

**UT to South Fork Creek (Stephens)
Stream and Wetland Restoration Project
Alamance County, North Carolina
EEP Project #405
Contract #D09079s**



MY-06 Monitoring Report



Prepared for:
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**UT to South Fork Creek
Stream and Wetland Restoration
EEP Project #405
Liberty, North Carolina
Alamance County**

**MY-06 Monitoring Report
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TABLE OF CONTENTS

I.	Executive Summary.....	1
II.	Methodology	3
III.	References	3

APPENDICES

Appendix A.	Project Vicinity Map and Background Tables.....	4
	Figure 1a. Vicinity Map.....	5
	Table 1a. Project Components	6
	Table 1b. Component Summations.....	6
	Table 2. Project Activity and Reporting History.....	7
	Table 3. Project Contacts Table.....	8
	Table 4. Project Attribute Table	9
Appendix B.	Visual Assessment Data	10
	Figure 2. Consolidated Current Conditions Plan View	11
	Figure 3. Monitoring Features and Maintenance.....	12
	Table 5. Visual Stream Morphology Assessment Table	13
	Table 6. Vegetation Condition Assessment Table	26
	Photos 1-9. Stream Station Photos.....	17
	Photos 10-16. Vegetation Monitoring Plots Photos	22
Appendix C.	Vegetation Plot Data.....	25
	Table 7. Vegetation Plot Criteria Attainment	26
	Table 8. CVS Vegetation Plot Metadata.....	27
	Table 9. CVS Planted and Total Stem Counts	28
Appendix D.	Stream Survey Data.....	30
	Figure 4-9. Cross-Sections	31
	Figure 10. Longitudinal Profile	40
	Figure 11-16. Pebble Count Plots	43
	Table 10a. Baseline Stream Data Summary	47
	Table 10b. Baseline Stream Data Summary	50
	Table 11a. Dimensional Morphology Summary	51
	Table 11b. Stream Reach Data Summary.....	52
Appendix E.	Hydrologic Data.....	55
	Table 12. Verification of Bankfull Events.....	56
	Table 13. Wetland Criteria Attainment	56
	Photo 17. Bankfull Indicator.....	56
	Figures 17-20. Groundwater Monitoring Gauge Hydrographs	57

I. Executive Summary

The UT to South Fork Creek (Stephens) (UTSFC) stream and wetland restoration project comprises 3943 linear feet of stream restoration with approximately 0.77 acre of wetland restoration and 0.14 acre of wetland enhancement. Site construction was completed June 2007 and plantings were completed in December 2007. This report represents the 5th consecutive year monitoring data collection. An integrated Baseline /Monitoring Year 1 Report year was combined as one report and submitted in May 2010, which contains only stream and vegetation baseline data. The monitoring year two report was submitted separately in May 2010, but contains monitoring year 1 stream and vegetation data. The monitoring year three report contains monitoring year two data, and this year's monitoring year six report contains monitoring year five data. The report title year only represents the post construction year as opposed to the post construction data collection year. The project is within USGS Hydrologic Cataloging Unit (HUC) 03030002050050 (NCDWQ sub basin 03-06-04) of the Cape Fear River Basin. This HUC has been identified as a Targeted Local Watershed (TLW) by EEP's *Cape Fear River Basin Priorities Plan 2009*. The project is in Alamance County, approximately eight miles north of Siler City and one mile west of Snow Camp Road (SR 1004). The goals and objectives for UT to South Fork Creek (Stephens) stream restoration are:

Project Goals:

- Improving water quality to the receiving watershed through:
 - Cattle exclusion from the easement
 - Planting a native riparian buffer
 - Reduction of bank derived sediment losses through stabilization via:
 - Construction of a channel with a stable dimension, pattern and profile
 - Protection of banks from hoof shear
 - Integration of a stabilizing root mass as part of planting a native riparian buffer
- Providing wildlife habitat through the creation of a riparian zone
- Improving aquatic habitat with the use of natural material stabilization structures and a riparian buffer

- Increasing stream access to the floodplain
- Reducing erosion and sedimentation

Priority I and II stream restoration was performed along 4181 lf of UTSFC, including 2 cattle crossings exclusions and a 148 lf road crossing exclusion. Stream preservation of 2764 lf of a perennial unnamed tributary (UT) to UTSFC was obtained by establishing cattle fencing along the existing stream buffer. In the floodplain of UTSFC, 0.77 acre of riparian wetlands was restored. An additional 0.14 acre of riparian wetlands was enhanced. The stream is divided into three reaches A (Sta 6+00 – 18+75), B (Sta 18+75 – 25+00), and C (Sta 29+00 – 40+00 for monitoring purposes (Figure 2).

Currently the vegetation success criteria for the project site are being met. Seven vegetation plots were monitored using Version 4.2 of the CVS-EEP vegetation monitoring protocol. The average stem density for the project site is 1,908 stems/acre including live stakes, planted stems, and natural stems. Counting only planted stems and excluding live takes, the average stem density for the project site is 358 stems/acre. The success criterion for planted woody species is 320 stems/acre after MY-03. A mortality rate of ten percent will be allowed after MY-04 (288 stems/acre), with another ten percent allowed after MY-05 (260 stems/acre). Plots 4, 5, and 6 stem densities were below the 260 planted stems/acre threshold, but the total stems/acre of desirable species far exceeded the stems/acre threshold. Since these same vegetation plots met the success criteria for total stems, this is a reflection of high recruitment of natural volunteer species. Supplemental plantings were conducted during the 2012 monitoring period to address areas of low stem densities identified in 2011.

The vegetation problem areas are small and consist of some areas with low planted stem densities and some areas of invasive exotic plants. Treatment and removal of targeted invasive exotic plants within the project area was conducted in 2010 and 2011 with the last treatments conducted in October 2011. Currently the invasives are in a manageable state and will be monitored to determine if further control measures will be necessary. Invasive exotic species observed throughout the conservation easement include multiflora rose (*Rosa multiflora*), Japanese honeysuckle (*Lonicera japonica*), Japanese stilt grass (*Microstegium vimineum*), Chinese privet (*Ligustrum sinense*), and tree of heaven (*Ailanthus altissima*). Some living individuals of multiflora rose and Chinese privet were observed scattered within Reach C. Some young individuals of tree of heaven were observed in the vicinity of the road crossing towards the center of the site. One area of Japanese honeysuckle was observed in Reach C. Japanese stilt grass is present throughout Reach A and B. 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 prior to construction. Supplemental planting of the conservation easement was completed on February 2, 2012.

Six riparian wetlands occur within the conservation easement totaling 0.91 acre. Wetlands 2-6, totaling 0.77 acres, are restored wetlands residing in the pre-construction channel alignment with each containing a groundwater monitoring gauge. Wetland 1, totaling 0.14 acres, is an enhanced wetland with one reference groundwater monitoring gauge. Groundwater levels are monitored to determine if levels are within 12 inches of the soil surface for at least 12% of the growing season. These areas will be considered wetlands if the groundwater is within 12 inches for at least 12% of the growing season, and the area supports hydrophytic vegetation, and meets the hydric soil requirements. According to the wetland groundwater gauges on site for MY-06, gauges 1, 2, 3, and 5 met wetland hydrology requirements (Appendix E), while Gauge 4 was unable to be located after multiple attempts using the supplied GPS coordinates and a metal detector. Wetland soils were observed within wetlands meeting the wetland hydrology success criteria based on the F3 hydric soil indicator. Wetland plants such as common rush (*Juncus effusus*), smartweed (*Polygonum* sp.), and various wetland sedges (*Carex* sp.) were also observed within these wetland areas.

Overall, the stream is stable and functioning as designed. There has been little change in the stream pattern, profile or dimension between MY-05 and the present monitoring year. Vegetation within the channel bottom continues to be present in all of Reach A and the upper portions of Reach B & C. All pebble counts within the site show little change and remain consistent with previous pebble counts.

The bedform features of the entire stream have remained consistent as compared to the previous year's monitoring data, with little change to pattern, profile or dimension. Comparison of the cross-sections in Reaches A and B show little change in geometry between MY-05 and MY-06 and are overall stable with the exception of cross-sections 3 and 4. These cross-sections are showing a slight change in geometry, as both are trending wider and deeper as compared to previous years.

Bank erosion problems are not evident anywhere along the site. Previously reported bank erosion areas have stabilized as woody stem vegetation has grown on these banks. No further erosion was observed in these previous bank erosion areas.

Summary information/data related to the occurrence of items such as beaver 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 Baseline Monitoring Report (formerly Mitigation Plan) and in the Mitigation Plan (formerly Restoration Plan) documents available on EEP's website. All raw data supporting the tables and figures in the appendices are available from EEP upon request.

II. Methodology

Methodologies follow EEP monitoring report template Version 1.3 (1/15/2010) and guidelines (Lee et al 2008). Photos were taken with a digital camera. A Trimble Geo XT handheld unit with sub-meter accuracy was used to collect groundwater gauge locations, vegetation monitoring plot origins, and problem area locations. Cross-sectional and longitudinal surveys were conducted using survey grade GPS equipment. Reports were then generated to display summaries of the stream survey.

A. Vegetation Methodologies

Level II of the EEP/CVS protocol Version 4.2 was used to collect data for MY-06, which includes natural stems. Data collection for these plots was conducted on July 29, 2013 (Appendix C).

B. Wetland Methodologies

Five RDS groundwater monitoring gauges (1-5) were downloaded bi-monthly to ensure proper function throughout the growing season. Data is provided in an Excel spreadsheet along with incorporation of local rainfall data provided by the State Climate Office.

C. Stream Methodologies

Stream profile and cross-sections were surveyed survey grade GPS equipment and methods. The longitudinal profile was generated using the MY-00 alignment. Cross-sectional data was extracted based on a linear alignment between the end pins. Cross-section bankfull elevations for yearly comparisons are based on the baseline bankfull elevation established for each cross-section. Data collection for the stream data was conducted on December 12, 2013.

III. References

Lee, Michael T. Peet, Robert K. Roberts, Steven D., Wentworth, Thomas R. (2008). *CVS-EEP Protocol for Recording Vegetation Version 4.2*.

Weakley, Alan (2007). *Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas*.
<http://www.herbarium.unc.edu/flora.htm>.

Wolman, M.G., 1954. A Method of Sampling Coarse River-Bed Material, *Transactions of American Geophysical Union* 35:951-956.

Appendix 1. Project Vicinity Map and Background Tables

Figure 1. Vicinity Map

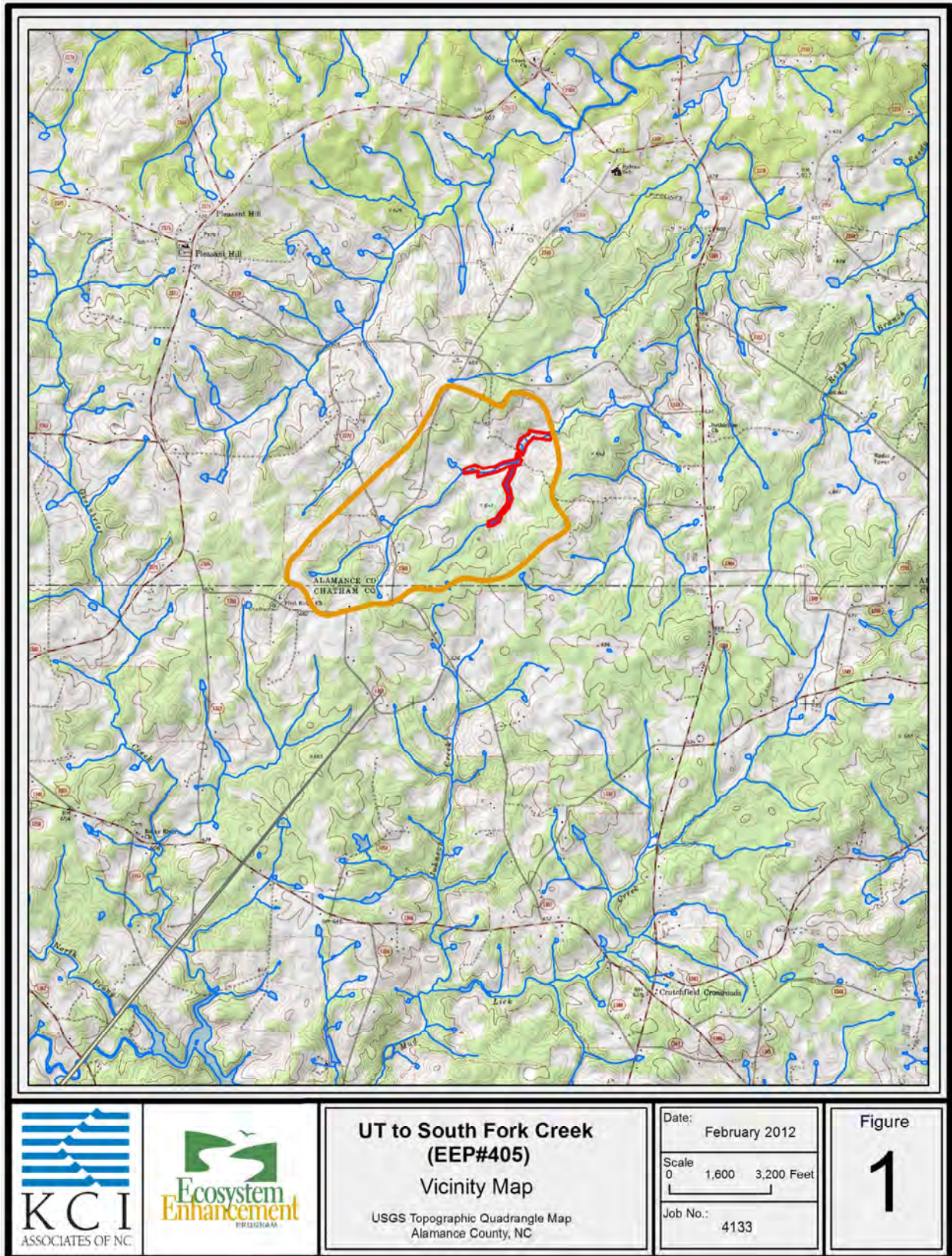


Table 1a. Project Components UT to South Fork Creek (Stephens) No. 405									
Project Component or Reach ID	Existing Feet/Acres	Restoration Level	Approach	Footage or Acreage	Stationing	Mitigation Ratio	Mitigation Units	BMP Elements 1	Comment
UT to South Fork Creek	735	R	P2	690 lf	0+30 – 7+50	1:1	690		Instream Structure and Vegetated Buffers
UT to South Fork Creek	1430	R	P1	1420 lf	7+50 – 21+70	1:1	1420		
UT to South Fork Creek	1917	R	P2	1833 lf	23+18 – 41+81	1:1	1833		
UT to UTSSFC	2764	P	Cattle Fencing	2734 lf	0+00 – 27+64	5:1	547		Cattle Fence Installed
Wetlands	0.77	R	Water table restored	0.77 Ac	0+00 – 15+50	1:1	0.77		Pre-construction channel location
Wetlands	0.14	E	Hardwood Plantings	0.14	13+00	2:1	0.07		Pre-construction wetland

1 = BR = Bioretention Cell; SF = Sand Filter; SW = Stormwater Wetland; WDP = Wet Detention Pond; DDP = Dry Detention Pond; FS = Filter Strip; Grassed Swale = S; LS = Level Spreader; NI = Natural Infiltration Area, O = Other; CF = Cattle Fencing; WS = Watering System; CH = Livestock Housing
 Cattle Crossings at Sta 0+00 to 0+30, Sta 6+00 to 6+30, Sta 28+85 to 29+15. 30 LF stream crossing on Preservation Reach of UT to UTSSFC
 Road Crossing at Sta 21+70 to 23+18
 Stream crossing lengths are not included in Mitigation Unit calculated values

Table 1b. Component Summations UT to South Fork Creek (Stephens) No. 405							
Restoration Level	Stream (lf)	Riparian Wetland (Ac)		Non-Riparian (Ac)	Upland (Ac)	Buffer (Ac)	BMP
		Riverine	Non-Riverine				
Restoration	3943	0.77					
Enhancement		0.14					
Enhancement I							
Enhancement II							
Creation							
Preservation	2734						
HQ Preservation							
		0.91					
Totals (Feet/Acres)	6677	0.91		0	0		
MU Totals	4490	0.84		0	0		

**Table 2. Project Activity and Reporting History
UT to South Fork Creek (Stephens) No. 405**

Elapsed Time Since Grading Complete: 6 yrs 6 months

Elapsed Time Since Planting Complete: 6 yrs 1 Months

Number of Reporting Years¹: 5

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Restoration Plan	N/A	Sep-04
Final Design – 90%	N/A	N/A
Construction	N/A	June-07
Temporary S&E mix applied to entire project area	N/A	June-07
Permanent seed mix applied to entire project area	N/A	June-07
Containerized, B&B, and livestake planting	N/A	Dec-07
Monitoring Baseline Year 0/1	Apr-09	June-09
Year 2 Monitoring	Nov-09	Dec-09
Invasives treatment #1	N/A	May-10
Invasives treatment #2	N/A	Oct-10
Year 3 Monitoring	Sep-10	Dec-10
Invasives treatment #3	N/A	Apr-11
Invasives treatment #4	N/A	Oct-11
Year 4 Monitoring	Oct-11	Feb-12
Supplemental Planting	N/A	Feb-12
Year 5 Monitoring	Oct-12	Nov-12
Year 6 Monitoring	Dec-13	Jan-14

¹ = Equals the number of reports or data points produced excluding the baseline

Table 3. Project Contacts Table UT to South Fork Creek (Stephens) No. 405	
Designer Primary project design POC	Dewberry & Dais, Inc. 2301 Rexwoods Dr., Ste. 200 Raleigh, NC, 27607-3366 Ph: 919-881-9939
Construction Contractor Construction contractor POC	N/A
Survey Contractor Survey contractor POC	N/A
Planting Contractor Planting contractor POC	N/A
Seeding Contractor Contractor point of contact	N/A
Seed Mix Sources	N/A
Nursery Stock Suppliers	Coastal Plain Conservation Nursery, Inc. Ph: 252-482-5707
Monitoring Years 1-5 Performers	Ward Consulting Engineers, P.C. 8368 Six Forks Road Suite 104 Raleigh, NC 27615-5083
Stream Monitoring POC	Becky Ward 919-870-0526
Vegetation Monitoring POC	Chris Sheats - The Catena Group - 919-732-1300
Wetland Monitoring POC	Chris Sheats - The Catena Group - 919-732-1300
Monitoring Year 6 Performers	KCI Associates of North Carolina, PA Landmark Center II, Suite 220 4601 Six Forks Road Raleigh, NC 27609 Phone: (919) 278-2514 POC: Adam Spiller

