Upper UT to Cane Creek (Pickard) Restoration Site
Alamance County, North Carolina
EEP Project #395

MY-03 Monitoring Report
Data Collected: August, 2011
Submitted: March, 2012

Prepared for:
North Carolina Department of Environment and Natural Resources
Ecosystem Enhancement Program
Parker Lincoln Building
2728 Capital Boulevard, Suite 1H-103
Raleigh, NC 27606

Upper UT to Cane Creek (Pickard)
Restoration Site
EEP Project #395
Alamance County
North Carolina

MY-03 Monitoring Report
Prepared By:

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TABLE OF CONTENTS

APPENDICES

I. Executive Summary

The Upper UT to Cane Creek (Pickard) Restoration Site (Site) is located in southwest Alamance County approximately 5 miles east of Liberty, North Carolina in United States Geological Survey Hydrologic Unit 03030002050050 (North Carolina Division of Water Quality Subbasin 03-06-04) of the Cape Fear River Basin. This Hydrologic Unit has been identified as a Targeted Local Watershed in NCEEP's *Cape Fear River Basin Restoration Priorities 2009*. The Site was identified to assist the North Carolina Ecosystem Enhancement Program in meeting stream and wetland restoration goals. Primary activities at the Site included stream restoration and wetland enhancement/preservation by excluding livestock from the Site, stabilizing stream banks, installing in-stream structures, adjusting stream plan form, removing invasive species, and replanting riparian areas with native vegetation. Project restoration efforts provided 6783 Stream Mitigation Units and 1.1 riparian riverine Wetland Mitigation Units. The goals and objectives of this project focused on improving local water quality, enhancing flood attenuation, and restoring aquatic and riparian habitat. These goals were accomplished by the following:

1. Reestablished stream stability and the capacity to transport watershed flows and sediment load by restoring stable channel morphology supported by natural instream habitat and grade/bank stabilization structures
2. Reduced nonpoint source sedimentation and nutrient inputs into the Site by eliminating the acceleration of bank erosion as a result of land use activities, excluding livestock, and reestablishing a native riparian buffer greater than 50 feet in width.
3. Enhanced the capacity of the Site to mitigate flood flows by reconnecting the stream to the historic floodplain.

Encroachment within the conservation easement by livestock and human intervention was evident at the project site. A bull was observed within the easement during data collection in August 2011 in the vicinity of Reach 3. Monitoring performers submitted an encroachment report on April 5, 2011 to NCEEP discussing specific encroachment issues located within the easement which is included in Appendix F. The debris blockages that appeared to have been installed in the stream by landowners are still present. These blockages have not been improved or built up since the April 2011 report.

Prior monitoring data was adjusted to meet the requirements of the current monitoring template (Version 1.3 1/15/10). The previous monitoring data was adjusted in which the datum was corrected to NAVD 88 to correlate with the vertical datum utilized in the year 3 data collection. The stream thalweg stationing was also corrected in this monitoring year so that all the reach longitudinal profiles display from upstream to downstream and read from left to right.

A cumulative total of 2,963 linear feet out of 6,783 linear feet (44%) of the restored stream was monitored/surveyed via 5 separate monitoring reaches. Overall, the entire site is stable with little change to pattern, profile and geometry. Flowing water was not present in any of the reaches during the data collection (August 2011); however there were pockets of standing water throughout the project site. The identification of stream features was more difficult due to the lack of flowing water. A comparison of longitudinal profiles for all reaches shows little change from the previous MY-02 year monitoring data. Cross section pins (rebar) were not installed

during the initial monitoring period. Bank pins were established at all cross sections this monitoring year to increase the accuracy in cross section comparisons moving forward. Two cross sections 3 and 11 at the upper and lower end of the stream show a decrease in cross sectional area. The thick bank vegetation and lack of flowing water is most likely the cause of the decrease in area at these sections. Overall the cross section comparisons confirm site stability. Pebble counts were preformed in previous monitoring years through a distribution of counts throughout all riffles within each reach. The reach pebble counts show slight coarsening in reaches 1, 2, and 3. The pebble counts for reaches 4 and 5 at the end of the system show the most significant coarsening.

The stream bank vegetation is well established in the monitoring reaches providing stable banks. There is very little bank erosion present; two sections of 10 linear feet each were identified, which is primarily due to lack of vegetation. The visual assessment concluded that the site exhibits a 100% structure integrity and function. The visual assessment for Reach 1 showed the lowest scores of the reaches. The riffle condition scored low due to the presence of heavy vegetation and the fines that the vegetation trapped. Pool depths were also affected by the heavy vegetation present in the channel. Reaches 2 and 4 showed 100% stability ratings for bed, bank, and structure performance categories. Reaches 3 and 5 also exhibited high stability ratings with lower values of 80% reflected for substrate texture and sufficient pool depth. A remnant beaver dam was present at the beginning of Reach 3 at approximate station 38+40. No signs of recent beaver activity are present throughout the entire site. The remnant beaver dam was breached by monitoring personnel during the data collection in August 2011.

Fifteen vegetation plots were monitored using Version 4.2 of the CVS-EEP vegetation monitoring protocol. Level II of this protocol was implemented for MY-03 to include both planted and natural woody stems. The success criterion for total woody stems is 320 stems/acre after MY-03. A mortality rate of ten percent will be allowed after MY-04 (288 stems/acre), with another ten percent allowed after MY-05 (260 stems/acre). Based on the CVS vegetation monitoring data for MY-03 there are 3155 total woody stems/acre including live stakes, planted stems, and natural stems. Counting only planted stems and excluding livestakes, there are 480 stems/acre. While all the vegetation plots combined meet the criteria for total stems, planed stem counts for plots 4, 11, and 12 had planted stem counts below the 320 stems/acre (Table 9). Data collected for the vegetation monitoring plots are in Appendix C.

Vegetation problem areas consist of areas with low stem densities, bare areas with limited herbaceous and woody stem coverage, invasive exotic plants, and encroachment. Most of the areas with low stem densities are located beyond the 50ft stream buffer in the upland areas mainly consisting of old pastures where tall fescue (Schedonurus arundinaceus) dominates the herb layer. Bare areas have little to no herbaceous cover with stunted woody stems if present likely due to a combination of infertile soils and disturbed soils from construction. Invasive exotics of concern and recorded as vegetation problem areas within the conservation easement include multiflora rose (Rosa multiflora) and Chinese privet (Ligustrum sinense). Multiflora rose was observed sparsely patchy throughout the conservation easement. Chinese privet was also sparsely patchy throughout the conservation easement concentrated mostly along the forest edge within Reach 5. Other invasive exotics observed include Japanese honeysuckle (Lonicera japonica), Japanese stiltgrass (Microstegium vimineum), and tall fescue. Japanese honeysuckle

was patchy in areas near the Old Dam Rd crossing and along the forest edge within Reach 5. Japanese stiltgrass was patchy throughout the conservation easement. Tall fescue was located in the uplands where old pastures were previous to construction. Although these species have different ranks of severity, the functionality of the project is not expected to be impaired significantly. It is likely that all of these species were present in and adjacent to the conservation easement prior to construction. Encroachment was observed during our MY-03 field visit. Horses were observed grazing within Reach 2 of the conservation easement during our investigation in April 2011. During our vegetation data collection visit in September 2011 a bull was observed grazing within Reach 3.

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

II. Methodology

Methodologies follow EEP monitoring report template Version 1.3.1 (01/15/10) and CVS –EEP Protocol for Recording Vegetation (Lee et al 2008). Photos were taken with a digital camera. A Trimble Geo XT handheld unit with sub-meter accuracy was used to collect vegetation area locations.

A. Vegetation Methodologies

Fifteen vegetation monitoring plots were monitored on September 6, 2011 according to Level II of the EEP/CVS Protocol for Recording Vegetation Version 4.2, which includes both natural and woody stems. The vegetation plots are 10 meters square and marked with metal fence posts at each corner, and an additional 1" diameter PVC pipe marking each plot origin. Data collected for these plots are in Appendix C. *Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas* (Weakley 2011) was used as the taxonomic standard for vegetation. See figures in Appendix A for monitoring plot locations.

B. Stream Methodologies

Stream profile and cross-sections were surveyed on August 17, 2011 using total station equipment and methods. The survey data was plotted using AutoCAD Civil3D. The longitudinal profile was generated using individual reach alignments. Cross sectional data was extracted based on a linear alignment between the end pins. Cross section bankfull elevations for yearly comparisons are based on the baseline bankfull elevation established for each cross section.

