FINAL
YEAR 1 MONITORING REPORT
UT TO MARTIN'S CREEK (CONTRERAS) MITIGATION PROJECT

Cherokee County, North Carolina
EEP Project No. 92766 (Contract No. 005717)
USACE Action ID No. 2010-00961/DWR Project No. 2010-00448
SCO No. 08-07249-01

Data Collection – March-October 2014

Hiwasssee River Basin
Cataloging Unit 06020002170010

SUBMITTED TO/PREPARED FOR:

North Carolina Department of Environment and Natural Resources
Ecosystem Enhancement Program
217 West Jones Street, Suite 3000A
Raleigh, North Carolina 27603

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SUBMITTED BY:

Axiom Environmental, Inc.
218 Snow Avenue
Raleigh, North Carolina 27603

December 2014

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Appendices

1.0 PROJECT SUMMARY

The North Carolina Ecosystem Enhancement Program (EEP) has established the UT to Martin's Creek (Contreras) Mitigation Project (Site) located in Cherokee County, just south of the town of Murphy. The Site is encompassed within 14-digit Cataloging Unit 06020002170010 of the Hiwassee River Basin (Figure 1, Appendix B and Table 4, Appendix A). Land use at the Site, prior to mitigation activities, was composed of agricultural uses, logging, grass land, single-family residences, and forested areas. Martin's Creek and its tributaries had been impaired by historical and current land management practices, which include timber harvesting, pasture, channelization, and livestock grazing. Completed project activities, reporting history, completion dates, project contacts, and project attributes are summarized in Tables 1-4 (Appendix A).

The Site is located on tributaries to Martin's Creek, which has been assigned Stream Index Number 1-49 and a Best Usage Classification of C. Site streams are listed on the NCDWQ draft 2014 and final 2012 Section 303(d) list of impaired streams due to a fair bioclassification for ecological/biological integrity and fish communities, and elevated levels of fecal coliform bacteria. The Site is located within a Targeted Local Watershed that has been identified for stream and buffer restoration opportunities (NCEEP 2008).

The Site lies within the focus area of the *Peachtree-Martins Creek Local Watershed Plan* (LWP). Goals of the LWP include working with local landowners, resource agencies, and nongovernmental groups to implement wetland and stream restoration projects that reduce sources of sediment and nutrients by restoring riparian buffers, stabilizing stream banks, and restoring natural channel geomorphology, particularly in headwater streams. The NCEEP is also placing an emphasis on projects that contribute to the restoration and protection of habitat for priority fish, mussel, snail, and crayfish species in the basin (NCEEP 2008).

The project goals will directly address stressors identified in the Peachtree-Martins Creek LWP, namely lack of riparian vegetation, channel modification, excess sediment inputs, excess nutrient inputs, and bacterial contamination as follows.

- Restore geomorphically stable stream channels within the Site;
- Restore or enhance wetlands;
- Exclude livestock from accessing project streams, wetlands, and riparian zones;
- Improve and restore hydrologic connections and achieve uplift of ecosystem functions;
- Improve water quality within the Site by reducing bank erosion, improving nutrient and sediment removal, and stabilizing stream banks;
- Restore and preserve headwater tributaries in the Peachtree-Martins Creek Watershed and the Hiwassee River; and
- Improve aquatic and terrestrial habitat by improving substrate and in-stream cover, adding woody debris, reducing water temperatures, and restoring riparian habitat.

In order to accomplish the goals of the project and contribute to the overall success of goals set forth for the greater Peachtree-Martin Creek local watershed planning area, a number of general project objectives and design objectives were identified for this project as follows.

General Project Objectives

- Utilize natural channel design concepts to restore or enhance channel profile, pattern, and dimension to reduce bank and channel profile degradation and to allow greater floodplain connectivity to aid in the dissipation of bankfull flows.
- Reduce stream bank degradation and sediment and nutrient inputs by limiting livestock access of project tributaries to crossings agreed upon between the NCEEP and the landowner.
- Further reduce sediment and nutrient inputs and stream bank instability by restoring or enhancing native riparian vegetation along a 30-foot buffer along the project reach.
- Improve channel bedform function and diversity by installing toe wood structures and grade control structures that also function to improve riffle and scour pool habitat.

Design Objectives

- Make important design decisions based on a geomorphic analyses of the Site, reference conditions, and hydraulic modeling.
- Consider field constraints and construction tolerances in order to produce a realistic design.
- Minimize disturbance to ecologically functional and physically stable areas and mimic the character of these areas to create a more natural design.
- Use native materials and minimize materials brought onsite to produce more favorable habitat for native flora and fauna, reduce compaction and onsite disturbance from material transport, and produce an aesthetically pleasing result.

The Site mitigation plan was completed in March 2010 with the final design and construction plans completed in November 2010 (Table 2, Appendix A). Project construction was completed between October 2012 and July 2013. The implemented mitigation is as follows (Figure 2, Appendix B and Table 1, Appendix A).

- 4952 Stream Mitigation Units
    - Restoring approximately 3330 linear feet of stream channel through construction of stable channel at the historic floodplain elevation.
    - Enhancing (level I) approximately 1319 linear feet of stream channel through cessation of current land use practices, installing grade control structures, repairing bank erosion, restoring proper channel dimension and profile, and planting with native forest vegetation.
    - Enhancing (level II) approximately 1953 linear feet of stream channel through cessation of current land use practices, removing invasive species, and planting with native forest vegetation.
- 0.15 Riparian Wetland Mitigation Units
    - Enhancing approximately 0.3 acres of riparian wetland by filling ditches/abandoned channels and supplemental planting.
- Planting a native woody riparian buffer (at least 30 feet in width) adjacent to restored/enhanced streams and wetlands within the Site.
- Protecting the Site in perpetuity with a conservation easement.

Stream Success Criteria

Stream restoration success criteria for the Site are based on the *Stream Mitigation Guidelines* issued in April 2003 by the USACE and NCDWQ. Success criteria for stream restoration will include 1)

documentation of two bankfull events, 2) little change in the channel cross-section from as-built conditions, 3) stable longitudinal profile, 4) substrate consistency, and 5) photographic evidence of stability.

Bankfull Events
Two bankfull flow events in separate years must be documented within the 5-year monitoring period. Otherwise, stream monitoring will continue until two bankfull events have been documented in separate years.

Cross-sections
Riffle cross-sections on the restoration and enhancement reaches should be stable and should show little change in bankfull area, maximum depth ratio, and width-to-depth ratio. Riffle cross-sections should generally fall within the parameters defined for channels of the appropriate Rosgen stream type. If any changes do occur, these changes will be evaluated to assess whether the stream channel is showing signs of instability. Indicators of instability include a vertically incising thalweg or eroding channel banks. Changes in the channel that indicate a movement toward stability or enhanced habitat include a decrease in the width-to-depth ratio in meandering channels or an increase in pool depth.

Longitudinal Profile
Longitudinal profile data for the stream reach should show that bedform features are remaining stable. The riffles should be steeper and shallower than the pools, while the pools should be deep with flat water surface slopes. The relative percentage of riffles and pools should not change significantly from the design parameters.

Bed Material Analysis
Substrate materials in the restoration reaches should indicate a progression towards or the maintenance of coarser materials in the riffle features and smaller particles in the pool features.

Photo Reference Sites
Photographs will be used to evaluate channel aggradation or degradation, bank erosion, success of riparian vegetation, and effectiveness of erosion control measures subjectively. Lateral photos should not indicate excessive erosion or continuing degradation of the banks. A series of photos over time should indicate successive maturation of riparian vegetation.

Vegetation Success Criteria
Success criteria have been established to verify that the vegetation component supports community elements necessary for forest development. Success criteria for this project includes an average density of 320 planted stems per acre must be surviving in the first three monitoring years. Subsequently, 290 planted stems per acre must be surviving in year 4, and 260 planted stems per acre in year 5.

Summary information/data related to the occurrence of items such as beaver or encroachment and statistics related to performance of various project and monitoring elements can be found in tables and figures within this report's 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 the Restoration Plan) documents available on the NC Ecosystem Enhancement Program (NCEEP) website. All raw data supporting the tables and figures in the appendices are available from NCEEP upon request.

2.0 METHODOLOGY

Monitoring of the Site's restoration efforts will be performed until agreed upon success criteria are fulfilled. Monitoring is proposed for the stream channel, riparian vegetation, and hydrology for a period of five years (Figure 2, Appendix B). Monitoring reports of collected data will be submitted no later than December of each monitoring year.

2.1 Streams

Post-restoration monitoring will be conducted for five years following the completion of construction to evaluate the effectiveness of the restoration practices. Measurements were taken using a Topcon GTS 303 total station and Recon data collector. The raw total station file was processed using Carlson Survey Software into a Computer Aided Design (CAD) file. Coordinates were exported as a text/ASCII file to Microsoft Excel for processing and presentation of data, and are not georeferenced. Pebble counts were completed using the modified Wolman method (Rosgen 1993). Monitored stream parameters include stream dimension (cross-sections), pattern (longitudinal survey), profile (profile survey), and photographic documentation. Baseline stream data can be found in Appendix D.

Bankfull Events

The occurrence of bankfull events within the monitoring period will be documented by the use of a crest gauge and photographs. One crest gauge was installed to record the highest watermark between site visits, and the gauge will be checked each Site visit to determine if a bankfull event has occurred (Figure 2, Appendix B). Photographs will be used to document the occurrence of debris lines and sediment deposition on the floodplain during monitoring site visits.

Five bankfull events were documented during monitoring year 1 (2014). To meet bankfull success criteria, one additional bankfull event will need to be documented to occur during monitoring years 2-5.

Cross-sections

A total of 14 permanent cross-sections, 10 riffle and 4 pool, were established and will be used to evaluate stream dimension; locations are depicted on Figure 2 (Appendix B) Because riffle cross-sections are critical in determining bankfull design parameters, the number of riffle cross-sections established will generally outnumber pool cross-sections. Each cross-section will be marked on both banks with permanent pins to establish the exact transect used. A common benchmark will be used for cross-sections and consistently used to facilitate easy comparison of year-to-year data. The annual cross-section survey will include points measured at all breaks in slope, including top of bank, bankfull, inner berm, edge of water, and thalweg, if the features are present. Riffle cross sections will be classified using the Rosgen Stream Classification System.

No areas of concern or indicators of instability were observed during year 1 (2014) monitoring; therefore, stream dimension measurements are currently meeting success criteria.

Longitudinal Profile

After Site construction, approximately 4640 linear feet of longitudinal profile was completed to document baseline conditions. Longitudinal profile will be resurveyed annually for the duration of the five-year monitoring period. Measurements include thalweg, water surface, bankfull, and top of low bank. Each of

these measurements will be taken at the head of each channel unit (e.g., riffle, pool) and at the maximum pool depth. The survey will be tied to a permanent benchmark.

No areas of concern or indicators of bedform instability were observed during year 1 (2014) monitoring; therefore, stream longitudinal profile measurements are currently meeting success criteria.

Bed Material Analysis

Pebble counts will be conducted annually on one permanent riffle cross-section (100-counts) at the time cross-section and longitudinal surveys are performed during the five year monitoring period. These samples will reveal changes in sediment gradation over time as the stream adjusts to upstream sediment loads.

Year 1 (2014) pebble counts indicate the maintenance of coarser materials in the measured riffle feature; therefore, bed material is currently meeting success criteria.

Photo Reference Sites

A total of 24 photographs will be used to visually document restoration success for at least five years following construction. Photographs will be taken from a height of approximately five to six feet. Photo locations will be recorded using sub-meter GPS to ensure that the same locations (and view directions) on the Site are monitored in each monitoring period.

Year 1 (2014) photo reference sites show no channel aggradation or degradation, or bank erosion. In addition, riparian vegetation is meeting success criteria based on stem counts across the Site; however, it is too early in the monitoring period to show successive maturation of riparian vegetation.

2.2 Vegetation

After planting was completed, an initial evaluation was performed to verify planting methods were successful and to determine initial species composition and density. Eleven sample vegetation plots (10-meter by 10-meter) were installed and measured within the Site as per guidelines established in *CVS-EEP Protocol for Recording Vegetation, Version 4.2* (Lee et al. 2008). Vegetation plots are permanently monumented with 6-foot metal t-posts at each corner. In each sample plot, vegetation parameters to be monitored include species composition and species density. Visual observations of the percent cover of shrub and herbaceous species will also be documented by photograph. Vegetation plot information can be found in Appendix C.

Year 1 (2014) stem count measurements indicate an average of 361 planted stems per acre (excluding livestakes) across the Site; therefore, the Site is currently meeting vegetation success criteria. In addition, eight of the eleven individual vegetation plots met success criteria based on planted stems alone.

3.0 REFERENCES

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United States Geological Survey (USGS). 1974. Hydrologic Unit Map - 1974. State of North Carolina.

Weakley, Alan S. 2012. Flora of the Southern and Mid-Atlantic States. Available online at: http://www.herbarium.unc.edu/WeakleysFlora.pdf [September 28, 2012]. University of North Carolina Herbarium, North Carolina Botanical Garden, University of North Carolina, Chapel Hill, North Carolina.

APPENDIX A

PROJECT BACKGROUND DATA AND MAPS

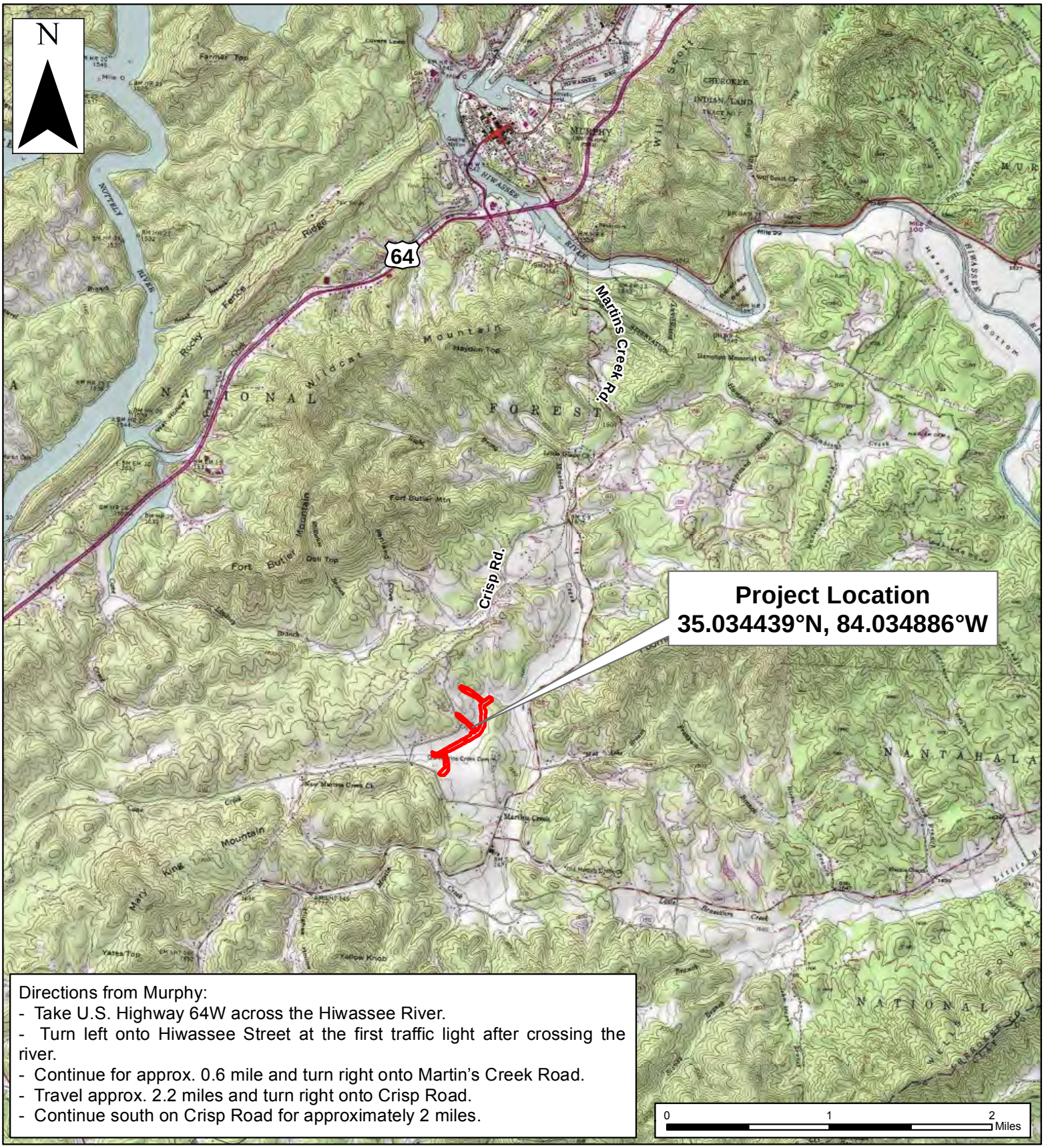
Figure 1. Vicinity Map

Table 1. Project Components and Mitigation Credits

Table 2. Project Activity and Reporting History

Table 3. Project Contacts Table

Table 4. Project Baseline Information and Attributes



Directions from Murphy:
- Take U.S. Highway 64W across the Hiwassee River.
- Turn left onto Hiwassee Street at the first traffic light after crossing the river.
- Continue for approx. 0.6 mile and turn right onto Martin's Creek Road.
- Travel approx. 2.2 miles and turn right onto Crisp Road.
- Continue south on Crisp Road for approximately 2 miles.

