06		81.12	285.47	XS4	52.39	281.11	TW	51.72	281.03		58.71	282.84				
55.31	281.43		101.11	285.13	XS4	54.21	281.27		53.49	281.17	TW	61.54	282.76				
56.77	281.63					56.92	281.62		55.54	281.21		65.12	283.60				
58.02	281.94	REW				58.34	282.02	TOER	58.33	281.77		73.78	283.71				
59.70	282.46					59.79	282.49		59.73	282.65		78.45	284.95				
63.41	283.39	EKF				59.87	282.75		61.44	282.92		84.13	283.46				
71.34	283.79					61.26	282.90		64.72	283.54		105.50	285.25				
76.63	284.41					63.34	283.40	EKF	69.12	283.78		135.10	284.75				
81.67	285.49					67.06	283.72		73.00	283.78	EKF						
95.84	285.41					73.71	283.92		79.41	285.06							
115.21	284.77					75.81	284.25		82.05	285.61							
133.15	284.69					78.38	284.96		92.78	285.57							
134.77	284.77	LPN4				81.63	285.48		109.32	285.13							
						86.89	285.66		124.61	284.79							
						103.94	285.33		135.09	284.72	X4 RP						
						123.37	284.82										
						135.06	284.77	RP									



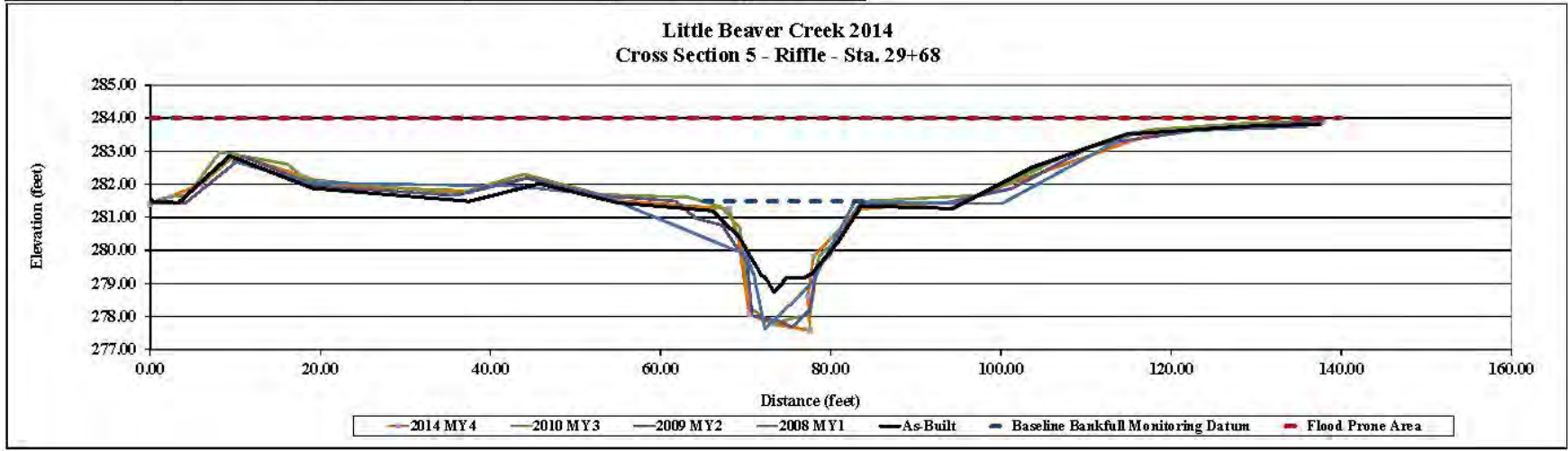
Project Name Little Beaver Creek, MY4
 Watershed
 Cross Section 5
 Drainage Area NA
 Date Mar-14
 Crew Boggs, Stafford

Photo of Cross-Section 5 - Riffle - Looking Downstream

Picture Taken April 16, 2014

As-Built Survey			2008			2009			2010			2014			2015		
As-Built Survey			2008 MY1			2009 MY2			2010 MY3			2014 MY4			2015 MY5		
Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes
0.00	281.56	LPIN5	9.76	282.70	XSS	0.00	281.44	LP	0.00	281.43	X5 LP	0.00	281.40				
0.33	281.48		18.55	282.06	XSS	4.16	281.45		1.00	281.59		6.00	282.00				
3.33	281.45		43.37	281.94	XSS	10.87	282.85		4.41	281.69		10.00	282.90				
9.33	282.86		53.09	281.67	XSS	19.52	281.96		8.21	282.98		21.50	281.95				
19.12	281.88		70.01	279.87	XSS	35.77	281.67		16.13	282.61		37.75	281.80				
37.50	281.49		70.93	279.27	XSS	44.29	282.19		18.27	282.16		44.40	282.20				
45.76	282.02		72.22	277.64	XSS	52.89	281.67		36.12	281.71		55.60	281.50				
54.98	281.45		74.65	278.22	XSS	61.74	281.50	EKF	43.91	282.31		68.02	281.26				
66.10	281.20	EKF	77.75	279.00	SS	64.15	280.98		52.85	281.70		69.08	280.38				
69.21	280.41		82.77	281.47	XSS	67.25	280.77		63.32	281.61		70.42	278.08				
71.77	279.29	LEW	100.07	281.42	XSS	69.23	279.99		67.09	281.32	EKF	73.38	277.76				
72.47	279.11	LEW	115.41	283.56	XSS	70.18	279.67		70.18	279.67		77.56	277.59				
73.33	278.74		135.85	283.75	XSS	70.75	278.03	TOEL	70.63	278.23		77.27	278.63				
74.78	279.16					73.75	277.88		73.38	277.78		77.95	279.83				
76.72	279.17	REW				75.46	277.69	TW	74.75	277.90	TW	80.12	280.40				
77.81	279.29					77.48	278.22		77.56	278.07		83.05	281.24				
81.04	280.33	EKF				77.61	278.35	TOER	78.61	279.83		95.20	281.50				
83.60	281.35					78.32	279.56		80.90	280.38		118.50	283.60				
94.31	281.27					79.80	279.82		84.20	281.50	EKF	137.90	283.90				
103.70	282.52					81.46	280.59		98.10	281.68							
114.69	283.52					83.50	281.43	EKF	98.13	281.69							
128.07	283.75					93.87	281.47		107.88	282.92							
137.36	283.82					101.20	281.88		117.43	283.65							
137.67	283.81	LPIN4				110.84	283.19		120.61	283.86							
						122.73	283.63		137.91	283.93	X5 RP						
						130.67	283.79										
						136.98	283.94										
						137.81	283.92	RP									

Summary Data	
Bankfull Elev.	281.5
BF Area	39
BF Width	40.6
Flood Prone Elev.	284
Flood Prone Width	137.9
Max Depth	3.9
Mean Depth	1
W/D Ratio	42.3
ER	3.4
Bank Height Ratio	1
Stream Type	C5

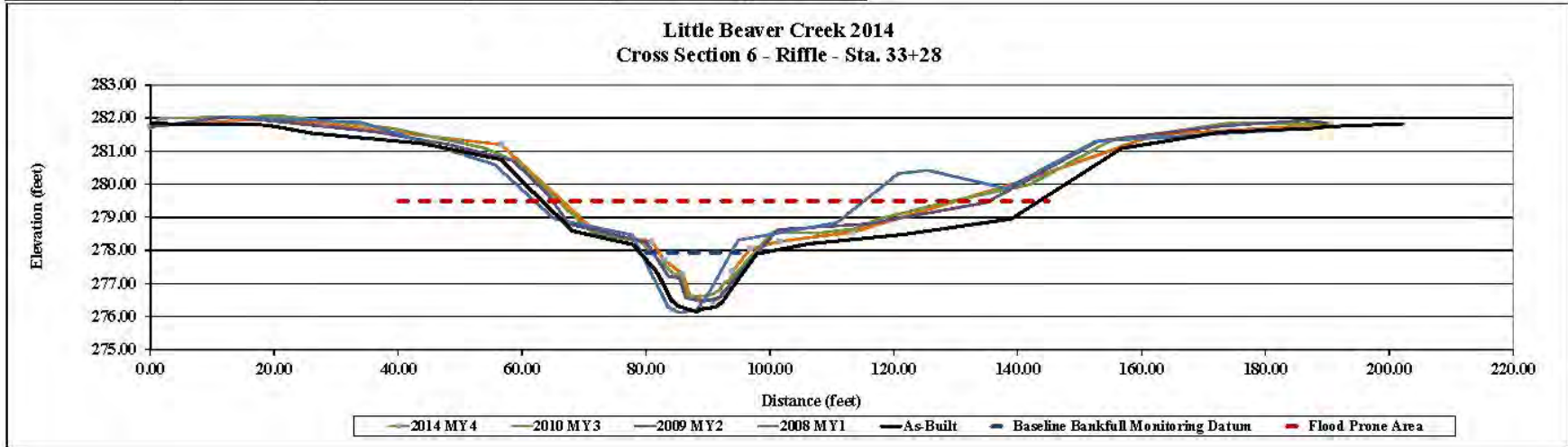


Project Name Little Beaver Creek, MY4
 Watershed
 Cross Section 6
 Drainage Area NA
 Date Mar-14
 Crew Boggs, Stafford

Photo of Cross-Section 6 - Riffle - Looking Upstream

Picture Taken April 16, 2014

As-Built Survey			2008			2009			2010			2014			2015		
As-Built Survey			2008 MY1			2009 MY2			2010 MY3			2014 MY4			2015 MY5		
Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes
0.00	281.84	RPN6	13.28	282.02	X6	0.00	281.73	LP	0.00	281.76	X6 LP	0.00	281.75				
18.75	281.79		33.81	281.88	X6	12.51	282.05		1.62	282.00		20.00	282.00				
26.19	281.54		55.54	280.60	X6	36.06	281.59		21.24	282.07		56.60	281.20				
43.89	281.23		65.11	278.96	X6 BKF	48.28	281.20		39.11	281.69		72.50	278.50				
56.64	280.74		77.75	278.46	X6	38.49	280.72		53.78	281.11		81.00	278.28				
62.25	279.67		83.53	276.31	X6	64.05	279.71		59.38	280.66		82.96	277.70				
69.18	278.59		85.26	276.12	X6 TW	67.61	278.80		71.27	278.53		85.89	277.29				
77.95	278.17		88.15	276.20	X6	80.05	278.25	BKF	79.17	278.28	BKF	87.14	276.59				
81.90	277.32		89.95	276.65	X6 EOW	83.66	277.22		81.69	277.79		90.85	276.47				
84.15	276.50		94.86	278.31	X6	85.37	277.17		84.59	277.27		93.16	276.72				
85.21	276.31	LEW	110.84	278.84	X6	86.43	276.57	TOEL	85.73	277.31		93.98	277.38				
86.12	276.27		120.71	280.32	X6	89.13	276.46	TW	86.41	276.67		96.85	278.05				
88.17	276.14		125.50	280.42	X6	91.70	276.57	TOER	87.95	276.60	TW	101.55	278.28				
89.02	276.23		138.13	279.87	X6	94.01	277.07		90.45	276.66		113.37	278.55				
90.55	276.27		152.54	281.29	X6	101.28	278.63	BKF	91.87	276.80		142.30	280.18				
91.48	276.32		189.33	281.72	X6 RPN	115.97	278.81		92.40	276.99		162.40	281.50				
92.36	276.47					134.98	279.45		93.67	277.14		190.00	281.80				
97.87	277.89	BKF				153.02	281.31		100.42	278.56	BKF						
106.30	278.20					172.91	281.76		107.66	278.53							
121.49	278.48					186.18	281.93		113.57	278.65							
138.98	278.96					189.98	281.85	RP	117.49	278.95							
156.76	281.09								128.91	279.48							
172.73	281.57								141.96	280.00							
188.63	281.69								154.92	281.32							
189.32	281.74								173.80	281.85							
202.09	281.83								188.24	281.83							
									190.03	281.83	X6 RP						



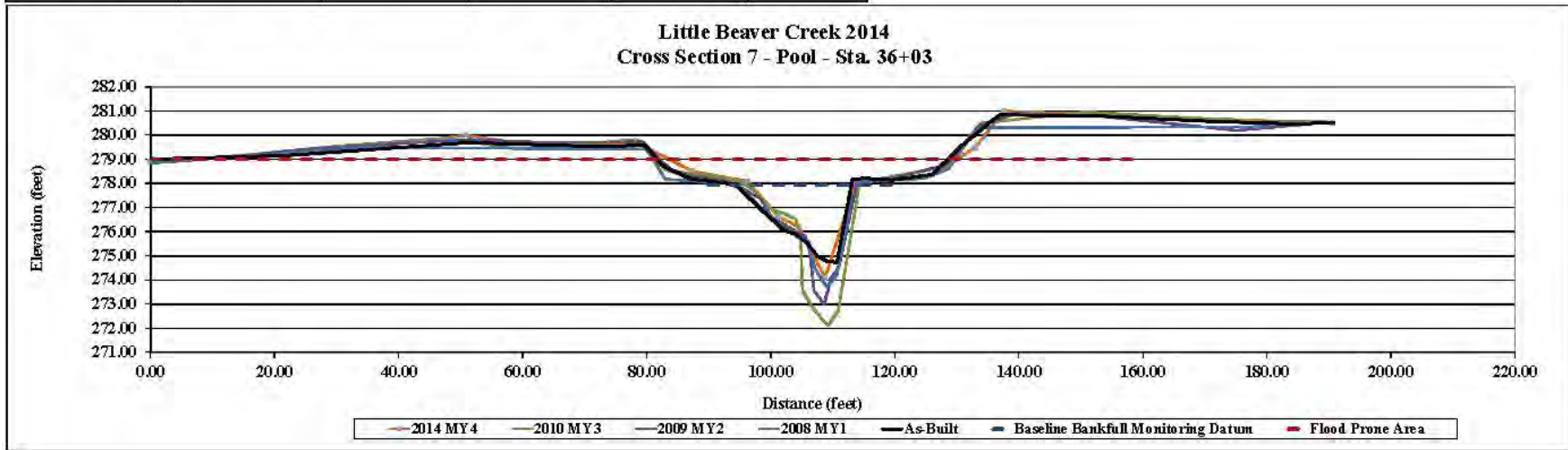
Project Name: Little Beaver Creek, MY4
 Watershed:
 Cross Section: 7
 Drainage Area: NA
 Date: Mar-14
 Crew: Boggs, Stafford

Photo of Cross-Section 7 - Pool - Looking Upstream

Picture Taken April 16, 2014

As-Built Survey			2008			2009			2010			2014			2015		
As-Built Survey			2008 MY1			2009 MY2			2010 MY3			2014 MY4			2015 MY5		
Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes
0.00	279.04	LPIN7	0.00	278.84	X7LPIN	0.00	279.00	LP	0.00	278.90	X7LP	0.00	278.90				
0.51	279.01		33.87	279.49	X7	10.98	279.04		0.78	278.97		38.50	279.60				
21.37	279.15		80.04	279.43	X7	27.27	279.46		9.10	279.03		50.70	280.00				
51.28	279.69		82.98	278.17	X7	51.48	279.82		30.67	279.56		62.30	279.56				
72.80	279.52		93.22	278.00	X7	64.37	279.69		47.46	279.88		79.15	279.60				
79.63	279.60		95.72	277.74	X7EKF	79.27	279.73		59.29	279.41		87.40	278.50				
82.39	278.74		98.35	276.99	X7	84.35	278.44		78.35	279.82		96.30	278.10				
87.04	278.19		99.37	276.86	X7	93.18	278.09		83.08	278.54		101.25	276.60				
94.24	277.96	EKF	100.51	276.50	X7	98.41	277.36	EKF	90.68	278.31		104.50	276.20				
98.16	276.99		104.62	275.71	X7	100.05	276.62		94.99	278.12		108.80	274.10				
102.16	276.05		105.51	275.84	X7EOW	104.88	275.89		96.51	277.84	EKF	113.75	278.10				
108.93	275.91	LEW	107.14	274.46	X7	106.12	275.59		97.53	277.64		126.10	278.35				
105.97	275.50		109.08	273.71	X7TW	106.98	273.56	TOEL	100.27	276.91		133.00	279.50				
107.48	275.00		110.65	274.18	X7	108.65	272.99	TW	102.39	276.73		137.55	281.00				
109.21	274.77		112.52	276.79	X7	109.62	274.05		103.97	276.51		190.60	280.50				
110.70	274.73		113.12	278.05	X7	111.04	274.57		104.82	275.88							
111.47	275.85	KEW	124.51	278.21	EFF	113.90	278.05	EKF	105.08	273.57							
113.14	278.16		128.63	278.60	X7	119.43	278.21		106.95	272.78							
115.19	278.22		133.27	280.31	X7	128.11	278.74		109.27	272.10	TW						
119.54	278.15		176.97	280.34	X7	133.95	280.45		110.89	272.72							
126.02	278.37		190.04	280.54	X7RPN	139.75	280.91		114.35	278.03	EKF						
131.05	279.63					152.76	280.79		128.12	278.69							
136.84	280.83					175.17	280.20		133.87	280.50							
151.13	280.81					189.83	280.53	RP	130.92	280.96							
170.43	280.58								176.60	280.58							
185.11	280.46								189.07	280.57							
190.41	280.53								190.59	280.52	X7RP						
190.77	280.53																

Summary Data	
Bankfull Elev.	277.93
BF Area	28.9
BF Width	16.7
Flood Prone Elev.	279
Flood Prone Width	190.6
Max Depth	3.8
Mean Depth	1.7
W/D Ratio	9.6
ER	11.4
Bank Height Ratio	1
Stream Type	C5

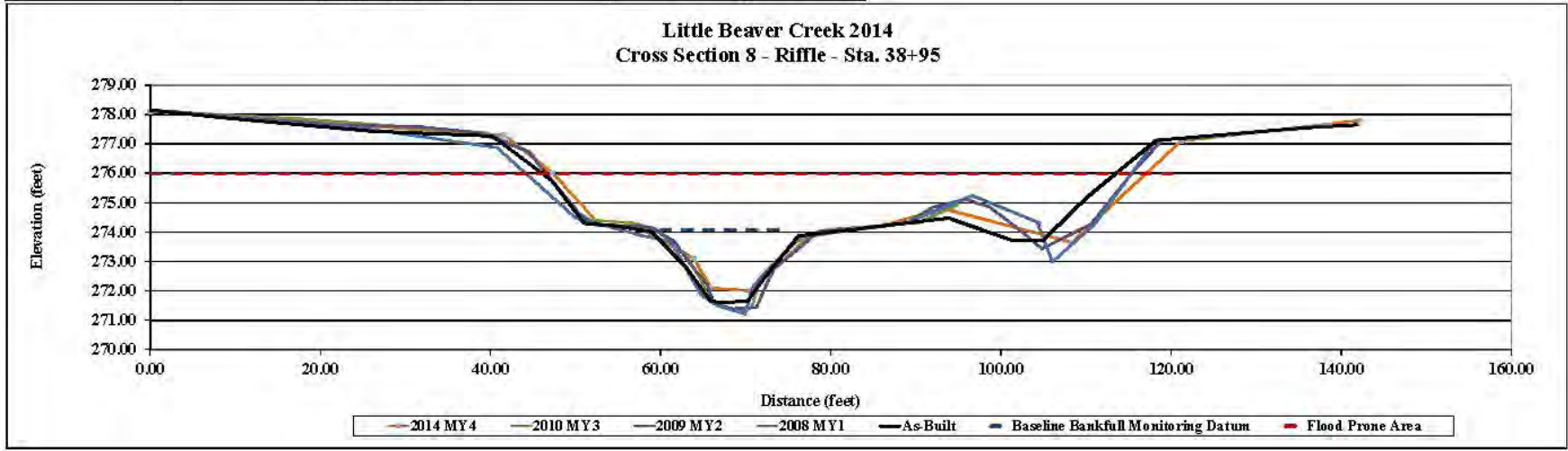


Project Name Little Beaver Creek, MY4
 Watershed
 Cross Section 8
 Drainage Area NA
 Date Mar-14
 Crew Boggs, Stafford