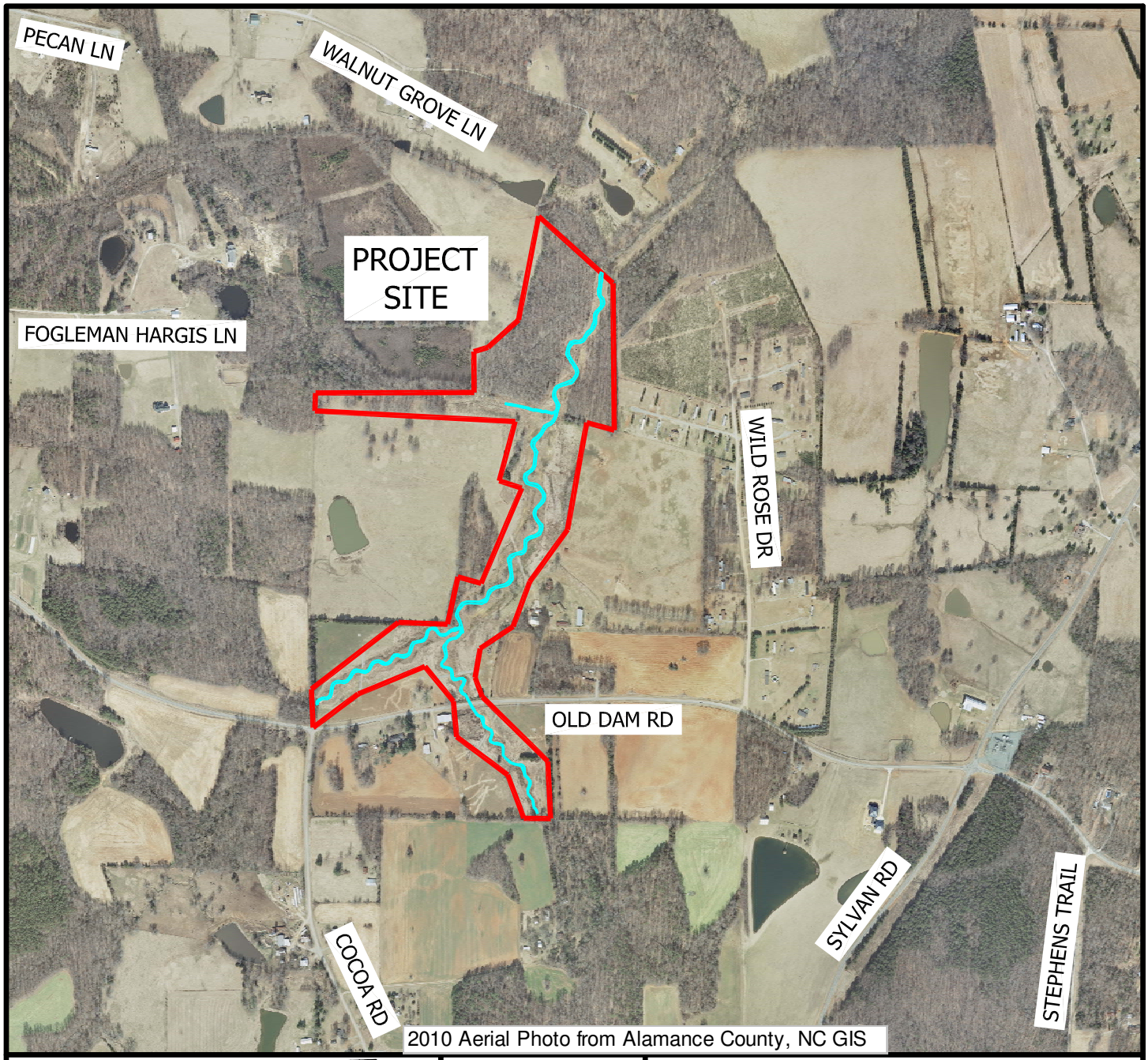
III. References

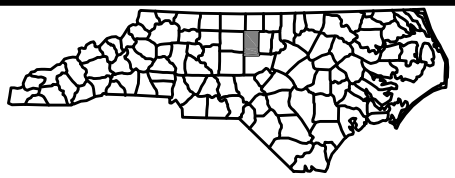
Lee, Michael T. Peet, Robert K. Roberts, Steven D., Wentworth, Thomas R. (2008). *CVS-EEP Protocol for Recording Vegetation Version 4.2.*

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

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

Appendix A. Project Vicinity Map and Background Tables





Ecosystem Enhancement PROGRAM

North Carolina – Ecosystem Enhancement Program

Upper UT to Cane Creek (Pickard)
Alamance County, North Carolina
EEP ID #395

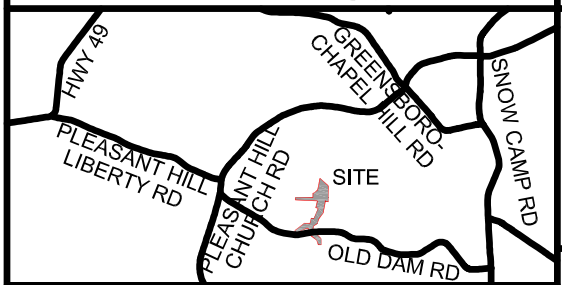


FIGURE 1
UPPER UT TO CANE CREEK (PICKARD)
AERIAL VICINITY MAP

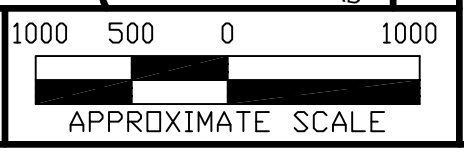


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Table 1. Project Components Upper UT to Cane Creek (Pickard) / EEP# 395									
Project Component or Reach ID	**Existing Feet/Acres**	**Restoration Level**	**Approach**	**Footage or Acreage**	**Stationing**	**Mitigation Ratio**	**Mitigation Units**	**BMP Elements[1]**	**Comment**
Reach A	1430	R	P1	1810.76 lf	10+00-28+10.76	1:1	1738.76		Excludes 72-foot ROW at Old Dam Rd
Reach B	2065	R	P1	2118.69 lf	28+10.76-49+29.45	1:1	2118.69		
Reach C	1435	R	P2	1194.58 lf	49+29.45-61+24.03	1:1	1194.58		
Reach D	1100	R	P1	1357.31 lf	100+00-113.57.31	1:1	1357.31		
Reach E	300	R	P1	373.25 lf	200+00-203+73.25	1:1	373.25		
Wetlands	1.3	E		1.3 Ac		2:1	0.65		
Wetlands	2	P		2 Ac		5:1	0.4		

1 = BR = Bioretention Cell; SF = Sand Filter; SW = Stormwater Wetland; WDP = Wet Detention Pond; DDP = Dry Detention Pond; FS = Filter Strip; Grassed Swale = S; LS = Level Spreader; NI = Natural Infiltration Area, O = Other; CF = Cattle Fencing; WS = Watering System; CH = Livestock Housing

Table 1b. Component Summations Upper UT to Cane Creek (Pickard) / EEP# 395							
Restoration Level	Stream (lf)	Riparian Wetland (Ac)		Non-Ripar (Ac)	Upland (Ac)	Buffer (Ac)	BMP
		Riverine	Non-Riverine				
Restoration	6782.59						
Enhancement		1.3					
Enhancement I							
Enhancement II							
Creation							
Preservation		2					
HQ Preservation							
Totals (Feet/Acres)	**6782.59**	**3.3**		**0**	**0**	**41**	
MU Totals	**6783**	**1.1**		**0**	**0**	**0**	
	Non-Applicable						

Table 2. Project Activity and Reporting History
Upper UT to Cane Creek (Pickard) / EEP# 395

Elapsed Time Since Grading Complete: 2 yrs 8 months
Elapsed Time Since Planting Complete: 2 yrs 8 Months
Number of Reporting Years[1]: 3

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Restoration Plan		Feb-06
Construction		Mar-09
Site Planting		Mar-09
As-built Drawings		Mar-09
Mitigation Plan (Year 0 Monitoring – baseline)	July-Oct 2008	July-09
Year 1 Monitoring	Oct-09	Nov-09
Year 2 Monitoring	Sep-10	Jan-11
Year 3 Monitoring	Aug-11	Dec-11
Year 4 Monitoring		
Year 5 Monitoring		