Prepared by:	Prepared for:
Axiom Environmental, Inc.	Ecosystem Enhancement Program

VICINITY MAP
UT TO MARTINS CREEK (CONTRERAS)
EEP PROJECT NUMBER 92766
Cherokee County, North Carolina

Dwn. by. KRJ	FIGURE
Date: April 2014	1
Project: 12.004.16	

Table 1. Project Components and Mitigation Credits
UT to Martin's Creek (Contreras) Mitigation Site

Mitigation Credit Summations		
Stream	**Riparian Wetland**	**Nonriparian Wetland**
4952	**0.15**	**--**

Project Components

Station Range	Existing Linear Footage/ Acreage	Priority Approach	Restoration/ Restoration Equivalent	Restoration Linear Footage/ Acreage	Mitigation Ratio	Mitigation Credits	Comment
UT1-1 Station 00+00 to 06+02	602	---	Enhance I	602-54 =548	1.5:1	365.3	Forded Crossing (54 linear feet) removed from credit
UT1-1	346	---	Enhance II	346	2.5:1	138.4	
UT1-1-1	106	---	Enhance II	106	2.5:1	42.4	
UT1-2 Station 00+00 to 02+07	141	PI	Restoration	207	1:1	207	
UT1-3 Station 00+00 to 08+33	767	---	Enhance I	767-62=705	1.5:1	470	Stream under power line easement (66 linear feet) will generate half credit and piped stream crossing (62 linear feet) removed from credit.
	66			66	3:1*	22.0	
UT1-4	1099	---	Enhance II	1014-53=961	2.5:1	384.4	Stream under two power line easements (40 and 45 linear feet) will generate half credit and forded crossing (53 linear feet) removed from credit.
	40			40	5:1**	8	
	45			45	5:1**	9	
UT 1 to Martin's Creek	455	---	Enhance II	455	2.5:1	182	
UT1 to Martin's Creek Station 00+00 to 32+74	2674	PI	Restoration	3274-53-47-51 =3123	1:1	3123	Three crossings (53, 47, and 51 linear feet) removed from credit.
Wetland Enhancement	0.3	---	Enhancement	0.3	2:1	0.15	Enhancement of existing riparian wetlands characterized by removal of invasive species and supplemental planting.

Component Summation

Restoration Level	Stream (linear footage)	Riparian Wetland (acreage)	Nonriparian Wetland (acreage)
Restoration	3330	--	--
Enhancement (Level 1)	1319	--	--
Enhancement (Level II)	1953	--	--
Enhancement	--	0.3	--
Totals	**6602**	**0.3**	**--**
Mitigation Units	**4952 SMUs**	**0.15 Riparian WMUs**	**0.00 Nonriparian WMUs**

*66 linear feet of stream under the power line easement is receiving a mitigation ratio of 3:1 (half credit for enhancement [level I]).
**85 linear feet of stream under two power line easements is receiving a mitigation ratio of 5:1 (half credit for enhancement [level II]).

Table 2. Project Activity and Reporting History
UT to Martin's Creek (Contreras) Mitigation Site

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Mitigation Plan	September 2009-March 2010	March 2010
Final Design – Construction Plans	March 2010-November 2010	November 2010
Construction	--	October 2012-July 2013
Temporary S&E Mix applied to Entire Project Site	--	October 2012-July 2013
Permanent Seed Mix applied to the Entire Project Site	--	October 2012-July 2013
Bare Root; Containerized; and B&B Plantings for the Entire Project Site	--	March 2014
Mitigation Plan/ As-Built (Year 0 Monitoring Baseline)	April 2014	April 2014
Year 1 Monitoring	October 2014	November 2014
Year 2 Monitoring		
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

Table 3. Project Contacts Table
Martin's Creek II Mitigation Site

Designer	Michael Baker Engineering, Inc. 797 Haywood Road, Suite 201 Asheville, NC 28806 Micky Clemmons 828-350-1408
Construction Plans and Sediment and Erosion Control Plans	Michael Baker Engineering, Inc. 797 Haywood Road, Suite 201 Asheville, NC 28806 Micky Clemmons 828-350-1408
Construction Contractor	River Works, Inc. 6105 Chapel Hill Rd. Raleigh, NC 27607 919-582-3574
Planting Contractor	Carolina Silvics, Inc. 908 Indian Trail Road Edenton, NC 27932 (252) 482-8491
As-built Surveyor	Turner Land Surveying. PLLC 3201 Glenridge Drive Raleigh, NC 27604 919-875-1378
Baseline Data Collection	Axiom Environmental, Inc. 218 Snow Avenue Raleigh, NC 27603 Grant Lewis 919-215-1693

Table 4. Project Attribute Table
UT to Martin's Creek (Contreras) Mitigation Site

Project County	Cherokee County, North Carolina									
Physiographic Region	Blue Ridge									
Ecoregion	Broad Basins									
Project River Basin	Hiwassee									
USGS HUC for Project (14 digit)	06020002170010									
NCDWQ Sub-basin for Project	04-05-02									
Planning Area	Yes – Peachtree-Martins Creek LWP									
WRC Class (Warm, Cool, Cold)	Cold									
% of easement fenced/demarcated	100% fenced to exclude livestock									
Beaver activity observed during design phase?	Yes, on UT1 below lower limits of project area									
	Restoration Component Attribute Table									
	UT 1-1		UT 1-1-1	UT 1-2	UT 1-3		UT 1-4		UT1 to Martin Cr	
Drainage Area	.018	.028	.004	.005	.074	.082	.023		.79	.82
Stream Order (USGS topo)	1st	2nd	1st	1st	1st	1st	2nd		3rd	3rd
Restored Length (feet)	346	548	106	207	----	738	----	1099	3123	----
Perennial or Intermittent	I	P	I	I	I	P	I	P	P	P
Watershed Type	Rural									
Watershed impervious cover	<10%									
NCDWQ AU/Index number	1-49									
NCDWQ Classification	C		C	C	C		C		C	
303d listed?	No									
Upstream of a 303d listed	No									
Reasons for 303d listed segment	NA									
Total acreage of easement	15.63									
Total existing vegetated acreage of easement	---									
Total planted restoration acreage	~15.63									
Rosgen Classification of preexisting	B/E/Eb		E	F	G/C/B		B		G/Eb/Cb	
Rosgen Classification of As-built	B		---	C	B		B		C	
Valley type	II		II	II	II		II		II	
Valley slope	.034		---	.010	.029		---		.009	
Cowardin classification of proposed	N/A		N/A	N/A	N/A		N/A		N/A	
Trout waters designation	No									
Species of concern, endangered etc.	No									
Dominant Soil Series	Junaluska Brasstown Complex/ Thurmont-Dillard Complex/Arc aqua loam		Junaluska Brasstown Complex	Arc qua loam	Thurmont-Dillard Complex		Junaluska Tsali Complex		Arc qua loam	

APPENDIX B

VISUAL ASSESSMENT DATA

Figure 2. Current Conditions Plan View (CCPV)

Tables 5A-5D. Visual Stream Morphology Stability Assessment

Table 6. Vegetation Condition Assessment

Stream Station Photographs

Vegetation Plot Photographs

N

UT1-4

UT1-3

UT1-2

UT1

UT1-1

UT1-1-1

0+00 2+00 4+00 5+00 6+00 8+00 10+00 15+00 20+00 25+00 30+00 32+50

XS1r XS2r XS3p XS4r XS5r XS6p XS7r XS8r XS9p XS10p XS11r XS12r XS13r XS14r

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

0 125 250 500 750 1,000 Feet

Legend

- Easement Boundary
- Streams
- Stream Stationing
- Instream Stuctures
- Constructed Riffles
- Crossings
- Powerline Right of Way
- Monitoring Reach
- Cross Sections
- Crest Gauge
- CVS Plots Meeting Success Criteria
- CVS Plots Not Meeting Success Criteria
- Wetlands
- Photo Points

Axiom Environmental, Inc.
Axiom Environmental
218 Snow Avenue
Raleigh, NC 27603
(919) 215-1693

CURRENT CONDITIONS PLAN VIEW
UT TO MARTINS CREEK (CONTRERAS)
EEP PROJECT # 92766
Cherokee County, North Carolina

Dwn. by.	KRJ
Date:	November 2014
Project:	12-004.16

FIGURE
2

Table 5A **Visual Stream Morphology Stability Assessment**
Reach ID **UT1**
Assessed Length **3123**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. **Vertical Stability** (Riffle and Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	39	39			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	40	40			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	40	40			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	40	40			100%			
		2. Thalweg centering at downstream of meander (Glide)	40	40			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			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%			100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	12	12			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	12	12			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	12	12			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	12	12			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	12	12			100%			

Table 5B **Visual Stream Morphology Stability Assessment**
Reach ID **UT1-1**
Assessed Length **602**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. **Vertical Stability** (Riffle and Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	14	14			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	17	17			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	17	17			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	17	17			100%			
		2. Thalweg centering at downstream of meander (Glide)	17	17			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			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%			100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	13	13			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	13	13			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	13	13			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	13	13			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	13	13			100%			

Table 5C **Visual Stream Morphology Stability Assessment**
Reach ID **UT1-2**
Assessed Length **207**

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

Table 5D **Visual Stream Morphology Stability Assessment**
Reach ID **UT1-3**
Assessed Length **803**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. **Vertical Stability** (Riffle and Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	23	23			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	24	24			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	24	24			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	24	24			100%			
		2. Thalweg centering at downstream of meander (Glide)	24	24			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			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%			100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	9	9			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	9	9			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	9	9			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	9	9			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	9	9			100%			

Table 6 — Vegetation Condition Assessment

UT to Martins Creek (Contreras) Mitigation Project

Planted Acreage[1] **15.63**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	None	0.1 acres	none	0	0.00	0.0%
2. Low Stem Density Areas	None	0.1 acres	none	0	0.00	0.0%
2B. Low Planted Stem Density Areas	None	0.1 acres	none	0	0.00	0.0%
			Total	0	0.00	0.0%
3. Areas of Poor Growth Rates or Vigor	None	0.25 acres	N/A	0	0.00	0.0%
			Cumulative Total	0	0.00	0.0%

Easement Acreage[2] **15.63**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern[4]	None	1000 SF	none	0	0.00	0.0%
5. Easement Encroachment Areas[3]	None	none	none	0	0.00	0.0%

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

2 = The acreage within the easement boundaries.

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

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

UT to Martin's Creek (Contreras)
Year 1 Fixed Station Photographs
Taken August 2014

Photo Point 1

Photo Point 2

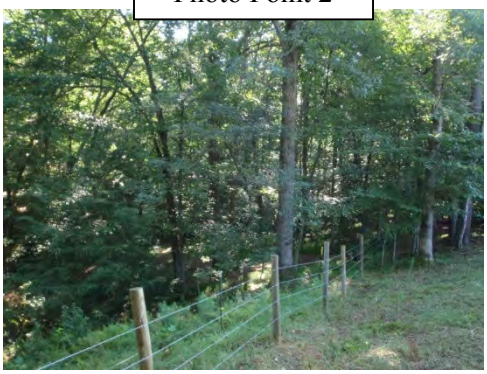


Photo Point 3

Photo Point 4

Photo Point 5

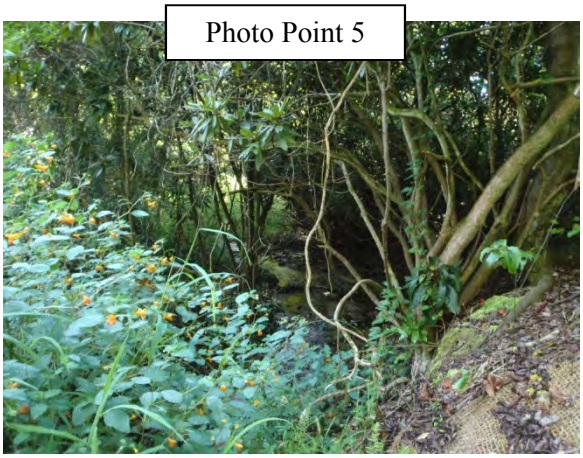


Photo Point 6

UT to Martin's Creek (Contreras)
Year 1 Fixed Station Photographs (continued)
Taken August 2014

Photo Point 7

Photo Point 8

Photo Point 9

Photo Point 10

Photo Point 11

Photo Point 12

UT to Martin's Creek (Contreras)
Year 1 Fixed Station Photographs (continued)
Taken August 2014

Photo Point 13

Photo Point 14

Photo Point 15

Photo Point 16

Photo Point 17

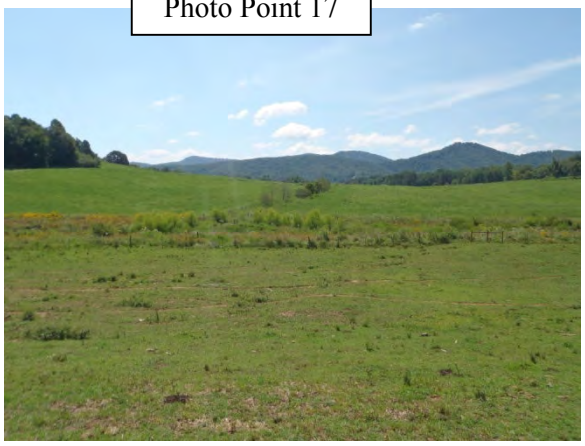


Photo Point 18

UT to Martin's Creek (Contreras)
Year 1 Fixed Station Photographs (continued)
Taken August 2014

Photo Point 19

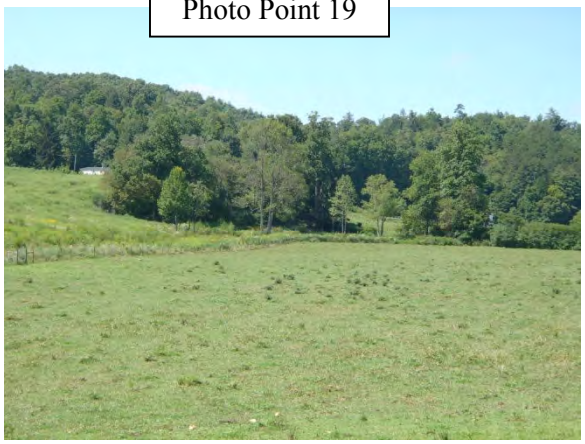


Photo Point 20

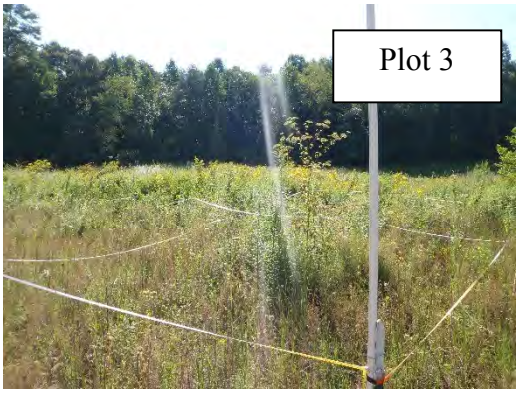
Photo Point 21

Photo Point 22

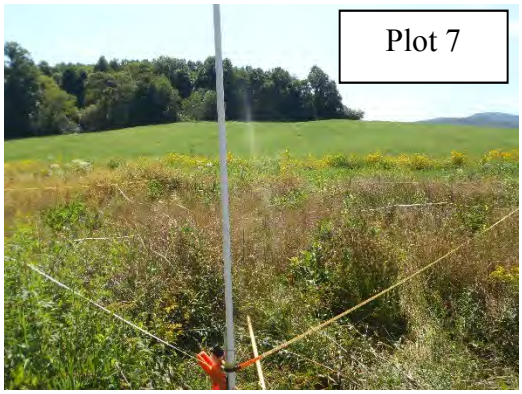
Photo Point 23

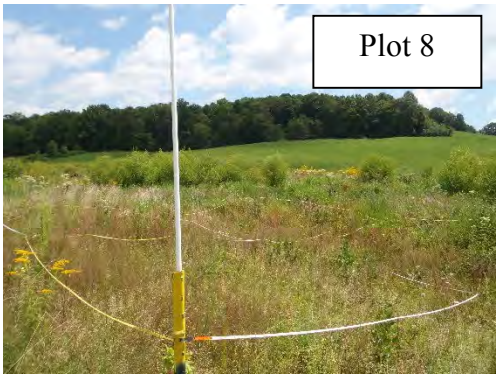
Photo Point 24

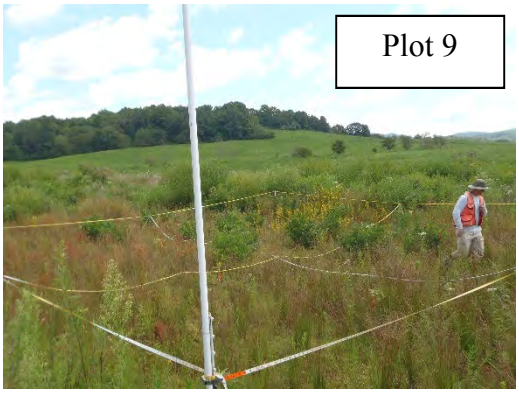
UT to Martin's Creek (Contreras)
Year 1 Vegetation Monitoring Photographs
Taken August 26, 2014



UT to Martin's Creek (Contreras)
Year 1 Vegetation Monitoring Photographs
Taken August 26, 2014
(continued)







APPENDIX C

VEGETATION PLOT DATA

Table 7. Vegetation Plot Criteria Attainment

Table 8. CVS Vegetation Plot Metadata

Table 9. Total and Planted Stems by Plot and Species

Table 7. Vegetation Plot Criteria Attainment Based on Planted Stems

UT to Martin's Creek (Contreras) Mitigation Site (EEP Project Number 92766)

Vegetation Plot ID	Vegetation Survival Threshold Met?	Tract Mean
1	Yes	73%
2	No	
3	No	
4	Yes	
5	Yes	
6	Yes	
7	No	
8	Yes	
9	Yes	
10	Yes	
11	Yes	

Table 8. CVS Vegetation Plot Metadata
UT to Martin's Creek (Contreras) Mitigation Site (EEP Project Number 92766)