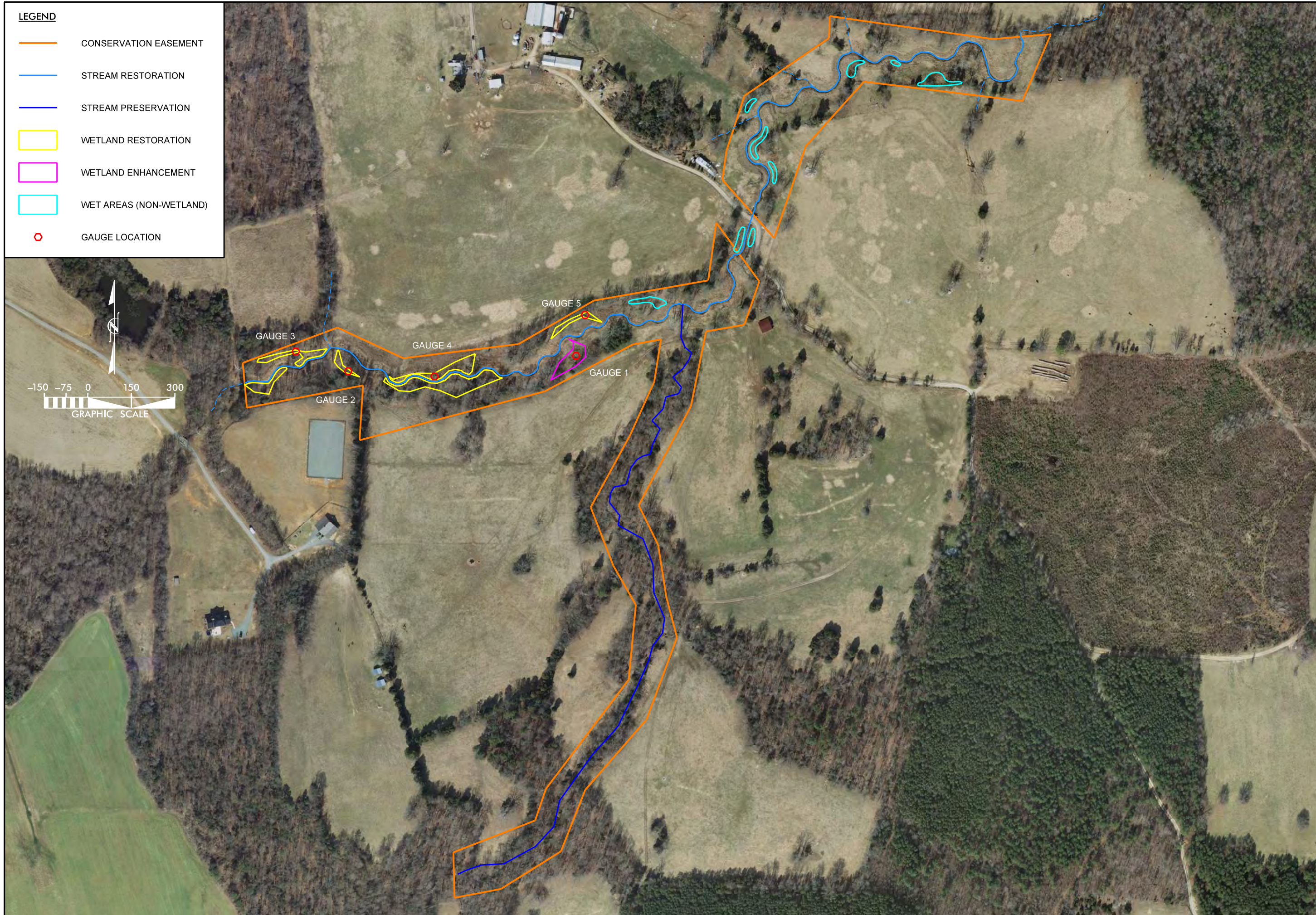
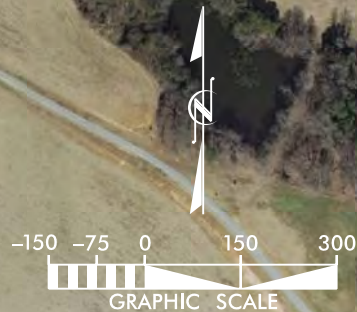
Table 4. Project Attribute Table UT to South Fork Creek (Stephens) No. 405	
Project County	Alamance
Physiographic Region	Piedmont
Ecoregion	Carolina Slate Belt
Project River Basin	Cape Fear River Basin
USGS HUC for Project (14 digit)	3030002050050
NCDWQ Sub-basin for Project	03-06-04
Within extent of EEP Watershed Plan?	Cape Fear River Basin Priorities Plan 2009
WRC Hab Class (Warm, Cool, Cold)	
% of project easement fenced or demarcated	100%
Beaver activity observed during design phase?	U
Restoration Component Attribute Table	
Drainage area	1.33 sq mi
Stream order	2nd
Restored length (feet)	4003
Perennial or Intermittent	Perennial
Watershed type (Rural, Urban, Developing etc.)	Rural
Watershed LULC Distribution (e.g.)	
Urban	51%
Ag-Row Crop	29%
Ag-Livestock	10%
Forested	7%
Water/Wetlands	3%
Watershed impervious cover (%)	<5%
NCDWQ AU/Index number	
NCDWQ classification	No classification; Haw River (C. NSW)
303d listed?	Yes
Upstream of a 303d listed segment?	Yes
Reasons for 303d listing or stressor	High pH
Total acreage of easement	22.58
Total vegetated acreage within the easement	21.86
Total planted acreage as part of the restoration	15.29
Rosgen classification of pre-existing	F4, G4c
Rosgen classification of As-built	E4
Valley type	-
Valley slope	-
Valley side slope range (e.g. 2-3. %)	-
Valley toe slope range (e.g. 2-3. %)	-
Cowardin classification	Riverine
Trout waters designation	-
Species of concern, endangered etc.? (Y/N)	Yes
Dominant soil series and characteristics	
Series	Herndon, Orange, Appling, and Colifax silty loams
Depth	-
Clay%	-
K	-
T	-

Use N/A for items that may not apply. Use "--" for items that are unavailable and "U" for items that are unknown

Appendix 2. Visual Assessment Data

LEGEND

-  CONSERVATION EASEMENT
-  STREAM RESTORATION
-  STREAM PRESERVATION
-  WETLAND RESTORATION
-  WETLAND ENHANCEMENT
-  WET AREAS (NON-WETLAND)
-  GAUGE LOCATION



SYL	DESCRIPTION	DATE



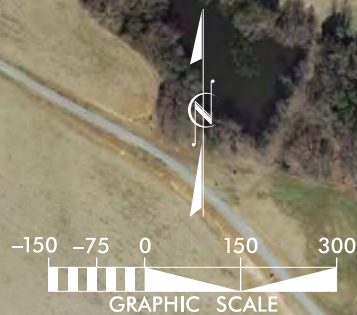
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 4601 SIX FORKS ROAD
 RALEIGH, NORTH CAROLINA 27609

**UT SOUTH FORK CREEK (STEPHENS)
 STREAM AND WETLAND
 RESTORATION PROJECT**
 LIBERTY, ALAMANCE COUNTY, NORTH CAROLINA

DATE: JAN 2014
 SCALE: GRAPHIC
 CURRENT
 CONDITION
 PLAN VIEW
 SHEET 1 OF 1

LEGEND

- CONSERVATION EASEMENT
- STREAM RESTORATION
- STREAM PRESERVATION
- SUPPLEMENTAL PLANTING (2012)
- CROSS-SECTION (XS)
- VEGETATION PLOT (VP)
- GAUGE LOCATION



SY#	DESCRIPTION	DATE



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 RALEIGH, NORTH CAROLINA 27609

**UT SOUTH FORK CREEK (STEPHENS)
 STREAM AND WETLAND
 RESTORATION PROJECT**
 LIBERTY, ALAMANCE COUNTY, NORTH CAROLINA

DATE: JAN 2014
 SCALE: GRAPHIC

**MONITORING
 FEATURES &
 MAINTENANCE**

Table 5 Visual Stream Morphology Stability Assessment
Reach ID Reach A (Sta. 6+00 – 18+75)
Assessed Length 1275 ft.

Major Channel Category	Channel Sub-Category	Metric	# Stable, Performing as Intended	Total # in As-built	# of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	# with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1. Vertical Stability (Rifle and Run units)	1. <u>Aggradation</u> – Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. <u>Degradation</u> – Evidence of downcutting			0	0	100%			
	2. Rifle Condition	1. <u>Texture/Substrate</u> Rifle maintains coarser substrate	5	12			42%			
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankful Depth \geq 1.6)	5	20			25%			
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream rifle and head of downstream rifle)	5	20			25%			
	4. Thalweg Position	1. Thalweg centering upstream of meander bend (Run)	32	32			100%			
2. Thalweg centering at downstream of meander (Glide)		31	31	100%						
Totals					0	0	100%			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%			
	3. Mass Wasting	Bank slumping, calving, or collapsing			0	0	100%			
Totals					0	0	100%			
3. Engineered Structures	1. Overall Integrity	Structure physically intact with no dislodged boulders or logs	2	3			66%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	1	1			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15% (see guidance for this table in EEP monitoring guidance document)	3	3			100%			
	4. Habitat	Pool forming structures maintain – Max Pool Depth : Mean Bankful Depth ratio \geq 1.6 Rootwads/logs providing some cover at base-flow	1	1			100%			

Table 5 Visual Stream Morphology Stability Assessment
Reach B (Sta. 18+75 – 25+00)
Assessed Length 625ft.

Major Channel Category	Channel Sub-Category	Metric	# Stable, Performing as Intended	Total # in As-built	# of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	# with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> – Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. <u>Degradation</u> – Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. <u>Texture/Substrate</u> Riffle maintains coarser substrate	0	6			0%			
		1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankful Depth ≥1.6)	4	14			29%			
	3. Meander Pool Condition	2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	4	14			29%			
		1. Thalweg centering upstream of meander bend (Run)	10	10			100%			
4. Thalweg Position	2. Thalweg centering at downstream of meander (Glide)	10	10			100%				
	Totals					0	0	100%		
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%			
	3. Mass Wasting	Bank slumping, calving, or collapsing			0	0	100%			
Totals					0	0	100%			
3. Engineered Structures	1. Overall Integrity	Structure physically intact with no dislodged boulders or logs	2	2			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	2	2			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15% (see guidance for this table in EEP monitoring guidance document)	2	2			100%			
	4. Habitat	Pool forming structures maintain – Max Pool Depth : Mean Bankful Depth ratio ≥1.6 Rootwads/logs providing some cover at base-flow	2	2			100%			

Table 5 Visual Stream Morphology Stability Assessment
Reach ID **Reach C (Sta. 29+00 – 40+00)**
Assessed Length **1100 ft.**

Major Channel Category	Channel Sub-Category	Metric	# Stable, Performing as Intended	Total # in As-built	# of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	# with Stabilizing Woody Veg.	Footage with Stabilizing Woody Veg.	Adjusted % for Stabilizing Woody Veg.
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> – Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. <u>Degradation</u> – Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. <u>Texture/Substrate</u> Riffle maintains coarser substrate	1	8			13%			
		1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankful Depth ≥ 1.6)	3	12			25%			
	3. Meander Pool Condition	2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	3	12			25%			
		1. Thalweg centering upstream of meander bend (Run)	26	26			100%			
4. Thalweg Position	2. Thalweg centering at downstream of meander (Glide)	26	26			100%				
	Totals					0	0	100%		
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%			
	3. Mass Wasting	Bank slumping, calving, or collapsing			0	0	100%			
Totals					0	0	100%			
3. Engineered Structures	1. Overall Integrity	Structure physically intact with no dislodged boulders or logs	1	1			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms	1	1			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15% (see guidance for this table in EEP monitoring guidance document)	1	1			100%			
	4. Habitat	Pool forming structures maintain – Max Pool Depth : Mean Bankful Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow	1	1			100%			

Table 6. Vegetation Condition Assessment Table

Planted Acreage						
Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Area
1. Bare Areas	Very limited cover of both woody and herbaceous material	0.1 acres	Pattern and Color	0	0	0
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY 3, 4, or 5 stem count criteria	0.1 acres	Pattern and Color	0	0	0
Total:					0	0
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year	0.25 acres	Pattern and color	0	0	0
Cumulative Total:					0	0
Easement Acreage						
4. Invasive Areas of Concern		1000 SF	Pattern and Color	0	0	0
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale)	none	Pattern and color	0	0	0

Stream Station Photos



Photo 1. Looking downstream at XS1 – 12/13/2013



Photo 2. Looking downstream at XS-2 – 12/13/2013



Photo 3. Looking downstream at XS-3 – 12/13/2013



Photo 4. Looking downstream at XS-4 – 12/13/2013



Photo 5. Looking downstream at XS-5 – 12/13/2013



Photo 6. Looking downstream at XS-6 – 12/13/2013



Photo 7. Looking downstream at XS-7 – 12/13/2013



Photo 8. Looking downstream at XS-8 – 12/13/2013



Photo 9. Looking downstream at XS-9 – 12/13/2013

Vegetation Monitoring Plot Photos



Photo 10. Vegetation Plot 1 – 7/29/2013



Photo 11. Vegetation Plot 2 – 7/29/2013



Photo 12. Vegetation Plot 3 – 7/29/2013



Photo 13. Vegetation Plot 4 – 7/29/2013



Photo 14. Vegetation Plot 5 – 7/29/2013



Photo 15. Vegetation Plot 6 – 7/29/2013



Photo 16. Vegetation Plot 7 – 7/29/2013

Appendix 3. Vegetation Plot Data

**Table 7. Vegetation Plot Criteria Attainment
UT to South Fork Creek. EEP # 405 Monitoring Year 6 (2013)**

Vegetation Plot ID	Vegetation Survival Threshold Met 260 planted stems/acre?	Monitoring Year 6 Planted Stem Density stems/acre	Monitoring Year 6 Total Stem Density stems/acre
VP 1	Yes	647	1335
VP 2	Yes	526	1740
VP 3	Yes	567	1821
VP 4	No	162	607
VP 5	No	202	931
VP 6	No	121	4168
VP 7	Yes, barely	283	2671
Project Avg	Yes	358	1896

Report Prepared By	Tommy Seelinger
Date Prepared	8/19/2013 16:09
database name	UTSF CVS veg data entry tool.mdb
database location	M:\2013\16133829_UT South Fork Monitoring
computer name	12-7GSWCX1
file size	71491584
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT-----	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY-----	
Project Code	405
project Name	UT to South Fork Creek (Stephens)
Description	South Fork of Cane Creek in Alamance County EEP Project # 405.
River Basin	Cape Fear
length(ft)	
stream-to-edge width (ft)	
area (sq m)	
Required Plots (calculated)	
Sampled Plots	7

Table 9. CVS Stem Count Total and Planted by Plot and Species

			Current Plot Data (MYS 2013)																					
Scientific Name	Common Name	Species Type	E405-01-0001			E405-01-0002			E405-01-0003			E405-01-0004			E405-01-0005			E405-01-0006			E405-01-0007			
			P-noLS	P-all	T	P-noLS	P-all	T	P-noLS	P-all	T	P-noLS	P-all	T	P-noLS	P-all	T	P-noLS	P-all	T	P-noLS	P-all	T	
<i>Acer rubrum</i>	red maple	Tree			1											3			18			1		
<i>Baccharis halimifolia</i>	eastern baccharis	Shrub			1					3														
<i>Betula nigra</i>	river birch	Tree	3	3	3							1	1	1	1	1	2							
<i>Callicarpa americana</i>	American beautyberry	Shrub				1	1	2										1	1	1				
<i>Celtis laevigata</i>	sugarberry	Tree							1	1	1													
<i>Cercis canadensis</i>	eastern redbud	Tree																						
<i>Cercis canadensis var. canadensis</i>	eastern redbud	Tree							7	7	7										1	1	1	
<i>Cornus amomum</i>	silky dogwood	Shrub	5	5	7													1	1	1				
<i>Cornus florida</i>	flowering dogwood	Tree									1													
<i>Corylus americana</i>	American hazelnut	Shrub	1	1	1							1	1	1	2	2	2							
<i>Diospyros virginiana</i>	common persimmon	Tree				3	3	3																
<i>Fraxinus pennsylvanica</i>	green ash	Tree	2	2	4	1	1	8	1	1	1							2		2	3	3	36	
<i>Genista tinctoria</i>	Dyer's greenweed							1		1														
<i>Juglans nigra</i>	black walnut	Tree				1	1	1			6			4				1					2	
<i>Juniperus virginiana</i>	eastern redcedar	Tree			9			3			2									1				
<i>Ligustrum sinense</i>	Chinese privet	Exotic												1						1				
<i>Liquidambar styraciflua</i>	sweetgum	Tree			2			1			4			1				4			45			
<i>Liriodendron tulipifera</i>	tuliptree	Tree	1	1	1	1	1	1				1	1	1	1	1	1							
<i>Morus rubra</i>	red mulberry	Tree				1	1	1				1	1	1							1	1	1	
<i>Platanus occidentalis</i>	American sycamore	Tree							1	1	1							1			1	1	1	
<i>Prunus serotina</i>	black cherry	Tree							1	1	4													
<i>Quercus coccinea</i>	scarlet oak	Tree	1	1	1														1	1	1			
<i>Quercus michauxii</i>	swamp chestnut oak	Tree	1	1	1				2	2	2													
<i>Quercus shumardii</i>	Shumard's oak	Tree	2	2	2																			
<i>Salix sericea</i>	silky willow	Shrub																				1		
<i>Sambucus canadensis</i>	Common Elderberry	Shrub																				1		
<i>Ulmus alata</i>	winged elm	Tree				2	2	13			4			4				2			10	1	1	19
<i>Ulmus rubra</i>	slippery elm	Tree				3	3	9	1	1	8			2	1	1	3				23			5
	Stem count		16	16	33	13	13	43	14	14	45	4	4	16	5	5	23	3	3	104	7	7	66	
	size (ares)		1			1			1			1			1			1			1			
	size (ACRES)		0.02			0.02			0.02			0.02			0.02			0.02			0.02			
	Species count		8	8	12	8	8	11	7	7	14	4	4	9	4	4	12	3	3	11	5	5	8	
	Stems per ACRE		647.5	647.5	1335.5	526.1	526.1	1740.1	566.6	566.6	1821.1	161.9	161.9	647.5	202.3	202.3	930.8	121.4	121.4	4208.7	283.3	283.3	2670.9	

Scientific Name	Common Name	Species Type	Annual Means																	
			MY5 (2013)			MY4 (2012)			MY3 (2011)			MY2 (2010)			MY1 (2009)			MY0 (2009)		
			P-noLS	P-all	T	P-noLS	P-all	T	P-noLS	P-all	T	P-noLS	P-all	T	P-noLS	P-all	T	P-noLS	P-all	T
<i>Acer rubrum</i>	red maple	Tree			23			54			57			10			31			
<i>Baccharis halimifolia</i>	eastern baccharis	Shrub			4			4			1			3			2			
<i>Betula nigra</i>	river birch	Tree	5	5	6	4	4	4	4	2	2	2	2	2	2	2	2	2	2	
<i>Callicarpa americana</i>	American beautyberry	Shrub	2	2	3	6	6	6	6	6	6	9	5	5	6	6	6	8	3	
<i>Carya alba</i>	mockernut hickory	Tree										1								
<i>Carya ovata</i>	shagbark hickory	Tree													1	1	1	1	1	
<i>Celtis laevigata</i>	sugarberry	Tree	1	1	1	2	2	3												
<i>Cercis canadensis</i>	eastern redbud	Tree	8	8	8	8	8	8	7	7	9	7	7	7	5	5	5	2	2	
<i>Cornus amomum</i>	silky dogwood	Shrub	6	6	8	6	6	8	7	7	8	7	7	9	7	7	7	7	7	
<i>Cornus florida</i>	flowering dogwood	Tree			1															
<i>Corylus americana</i>	American hazelnut	Shrub	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	
<i>Diospyros virginiana</i>	common persimmon	Tree	3	3	3	3	3	5	3	3	5	3	3	3	2	2	3	2	2	
<i>Fraxinus pennsylvanica</i>	green ash	Tree	7	7	53	8	8	80	8	8	58	8	8	50	8	8	40	7	7	
<i>Gleditsia triacanthos</i>	honeylocust	Tree						2			2			2			3			
<i>Ilex decidua var. decidua</i>	Poosum-haw	shrub															1			
<i>Juglans nigra</i>	black walnut	Tree	1	1	14	1	1	17	1	1	10			6						
<i>Juniperus virginiana</i>	eastern redcedar	Tree			15			10			10			11			3			
<i>Ligustrum sinense</i>	Chinese privet	Exotic			2			1									3			
<i>Liquidambar styraciflua</i>	sweetgum	Tree			57			72			95			55			49			
<i>Liriodendron tulipifera</i>	tuliptree	Tree	4	4	4	5	5	8	3	3	6	2	2	2	2	2	2	2	2	
<i>Morus rubra</i>	red mulberry	Tree	3	3	3	3	3	5	3	3	3	3	3	3	3	3	3	3	3	
<i>Nyssa sylvatica</i>	blackgum	Tree						1												
<i>Pinus taeda</i>	loblolly pine	Tree						1			1			1						
<i>Platanus occidentalis</i>	American sycamore	Tree	2	2	4	2	2	4	2	2	4	5	5	5	5	5	7	5	5	
<i>Prunus</i>	plum	Tree												5						
<i>Prunus serotina</i>	black cherry	Tree	1	1	4			5			4						1			
<i>Quercus coccinea</i>	scarlet oak	Tree	2	2	2															
<i>Quercus michauxii</i>	swamp chestnut oak	Tree	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	
<i>Quercus shumardii</i>	Shumard's oak	Tree	2	2	2	1	1	1												
<i>Quercus stellata</i>	post oak	Tree				4	4	4												
<i>Salix sericea</i>	silky willow	Shrub			1															
<i>Sambucus canadensis</i>	Common Elderberry	Shrub			1			1			1									
<i>Ulmus</i>	elm	Tree							1	1	13	6	6	21	8	8	95	8	8	
<i>Ulmus alata</i>	winged elm	Tree	3	3	52	3	3	65	3	3	58			37						
<i>Ulmus rubra</i>	slippery elm	Tree	5	5	50	5	5	51	4	4	29	2	2	6						
<i>Unknown</i>		Tree										1	1	2	1	1	1			
Stem count			62	62	328	68	68	427	57	57	393	58	58	253	58	58	275	49	49	
size (ares)			7			7			7			7			7			7		
size (ACRES)			0.17			0.17			0.17			0.17			0.17			0.17		
Species count			18	18	26	17	17	27	15	15	24	14	14	23	14	14	22	13	13	
Stems per ACRE			358.4	358.4	1896.2	393.1	393.1	2468.6	329.5	329.5	2272.0	335.3	335.3	1462.6	335.3	335.3	1589.8	283.3	283.3	