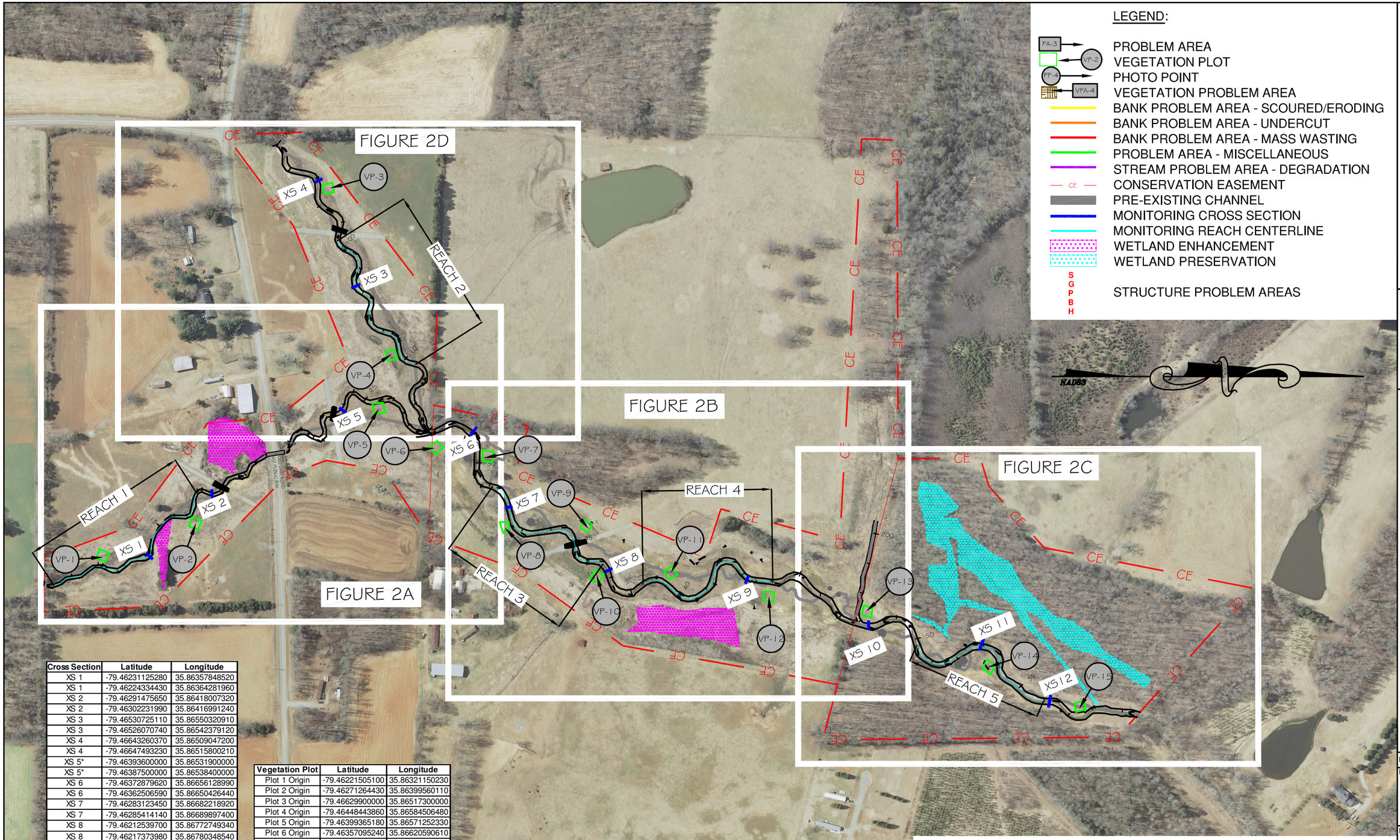
Bolded items are examples of those items that are not standard, but may come up and should be included. Non-bolded items represent events that are standard components over the course of a typical project. The above are obviously not the extent of potential relevant project activities, but are just provided as example as part of this exhibit. If planting and morphology are on split monitoring schedules that should be made clear in the table.
1 = Equals the number of reports or data points produced excluding the baseline

Table 3. Project Contacts Table Upper UT to Cane Creek (Pickard) / EEP# 395	
Designer	URS Corporation 1600 Perimeter Park Drive, Suite 400 Morrisville, North Carolina 27560
Primary project design POC	Kathleen McKeithan (919) 461-1597
Construction Contractor	River Works, Inc. 8000 Regency Parkway, Suite 200 Cary, North Carolina 27511
Construction contractor POC	Will Pederson (919) 459-9001
Survey Contractor	Level Cross Surveying, PLLC 668 Marsh County Lane Randleman, North Carolina 23717
Survey contractor POC	Sherri Willard (336) 495-1713
Planting Contractor	Habitat Assessment & Restoration Program, Inc. 9305-D Monroe Road Charlotte, North Carolina 28270
Planting contractor POC	Karri Blackmon (704) 841-2841
Seeding Contractor	River Works, Inc. 8000 Regency Parkway, Suite 200 Cary, North Carolina 27511
Contractor point of contact	Will Pederson (919) 459-9001
Seed Mix Sources	Green Resource Colfax, NC Rodney Montgomery (336-855-6363
Nursery Stock Suppliers	Strader Fencing, Inc. Julian, NC Kenneth Strader (336)-697-5715
Monitoring Performers	Ward Consulting Engineers, P.C. 8368 Six Forks Road Suite 104 Raleigh, NC 27615-5083
Stream Monitoring POC	Becky Ward 919-870-0526
Vegetation Monitoring POC	Chris Sheats - The Catena Group - 919-732-1300
Wetland Monitoring POC	Chris Sheats - The Catena Group - 919-732-1300

Table 4. Project Attribute Table Upper UT to Cane Creek (Pickard) / EEP# 395					
Project County	Alamance County, North Carolina				
Physiographic Region	Piedmont				
Ecoregion	Carolina Slate Belt				
Project River Basin	Cape Fear				
USGS HUC for Project (14 digit)	3030002050050				
NCDWQ Sub-basin for Project	3/6/2004				
Within extent of EEP Watershed Plan?	Cape Fear River Basin Restoration Priorities 2009				
WRC Hab Class (Warm, Cool, Cold)	Warm				
% of project easement fenced or demarcated	100%				
Beaver activity observed during design phase?	No				
Restoration Component Attribute Table					
	Reach A	Reach B	Reach C	Reach D	Reach E
Drainage area	390	1333	1640	892	282
Stream order	first	third	third	third	second
Restored length (feet)	1738.76	2118.69	1194.58	1357.31	373.25
Perennial or Intermittent	perennial	perennial	perennial	perennial	perennial
Watershed type (Rural, Urban, Developing etc.)	Rural				
Watershed LULC Distribution (e.g.)					
Managed Herbaceous Coverage	49.8				
Mixed Upland Hardwoods	31.4				
Cultivated	9.9				
Southern Yellow Pine	4.6				
Deciduous Shrubland	2				
Mixed Hardwoods/Conifers	0.9				
Unmanaged Herbaceous Upland	0.6				
Evergreen Shrubland	0.4				
Water Bodies	0.4				
Etc.					
Watershed impervious cover (%)	<0.1				
NCDWQ AU/Index number	16-28				
NCDWQ classification	C, NSW				
303d listed?	No				
Upstream of a 303d listed segment?	No				
Reasons for 303d listing or stressor	N/A				
Total acreage of easement	50.75				
Total vegetated acreage within the easement	-	-	-	-	-
Total planted acreage as part of the restoration	41				
Rosgen classification of pre-existing	Degraded E4	Degraded E4	Degraded E4	Degraded E4	Degraded E4
Rosgen classification of As-built	E4	E4	E4	E4	E4
Valley type	VIII	VIII	VIII	VIII	VIII
Valley slope	0.0083	0.0041	0.0045	0.0046	0.0156
Valley side slope range (e.g. 2-3.%)	-	-	-	-	-
Valley toe slope range (e.g. 2-3.%)	-	-	-	-	-
Cowardin classification	R3UB1	R3UB1	R3UB1	R3UB1	R3UB1
Trout waters designation	No	No	No	No	No
Species of concern, endangered etc.? (Y/N)	No	No	No	No	No
Dominant soil series and characteristics					
Series	Tirzah silt loam, Georgeville silt loam, Starr loam, Colfax silt loam, Herndon silt loam, and mixed alluvial land				
Depth	-	-	-	-	-
Clay%	-	-	-	-	-
K	-	-	-	-	-
T	-	-	-	-	-

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

Appendix B. Visual Assessment Data



LEGEND:

- PA-3 — PROBLEM AREA
- VP-2 — VEGETATION PLOT
- PP-4 — PHOTO POINT
- VPA-4 — VEGETATION PROBLEM AREA
- BANK PROBLEM AREA - SCOURED/ERODING
- BANK PROBLEM AREA - UNDERCUT
- BANK PROBLEM AREA - MASS WASTING
- PROBLEM AREA - MISCELLANEOUS
- STREAM PROBLEM AREA - DEGRADATION
- CE — CONSERVATION EASEMENT
- PRE-EXISTING CHANNEL
- MONITORING CROSS SECTION
- MONITORING REACH CENTERLINE
- WETLAND ENHANCEMENT
- WETLAND PRESERVATION
- S G P B H — STRUCTURE PROBLEM AREAS

Cross Section	Latitude	Longitude
XS 1	-79.46231125280	35.86357848520
XS 1	-79.46224334430	35.86364281960
XS 2	-79.46291475650	35.86418007320
XS 2	-79.46302231990	35.86416991240
XS 3	-79.46530725110	35.86550320910
XS 3	-79.46526070740	35.86542379120
XS 4	-79.46643260370	35.86509047200
XS 4	-79.46647493230	35.86515800210
XS 5*	-79.46393600000	35.86531900000
XS 5*	-79.46387500000	35.86538400000
XS 6	-79.46372879620	35.86656128990
XS 6	-79.46362506590	35.86650426440
XS 7	-79.46283123450	35.86682218920
XS 7	-79.46285414140	35.86689897400
XS 8	-79.46212539700	35.86772749340
XS 8	-79.46217373980	35.86780348540
XS 9	-79.46209588240	35.86902251620
XS 9	-79.46200190240	35.86899246280
XS 10	-79.46160158640	35.87010655060
XS 10	-79.46149803240	35.87011035350
XS 11	-79.46127581910	35.87110850340
XS 11	-79.46140636960	35.87114812000
XS 12	-79.46064310510	35.87173551710
XS 12	-79.46078244370	35.87175495800

* Locations are approximate

Vegetation Plot	Latitude	Longitude
Plot 1 Origin	-79.46221505100	35.86321150230
Plot 2 Origin	-79.46271264430	35.86399560110
Plot 3 Origin	-79.46629900000	35.86517300000
Plot 4 Origin	-79.46448443860	35.86584506480
Plot 5 Origin	-79.46399365180	35.86571252330
Plot 6 Origin	-79.46357095240	35.86620590610
Plot 7 Origin	-79.46344201540	35.86664098490
Plot 8 Origin	-79.46267301560	35.86685520690
Plot 9 Origin	-79.46261109950	35.86750457640
Plot 10 Origin	-79.46215083880	35.86763646240
Plot 11 Origin	-79.46204497230	35.86830888870
Plot 12 Origin	-79.46182655010	35.86915604160
Plot 13 Origin	-79.46166371170	35.87004828190
Plot 14 Origin	-79.46107250310	35.87113937100
Plot 15 Origin	-79.46062551010	35.87207557390

2010 Aerial Photo from Alamance County, NC GIS

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch = 300 ft.