Report Prepared By	Corri Faquin
Date Prepared	9/3/2014 9:35
database name	Axiom-EEP-2014-A-v2.3.1.mdb
database location	\\AE-SBS\RedirectedFolders\KJernigan\Desktop
computer name	KEENAN-PC
file size	72589312
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	92766
project Name	UT to Martin's Creek (Contreras)
Description	Stream Restoration
River Basin	Hiwassee
length(ft)	
stream-to-edge width (ft)	
area (sq m)	
Required Plots (calculated)	
Sampled Plots	11

Table 9. Total and Planted Stems by Plot and Species

EEP Project Code 92766. Project Name: UT to Martin's Creek (Contreras)

			Current Plot Data (MY1 2014)																													Annual Means					
			92766-01-0001			92766-01-0002			92766-01-0003			92766-01-0004			92766-01-0005			92766-01-0006			92766-01-0007			92766-01-0008			92766-01-0009			92766-01-0010			92766-01-0011			MY1 (2014)			MY0 (2014)		
Scientific Name	**Common Name**	**Species Type**	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	Tree																																1			1					
Alnus serrulata	hazel alder	Shrub									6												22			24			21			8						81			1
Amelanchier arborea	common serviceberry	Tree																									2	2	2							2	2	2	3	3	3
Betula nigra	river birch	Tree	3	3	3										1	1	1	3	3	3	2	2	2							3	3	3				12	12	12	19	19	19
Carpinus caroliniana	American hornbeam	Tree													4	4	4										1	1	1							5	5	5	5	5	5
Carya	hickory	Tree				2	2	2				1	1	1																						3	3	3	2	2	2
Carya alba	mockernut hickory	Tree	1	1	1	1	1	1	1	1	1																									3	3	3	5	5	5
Carya glabra	pignut hickory	Tree										1	1	1							1	1	1										3	3	3	5	5	5	5	5	5
Cornus amomum	silky dogwood	Shrub										1	1	1		1	1																	2	1	2	4		1	2
Diospyros virginiana	common persimmon	Tree																																				1	1	1
Juglans nigra	black walnut	Tree															1			2																		3			
Liriodendron tulipifera	tuliptree	Tree				1	1	1							5	5	5	1	1	1				1	1	1	1	1	1							9	9	9	7	7	7
Platanus occidentalis	American sycamore	Tree																									5	5	5	3	3	3				8	8	8	10	10	10
Prunus serotina	black cherry	Tree																																5			5					
Quercus	oak	Tree	1	1	1				1	1	1	2	2	2	1	1	1	1	1	1	2	2	2	2	2	2	5	5	5	1	1	1				16	16	16	49	49	49
Quercus coccinea	scarlet oak	Tree	1	1	1																						1	1	1							2	2	2			
Quercus nigra	water oak	Tree																						1	1	1										1	1	1	1	1	1
Quercus pagoda	cherrybark oak	Tree										2	2	2							1	1	1							2	2	2	3	3	3	8	8	8	5	5	5
Quercus rubra	northern red oak	Tree	2	2	2	2	2	2	1	1	1	1	1	1				7	7	7	1	1	1	6	6	6	2	2	2				1	1	1	23	23	23	1	1	1
Salix nigra	black willow	Tree																																							1
Unknown		Shrub or Tree																															1	1	1	1	1	1			6
		Stem count	8	8	8	6	6	6	3	3	9	8	8	8	11	12	13	12	12	14	7	7	29	10	10	34	17	17	38	9	9	17	8	8	16	99	100	192	113	114	123
		size (ares)	1			1			1			1			1			1			1			1			1			1			1			11			11		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.27			0.27		
		Species count	5	5	5	4	4	4	3	3	4	6	6	6	4	5	6	4	4	5	5	5	6	4	4	5	7	7	8	4	4	5	4	4	7	15	15	19	13	14	17
		Stems per ACRE	323.7	323.7	323.7	242.8	242.8	242.8	121.4	121.4	364.2	323.7	323.7	323.7	445.2	485.6	526.1	485.6	485.6	566.6	283.3	283.3	1174	404.7	404.7	1376	688	688	1538	364.2	364.2	688	323.7	323.7	647.5	364.2	367.9	706.4	415.7	419.4	452.5

Color for Density

Exceeds requirements by 10%	PnoLS = Planted excluding livestakes
Exceeds requirements, but by less than 10%	P-all = Planting including livestakes
Fails to meet requirements, by less than 10%	T = All planted and natural recruits including livestakes
Fails to meet requirements by more than 10%	T includes natural recruits

APPENDIX D

STREAM SURVEY DATA

Cross-section Plots

Longitudinal Profile Plots

Substrate Plots

Tables 10a-f. Baseline Stream Data Summary

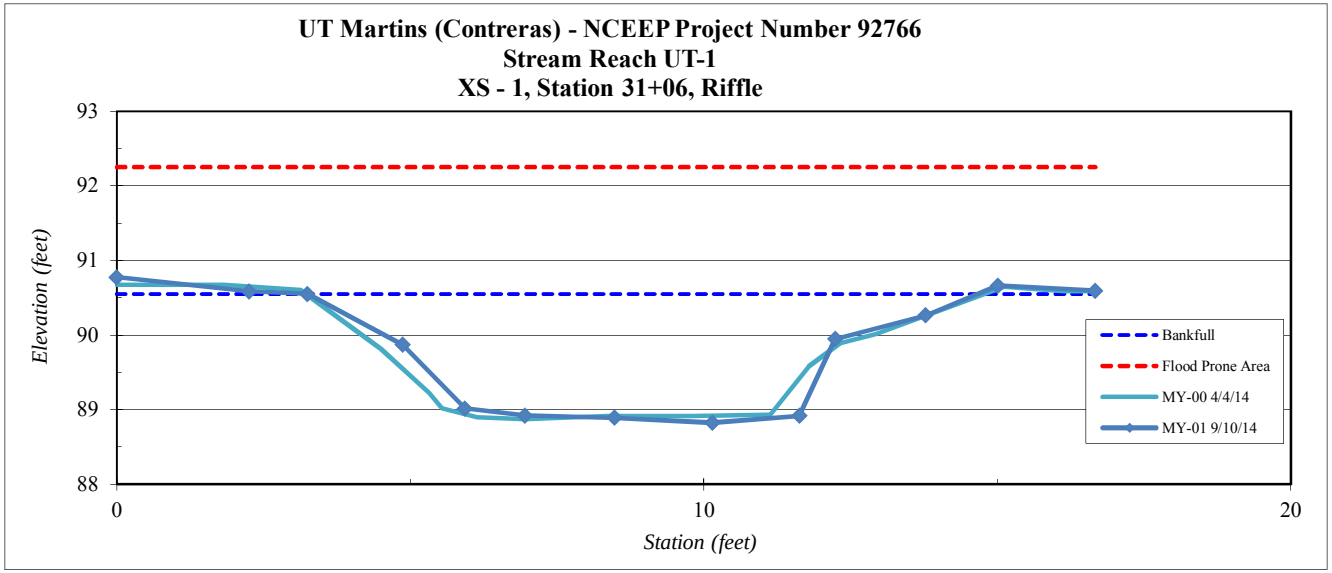
Tables 11a-f. Monitoring Data

Site	UT to Martins (Contreras)
Project Number:	92766
XS ID	XS - 1, Riffle
Reach	UT 1
Date:	9/10/2014
Field Crew:	Perkinson, Jernigan

Station	Elevation
0.00	90.78
2.25	90.59
3.24	90.55
4.87	89.87
5.93	89.01
6.95	88.92
8.48	88.89
10.14	88.82
11.62	88.92
12.23	89.95
13.78	90.27
15.01	90.66
16.67	90.59

SUMMARY DATA	
Bankfull Elevation:	90.6
Bankfull Cross-Sectional Area:	12.7
Bankfull Width:	11.4
Flood Prone Area Elevation:	92.3
Flood Prone Width:	100.0
Max Depth at Bankfull:	1.7
Mean Depth at Bankfull:	1.1
W / D Ratio:	10.2
Entrenchment Ratio:	8.8
Bank Height Ratio:	1.0

Stream Type	E

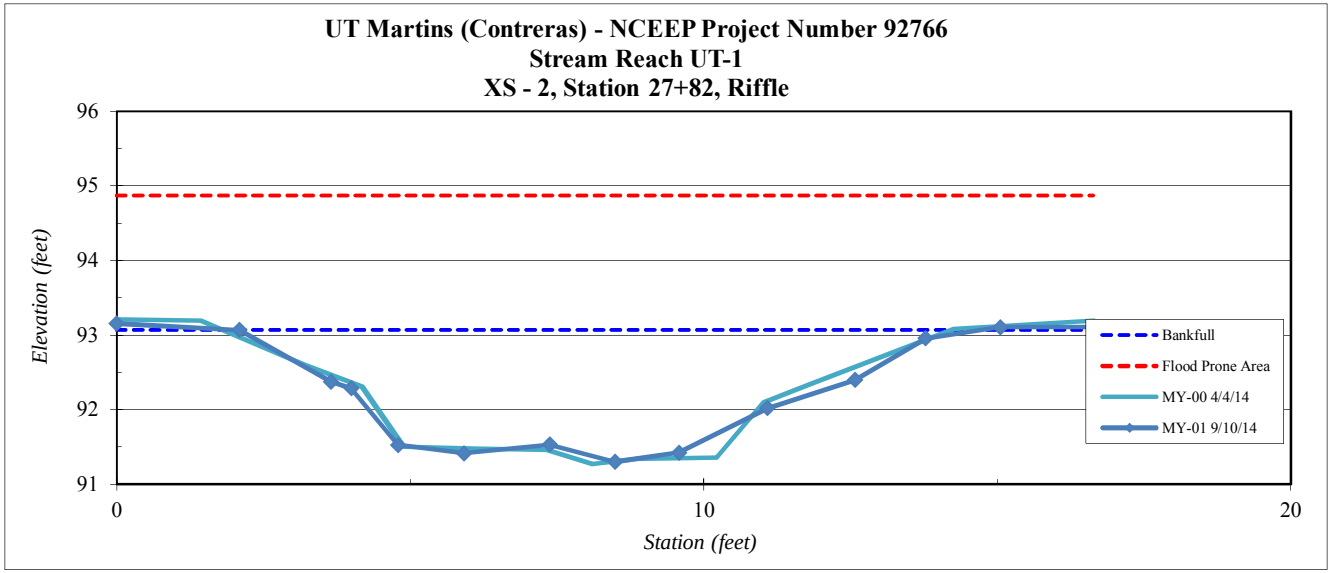


Site	UT to Martins (Contreras)
Project Number:	92766
XS ID	XS - 2, Riffle
Reach	UT 1
Date:	9/10/2014
Field Crew:	Perkinson, Jernigan

Station	Elevation
0.00	93.15
2.09	93.07
3.65	92.38
3.99	92.29
4.79	91.53
5.91	91.41
7.37	91.53
8.49	91.30
9.58	91.42
11.08	92.02
12.57	92.40
13.78	92.96
15.05	93.11
16.62	93.11

SUMMARY DATA	
Bankfull Elevation:	93.1
Bankfull Cross-Sectional Area:	13.4
Bankfull Width:	12.7
Flood Prone Area Elevation:	94.9
Flood Prone Width:	100.0
Max Depth at Bankfull:	1.8
Mean Depth at Bankfull:	1.1
W / D Ratio:	12.0
Entrenchment Ratio:	7.9
Bank Height Ratio:	1.0

Stream Type	E

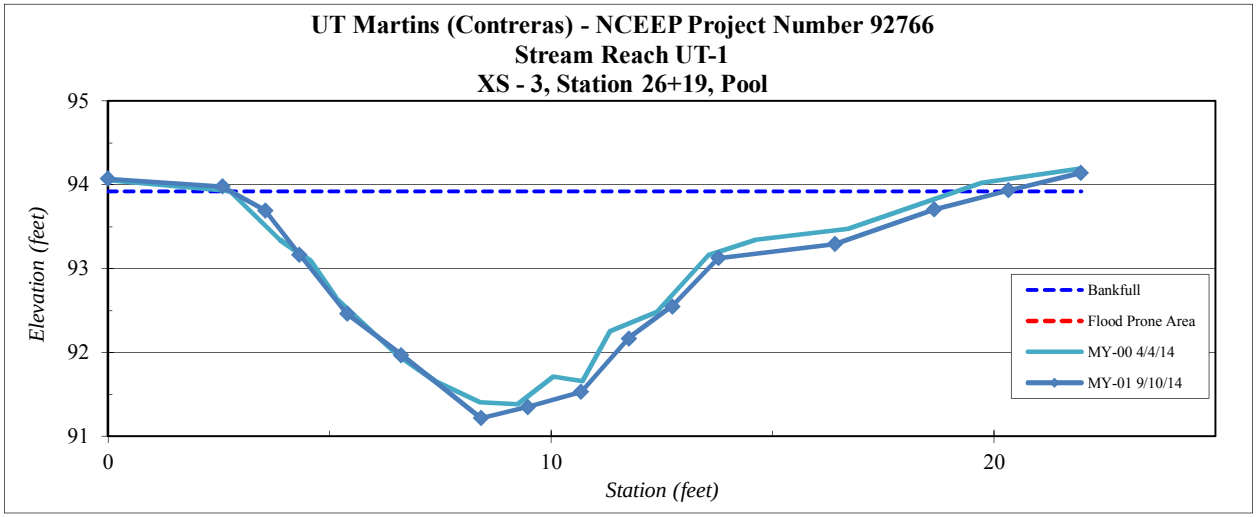


Site	UT to Martins (Contreras)
Project Number:	92766
XS ID	XS - 3, Pool
Reach	UT 1
Date:	9/10/2014
Field Crew:	Perkinson, Jernigan

Station	Elevation
0.0	94.1
2.6	94.0
3.5	93.7
4.3	93.2
5.4	92.5
6.6	92.0
8.4	91.2
9.5	91.3
10.7	91.5
11.8	92.2
12.7	92.5
13.8	93.1
16.4	93.3
18.6	93.7
20.3	93.9
22.0	94.1

SUMMARY DATA	
Bankfull Elevation:	93.9
Bankfull Cross-Sectional Area:	21.6
Bankfull Width:	17.4
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	2.7
Mean Depth at Bankfull:	1.2
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	E

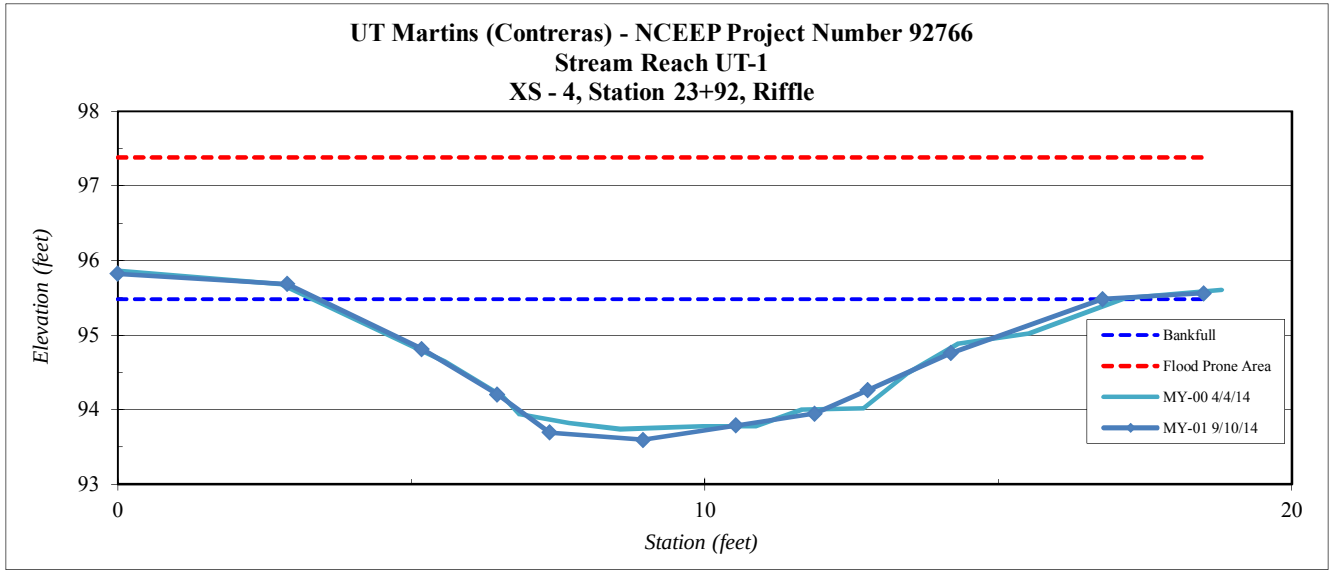


Site	UT to Martins (Contreras)
Project Number:	92766
XS ID	XS - 4, Riffle
Reach	UT 1
Date:	9/10/2014
Field Crew:	Perkinson, Jernigan

Station	Elevation
0.00	95.82
2.89	95.68
5.18	94.82
6.46	94.20
7.35	93.69
8.95	93.60
10.53	93.79
11.87	93.95
12.77	94.26
14.19	94.76
16.78	95.48
18.50	95.56

SUMMARY DATA	
Bankfull Elevation:	95.5
Bankfull Cross-Sectional Area:	14.7
Bankfull Width:	13.3
Flood Prone Area Elevation:	97.4
Flood Prone Width:	100.0
Max Depth at Bankfull:	1.9
Mean Depth at Bankfull:	1.1
W / D Ratio:	12.0
Entrenchment Ratio:	7.5
Bank Height Ratio:	1.0