Photo of Cross-Section T8 - Riffle - Looking Upstream

Picture Taken April 16, 2014

As-Built Survey			2008			2009			2010			2014			2015		
As-Built Survey			2008 MY1			2009 MY2			2010 MY3			2014 MY4			2015 MY5		
Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes
0.00	278.13	RPNB	0.00	278.13	X8LPN	0.00	278.15	LP	-0.02	278.13	X8 LP	0.00	278.10				
0.56	278.13		2.52	277.53	X8	2.47	278.11		18.03	277.85		41.54	277.30				
9.08	277.87		40.75	276.88	X8	9.65	277.93		39.42	277.38		47.30	276.00				
25.95	277.43		49.89	274.50	X8	22.03	277.64		44.68	276.72		52.85	274.25				
40.23	277.27		57.68	273.88	X8BKF	31.79	277.58		50.67	274.44		57.25	274.20				
47.20	275.74		61.18	273.68	X8	38.64	277.39		57.06	274.31	BKF	63.90	273.10				
50.99	274.30		64.71	271.89	X8	44.38	276.75		59.93	273.99		65.90	272.10				
55.07	274.21		66.92	271.48	X8	50.52	274.61		63.01	273.17		70.60	272.00				
58.92	274.01		69.90	271.21	X8TW	52.39	274.23		64.65	272.44		77.40	273.85				
62.83	272.85		70.92	272.19	X8EOW	58.74	274.18	E K F	65.79	271.65		86.50	274.25				
65.38	271.76	LEW	76.16	273.83	X8EOW	61.64	273.66		68.12	271.38	TW	93.15	274.80				
65.82	271.65		82.66	274.11	X8	63.35	272.96		69.99	271.31		108.35	273.65				
67.49	271.60		89.15	274.34	X8	65.41	272.25		70.78	271.50		121.20	277.10				
68.66	271.63		96.62	275.25	X8	66.23	271.57	TOEL	71.64	272.40		142.20	277.80				
70.16	271.64		104.54	274.31	X8	68.42	271.39	TW	72.81	272.80							
70.51	271.78	REW	104.30	274.31	X8	71.24	271.44	TOER	75.80	273.66							
72.08	272.40		106.02	272.99	X8	72.72	272.41		79.62	274.09	BKF						
76.21	273.87	BKF	111.01	274.27	X8	73.29	272.74		90.32	274.33							
81.67	274.06		117.84	277.00	X8	78.73	274.06	E K F	94.89	274.94							
93.83	274.48					83.12	274.09		106.57	273.39							
101.17	273.73					88.92	274.30		110.63	274.28							
104.99	273.73					92.04	274.85		121.02	277.53							
110.07	275.17					95.82	275.12		134.12	277.53							
118.23	277.13					98.39	274.86		142.08	277.65	X8 RP						
125.88	277.55					101.85	274.15										
141.94	277.65					104.80	273.44										
						110.88	274.27										
						115.42	276.02										
						118.97	277.14										



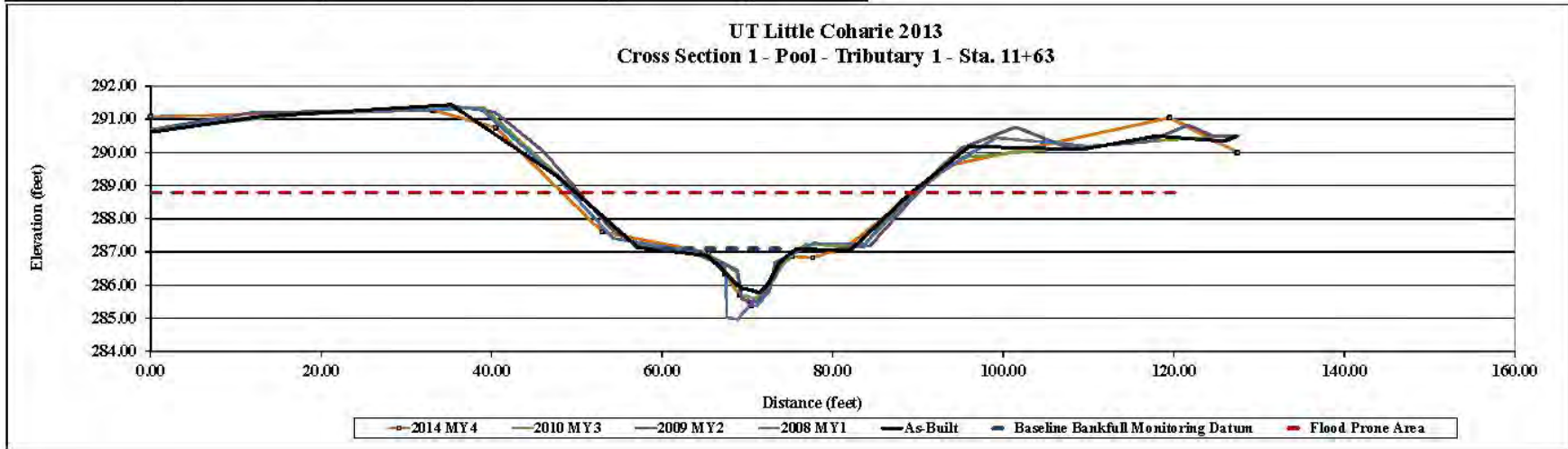
Project Name: Little Beaver Creek, MY4
 Watershed:
 Cross Section: T1
 Drainage Area: NA
 Date: Mar-14
 Crew: Boggs, Stafford

Photo of Cross-Section T1 - Pool - Looking Upstream

Picture Taken April 16, 2014

As-Built Survey			2008			2009			2010			2014			2015		
As-Built Survey			2008 MY1			2009 MY2			2010 MY3			2014 MY4			2015 MY5		
Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes
0.00	290.62	LPINT1	0.00	290.69	TILEPN	0.00	290.69	LP	0.07	290.68	XT 1 LP	0.00	291.08				
0.39	290.63		13.85	291.12	XT1	11.94	291.21		19.84	291.21		33.10	291.27				
12.85	291.09		38.65	291.33	XT1	24.13	291.26		39.00	291.36		40.47	290.75				
35.25	291.44		47.67	289.25	XT1	34.65	291.43		36.36	287.25		52.97	287.61				
47.70	289.28		54.18	287.43	XT1	40.39	291.22		64.95	286.96	EKF	65.42	286.98				
57.14	287.13		54.28	287.42	XT1	46.09	290.03		67.90	286.56		67.38	286.33				
65.34	286.89	EKF	63.34	287.02	KTIEKF	53.82	287.74		68.70	286.39		69.11	285.69				
69.17	285.92	LEW	67.41	286.56	XT1	57.40	287.14		69.22	285.71		70.41	285.39				
69.46	285.89		67.50	286.00	TIEOW	64.23	287.03	EKF	71.06	285.58	TW	73.90	286.60				
70.22	285.87		67.55	285.02	TIEOW	68.85	286.45		72.26	285.83		75.30	286.86				
71.39	285.77		68.88	284.98	XTITW	69.36	285.58	TOEL	74.47	286.78		77.64	286.83				
71.94	285.90	KEW	70.25	285.41	XTITW	71.06	285.48	TW	76.82	287.23	EKF	81.38	287.15				
72.44	286.04		71.04	285.37	XTITW	72.15	285.78	TOE R	83.45	287.17		93.86	289.62				
73.71	286.67		72.56	285.82	TIEOW	74.08	286.71		93.65	289.81		119.53	291.05				
75.78	287.11		73.20	286.68	KTIEKF	75.93	287.11	EKF	114.60	290.29		127.50	290.00				
78.39	287.07		77.75	287.26	KTIEKF	79.65	287.07		127.56	290.51	XT 1 RP						
82.11	287.06		83.72	287.24	XT1	84.39	287.20										
88.47	288.63		90.12	288.99	XT1	88.37	288.34										
96.01	290.18		99.13	290.45	XT1	94.97	290.12										
109.21	290.09		109.52	290.21	XT1	101.47	290.77										
117.96	290.30					107.80	290.12										
125.91	290.34					117.09	290.33										
127.30	290.49	RPNT1				121.67	290.83										
						124.62	290.50										
						127.63	290.51	RP									

Summary Data	
Bankfull Elev.	287.11
BF Area	10.4
BF Width	18
Flood Prone Elev.	289
Flood Prone Width	41.6
Max Depth	1.7
Mean Depth	0.6
WD Ratio	31.1
ER	2.3
Bank Height Ratio	1
Stream Type	C5

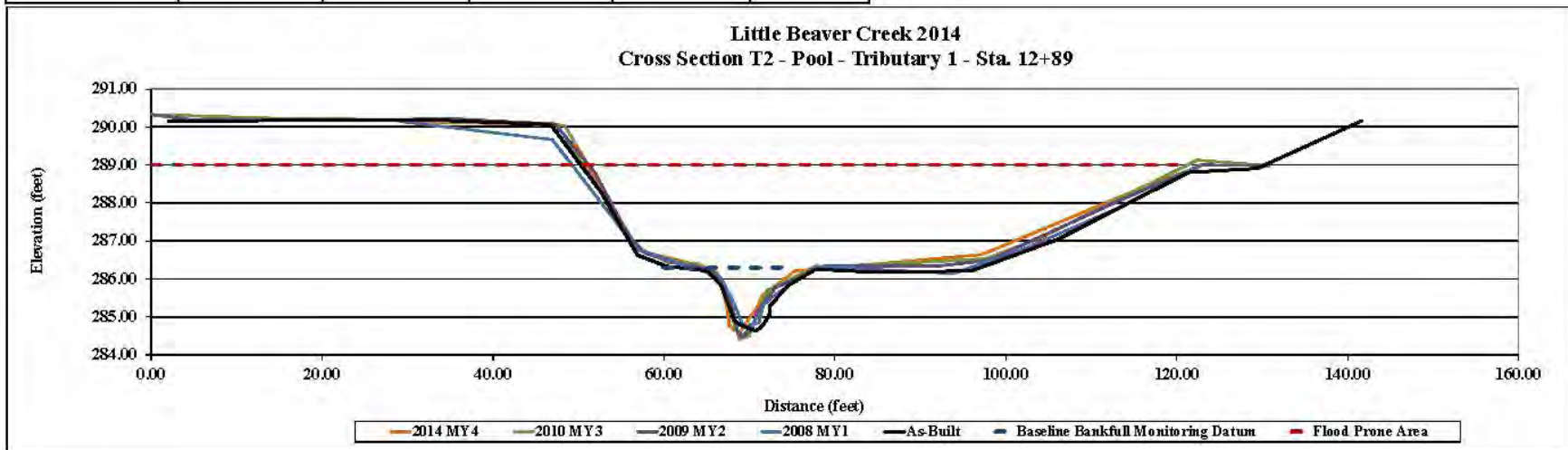


Project Name: Little Beaver Creek, MY4
 Watershed:
 Cross Section: T2
 Drainage Area: NA
 Date: Mar-14
 Crew: Boggs, Stafford

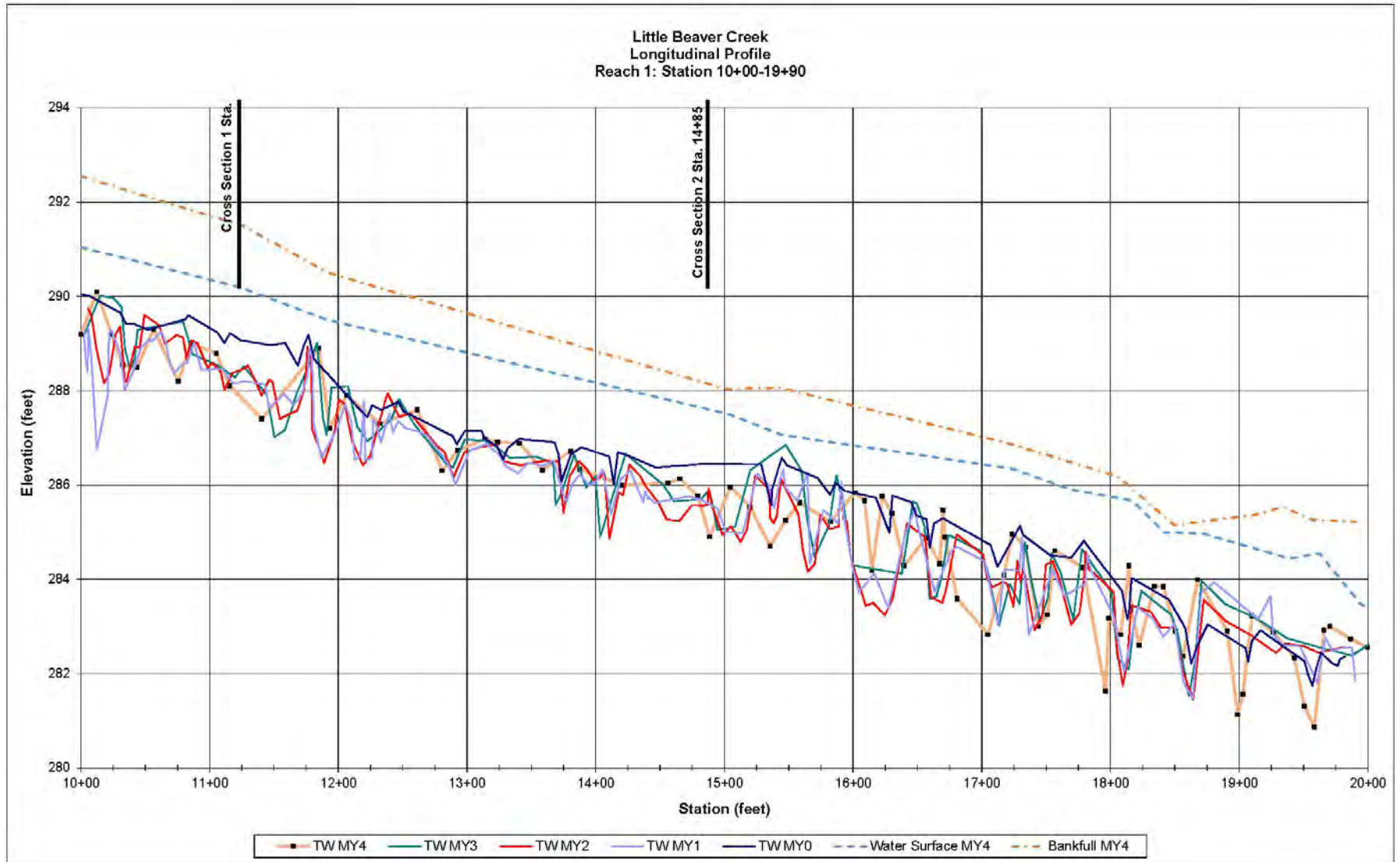
Photo of Cross-Section T2 - Pool - Looking Upstream