Appendix 4. Stream Survey Data

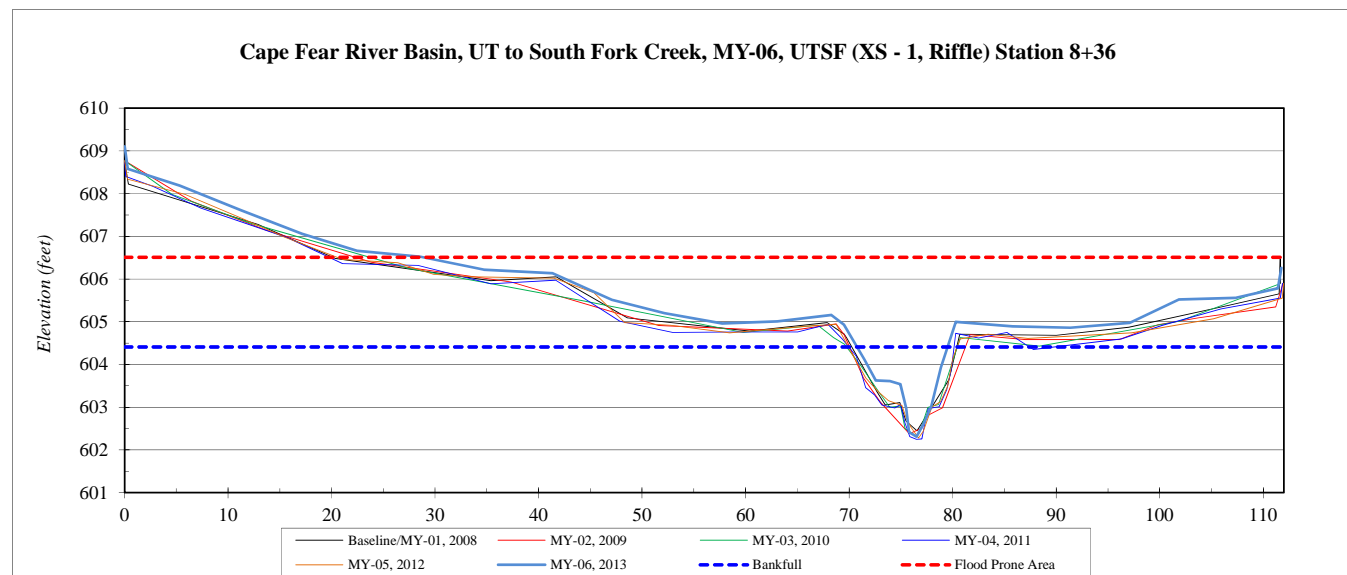
River Basin:	Cape Fear
Watershed:	UT to South Fork Creek, MY-06
XS ID	UTSF (XS - 1, Riffle) Station 8+36
Drainage Area (sq mi):	1.33
Date:	12/13/2013
Field Crew:	T. Seelinger, M. Koss



Station	Elevation
0.0	609.10
0.3	608.58
5.3	608.19
11.2	607.61
17.1	607.06
22.5	606.66
28.6	606.53
34.7	606.22
41.4	606.13
47.1	605.51
52.2	605.20
57.8	604.96
63.1	605.01
68.3	605.16
69.5	604.93
71.5	604.12
72.6	603.63
73.9	603.61
74.9	603.54
75.5	602.98
75.8	602.42
76.5	602.31
77.2	602.63
78.0	603.04
78.9	603.93
80.3	604.99
85.8	604.89
91.4	604.86
97.1	604.98
101.9	605.52
107.3	605.56
111.4	605.78
111.7	606.26

SUMMARY DATA	
Bankfull Elevation:	604.4
Bankfull Cross-Sectional Area:	8.8
Bankfull Width:	8.7
Flood Prone Area Elevation:	606.5
Flood Prone Width:	>90
Max Depth at Bankfull:	2.1
Mean Depth at Bankfull:	1.0
W / D Ratio:	8.7
Entrenchment Ratio:	10.8
Bank Height Ratio:	1.0

Stream Type E4



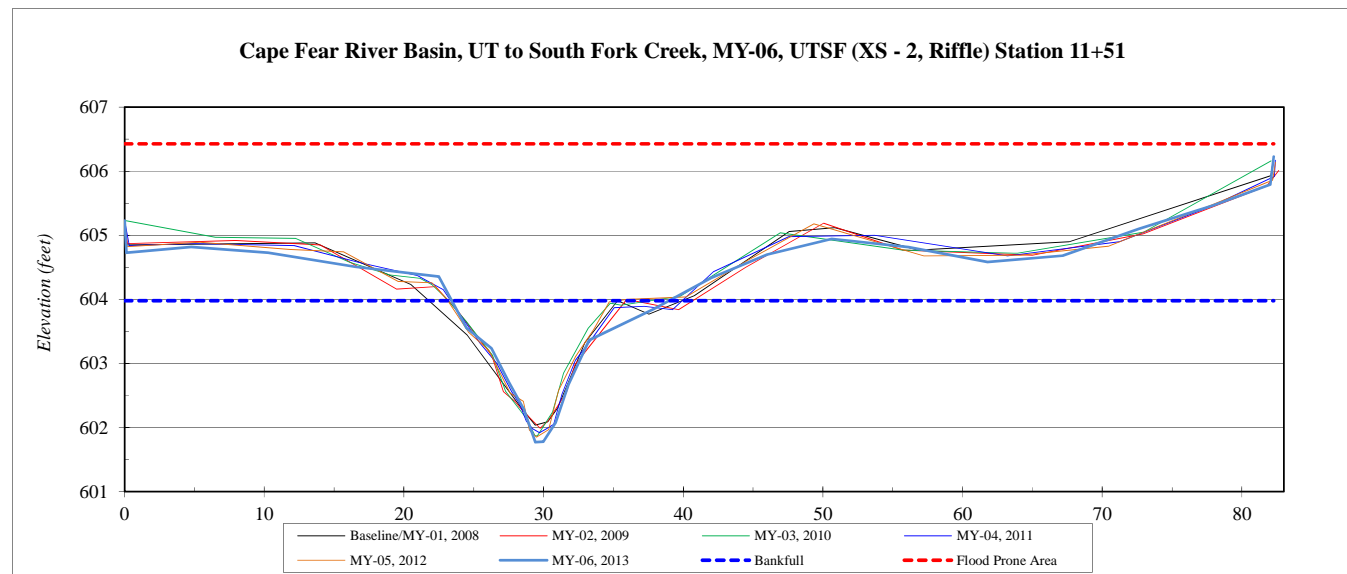
River Basin:	Cape Fear
Watershed:	UT to South Fork Creek, MY-06
XS ID	UTSF (XS - 2, Riffle) Station 11+51
Drainage Area (sq mi):	1.33
Date:	12/13/2013
Field Crew:	T. Seelinger, M. Koss



Station	Elevation
0.0	605.23
0.1	604.73
4.8	604.82
10.3	604.73
16.6	604.51
22.5	604.36
24.5	603.56
26.3	603.23
27.5	602.71
28.6	602.29
29.4	601.77
30.0	601.78
30.9	602.08
31.8	602.67
33.3	603.36
37.8	603.84
42.0	604.34
46.0	604.70
50.6	604.95
56.1	604.81
61.8	604.59
67.2	604.68
72.6	605.10
77.9	605.47
82.0	605.79
82.3	606.23

SUMMARY DATA	
Bankfull Elevation:	604.0
Bankfull Cross-Sectional Area:	15.1
Bankfull Width:	15.1
Flood Prone Area Elevation:	606.2
Flood Prone Width:	>90
Max Depth at Bankfull:	2.2
Mean Depth at Bankfull:	1.0
W / D Ratio:	15.1
Entrenchment Ratio:	5.5
Bank Height Ratio:	1.0

Stream Type E4



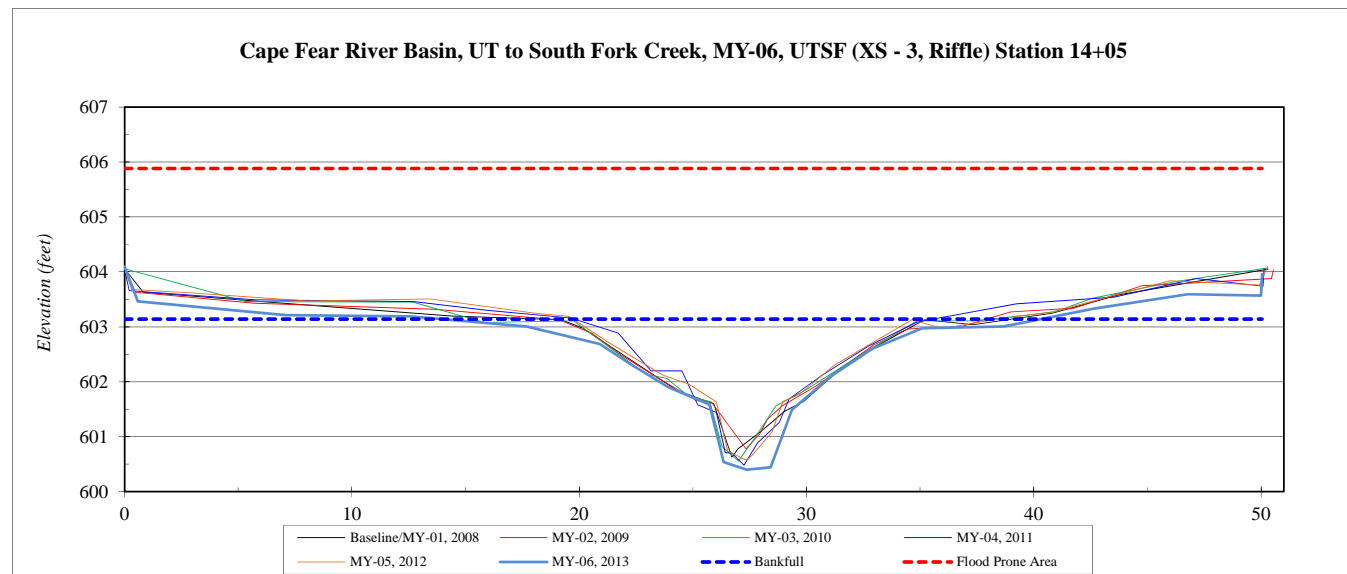
River Basin:	Cape Fear
Watershed:	UT to South Fork Creek, MY-06
XS ID	UTSF (XS - 3, Riffle) Station 14+05
Drainage Area (sq mi):	1.33
Date:	12/13/2013
Field Crew:	T. Seelinger, M. Koss



Station	Elevation
0.0	604.10
0.6	603.46
7.1	603.21
12.6	603.19
17.7	603.01
20.9	602.69
22.3	602.32
23.9	601.91
25.7	601.59
26.4	600.54
27.4	600.40
28.4	600.45
29.4	601.49
31.1	602.10
32.9	602.60
35.1	602.97
38.7	603.01
42.7	603.33
46.8	603.59
50.0	603.57
50.0	603.96

SUMMARY DATA	
Bankfull Elevation:	603.1
Bankfull Cross-Sectional Area:	20.7
Bankfull Width:	17.4
Flood Prone Area Elevation:	605.9
Flood Prone Width:	>90
Max Depth at Bankfull:	2.7
Mean Depth at Bankfull:	1.2
W / D Ratio:	14.6
Entrenchment Ratio:	2.9
Bank Height Ratio:	1.0

Stream Type E4



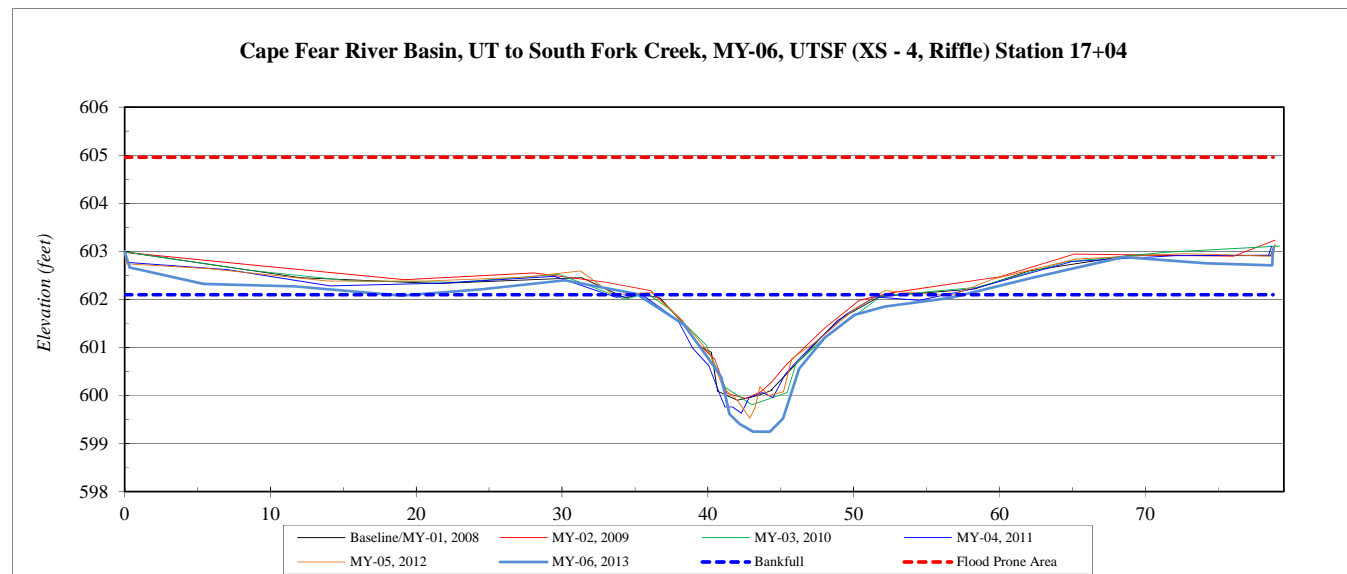
River Basin:	Cape Fear
Watershed:	UT to South Fork Creek, MY-06
XS ID	UTSF (XS - 4, Riffle) Station 17+04
Drainage Area (sq mi):	1.33
Date:	12/13/2013
Field Crew:	T. Seelinger, M. Koss



Station	Elevation
0.0	602.99
0.4	602.66
5.4	602.32
11.7	602.27
19.0	602.08
24.5	602.21
30.2	602.39
35.1	602.11
38.3	601.48
39.9	600.82
40.9	600.39
41.5	599.61
42.2	599.41
43.1	599.25
44.3	599.25
45.2	599.52
46.3	600.56
48.0	601.19
50.1	601.68
52.1	601.85
56.6	602.03
62.3	602.46
68.5	602.88
74.1	602.75
78.7	602.71
78.8	603.06

SUMMARY DATA	
Bankfull Elevation:	602.1
Bankfull Cross-Sectional Area:	24.9
Bankfull Width:	25.3
Flood Prone Area Elevation:	605.0
Flood Prone Width:	>90
Max Depth at Bankfull:	2.9
Mean Depth at Bankfull:	1.0
W / D Ratio:	25.8
Entrenchment Ratio:	3.1
Bank Height Ratio:	1.0

Stream Type E4



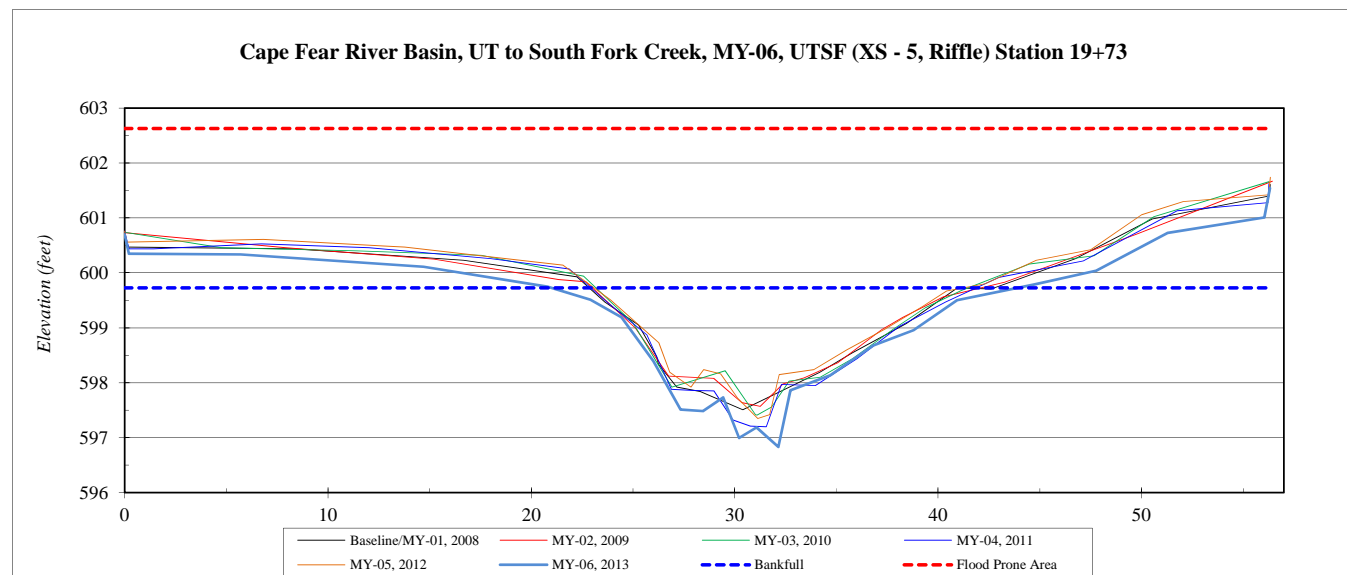
River Basin:	Cape Fear
Watershed:	UT to South Fork Creek, MY-06
XS ID	UTSF (XS - 5, Riffle) Station 19+73
Drainage Area (sq mi):	1.33
Date:	12/13/2013
Field Crew:	T. Seelinger, M. Koss