Stream Type	E

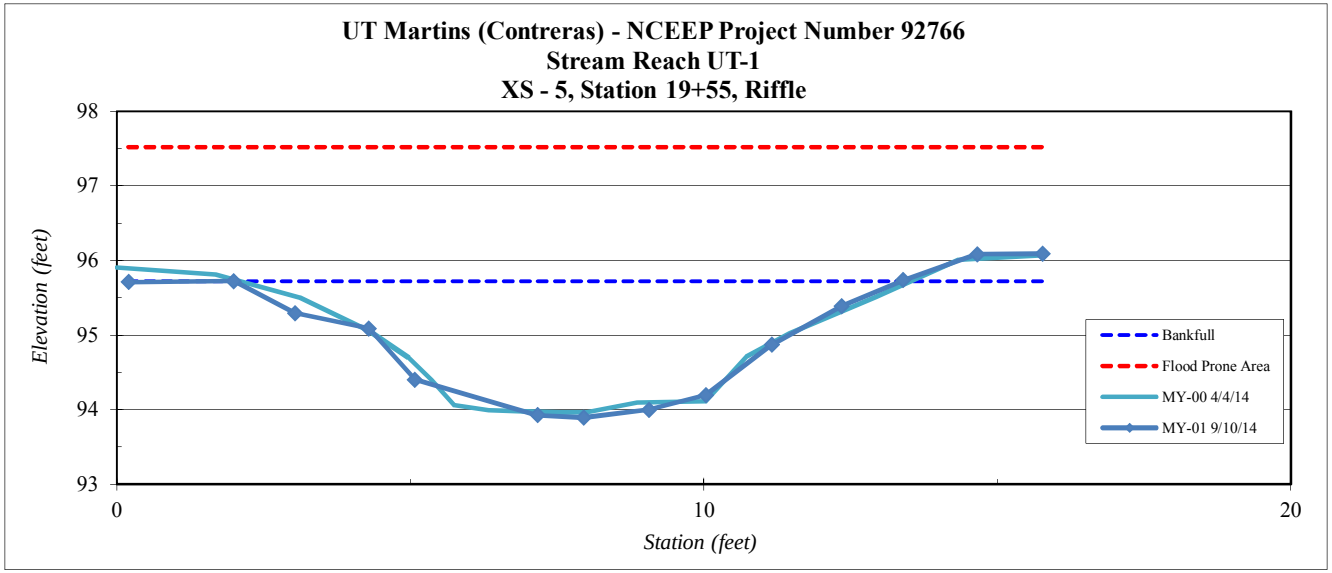


Site	UT to Martins (Contreras)
Project Number:	92766
XS ID	XS - 5, Riffle
Reach	UT 1
Date:	9/10/2014
Field Crew:	Perkinson, Jernigan

Station	Elevation
0.20	95.71
1.99	95.72
3.03	95.29
4.29	95.09
5.08	94.40
7.16	93.93
7.95	93.89
9.06	94.00
10.04	94.20
11.16	94.87
12.35	95.39
13.40	95.74
14.66	96.08
15.77	96.09

SUMMARY DATA	
Bankfull Elevation:	95.7
Bankfull Cross-Sectional Area:	12.1
Bankfull Width:	11.3
Flood Prone Area Elevation:	97.5
Flood Prone Width:	50.0
Max Depth at Bankfull:	1.8
Mean Depth at Bankfull:	1.1
W / D Ratio:	10.6
Entrenchment Ratio:	4.4
Bank Height Ratio:	1.0

Stream Type	E

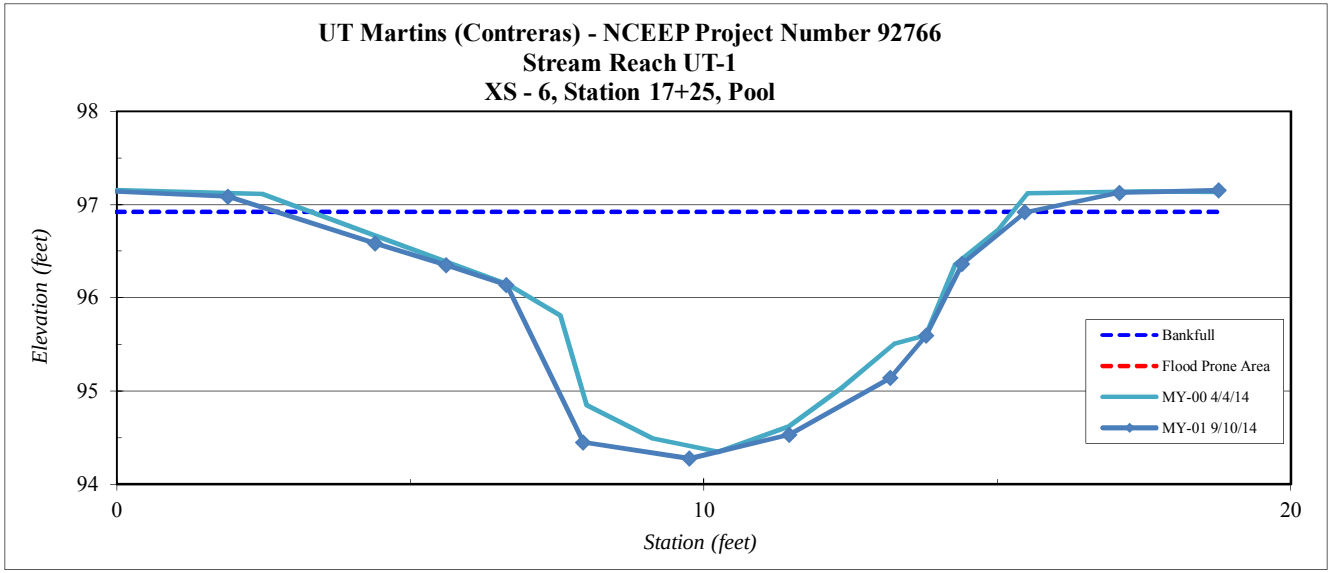


Site	UT to Martins (Contreras)
Project Number:	92766
XS ID	XS - 6, Pool
Reach	UT 1
Date:	9/10/2014
Field Crew:	Perkinson, Jernigan

Station	Elevation
-0.30	97.15
1.89	97.08
4.40	96.58
5.61	96.35
6.64	96.14
7.95	94.45
9.76	94.28
11.46	94.53
13.17	95.14
13.79	95.59
14.40	96.36
15.47	96.92
17.08	97.13
18.77	97.15

SUMMARY DATA	
Bankfull Elevation:	96.9
Bankfull Cross-Sectional Area:	18.0
Bankfull Width:	12.8
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	2.6
Mean Depth at Bankfull:	1.4
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	E

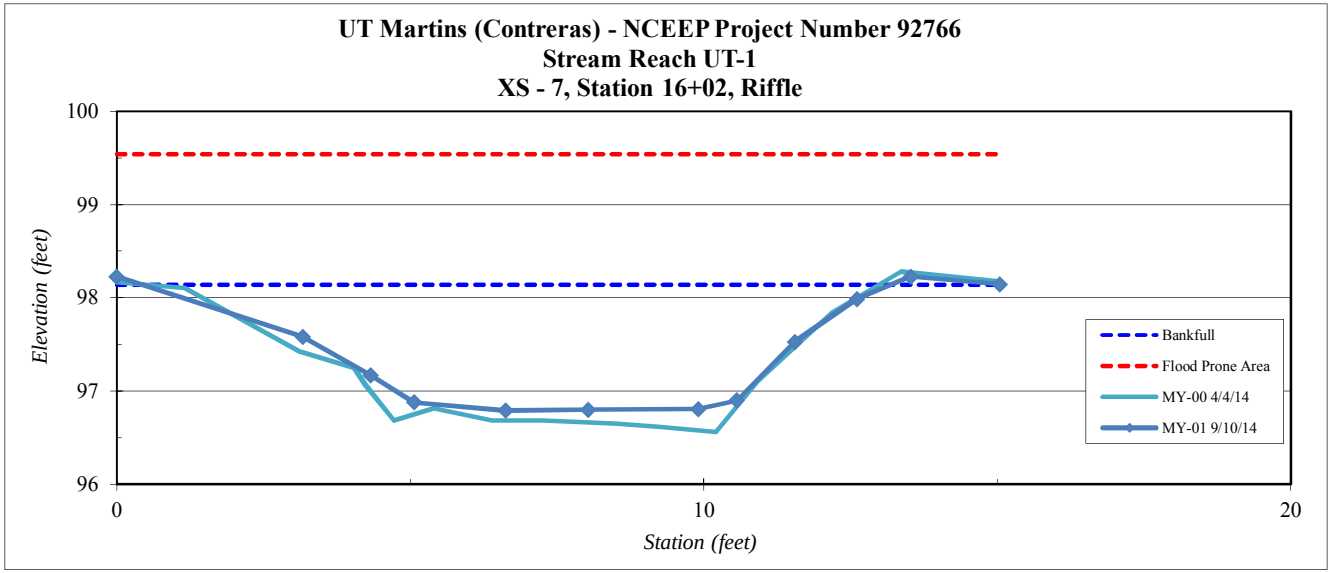


Site	UT to Martins (Contreras)
Project Number:	92766
XS ID	XS - 7, Riffle
Reach	UT 1
Date:	9/10/2014
Field Crew:	Perkinson, Jernigan

Station	Elevation
0.00	98.23
3.17	97.58
4.32	97.17
5.07	96.88
6.62	96.79
8.03	96.80
9.91	96.81
10.56	96.90
11.55	97.53
12.61	97.99
13.52	98.23
15.04	98.14

SUMMARY DATA	
Bankfull Elevation:	98.1
Bankfull Cross-Sectional Area:	11.1
Bankfull Width:	12.8
Flood Prone Area Elevation:	99.5
Flood Prone Width:	50.0
Max Depth at Bankfull:	1.4
Mean Depth at Bankfull:	0.9
W / D Ratio:	14.8
Entrenchment Ratio:	3.9
Bank Height Ratio:	1.0

Stream Type	E

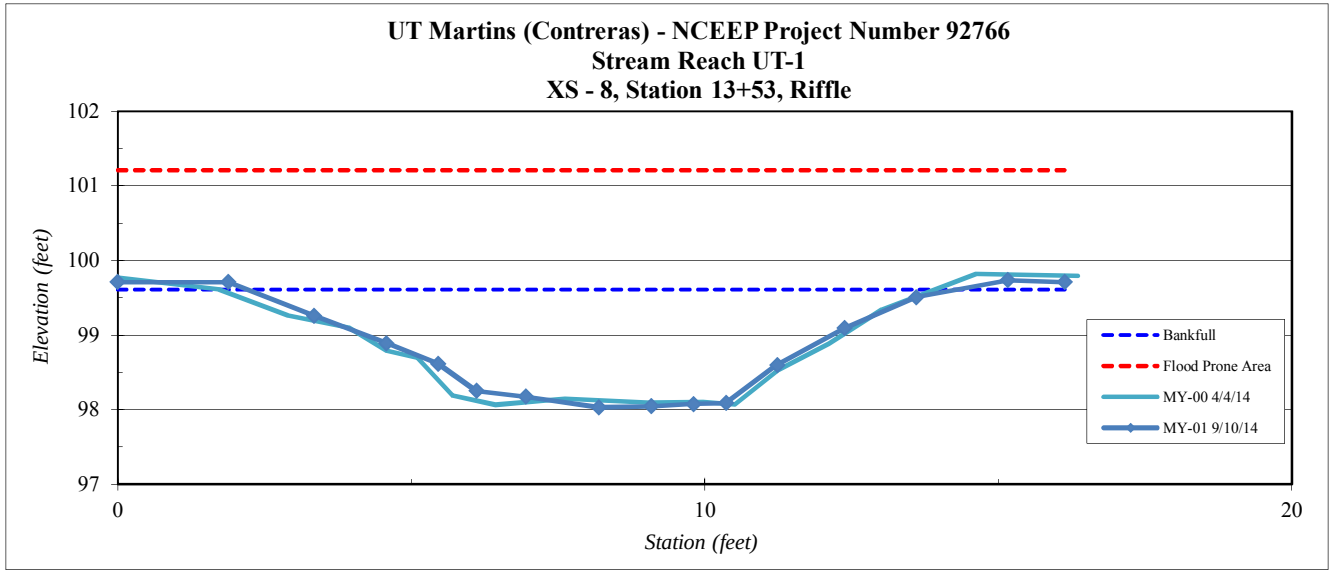


Site	UT to Martins (Contreras)
Project Number:	92766
XS ID	XS - 8, Riffle
Reach	UT 1
Date:	9/10/2014
Field Crew:	Perkinson, Jernigan

Station	Elevation
0.00	99.71
1.89	99.71
3.34	99.26
4.58	98.89
5.45	98.62
6.11	98.25
6.95	98.18
8.20	98.03
9.09	98.05
9.80	98.08
10.36	98.09
11.23	98.60
12.38	99.09
13.61	99.51
15.16	99.74
16.1	99.71

SUMMARY DATA	
Bankfull Elevation:	99.6
Bankfull Cross-Sectional Area:	11.2
Bankfull Width:	12.1
Flood Prone Area Elevation:	101.2
Flood Prone Width:	50.0
Max Depth at Bankfull:	1.6
Mean Depth at Bankfull:	0.9
W / D Ratio:	13.1
Entrenchment Ratio:	4.1
Bank Height Ratio:	1.0

Stream Type	E

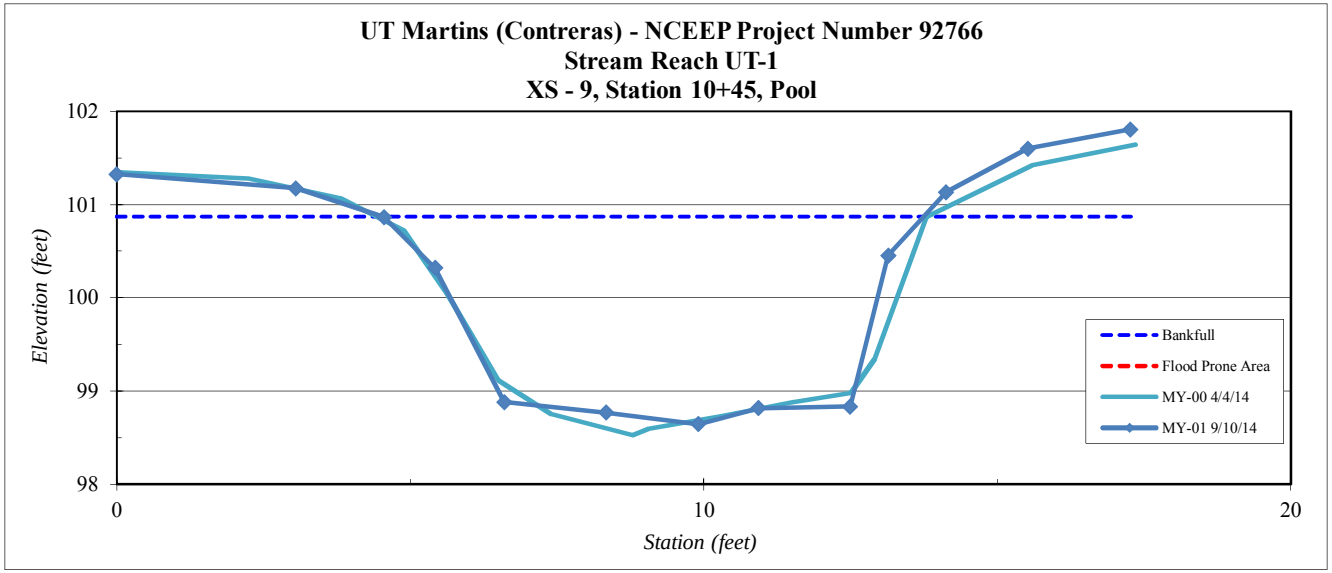


Site	UT to Martins (Contreras)
Project Number:	92766
XS ID	XS - 9, Pool
Reach	UT 1
Date:	9/10/2014
Field Crew:	Perkinson, Jernigan

Station	Elevation
0.00	101.33
3.05	101.18
4.55	100.86
5.42	100.32
6.60	98.88
8.34	98.77
9.91	98.64
10.93	98.82
12.49	98.83
13.14	100.45
14.13	101.13
15.52	101.60
17.27	101.81

SUMMARY DATA	
Bankfull Elevation:	100.9
Bankfull Cross-Sectional Area:	15.0
Bankfull Width:	9.2
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	2.2
Mean Depth at Bankfull:	1.6
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	E

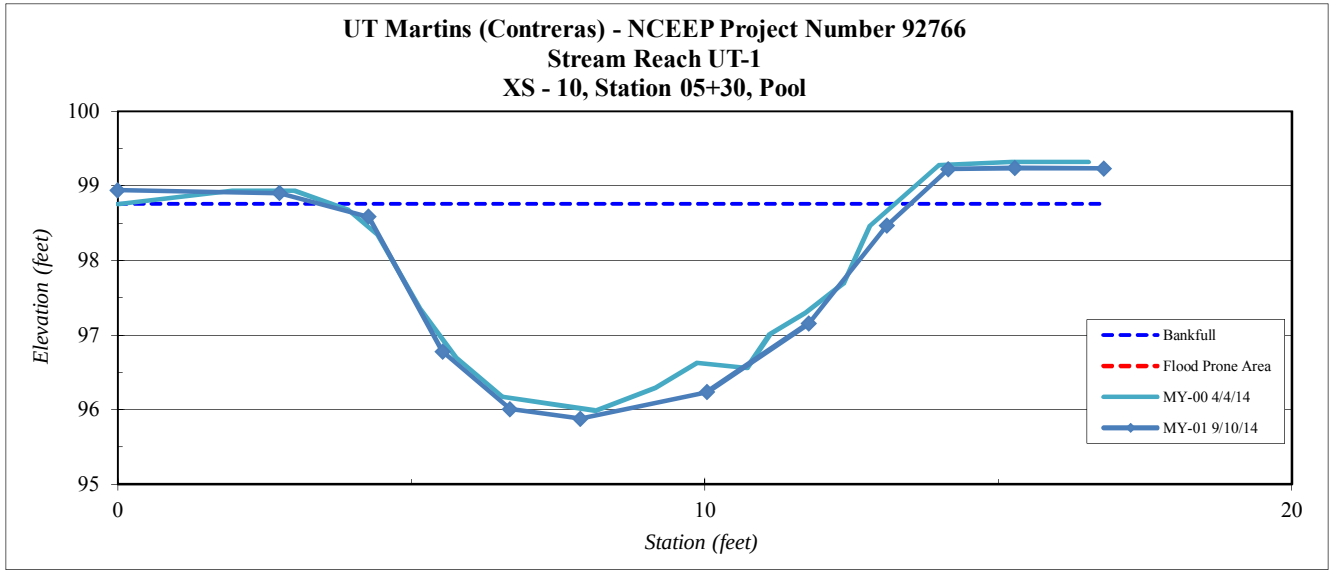


Site	UT to Martins (Contreras)
Project Number:	92766
XS ID	XS - 10, Pool
Reach	UT 1
Date:	9/10/2014
Field Crew:	Perkinson, Jernigan