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Ecosystem Enhancement PROGRAM

UPPER UT to CANE CREEK
(PICKARD) (EEP #395)
CURRENT CONDITIONS PLAN VIEW

ALAMANCE COUNTY, NORTH CAROLINA

DATE: 25 April 2011
REVISIONS:
PROJECT NAME: UPPER UT to CANE CREEK
DWG NAME: CCPV
SCALE: 1' = 300'
SHEET NO.

FIGURE 2
OVERALL

LEGEND:

- PA-3 — PROBLEM AREA
- VP-2 — VEGETATION PLOT
- PP-4 — PHOTO POINT
- VPA-4 — VEGETATION PROBLEM AREA
- BANK PROBLEM AREA - SCOURED/ERODING
- BANK PROBLEM AREA - UNDERCUT
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- CE — CONSERVATION EASEMENT
- PRE-EXISTING CHANNEL
- MONITORING CROSS SECTION
- MONITORING REACH CENTERLINE
- WETLAND ENHANCEMENT
- WETLAND PRESERVATION

S
G
P
B
H

STRUCTURE PROBLEM AREAS

REACH 1

REACH 2

REACH 3

PA-1

PA-2

PA-3

PA-4

PA-6

VPA-1

VPA-2

VPA-3

VP-1

VP-2

VP-4

VP-5

VP-6

VP-8

CROSS SECTION 1

CROSS SECTION 2

CROSS SECTION 5

CROSS SECTION 6

STREAM CROSSING

OLD DAM ROAD
60' PUBLIC R/W

TREES

CE

NADB3

2010 Aerial Photo from Alamance County, NC GIS

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)

1 inch = 100 ft.

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Ecosystem Enhancement PROGRAM

UPPER UT to CANE CREEK
(PICKARD) (EEP #395)
CURRENT CONDITIONS PLAN VIEW

ALAMANCE COUNTY, NORTH CAROLINA

DATE: 25 April 2011

REVISIONS:

PROJECT NAME: UPPER UT to CANE CREEK

DWG NAME: CCPV

SCALE: 1" = 100'

SHEET NO.

FIGURE 2A

LEGEND:

- PROBLEM AREA
- VEGETATION PLOT
- PHOTO POINT
- VEGETATION PROBLEM AREA
- BANK PROBLEM AREA - SCOURED/ERODING
- BANK PROBLEM AREA - UNDERCUT
- BANK PROBLEM AREA - MASS WASTING
- PROBLEM AREA - MISCELLANEOUS
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- CONSERVATION EASEMENT
- PRE-EXISTING CHANNEL
- MONITORING CROSS SECTION
- MONITORING REACH CENTERLINE
- WETLAND ENHANCEMENT
- WETLAND PRESERVATION

S
G
P
B
H

STRUCTURE PROBLEM AREAS

PA-3
PA-4
PA-5
VPA-1
VPA-2
VPA-3
VPA-4
VP-7
VP-8
VP-9
VP-10
VP-11
VP-12
VP-13
CROSS SECTION 6
CROSS SECTION 7
CROSS SECTION 8
CROSS SECTION 9
CROSS SECTION 10
REACH 3
REACH 4
STREAM CROSSING
NADS3
30
35
40
200

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

2010 Aerial Photo from Alamance County, NC GIS

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Ecosystem Enhancement PROGRAM

UPPER UT to CANE CREEK (PICKARD) (EEP #395)
CURRENT CONDITIONS PLAN VIEW
ALAMANCE COUNTY, NORTH CAROLINA

DATE: 25 April 2011
REVISIONS:
PROJECT NAME: UPPER UT to CANE CREEK
DWG NAME: CCPV
SCALE: 1' = 100'
SHEET NO.

FIGURE 2B

LEGEND:

- PROBLEM AREA
- VEGETATION PLOT
- PHOTO POINT
- VEGETATION PROBLEM AREA
- BANK PROBLEM AREA - SCOURED/ERODING
- BANK PROBLEM AREA - UNDERCUT
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- MONITORING REACH CENTERLINE
- WETLAND ENHANCEMENT
- WETLAND PRESERVATION

S G P B H

- STRUCTURE PROBLEM AREAS

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

NAD83

VPA-1
VPA-2
VPA-3
VPA-4
VP-13
VP-14
VP-15
CROSS SECTION 10
CROSS SECTION 11
CROSS SECTION 12
REACH 5
200
45
50
55

2010 Aerial Photo from Alamance County, NC GIS

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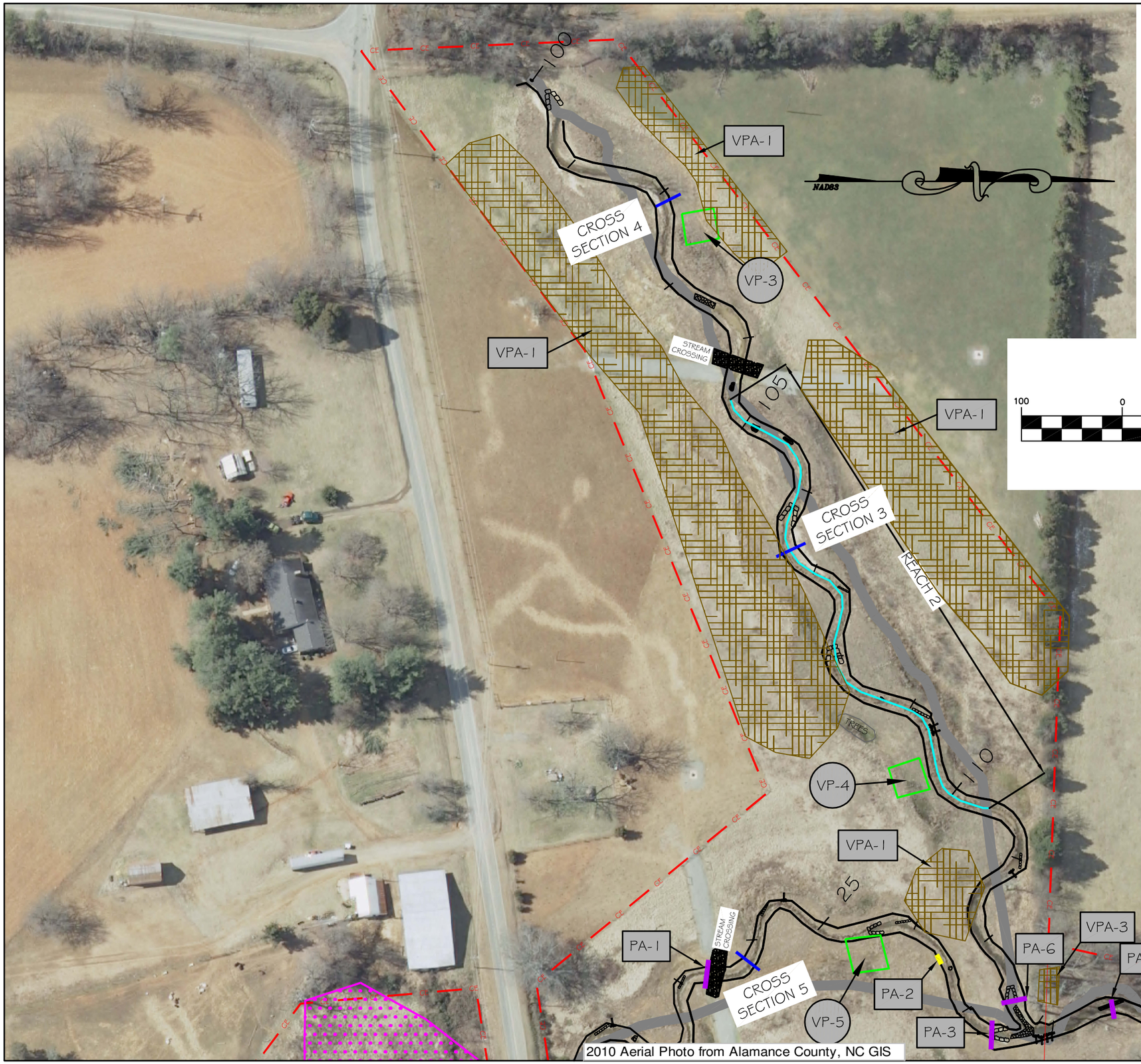
Ecosystem Enhancement PROGRAM

UPPER UT to CANE CREEK (PICKARD) (EEP #395)
CURRENT CONDITIONS PLAN VIEW
ALAMANCE COUNTY, NORTH CAROLINA

DATE: 25 April 2011
REVISIONS:
PROJECT NAME: UPPER UT to CANE CREEK
DWG NAME: CCPV
SCALE: 1' = 100'
SHEET NO.