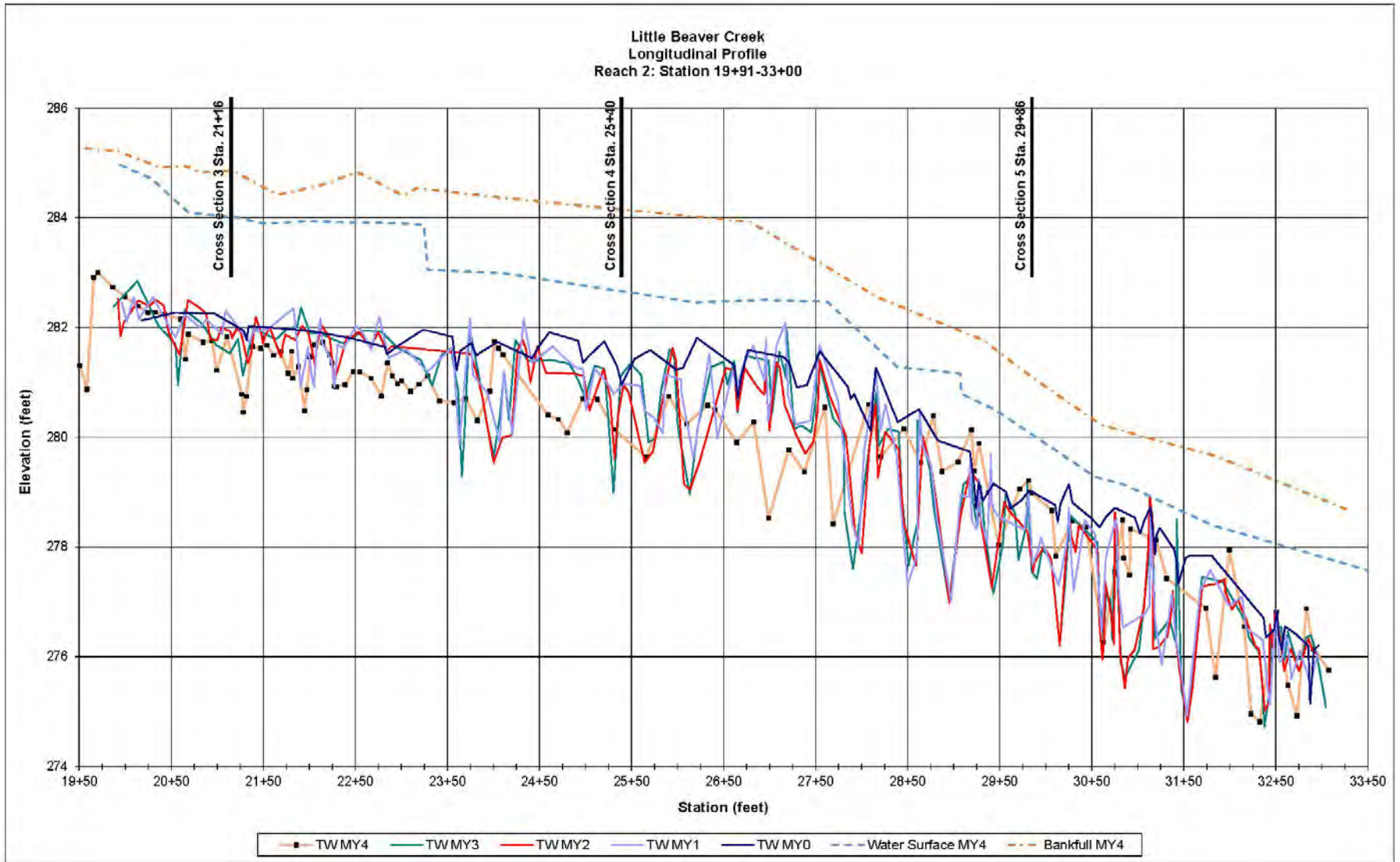
Picture Taken April 16, 2014

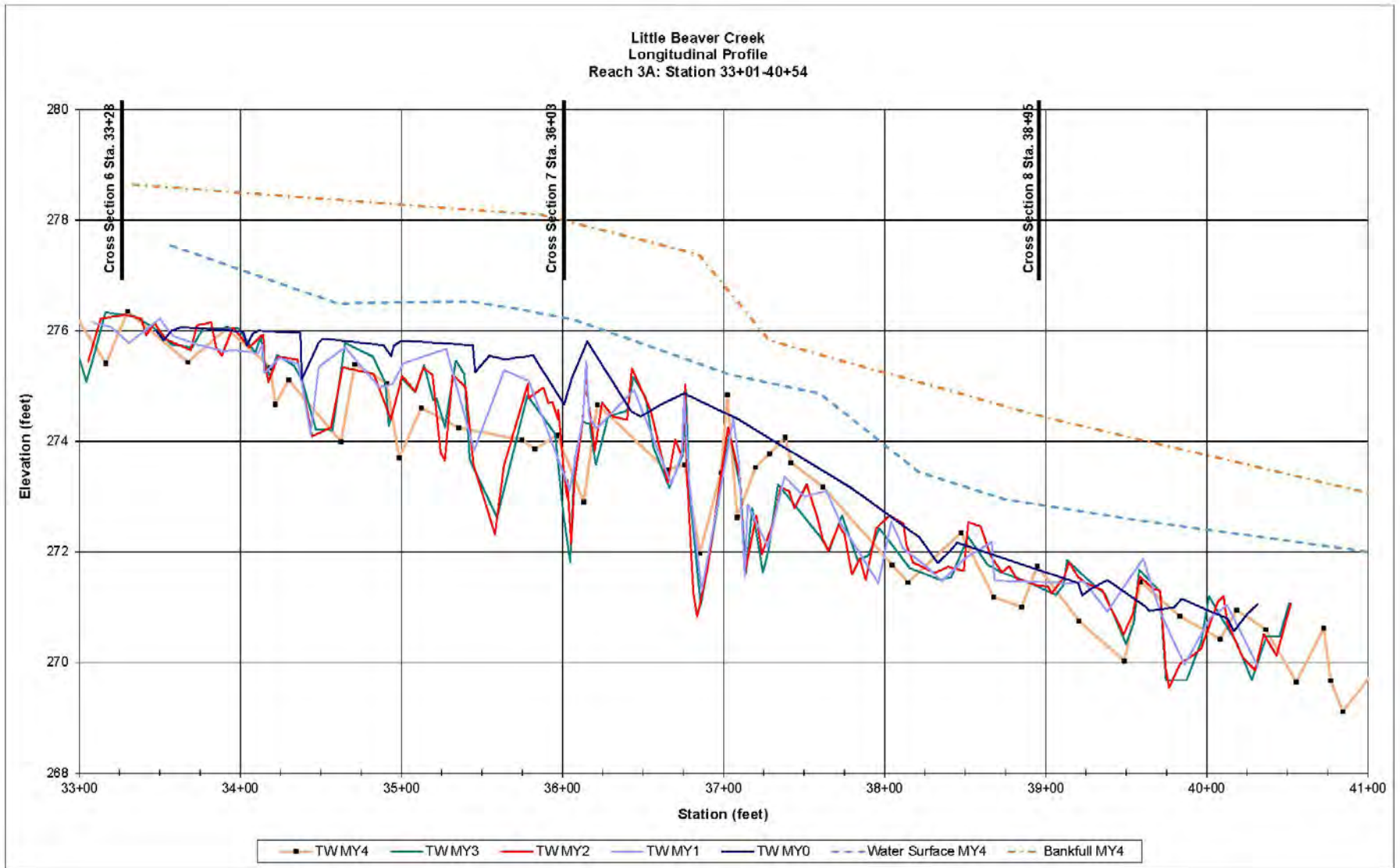
As-Built Survey			2008			2009			2010			2014			2015		
As-Built Survey			2008 MY1			2009 MY2			2010 MY3			2014 MY4			2015 MY5		
Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes	Station	Elev	Notes
2.00	290.16	RPINT2	29.05	290.15	XT2	0.00	290.32	LP	0.03	290.33	XT 2 LP	29.07	290.14				
15.71	290.17		46.95	289.67	XT2	4.97	290.18		16.72	290.21		48.36	290.05				
33.69	290.18		56.85	286.79	XT2	22.13	290.16		32.94	290.19		57.06	286.75				
46.73	290.07		66.58	286.05	XT2BKF	34.82	290.22		47.32	290.05		63.85	286.37				
52.71	288.26		68.14	285.39	T2EOW	47.28	290.07		56.95	286.83		66.71	285.86				
56.88	286.64		69.29	284.74	XT2	51.86	288.82		60.65	286.43		67.28	285.33				
60.27	286.34		71.11	284.85	XT2	55.59	287.23		64.04	286.39	BKF	67.63	284.78				
65.10	286.21		71.62	285.31	T2EOW	57.68	286.69		66.27	286.15		68.81	284.56				
66.73	285.80		72.66	285.52	XT2	60.91	286.43		68.81	284.43	TW	69.56	284.81				
67.64	285.27	LEW	77.88	286.34	XT2	65.64	286.26	BKF	68.87	284.41		71.06	285.31				
68.30	284.88		93.88	286.14	XT2	67.16	285.80		69.98	284.51		71.46	285.54				
68.90	284.80		102.17	286.79	XT2	68.21	285.09	TOEL	72.06	285.69		75.36	286.21				
70.02	284.69		113.04	287.85	XT2	68.63	284.61		77.49	286.30	BKF	97.18	286.64				
70.78	284.63		122.50	288.98	XT2	69.20	284.48	TW	97.56	286.53		119.16	288.70				
71.62	284.79					70.34	284.74		108.98	287.08		122.50	288.90				
72.39	285.06					70.84	285.11	TOER	122.34	289.13							
72.40	285.29	KEW				73.06	285.77		130.76	288.98	XT 2 RP						
74.49	285.82					78.75	286.34	BKF									
77.78	286.26					91.66	286.33										
84.67	286.17	BKF				98.03	286.49										
95.96	286.21					113.42	288.08										
106.06	287.03					122.83	288.99										
121.39	288.80					130.78	288.98	RP									
129.48	288.91																
130.58	289.02																
141.63	290.16	LPINT2															

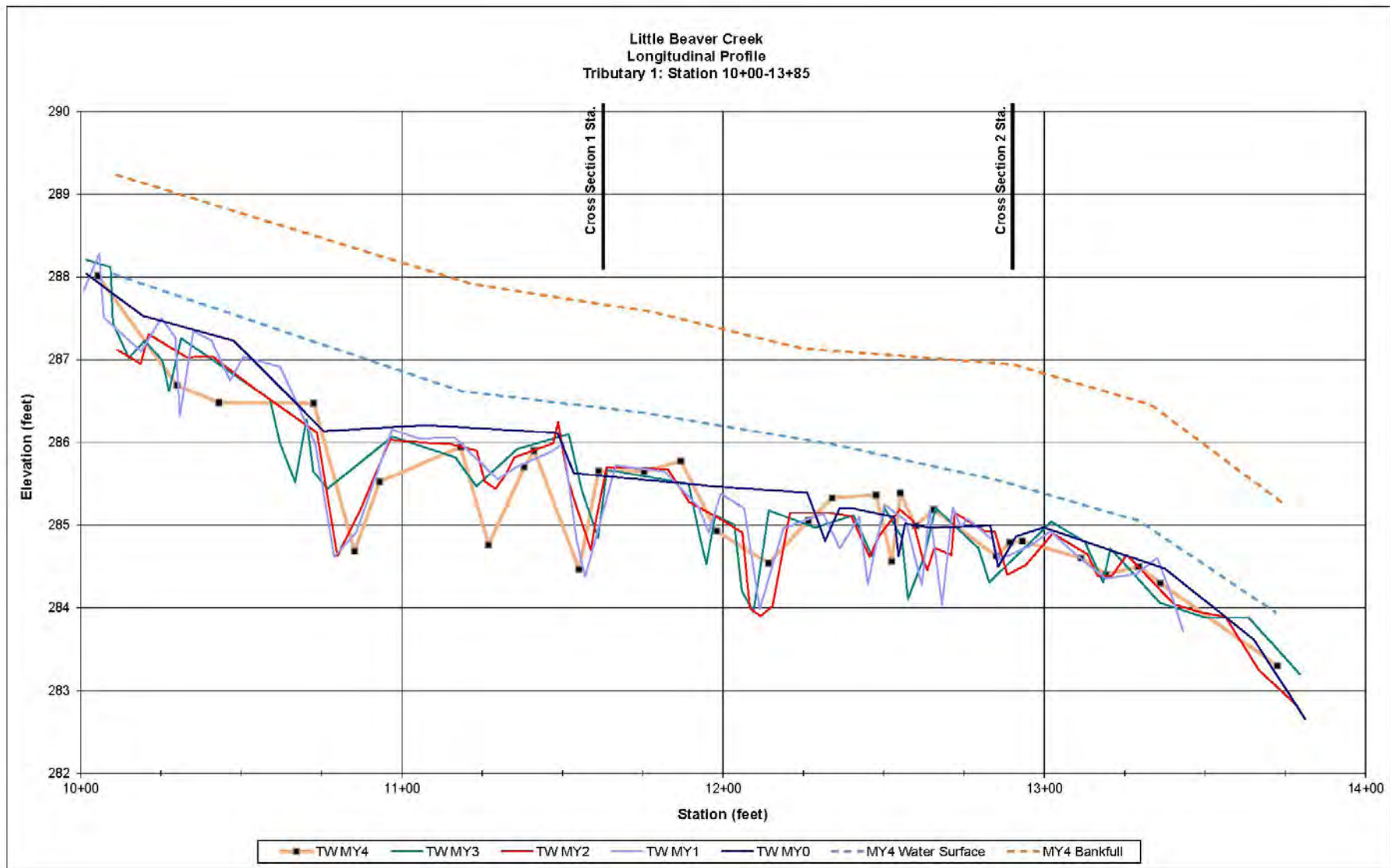


Longitudinal Profiles with Annual Overlays

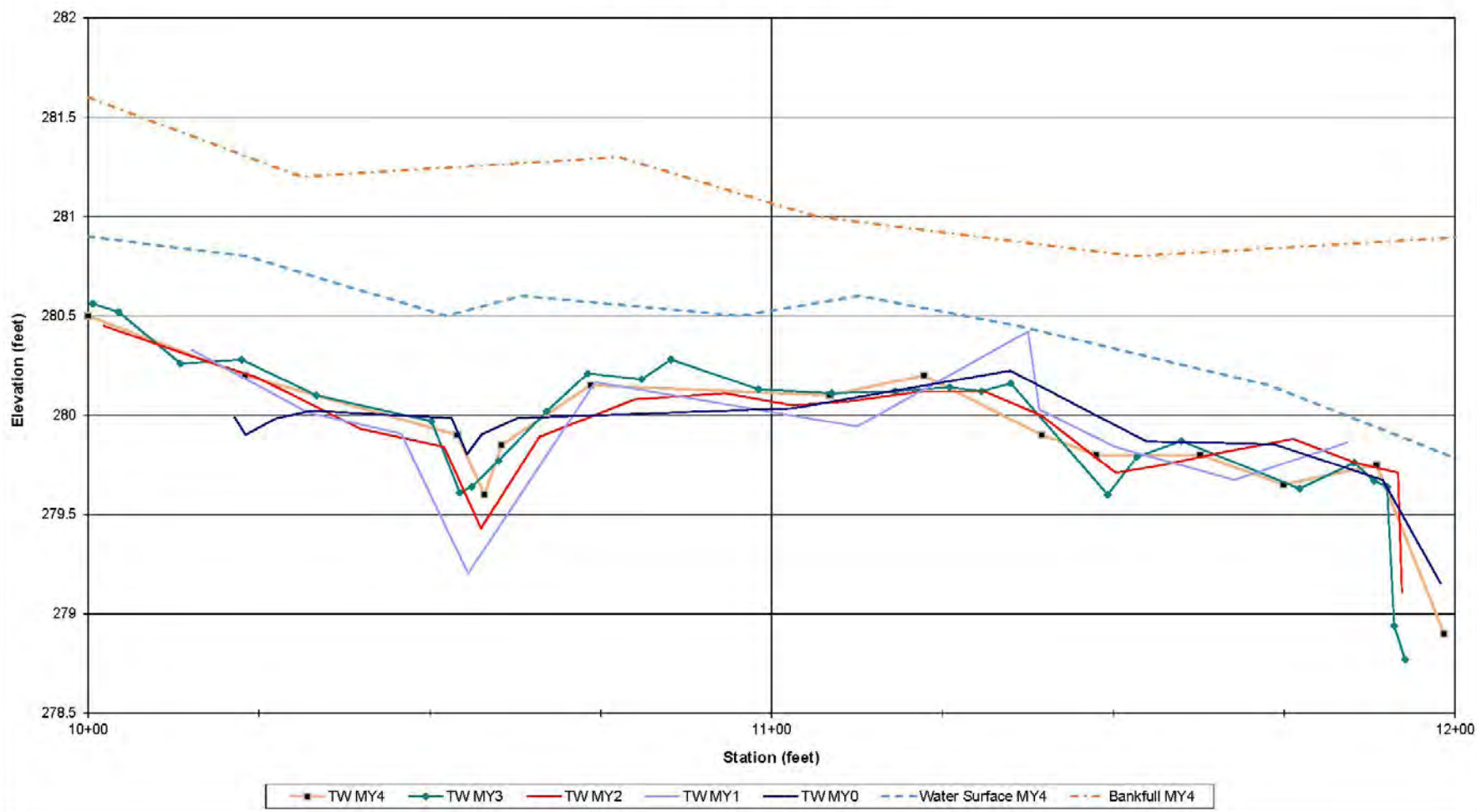








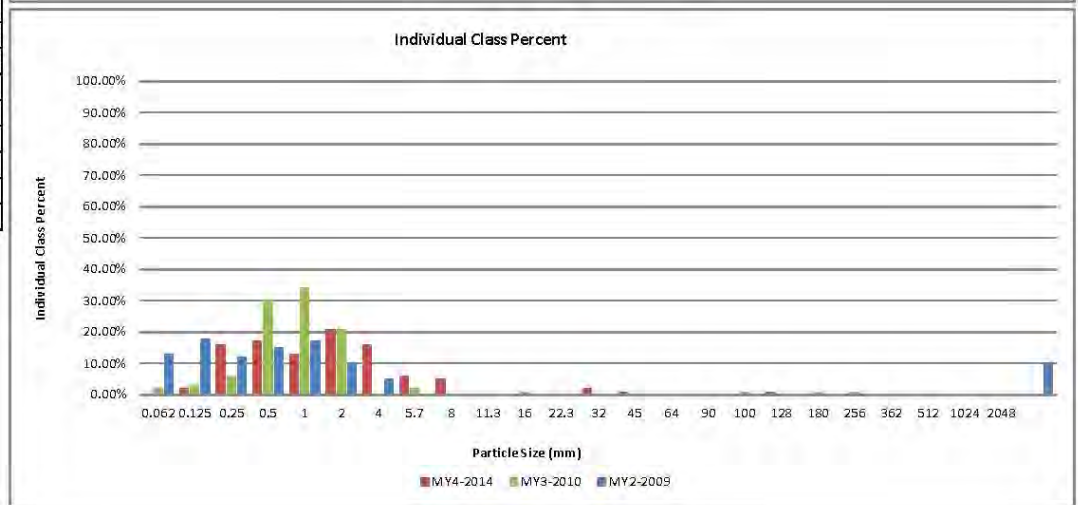
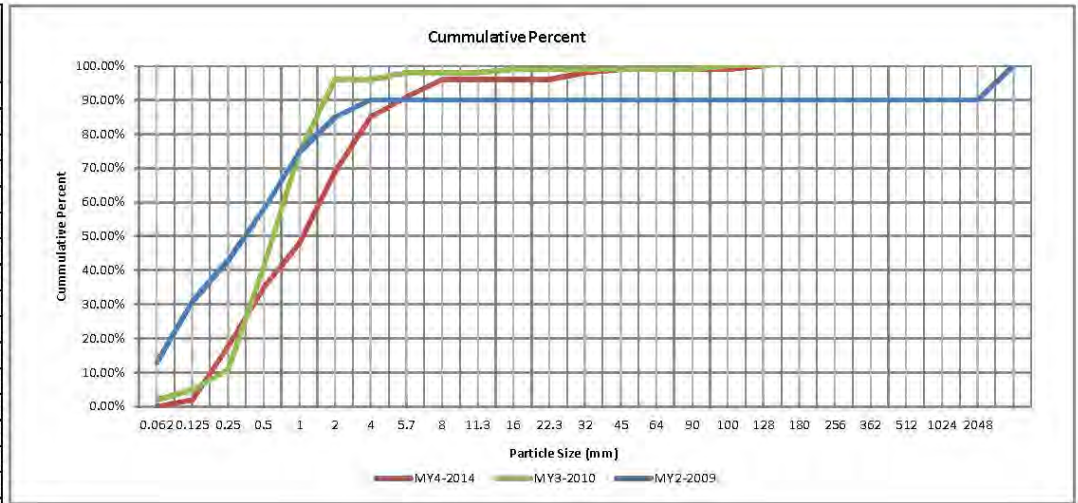
Little Beaver Creek
 Longitudinal Profile
 Tributary 2: Station 10+00-12+00



Pebble counts with annual overlays

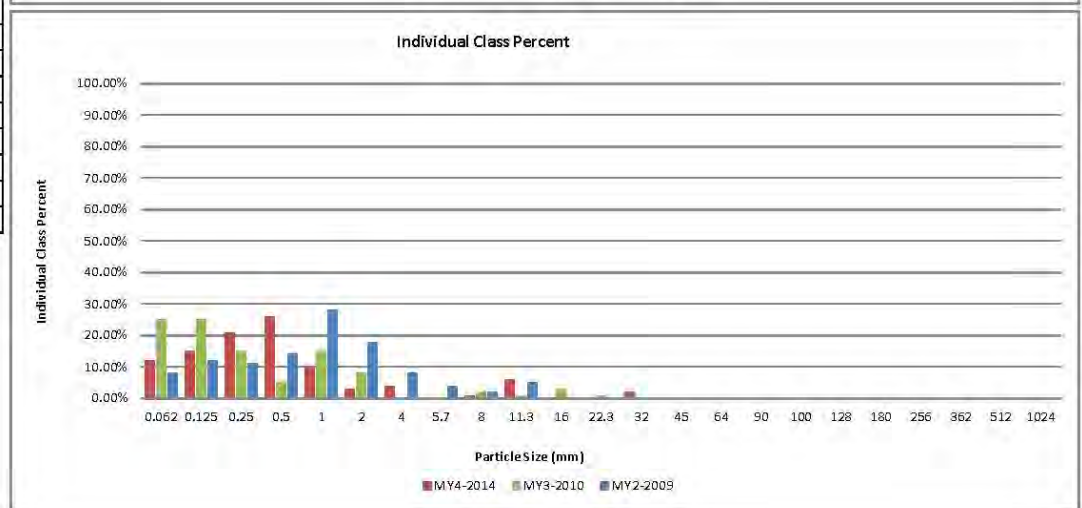
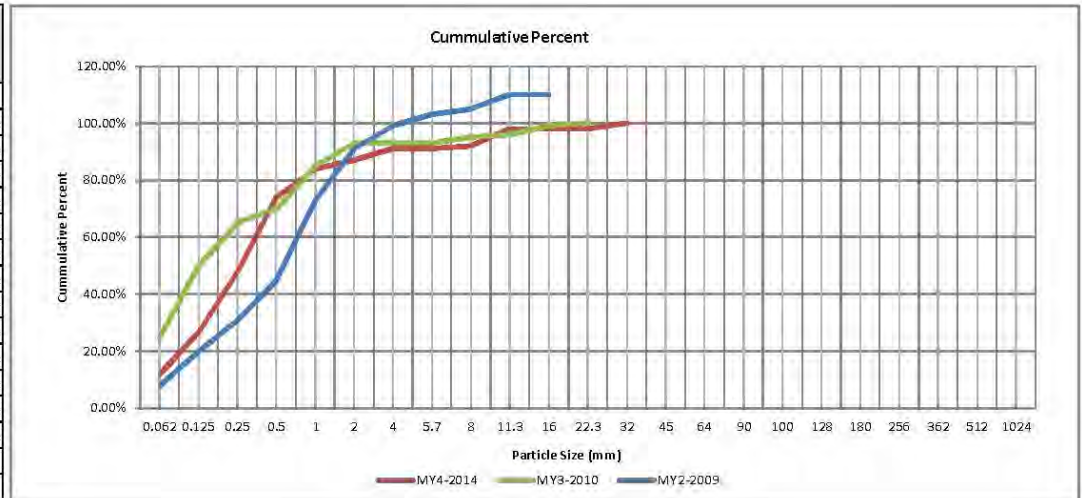
Project Name: Little Beaver Creek Cross Section 1 Monitoring Year 4 - 2014					
Desc.	Material	Size (MM)	Count	% of Total	Cumulative %
SAND	silt/clay	0.062	0	0.00%	0.00%
	very fine sand	0.125	2	2.00%	2.00%
	fine sand	0.25	16	16.00%	18.00%
	medium sand	0.5	17	17.00%	35.00%
	coarse sand	1	13	13.00%	48.00%
GRAVEL	very coarse sand	2	21	21.00%	69.00%
	very fine gravel	4	16	16.00%	85.00%
	fine gravel	5.7	6	6.00%	91.00%
	fine gravel	8	5	5.00%	96.00%
	medium gravel	11.3	0	0.00%	96.00%
	medium gravel	16	0	0.00%	96.00%
	coarse gravel	22.3	0	0.00%	96.00%
	coarse gravel	32	2	2.00%	98.00%
	very coarse gravel	45	1	1.00%	99.00%
	very coarse gravel	64	0	0.00%	99.00%
COBBLE	small cobble	90	0	0.00%	99.00%
	medium cobble	128	0	0.00%	99.00%
	large cobble	180	1	1.00%	100.00%
	very large cobble	256			
BOULDER	small boulder	362			
	small boulder	512			
	medium boulder	1024			
	large boulder	2048			
TOTAL % of whole count:			100	100%	100%