Station	Elevation
0.0	600.70
0.2	600.35
5.7	600.34
14.7	600.11
20.8	599.75
22.9	599.51
24.4	599.20
26.0	598.40
27.3	597.51
28.4	597.48
29.4	597.73
30.2	596.99
31.1	597.19
32.1	596.83
32.7	597.86
34.7	598.14
36.8	598.68
38.8	598.96
40.9	599.50
44.7	599.79
47.8	600.04
51.3	600.73
56.0	601.01
56.3	601.54

SUMMARY DATA	
Bankfull Elevation:	599.7
Bankfull Cross-Sectional Area:	27.0
Bankfull Width:	23.0
Flood Prone Area Elevation:	602.6
Flood Prone Width:	>90
Max Depth at Bankfull:	2.9
Mean Depth at Bankfull:	1.2
W / D Ratio:	19.5
Entrenchment Ratio:	2.5
Bank Height Ratio:	1.0

Stream Type E4



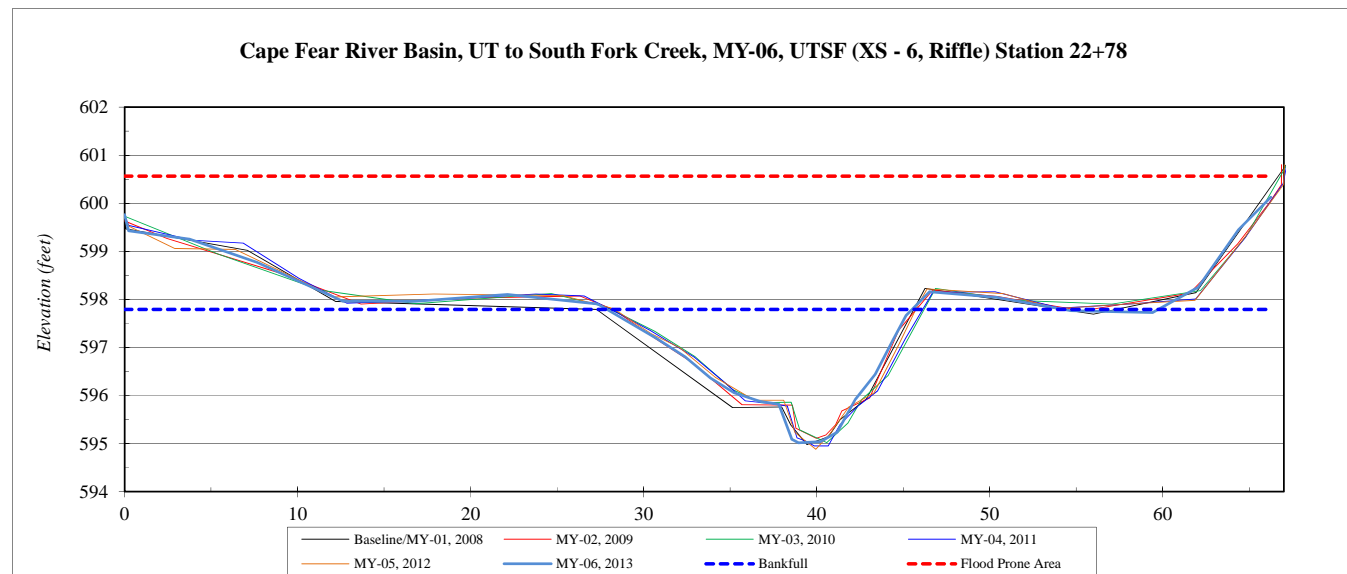
River Basin:	Cape Fear
Watershed:	UT to South Fork Creek, MY-06
XS ID	UTSF (XS - 6, Riffle) Station 22+78
Drainage Area (sq mi):	1.33
Date:	12/13/2013
Field Crew:	T. Seelinger, M. Koss



Station	Elevation
0.0	599.76
0.2	599.43
3.7	599.25
7.7	598.77
12.6	597.96
16.8	597.96
22.1	598.10
27.3	597.91
30.7	597.19
32.4	596.80
33.9	596.36
35.2	596.05
36.7	595.88
37.8	595.82
38.6	595.09
39.0	595.02
40.2	595.04
41.2	595.24
42.2	595.93
43.4	596.44
44.4	597.16
45.2	597.67
46.5	598.16
50.4	598.04
54.6	597.77
59.4	597.72
62.0	598.25
64.4	599.45
66.2	600.13

SUMMARY DATA	
Bankfull Elevation:	597.8
Bankfull Cross-Sectional Area:	25.3
Bankfull Width:	17.6
Flood Prone Area Elevation:	600.6
Flood Prone Width:	>90
Max Depth at Bankfull:	2.8
Mean Depth at Bankfull:	1.4
W / D Ratio:	12.3
Entrenchment Ratio:	3.8
Bank Height Ratio:	1.0

Stream Type E4



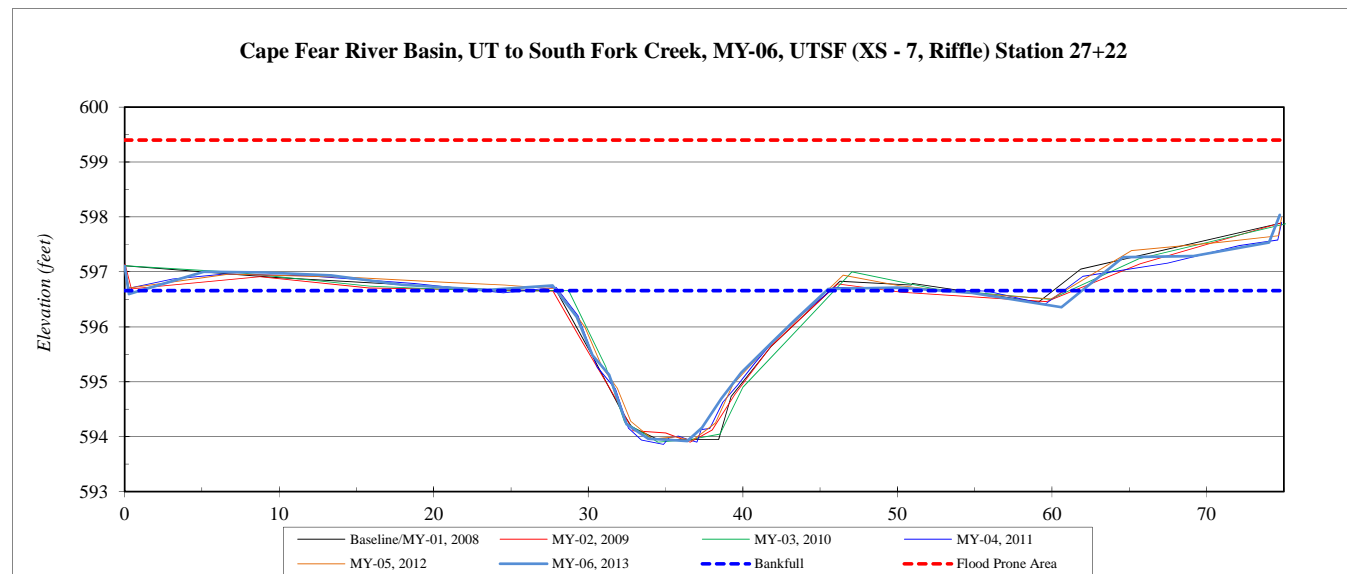
River Basin:	Cape Fear
Watershed:	UT to South Fork Creek, MY-06
XS ID	UTSF (XS - 7, Riffle) Station 27+22
Drainage Area (sq mi):	1.33
Date:	12/13/2013
Field Crew:	T. Seelinger, M. Koss



Station	Elevation
0.0	597.11
0.3	596.60
5.1	597.00
9.1	596.99
13.4	596.94
17.9	596.77
23.4	596.67
27.7	596.75
29.2	596.18
30.3	595.48
31.3	595.13
32.5	594.23
33.9	593.96
35.0	593.95
36.4	593.92
37.4	594.17
38.6	594.70
39.9	595.17
41.9	595.73
43.4	596.14
45.5	596.69
50.0	596.72
54.8	596.62
60.6	596.36
64.6	597.27
69.1	597.29
74.0	597.54
74.7	598.04

SUMMARY DATA	
Bankfull Elevation:	596.7
Bankfull Cross-Sectional Area:	22.7
Bankfull Width:	15.8
Flood Prone Area Elevation:	599.4
Flood Prone Width:	>90
Max Depth at Bankfull:	2.7
Mean Depth at Bankfull:	1.4
W / D Ratio:	11.0
Entrenchment Ratio:	4.7
Bank Height Ratio:	1.0

Stream Type E4



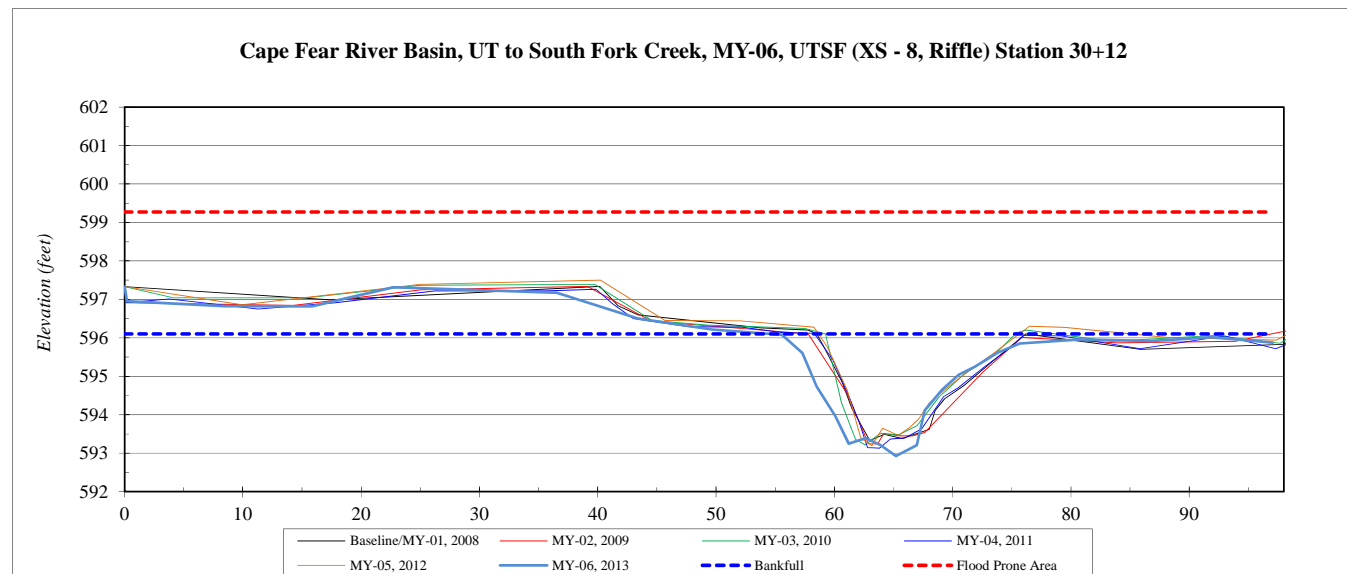
River Basin:	Cape Fear
Watershed:	UT to South Fork Creek, MY-06
XS ID	UTSF (XS - 8, Riffle) Station 30+12
Drainage Area (sq mi):	1.33
Date:	12/13/2013
Field Crew:	T. Seelinger, M. Koss



Station	Elevation
0.0	597.33
0.2	596.95
8.4	596.83
15.9	596.82
22.7	597.31
36.5	597.18
43.4	596.50
49.6	596.22
55.6	596.08
57.3	595.61
58.5	594.73
60.1	593.97
61.2	593.25
62.7	593.39
63.9	593.21
65.2	592.93
67.0	593.21
67.7	594.12
69.1	594.65
70.5	595.04
71.9	595.25
73.8	595.61
75.7	595.85
80.8	595.96
86.7	595.92
91.9	596.02
97.1	595.87

SUMMARY DATA	
Bankfull Elevation:	596.1
Bankfull Cross-Sectional Area:	27.1
Bankfull Width:	18.5
Flood Prone Area Elevation:	599.3
Flood Prone Width:	>90
Max Depth at Bankfull:	3.2
Mean Depth at Bankfull:	1.5
W / D Ratio:	12.7
Entrenchment Ratio:	5.2
Bank Height Ratio:	1.0

Stream Type E4



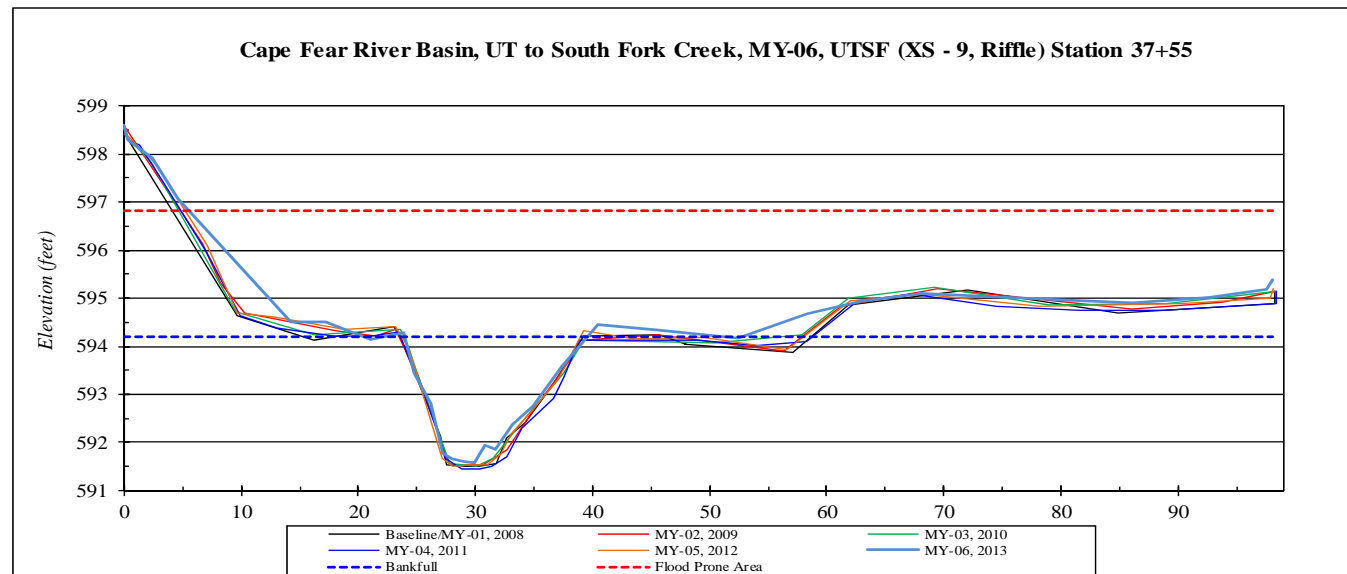
River Basin:	Cape Fear
Watershed:	UT to South Fork Creek, MY-06
XS ID	UTSF (XS - 9, Riffle) Station 37+55
Drainage Area (sq mi):	1.33
Date:	12/13/2013
Field Crew:	T. Seelinger, M. Koss



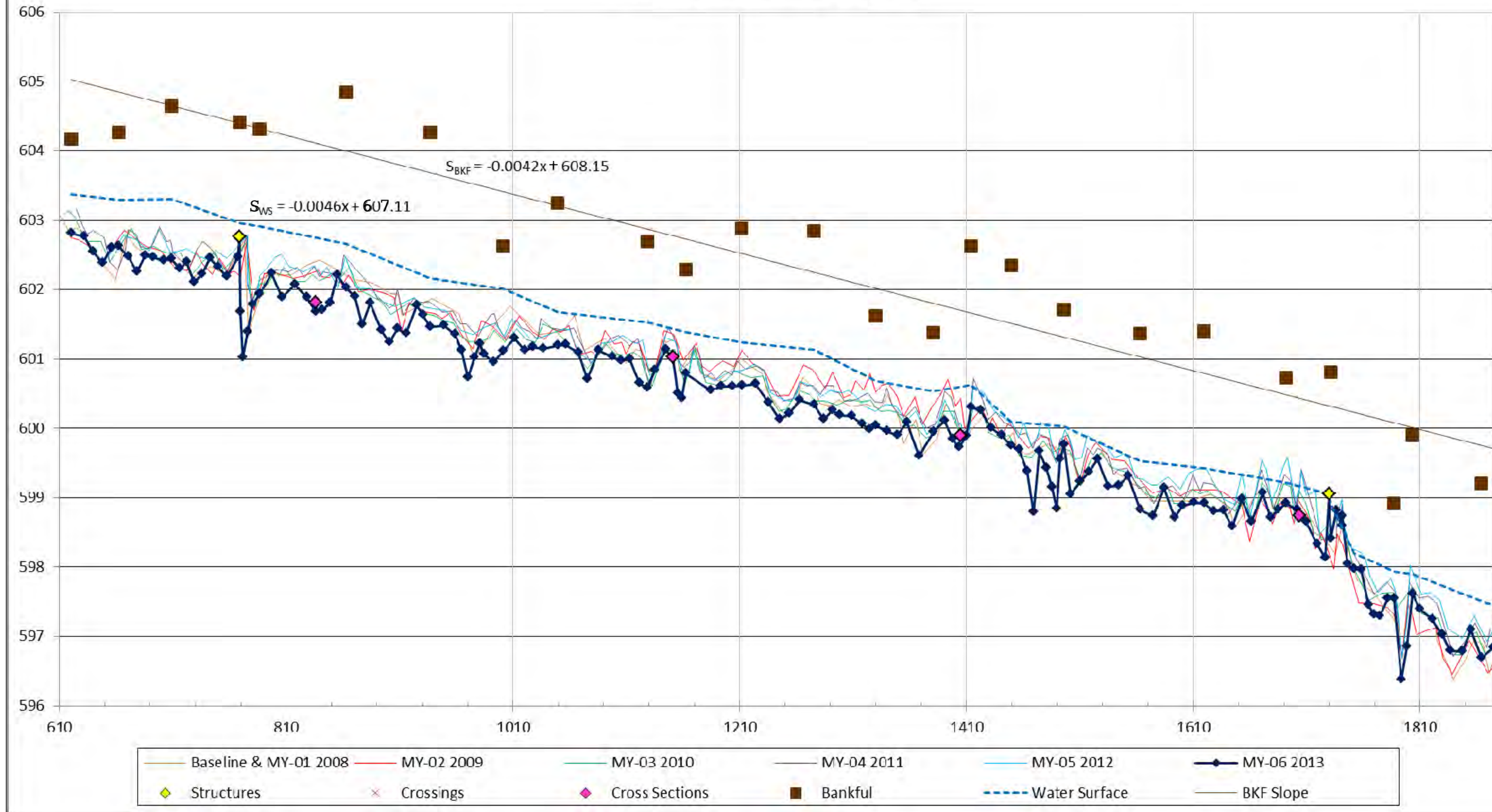
Station	Elevation
0.0	598.59
0.3	598.28
2.4	597.93
4.5	597.08
6.7	597.80
14.2	594.52
17.2	594.50
21.1	594.15
23.8	594.29
24.8	593.45
26.1	592.81
27.2	591.76
27.9	591.66
29.0	591.60
30.0	591.57
30.8	591.94
31.8	591.87
33.2	592.36
34.9	592.76
37.4	593.56
40.5	594.46
45.7	594.34
52.4	594.16
58.3	594.69
62.9	595.46
68.2	595.51
80.5	594.96
86.1	594.89
92.6	595.03
97.6	595.19
98.0	595.39

SUMMARY DATA	
Bankfull Elevation:	594.2
Bankfull Cross-Sectional Area:	21.1
Bankfull Width:	14.7
Flood Prone Area Elevation:	596.8
Flood Prone Width:	>90
Max Depth at Bankfull:	2.6
Mean Depth at Bankfull:	1.4
W / D Ratio:	10.3
Entrenchment Ratio:	6.0
Bank Height Ratio:	1.0