Station	Elevation
0.00	98.94
2.75	98.90
4.27	98.59
5.53	96.78
6.68	96.01
7.88	95.88
10.03	96.23
11.77	97.16
13.10	98.47
14.15	99.22
15.28	99.24
16.79	99.23

SUMMARY DATA	
Bankfull Elevation:	98.8
Bankfull Cross-Sectional Area:	18.3
Bankfull Width:	10.1
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	2.9
Mean Depth at Bankfull:	1.8
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	E

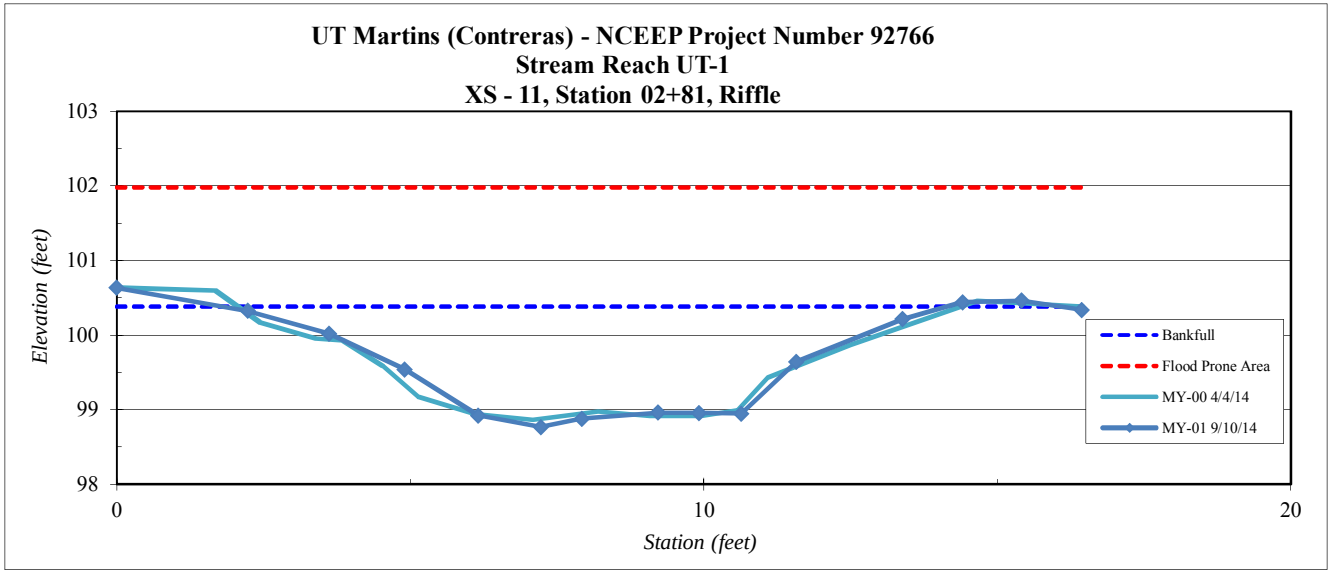


Site	UT to Martins (Contreras)
Project Number:	92766
XS ID	XS - 11, Riffle
Reach	UT 1
Date:	9/10/2014
Field Crew:	Perkinson, Jernigan

Station	Elevation
0.00	100.63
2.23	100.32
3.61	100.02
4.90	99.54
6.16	98.92
7.22	98.77
7.92	98.88
9.22	98.96
9.91	98.96
10.64	98.95
11.58	99.64
13.38	100.21
14.41	100.44
15.42	100.46
16.44	100.34

SUMMARY DATA	
Bankfull Elevation:	100.4
Bankfull Cross-Sectional Area:	11.0
Bankfull Width:	12.3
Flood Prone Area Elevation:	102.0
Flood Prone Width:	50.0
Max Depth at Bankfull:	1.6
Mean Depth at Bankfull:	0.9
W / D Ratio:	13.8
Entrenchment Ratio:	4.1
Bank Height Ratio:	1.0

Stream Type	E

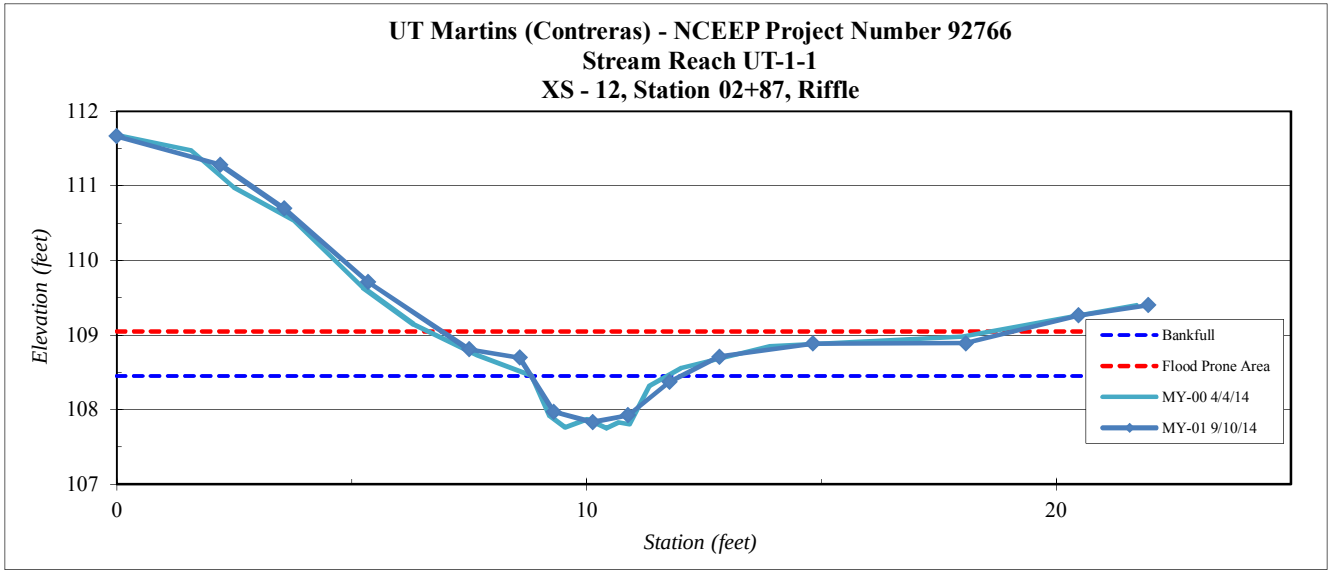


Site	UT to Martins (Contreras)
Project Number:	92766
XS ID	XS - 12, Riffle
Reach	UT 1-1
Date:	9/10/2014
Field Crew:	Perkinson, Jernigan

Station	Elevation
0.00	111.67
2.20	111.29
3.56	110.70
5.35	109.71
7.50	108.81
8.58	108.70
9.30	107.97
10.13	107.83
10.89	107.93
11.77	108.37
12.83	108.71
14.82	108.89
18.08	108.89
20.48	109.26
21.96	109.40

SUMMARY DATA	
Bankfull Elevation:	108.5
Bankfull Cross-Sectional Area:	1.3
Bankfull Width:	3.2
Flood Prone Area Elevation:	109.1
Flood Prone Width:	14.0
Max Depth at Bankfull:	0.6
Mean Depth at Bankfull:	0.4
W / D Ratio:	7.9
Entrenchment Ratio:	4.4
Bank Height Ratio:	1.0

Stream Type	E

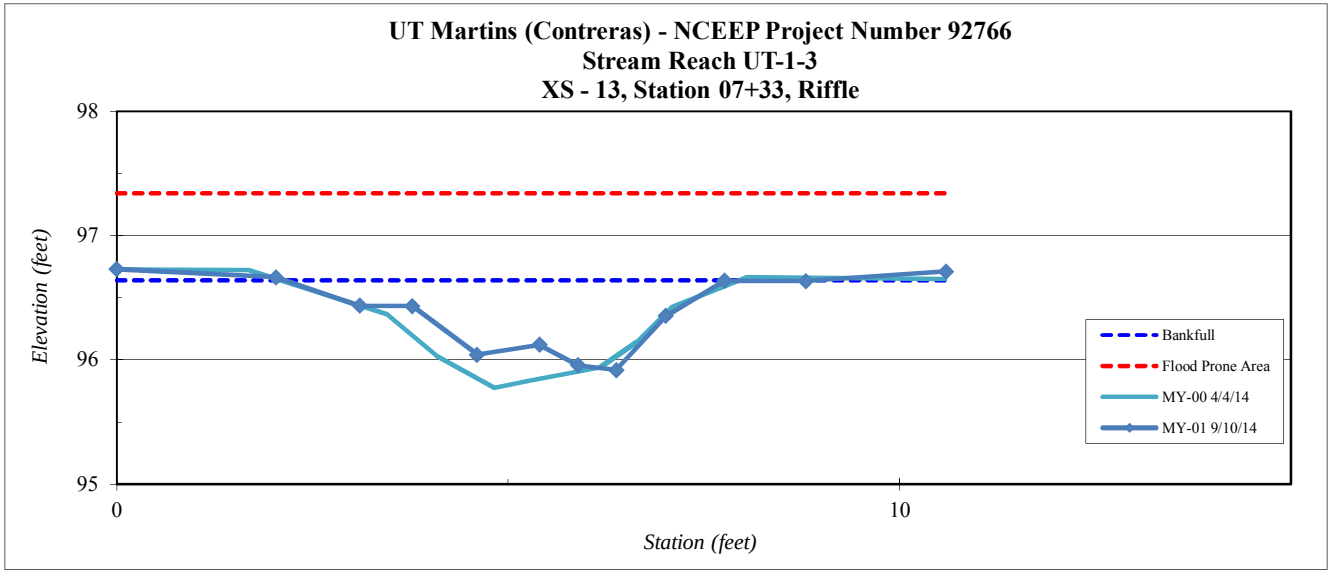


Site	UT to Martins (Contreras)
Project Number:	92766
XS ID	XS - 13, Riffle
Reach	UT 1-3
Date:	9/10/2014
Field Crew:	Perkinson, Jernigan

Station	Elevation
0.00	96.73
2.03	96.67
3.10	96.43
3.77	96.43
4.60	96.04
5.40	96.12
5.89	95.96
6.38	95.92
7.01	96.35
7.76	96.64
8.80	96.63
10.59	96.71

SUMMARY DATA	
Bankfull Elevation:	96.6
Bankfull Cross-Sectional Area:	2.1
Bankfull Width:	5.6
Flood Prone Area Elevation:	97.3
Flood Prone Width:	25.0
Max Depth at Bankfull:	0.7
Mean Depth at Bankfull:	0.4
W / D Ratio:	14.9
Entrenchment Ratio:	4.5
Bank Height Ratio:	1.0

Stream Type	C/E

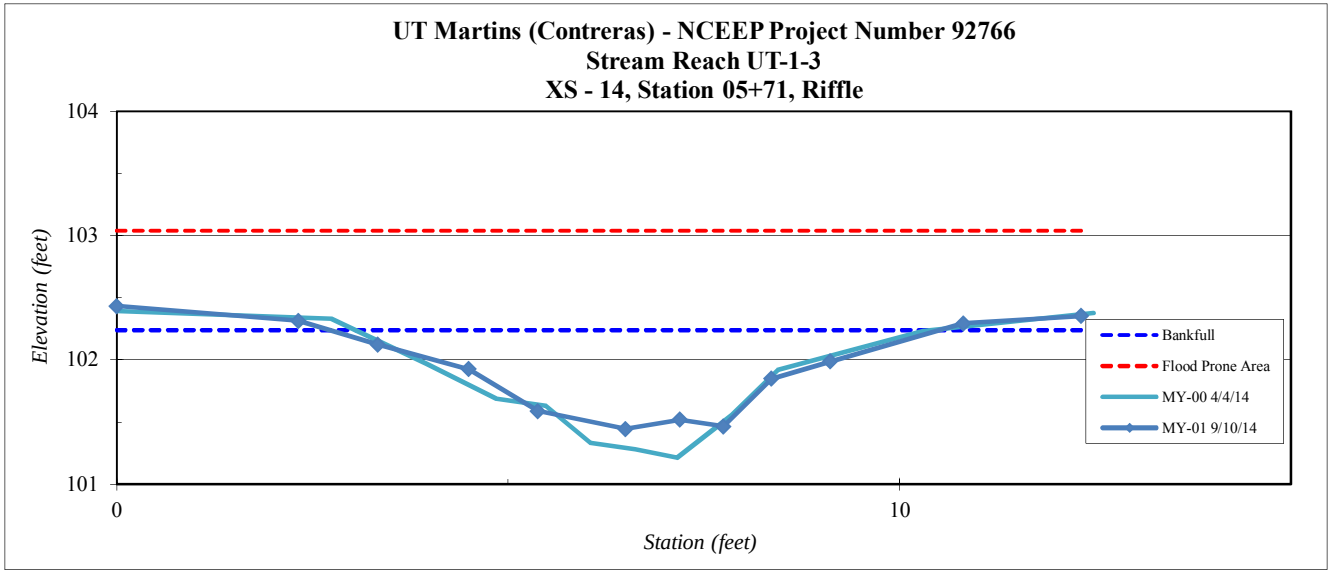


Site	UT to Martins (Contreras)
Project Number:	92766
XS ID	XS - 14, Riffle
Reach	UT 1-3
Date:	9/10/2014
Field Crew:	Perkinson, Jernigan

Station	Elevation
0.00	102.43
2.31	102.31
3.33	102.12
4.50	101.93
5.38	101.59
6.50	101.44
7.19	101.52
7.75	101.47
8.36	101.85
9.11	101.99
10.82	102.30
12.32	102.35

SUMMARY DATA	
Bankfull Elevation:	102.2
Bankfull Cross-Sectional Area:	3.2
Bankfull Width:	7.8
Flood Prone Area Elevation:	103.0
Flood Prone Width:	25.0
Max Depth at Bankfull:	0.8
Mean Depth at Bankfull:	0.4
W / D Ratio:	19.0
Entrenchment Ratio:	3.2
Bank Height Ratio:	1.0

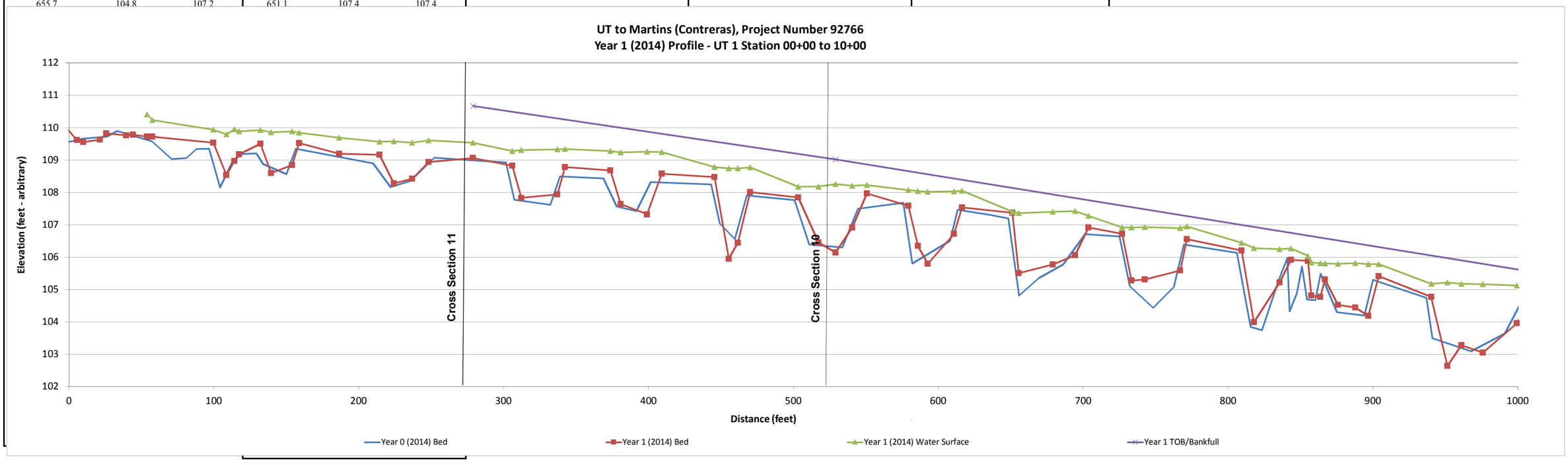
Stream Type	C/E



Project Name	UT to Martins (Contreras), NC EEP Project Number 92766
Reach	UT 1 Station 00+00 - 10+00
Project Number	92766
Date	9/10/14
Crew	Perkinson, Jernigan