Sumamry Data	
D50	1.1
D84	3.8
D95	7.6



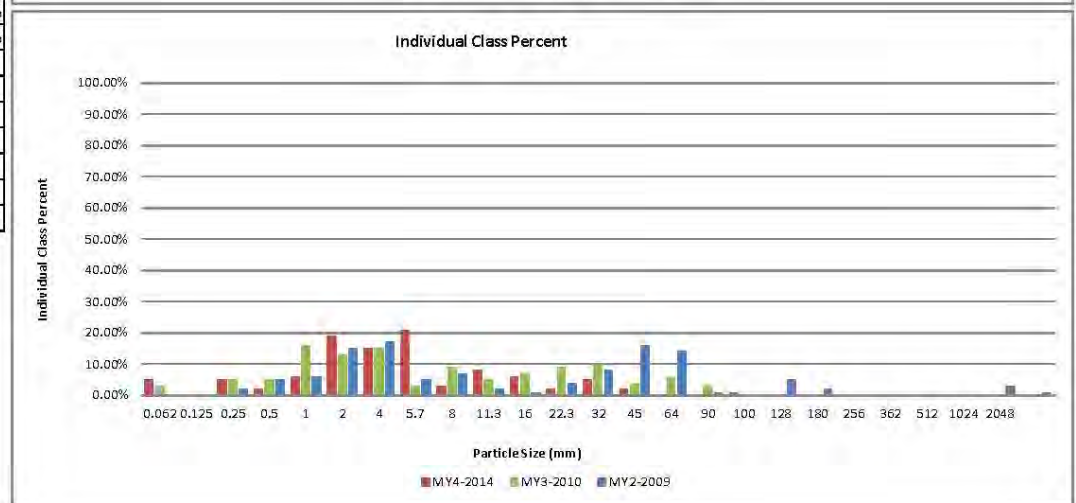
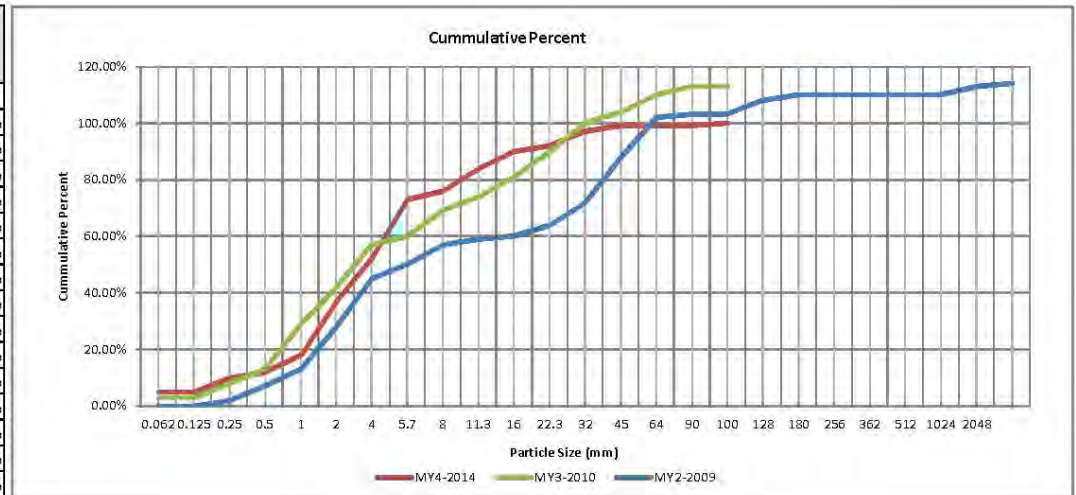
Project Name: Little Beaver Creek Cross Section 3 - Main Reach Monitoring Year 4 - 2014					
Desc.	Material	Size (MM)	Count	% of Total	Cumulative %
SAND	silt/clay	0.062	12	12.00%	12.00%
	very fine sand	0.125	15	15.00%	27.00%
	fine sand	0.25	21	21.00%	48.00%
	medium sand	0.5	26	26.00%	74.00%
	coarse sand	1	10	10.00%	84.00%
	very coarse sand	2	3	3.00%	87.00%
GRAVEL	very fine gravel	4	4	4.00%	91.00%
	fine gravel	5.7	0	0.00%	91.00%
	fine gravel	8	1	1.00%	92.00%
	medium gravel	11.3	6	6.00%	98.00%
	medium gravel	16	0	0.00%	98.00%
	coarse gravel	22.3	0	0.00%	98.00%
	coarse gravel	32	2	2.00%	100.00%
	very coarse gravel	45			
	very coarse gravel	64			
	very coarse gravel	90			
COBBLE	small cobble	90			
	medium cobble	128			
	large cobble	180			
	very large cobble	256			
BOULDER	small boulder	362			
	small boulder	512			
	medium boulder	1024			
large boulder	2048				
TOTAL % of whole count:			100	100%	100%

Summary Data	
D50	0.26
D84	1
D95	9.4



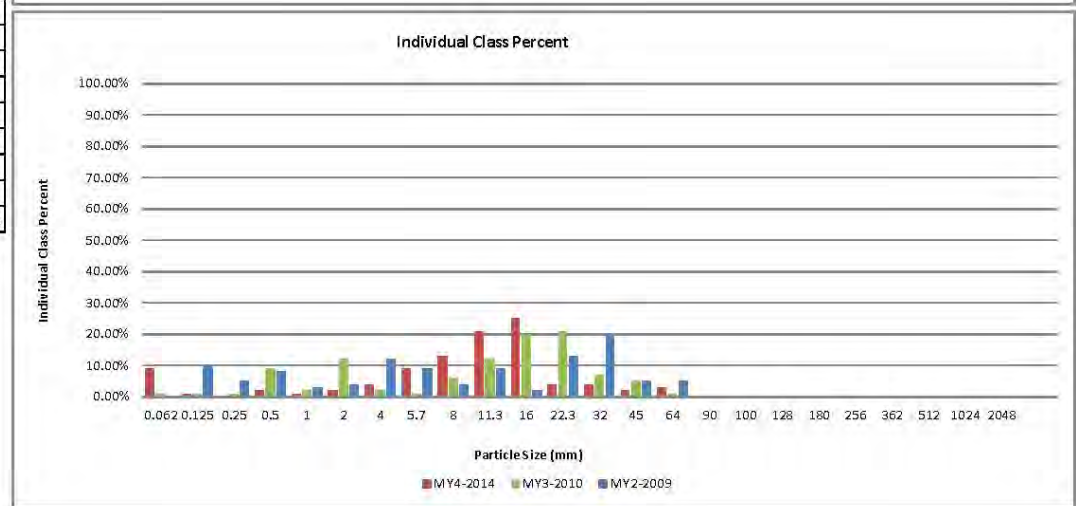
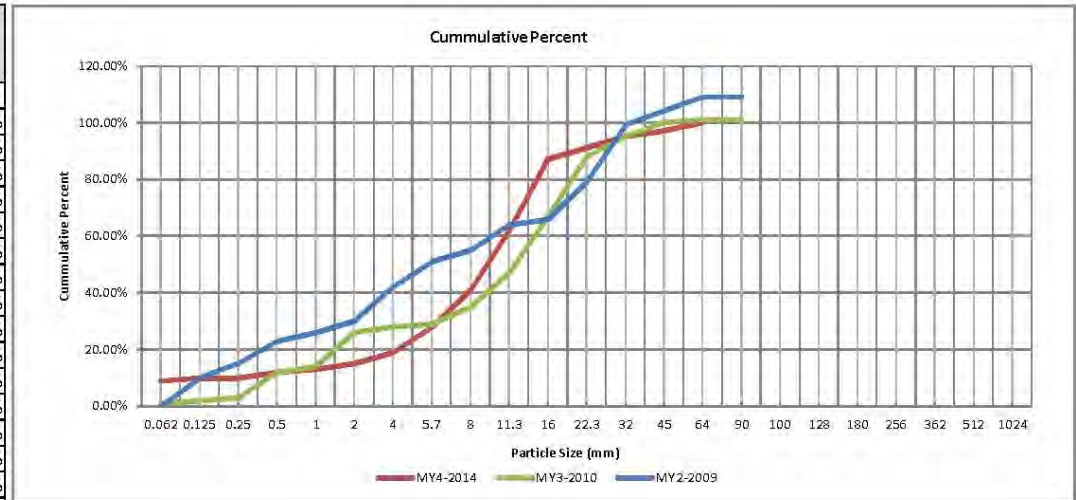
Project Name: Little Beaver Creek Cross Section 5 - Main Reach Monitoring Year 4 - 2014					
Desc.	Material	Size (MM)	Count	% of Total	Cumulative %
SAND	silt/clay	0.062	5	5.00%	5.00%
	very fine sand	0.125	0	0.00%	5.00%
	fine sand	0.25	5	5.00%	10.00%
	medium sand	0.5	2	2.00%	12.00%
	coarse sand	1	6	6.00%	18.00%
	very coarse sand	2	19	19.00%	37.00%
GRAVEL	very fine gravel	4	15	15.00%	52.00%
	fine gravel	5.7	21	21.00%	73.00%
	fine gravel	8	3	3.00%	76.00%
	medium gravel	11.3	8	8.00%	84.00%
	medium gravel	16	6	6.00%	90.00%
	coarse gravel	22.3	2	2.00%	92.00%
	coarse gravel	32	5	5.00%	97.00%
	very coarse gravel	45	2	2.00%	99.00%
	very coarse gravel	64	0	0.00%	99.00%
	small cobble	90	0	0.00%	99.00%
COBBLE	medium cobble	128	1	1.00%	100.00%
	large cobble	180			
BOULDER	very large cobble	256			
	small boulder	362			
	small boulder	512			
	medium boulder	1024			
	large boulder	2048			
TOTAL % of whole count:			100	100%	100%

Summary Data	
D50	3.6
D84	11
D95	28



Project Name: Little Beaver Creek Cross Section 6 - Main Reach Monitoring Year 4 - 2014					
Desc.	Material	Size (MM)	Count	% of Total	Cummulative %
SAND	silt/clay	0.062	9	9.00%	9.00%
	very fine sand	0.125	1	1.00%	10.00%
	fine sand	0.25	0	0.00%	10.00%
	medium sand	0.5	2	2.00%	12.00%
	coarse sand	1	1	1.00%	13.00%
	very coarse sand	2	2	2.00%	15.00%
GRAVEL	very fine gravel	4	4	4.00%	19.00%
	fine gravel	5.7	9	9.00%	28.00%
	fine gravel	8	13	13.00%	41.00%
	medium gravel	11.3	21	21.00%	62.00%
	medium gravel	16	25	25.00%	87.00%
	coarse gravel	22.3	4	4.00%	91.00%
	coarse gravel	32	4	4.00%	95.00%
	very coarse gravel	45	2	2.00%	97.00%
	very coarse gravel	64	3	3.00%	100.00%
COBBLE	small cobble	90			
	medium cobble	128			
	large cobble	180			
	very large cobble	256			
BOULDER	small boulder	362			
	small boulder	512			
	medium boulder	1024			
large boulder	2048				
TOTAL % of whole count:			100	100%	100%

Summary Data	
D50	9.2
D84	15
D95	32



Project Name: Little Beaver Creek Cross Section 8 - Main Reach Monitoring Year 4 - 2014						
Desc.	Material	Size (MM)	Count	% of Total	Cumulative %	
SAND	silt/clay	0.062	10	10.00%	10.00%	
	very fine sand	0.125	3	3.00%	13.00%	
	fine sand	0.25	9	9.00%	22.00%	
	medium sand	0.5	10	10.00%	32.00%	
	coarse sand	1	20	20.00%	52.00%	
GRAVEL	very coarse sand	2	14	14.00%	66.00%	
	very fine gravel	4	7	7.00%	73.00%	
	fine gravel	5.7	3	3.00%	76.00%	
	fine gravel	8	0	0.00%	76.00%	
	medium gravel	11.3	1	1.00%	77.00%	
	medium gravel	16	2	2.00%	79.00%	
	coarse gravel	22.3	0	0.00%	79.00%	
	coarse gravel	32	1	1.00%	80.00%	
	very coarse gravel	45	0	0.00%	80.00%	
	very coarse gravel	64	2	2.00%	82.00%	
COBBLE	small cobble	90	4	4.00%	86.00%	
	medium cobble	128	0	0.00%	86.00%	
	large cobble	180	1	1.00%	87.00%	
BOULDER	very large cobble	256	0	0.00%	87.00%	
	small boulder	362	0	0.00%	87.00%	
	small boulder	512	0	0.00%	87.00%	
	medium boulder	1024	0	0.00%	87.00%	
BEDROCK	large boulder	2048	0	0.00%	87.00%	
			13	13.00%	100.00%	
TOTAL % of whole count:			100	100%	100%	

Summary Data	
D50	0.74
D84	4
D95	68

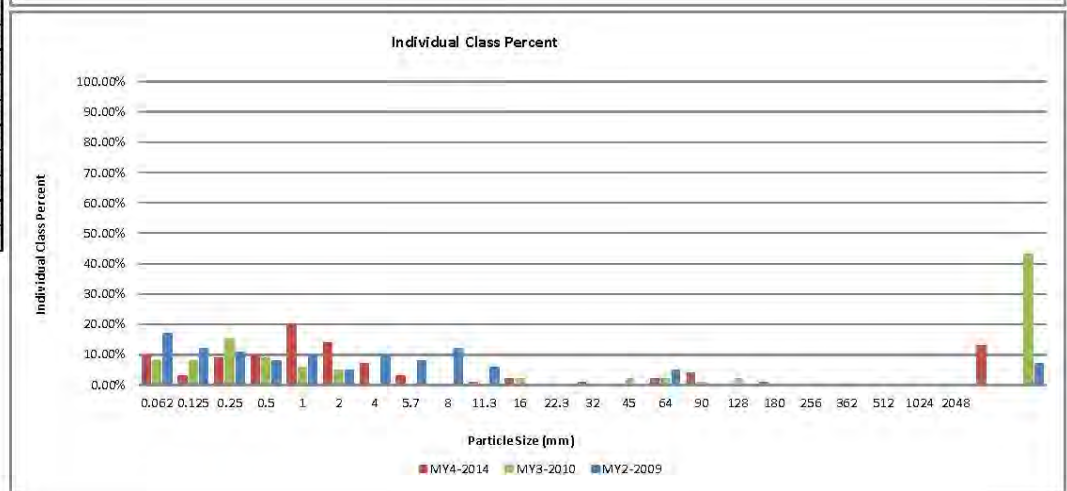
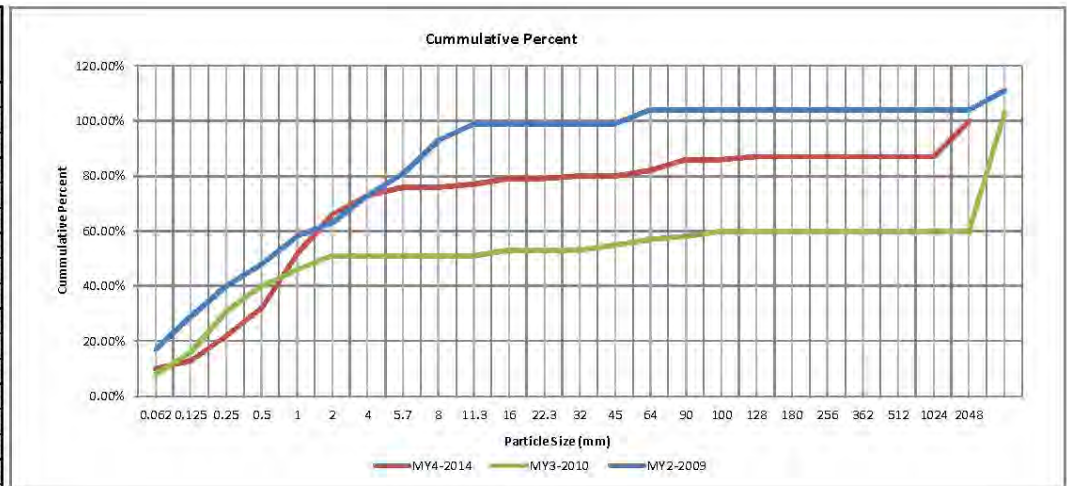


Table 9. Stream Bank Erosion Pin Data

Not Applicable

Table 10a and b. Baseline Stream Summary Data

Table 10a. Baseline Stream Data Summary Little Beaver Creek Stream Restoration Project - EEP No. 221 - Reach 1																									
Parameter	Gauge ²	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
		LL	UL	Eq.	Min	Mean	Med	Max	SD ⁵	n	Min	Mean	Med	Max	SD ⁵	n	Min	Med	Max	Min	Mean	Med	Max	SD ⁵	n
Dimension and Substrate																									
Bankfull Width (ft)							11.2				14		14.4	16.7				14.5		13.8		21.8	29.7		
Floodprone Width (ft)																									
Bankfull Mean Depth (ft)							0.7				0.8		0.9	0.9				1.04		1.2		1.5	1.8		
¹ Bankfull Max Depth (ft)							1.2				1.4		1.8	2				2.3		2.3		2.9	3.4		
Bankfull Cross Sectional Area (ft ²)							8				12.2		15.5	13.7				15		25.1		29.7	34.2		
Width/Depth Ratio							15.6				16		17.6	18				14		7.6		16.7	25.8		
Entrenchment Ratio							2				3		6.1	13.6				>8		4.3		7.8	11.2		
¹ Bank Height Ratio																									
Profile																									
Riffle Length (ft)											4			18						17		32	68		
Riffle Slope (ft/ft)					0.009			0.067			0.00033		0.1125				0.007	0.02	0.001		0.008	0.02			
Pool Length (ft)											6			41.5						0.0013		0.0027	0.0035		
Pool Max depth (ft)																									
Pool Spacing (ft)					4			78			14			95.8			36.5	58	31				43		
Pattern																									
Channel Beltwidth (ft)					12			16			5			40			36	65	37.9		37.9	58.2			
Radius of Curvature (ft)					6			12			11			90			29	44	10.9		18.59	26.2			
Rc:Bankfull width (ft/ft)																									
Meander Wavelength (ft)											14			67			46	83	68.7		98.5	80.1			
Meander Width Ratio					1.1			1.4								2.5		4.5							
Transport parameters																									
Reach Shear Stress (competency) lb/ft ²																									
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m ²																									
Additional Reach Parameters																									
Rosgen Classification							E4						C4/C5					C4/C5							
Bankfull Velocity (fps)																									
Bankfull Discharge (cfs)																									
Valley length (ft)																									
Channel Thalweg length (ft)																									
Sinuosity (ft)							1						1.2-1.5					1.3							
Water Surface Slope (Channel) (ft/ft)							0.011						0.011-0.025					0.0066							
BF slope (ft/ft)																									
³ Bankfull Floodplain Area (acres)																									
⁴ % of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Table 10a. Baseline Stream Data Summary
 Little Beaver Creek Stream Restoration Project - EEP No. 221 - Reach 2