FIGURE 2C



LEGEND:

- PA-3 / VP-2 / PP-4 / VPA-4 — PROBLEM AREA / VEGETATION PLOT / PHOTO POINT / VEGETATION PROBLEM AREA
- BANK PROBLEM AREA - SCOURED/ERODING
- BANK PROBLEM AREA - UNDERCUT
- BANK PROBLEM AREA - MASS WASTING
- PROBLEM AREA - MISCELLANEOUS
- STREAM PROBLEM AREA - DEGRADATION
- CE — CONSERVATION EASEMENT
- PRE-EXISTING CHANNEL
- MONITORING CROSS SECTION
- MONITORING REACH CENTERLINE
- WETLAND ENHANCEMENT
- WETLAND PRESERVATION
- S G P B — STRUCTURE PROBLEM AREAS

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

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Ecosystem Enhancement Program

UPPER UT to CANE CREEK (PICKARD) (EEP #395)
CURRENT CONDITIONS PLAN VIEW
ALAMANCE COUNTY, NORTH CAROLINA

DATE: 25 April 2011
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PROJECT NAME: UPPER UT to CANE CREEK
DWG NAME: CCPV
SCALE: 1' = 100'
SHEET NO.

FIGURE 2D

Table 5 **Visual Stream Morphology Stability Assessment**
Reach ID **Reach 1 (Sta 10+33 - 16+93) Stream Design Reach A**
Assessed Length **641**

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)					100%			
		2. Degradation - Evidence of downcutting					100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	6	11			55%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	9	11			82%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	9	11			82%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	10	11			91%			
		2. Thalweg centering at downstream of meander (Glide)	10	11			91%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion					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.					100%			100%
	3. Mass Wasting	Bank slumping, calving, or collapse					100%			100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	8	8			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	6	6			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	6	6			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)	8	8			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	8	8			100%			

Table 5 **Visual Stream Morphology Stability Assessment**
Reach ID **Reach 2 (Sta 104+65 - 110+40) Stream Design Reach D**
Assessed Length **587**

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)					100%			
		2. Degradation - Evidence of downcutting					100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	7	7			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	7	7			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	7	7			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	7	7			100%			
		2. Thalweg centering at downstream of meander (Glide)	7	7			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion					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.					100%			100%
	3. Mass Wasting	Bank slumping, calving, or collapse					100%			100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	6	6			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)	6	6			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	6	6			100%			

Table 5 **Visual Stream Morphology Stability Assessment**
Reach ID **Reach 3 (Sta 31+11 - 36+48) Stream Design Reach B**
Assessed Length **531**

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)					100%			
		2. Degradation - Evidence of downcutting					100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	4	5			80%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	4	4			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	4	4			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			1	10	99%	1	10	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.					100%			100%
	3. Mass Wasting	Bank slumping, calving, or collapse					100%			100%
				Totals	1	10	99%	1	10	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	5	5			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	5	5			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	5	5			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)	5	5			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	5	5			100%			

Table 5 **Visual Stream Morphology Stability Assessment**
Reach ID **Reach 4 (Sta 38+49 - 44+06) Stream Design Reach B**
Assessed Length **570**

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)					100%			
		2. Degradation - Evidence of downcutting					100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	5	5			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	4	4			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	4	4			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					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.					100%			100%
	3. Mass Wasting	Bank slumping, calving, or collapse					100%			100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	6	6			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	3	3			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	3	3			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)	6	6			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	6	6			100%			

Table 5 **Visual Stream Morphology Stability Assessment**
Reach ID **Reach 5 (Sta 50+23 - 55+97) Stream Design Reach C**
Assessed Length **634**

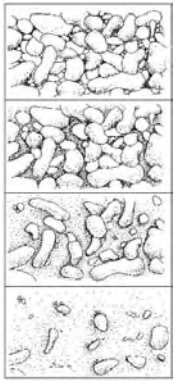
Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing 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)					100%			
		2. Degradation - Evidence of downcutting					100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	5	5			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	4	5			80%			
		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					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.					100%			100%
	3. Mass Wasting	Bank slumping, calving, or collapse					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.	3	3			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	3	3			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%			

Criteria, Definitions and Thresholds for Visual Stream Morphology Assessments

Major Channel Category	Channel Sub-Category	Metric	Definitions	Cataloging Threshold	CCPV Depiction
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)	"Aggradation refers to at least moderate increases in reach stored sediment. It is NOT simply constituted by minor fining of riffles or filling of pools at or below baseflow elevations. An aggrading reach is often characterized by sand or gravel bar formation/growth with associated fining of reach substrate and smoothing of the reach long profile. Bars/aggraded areas significant enough to deflect flow against banks should be catalogued. Repeat channel photopoints are a key tool in assessing project aggradation. (See photo exhibit 1 below for range of example bar development/aggradation)	Catalog only if feature has most of the characteristics described to the left (cell E11) and is at least 15 feet in length or 20% of the riffle/run length, whichever is less.	NA
		2. Degradation - Number and size of evident downcuts within Riffle/Run units.	Where projects have regularly-spaced engineered grade control, degredation/downcutting is expected only in short, discreet lengths. "Indicators include perched sill structures, channel bed "steps" in clay-rich parent material, evidence of bed retreat at the bank toe (parent material may be exposed); mobilization of coarse riffle substrate in to pools downstream, and perhaps riffles with run morphology. Long-profile surveys should support an assessment of bed degradation where the visual assessment and survey overlap.	Catalog only if feature has most of the characteristics described to the left (cell E12) and is at least 15 feet in length or 20% of the riffle/run length, whichever is less.	Dark Red or Purple Color to be certain to distinguish from Mass Wasting Color Code
	2. Riffle Condition	1. Texture	Riffles should maintain a coarseness similar to the design distribution. Significant fining of the riffle surface indicates non-attainment for the riffle. Repeat pebble counts should support an assessment of riffle fining where overlap occurs (see exhibit graphic 2 below describing embedding for gravel-cobble systems).	NA	NA
	3. **Meander Pool Condition**	1. Depth Sufficient?	This metric is used to assess meander pools and also step-pools along a Rosgen B-type channel reaches. For stepped reaches the pools will be evaluated and tallied here and under the Habitat Sub-Category below. The max pool bankfull depth should be 1.6 times the mean bankfull depth (Max Pool Depth : Mean Bankfull Depth > 1.6). The mean bankfull depth from the As-built/baseline survey can be utilized to make this determination. Exhibit 3 provides residual pool depths using the 1.6 multiplier for a range of mean channel riffle depths that typify restoration projects.	NA	NA
		2. Length appropriate?	This metric will only be applied to meander pools. The meander pool length should be >30% of the ~ linear centerline distance between the tail of the upstream riffle and the head of the downstream rifle.	NA	NA
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)?	This metric is used to characterize flow paths along riffle-run-pool transitions. The thalweg is expected to be against the outer bank in the bend apex, but vectors oriented towards the outer bank too far above the bend apex may indicate the potential for increased bank erosion. Similarly, the pool-glide-riffle transition is also expected to demonstrate flow path centering (Metric 4.2 below). The current-year thalweg rendered on the CCPV figure can assist in this assessment.	NA	NA
		2. Thalweg centering at downstream of meander bend (Glide)?	See Metric 4.1 above	NA	NA
2. Bank	**1. Scoured/Eroding Bank**	In order to better assess continued bank erosion risk, tallied bank segments are also characterized with respect to the proximity and integrated extent of stabilizing vegetation. Continued erosion risk for a given bank instability object is essentially adjusted downwards by adjacent mature vegetation and/or stabilizing roots. One or more mature trees in close proximity (e.g. 10 feet or less) or obvious integration of root mass within the bank failure are characteristics that would prompt the tallying of a given bank object into the additional sub-category related to risk of further instability (columns J-L of the actual data table). Essentially, the vegetative elements of rooting density and depth (e.g. from a BEHI assessment) need to be considered here.	Banks with evident scour /erosion	<table><tr><th>Bank Height</th><th>Minimum Length</th></tr><tr><td>>6</td><td>6</td></tr><tr><td>3-6</td><td>8</td></tr><tr><td><3</td><td>10</td></tr></table> See Footnote/Exhibit 5 below also This table provides a guide for working thresholds for bank erosion cataloging/mapping based on bank height. For the bank height ranges above, the minimum length of bank to be mapped and tallied is specified. For example, where banks are <3 feet high, only map an unstable segment if it is ≥ 10 feet.[5]	Yellow.
	2. Undercut		Banks undercut/overhanging to the extent that mass wasting appears likely? Does NOT include undercuts that modest, appear sustainable/stable and are providing habitat.		Orange.
	3. Mass Wasting		Bank slumping/calving/collapse?		Red.
3. Structures	**1. Overall Integrity**	The assessment of engineered structure performance should include all structures that provide grade control, bank protection, or habitat functions. These include Vanes, J-hooks, and rootwads, etc.	Bulk of structure physically intact with no dislodged boulders or logs?		Using callouts or some other means to maintain legibility, annotate structure with red **"S"** if structural failure has occurred
	2. Grade Control		Bed grade control maintained across the sill structure? No evident loss of bed elevation immediately upstream of structure? Some piping alone will not constitute a loss of grade control.		Using callouts or some other means to maintain legibility, annotate structure with red **"G"** if structure has lost grade control
	2a. Piping		Catalog structures lacking any substantial flow underneath sills or around arms?		Using callouts or some other means to maintain legibility, annotate structure with red **"P"** if significant piping has occurred
	3. Bank Protection		See exhibit 4 below for determining structural sphere of influence. If the amount of bank that is deemed to be actively eroding within the structures sphere of influence exceeds 15% of the total bank footage within the structures sphere of influence, then the structure should be classified as not providing adequate bank protection in the data table.		Using callouts or some other means to maintain legibility, annotate structure with red **"B"** if structure has failed to provide bank protection
	4. Habitat		Are pools maintained @ ~ Max Pool Depth : Mean Bankfull Depth > 1.6? For rootwads, habitat provision means interacting with baseflow and providing cover.		Using callouts or some other means to maintain legibility, annotate structure with red **"H"** if structure is not providing habitat