2014 Year 0 Monitoring \Survey			2014 Year 1 Monitoring \Survey			2015 Year 2 Monitoring \Survey			2016 Year 3 Monitoring \Survey			2017 Year 4 Monitoring \Survey		
Station	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**
1001.1	104.5	105.0	1008.1	104.6	105.1									
991.0	103.6	105.0	999.2	104.0	105.1									
967.6	103.1	105.0	975.8	103.0	105.2									
941.1	103.5	105.0	961.0	103.3	105.2									
936.9	104.7	105.2	951.3	102.6	105.2									
899.9	105.3	105.7	940.2	104.8	105.2									
894.1	104.2	105.7	903.9	105.4	105.8									
875.1	104.3	105.7	896.7	104.2	105.8									
863.9	105.5	105.7	887.8	104.4	105.8									
860.2	104.7	105.7	875.7	104.5	105.8									
854.4	104.7	105.8	866.9	105.3	105.8									
851.1	105.7	105.9	863.7	104.8	105.8									
847.6	104.9	105.9	857.5	104.8	105.8									
842.6	104.3	105.9	855.1	105.9	106.0									
840.9	106.0	106.2	843.3	105.9	106.3									
835.0	105.3	106.2	835.5	105.2	106.2									
823.4	103.7	106.2	817.9	104.0	106.3									
815.6	103.8	106.2	809.3	106.2	106.4									
806.1	106.1	106.5	771.6	106.6	106.9									
769.4	106.4	106.8	766.9	105.6	106.9									
762.6	105.1	106.8	742.5	105.3	106.9									
748.3	104.4	106.8	733.3	105.3	106.9									
732.1	105.1	106.8	726.8	106.7	106.9									
725.1	106.6	107.0	703.6	106.9	107.3									
701.4	106.7	107.2	694.4	106.1	107.4									
686.2	105.8	107.2	679.0	105.8	107.4									
669.2	105.3	107.2	655.4	105.5	107.4									
655.7	104.8	107.2	651.1	107.4	107.4									

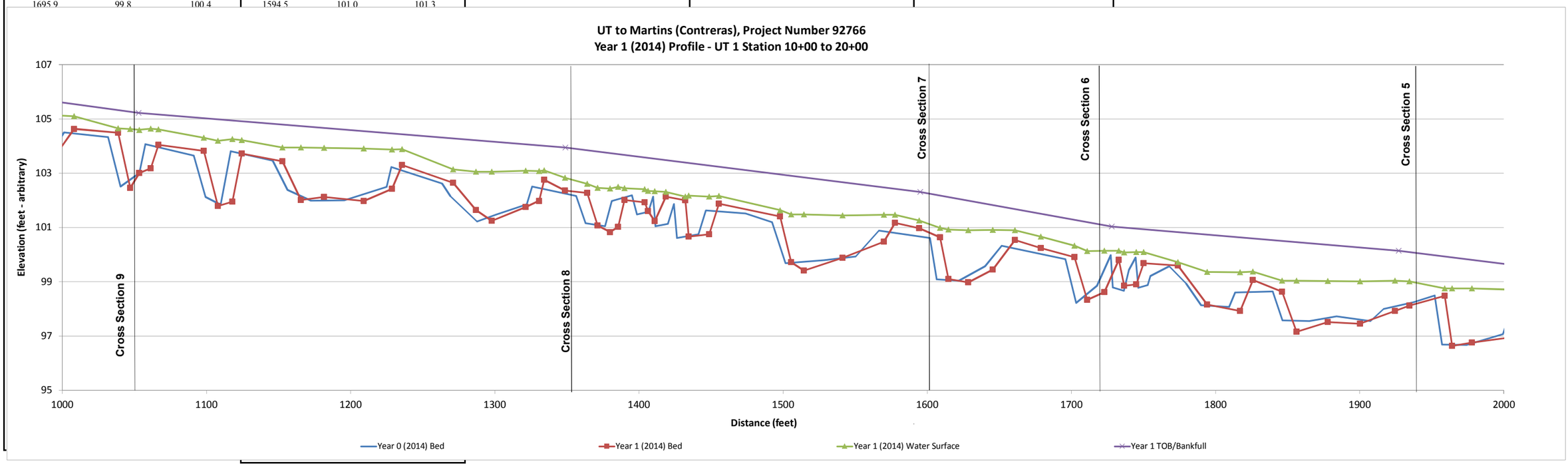
	2014	2014	2015	2016	2017
Avg. Water Surface Slope	0.0069	0.0066			
Riffle Length	33	32			
Avg. Riffle Slope	0.0107	0.0118			
Pool Length	40	42			
Pool to Pool Spacing	66	71			



Project Name	UT to Martins (Contreras), NC EEP Project Number 92766
Reach	UT 1 Station 10+00 - 20+00
Project Number	92766
Date	9/10/14
Crew	Perkinson, Jernigan

2014 Year 0 Monitoring \Survey			2014 Year 1 Monitoring \Survey			2015 Year 2 Monitoring \Survey			2016 Year 3 Monitoring \Survey			2017 Year 4 Monitoring \Survey		
Station	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**
2006.3	98.1	98.7	2005.5	97.0	98.7									
1999.4	97.1	98.7	1977.9	96.8	98.8									
1974.3	96.7	98.7	1964.2	96.6	98.7									
1957.1	96.7	98.7	1958.9	98.5	98.8									
1952.0	98.5	98.8	1934.5	98.1	99.0									
1937.4	98.2	98.9	1924.6	97.9	99.0									
1916.5	98.0	99.0	1900.2	97.5	99.0									
1907.4	97.5	99.0	1877.8	97.5	99.0									
1883.9	97.7	99.0	1856.1	97.2	99.0									
1865.1	97.6	99.0	1846.2	98.6	99.0									
1846.5	97.6	99.0	1825.9	99.1	99.4									
1839.6	98.6	99.0	1817.1	97.9	99.3									
1813.6	98.6	99.4	1794.3	98.2	99.4									
1809.5	98.1	99.4	1773.9	99.6	99.7									
1790.1	98.1	99.4	1750.2	99.7	100.1									
1779.6	98.9	99.5	1745.0	98.9	100.1									
1767.8	99.6	99.7	1736.6	98.9	100.1									
1754.8	99.2	99.7	1732.9	99.8	100.1									
1752.9	98.9	99.7	1722.8	98.6	100.1									
1746.3	98.8	99.7	1711.1	98.3	100.1									
1744.5	99.9	100.0	1702.1	99.9	100.3									
1739.8	99.4	100.0	1678.8	100.2	100.7									
1736.5	98.7	100.0	1660.8	100.5	100.9									
1728.7	98.8	100.1	1645.4	99.4	100.9									
1727.2	100.0	100.2	1628.5	99.0	100.9									
1717.9	98.9	100.2	1614.7	99.1	100.9									
1703.3	98.2	100.2	1608.8	100.6	101.0									
1695.9	99.8	100.4	1594.5	101.0	101.3									

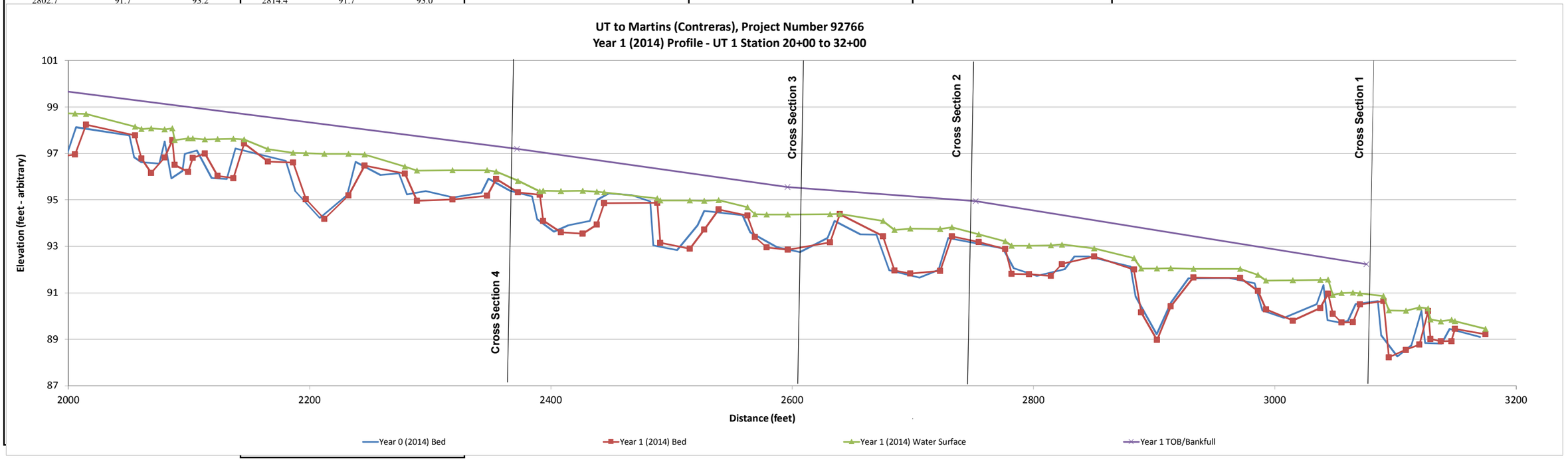
	2014	2014	2015	2016	2017
Avg. Water Surface Slope	0.0069	0.0066			
Riffle Length	33	32			
Avg. Riffle Slope	0.0107	0.0118			
Pool Length	40	42			
Pool to Pool Spacing	66	71			



Project Name	UT to Martins (Contreras), NC EEP Project Number 92766
Reach	UT 1 Station 20+00 - 32+00
Project Number	92766
Date	9/10/14
Crew	Perkinson, Jernigan

2014 Year 0 Monitoring \Survey			2014 Year 1 Monitoring \Survey			2015 Year 2 Monitoring \Survey			2016 Year 3 Monitoring \Survey			2017 Year 4 Monitoring \Survey		
Station	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**
3170.0	89.1	89.4	3174.7	89.2	89.4									
3145.0	89.5	89.8	3149.4	89.4	89.8									
3138.3	88.8	89.8	3146.4	88.9	89.8									
3124.6	88.8	89.8	3137.7	88.9	89.8									
3121.6	90.2	90.3	3128.9	89.0	89.9									
3113.2	88.7	90.4	3127.0	90.2	90.3									
3101.4	88.3	90.3	3119.8	88.8	90.4									
3088.0	89.2	90.4	3108.6	88.5	90.2									
3085.4	90.7	90.8	3094.5	88.2	90.2									
3066.9	90.5	91.0	3090.0	90.7	90.9									
3060.6	89.8	91.0	3070.6	90.5	91.0									
3053.7	89.7	91.1	3064.8	89.7	91.0									
3043.5	89.8	91.0	3055.2	89.7	91.0									
3040.2	91.3	91.6	3048.0	90.1	90.9									
3034.9	90.5	91.6	3044.2	91.0	91.6									
3007.6	89.9	91.6	3037.6	90.3	91.6									
2989.7	90.3	91.7	3014.9	89.8	91.5									
2983.2	91.4	91.7	2992.8	90.3	91.5									
2962.1	91.7	92.2	2986.1	91.1	91.8									
2928.5	91.6	92.1	2971.2	91.6	92.0									
2914.1	90.6	92.1	2932.5	91.7	92.0									
2902.0	89.2	92.1	2913.6	90.4	92.1									
2884.4	90.8	92.2	2902.2	89.0	92.1									
2880.3	92.1	92.6	2889.2	90.2	92.0									
2845.7	92.6	93.0	2883.3	92.0	92.5									
2833.9	92.6	93.1	2850.4	92.6	92.9									
2825.9	92.0	93.1	2823.5	92.2	93.1									
2802.7	91.7	93.2	2814.4	91.7	93.0									

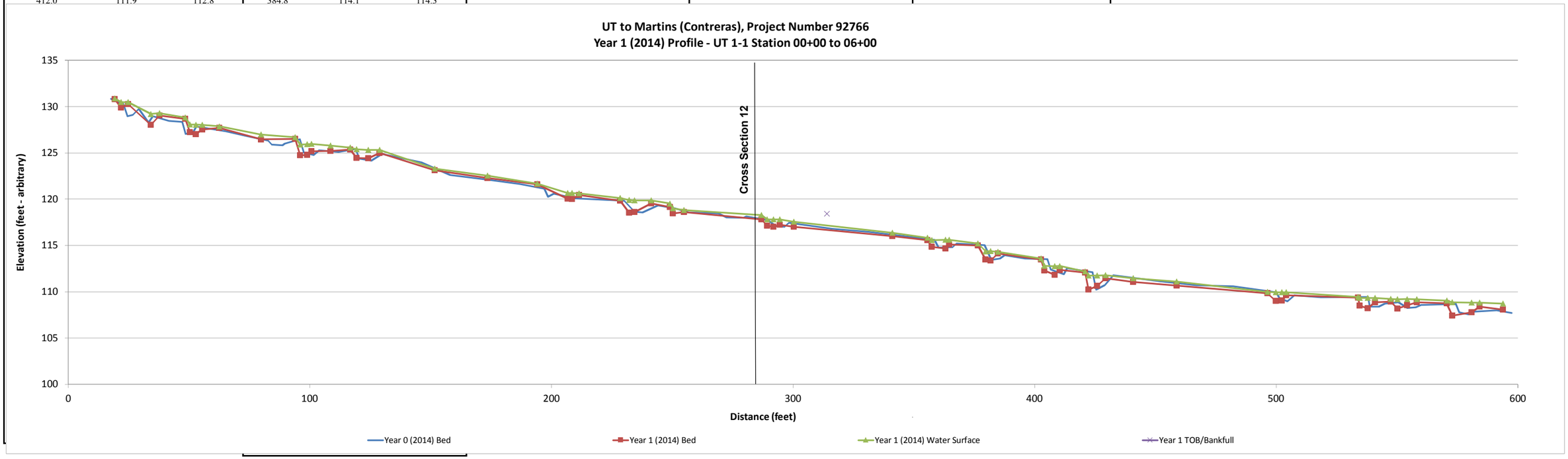
	2014	2014	2015	2016	2017
Avg. Water Surface Slope	0.0069	0.0066			
Riffle Length	33	32			
Avg. Riffle Slope	0.0107	0.0118			
Pool Length	40	42			
Pool to Pool Spacing	66	71			



Project Name	UT to Martins (Contreras), NC EEP Project Number 92766
Reach	UT 1-1 Station 00+00 - 06+00
Project Number	92766
Date	9/10/14
Crew	Perkinson, Jernigan

2014 Year 0 Monitoring \Survey			2014 Year 1 Monitoring \Survey			2015 Year 2 Monitoring \Survey			2016 Year 3 Monitoring \Survey			2017 Year 4 Monitoring \Survey		
Station	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**
597.4	107.7	108.5	593.9	108.1	108.7									
591.3	108.0	108.6	584.1	108.4	108.8									
581.8	107.9	108.5	580.9	107.8	108.8									
579.4	107.6	108.6	572.9	107.4	108.9									
575.8	107.8	108.7	570.5	108.8	109.1									
574.4	108.7	108.9	558.2	108.9	109.2									
559.8	108.6	109.3	554.2	108.5	109.2									
557.6	108.3	109.3	550.1	108.2	109.2									
554.3	108.3	109.3	547.4	109.0	109.2									
550.5	108.9	109.3	540.9	108.9	109.3									
544.9	108.7	109.5	537.8	108.2	109.4									
542.5	108.4	109.5	534.6	108.5	109.3									
538.7	108.4	109.5	533.9	109.4	109.5									
538.0	109.5	109.5	504.2	109.6	110.0									
518.3	109.4	110.0	502.4	109.1	109.9									
507.5	109.6	109.9	499.8	109.0	109.9									
504.5	109.0	110.0	496.3	109.8	110.0									
501.3	109.3	109.9	458.8	110.7	111.1									
499.9	110.0	110.1	440.7	111.1	111.5									
482.1	110.6	110.9	429.3	111.5	111.8									
467.0	110.7	111.1	425.8	110.6	111.8									
451.7	111.1	111.4	422.3	110.2	111.8									
432.5	111.8	111.9	420.9	112.1	112.2									
428.9	110.7	111.9	410.4	112.4	112.8									
425.5	110.3	111.9	408.3	111.8	112.8									
423.9	112.1	112.2	404.0	112.3	112.8									
413.5	112.5	112.8	402.7	113.5	113.6									
412.0	111.9	112.8	384.8	114.1	114.3									

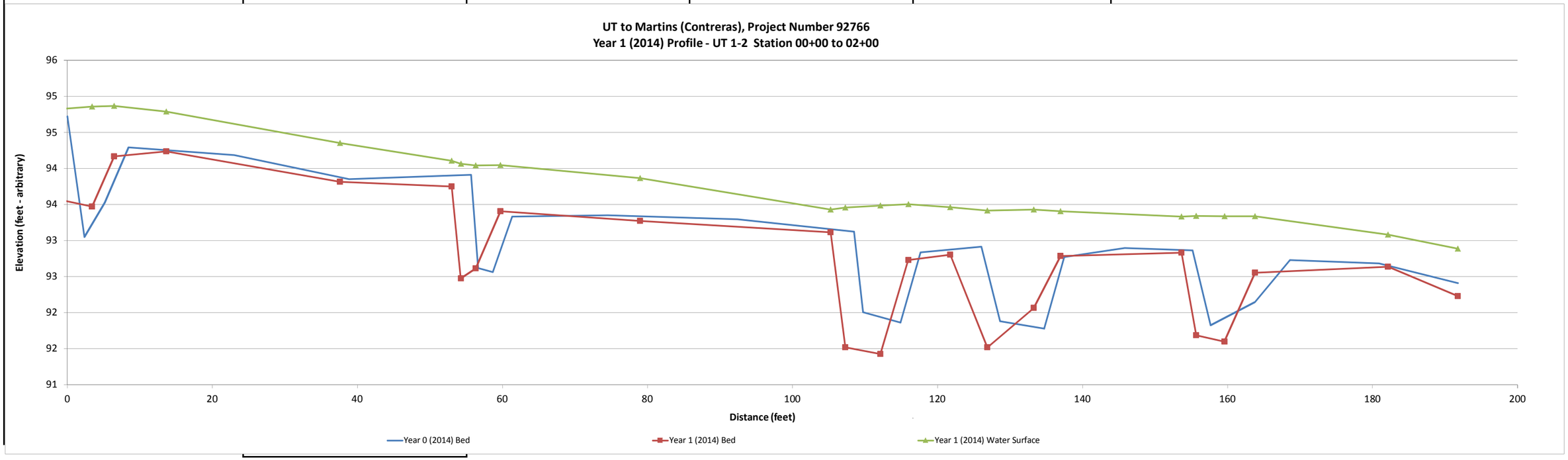
	2014	2014	2015	2016	2017
Avg. Water Surface Slope	0.0383	0.0385			
Riffle Length	24	26			
Avg. Riffle Slope	0.0357	0.0306			
Pool Length	8	9			
Pool to Pool Spacing	32	34			