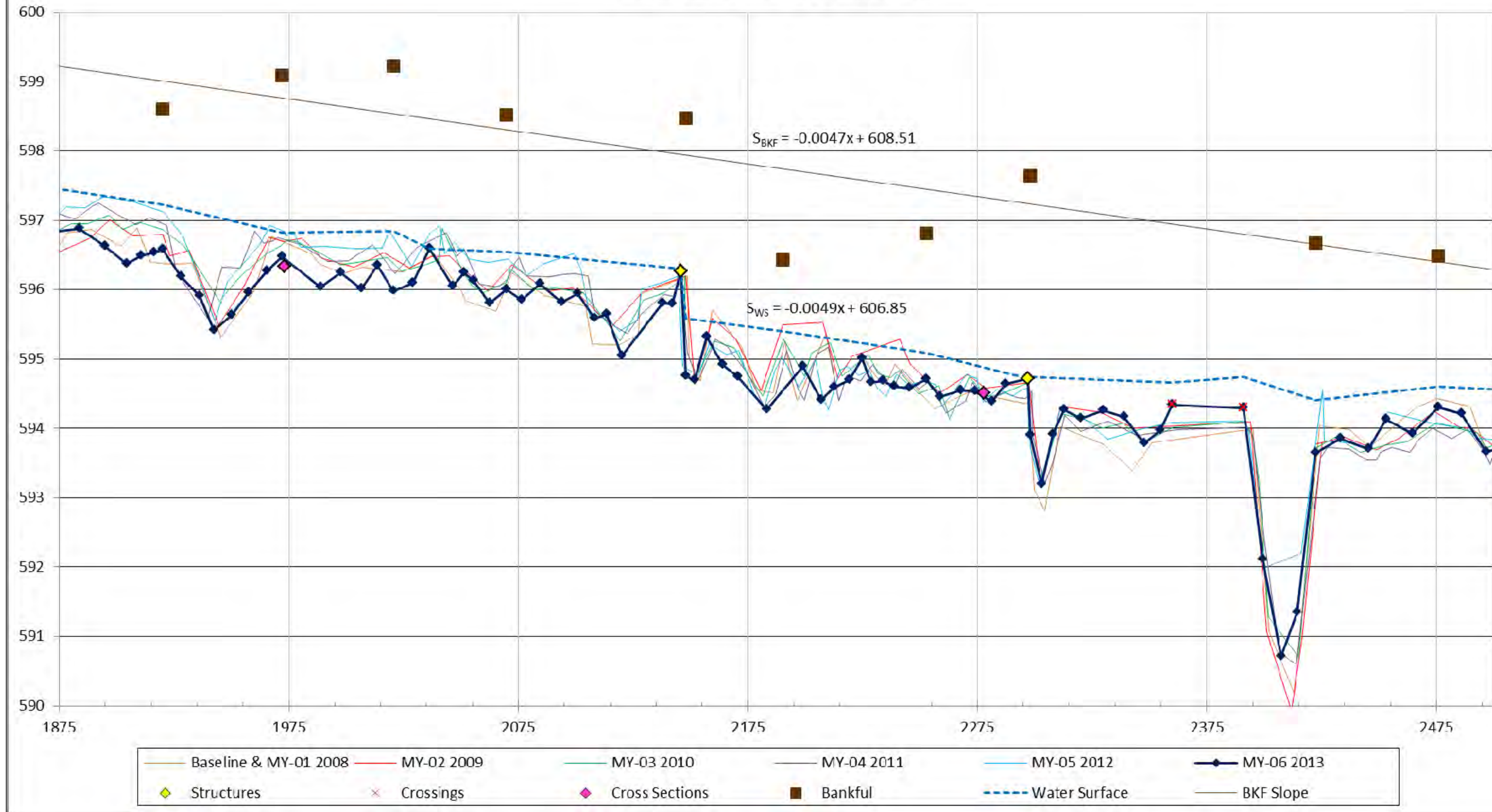
Stream Type E4



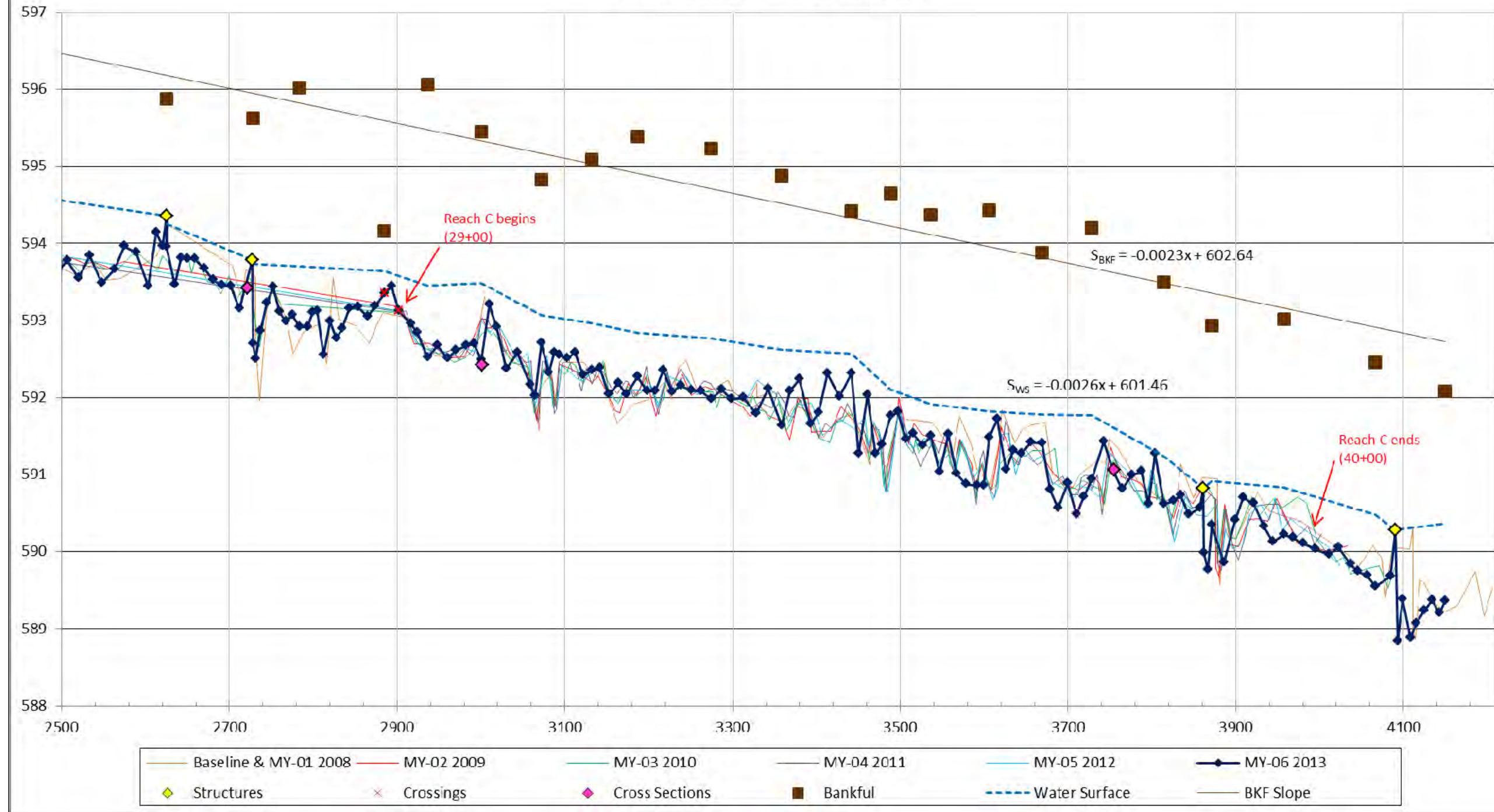
**Longitudinal Profile
UT to South Fork Creek
EEP Project Number - 405
Station 6+10 - 18+75 (Reach A)**



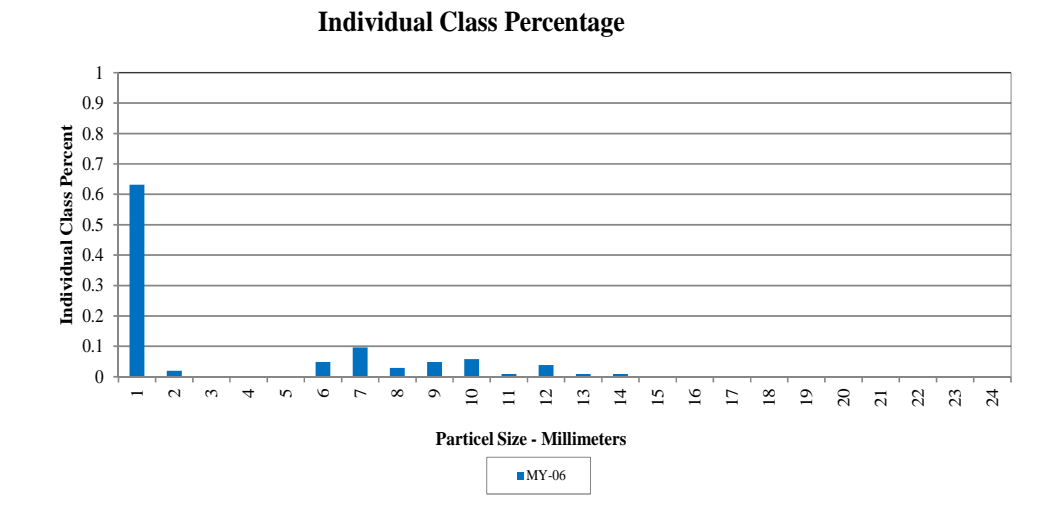
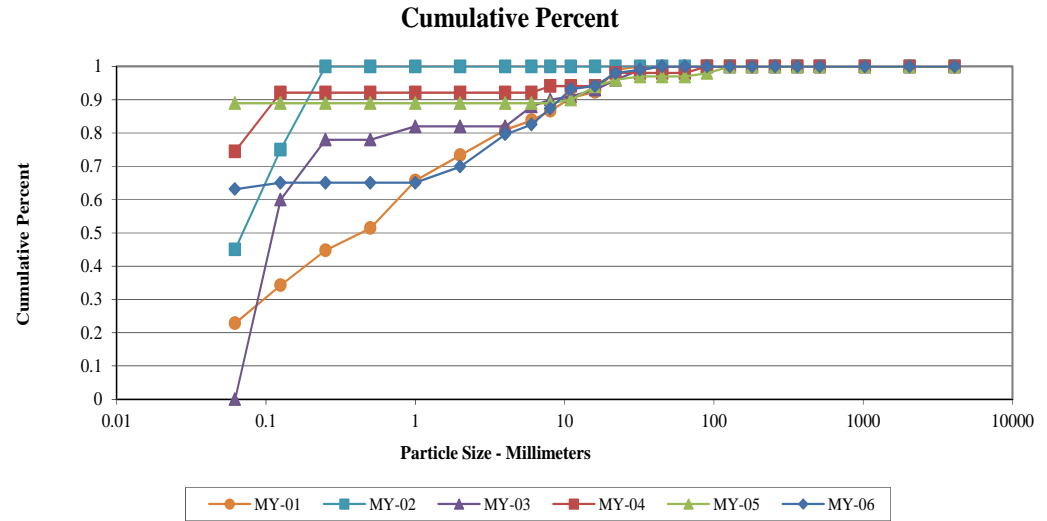
**Longitudinal Profile
UT to South Fork Creek
EEP Project Number - 405
Station 18+75 - 25+00 (Reach B)**



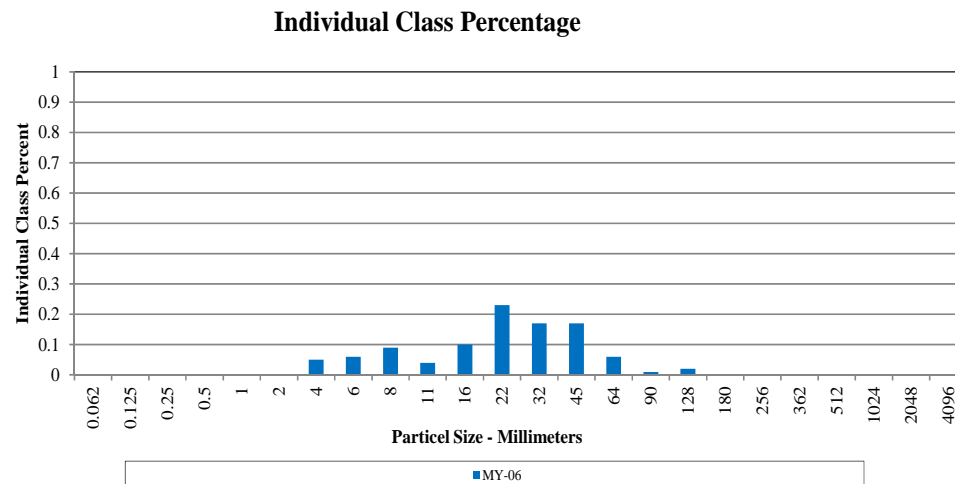
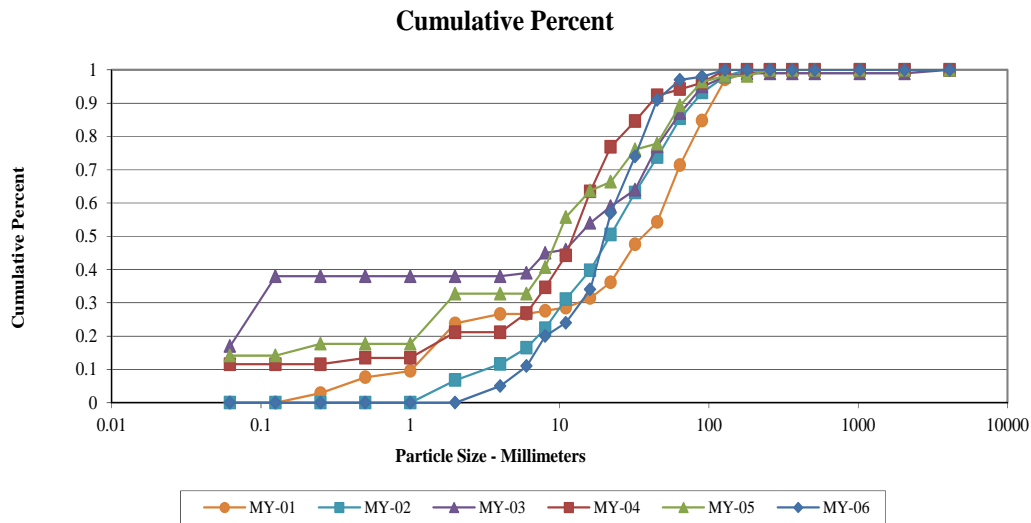
**Longitudinal Profile
UT to South Fork Creek
EEP Project Number - 405
Station 25+00 - 42+10 (Reach C)**



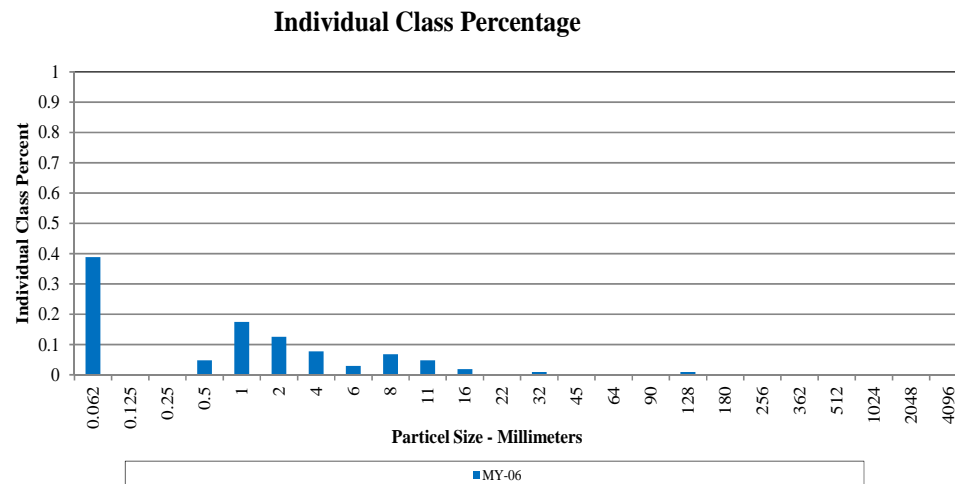
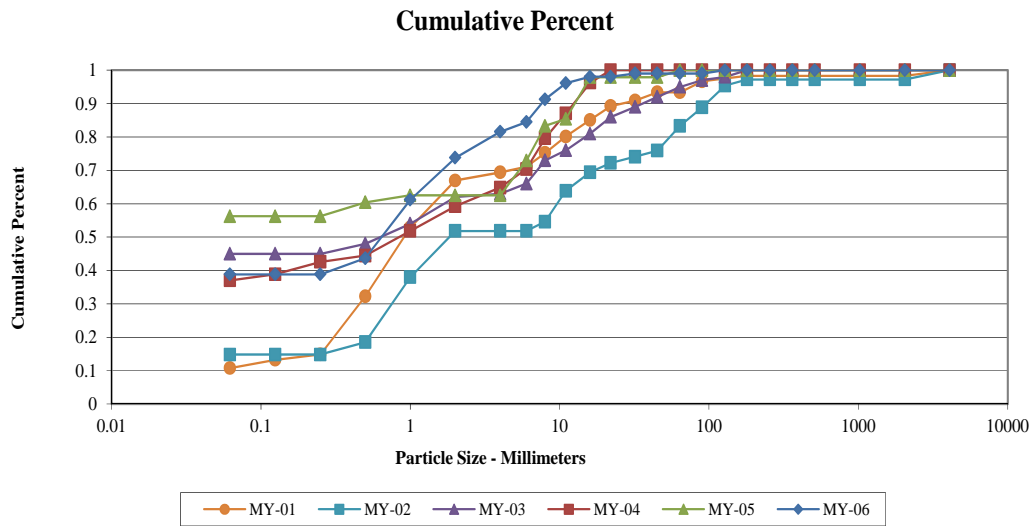
Cross-Section 1 Riffle - UTSF MY-06					
Particle	Millimeter	Material	Count	Item %	Cum %
Silt/Clay	< 0.062	S/C	65	63%	63%
Very Fine	.062 - .125	S	2	2%	65%
Fine	.125 - .25	A		0%	65%
Medium	.25 - .50	N		0%	65%
Coarse	.50 - 1	D		0%	65%
Very Coarse	1 - 2	S	5	5%	70%
Very Fine	2 - 4		10	10%	80%
Fine	4 - 5.7	G	3	3%	83%
Fine	5.7 - 8	R	5	5%	87%
Medium	8 - 11.3	A	6	6%	93%
Medium	11.3 - 16	V	1	1%	94%
Coarse	16 - 22.6	E	4	4%	98%
Coarse	22.6 - 32	L	1	1%	99%
Very Coarse	32 - 45	S	1	1%	100%
Very Coarse	45 - 64			0%	100%
Small	64 - 90	C		0%	100%
Small	90 - 128	O		0%	100%
Large	128 - 180	B		0%	100%
Large	180 - 256	L		0%	100%
Small	256 - 362	B		0%	100%
Small	362 - 512	L		0%	100%
Medium	512 - 1024	D		0%	100%
Lrg- Very Lrg	1024 - 2048	R		0%	100%
Bedrock	>2048	BDRK		0%	100%
Total			103	100%	100%
Size (mm)		Type			
D50	0.062	silt/clay	63%		
D84	6.5	sand	7%		
D95	17	gravel	30%		
		cobble	0%		