Parameter	Gauge ²	Regional Curve			Pre-Existing Condition							Reference Reach(es) Data						Design			Monitoring Baseline					
		LL	UL	Eq.	Min	Mean	Med	Max	SD ⁵	n	Min	Mean	Med	Max	SD ⁵	n	Min	Med	Max	Min	Mean	Med	Max	SD ⁵	n	
Dimension and Substrate																										
Bankfull Width (ft)					10.5			15.1			14		14.4	16.7				16.1		15.4		17.8	21.1			
Floodprone Width (ft)																										
Bankfull Mean Depth (ft)					0.9			1.4			0.8		0.9	0.9				1.15		17.9		20.4	22.8			
¹ Bankfull Max Depth (ft)					1.9			2.5			1.4		1.8	2				2.5		1.88		2.29	2.54			
Bankfull Cross Sectional Area (ft ²)					14.3			14.8			12.2		15.5	13.7				18.5		17.9		20.4	22.8			
Width/Depth Ratio											16		17.6	18				14		11.69		16.4	17.24			
Entrenchment Ratio											3		6.1	13.6				>11		2.27		5.8	8.07			
¹ Bank Height Ratio																										
Profile																										
Rifle Length (ft)											4			18						17		32	68			
Rifle Slope (ft/ft)					0.009			0.045			0.00083			0.1125				0.005		0.015	0.001		0.008	0.02		
Pool Length (ft)											6			41.5						0.0013		0.0027	0.0035			
Pool Max depth (ft)																										
Pool Spacing (ft)					30			86			14			95.8				36.5		80.5	31			43		
Pattern																										
Channel Beltwidth (ft)					10			37			5			40				40		72	32.2		61	45		
Radius of Curvature (ft)					6			25			11			90				32		48	18.3		24.4	31.8		
Rc:Bankfull width (ft/ft)																										
Meander Wavelength (ft)					40			95			14			67				51		91	76.9			113.3		
Meander Width Ratio					1			1.9										2.5		4.5						
Transport parameters																										
Reach Shear Stress (competency) lb/ft ²																										
Max part size (mm) mobilized at bankfull																										
Stream Power (transport capacity) W/m ²																										
Additional Reach Parameters																										
Rosgen Classification								F4/G4						C4/C5												
Bankfull Velocity (fps)																										
Bankfull Discharge (cfs)																										
Valley length (ft)																										
Channel Thalweg length (ft)																										
Sinuosity (ft)								1.1						1.2-1.5						1.3						
Water Surface Slope (Channel) (ft/ft)								0.0055						0.011-0.025						0.0066						
BF slope (ft/ft)																										
³ Bankfull Floodplain Area (acres)																										
⁴ % of Reach with Eroding Banks																										
Channel Stability or Habitat Metric																										
Biological or Other																										

Table 10a. Baseline Stream Data Summary
 Little Beaver Creek Stream Restoration Project- EEP No. 221 - Reach 3

Parameter	Gauge ²	Regional Curve			Pre-Existing Condition							Reference Reach(es) Data						Design			Monitoring Baseline					
		LL	UL	Eq.	Min	Mean	Med	Max	SD ⁵	n	Min	Mean	Med	Max	SD ⁵	n	Min	Med	Max	Min	Mean	Med	Max	SD ⁵	n	
Dimension and Substrate																										
Bankfull Width (ft)					9.5			15.5			14		14.4	16.7				17.1		16.9		18.1	18.8			
Floodprone Width (ft)																										
Bankfull Mean Depth (ft)					1.4			2		0.8		0.9	0.9				1.22		1.1		1.4	1.8				
¹ Bankfull Max Depth (ft)					2.1			2.6		1.4		1.8	2				2.7		1.75		2.41	3.23				
Bankfull Cross Sectional Area (ft ²)					19.2			21.9		12.2		15.5	13.7				21		20.1		25.5	33.6				
Width/Depth Ratio										16		17.6	18				14		10.48		13.41	17.24				
Entrenchment Ratio								1.6		3		6.1	13.6				3		4.06		10.17	4.42				
¹ Bank Height Ratio																										
Profile																										
Rifle Length (ft)										4			18						17		32	68				
Rifle Slope (ft/ft)					0.01			0.07		0.00083			0.1125						0.001		0.008	0.02				
Pool Length (ft)										6			41.5						0.0013		0.0027	0.0035				
Pool Max depth (ft)																										
Pool Spacing (ft)					18			122		14			95.8						31			43				
Pattern																										
Channel Beltwidth (ft)					9			79		5			40						19.4		32.4	43.2				
Radius of Curvature (ft)					4			33		11			90						15.29		19.58	23.3				
Rc:Bankfull width (ft/ft)																										
Meander Wavelength (ft)					19			135		14			67						78.8			123.3				
Meander Width Ratio					1			6.2																		
Transport parameters																										
Reach Shear Stress (competency) lb/ft ²																										
Max part size (mm) mobilized at bankfull																										
Stream Power (transport capacity) W/m ²																										
Additional Reach Parameters																										
Rosgen Classification								G4											C4/C5							
Bankfull Velocity (fps)																										
Bankfull Discharge (cfs)																										
Valley length (ft)																										
Channel Thalweg length (ft)																										
Sinuosity (ft)								1.1					1.2-1.5													
Water Surface Slope (Channel) (ft/ft)								0.0067					0.011-0.025													
BF slope (ft/ft)																										
³ Bankfull Floodplain Area (acres)																										
⁴ % of Reach with Eroding Banks																										
Channel Stability or Habitat Metric																										
Biological or Other																										

Table 11a and b. Monitoring - Cross-Section Morphology Table

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)																																			
Little Beaver Creek Stream Restoration Project - EEP No. 221 - Reach 1 (991 LF)																																			
	Cross Section 1						Cross Section 2						Cross Section 3						Cross Section 4						Cross Section 5										
Based on fixed baseline bankfull elevation	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	291.72	291.72	291.72	291.72				288.10	288.10	288.10	288.10																								
Bankfull Width (ft)	13.80	15.40	13.89	25.10				17.35	19.12	21.34	12.20																								
Floodprone Width (ft)	154.00	154.00	154.00	116.00				87.00	87.00	87.00	88.20																								
Bankfull Mean Depth (ft)	1.80	1.45	1.81	1.00				0.99	0.96	0.85	0.90																								
Bankfull Max Depth (ft)	3.40	2.88	3.13	2.70				2.21	2.24	2.14	1.90																								
Bankfull Cross Sectional Area (ft ²)	25.10	22.40	25.09	24.90				17.23	18.39	18.04	20.10																								
Bankfull Width/Depth Ratio	7.60	10.59	7.69	25.20				17.33	19.89	25.24	24.70																								
Bankfull Entrenchment Ratio	11.20	10.00	11.09	4.60				5.04	4.53	4.08	4.40																								
Bankfull Bank Height Ratio	1.00	1.00	1.00	1.00				1.00	1.00	1.00	1.00																								
Cross Sectional Area between end pins (ft ²)																																			
d50 (mm)	0.81	0.36	0.6					0.57	N/A	N/A																									
	Cross Section 6						Cross Section 7						Cross Section 8						Cross Section 9						Cross Section 10										
Based on fixed baseline bankfull elevation	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																																			
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. MY-01 monitoring did not separate these parameters based on the separate reaches.

**Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
Little Beaver Creek Stream Restoration Project - EEP No. 221 - Reach 1 (991 LF)**

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																					
Dimension and Substrate - Riffle only																																																			
Bankfull Width (ft)						13.8	15.58	17.35				15.4	17.26	19.12				13.89	17.62	21.34				12.2	18.65	25.1																									
Floodprone Width (ft)						87	120.5	154				87	120.5	154				87	120.5	154				88.2	102.1	116																									
Bankfull Mean Depth (ft)						0.99	1.395	1.8				0.962	1.209	1.455				0.845	1.326	1.806				0.8	0.9	1																									
Bankfull Max Depth (ft)						2.21	2.805	3.4				2.24	2.56	2.88				2.14	2.635	3.13				1.9	2.3	2.7																									
Bankfull Cross Sectional Area (ft ²)						17.23	21.17	25.1				18.39	20.4	22.4				18.04	21.57	25.09				20.1	22.55	24.99																									
Width/Depth Ratio						7.6	12.57	17.53				10.59	15.24	19.89				7.69	16.47	25.24				24.7	24.95	25.2																									
Entrenchment Ratio						5.04	8.12	11.2				4.55	7.275	10				4.077	7.584	11.09				4.4	4.5	4.6																									
Bank Height Ratio						1	1	1				1	1	1				1	1	1				1	6	11																									
Profile																																																			
Riffle Length (ft)						3.77	18.61	109.38				3	14.9	41				12	35	67				10.15	47.55	84.95																									
Riffle Slope (ft/ft)						0.006	0.04	1.7				0.01	0.07	0.41				0.01	0.03	0.05				0.01	0.195	0.38																									
Pool Length (ft)						9.86	40.88	93.63				9	30	86				18	46	79					83	83																									
Pool Max depth (ft)																																																			
Pool Spacing (ft)						3.77	18.1	97.6				17	47.3	107				21	79	126				18.6	60.48	102.3																									
Pattern																																																			
Channel Beltwidth (ft)																																																			
Radius of Curvature (ft)																																																			
Rc:Bankfull width (ft/ft)																																																			
Meander Wavelength (ft)																																																			
Meander Width Ratio																																																			
Additional Reach Parameters																																																			
Rosgen Classification																																																			
Channel Thalweg Length (ft)																																																			
Sinuosity (ft)																																																			
Water Surface Slope (Channel) (ft/ft)																																																			
BF slope (ft/ft)																																																			
*R1% / Ru% / P% / G% / S%																																																			
*SC% / Sa% / G% / C% / B% / Be%																																																			
*d10 / d35 / d50 / d84 / d95 /																																																			
% of Reach with Eroding Banks																																																			
Channel Stability or Habitat Metric																																																			
Biological or Other																																																			

Shaded cells indicate that these will typically not be filled in.

- 1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile.
- 2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
- 3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
- 4 = Of value/needed only if the n exceeds 3

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Little Beaver Creek Stream Restoration Project - EEP No. 221 - Reach 2 (1309 LF)

	Cross Section 3							Cross Section 4							Cross Section 5																				
	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+
Based on fixed baseline bankfull elevation																																			
Record elevation (datum) uses	284.29	284.29	284.29	284.29				283.78	283.78	283.78	283.78				281.50	281.50	281.50	281.50																	
Bankfull Width (ft)	16.43	16.65	16.58	32.00				19.42	21.58	21.58	26.00				28.18	30.67	19.45	40.60																	
Floodprone Width (ft)	53.00	54.49	55.21	55.70				97.00	97.00	97.00	135.10				126.00	126.00	126.00	137.90																	
Bankfull Mean Depth (ft)	1.16	1.11	0.97	0.70				1.23	1.24	1.30	1.10				1.56	1.27	1.89	1.00																	
Bankfull Max Depth (ft)	2.32	2.36	2.34	2.40				2.71	2.68	2.75	3.20				3.93	3.78	3.72	3.90																	
Bankfull Cross Sectional Area (ft ²)	19.10	18.54	16.06	21.40				23.93	26.86	28.15	27.60				43.98	38.96	36.86	39.00																	
Bankfull Width/Depth Ratio	14.16	14.95	17.13	47.90				4.98	4.49	4.48	24.50				18.06	24.14	10.26	42.30																	
Bankfull Entrenchment Ratio	3.25	3.27	3.33	1.70				20.61	22.84	22.99	5.20				4.47	4.11	6.48	3.40																	
Bankfull Bank Height Ratio	1.00	1.00	1.00	1.00				1.00	0.85	0.95	1.00				1.00	0.99	0.92	1.00																	
Cross Sectional Area between end pins (ft ²)																																			
σ50 (mm)	1.31	0.68	0.13					0.43	N/A	N/A					7.08	8	3.9																		
Based on fixed baseline bankfull elevation																																			
Record elevation (datum) uses																																			
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)																																			
σ50 (mm)																																			

1. MY-01 monitoring did not separate these parameters based on the separate reaches.
2. This reach has two distinct slopes with the transition at approximate station .27+00.

Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
Little Beaver Creek Stream Restoration Project - EEP No. 221 - Reach 2 (1309 LF)

Parameter	Monitoring Data - Stream Reach Data Summary																																			
	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 - Riffs only																																				
Bankfull Width (ft)	32	26	40.6				16.43	22.31	28.18				16.65	23.66	30.67				26	33.3	40.6				26	33.3	40.6				26	33.3	40.6			
Floodprone Width (ft)	357	133.1	137.9				53	89.5	126				54.49	90.24	126				55.7	96.8	137.9				55.7	96.8	137.9				55.7	96.8	137.9			
Bankfull Mean Depth (ft)	0.7	1.1	1				1.16	1.36	1.56				1.113	1.192	1.27				0.7	0.9	1.1				0.7	0.9	1.1				0.7	0.9	1.1			
Bankfull Max Depth (ft)	2.4	3.2	3.9				2.32	3.125	3.93				2.36	3.068	3.775				2.4	3.15	3.9				2.4	3.15	3.9				2.4	3.15	3.9			
Bankfull Cross-Sectional Area (ft ²)	21.4	27.6	39				19.1	31.54	43.98				18.54	28.75	38.96				21.4	30.2	39				21.4	30.2	39				21.4	30.2	39			
Width/Depth Ratio	47.9	24.5	42.3				4.98	11.52	18.06				4.495	14.32	24.14				24.5	36.2	47.9				24.5	36.2	47.9				24.5	36.2	47.9			
Entrenchment Ratio	1.7	5.2	3.4				3.25	11.93	20.61				3.272	13.05	22.84				1.7	3.45	5.2				1.7	3.45	5.2				1.7	3.45	5.2			
Bank Height Ratio	1	1	1				1	1	1				0.85	0.925	1				1	1	1				1	1	1				1	1	1			
Profile																																				
Riffle Length (ft)							3.77	18.61	109.38				2.4	15.6	50				12	45	215				9.366	62.343	115.32									
Riffle Slope (ft/ft)							0.006	0.04	1.7				0.01	0.04	0.16				0	0.02	0.87				0.01	0.055	0.1									
Pool Length (ft)							9.86	40.88	93.65				17	41	97				19	37	57				21.22	43.89	66.56									
Pool Max depth (ft)																																				
Pool Spacing (ft)							3.77	18.05	97.39				24	77.7	173				35	18	238				27.91	95.23	162.55									
Pattern																																				
Channel Beltwidth (ft)																																				
Radius of Curvature (ft)																																				
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)																																				
Meander Width Ratio																																				
Additional Reach Parameters																																				
Rosgen Classification									C4/C5						C4						C4						C4									
Channel Thalweg length (ft)									1309						1398						1398															
Sinuosity (ft)									1.38						1.69						1.69															
Water Surface Slope (Channel) (ft/ft)									0.0048						0.0012/0.0083**						0.0030/0.0080**															
BF slope (ft/ft)									0.0039						0.0019/0.0091**						0.0013/0.0086**															
*Ri% / Ru% / P% / G% / S%																																				
**SC% / Sa% / G% / C% / B% / Be%																																				
*d16 / d35 / d50 / d84 / d95 /																																				
% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

*MY-01 monitoring did not separate these parameters based on the separate reaches.
 **This reach has two distinct slopes with the transition at approximate station 27+00.

Shaded cells indicate that these will typically not be filled in.
 1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile.
 2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
 3 = Riffle, Run, Pool, Glide, Step, Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock, dip = max pave, disp = max subpave
 4 = Of value/needed only if the n exceeds 3

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Little Beaver Creek Stream Restoration Project - EEP No. 221 - Reach 3A (732 LF)

	Cross Section 6							Cross Section 7							Cross Section 8														
	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+	
Based on fixed baseline bankfull elevation																													
Record elevation (datum) used	277.94	277.94	277.94	277.94				277.93	277.93	277.93	277.93				274.09	274.09	274.09	274.09											
Bankfull Width (ft)	21.65	19.46	19.92	14.20				19.87	17.68	18.43	16.70				19.46	19.32	20.59	32.20											
Floodprone Width (ft)	95.00	78.47	77.67	61.40				156.00	156.00	156.00	190.60				75.00	73.23	76.21	71.20											
Bankfull Mean Depth (ft)	1.18	1.07	0.96	0.90				1.91	1.96	2.62	1.70				1.21	1.43	1.29	0.80											
Bankfull Max Depth (ft)	2.34	1.79	1.68	1.50				4.29	4.72	5.83	3.80				2.68	2.67	2.78	2.10											
Bankfull Cross Sectional Area (ft ²)	25.34	20.82	19.02	13.40				38.05	34.68	48.27	28.90				23.62	27.63	26.50	25.60											
Bankfull Width/Depth Ratio	18.35	18.19	20.86	16.40				10.40	9.01	7.04	9.60				16.08	13.51	15.99	40.40											
Bankfull Entrenchment Ratio	4.40	4.03	3.90	4.30				7.86	8.82	8.46	11.40				3.84	3.79	3.70	2.20											
Bankfull Bank Height Ratio	1.00	1.00	1.00	1.00				1.00	0.93	0.98	1.00				1.00	1.00	0.97	1.00											
Cross Sectional Area between end pins (ft ²)																													
d50 (mm)	3/4	7.75	11.9					0.2	N/A	N/A					0.21	0.86	12.3												
Based on fixed baseline bankfull elevation																													
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. MY-01 monitoring did not separate these parameters based on the separate reaches.
2. This reach has two distinct slopes with the transition at approximate station 36+00.

Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
Little Beaver Creek Stream Restoration Project - EEP No. 221 - Reach 1 (991 LF)

Parameter	Monitoring Data - Stream Reach Data Summary																																								
	Baseline							MY-1							MY-2							MY-3							MY-4							MY-5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD ¹	n	Min	Mean	Med	Max	SD ¹	n	Min	Mean	Med	Max	SD ¹	n	Min	Mean	Med	Max	SD ¹	n	Min	Mean	Med	Max	SD ¹	n	Min	Mean	Med	Max	SD ¹	n					
Bankfull Width (ft)	14.2	16.7	32.2				19.46	20.56	21.65				17.68	18.57	19.46				18.43	19.51	20.59				14.2	23.2	32.2														
Floodprone Width (ft)	61.4	190.6	71.2				75	115.5	15.6				73.23	114.6	15.6				76.21	116.1	15.6				61.4	126	190.6														
Bankfull Mean Depth (ft)	0.9	1.7	0.8				1.18	1.545	1.91				1.07	1.516	1.962				0.955	1.787	2.619				0.8	1.25	1.7														
¹ Bankfull Max Depth (ft)	1.5	3.8	2.1				2.34	3.315	4.29				1.79	3.253	4.715				1.68	3.757	5.835				1.5	2.65	3.8														
Bankfull Cross Sectional Area (ft ²)	12.4	28.9	25.6				23.62	30.84	38.05				20.82	27.75	34.68				19.02	33.65	48.27				12.4	20.65	28.9														
Width/Depth Ratio	16.4	9.6	40.4				10.4	14.38	18.35				9.012	13.6	18.19				7.036	13.95	20.86				9.6	25	40.4														
Entrenchment Ratio	4.3	11.4	2.2				3.84	5.85	7.86				3.79	6.307	8.824				3.702	6.083	8.465				2.2	6.8	11.4														
¹ Bank Height Ratio	1	1	1				1	1	1				0.927	0.963	1				0.975	0.987	1				1	1	1														
Profile																																									
Riffle Length (ft)							3.77	18.61	109.38				3	13.6	69				7	19	36				8.1	30.755	93.41														
Riffle Slope (ft/ft)							0.006	0.04	1.7				0.007	0.03	0.13				0	0.04	0.14				0.001	0.0553	0.11														
Pool Length (ft)							9.86	40.88	93.63				10	27.4	54				23	50	111				13.26	56.5	99.74														
Pool Max depth (ft)																																									
Pool Spacing (ft)							3.77	18.03	97.39				15	37.7	73				20	76	115				18.622	32.411	86.2														
Pattern																																									
Channel Belwidth (ft)																																									
Radius of Curvature (ft)																																									
Rc/Bankfull width (ft/ft)																																									
Meander Wavelength (ft)																																									
Meander Width Ratio																																									
Additional Reach Parameters																																									
Rosgen Classification									C4/C5						C4						C4						C4														
Channel Thalweg length (ft)									732						790						790						800														
Sinuosity (ft)									1.17						1.26						1.26						1.26														
Water Surface Slope (Channel) (ft/ft)									0.0069						0.002/0.0127**						0.0014/0.0118**																				
BF slope (ft/ft)									0.0058						0.0027/0.0132**						0.0024/0.0124**																				
³ R% / Ru% / P% / G% / S%																																									
² SC% / Sa% / G% / C% / B% / Be%																																									
⁴ d1B / d35 / d50 / d84 / d95																																									
² % of Reach with Eroding Banks																																									
Channel Stability or Habitat Metric																																									
Biological or Other																																									

*MY-01 monitoring did not separate these parameters based on the separate reaches.
 **This reach has two distinct slopes with the transition at approximate station 27+00.

Shaded cells indicate that these will typically not be filled in.
 1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile.
 2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
 3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
 4 = Of value/needed only if the n exceeds 3

**Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Little Beaver Creek Stream Restoration Project - EEP No. 221 - Tributary 1 (381 LF)**

	Cross Section Trib 1							Cross Section Trib 2																											
	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+
Based on fixed baseline bankfull elevation																																			
Record elevation (datum) used	287.11	287.11	287.11	287.11				286.30	286.30	286.30	286.30																								
Bankfull Width (ft)	12.48	14.00	15.07	18.00				9.46	13.81	12.61	15.30																								
Floodprone Width (ft)	42.00	38.84	38.26	41.60				53.00	60.33	61.20	58.30																								
Bankfull Mean Depth (ft)	0.85	0.63	0.61	0.60				0.63	0.66	0.79	0.60																								
Bankfull Max Depth (ft)	2.04	1.59	1.51	1.70				1.31	1.32	1.89	1.70																								
Bankfull Cross Sectional Area (ft ²)	10.66	8.82	9.21	10.40				5.96	9.09	9.99	8.30																								
Bankfull Width/Depth Ratio	14.68	22.22	24.65	31.10				15.02	20.98	15.93	27.60																								
Bankfull Entrenchment Ratio	3.38	2.77	2.54	2.30				5.61	4.37	4.85	3.80																								
Bankfull Bank Height Ratio	1.00	0.97	0.91	1.00				1.00	0.98	0.99	1.00																								
Cross Sectional Area between end pins (ft ²)																																			
d50 (mm)	0.59	N/A	N/A					0.18	N/A	N/A																									
Based on fixed baseline bankfull elevation																																			
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)																																			

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Little Beaver Creek Stream Restoration Project - EEP No. 221 - Reach 3A (732 LF)

Based on fixed baseline bankfull elevation	Cross Section 6							Cross Section 7							Cross Section 8													
	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) uses	277.94	277.94	277.94	277.94				277.93	277.93	277.93	277.93				274.09	274.09	274.09	274.09										
Bankfull Width (ft)	21.65	19.46	19.92	14.20				19.87	17.68	18.43	16.70				19.46	19.32	20.59	32.20				#N/D						
Floodprone Width (ft)	95.00	78.47	77.67	61.40				136.00	136.00	136.00	190.60				73.00	73.23	76.21	71.20				#N/D						
Bankfull Mean Depth (ft)	1.18	1.07	0.96	0.90				1.91	1.96	2.62	1.70				1.21	1.43	1.29	0.80				#N/D						
Bankfull Max Depth (ft)	2.34	1.79	1.68	1.50				4.29	4.72	5.83	3.80				2.68	2.67	2.78	2.10				#N/D						
Bankfull Cross Sectional Area (ft ²)	25.54	20.82	19.02	12.40				38.05	34.68	48.27	28.90				23.62	27.63	26.50	25.60				#N/D						
Bankfull Width/Depth Ratio	18.35	18.19	20.86	16.40				10.40	9.01	7.04	9.60				16.08	13.51	15.99	40.40				#N/D						
Bankfull Entrenchment Ratio	4.40	4.03	3.90	4.30				7.86	8.82	8.46	11.40				3.84	3.79	3.70	2.20				#N/D						
Bankfull Bank Height Ratio	1.00	1.00	1.00	1.00				1.00	0.93	0.98	1.00				1.00	1.00	0.97	1.00				#N/D						
Cross Sectional Area between end pins (ft ²)																												
d50 (mm)	3.4	7.75	11.9					0.2	N/A	N/A					0.21	0.88	12.3											
Based on fixed baseline bankfull elevation	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) uses																												
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. MY-01 monitoring did not separate these parameters based on the separate reaches.
2. This reach has two distinct slopes with the transition at approximate station 36+00.

Appendix E.

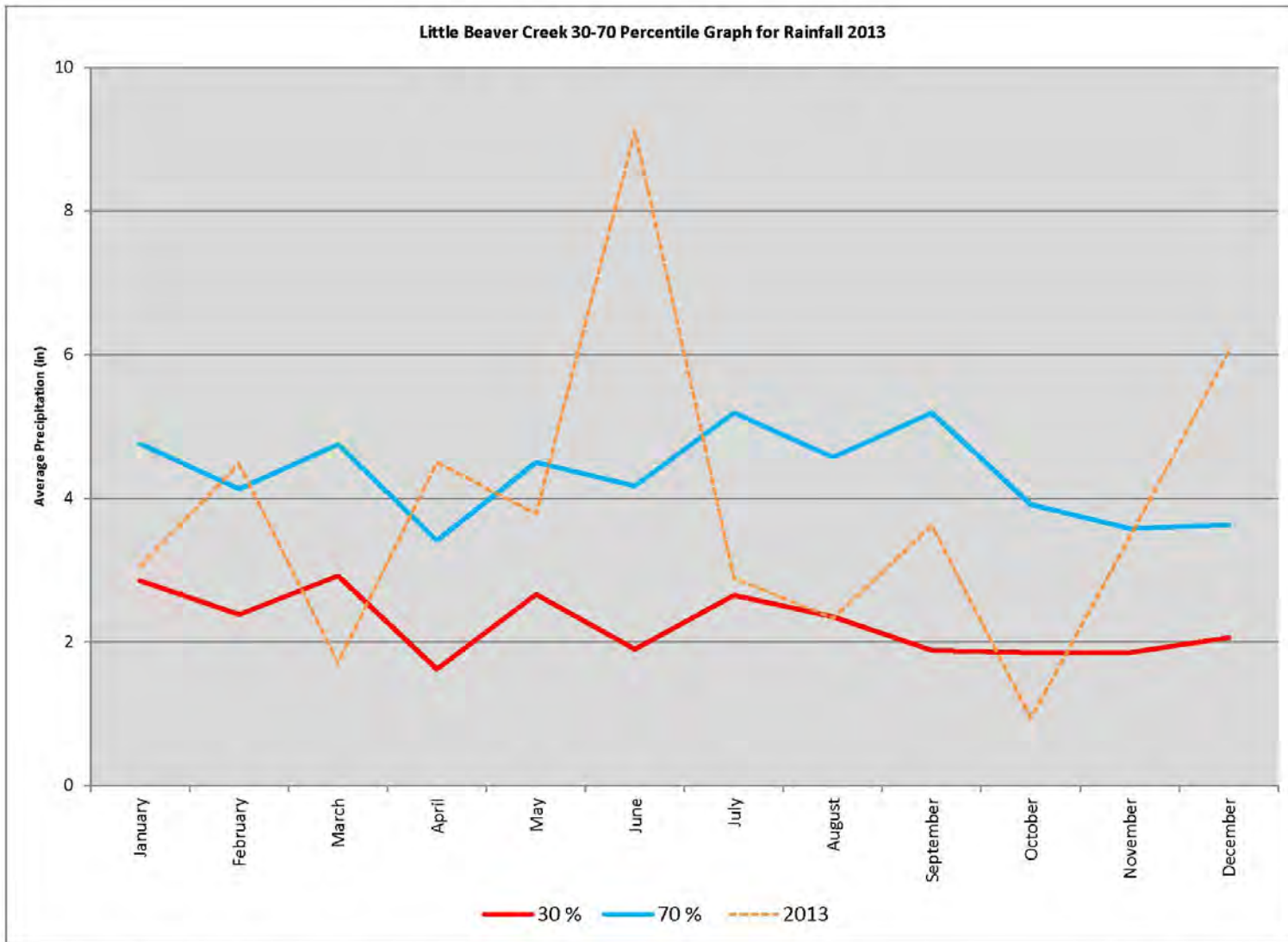
Hydrologic Data

Table 12. Verification of Bankfull Events

Little Beaver Creek Stream and Wetland Restoration Site-Project No. 221			
Date of Data Collection	Date of Occurrence	Method	Photo #
2006	June 14, 2006	Visual	NA
September 18, 2008	September 7, 2008	Visual (i.e. wrack lines)	NA
April 1, 2014	March 2014	Observation of wrack lines in the floodplain	See below

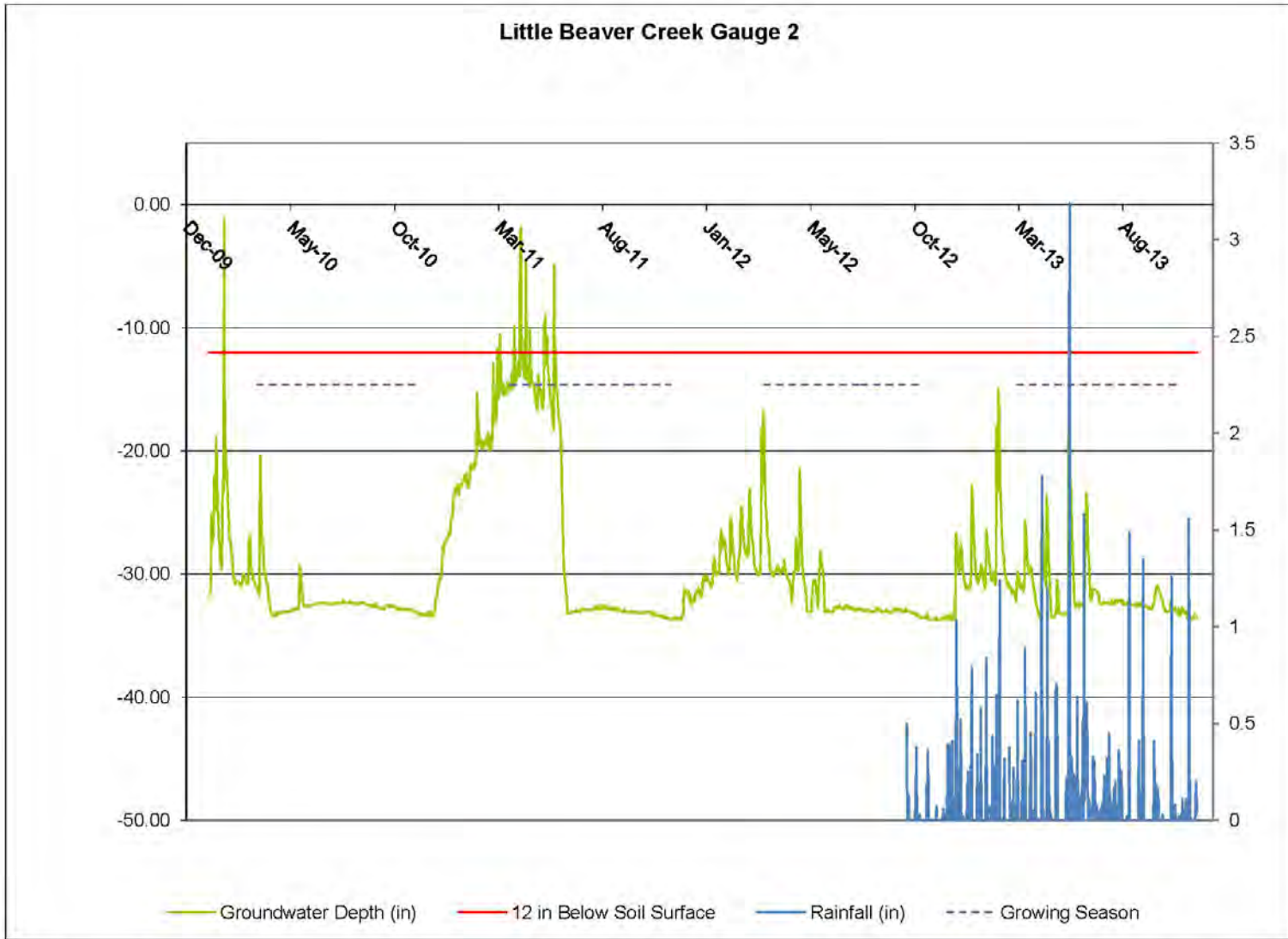


View of floodplain at the confluence of Little Beaver Creek and the tributary.



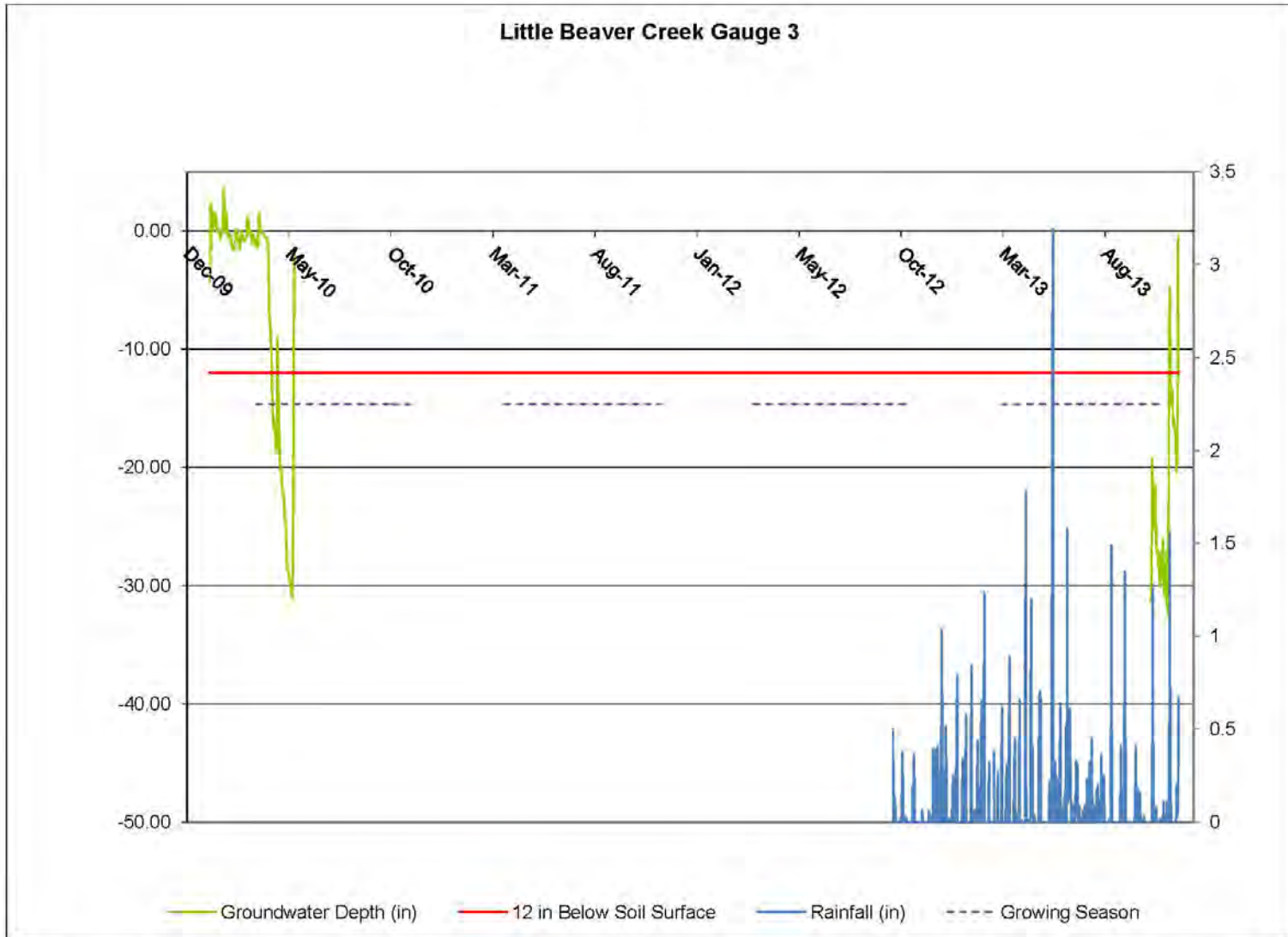
Growing Season: March 25 to November 10 (230 days)
<http://agacis.rcc-acis.org/37183/wets/results>