Project Name	UT to Martins (Contreras), NC EEP Project Number 92766
Reach	UT 1-2 Station 00+00 - 02+00
Project Number	92766
Date	9/10/14
Crew	Perkinson, Jernigan

2014 Year 0 Monitoring \Survey			2014 Year 1 Monitoring \Survey			2015 Year 2 Monitoring \Survey			2016 Year 3 Monitoring \Survey			2017 Year 4 Monitoring \Survey		
Station	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**
191.8	92.4	93.0	191.8	92.2	92.9									
180.9	92.7	93.2	182.1	92.6	93.1									
168.6	92.7	93.2	163.8	92.6	93.3									
163.8	92.1	93.2	159.6	91.6	93.3									
157.7	91.8	93.2	155.7	91.7	93.3									
155.2	92.9	93.2	153.7	92.8	93.3									
145.8	92.9	93.3	137.0	92.8	93.4									
137.5	92.8	93.3	133.3	92.1	93.4									
134.7	91.8	93.3	126.9	91.5	93.4									
128.6	91.9	93.3	121.8	92.8	93.5									
126.0	92.9	93.3	116.0	92.7	93.5									
117.6	92.8	93.4	112.1	91.4	93.5									
114.9	91.9	93.4	107.3	91.5	93.5									
109.8	92.0	93.3	105.3	93.1	93.4									
108.5	93.1	93.4	79.0	93.3	93.9									
92.4	93.3	93.6	59.7	93.4	94.0									
74.5	93.4	93.9	56.3	92.6	94.0									
61.3	93.3	93.9	54.3	92.5	94.1									
58.7	92.6	93.9	53.0	93.7	94.1									
56.6	92.6	93.9	37.6	93.8	94.4									
55.7	93.9	94.0	13.6	94.2	94.8									
38.8	93.9	94.3	6.5	94.2	94.9									
23.0	94.2	94.6	3.4	93.5	94.9									
8.4	94.3	94.7	-1.4	93.6	94.8									
5.1	93.5	94.8	-2.2	94.6	94.9									
2.3	93.1	94.7												
0.0	94.7	95.0												

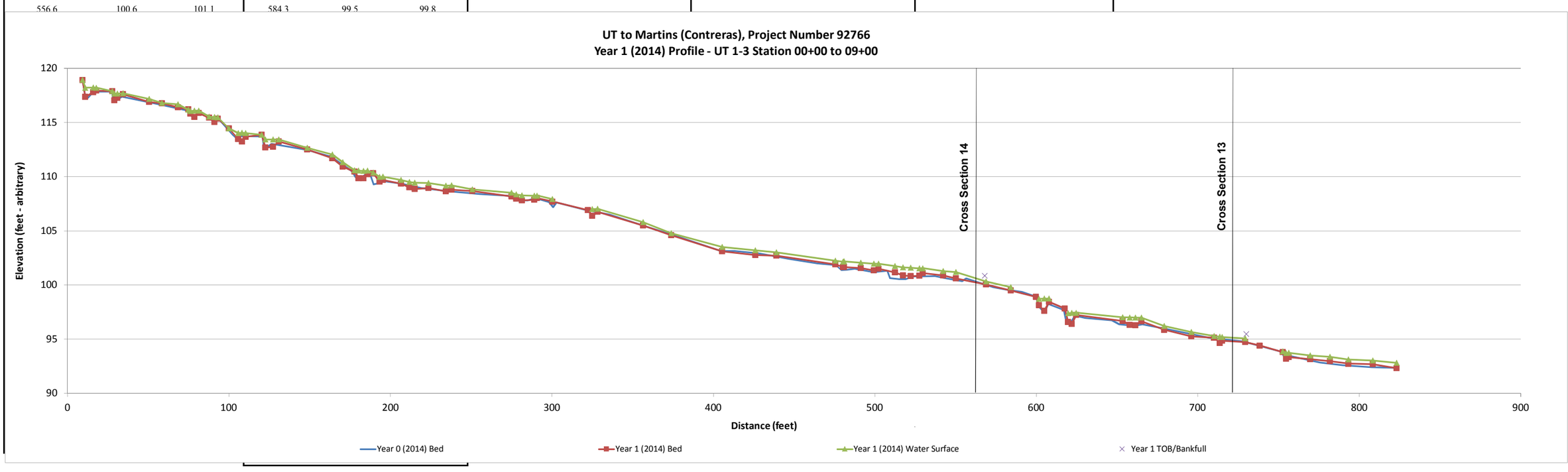
	2014	2014	2015	2016	2017
Avg. Water Surface Slope	0.0105	0.0102			
Riffle Length	29	27			
Avg. Riffle Slope	0.0108	0.0112			
Pool Length	10	10			
Pool to Pool Spacing	38	37			



Project Name	UT to Martins (Contreras), NC EEP Project Number 92766
Reach	UT 1-3 Station 00+00 - 09+00
Project Number	92766
Date	9/10/14
Crew	Perkinson, Jernigan

2014 Year 0 Monitoring \Survey			2014 Year 1 Monitoring \Survey			2015 Year 2 Monitoring \Survey			2016 Year 3 Monitoring \Survey			2017 Year 4 Monitoring \Survey		
Station	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**	**Station**	**Bed Elevation**	**Water Elevation**
822.4	92.4	92.9	823.2	92.3	92.8									
807.4	92.4	93.0	808.3	92.7	93.0									
789.7	92.6	93.3	793.4	92.7	93.1									
775.6	92.8	93.5	781.8	93.0	93.4									
757.6	93.4	93.8	769.7	93.1	93.5									
754.1	93.2	93.8	756.4	93.3	93.7									
752.0	93.8	93.9	754.8	93.2	93.7									
727.9	94.8	95.0	752.6	93.8	93.9									
707.0	95.1	95.4	738.3	94.4										
681.7	95.9	96.2	729.5	94.7	95.1									
665.8	96.4	97.0	715.1	94.8	95.2									
662.5	96.3	97.0	713.7	94.6	95.2									
660.1	96.2	97.0	710.2	95.1	95.3									
651.4	96.4	97.1	696.1	95.2	95.6									
646.9	96.7	97.2	679.2	95.9	96.2									
630.3	97.0	97.4	665.1	96.6	97.0									
624.0	97.2	97.5	661.4	96.3	97.0									
621.8	96.7	97.5	657.9	96.3	97.0									
618.3	96.8	97.5	653.5	96.7	97.0									
617.1	97.7	97.8	624.8	97.2	97.4									
607.2	98.2	98.7	622.0	96.4	97.4									
605.0	97.4	98.7	619.6	96.6	97.4									
600.9	98.1	98.6	617.6	97.8										
600.2	98.9	99.1	607.9	98.4	98.7									
591.1	99.3	99.5	605.0	97.6	98.8									
582.1	99.5	99.9	601.6	98.1	98.7									
573.3	99.8	100.1	599.8	98.9										
556.6	100.6	101.1	584.3	99.5	99.8									

	2014	2014	2015	2016	2017
Avg. Water Surface Slope	0.0321	0.0321			
Riffle Length	41	34			
Avg. Riffle Slope	0.0318	0.0422			
Pool Length	12	11			
Pool to Pool Spacing	51	45			



	UT to Martins Creek
	Hiawassee

Note:	**Cross Section 5**

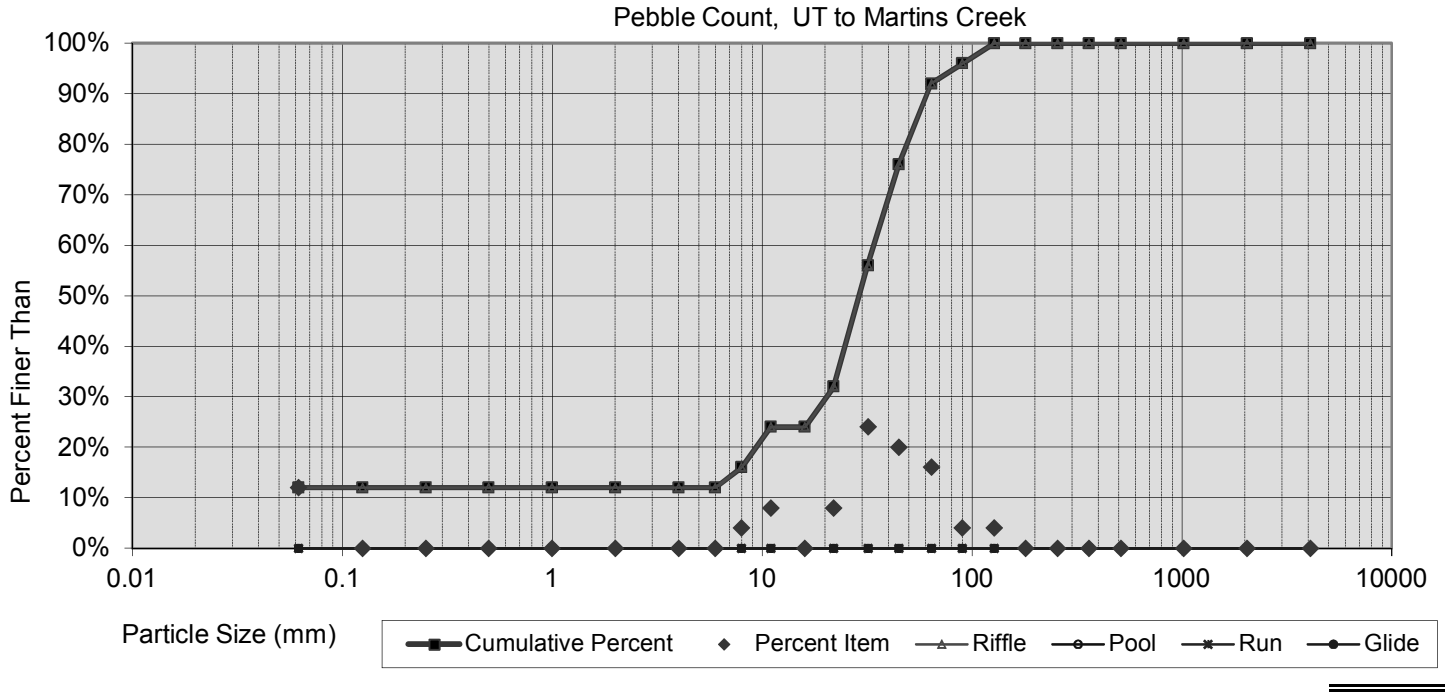


Table 10a. Baseline Stream Data Summary (UT -1 to Martin's Creek)
UT to Martin's Creek Mitigation Project - EEP Project Number 92766

Parameter	Gauge	Regional Curve			Pre-Existing Condition (UT-1)					Reference Reach(es) Data					Design (UT-1)			Monitoring Baseline				
Dimension and Substrate - Riffle Only		**LL**	**UL**	**Eq.**	**Min**	**Mean**	**Med**	**Max**	**SD**	**Min**	**Mean**	**Med**	**Max**	**SD**	**Min**	**Max**	**Med**	**Min**	**Mean**	**Med**	**Max**	**SD**
BF Width (ft)					9.2			16.9		11.7			21.7		12.5	15.0		11.7	12.3	12.2	13.8	0.7
Floodprone Width (ft)					31.0			51.0		20			410		50	100		50	71	50	100	27
BF Mean Depth (ft)					1.0			1.6		0.6			1.0		1.0	1.2		0.9	1.0	1.1	1.1	0.1
BF Max Depth (ft)					2.1			2.6		0.9			2.5		1.2	1.7		1.5	1.7	1.7	1.8	0.2
BF Cross Sectional Area (ft^2)					12.8			18.8		10.2			13.1		12.5	18.0		11.5	12.7	12.8	14.7	1.2
Width/Depth Ratio					6.0			17.6		10.7			17.0		12.5	12.5		10.6	11.9	11.7	13.7	1.0
Entrenchment Ratio					>2.4			>5		1.7			32.0		3.5	7.7		4.1	5.8	5.8	8.5	2.1
Bank Height Ratio					1.1			1.7		1.0			1.0		1.0	1.0			1.0	1.0		
Profile																						
Riffle length (ft)																		5	33	35	55	12.2
Riffle slope (ft/ft)										0.2000			1.9000		0.0140	0.0140		0.0000	0.0107	0.0115	0.0230	0.0053
Pool length (ft)																		10.0	40.0	36.0	82.0	17.4
Pool Max depth (ft)										2.2			2.5		2.0	3.6		2.3	2.6	2.7	2.8	0.2
Pool spacing (ft)										48.0			231.0		50.0	105.0		10.0	66.0	70.0	118.0	31.0
Pattern																						
Channel Beltwidth (ft)										16			55		19	60		19			60	
Radius of Curvature (ft)										28			47		23	53		23			53	
Rc:Bankfull width (ft/ft)										2			3		1.8	3.5		1.8			3.5	
Meander Wavelength (ft)										70			260		87.5	180		87.5			180	
Meander Width ratio										4.4			17.6		7	12		7			12	
Transport parameters																						
Reach Shear Stress (competency) lbs/ft^2																						
Max part size (mm) mobilized at bankfull																						
Stream Power (transport capacity) W/m^2																						
Additional Reach Parameters																						
Rosgen Classification					Bc/Cc/E					Aa/Bc					C			E				
Bankfull Velocity (fps)					3.6 - 4.2										3.5 - 4.2							
Bankfull Discharge (cfs)					46 - 60																	
Valley Length (ft)																						
Channel Thalweg Length (ft)																		3180				
Sinuosity					1.17					1.19					1.5			1.5				
Water Surface Slope (ft/ft)					0.0075					0.0333					0.0058			0.0069				
BF slope (ft/ft)																						
Bankfull Floodplain Area (acres)																						
% of Reach with Eroding Banks					----					----												
Channel Stability or Habitat Metric					----					----												
Biological or Other					----					----												

Table 10b. Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions)
UT to Martin's Creek Mitigation Project - EEP Project Number 92766

Parameter	Pre-Existing Condition							Reference Reach(es) Data							Design							Monitoring Baseline						
Ri%/RU%P%G%/S%																											
SC%/SA%/G%/C%/B%BE%																											
d16/d35/d50/d84/d95	3.0	12.6	17.9	72.3	84.0																						
Entrainment Class <1.5/1.5-1.99/2.0-4.9/5.0-																											
Incision Class <1.2/1.2-1.49/1.5-1.99/>2.0																											

Table 10c. Baseline Stream Data Summary (UT 1-1 and UT 1-2 to Martin's Creek)
UT to Martin's Creek Mitigation Project - EEP Project Number 92766

Parameter	Gauge	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	Min	Mean	Med	Max	SD	Min	Max	Med	Min	Mean	Med	Max	SD
BF Width (ft)					4.5			6.7		11.7			21.7				4.5		2.9			
Floodprone Width (ft)					5.4			8.5		20			410				13.5		14			
BF Mean Depth (ft)					0.3			0.4		0.6			1.0				0.4		0.5			
BF Max Depth (ft)					0.5			1.0		0.9			2.5				0.5		0.7			
BF Cross Sectional Area (ft^2)					1.5			2.4		10.2			13.1				1.7		1.4			
Width/Depth Ratio					13.2			18.9		10.7			17.0				12.0		6.0			
Entrenchment Ratio					1.2			1.6		1.7			32.0				3.0		4.8			
Bank Height Ratio					1.0			4.4		1.0			1.0				1.0		1.0			
Profile																						
Riffle length (ft)																		5	24	15	67	21
Riffle slope (ft/ft)										0.2000			1.9000				0.0140	0.0000	0.0357	0.0332	0.1101	0.0245
Pool length (ft)																		4.0	8.0	8.0	14.0	2.3
Pool Max depth (ft)										2.2			2.5				0.8	----	----	----	----	----
Pool spacing (ft)										48.0			231.0				32.0	6.0	32.0	23.0	78.0	22.0
Pattern																						
Channel Beltwidth (ft)										16			55									
Radius of Curvature (ft)										28			47				34			34		
Rc:Bankfull width (ft/ft)										2			3				7.6			7.6		
Meander Wavelength (ft)										70			260									
Meander Width ratio										4.4			17.6									
Transport parameters																						
Reach Shear Stress (competency) lbs/ft^2																						
Max part size (mm) mobilized at bankfull																						
Stream Power (transport capacity) W/m^2																						
Additional Reach Parameters																						
Rosgen Classification					C					Aa/Bc					C			E				
Bankfull Velocity (fps)					3.5 - 4.1										3.5 - 4.1							
Bankfull Discharge (cfs)					6.0 - 7.0																	
Valley Length (ft)																						
Channel Thalweg Length (ft)																		580				
Sinuosity					1.02 - 1.08					1.19					1.03			1.03				
Water Surface Slope (ft/ft)					0.0096 - 0.0333					0.0333					0.0096 - 0.0333			0.0383				
BF slope (ft/ft)					----					----					----							
Bankfull Floodplain Area (acres)					----					----					----							
% of Reach with Eroding Banks					----					----												
Channel Stability or Habitat Metric					----					----												
Biological or Other					----					----												

Table 10d. Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions)
UT to Martin's Creek Mitigation Project - EEP Project Number 92766