Exhibit 1. Examples of bar features warranting concerning related to cataloging item 1.1.1 of the assessment

Exhibit 2. Graphic depicting embedding of riffles with fine material



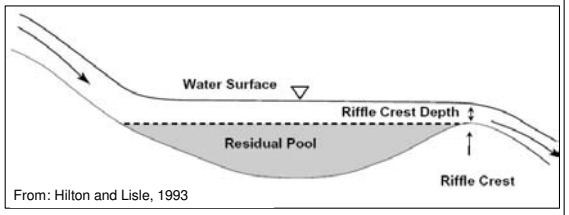
Progressing from top to bottom, the series of graphics to the left depicts the fining of interstial spaces between coarser particles. This describes increasing levels of embededness in riffles. The observer must have an understanding of the intended substrate distributions/texture of the bed for the projects riffles when assessing this. However, as a guideline for streams in the coarse gravel to cobble range, the 2nd panel from the top represents a visual guideline for the condition that would begin to elicit concern for this parameter, but still contains a good deal of coarse material. Progressing from that state to the conditions depicted in the the 3rd and 4th panel represents a visual que for significant emdedding.

From USEPA (EPA 841-B-97-003 - Nov 1997)

Exhibit 3. Residual Pool Depth Table - Relating 1.6 criterion for typical mean riffle depths to residual pool depths

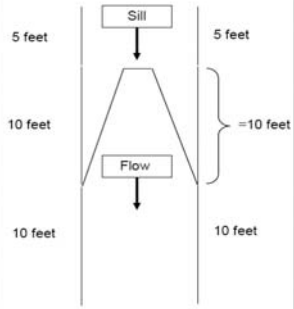
This residual pool table was provided in the event the tracking of bankfull at each pool feature to estimate a Dmax was inconvenient. Estimating the residual pool depth by measuring the max pool depth to water surface and subtracting the water depth at the riffle head may provide a more convenient way under certain circumstances to estimate in the field. For this reason the exhibit table provides a relationship between the 1.6 criterion applied to mean riffle depth for the site and the resulting residual pool depths.

Mean Riffle Depth D_{bkf}	Multiplier	Target Bankfull Pool Max	Residual Pool Depth
1.0	1.6	1.6	0.6
1.5	1.6	2.4	0.9
2.0	1.6	3.2	1.2
2.5	1.6	4.0	1.5
3.0	1.6	4.8	1.8
3.5	1.6	5.6	2.1
4.0	1.6	6.4	2.4
4.5	1.6	7.2	2.7
5.0	1.6	8.0	3.0



From: Hilton and Lisle, 1993

Exhibit 4. Extent of Structural Influence for Bank Protection



The drawing is a guideline for the extent of influence vane arms exert on stream banks. The bracketed segment (10ft) immediately adjacent to the vane arm is multiplied by 5 to determine the total length of bank influenced by a cross vane. This includes the bank length adjacent to each vane arm, 1 length (10 feet) below each van arm, and ½ length (5 feet) on each bank above the uppermost structural element (in this case the vane sill), yielding 50 feet in this example case. In this example a single arm vane or j-hook would only influence 25ft of bank.

If the amount of recent bank erosion observed within the extent of influence exceeds 15% then the structure is deemed not to be providing adequate bank protection. In the above examples this would amount to ~ 8 and 4 feet, respectively.

If in an earlier assessment the structure failed the 15% bank protection criteria but the erosion has subsequently stabilized, then the observer can use best professional judgment to determine if the structure is currently meeting the bank protection criteria.

5 = The above was developed because of the need to have a threshold given the large number of performers and to avoid spending time trying to catalog and map small objects that if excluded would have minimal overall impacts on the performance percentages. It is a guide that tries to strike a balance between the obvious need to have a threshold, yet provide confidence that the site conditions are accurately represented. For example, a scenario where 1 object nearly exceeding the threshold were to occur every 100 feet of bank height (which would be a high frequency and unlikely) with a bank height of 5 feet, would yield an error of ~3%. However, if the observer is encountering a truly high number of objects just below the threshold in the above table (e.g. > 1 per 100 feet of bank channel on average) and is concerned that the exclsuion of such objects is going to misrepresent the site conditions, then judgement should be applied and objects below the threshold may be cataloged. If a rare condition as described does occur and the thresholds are not utilized then a table footnote explaining this should be included.

Lastly, given the increase in overall area and the implications to stability, greater banks heights required smaller threshold minimums.

Table 6 Vegetation Condition Assessment

Planted Acreage[1] **41**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	Brown Hatch	3	0.40	1.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.01 acres	Brown Hatch	15	9.17	22.4%
			Total	18	9.57	23.3%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	Brown Hatch	0	0.00	0.0%
			Cumulative Total	18	9.57	23.3%

Easement Acreage[2] **51.83**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern[4]	Areas or points (if too small to render as polygons at map scale).	500 SF	Brown Hatch	7	0.48	0.9%
5. Easement Encroachment Areas[3]	Areas or points (if too small to render as polygons at map scale).	none	Brown Hatch	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.

High Concern:				**Low/Moderate Concern:**	
Vines	**Genus/Species**	**Shrubs/Herbs**	**Genus/Species**	**Shrubs/Herbs**	**Genus/Species**
Kudzu	*Pueraria lobata*	Japanese Knotweed	Polygonum cuspidatum	Japanese Privet	Ligustrum Japonicum
Porcelain Berry	Ampelopsis brevipeduncu	Oriental Bittersweet	Celastrus orbiculatus	Glossy Privet	Ligustrum lucidum
Japanese Honeysuckle	Lonicera japonica	Multiflora Rose	Rosa multiflora	Fescue	Festuca spp.
Japanese Hops	Humulus japonicus	Russian olive	Elaeagnus angustifolia	English Ivy	Hedera helix
Wisterias	Wisteria spp.	Chinese Privet	Ligustrum sinense	Microstegium	Microstegium vimineum
Winter Creeper	Euonymus fortunei	Chinese Silvergrass	Miscanthus sinensis	Burning Bush	Euonymus alatus
Bush Killer (Watch List)	Cayratia japonica	Phragmites	Phragmites australis	Johnson Grass	Sorghum halepense
		Bamboos	Phyllostachys spp	Bush Honeysuckles	Lonicera, spp.
Trees		Sericea Lespedeza	Sericea Lespedeza	Periwinkles	Vinca minor
Tree of Heaven	Ailanthus altissima	Garlic Mustard (Watch List)	Alliaria petiolata	Morning Glories	Morning Glories
Mimosa	Albizia julibrissin	Cogon Grass (Watch List)	Imperata cylindrica	Bicolor Lespedeza (Watch List)	Lespedeza bicolor
Princess Tree	Paulownia tomentosa	Giant Reed (Watch List)	Arundo donax	Chinese Yams (Watch List)	Dioscorea oppositifolia
China Berry	Melia azedarach	Tropical Soda Apple (Watch List)	Solanum viarum	Air Potato (Watch List)	Dioscorea bulbifera
Callery Pear	Pyrus calleryana	Japanese Spirea (Watch List)	Spiraea japonica	Japanese Climbing Fern (Watch List)	Lygodium japonicum
White Mulberry	Morus alba	Japanese Barberry (Watch List)	Berberis thunbergii		
Tallow Tree (Watch List)	Triadica sebifera				