Rain Data: Station Apex
<http://www.nc-climate.ncsu.edu/services/request.php>



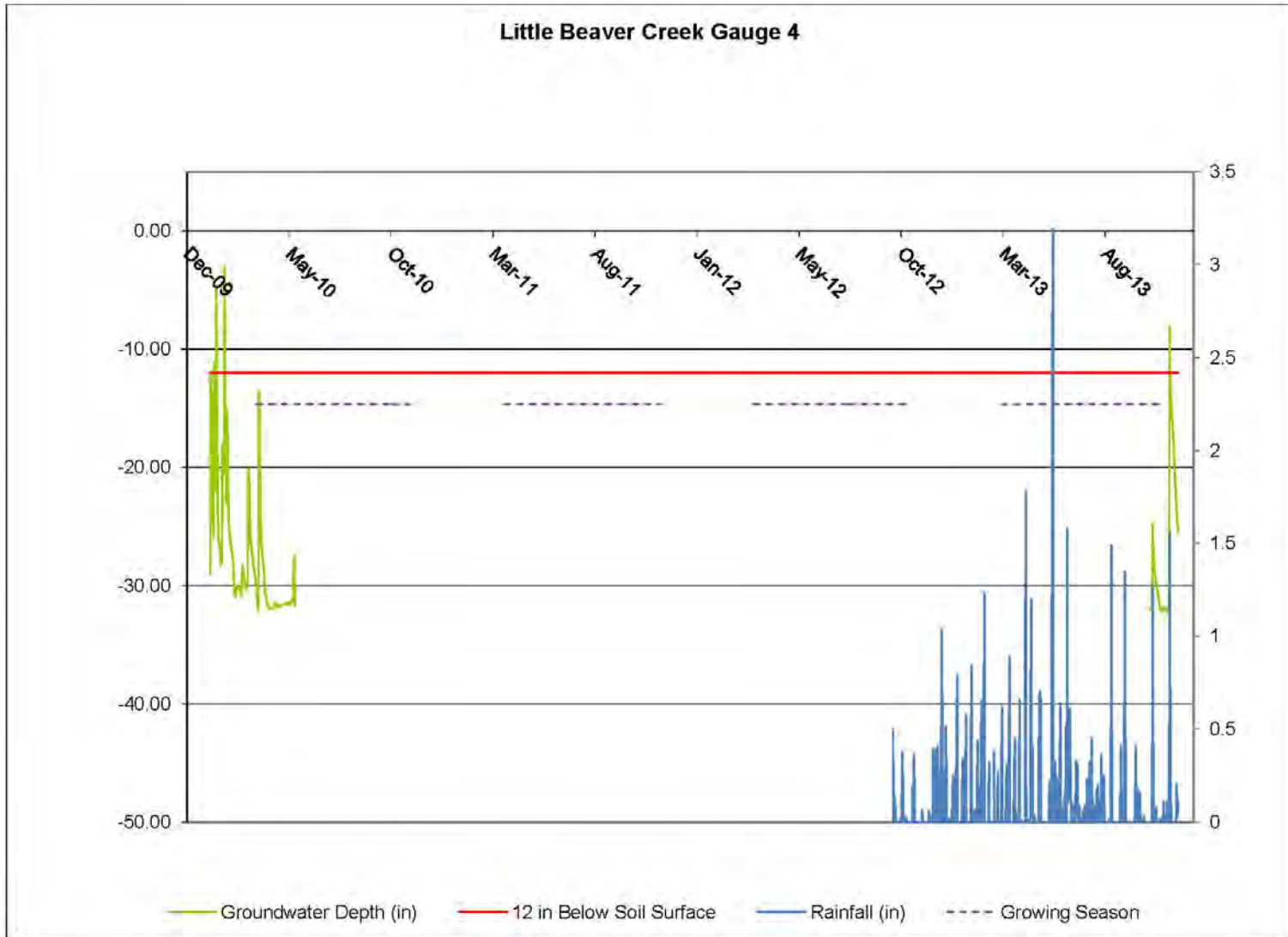
Growing Season: March 25 to November 10 (230 days)
<http://agacis.rcc-acis.org/37183/wets/results>

Rain Data: Station Apex
<http://www.nc-climate.ncsu.edu/services/request.php>



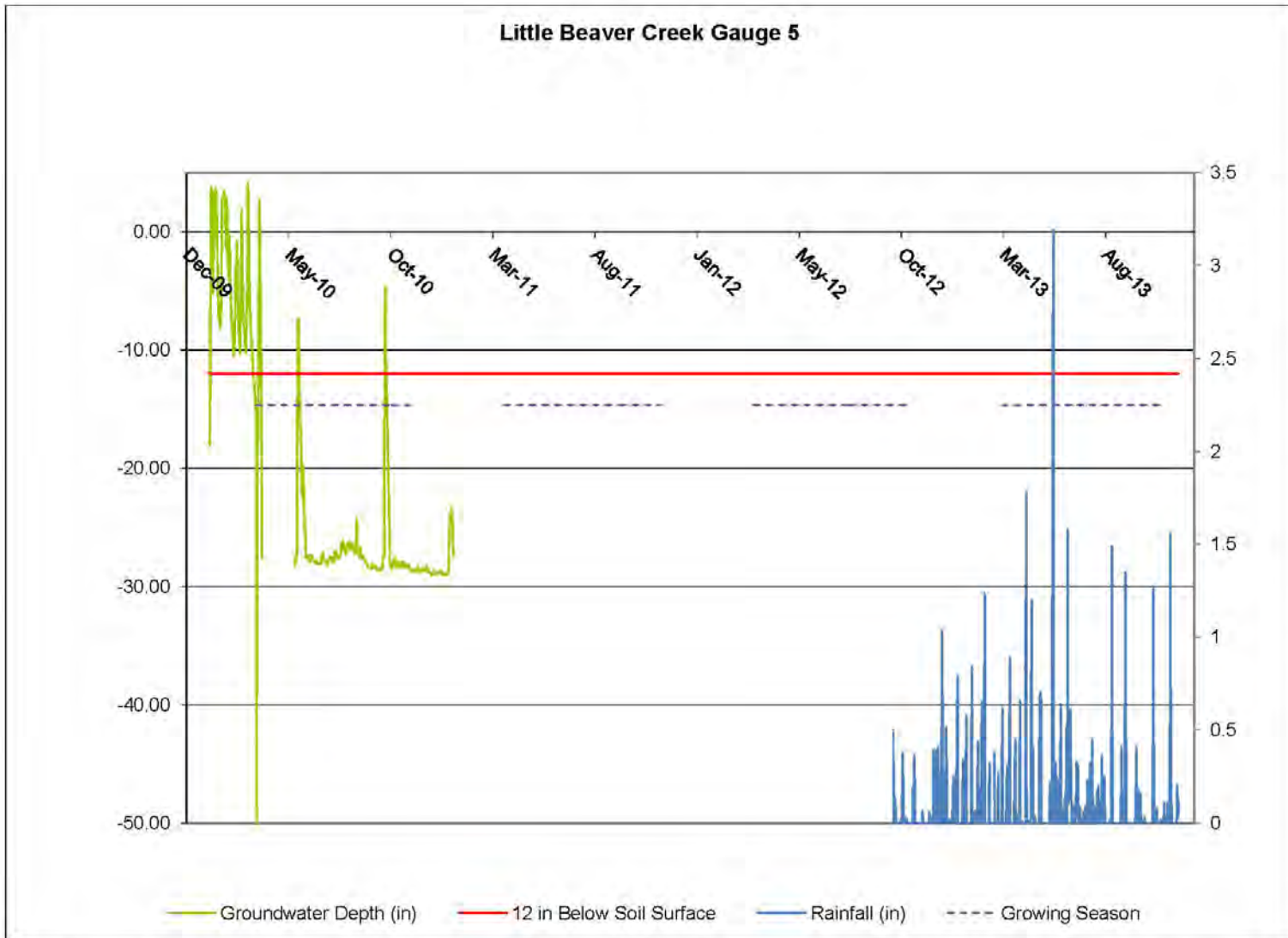
Growing Season: March 25 to November 10 (230 days)
<http://agacis.rcc-acis.org/37183/wets/results>

Rain Data: Station Apex
<http://www.nc-climate.ncsu.edu/services/request.php>



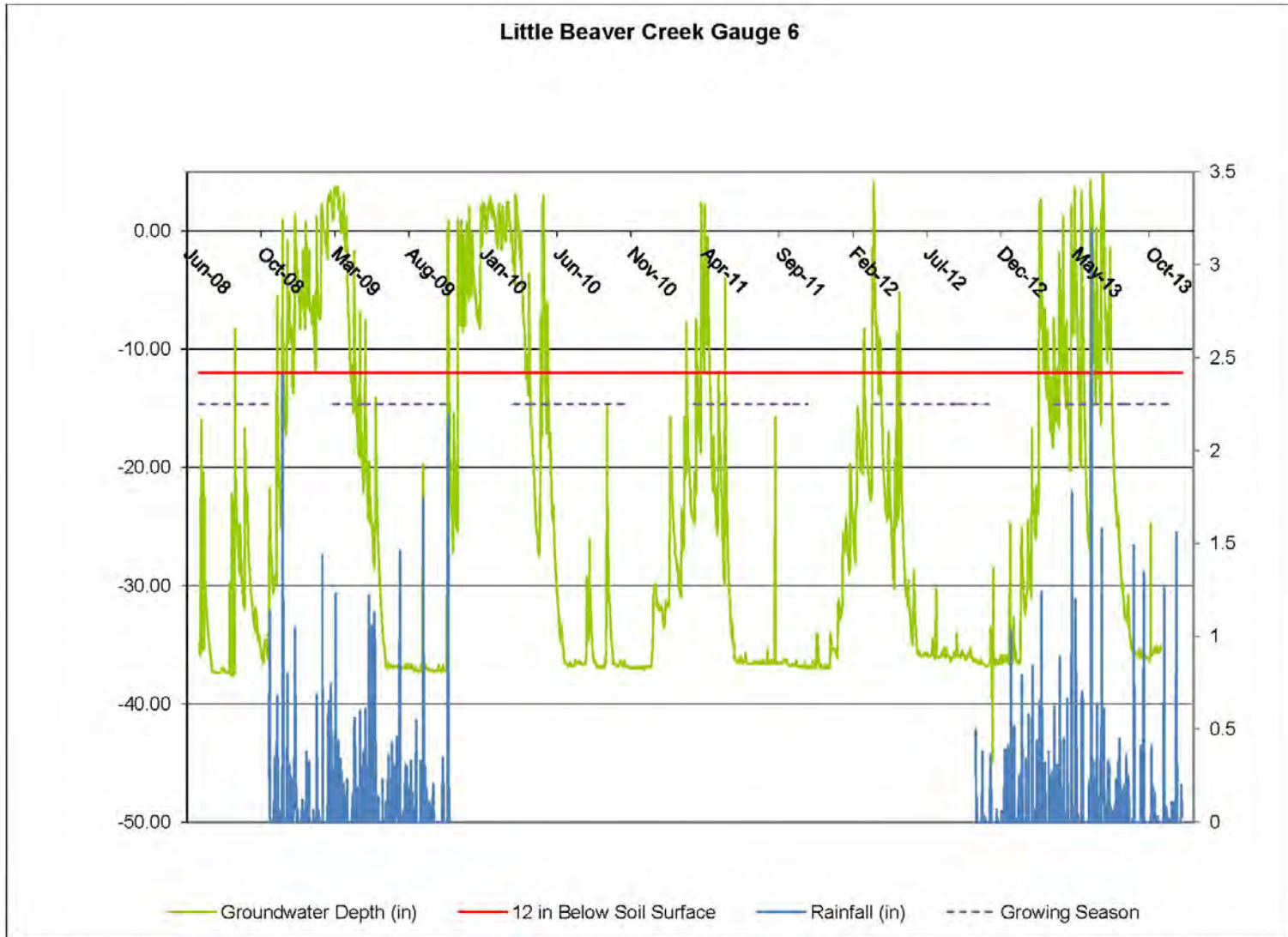
Growing Season: March 25 to November 10 (230 days)
<http://agacis.rcc-acis.org/37183/wets/results>

Rain Data: Station Apex
<http://www.nc-climate.ncsu.edu/services/request.php>



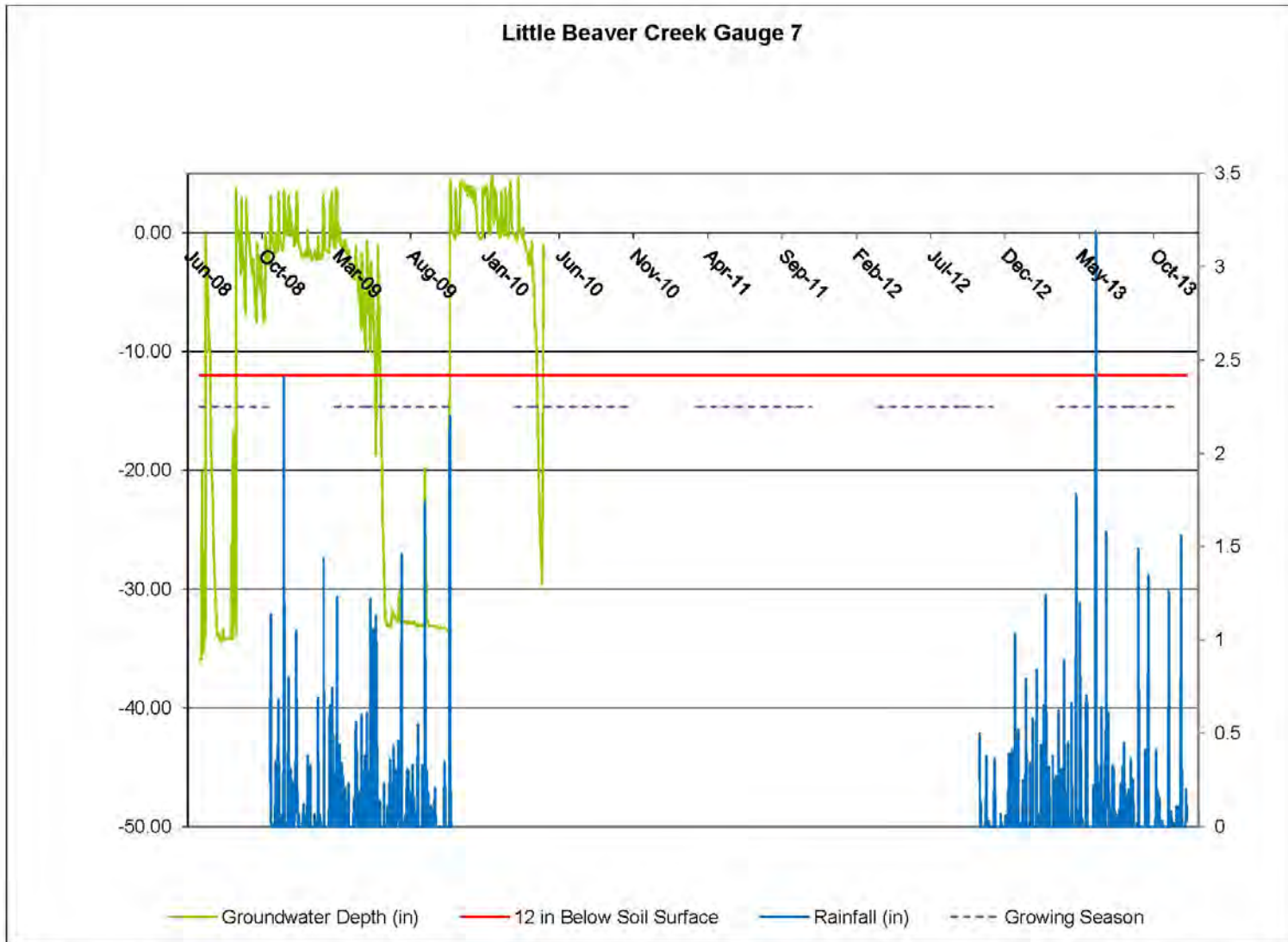
Growing Season: March 25 to November 10 (230 days)
<http://agacis.rcc-acis.org/37183/wets/results>

Rain Data: Station Apex
<http://www.nc-climate.ncsu.edu/services/request.php>



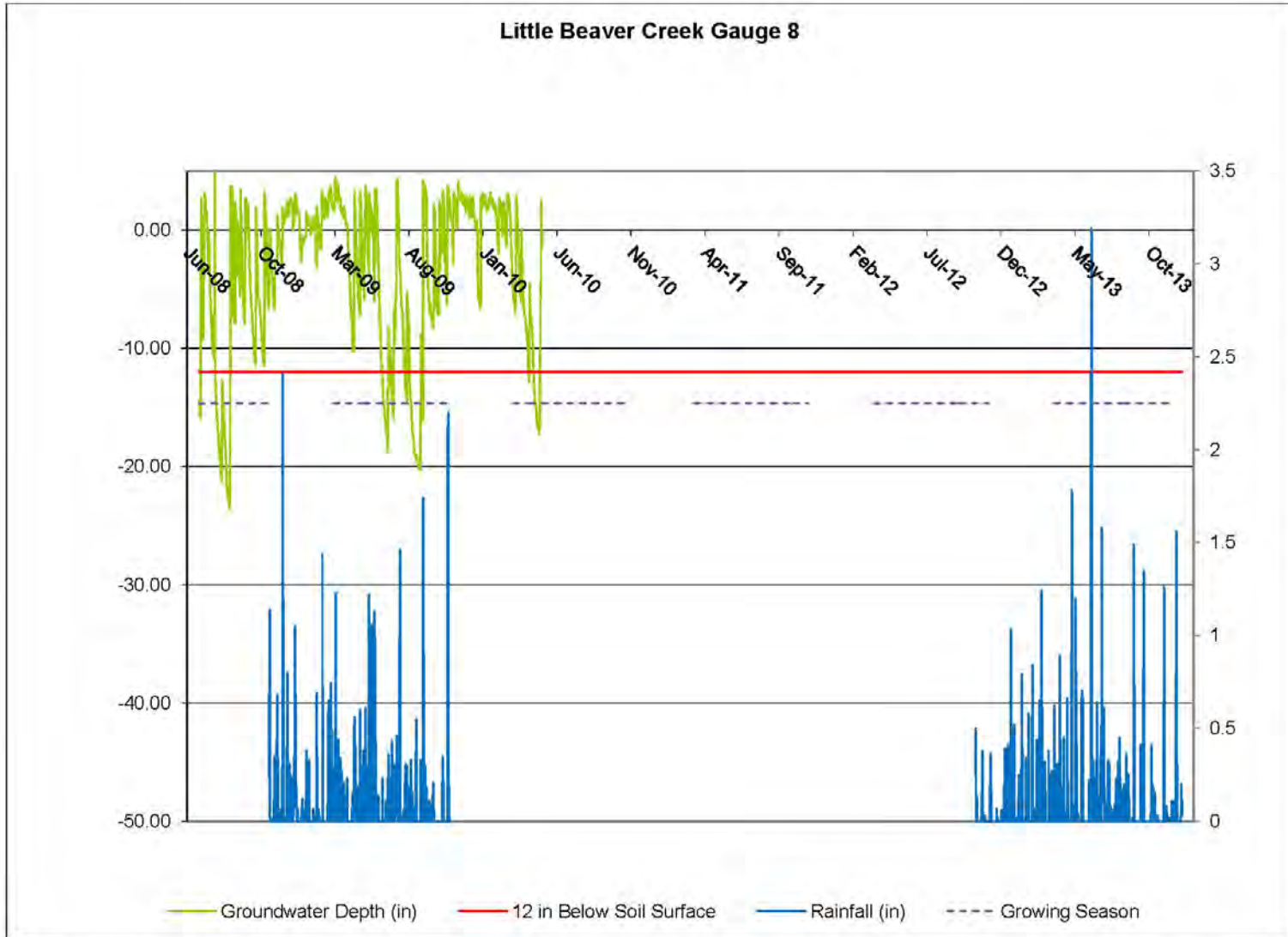
Growing Season: March 25 to November 10 (230 days)
<http://agacis.rcc-acis.org/37183/wets/results>