Parameter	Pre-Existing Condition							Reference Reach(es) Data							Design							Monitoring Baseline						
Ri%/RU%P%G%/S%																											
SC%/SA%/G%/C%/B%BE%																											
d16/d35/d50/d84/d95																											
Entrainment Class <1.5/1.5-1.99/2.0-4.9/5.0-																											
Incision Class <1.2/1.2-1.49/1.5-1.99/>2.0																											

Table 10e. Baseline Stream Data Summary (UT 1-3 to Martin's Creek)
UT to Martin's Creek Mitigation Project - EEP Project Number 92766

Parameter	Gauge	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**	**Min**	**Mean**	**Med**	**Max**	**SD**	**Min**	**Max**	**Med**	**Min**	**Mean**	**Med**	**Max**	**SD**
BF Width (ft)					6.3			14.3		11.7			21.7				6.5	5.9	6.6	6.6	7.3	1
Floodprone Width (ft)					10.2			32.6		20			410				14.0		25	25		
BF Mean Depth (ft)					0.2			0.5		0.6			1.0				0.5	0.4	0.5	0.5	0.5	0.1
BF Max Depth (ft)					0.8			1.0		0.9			2.5				0.7	0.9	1.0	1.0	1.0	0.1
BF Cross Sectional Area (ft^2)					3.2			3.5		10.2			13.1				3.5	2.7	3.2	3.2	3.6	0.6
Width/Depth Ratio					12.5			58.6		10.7			17.0				12.0	14.6	14.7	14.7	14.8	0.1
Entrenchment Ratio					>1.6			2.3		1.7			32.0				2.2	3.4	3.8	3.8	4.2	0.6
Bank Height Ratio					1.2			1.3		1.0			1.0				1.0		1.0	1.0		
Profile																						
Riffle length (ft)																		4	41	22	173	44
Riffle slope (ft/ft)										0.2000			1.9000				0.0140	0.0047	0.0318	0.0326	0.0913	0.0218
Pool length (ft)																		5.0	12.0	7.0	50.0	11.0
Pool Max depth (ft)										2.2			2.5				1.1					
Pool spacing (ft)										48.0			231.0				45.0	11.0	51.0	31.0	178.0	43.0
Pattern																						
Channel Beltwidth (ft)										16			55									
Radius of Curvature (ft)										28			47									
Rc:Bankfull width (ft/ft)										2			3									
Meander Wavelength (ft)										70			260									
Meander Width ratio										4.4			17.6									
Transport parameters																						
Reach Shear Stress (competency) lbs/ft^2																						
Max part size (mm) mobilized at bankfull																						
Stream Power (transport capacity) W/m^2																						
Additional Reach Parameters																						
Rosgen Classification					B					Aa/Bc					B			C/E				
Bankfull Velocity (fps)					2.5 - 2.9										2.3							
Bankfull Discharge (cfs)					8.0 - 10.0																	
Valley Length (ft)																						
Channel Thalweg Length (ft)																		813				
Sinuosity					1.08					1.19					1.08			1.08				
Water Surface Slope (ft/ft)					0.0275					0.0333					0.0275			0.0321				
BF slope (ft/ft)					----					----					----							
Bankfull Floodplain Area (acres)					----					----					----							
% of Reach with Eroding Banks					----					----												
Channel Stability or Habitat Metric					----					----												
Biological or Other					----					----												

Table 10f. Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions)
UT to Martin's Creek Mitigation Project - EEP Project Number 92766

Parameter	Pre-Existing Condition							Reference Reach(es) Data							Design							Monitoring Baseline						
Ri%/RU%P%G%/S%																												
SC%/SA%/G%/C%/B%BE%																												
d16/d35/d50/d84/d95																												
Entrainment Class <1.5/1.5-1.99/2.0-4.9/5.0-																												
Incision Class <1.2/1.2-1.49/1.5-1.99/>2.0																												

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters - Cross Sections)
UT to Martin's Creek Mitigation Project - EEP Project Number 92766

Parameter	Cross Section 1 UT - 1 Riffle							Cross Section 2 UT - 1 Riffle							Cross Section 3 UT - 1 Pool							Cross Section 4 UT - 1 Riffle							Cross Section 5 UT - 1 Riffle							Cross Section 6 UT - 1 Pool						
Dimension	MY0	MY1	MY2	MY3	MY4	MY5	MY5+	MY0	MY1	MY2	MY3	MY4	MY5	MY5+	MY0	MY1	MY2	MY3	MY4	MY5	MY5+	MY0	MY1	MY2	MY3	MY4	MY5	MY5+	MY0	MY1	MY2	MY3	MY4	MY5	MY5+	MY0	MY1	MY2	MY3	MY4	MY5	MY5+
BF Width (ft)	11.7	11.4						12.5	12.7						16.4	17.4						13.8	13.3						12.1	11.3						13.0	12.8					
Floodprone Width (ft) (approx)	100.0	100.0						100.0	100.0						NA	NA						100.0	100.0						50.0	50.0						NA	NA					
BF Mean Depth (ft)	1.1	1.1						1.1	1.1						1.2	1.2						1.1	1.1						1.1	1.1						1.4	1.4					
BF Max Depth (ft)	1.7	1.7						1.8	1.8						2.5	2.7						1.8	1.9						1.8	1.8						2.8	2.6					
BF Cross Sectional Area (ft^2)	13.3	12.7						13.4	13.4						19.9	21.6						14.7	14.7						12.8	12.1						18.3	18.0					
Width/Depth Ratio	10.3	10.2						11.7	12.0						NA	NA						13.0	12.0						11.4	10.6						NA	NA					
Entrenchment Ratio	8.5	8.8						8.0	7.9						NA	NA						7.2	7.5						4.1	4.4						NA	NA					
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					
d50 (mm)	----	----						----	----						----	----						----	----						28.6	29.1						----	----					

Parameter	Cross Section 7 UT - 1 Riffle							Cross Section 8 UT - 1 Riffle							Cross Section 9 UT - 1 Pool							Cross Section 10 UT - 1 Pool							Cross Section 11 UT - 1 Riffle						
Dimension	MY0	MY1	MY2	MY3	MY4	MY5	MY5+	MY0	MY1	MY2	MY3	MY4	MY5	MY5+	MY0	MY1	MY2	MY3	MY4	MY5	MY5+	MY0	MY1	MY2	MY3	MY4	MY5	MY5+	MY0	MY1	MY2	MY3	MY4	MY5	MY5+
BF Width (ft)	11.7	12.8						12.2	12.1						9.4	9.2						9.6	10.1						12.3	12.3					
Floodprone Width (ft) (approx)	50.0	50.0						50.0	50.0						NA	NA						NA	NA						50.0	50.0					
BF Mean Depth (ft)	1.0	0.9						1.0	0.9						1.6	1.6						1.8	1.8						0.9	0.9					
BF Max Depth (ft)	1.5	1.4						1.5	1.6						2.3	2.2						2.8	2.9						1.5	1.6					
BF Cross Sectional Area (ft^2)	11.7	11.1						11.8	11.2						15.5	15.0						17.0	18.3						11.5	11.0					
Width/Depth Ratio	11.7	14.8						12.6	13.1						NA	NA						NA	NA						13.2	13.8					
Entrenchment Ratio	4.3	3.9						4.1	4.1						NA	NA						NA	NA						4.1	4.1					
Bank Height Ratio	1.0	1.0						1.0	1.0						1.0	1.0						1.0	1.0						1.0	1.0					
d50 (mm)	----	----						----	----						----	----						----	----						----	----					

Table 11b. Monitoring Data - Stream Reach Data Summary
UT to Martin's Creek Mitigation Project - EEP Project Number 92766

Parameter	Baseline (UT - 1)					MY-1 (UT - 1)					MY-2 (UT - 1)					MY-3 (UT - 1)					MY-4 (UT - 1)					MY-5 (UT - 1)				
Dimension and Substrate - Riffle Only	**Min**	**Mean**	**Med**	**Max**	**SD**	**Min**	**Mean**	**Med**	**Max**	**SD**	**Min**	**Mean**	**Med**	**Max**	**SD**	**Min**	**Mean**	**Med**	**Max**	**SD**	**Min**	**Mean**	**Med**	**Max**	**SD**	**Min**	**Mean**	**Med**	**Max**	**SD**
BF Width (ft)	11.7	12.3	12.2	13.8	0.7	11.3	12.3	12.3	13.3	0.7																				
Floodprone Width (ft)	50	71	50	100	27	50	71	50	100	27																				
BF Mean Depth (ft)	0.9	1.0	1.1	1.1	0.1	0.9	1.0	1.1	1.1	0.1																				
BF Max Depth (ft)	1.5	1.7	1.7	1.8	0.2	1.4	1.7	1.7	1.9	0.2																				
BF Cross Sectional Area (ft^2)	11.5	12.7	12.8	14.7	1.2	11.0	12.3	12.1	14.7	1.4																				
Width/Depth Ratio	10.6	11.9	11.7	13.7	1.0	10.3	12.2	12.1	14.2	1.6																				
Entrenchment Ratio	4.1	5.8	5.8	8.5	2.1	3.9	5.8	5.8	8.8	2.1																				
Bank Height Ratio		1.0	1.0				1.0	1.0																						
Profile - UT -1																														
Riffle length (ft)	5	33	35	55	12.2	10	32	32	60	13																				
Riffle slope (ft/ft)	0.0000	0.0107	0.0115	0.0230	0.0053	0.0000	0.0118	0.0127	0.0250	0.0059																				
Pool length (ft)	10	40	36	82	17	12	42	37	88	20																				
Pool Max depth (ft)	2.3	2.6	2.7	2.8	0.2	2.2	2.6	2.7	2.9	0.3																				
Pool spacing (ft)	10	66	70	118	31	12	71	72	118	28																				
Pattern																														
Channel Beltwidth (ft)	19			60																										
Radius of Curvature (ft)	23			53																										
Rc:Bankfull width (ft/ft)	1.8			3.5																										
Meander Wavelength (ft)	87.5			180																										
Meander Width ratio	7			12																										
Additional Reach Parameters																														
Rosgen Classification	E-Type					Ec-Type																								
Channel Thalweg Length (ft)	3180					3184																								
Sinuosity	1.5					1.5																								
Water Surface Slope (Channel) (ft/ft)	0.0069					0.0066																								
BF slope (ft/ft)	-----					-----																								
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	-----																													

Table 11c. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters - Cross Sections)
UT to Martin's Creek Mitigation Project - EEP Project Number 92766

Parameter	Cross Section 12 UT 1 -1 Riffle						
Dimension	MY0	MY1	MY2	MY3	MY4	MY5	MY5+
BF Width (ft)	2.9	3.2					
Floodprone Width (ft) (approx)	14.0	14.0					
BF Mean Depth (ft)	0.5	0.4					
BF Max Depth (ft)	0.7	0.6					
BF Cross Sectional Area (ft^2)	1.4	1.3					
Width/Depth Ratio	6.0	7.9					
Entrenchment Ratio	4.8	4.4					
Bank Height Ratio	1.0	1.0					
d50 (mm)	----	----					

Table 11d. Monitoring Data - Stream Reach Data Summary
UT to Martin's Creek Mitigation Project - EEP Project Number 92766

Parameter	Baseline (UT 1 - 1)					MY-1 (UT 1 - 1)					MY-2 (UT 1 - 1)					MY-3 (UT 1 - 1)					MY-4 (UT 1 - 1)					MY-5 (UT 1 - 1)				
Dimension and Substrate - Riffle Only	Min	Mean	Med	Max	SD	Min	Mean	Med	Max	SD	Min	Mean	Med	Max	SD	Min	Mean	Med	Max	SD	Min	Mean	Med	Max	SD	Min	Mean	Med	Max	SD
BF Width (ft)		2.9					3.2																						
Floodprone Width (ft)		14					14																						
BF Mean Depth (ft)		0.5					0.4																						
BF Max Depth (ft)		0.7					0.6																						
BF Cross Sectional Area (ft^2)		1.4					1.3																						
Width/Depth Ratio		6.0					8.0																						
Entrenchment Ratio		4.8					4.4																						
Bank Height Ratio		1.0					1.0																						
Profile - UT 1 - 1																													
Riffle length (ft)	5	24	15	67	21	7	26	17	67	21																			
Riffle slope (ft/ft)	0.0000	0.0357	0.0332	0.1101	0.0245	0.0104	0.0306	0.0308	0.0555	0.0143																			
Pool length (ft)	4	8	8	14	2	6	9	8	17	3																			
Pool Max depth (ft)	----	----	----	----	----	----	----	----	----	----																			
Pool spacing (ft)	6	32	23	78	22	6	34	24	78	21																			
Pattern																													
Channel Beltwidth (ft)																													
Radius of Curvature (ft)			34																										
Rc:Bankfull width (ft/ft)			7.6																										
Meander Wavelength (ft)																													
Meander Width ratio																													
Additional Reach Parameters																													
Rosgen Classification		E-type					E-type																						
Channel Thalweg Length (ft)		580					576																						
Sinuosity		1.03					1.03																						
Water Surface Slope (Channel) (ft/ft)		0.0383					0.0385																						
BF slope (ft/ft)		-----					-----																						
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		-----																											

Table 11e. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters - Cross Sections)
UT to Martin's Creek Mitigation Project - EEP Project Number 92766

Parameter	Cross Section 13 UT 1 - 3 Riffle							Cross Section 14 UT 1 - 3 Riffle						
Dimension	MY0	MY1	MY2	MY3	MY4	MY5	MY5+	MY0	MY1	MY2	MY3	MY4	MY5	MY5+
BF Width (ft)	5.9	5.6						7.3	7.8					
Floodprone Width (ft) (approx)	25.0	25.0						25.0	25.0					
BF Mean Depth (ft)	0.5	0.4						0.5	0.4					
BF Max Depth (ft)	0.9	0.7						1.0	0.8					
BF Cross Sectional Area (ft^2)	2.7	2.1						3.6	3.2					
Width/Depth Ratio	12.9	14.9						14.8	19.0					
Entrenchment Ratio	4.2	4.5						3.4	3.2					
Bank Height Ratio	1.0	1.0						1.0	1.0					
d50 (mm)	----	----						----	----					

Table 11f. Monitoring Data - Stream Reach Data Summary
UT to Martin's Creek Mitigation Project - EEP Project Number 92766

Parameter	Baseline (UT 1 - 3)					MY-1 (UT 1 - 3)					MY-2 (UT 1 - 3)					MY-3 (UT 1 - 3)					MY-4 (UT 1 - 3)					MY-5 (UT 1 - 3)				
Dimension and Substrate - Riffle Only	Min	Mean	Med	Max	SD	Min	Mean	Med	Max	SD	Min	Mean	Med	Max	SD	Min	Mean	Med	Max	SD	Min	Mean	Med	Max	SD	Min	Mean	Med	Max	SD
BF Width (ft)	5.9	6.6	6.6	7.3	1	5.6	6.7	6.7	7.8	1.6																			
Floodprone Width (ft)		25	25				25	25																					
BF Mean Depth (ft)	0.4	0.5	0.5	0.5	0.1	0.4	0.4	0.4	0.4																				
BF Max Depth (ft)	0.9	1.0	1.0	1.0	0.1	0.7	0.8	0.8	0.8	0.1																			
BF Cross Sectional Area (ft^2)	2.7	3.2	3.2	3.6	0.6	2.1	2.7	2.7	3.2	0.8																			
Width/Depth Ratio	14.6	14.7	14.7	14.8	0.1	14.0	16.8	16.8	19.5	3.9																			
Entrenchment Ratio	3.4	3.8	3.8	4.2	0.6	3.2	3.8	3.8	4.5	0.9																			
Bank Height Ratio		1.0	1.0				1.0	1.0																					
Profile - UT 1 - 3																													
Riffle length (ft)	4	41	22	173	44	4	34	30	147	35																			
Riffle slope (ft/ft)	0.0047	0.0318	0.0326	0.0913	0.0218	0.0139	0.0422	0.0324	0.1479	0.0353																			
Pool length (ft)	5	12	7	50	11	4	11	8	31	8																			
Pool Max depth (ft)																													
Pool spacing (ft)	11	51	31	178	43	12	45	40	153	35																			
Pattern																													
Channel Beltwidth (ft)																													
Radius of Curvature (ft)																													
Rc:Bankfull width (ft/ft)																													
Meander Wavelength (ft)																													
Meander Width ratio																													
Additional Reach Parameters																													
Rosgen Classification	C/E type					C/E type																							
Channel Thalweg Length (ft)	813					814																							
Sinuosity	1.08					1.08																							
Water Surface Slope (Channel) (ft/ft)	0.0321					0.0321																							
BF slope (ft/ft)	-----					-----																							
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	-----																												

APPENDIX E

HYDROLOGY DATA

Table 12. Verification of Bankfull Events

Table 12. Verification of Bankfull Events
UT to Martin's Creek (Contreras) Mitigation Site (EEP Project Number 92766)

Date of Data Collection	Date of Occurrence	Method	Photo (if available)
August 25, 2014	April 7, 2014	Crest gauge data indicates a bankfull event after approximately 2.4 inches of rain documented in one day at a nearby rain gauge.	---
August 25, 2014	July 1, 2014	Crest gauge data indicates a bankfull event after approximately 2.02 inches of rain was documented over two days at a nearby rain gauge.	---
August 25, 2014	August 24, 2014	Crest gauge data indicates a bankfull event after approximately 1.39 inches of rain documented over two days at a nearby rain gauge. Wrack and laid-back vegetation were also observed.	1
October 27, 2014	September 3, 2014	Crest gauge data indicates a bankfull event after approximately 1.67 inches of rain documented in one day at a nearby rain gauge.	---
October 27, 2014	October 14, 2014	Crest gauge data and wrack observed indicate a bankfull event after approximately 2.5 inches of rain documented in one day at a nearby rain gauge.	2

Bankfull Photo 1:
Laid-back vegetation after a bankfull event

Bankfull Photo 2:
Wrack on the fence at the downstream crossing after a bankfull event