Cross-Section 4 Riffle - UTSF MY-06					
Particle	Millimeter	Material	Count	Item %	Cum %
Silt/Clay	< 0.062	S/C		0%	0%
Very Fine	.062 - .125	S		0%	0%
Fine	.125 - .25	A		0%	0%
Medium	.25 - .50	N		0%	0%
Coarse	.50 - 1	D		0%	0%
Very Coarse	1 - 2	S		0%	0%
Very Fine	2 - 4	G	5	5%	5%
Fine	4 - 5.7		6	6%	11%
Fine	5.7 - 8		9	9%	20%
Medium	8 - 11.3		4	4%	24%
Medium	11.3 - 16		10	10%	34%
Coarse	16 - 22.6		23	23%	57%
Coarse	22.6 - 32		17	17%	74%
Very Coarse	32 - 45		17	17%	91%
Very Coarse	45 - 64		6	6%	97%
Small	64 - 90		C	1	1%
Small	90 - 128	O	2	2%	100%
Large	128 - 180	B		0%	100%
Large	180 - 256	L		0%	100%
Small	256 - 362	B		0%	100%
Small	362 - 512	L		0%	100%
Medium	512 - 1024	D		0%	100%
Lrg- Very Lrg	1024 - 2048	R		0%	100%
Bedrock	>2048	BDRK		0%	100%
Total			100	100%	100%
Size (mm)		Type			
D50	20	silt/clay	0%		
D84	39	sand	0%		
D95	57	gravel	97%		
		cobble	3%		



Cross-Section 7 Riffle - UTSF MY-06					
Particle	Millimeter	Material	Count	Item %	Cum %
Silt/Clay	< 0.062	S/C	40	39%	39%
Very Fine	.062 - .125	S		0%	39%
Fine	.125 - .25	A		0%	39%
Medium	.25 - .50	N	5	5%	44%
Coarse	.50 - 1	D	18	17%	61%
Very Coarse	1 - 2	S	13	13%	74%
Very Fine	2 - 4		8	8%	82%
Fine	4 - 5.7	G	3	3%	84%
Fine	5.7 - 8	R	7	7%	91%
Medium	8 - 11.3	A	5	5%	96%
Medium	11.3 - 16	V	2	2%	98%
Coarse	16 - 22.6	E		0%	98%
Coarse	22.6 - 32	L	1	1%	99%
Very Coarse	32 - 45	S		0%	99%
Very Coarse	45 - 64			0%	99%
Small	64 - 90	C		0%	99%
Small	90 - 128	O	1	1%	100%
Large	128 - 180	B		0%	100%
Large	180 - 256	L		0%	100%
Small	256 - 362	B		0%	100%
Small	362 - 512	L		0%	100%
Medium	512 - 1024	D		0%	100%
Lrg- Very Lrg	1024 - 2048	R		0%	100%
Bedrock	>2048	BDRK		0%	100%
Total			103	100%	100%
Size (mm)		Type			
D50	0.64	silt/clay	39%		
D84	5.6	sand	35%		
D95	10	gravel	25%		
		cobble	1%		



Cross-Section 9 Riffle - UTSF MY-06					
Particle	Millimeter	Material	Count	Item %	Cum %
Silt/Clay	< 0.062	S/C	12	12%	12%
Very Fine	.062 - .125	S	3	3%	15%
Fine	.125 - .25	A	7	7%	22%
Medium	.25 - .50	N	8	8%	30%
Coarse	.50 - 1	D	9	9%	39%
Very Coarse	1 - 2	S	15	15%	54%
Very Fine	2 - 4	G	19	19%	73%
Fine	4 - 5.7		7	7%	80%
Fine	5.7 - 8	R	9	9%	89%
Medium	8 - 11.3	A	3	3%	92%
Medium	11.3 - 16	V	6	6%	98%
Coarse	16 - 22.6	E	2	2%	100%
Coarse	22.6 - 32	L		0%	100%
Very Coarse	32 - 45	S		0%	100%
Very Coarse	45 - 64			0%	100%
Small	64 - 90	C		0%	100%
Small	90 - 128	O		0%	100%
Large	128 - 180	B		0%	100%
Large	180 - 256	L		0%	100%
Small	256 - 362	B		0%	100%
Small	362 - 512	L		0%	100%
Medium	512 - 1024	D		0%	100%
Lrg- Very Lrg	1024 - 2048	R		0%	100%
Bedrock	>2048	BDRK		0%	100%
Total			100	100%	100%
Size (mm)		Type			
D50	1.7	silt/clay	12%		
D84	6.8	sand	42%		
D95	13	gravel	46%		
		cobble	0%		

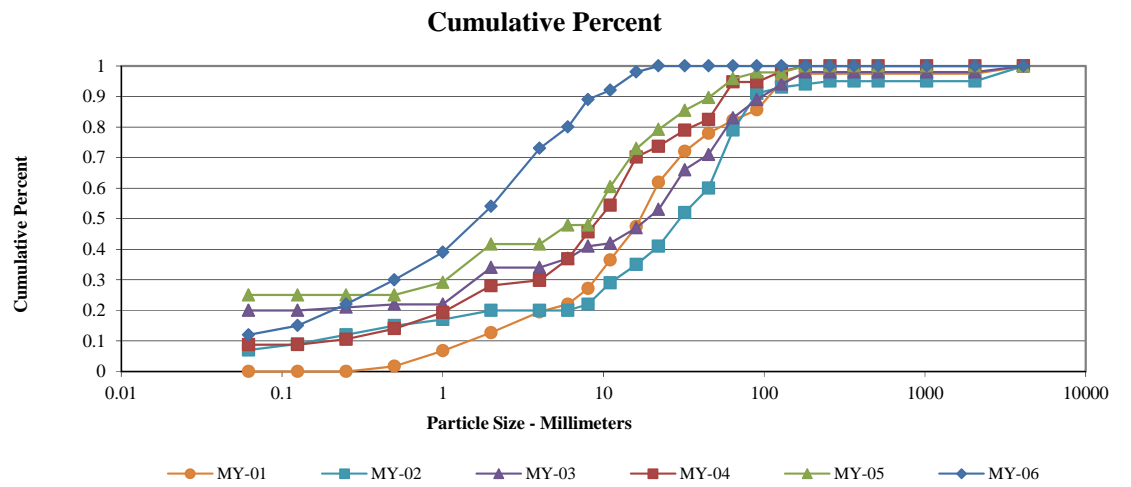
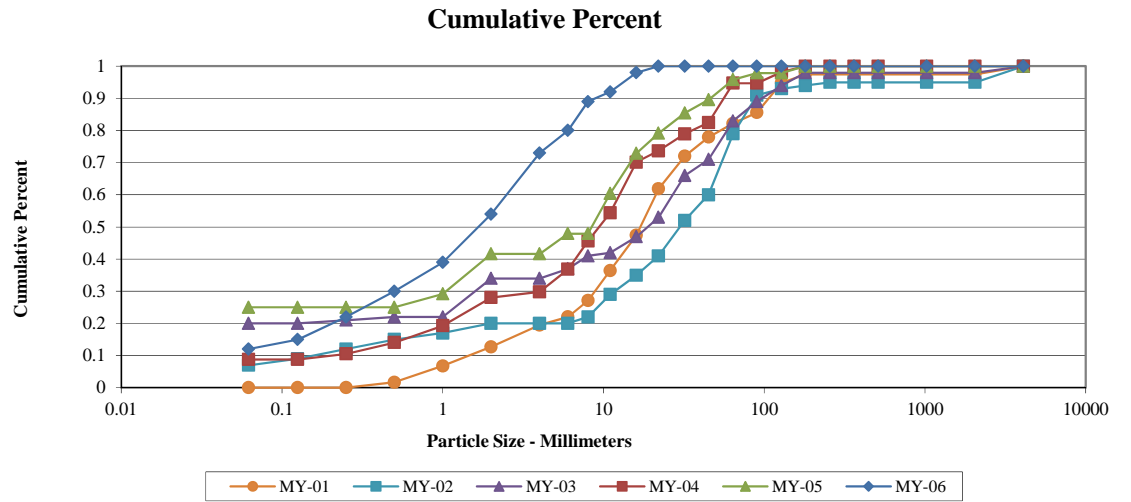


Table 10a. Baseline Stream Data Summary
 UT to South Fork Creek (Stephens) No. 405 Reach: A [Sta 6+00 - 18+75] (1275 feet)

Parameter	Gauge ²	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		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
Bankfull Width (ft)							11.4					11.6					12			13.37	15.76	15.76	18.15	2.75	4
Floodprone Width (ft)							14.9					41.3					≥ 36			78.21	106.5	113.64	120.5	19.27	4
Bankfull Mean Depth (ft)							1.3					1					1.2			2.07	2.54	2.67	2.77	0.32	4
¹ Bankfull Max Depth (ft)							1.6					1.4					1.9			2.07	2.57	2.7	2.81	0.34	4
Bankfull Cross Sectional Area (ft ²)							14.8					11.6					14.7			15.35	23.67	25.01	29.31	5.92	4
Width/Depth Ratio							8.7					11.6					9.8			4.76	6.17	6.55	6.79	0.95	4
Entrenchment Ratio							1.3					3.6					≥ 3.0			5.85	6.8	6.53	8.29	1.05	4
¹ Bank Height Ratio							2.7					1					1			1	1.02	1.02	1.03	0.01	4
Profile																									
Riffle Length (ft)					1.1			37.2			4			38.9			10		10	11.59	34.45	24.17	95.87	27.14	10
Riffle Slope (ft/ft)																				0.006	0.011	0.011	0.021	0.004	10
Pool Length (ft)					5			26.2			14.8			42.8			20		20	12.1	36.82	34.6	66.9	13.98	14
Pool Max depth (ft)																									
Pool Spacing (ft)					19			509			17			159			30		55	24	70.79	58.79	154.1	39.79	18
Pattern																									
Channel Beltwidth (ft)					2			36			19.1			41.2			25		65	32.967	46.967	45.467	66.967	8.8377	20
Radius of Curvature (ft)					3.7			69.4			9.4			81.2			40		60	28.99	40.139	38.995	64.66	7.7822	20
Rc:Bankfull width (ft/ft)					0.3			6.1			0.8			7			3.3		5						
Meander Wavelength (ft)					30			247			43.3			46.2			85		150	90	108.63	105	140	13.639	19
Meander Width Ratio					2.6			21.7			3.7			4			7.1		12.5	1.6511	2.3523	2.2771	3.3539	0.4426	20
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								G4c						E4b					E4					E4	
Bankfull Velocity (fps)								3.1						4.3					3.1						
Bankfull Discharge (cfs)								45						50											
Valley length (ft)														424.4											
Channel Thalweg length (ft)														459.5											1275
Sinuosity (ft)								1.17						1.08					0.09						1.19
Water Surface Slope (Channel) (ft/ft)								0.0031						0.022					0.0039						0.0044
BF slope (ft/ft)								0.0043						0.023					0.0043						0.0041
³ Bankfull Floodplain Area (acres)																									
⁴ % 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 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

3. Utilizing survey data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.

4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 10a. Baseline Stream Data Summary
 UT to South Fork Creek (Stephens) No. 405 Reach: B [Sta 18+75 - 25+00] (625 feet)

Parameter	Gauge ²	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		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
Bankfull Width (ft)							11.4						11.6					12		14.6	18.56	14.9	29.84	7.53	4
Floodprone Width (ft)							14.9						41.3					≥ 36		49.52	78.82	76.33	113.09	29.43	4
Bankfull Mean Depth (ft)							1.3						1					1.2		2.01	2.65	2.69	3.19	0.5	4
¹ Bankfull Max Depth (ft)							1.6						1.4					1.9		2.04	2.74	2.8	3.32	0.54	4
Bankfull Cross Sectional Area (ft ²)							14.8						11.6					14.7		21.85	30.41	27.39	45.01	10.15	4
Width/Depth Ratio							8.7						11.6					9.8		4.4	6.87	6.48	10.12	2.49	4
Entrenchment Ratio							1.3						3.6					≥ 3.0		3.12	4.55	3.67	7.75	2.17	4
¹ Bank Height Ratio							2.7						1					1		1.03	1.07	1.08	1.09	0.03	4
Profile																									
Riffle Length (ft)					1.1			37.2			4			38.9			10		10						
Riffle Slope (ft/ft)																									
Pool Length (ft)					5			26.2			14.5			42.8			20		20						
Pool Max depth (ft)																									
Pool Spacing (ft)					19			509			17			154			30		55						
Pattern																									
Channel Beltwidth (ft)					2			36			19.1			41.2			25		40	33.2	53.95	56.2	70.2	15.671	4
Radius of Curvature (ft)					3.7			69.4			9.4			81.2			40		100	34.58	37.078	35.83	40.52	2.4743	6
Rc:Bankfull width (ft/ft)					0.3			6.1			0.8			7			3.3		8.3						
Meander Wavelength (ft)					30			247			43.3			46.2			90		130	120	136.25	137.5	150	13.769	4
Meander Width Ratio					2.6			21.7			3.7			4			7.5		10.8	1.82	2.96	3.0879	3.8571	0.861	4
Transport parameters																									
Reach Shear Stress (competency) lb/f ²																									
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m ²																									
Additional Reach Parameters																									
Rosgen Classification								G4c					E4b				E4						E4		
Bankfull Velocity (fps)								3.1					4.3				3.1								
Bankfull Discharge (cfs)								45					50												
Valley length (ft)													424.4												
Channel Thalweg length (ft)													459.5											625	
Sinuosity (ft)								1.17					1.08				0.09						1.08		
Water Surface Slope (Channel) (ft/ft)								0.0031					0.022				0.0039						0.0057		
BF slope (ft/ft)								0.0043					0.023				0.0043						0.0049		
³ Bankfull Floodplain Area (acres)																									
⁴ % 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 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

3. Utilizing survey data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.

4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 10a. Baseline Stream Data Summary
 UT to South Fork Creek (Stephens) No. 405 Reach: C [Sta 29+00 - 40+00] (1100 feet)

Parameter	Gauge ²	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		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
Bankfull Width (ft)							11.4						11.6				12			16.98	18.44	18.19	20.19	1.39	7
Floodprone Width (ft)							14.9						41.3				≥ 36			80	103.11	100.9	134.45	22.9	7
Bankfull Mean Depth (ft)							1.3						1				1.2			2.84	3.27	3.18	3.77	0.36	7
¹ Bankfull Max Depth (ft)							1.6						1.4				1.9			2.86	3.36	3.18	4	0.42	7
Bankfull Cross Sectional Area (ft ²)							14.8						11.6				14.7			28.16	38.51	37.44	49.25	7.24	7
Width/Depth Ratio							8.7						11.6				9.8			4.8	5.55	5.46	6.83	0.8	7
Entrenchment Ratio							1.3						3.6				≥ 3.0			3.96	5.67	5.51	7.92	1.57	7
¹ Bank Height Ratio							2.7						1				1			1	1.05	1.05	1.13	0.05	7
Profile																									
Riffle Length (ft)					1.1			37.2			4			38.9			12		12						
Riffle Slope (ft/ft)																	2.1		9.3						
Pool Length (ft)					5			26.2			14.8			42.8			24		24						
Pool Max depth (ft)																									
Pool Spacing (ft)					19			509			17			159			31		50						
Pattern																									
Channel Beltwidth (ft)					2			36			19.1			41.2			25		40	45.967	68.167	58.967	114.97	23.957	10
Radius of Curvature (ft)					3.7			69.4			9.4			81.2			40		100	35.75	47.407	49.56	58.12	6.8513	11
Rc:Bankfull width (ft/ft)					0.3			6.1			0.8			7			3.3		8.3						
Meander Wavelength (ft)					30			247			43.3			46.2			90		130	105	147.5	160	170	24.296	10
Meander Width Ratio					2.6			21.7			3.7			4			7.5		10.8	2.3022	3.414	2.9533	5.7579	1.1999	10
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								G4c					E4b				E4							E4	
Bankfull Velocity (fps)								3.1					4.3				2.7								
Bankfull Discharge (cfs)								45					50												
Valley length (ft)													424.4												
Channel Thalweg length (ft)													459.5											1100	
Sinuosity (ft)								1.17					1.08											1.48	
Water Surface Slope (Channel) (ft/ft)								0.0031					0.022											0.0023	
BF slope (ft/ft)								0.0043					0.023											0.0025	
³ Bankfull Floodplain Area (acres)																									
⁴ % 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 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).
 3. Utilizing survey data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.
 4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

**Table 10b. Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions)
UT to South Fork Creek (Stephens) No. 405 Reach: A [Sta 6+00 - 18+75] (1275 feet)**

Parameter	Pre-Existing Condition					Reference Reach(es) Data					Design					As-built/Baseline									
¹ Ri% / Ru% / P% / G% / S%																					27%		40%		
¹ SC% / Sa% / G% / C% / B% / Be%																									
¹ d16 / d35 / d50 / d84 / d95 / di ^p / di ^{sp} (mm)	Silt/Clay		4	22.6		Silt/Clay		4	128																
² Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10																									
³ Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0																									

UT to South Fork Creek (Stephens) No. 405 Reach: B [Sta 18+75 - 25+00] (625 feet)

Parameter	Pre-Existing Condition					Reference Reach(es) Data					Design					As-built/Baseline									
¹ Ri% / Ru% / P% / G% / S%																					25%		39%		
¹ SC% / Sa% / G% / C% / B% / Be%																									
¹ d16 / d35 / d50 / d84 / d95 / di ^p / di ^{sp} (mm)	Silt/Clay		4	22.6		Silt/Clay		4	128																
² Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10																									
³ Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0																									

UT to South Fork Creek (Stephens) No. 405 Reach: C [Sta 29+00 - 40+00] (1100 feet)

Parameter	Pre-Existing Condition					Reference Reach(es) Data					Design					As-built/Baseline									
¹ Ri% / Ru% / P% / G% / S%																					28%		50%		
¹ SC% / Sa% / G% / C% / B% / Be%																									
¹ d16 / d35 / d50 / d84 / d95 / di ^p / di ^{sp} (mm)	Silt/Clay		4	22.6		Silt/Clay		4	128																
² Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10																									
³ Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0																									

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

1 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

2 = Entrenchment Class - Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as visual estimates

3 = Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as the longitudinal profile

Footnotes 2,3 - These classes are loosely built around the Rosgen classification and hazard ranking breaks, but were adjusted slightly to make for easier assignment to somewhat coarser bins based on visual estimates in the field such that measurement of every segment for ER would not be necessary.

The intent here is to provide the reader/consumer of design and monitoring information with a good general sense of the extent of hydrologic containment in the pre-existing and the rehabilitated states as well as comparisons to the reference distributions.

ER and BHR have been addressed in prior submissions as a subsample (cross-sections as part of the design survey), however, these subsamples have often focused entirely on facilitating design without providing a thorough pre-construction distribution of these parameters, leaving the reader/consumer with a sample that is weighted heavily on the stable sections of the reach. This means that the distributions for these parameters should include data from both the cross-section surveys and the longitudinal profile and in the case of ER, visual estimates. For example, the typical longitudinal profile permits sampling of the BHR at riffles beyond those subject to cross-sections and therefore can be readily integrated and provide a more complete sample distribution for these parameters, thereby providing the distribution/coverage necessary to provide meaningful comparisons.