Rain Data: Station Apex
<http://www.nc-climate.ncsu.edu/services/request.php>



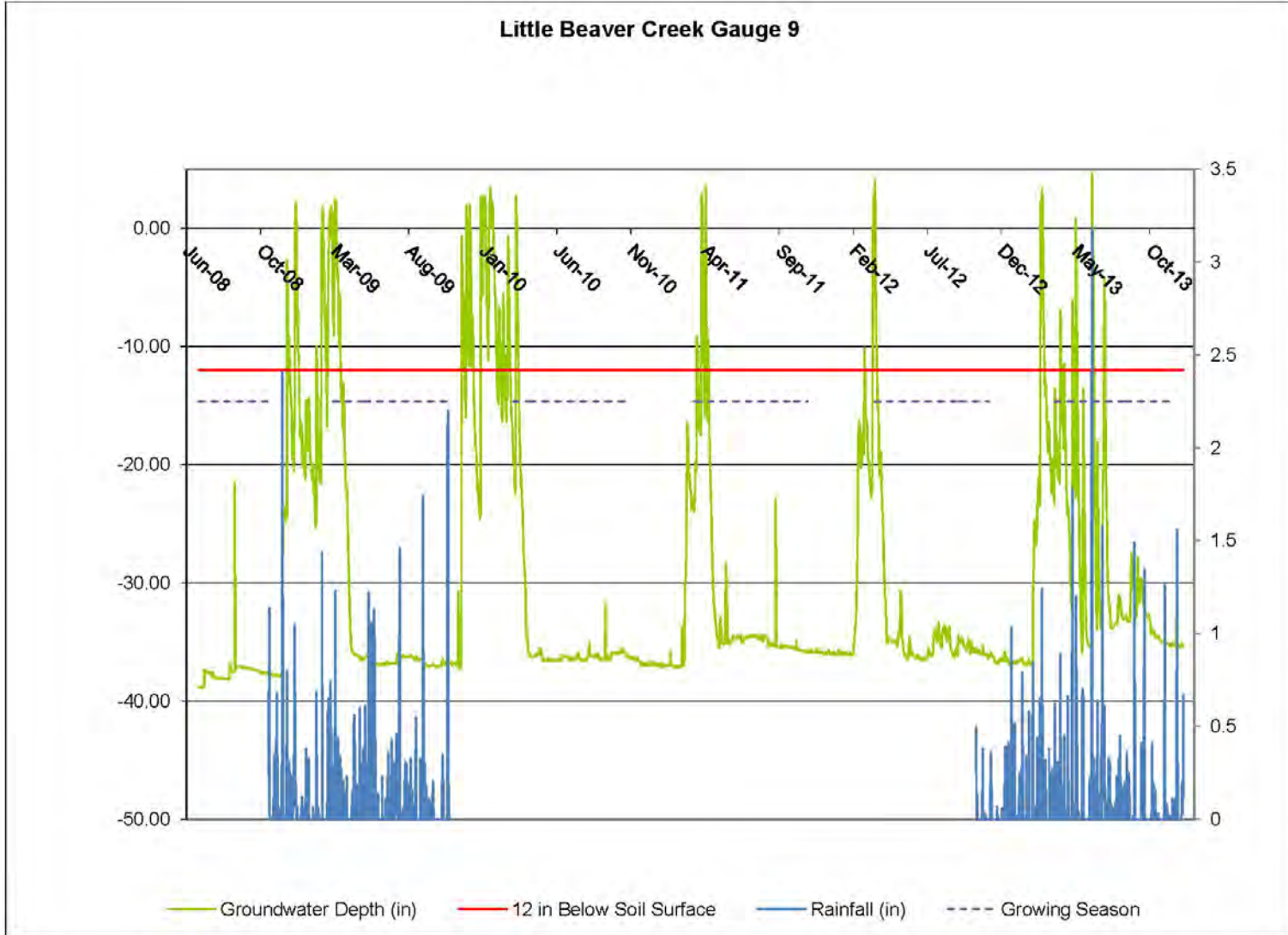
Growing Season: March 25 to November 10 (230 days)
<http://agacis.rcc-acis.org/37183/wets/results>

Rain Data: Station Apex
<http://www.nc-climate.ncsu.edu/services/request.php>



Growing Season: March 25 to November 10 (230 days)
 (<http://agacis.rcc-acis.org/37183/wets/results>)

Rain Data: Station Apex
 (<http://www.nc-climate.ncsu.edu/services/request.php>)



Growing Season: March 25 to November 10 (230 days)
<http://agacis.rcc-acis.org/37183/wets/results>

Rain Data: Station Apex
<http://www.nc-climate.ncsu.edu/services/request.php>

Table 13. Wetland Hydrology Criteria Attainment.

Summary of Groundwater Gauge Results for Years 1 through 4

Gauge #	2007 (MY1)			2008 (MY2)			2009 (MY3)			2013(MY4)		
	Max # Consecutive Days	% Growing Season	Success Criteria Attained	Max # Consecutive Days	% Growing Season	Success Criteria Attained	Max # Consecutive Days	% Growing Season	Success Criteria Attained	Max # Consecutive Days	% Growing Season	Success Criteria Attained
2		*			*		*	*	*	0	0	No
3		*			*		*	*	*		N/A	
4		*			*		*	*	*		N/A	
5		*			*		*	*	*		N/A	
6	28	12%	Yes		N/A		35	15%	Yes	21	9%	Yes
7	>29	>12.5%	Yes	65	28%	Yes	81	35%	Yes		N/A	
8	>29	>12.5	Yes	75	33%	Yes	99	43%	Yes		N/A	
9			No		N/A		15	7%	Yes	5	2%	No

* - Gauge installed 1/15/10, incomplete growing season

N/A – insufficient data or data not available due to gauge failure or battery exhaustion

Appendix F
2013 Supplemental Monitoring Report

**Little Beaver Creek (EEP #221)
Stream and Wetland Restoration Site
2013 Supplemental Monitoring Report**

**Wake County
EEP Project No. 221
Design Firm: Earthtech
Construction Completed 2005
Construction Repairs Completed May 2013**



July 26, 2013

Prepared for:



**NCDENR/ Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652**

Prepared by:



**Ward Consulting Engineers
4805 Green Road, Suite 100
Raleigh, North Carolina 27616-2848**

and



**The Catena Group
410-B Millstone Dr.
Hillsborough, NC 27278**

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FILES ON ATTACHED CD

Supplemental Monitoring Report Amendment- Word and PDF
Little Beaver Repair Construction Drawings -AutoCAD
As-built Drawings for the 2013 repairs PDF &AutoCAD
Vegetation Plot Data- Excel
Table7-Excel
Little Beaver Scanned CVS forms
Re-surveyed Cross Section#8, 7-2013 - Excel
Pictures
 Site Visit 7-Feb-2011
 Site Visit 21- Apr-2011
 Site Visit 21-Sep-2011
 Vegetation Plot Pictures 2013
 Construction Pictures

Little Beaver Creek Repairs Supplemental Monitoring Report

Inventory and description of Channel Repairs:

The Little Beaver Creek Restoration Project is a stream restoration project located four (4) miles southwest from the center of Apex in Wake County, NC constructed for the North Carolina Ecosystem Enhancement Program (NCEEP). It consisted of spot repairs along 1575 linear feet of constructed channel, installation of constructed riffles, unwanted/invasive treatment within the conservation easement, pine thinning, removal of selected boulders on existing structures and supplemental planting. The spot repairs included bank reshaping and brush toe stabilization. Constructed riffle in-stream structures were added in three locations. The stream repairs were limited to the length of stream from station 23+75 to 39+ 50. Construction began on the repairs January 14, 2013 and the construction was accepted on May 6, 2013.

A description of stream bank and channel repairs is listed as follows by station.

1. Constructed riffle installed Station 23+86 to 24+12
2. Bank repair right 24+30 hole filled and matted
3. Bank repair right 24+52 to 24+78 graded and some rock added to toe after soil lost in a large rain event after construction.
4. Bank graded and brush toe added to right bank station 26+42 to 27+08. One boulder taken off structures at 27+55 and two boulders from structure at 27+75 used in the repair.
5. Bank re-graded 27+60 to 27+75 and two boulders removed from upstream structure.
6. Graded bank 27+95 to 28+18 right and removal of former beaver dam remnant debris.
7. Brush toe from 28+45 to 28+75 to repair large channel blow out bank left.
8. Class B stone added below structure at 28+80
9. Bank Rt. graded from 29+25 to 29+41 and 5 boulders added to the toe for reinforcement from structure at 29+45 where the boulders were removed.
10. Graded bank left from 29+58 to 29+72 and matted.
11. Constructed riffle added 29+92 to 30+26 and right bank graded and matted.
12. Graded bank left and matted 30+86 to 31+06
13. Graded bank right and rock toe added 31+33 to 31+53. Four boulders used removed from structure at 31+60.
14. Graded bank right with rock toe added 31+92 to 32+12. Three boulders used from structure at 32+00.
15. Proposed riffle at station 32+80 to 33+05 not constructed. The stream in this area had filled in with stone and had formed a riffle the banks in the area were stable. No work in this area was needed.
16. One boulder was removed from the structure at 33+60
17. Constructed riffle added 37+85 to 38+18. Broad and deep blow out area. Banks reconstructed and one large boulder and two small added from structure at 37+30 due to the riffle due the extreme depth of the void.

18. Graded bank at 39+02 – smaller riprap used for the rock at toe due to the presence of saprolite in the area.

Repairs beyond the stream channel included the following:

1. Conservation easement markers were added along the entire easement.
2. A trash rack was added to the pond outlet adjacent to stream station 26+50
3. The farm access road was relocated outside of the conservation easement north of stream station 25+00 through 28+00
4. Pine and Sweet gum thinning was performed within the 50 foot buffer for a depth of 40 feet. The first ten feet from the top of the existing bank was not thinned.
5. Supplemental planting was completed in accordance with the construction plans. The attached Record drawings show on the cover sheet the total number of plant stems and species planted for the repair project.

No site benchmarks were available for horizontal and vertical control for subsequent monitoring years after the base line data collection. The horizontal and vertical data was generated from data obtained from the original construction plans and the base line data. This information particularly the horizontal alignment was manually adjusted to fit with the construction plan alignment for MY02 and MY03. With the repairs that were conducted in 2013, four (4) benchmarks were set by the surveyor (5/8” rebar with cap) so that future monitoring could be tied to surveyed control points at the project site. It is anticipated that the horizontal and vertical alignment for the new monitoring year based on the surveyed benchmarks will have differences from the MY-03 data. The new monitoring year should be held as the correct data and the previous monitoring year data should be adjusted to it. The benchmarks are listed in the table below and on the cover sheet of the as-built drawings prepared by NorthState Environmental on the attached CD, horizontal datum NAD83(2011) and vertical datum NAVD88.

Control Point Number	Northing	Easting	Elevation	Description
1	707947.7075	2022618.550	279.22	CP1 (5/8” rebar w/cap)
2	708073.103	2023184.7705	282.33	CP2 (5/8” rebar w/cap)
3	708341.450	2024018.2505	288.97	CP3 (5/8” rebar w/cap)
4	708438.089	2024471.301	289.66	CP4 (5/8” rebar w/cap)

Credit Adjustment Resulting from the Repairs:

The repairs consisted of spot repairs and no adjustment was made to the channel alignment. Therefore no credit adjustments are needed for the Little Beaver Repairs conducted in 2013.

Updated Tables II and III

Table II – Project Activity and Reporting History

Table 2. Project Activity and Reporting History Little Beaver Creek Stream and Wetland Restoration Site-Project No. 221			
Activity or Reporting	Scheduled Completion	Data Collection Complete	Actual Completion Date
Restoration Plan	2003	2003	March 2003
Final Design-90%	2005	2005	2005
Construction	2005	2005	November 2005
Temporary S&E mix applied to entire project area	2005	2005	2005
Permanent seed mix applied to entire project area	2005	2005	2005
Containerized, B&B, and live stake planting	January 2007	February 2007	February 2007
Mitigation Plan/As-built (Year 0 Monitoring-baseline)	July 2006	March 2006	February 2007
Year 1 Monitoring	Fall 2006	February 2007	November 2007
Year 2 Monitoring	December 2008	Fall 2008	December 2008
Year 3 Monitoring	December 2009*	May 2010*	May 2010*
Year 4 Monitoring	NA	NA	NA
Year 5 Monitoring	NA	NA	NA
Stream Spot repairs, pine & sweet gum thinning, removal of selected boulders on existing structures, addition of constructed riffles and supplemental planting	NA	NA	May 6, 2013

* Postponed due to Scoped Re-grading Activities

Table III – Project Contacts

Table 3. Project Contacts Table Little Beaver Creek Stream and Wetland Restoration Site-Project No. 221	
Designer POC	Earth Tech 701 Corporate Center Drive Suite 475 Raleigh, NC 27607 Bill Jenkins PE (919) 854-6200
Designer Repairs	Ward Consulting Engineers, PC 4805 Green Road Suite 100 Raleigh NC 27616
Construction Contractor Original Construction	Envirocon, Inc. 651 Corporate Circle Suite 114 Golden, CO 80401 Verne Musser (303) 215-0187
Construction Contractor Repairs 2013	NorthState Environmental 2889 Lowery Street, Winston-Salem, NC 27101 (336) 725-2010
Planting Contractor POC	Seal Brothers 131 West Cleve St. Mt. Airy, NC 27030 Brain Seal (336) 786-2263
Planting Contractor Repairs	NorthState Environmental 2889 Lowery Street, Winston-Salem, NC 27101 (336) 725-2010
Seeding Contractor POC	Seal Brothers 131 West Cleve St. Mt. Airy, NC 27030 Brain Seal (336) 786-2263

Repairs Seeding Contractor	NorthState Environmental 2889 Lowery Street, Winston-Salem, NC 27101 (336) 725-2010
Seed Mix Sources	Evergreen Seeding 4792 Rawls Church Rd. Fuquay-Varina, NC 27526
Seed Mix Source Repairs	Green Resources PO Box 429 Colfax, NC 27235
Nursery Stock Suppliers	Mellow March Farm 1312 Woody Store Rd. Siler City, NC 27344 (919) 742-1200
Bare Root Tree Supplier- Repairs	Dykes and Sons Nursery 825 Maude Etter Road McMinnville, TN 37110
Container Plant Supplier- Repairs	Native Roots Nursery 106 Reynard Path Clinton, NC 28328
Live stake, whips, and container plants supplier-Repairs	Mellow Marsh Farms 1312 Woody Store Road Siler City, NC 27344
Monitoring Performers Repairs	Ward Consulting Engineers and The Catena Group
Stream Monitoring Repairs	Ward Consulting Engineers 4805 Green Road Raleigh, North Carolina 27616
Vegetation Monitoring Repairs	The Catena Group 410-B Millstone Drive Hillsborough, NC 27278
Wetland Monitoring	N/A

Stream Centerline

No changes to the stream alignment were made with the repairs therefore the centerline station of the stream was not re-surveyed.

Longitudinal Profile

For the Little Beaver Repair plans the MY-03 longitudinal survey was used for the base plans for the repair project. Additional survey information was collected at the same time to further define the existing top of bank and toe information for the repairs. The Little Beaver Creek Repairs consisted of spot repairs in the channel. A longitudinal profile was not conducted after the repairs. At three locations constructed riffles were installed for vertical control at stations 23+90, 30+90, and 37+95. The as-built elevations of the constructed riffles are included in the as-built drawings prepared by NorthState Environmental included on the CD. The Little Beaver Repair AutoCAD drawing files are also included on the attached CD.

Cross Sections

Eight monitoring cross sections are located on Little Beaver Creek and two on the tributary in the upper reach of the project. The section end pins were all located or re-set after the construction was completed. The end pins were re-marked with wooden stakes, yellow or green fiberglass poles, and pink flagging for future location. The surveyor additionally located 8 of the cross section re-bar end pins as a part of the as-built drawings. The coordinates for the pins are shown in the following table and in the control point data table on page 1 of the as-built drawings surveyed by North State Environmental.

Longitudinal Station	Control Point Number	Monitoring Cross-section	Pin Location	Northing	Easting	Elevation
XS2 RP	6	T2-Tributary	Left	708389.955	2024236.550	289.15
XS3 RP	5	3	Right	708242.672	2023909.110	286.27
XS4 RP	7	4	Right	708202.546	2023642.500	283.80
XS5 RP	10	5	Right	708087.758	2023251.487	282.84
XS6 RP	9	6	Right	708024.332	2022931.379	280.88
XS6 LP	11	6	Left	707910.895	2023083.312	280.67
XS7 RP	8	7	Right	708011.763	2022718.130	279.70
XS7 LP	12	7	Left	707849.275	2022816.980	278.07

Note: 1. Cross sections included in the table are located on Little Beaver Creek unless otherwise noted that they are on a tributary of Little Beaver Creek.
2. Clarification/Corrections to the as-built table are shown in red.

Cross section #8 on Little Beaver Creek was the only cross section in which an end pin had to be reset. The left bank pin was re-set and the cross section was resurveyed in July of 2013. The surveyed cross section station and elevations for cross section #8 is included in the excel file titled Re-surveyed Cross Section #8, 7-2013 on the attached CD.

Vegetation Plots

As a result of the stream repairs in 2013, the eight vegetation monitoring plots (Plot #'s 2, 5, 7, 8, 9, 10, 11, and 14) received supplemental plantings in March 2013. Previous to re-grading, the vegetation monitoring plots were located and flagged to avoid removal of planted stems. Re-grading only occurred in plots 8 and 10. A cut stump herbicidal treatment method was employed on the Loblolly pine and Sweetgum saplings throughout the conservation easement altering Plots 5, 7, 11, and 14. Vegetation plot 2 remained relatively intact with the addition of two planted river birch. On March 22, 2013, the vegetation data was collected for all planted and natural stems in accordance with Level II of the CVS–EEP Protocol for Recording Vegetation (Lee et al. 2008). Data collected for these plots are included in files located on the attached CD. Invasive exotic vegetation was observed during the site assessment but is not expected to affect project success.

Vegetation plot corner locations were surveyed by North State Environmental and included in a table on the cover sheet of the as-built plans. The table on the as-built plan has been reproduced below. The point numbers correspond to survey points in the as-built survey.

Point	Northing	Easting	Elevation	Description
3007	707988.15	2022747.65	280.1	VP14-IP
3008	707957.25	2022756.85	277.9	VP14-IP
3009	707968.06	2022787.62	280.2	VP14-IP
3010	707999.86	2022778.24	280.4	VP14-IP
3011	708088.32	2023261.81	283.5	VP10-IP
3012	708049.37	2023265.03	280.4	VP10- (IP MISSING)
3013	708059.42	2023298.48	281.1	VP10-IP
3014	708091.82	2023294.39	284.1	VP10-IP

3015	708120.90	2023518.61	283.1	VP8-(IP MISSING)
3016	708110.01	2023549.24	283.0	VP8-(IP MISSING)
3017	708141.07	2023561.66	285.3	VP8-IP
3018	708154.19	2023531.61	285.4	VP8-IP
3019	708560.48	2024624.80	291.6	VP2-(IP MISSING)
3020	708596.80	2024628.17	292.4	VP2-IP
3021	708593.78	2024661.06	293.2	VP2-IP
3022	708561.45	2024657.69	292.2	VP2-IP
3023	708324.12	2024145.21	285.1	VP5-IP
3024	708293.60	2024155.56	288.6	VP5-IP
3025	708303.69	2024186.62	288.8	VP5-IP
3026	708334.42	2024176.32	285.3	VP5-IP
3037	708158.20	2023733.51	284.1	VP7-(IP MISSING)
3038	708142.81	2023762.11	287.0	VP7-IP
3039	708129.36	2023718.05	286.8	VP7-IP
3040	708114.05	2023746.70	286.5	VP7-IP
3042	708017.54	2023430.69	282.5	VP9-IP
3043	708048.96	2023422.48	282.4	VP9-IP
3044	708041.27	2023390.55	281.7	VP9-IP
3045	708009.57	2023398.76	282.1	VP9-IP
3046	708006.38	2023200.12	280.6	VP11-IP
3047	708001.85	2023167.11	280.5	VP11-IP
3048	707965.23	2023172.88	279.8	VP11-(IP MISSING)
3049	707974.03	2023204.54	280.1	VP11-IP

The plants installed for the repair project are listed on the cover sheet of the record drawings included on the attached CD.

Wetlands

No supplemental wetland data was collected for this report. The most recent delineation of the project wetlands was included on the Little Beaver Creek Repairs construction plans included on the attached CD.

Data Submittal:

A CD has been included with this submittal that includes the data listed in the table of Contents of this report.