Stream Station Photos

Photo 1. Looking downstream at XS-1

Photo 2. Looking downstream at XS-2

Photo 3. Looking downstream at XS-3

Photo 4. Looking downstream at XS-4

Photo 5. Looking downstream at XS-5

Photo 6. Looking downstream at XS-6

Photo 7. Looking downstream at XS-7

Photo 8. Looking downstream at XS-8

Photo 9. Looking downstream at XS-9

Photo 10. Looking downstream at XS-10

Photo 11. Looking downstream at XS-11

Photo 12. Looking downstream at XS-12

Vegetation Monitoring Plots Photos

Photo Not Available

Photo 13. Vegetation Plot 1 (September 6, 2011)

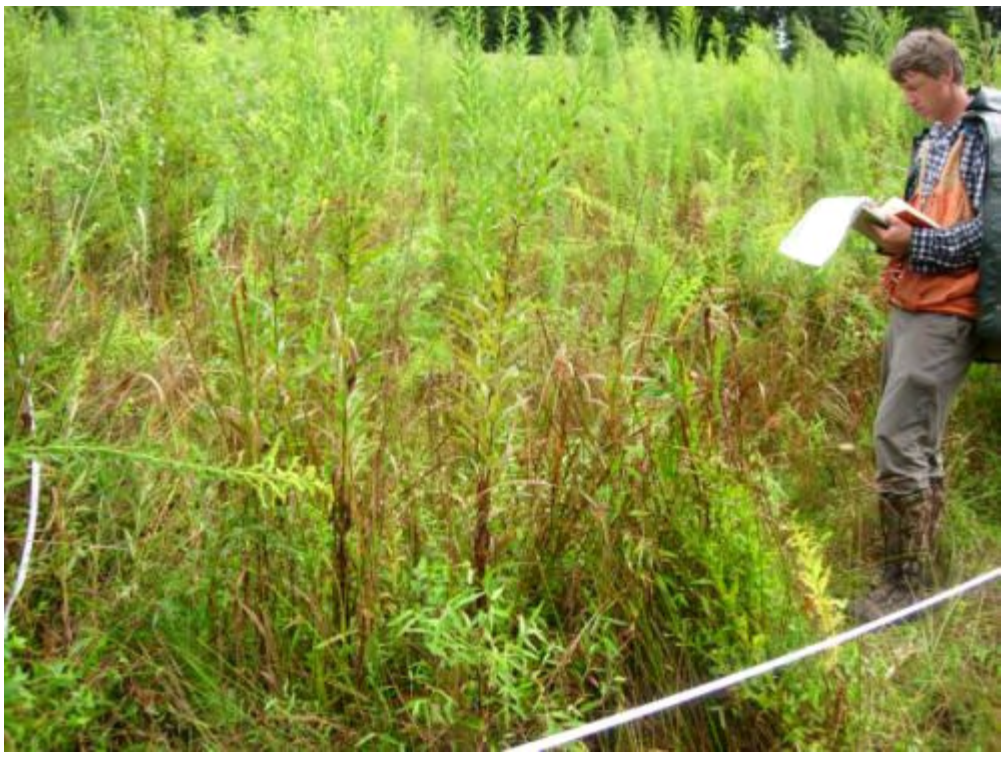


Photo 14. Vegetation Plot 2 (September 6, 2011)

Photo 15. Vegetation Plot 3 (September 6, 2011)

Photo 16. Vegetation Plot 4 (September 6, 2011)

Photo 17. Vegetation Plot 5 (September 6, 2011)

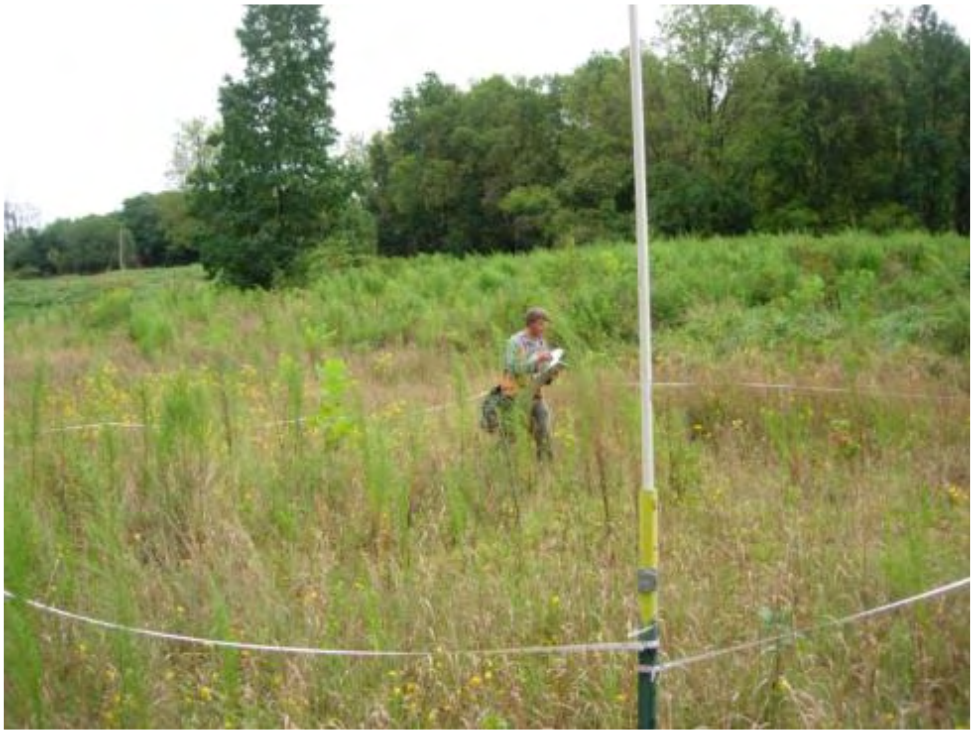


Photo 18. Vegetation Plot 6 (September 6, 2011)

Photo 19. Vegetation Plot 7 (September 6, 2011)

Photo 20. Vegetation Plot 8 (September 6, 2011)

Photo 21. Vegetation Plot 9 (September 6, 2011)

Photo 22. Vegetation Plot 10 (September 6, 2011)

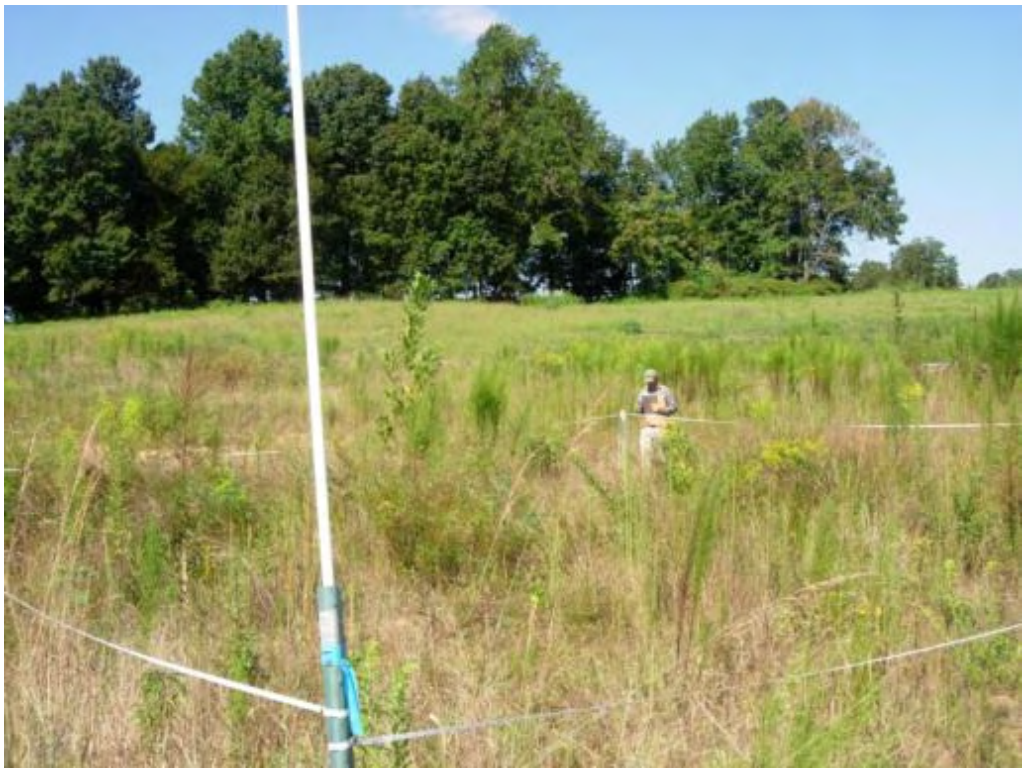


Photo 23. Vegetation Plot 11 (September 6, 2011)

Photo 24. Vegetation Plot 12 (September 6, 2011)

Photo 25. Vegetation Plot 13 (September 6, 2011)