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections) UT to South Fork Creek (Stephens) No. 405 Reach: A [Sta 6+00 - 18+75] (1275 feet)																								
Based on fixed baseline bankfull elevation ¹	Cross Section 1 (Riffle)						Cross Section 2 (Riffle)						Cross Section 3 (Riffle)						Cross Section 4 (Riffle)					
	Base/MY1	MY2	MY3	MY4	MY5	MY6	Base/MY1	MY2	MY3	MY4	MY5	MY6	Base/MY1	MY2	MY3	MY4	MY5	MY6	Base/MY1	MY2	MY3	MY4	MY5	MY6
Record elevation (datum) used	604.41	604.70	604.41	604.41	604.41	604.41	603.98	603.96	603.98	603.98	603.98	603.98	603.14	603.16	603.14	603.14	603.14	603.14	602.09	602.05	602.09	602.09	602.09	602.09
Bankfull Width (ft)	11.4	12.4	12.3	10.2	10.5	8.7	17.0	12.9	19.1	16.6	12.2	15.1	19.7	21.3	15.1	15.7	18.7	17.4	17.0	16.9	18.3	16.0	15.3	17.0
Floodprone Width (ft)	147	148	148	148	148	148	160	170	170	160	160	160	190	190	190	190	190	190	160	160	160	160	160	160
Bankfull Mean Depth (ft)	1.3	1.4	1.2	1.3	1.1	1.0	1.0	1.0	0.8	0.8	1.0	1.0	0.9	0.8	1.1	1.0	0.8	1.2	1.0	1.0	1.0	1.2	1.1	1.0
Bankfull Max Depth (ft)	2.3	2.3	2.3	2.2	2.1	2.1	2.2	2.0	2.4	2.1	2.1	2.4	2.5	2.4	2.6	2.7	2.6	2.7	2.2	2.2	2.3	2.5	2.6	2.9
Bankfull Cross Sectional Area (ft ²)	14.8	17.2	14.4	13.0	12.0	8.8	17.5	12.8	15.8	12.7	11.6	15.1	17.0	17.9	16.0	16.0	15.9	20.7	17.5	17.1	18.7	18.9	17.3	24.9
Bankfull Width/Depth Ratio	8.7	9.0	10.4	7.9	9.2	8.7	16.6	12.9	23.0	21.7	12.9	15.1	22.8	25.3	14.3	15.5	22.1	14.6	16.6	16.7	17.9	13.5	13.5	25.8
Bankfull Entrenchment Ratio	12.9	11.9	12.1	14.6	14.1	10.8	9.4	13.2	8.9	10.3	13.9	5.5	9.6	8.9	12.6	12.1	10.1	2.9	9.4	9.4	8.8	10.0	10.4	3.1
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.1	1.1	1.0	1.0	0.9	0.9	0.9	1.0	1.0	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0
Cross Sectional Area between end pins (ft ²)			218.8	225.5	218.6	221.3			96.4	97.7	97.3	104.0			51.4	49.6	51.3	59.7			64.5	68.8	66.2	77.9
d50 (mm)	0.5	silt	silt	0.1	0.1	silt	36.3	0.4	0.2	4.5	1.8		0.2	0.2	0.1	0.1	0.1		36.3	21.7	13.5	12.5	9.9	20.0

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections) UT to South Fork Creek (Stephens) No. 405 Reach: B [Sta 18+75 - 25+00] (625 feet)												
Based on fixed baseline bankfull elevation ¹	Cross Section 5 (Riffle)					Cross Section 6 (Riffle)						
	Base/MY1	MY2	MY3	MY4	MY5	MY6	Base/MY1	MY2	MY3	MY4	MY5	MY6
Record elevation (datum) used	599.73	599.83	599.73	599.73	599.73	599.73	597.79	598.09	597.79	597.79	597.79	597.79
Bankfull Width (ft)	18.1	20.6	20.4	19.0	18.2	20.0	18.3	20.1	18.4	18.0	17.4	17.6
Floodprone Width (ft)	170	170	170	170	170	170	83.5	83.5	83.5	83.5	83.5	83.5
Bankfull Mean Depth (ft)	1.2	1.1	1.3	1.3	1.1	1.2	1.5	1.5	1.4	1.4	1.4	1.4
Bankfull Max Depth (ft)	2.2	2.3	2.5	2.5	2.4	2.9	2.8	3.0	2.8	2.8	2.9	2.8
Bankfull Cross Sectional Area (ft ²)	22.2	23.5	25.8	23.9	20.1	27.0	28.2	30.8	26.3	26.0	25.1	25.3
Bankfull Width/Depth Ratio	14.8	18.0	16.1	15.1	16.5	19.5	11.9	13.1	12.9	12.5	12.1	12.3
Bankfull Entrenchment Ratio	9.4	8.3	8.3	9.0	9.3	2.5	4.6	4.3	4.5	4.6	4.8	3.8
Bankfull Bank Height Ratio	1.0	1.0	1.0	0.9	0.9	1.0	1.0	1.0	1.1	1.0	0.7	1.0
Cross Sectional Area between end pins (ft ²)			78.2	79.2	75.6	87.6			163.9	163.5	162.1	143.0
d50 (mm)	2.0	1.1	11.0	4.3	4.6		21.3	7.6	28.9	15.2	15.6	

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections) UT to South Fork Creek (Stephens) No. 405 Reach: C [Sta 29+00 - 40+00] (1100 feet)																								
Based on fixed baseline bankfull elevation ¹	Cross Section 7 (Riffle)					Cross Section 8 (Riffle)					Cross Section 9 (Riffle)													
	Base/MY1	MY2	MY3	MY4	MY5	MY6	Base/MY1	MY2	MY3	MY4	MY5	MY6	Base/MY1	MY2	MY3	MY4	MY5	MY6	Base/MY1	MY2	MY3	MY4	MY5	MY6
Record elevation (datum) used	596.66	596.65	596.66	596.66	596.66	596.66	596.66	596.65	596.66	596.66	596.66	596.66	596.10	596.01	596.10	596.10	596.10	596.10	594.20	594.09	594.20	594.20	594.20	594.20
Bankfull Width (ft)	17.7	17.9	17.2	17.6	17.4	17.2	17.7	17.9	17.2	17.6	17.4	17.2	18.0	17.7	16.0	17.7	17.0	17.2	15.8	15.6	32.6	15.3	15.3	14.7
Floodprone Width (ft)	190	190	190	190	190	190	190	190	190	190	190	190	200	200	200	200	200	200	135	135	135	135	135	135
Bankfull Mean Depth (ft)	1.6	1.6	1.7	2.1	1.6	1.4	1.6	1.6	1.7	2.1	1.6	1.4	1.6	1.6	1.7	1.5	1.5	1.5	1.7	1.6	0.8	1.9	1.7	1.4
Bankfull Max Depth (ft)	2.7	2.8	2.8	2.8	2.7	2.7	2.7	2.8	2.8	2.8	2.7	2.7	2.8	2.8	2.9	3.0	2.9	3.2	2.7	2.6	2.7	2.8	2.7	2.6
Bankfull Cross Sectional Area (ft ²)	28.8	28.4	28.8	37.2	27.1	22.7	28.8	28.4	28.8	37.2	27.1	22.7	28.2	28.7	26.7	26.6	25.2	27.1	26.6	25.5	27.0	28.7	26.3	21.1
Bankfull Width/Depth Ratio	10.9	11.3	10.3	8.3	11.2	11.0	10.9	11.3	10.3	8.3	11.2	11.0	11.4	11.0	9.7	11.7	11.4	12.7	9.4	9.6	39.3	8.2	8.9	10.3
Bankfull Entrenchment Ratio	10.7	10.6	11.1	10.8	10.9	4.7	10.7	10.6	11.1	10.8	10.9	4.7	11.1	11.3	12.5	11.3	11.8	5.2	8.6	8.6	4.1	8.8	8.9	6.0
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Cross Sectional Area between end pins (ft ²)			79.9	79.0	78.4	83.4			79.9	79.0	78.4	83.4			424.4	419.7	439.8	114.3 ^a			237.4	246.3	244.1	227.8
d50 (mm)	0.9	1.9	0.7	0.9	0.1	0.6	0.9	1.9	0.7	0.9	0.1	0.6	1.3	0.6	0.2	0.2	1.2		17.1	30.2	19.0	9.5	9.0	1.7

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

a= discrepancy in area due to lack of right bank pin

**Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
UT to South Fork Creek (Stephens) No. 405 Reach: A [Sta 6+00 - 18+75] (1275 feet)**

Parameter	Baseline/MY-01 (2010)						MY-2 (2010)						MY-3 (2010)						MY-4 (2011)						MY-5 (2012)						MY-6 (2013)					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n
Bankfull Width (ft)	11.4	16.3	17.0	19.7	3.5	4	12.4	15.9	14.9	21.3	4.2	4	12.3	16.2	16.7	19.1	3.1	4	10.2	14.6	15.9	16.6	3.0	4	10.5	14.2	13.8	18.7	3.6	4	8.7	16.6	16.3	25.3	6.9	4
Floodprone Width (ft)	146.5	164	160	190	18	4	147.6	167	165	190	18	4	148	167	165	190	18	4	148	165	160	190	18	4	148	165	160	190	18	4	148	164.5	160	190	18	4
Bankfull Mean Depth (ft)	0.9	1.1	1.0	1.3	0.2	4	0.8	1.1	1.0	1.4	0.2	4	0.8	1.0	1.0	1.2	0.1	4	0.8	1.1	1.1	1.3	0.2	4	0.8	1.0	1.0	1.1	0.1	4	1.0	1.1	1.0	1.2	0.1	4
¹ Bankfull Max Depth (ft)	2.2	2.3	2.2	2.5	0.2	4	2.0	2.2	2.3	2.4	0.2	4	2.3	2.4	2.3	2.6	0.1	4	2.1	2.3	2.3	2.7	0.3	4	2.1	2.3	2.3	2.6	0.3	4	2.1	2.5	2.6	2.9	0.4	4
Bankfull Cross Sectional Area (ft ²)	14.8	16.7	17.2	17.5	1.3	4	12.8	16.3	17.2	17.9	2.3	4	14.4	16.2	15.9	18.7	1.8	4	12.7	15.2	14.5	18.9	2.9	4	11.6	14.2	14.0	17.3	2.8	4	8.8	17.4	17.9	24.9	7.0	4
Width/Depth Ratio	8.7	16.2	16.6	22.8	5.8	4	9.0	16.0	14.8	25.3	7.0	4	10.4	16.4	16.1	23.0	5.4	4	7.9	14.6	14.5	21.7	5.7	4	9.2	14.4	13.2	22.1	5.4	4	8.7	16.1	14.9	25.8	7.1	4
Entrenchment Ratio	9.4	10.3	9.5	12.9	1.7	4	8.9	10.9	10.7	13.2	2.0	4	8.8	10.6	10.5	12.6	2.0	4	10.0	11.7	11.2	14.6	2.1	4	10.1	12.1	12.2	14.1	2.1	4	2.9	5.6	4.3	10.8	3.7	4
¹ Bank Height Ratio	0.9	1.0	1.0	1.0	0.0	4	0.9	1.0	1.0	1.0	0.0	4	0.9	1.0	1.0	1.0	0.1	4	0.9	1.0	1.0	1.1	0.1	4	1.0	1.0	1.0	1.1	0.0	4	1.0	1.0	1.0	1.0	0.0	4
Profile																																				
Riffle Length (ft)	11.6	34.4		95.9			5.3	35.6	25.1	107.7	34.0	14	4.6	38.5	25.2	101.4	30.9	16	2.0	21.7	9.6	155.5	33.0	20	8.3	37.0	32.2	84.2	23.8	14	4.7	21.4	17.9	34.9	13.0	5
Riffle Slope (ft/ft)	0.0	0.0		0.0			0.0	0.0	0.0	0.0	0.0	14	0.0	0.0	0.0	0.1	0.0	12	0.0	0.0	0.0	0.1	0.0	17	0.0	0.0	0.0	0.0	0.0	13	0.01	0.02	0.02	0.05	0.01	5
Pool Length (ft)	12.1	36.8		66.9			18.5	47.8	45.0	95.2	21.1	14	14.9	37.4	34.0	83.5	16.1	16	14.5	41.7	36.2	85.4	21.8	20	14.6	47.1	39.6	117.3	28.8	13	10.6	17.3	17.2	29.9	7.8	5
Pool Max depth (ft)							2.1	2.4	2.4	2.9	0.6	14	2.6	3.2	3.1	4.5	0.5	16	2.3	2.7	2.8	3.8	0.3	20	2.3	2.7	2.6	3.8	0.4	13	0.9	1.3	1.2	1.9	0.4	5
Pool Spacing (ft)	24.0	70.8		154.0			19.8	75.5	61.8	149.9	38.5	14	19.5	72.6	57.3	152.1	40.9	15	28.1	62.0	54.2	177.5	36.0	19	43.9	84.3	68.2	151.2	37.8	12	16.0	235.5	300.5	325.0	147.1	4
Pattern																																				
Channel Beltwidth (ft)	33.0	47.0		67.0																																
Radius of Curvature (ft)	29.0	40.1		64.7																																
Rc:Bankfull width (ft/ft)	90.0	109.0		140.0																																
Meander Wavelength (ft)	1.7	2.4		3.4																																
Meander Width Ratio																																				
Additional Reach Parameters																																				
Rosgen Classification	E4						E4						E4						E4						E4											
Channel Thalweg length (ft)	1275						1275						1281						1275						1275											
Sinuosity (ft)	1.19						1.19						1.2						1.19						1.19											
Water Surface Slope (Channel) (ft/ft)	0.0044						0.0044						N/A						0.0047						0.0048											
BF slope (ft/ft)	0.0041						0.004						0.0051						0.0040						0.0042											
³ Ri% / Ru% / P% / G% / S%	27%		40%				39%		56%				48%		47%				34%		65%				41%		48%									
³ SC% / Sa% / G% / C% / B% / Be%													4.3%	63.3%	29.3%	3.0%	0.0%	0.2%	46.8%	15.0%	36.3%	1.9%	0.0%	0.0%	44.8%	0.2	33.7%	3.4%	0.0%	0.0%	28%	21%	50%	1%	0%	0%
³ d16 / d35 / d50 / d84 / d95 /													0.083	0.10746	3.4826	17.79	33.75	0.3928	2.2	4.2991	11.44	34.69	0.1132	2.0	2.9573	18.75	37.6									
² % of Reach with Eroding Banks							1%						3%						5%						0%											
Channel Stability or Habitat Metric																																				
Biological or Other																																				

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

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

**Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
UT to South Fork Creek (Stephens) No. 405 Reach: B [Sta 18+75 - 25+00] (625 feet)**

Parameter	Baseline/MY-01 (2010)						MY-2 (2010)						MY-3 (2010)						MY-4 (2011)						MY-5 (2012)						MY-6 (2013)					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n
Bankfull Width (ft)	18.1	18.2	18.2	18.3	0.2	2	20.1	20.3	20.3	20.6	0.3	2	18.4	19.4	19.4	20.4	1.4	2	18.0	18.5	18.5	19.0	0.7	2	17.4	17.8	17.8	18.2	0.6	2	17.6	20.3	20.3	23.0		2
Floodprone Width (ft)	83.5	126.8	126.8	170.0	61.1	2	83.5	126.8	126.8	170.0	61.2	2	83.5	126.8	126.8	170.0	61.2	2	83.5	126.8	126.8	170.0	61.2	2	83.5	126.8	126.8	170.0	61.2	2	83.5	126.8	126.8	170.0		2
Bankfull Mean Depth (ft)	1.2	1.4	1.4	1.5	0.2	2	1.1	1.3	1.3	1.5	0.3	2	1.3	1.3	1.3	1.4	0.1	2	1.3	1.3	1.3	1.4	0.1	2	1.1	1.3	1.3	1.4	0.2	2	1.2	1.3	1.3	1.4		2
¹ Bankfull Max Depth (ft)	2.2	2.5	2.5	2.8	0.4	2	2.3	2.6	2.6	3.0	0.5	2	2.5	2.7	2.7	2.8	0.2	2	2.5	2.7	2.7	2.8	0.2	2	2.4	2.6	2.6	2.9	0.4	2	2.8	2.9	2.9	2.9		2
Bankfull Cross Sectional Area (ft ²)	22.2	25.2	25.2	28.2	4.2	2	23.5	27.1	27.1	30.8	5.2	2	25.8	26.1	26.1	26.3	0.4	2	23.9	24.9	24.9	26.0	1.5	2	20.1	22.6	22.6	25.1	3.5	2	25.3	26.2	26.2	27.0		2
Width/Depth Ratio	11.9	13.4	13.4	14.8	2.0	2	13.1	15.6	15.6	18.0	3.5	2	12.9	14.5	14.5	16.1	2.2	2	12.5	13.8	13.8	15.1	1.8	2	12.1	14.3	14.3	16.5	3.1	2	12.3	15.9	15.9	19.5		2
Entrenchment Ratio	4.6	7.0	7.0	9.4	3.4	2	4.3	6.3	6.3	8.3	2.8	2	4.5	6.4	6.4	8.3	2.7	2	4.6	6.8	6.8	9.0	3.1	2	4.8	7.1	7.1	9.3	3.2	2	2.5	3.2	3.2	3.8		2
¹ Bank Height Ratio	1.0	10.3	10.3	19.5	13.1	2	1.0	11.3	11.3	21.5	14.5	2	1.0	1.0	1.0	1.1	0.1	2	0.9	0.9	0.9	1.0	0.1	2	0.7	0.8	0.8	0.9	0.1	2	1.0	1.0	1.0	1.0		2
Profile																																				
Riffle Length (ft)	12.2	19.3		32.1			14.5	26.7	23.2	56.2	14.6	7	9.1	42.4	33.3	79.5	25.7	8	2.0	31.9	27.8	88.7	32.3	9	12.8	28.4	21.8	80.2	21.9	8	No identifiable riffles					
Riffle Slope (ft/ft)	0.006	0.021		0.043			0.001	0.0	0.01	0.025	0.009	6	0.001	0.0066	0.0051	0.014	0.005	8	0.0037	0.01	0.009	0.029	0.009	9	0.003	0.01	0.0078	0.033	0.01	7						
Pool Length (ft)	10.7	27.4		53.8			14.0	34.0	32.2	51.7	12.1	8	14.8	35.3	32.3	83.9	22.2	8	14.4	39.3	38.1	78.2	23.0	8	13.3	23.7	21.1	46.6	11.5	8	9.0	24.6	18.7	52.2	19.2	4
Pool Max depth (ft)							1.8	3.2	3.0	6.1	1.3	8	2.8	4.2	4.0	6.6	1.1	8	2.8	4.1	4.0	6.4	1.1	8	2.6	3.7	3.7	4.3	0.5	8	0.8	1.9	1.6	3.9	1.3	4
Pool Spacing (ft)	54.0	77.3		118.0			33.5	70.1	59.0	132.5	31.9	7	34.7	78.2	77.4	114.7	29.1	7	28.9	66.6	52.3	122.1	35.9	7	27.9	51.3	42.0	119.0	31.8	7	86.7	134.6	141.0	176.0		3
Pattern																																				
Channel Beltwidth (ft)	33.2	54		70.2																																
Radius of Curvature (ft)	34.6	37.1		40.5																																
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)	120	136		150																																
Meander Width Ratio	1.82	2.96		3.86																																
Additional Reach Parameters																																				
Rosgen Classification	E4						E4						E4						E4						E4											
Channel Thalweg length (ft)	625						625						630						625						625											
Sinuosity (ft)	1.08						1.08						1.09						1.08						1.08											
Water Surface Slope (Channel) (ft/ft)	0.0057						0.007						N/A						0.0055						0.0051											
BF slope (ft/ft)	0.0049						0.005						0.0025						0.0045						0.0053											
³ Ri% / Ru% / P% / G% / S%	25%		39%				30%		43%				54%		45%				46%		50%				36%		30%									
³ SC% / Sa% / G% / C% / B% / Be%													6.5%	32.2%	56.5%	4.3%	0.0%	0.5%	10.9%	15.2%	69.0%	4.8%	0.0%	0.0%	16.9%	18.4%	59.3%	4.5%	0.0%	0.9%	28%	21%	50%	1%	0%	0%
³ d16 / d35 / d50 / d84 / d95 /													0.162	9.98915	14.497	33.33	46.18		0.1635	5.8	9.7197	32.36	50.55		0.7044	4.4	10.092	31.59	66.01				6	14	24	
² % of Reach with Eroding Banks							1%						1%						0%						0%											
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

Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
UT to South Fork Creek (Stephens) No. 405 Reach: C [Sta 29+00 - 40+00] (1100 feet)

Parameter	Baseline/MY-01 (2010)						MY-2 (2010)						MY-3 (2010)						MY-4 (2011)						MY-5 (2012)						MY-6 (2013)							
	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n	Min	Mean	Med	Max	SD ⁴	n		
Dimension and Substrate - Riffle only																																						
Bankfull Width (ft)	15.8	17.1	17.7	17.7	1.1	3	15.6	17.2	17.9	17.9	1.3	3	16.0	21.9	17.2	32.6	9.2	3	15.3	16.9	17.6	17.7	1.3	3	15.3	16.6	17.0	17.4	1.1	3	14.7	16.3	15.8	18.5		3		
Floodprone Width (ft)	135.0	171.7	190.0	190.0	31.8	3	135.0	171.7	190.0	190.0	31.8	3	135.0	175.0	190.0	200.0	35.0	3	135.0	175.0	190.0	200.0	35.0	3	135.0	175.0	190.0	200.0	35.0	3	135.0	175.0	190.0	200.0		3		
Bankfull Mean Depth (ft)	1.6	1.6	1.6	1.7	0.0	3	1.6	1.6	1.6	1.6	0.0	3	0.8	1.4	1.7	1.7	0.5	3	1.5	1.8	1.9	2.1	0.3	3	1.5	1.6	1.6	1.7	0.1	3	1.4	1.4	1.4	1.5		3		
¹ Bankfull Max Depth (ft)	2.7	2.7	2.7	2.7	0.0	3	2.6	2.7	2.8	2.8	0.1	3	2.7	2.8	2.8	2.9	0.1	3	2.8	2.8	2.8	3.0	0.1	3	2.7	2.8	2.7	2.9	0.1	3	2.6	2.8	2.7	3.2		3		
Bankfull Cross Sectional Area (ft ²)	26.6	28.1	28.8	28.8	1.3	3	25.5	27.5	28.4	28.4	1.7	3	26.7	27.5	27.0	28.8	1.2	3	26.6	30.8	28.7	37.2	5.6	3	25.2	26.2	26.3	27.1	0.9	3	21.1	23.6	22.7	27.1		3		
Width/Depth Ratio	9.4	10.4	10.9	10.9	0.9	3	9.6	10.7	11.3	11.3	1.0	3	9.7	19.7	10.3	39.3	16.9	3	8.2	9.4	8.3	11.7	2.0	3	8.9	10.5	11.2	11.4	1.4	3	10.3	11.3	11.0	12.7		3		
Entrenchment Ratio	8.6	10.0	10.7	10.7	1.3	3	8.6	9.9	10.6	10.6	1.1	3	4.1	9.2	11.1	12.5	4.5	3	8.8	10.3	10.8	11.3	1.3	3	8.9	10.5	10.9	11.8	1.5	3	4.7	5.3	5.2	6.0		3		
¹ Bank Height Ratio	1.0	1.0	1.0	1.0	-	3	1.0	1.0	1.0	1.0	-	3	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.0	0.0	3	1.0	1.0	1.0	1.1	0.0	3	1.0	1.0	1.0	1.0		3		
Profile																																						
Riffle Length (ft)	8.8	25.7		51.8			7.6	26.2	19.4	52.7	16.0	10	9.0	39.5	27.0	132.6	37.8	11	7.6	37.3	15.0	140.6	40.6	12	8.0	45.9	25.5	162.0	51.5	8	25.0	25.0	25.0	25.0		1		
Riffle Slope (ft/ft)	0	0.014		0.053			0.003	0.019	0.013	0.06	0.016	10	0.001	0.013	0.012	0.03	0.010	9	0.003	0.013	0.010	0.03	0.01	12	0.0013	0.007	0.0056	0.013	0.005	7	0.01	0.01	0.01	0.01		1		
Pool Length (ft)	27.0	49.8		92.0			27.4	70.1	73.9	103.8	27.5	11	25.2	62.7	61.1	108.8	28.1	12	11.8	57.0	51.2	112.2	29.8	11	28.2	72.4	72.7	119.6	32.7	8	37.4	53.2	48.7	73.5		3		
Pool Max depth (ft)							2.4	2.7	2.6	3.2	0.3	10	3.3	3.7	3.7	4.2	0.3	12	3.1	3.5	3.4	4.0	0.3	11	3.3	3.6	3.5	3.9	0.3	8	1.0	1.1	1.1	1.3		3		
Pool Spacing (ft)	20.0	78.0		148.0			30.6	90.0	82.3	202.0	49.7	10	32.2	97.2	95.7	201.3	51.1	12	29.5	91.0	89.5	161.4	44.8	10	77.9	116.9	95.2	196.4	42.7	7	63.5	91.4	91.4	119.3		2		
Pattern																																						
Channel Beltwidth (ft)	46	68.2		115																																		
Radius of Curvature (ft)	35.8	47.4		58.1																																		
Rc:Bankfull width (ft/ft)																																						
Meander Wavelength (ft)	105	148		170																																		
Meander Width Ratio	2.3	3.41		5.76																																		
Additional Reach Parameters																																						
Rosgen Classification	E4						E4						E4						E4						E4													
Channel Thalweg length (ft)	1100						1100						1111						1100						1100													
Sinuosity (ft)	1.48						1.48						1.49						1.48						1.48													
Water Surface Slope (Channel) (ft/ft)	0.0023						0.003						N/A						0.0026						0.0030													
BF slope (ft/ft)	0.0025						0.0031						0.0026						0.0032						0.0027													
³ Ri% / Ru% / P% / G% / S%	28%		50%				24%		70%				40%		68%				41%		57%				33%		53%											
³ SC% / Sa% / G% / C% / B% / Be%													30.9%	27.2%	34.6%	6.7%	0.0%	0.7%	24.9%	26.0%	46.7%	2.4%	0.0%	0.0%	30.0%	21.7%	44.3%	1.3%	0.0%	2.7%	28%	21%	50%	1%	0%	0%		
³ d16 / d35 / d50 / d84 / d95 /													0.094	1.6	6.5556	31.07	71.98		0.2865	1.9	3.5179	21.14	40.05		0.0616	0.7	3.429	19.6	72.9				6	14	24			
² % of Reach with Eroding Banks							1%						2%						1%						0%													
Channel Stability or Habitat Metric																																						
Biological or Other																																						

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

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

Appendix E. Hydrologic Data

Date of Data Collection	Date of Occurrence	Method	Photo #
23-Jun-10	15-May-10	Visual Observation of Wrack Lines	N/A
12-Apr-11	31-Mar-11	Visual Observation of Wrack Lines	See previous report
18-Jan-13	18-Jan-13	A 2.1-inch* rainfall event within 4 hours occurred less than 24 hours after a 1.3 inch rainfall within 6 hours.	N/A
18-Jan-13	18-Jan-13	A 1.6-inch* rainfall event within 1 hour occurred less than 15 hours after a 1.3 inch rainfall within 4 hours	N/A
3-Jan-14	June-July 2014	Visual Observation of Wrack lines, 13.0 inches of rain fell over the course of 39 days	17

* - Reported at USGS 355637079122545 Rain gauge at Berry Andrews Rd near White Cross

Table 13. Wetland Criteria Attainment 2009-2013

Gauge #	2009 (MY-02)			2010 (MY-03)			2011 (MY-04)			2012 (MY-05)			2013 (MY-06)		
	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	Max # Consecutive Days	% Growing Season	Success Criteria Attained
Ref	~	~	~	3 ^b	1%	No	59	26%	Yes	37 ^d	16%	Yes	169	73%	Yes
2	8 ^a	3%	No	20	9%	No	10 ^c	4%	No	18 ^d	8%	No	67	29%	Yes
3	0 ^a	0%	No	79	34%	Yes	72	31%	Yes	73 ^d	32%	Yes	195	84%	Yes
4	0 ^a	0%	No	24	10%	No	34	15%	Yes	15 ^d	7%	No	- ^e	- ^e	- ^e
5	0 ^a	0%	No	43	19%	Yes	62	27%	Yes	28 ^d	12%	Yes	179	77%	Yes

a - Gauge installed 9/28/2009 - groundwater level monitored for 42 days of the growing season

b - Gauge installed 8/12/2010 - groundwater level monitored for 89 days of the growing season

c - Gauge malfunction - groundwater level monitored for 148 days of the growing season

d - Monitoring ended before end of growing season - groundwater level monitored for 228 days of the growing season

e - Multiple attempts made to locate gauge throughout the growing season using GPS and a metal detector, all were unsuccessful

A wetland hydrology success criterion is met if levels are within 12 inches of the soil surface for at least 12% of the growing season. Growing Season (230 days): March 24 to November 9 (source: <http://www.wcc.nrcs.usda.gov/ftpref/support/climate/wetlands/nc/37001.txt>)



Photo 17. Bankfull indicators (wrack lines and flatten brush) - 1/3/2014

Figure 17.
UT to South Fork Creek
Reference Gauge
2013-MY06

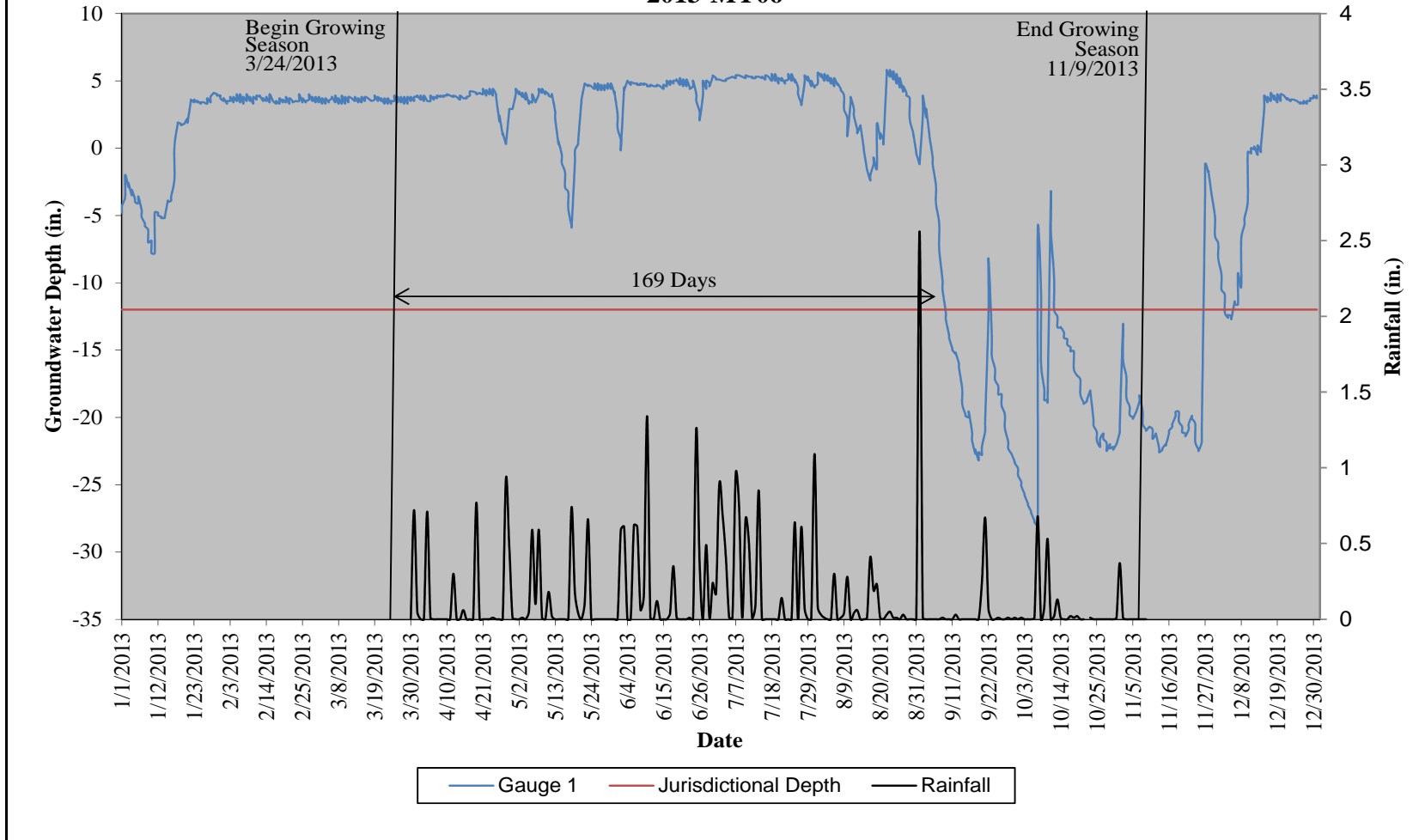


Figure 18.
UT to South Fork Creek
Gauge 2
2013-MY06

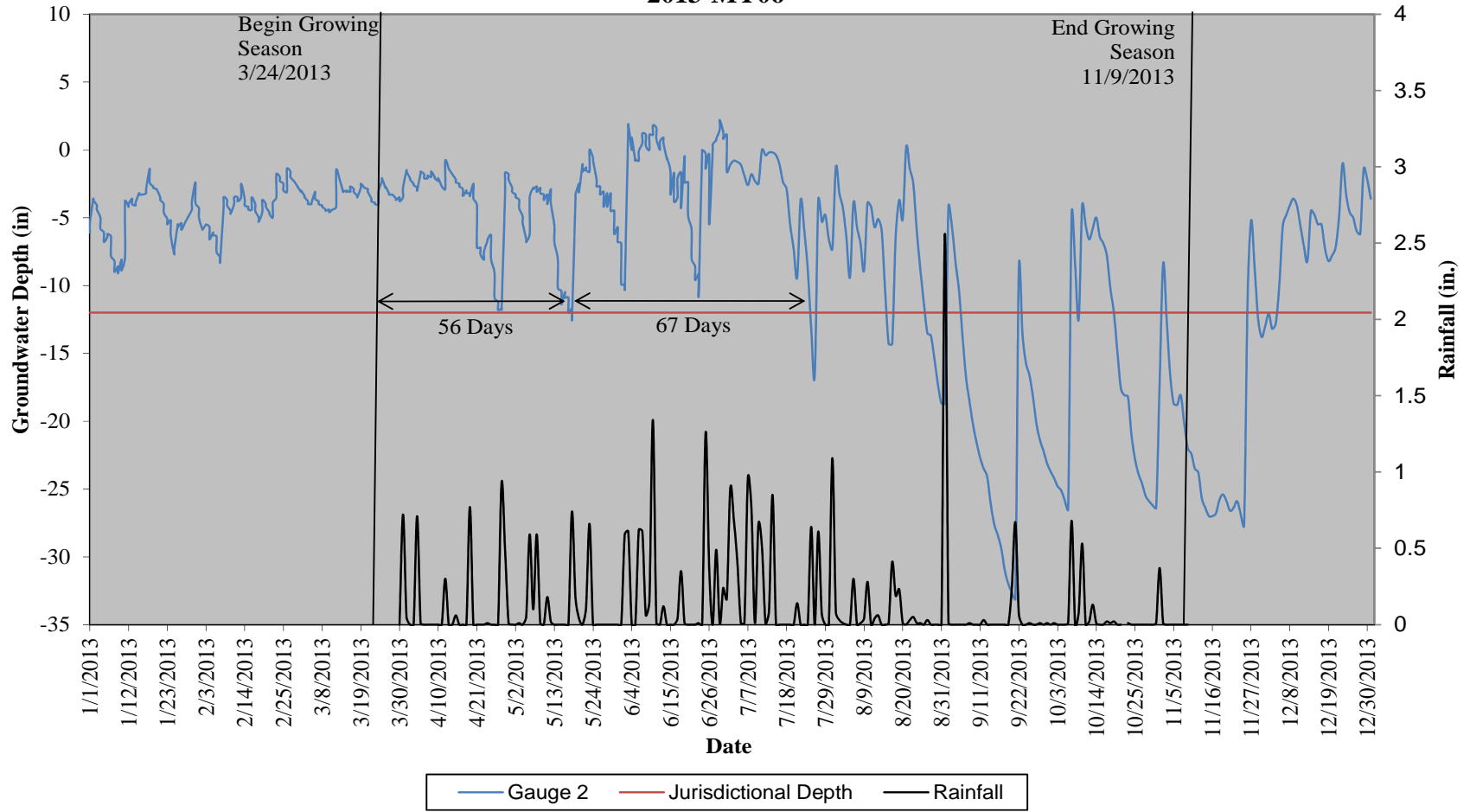


Figure 19.
UT to South Fork Creek
Gauge 3
2013-MY06

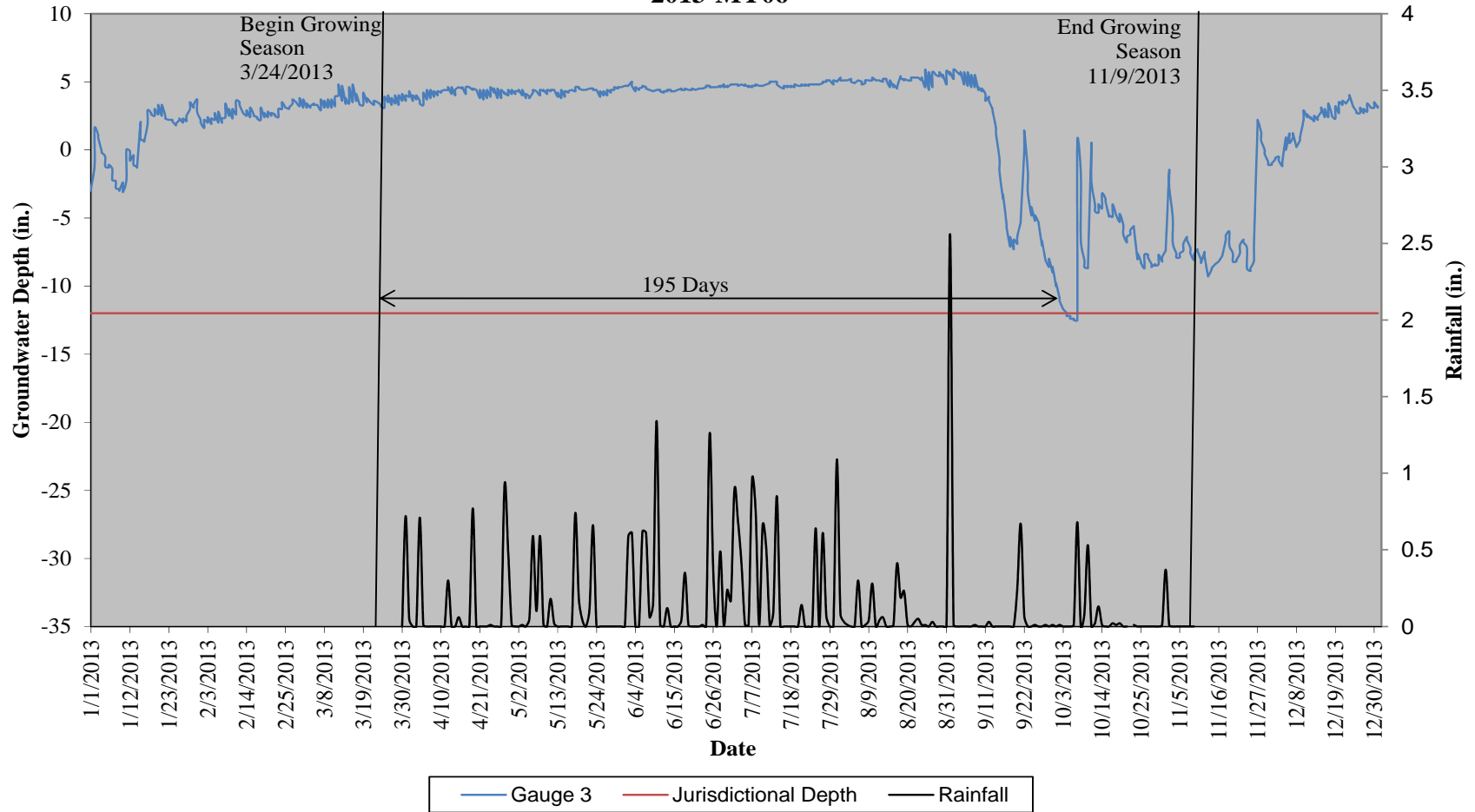


Figure 20.
UT to South Fork Creek
Gauge 5
2013-MY06