Photo 26. Vegetation Plot 14 (September 6, 2011)

Photo 27. Vegetation Plot 15 (September 6, 2011)

Appendix C. Vegetation Plot Data

Table 7. Vegetation Plot Criteria Attainment		
Vegetation Plot ID	**Vegetation Survival Threshold Met?**	**Tract Mean**
VP1	Yes	100%
VP2	Yes	
VP3	Yes	
VP4	Yes	
VP5	Yes	
VP6	Yes	
VP7	Yes	
VP8	Yes	
VP9	Yes	
VP10	Yes	
VP11	Yes	
VP12	Yes	
VP13	Yes	
VP14	Yes	
VP15	Yes	

Table 8. CVS Vegetation Plot Metadata	
Upper UT to Cane Creek (Pickard) / EEP# 395	
Report Prepared By	The Catena Group
database name	Upper UT to Cane Creek (Pickard).mdb
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	395
project Name	Upper UT to Cane Creek (Picard)
Description	UT to Cane Creek Stream and Wetland Enhancement
River Basin	Cape Fear
length(ft)	6782.59
stream-to-edge width (ft)	
area (sq m)	51.83
Required Plots (calculated)	
Sampled Plots	15

Table 9. CVS Stem Count Total and Planted by Plot and Species - EEP Project Code 395. Project Name: Upper UT to Cane Creek (Pickard)

Current Plot Data (MY3 2011)

Scientific Name	Common Name	Species Type	E395-AXE-0001			E395-AXE-0002			E395-AXE-0003			E395-AXE-0004			E395-AXE-0005			E395-AXE-0006			E395-AXE-0007			E395-AXE-0008			E395-AXE-0009		
			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 rubrum	red maple	Tree			3															2			12						
Alnus serrulata	hazel alder	Shrub Tree				1	1	2						1			1				1	1	1						
Aronia																													
Aronia arbutifolia	Red Chokeberry	Shrub																						1	1	1			
Baccharis halimifolia	eastern baccharis	Shrub Tree												3									1						2
Betula nigra	river birch	Tree	1	1	1	4	4	5	3	3	3				1	1	1	2	2	2	2	2	2	2	2	2	2	2	2
Carpinus caroliniana	American hornbeam	Shrub Tree													2	2	2	1	1	1	2	2	2				1	1	1
Carya	hickory	Tree																											
Carya cordiformis	bitternut hickory	Tree	1	1	1																								
Celtis laevigata	sugarberry	Shrub Tree												1							3	3	3				2	2	2
Cephalanthus occidentalis	common buttonbush	Shrub Tree	2	2	2	2	2	2							1	1	1	1	1	1							1	1	1
Cornus amomum	silky dogwood	Shrub	1	1	1	1	1	1				3	3	3							1	1	1						
Corylus americana	American hazelnut	Shrub																			2	2	2						
Diospyros virginiana	common persimmon	Tree													3	3	3			8									
Fraxinus pennsylvanica	green ash	Tree			1	1	1	2	6	6	6	3	3	3			21	3	3	40	2	2	8			8	4	4	5
Juglans nigra	black walnut	Tree																			1	1	1						
Juniperus virginiana	eastern redcedar	Tree																		12			1						
Liquidambar styraciflua	sweetgum	Tree									66			8			8			30			6.25			16			11.5
Liriodendron tulipifera	tuliptree	Tree												2						1			1						2
Nyssa	tupelo	Tree													1	1	1												
Pinus taeda	loblolly pine	Tree												1									2						
Platanus occidentalis	American sycamore	Tree	1	1	1				2	2	4				1	1	1	1	1	1				7	7	8	2	2	3
Platanus occidentalis var.occidentalis	Sycamore, Plane-tree	Tree						1																					
Quercus michauxii	Callery pear	Tree													4	4	4	2	2	2				1	1	1			
Quercus pagoda	swamp chestnut oak	Tree																			2	2	2						
Quercus phellos	cherrybark oak	Tree	1	1	2	4	4	4	1	1	1				4	4	4							2	2	2	2	2	2
Rhus copallinum	willow oak	Tree																					1						
Rhus glabra	flameleaf sumac	Shrub Tree																											
Salix nigra	smooth sumac	Shrub Tree	1	1	8			1	3	3	4				1	1	11									47			
Sassafras albidum	multiflora rose	Shrub Vine																											
Unknown	black willow	Tree																											
Color for Density		**Stem count**	8	8	20	13	13	18	15	15	84	6	6	22	18	18	58	8	8	98	16	16	46.25	13	13	85	14	14	31.5
Exceeds requirements by 10%		**size (ares)**	1			1			1			1			1			1			1			1			1		
Exceeds requirements, but by less than 10%		**size (ACRES)**	0.024710538			0.024710538			0.024710538			0.024710538			0.024710538			0.024710538			0.024710538			0.024710538			0.024710538		
Fails to meet requirements, by less than 10%		**Species count**	7	7	9	6	6	8	5	5	6	2	2	8	9	9	12	5	5	10	9	9	16	5	5	8	7	7	10
Fails to meet requirements by more than 10%		**Stems per ACRE**	323.74851	323.7485	809.37128	526.09133	526.0913	728.43416	607.02846	607.0285	3399.35939	242.81139	242.8114	890.308412	728.43416	728.4342	2347.1767	323.74851	323.7485	3965.91929	647.49703	647.497	1871.671	526.09133	526.0913	3439.82796	566.5599	566.5599	1274.7598

Scientific Name	Common Name	Species Type	E395-AXE-0010			E395-AXE-0011			E395-AXE-0012			E395-AXE-0013			E395-AXE-0014			E395-AXE-0015			MY3 (2011)			MY2 (2010)			MY1 (2009)		
			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 rubrum	red maple	Tree																					17						1
Alnus serrulata	hazel alder	Shrub Tree										6	6	7							8	8	12	7	7	7	1	1	1
Aronia						1	1	1									1				1	1	2	2	2	2			
Aronia arbutifolia	Red Chokeberry	Shrub																			1	1	1	1	1	1			
Baccharis halimifolia	eastern baccharis	Shrub Tree																		4			10						
Betula nigra	river birch	Tree	1	1	1							3	3	3				1	1	1	20	20	21	37	37	37	30	30	31
Carpinus caroliniana	American hornbeam	Shrub Tree			1							4	4	4	1	1	1	1	1	2	12	12	14						
Carya	hickory	Tree																						2	2	2	5	5	5
Carya cordiformis	bitternut hickory	Tree																			1	1	1						
Celtis laevigata	sugarberry	Shrub Tree																			5	5	6	6	6	6	6	6	6
Cephalanthus occidentalis	common buttonbush	Shrub Tree										2	2	2	1	1	1				10	10	10	11	11	11	9	9	9
Cornus amomum	silky dogwood	Shrub							1	1	1										7	7	7	7	7	7	7	7	7
Corylus americana	American hazelnut	Shrub																		1	2	2	3	3	3	3	3	3	3
Diospyros virginiana	common persimmon	Tree																			3	3	11	3	3	3	2	2	4
Fraxinus pennsylvanica	green ash	Tree	2	2	2	5	5	10	3	3	15			103	2	2	101	2	2	113	33	33	438	35	35	35	31	31	393
Juglans nigra	black walnut	Tree															1				1	1	2	2	2	2			
Juniperus virginiana	eastern redcedar	Tree																					13						
Liquidambar styraciflua	sweetgum	Tree			3			9			15			99			15			99			385.75						53
Liriodendron tulipifera	tuliptree	Tree													1	1	1			1	1	1	8	2	2	2	3	3	3
Nyssa	tupelo	Tree																			1	1	1	2	2	2	1	1	1
Pinus taeda	loblolly pine	Tree												3			1						7						
Platanus occidentalis	American sycamore	Tree				1	1	3	1	1	2							6	6	8	22	22	31	22	22	22	18	18	22
Platanus occidentalis var. occidentalis	Sycamore, Plane-tree	Tree																					1						
Quercus michauxii	Callery pear	Tree	5	5	5				1	1	1				2	2	2	5	5	5	20	20	20	21	21	21	21	21	21
Quercus pagoda	swamp chestnut oak	Tree													3	3	3				5	5	5	5	5	5	5	5	5
Quercus phellos	cherrybark oak	Tree						1	1	1	1	3	3	3	2	2	2				20	20	22	20	20	20	19	19	19
Rhus copallinum	willow oak	Tree																					1						
Rhus glabra	flameleaf sumac	Shrub Tree																											1
Salix nigra	smooth sumac	Shrub Tree			46			3													5	5	120	5	5	5	5	5	80
Sassafras albidum	multiflora rose	Shrub Vine																											1
Unknown	black willow	Tree																						1	1	1	1	1	1
Sassafras albidum	sassafras	Shrub Tree	8	8	58	7	7	27	7	7	35	18	18	224	12	12	129	15	15	234	178	178	1169.75	192	192	192	167	167	667
Unknown		unknown	1			1			1			1			1			1			15			15			15		
Color for Density		**Stem count**	0.024710538			0.024710538			0.024710538			0.024710538			0.024710538			0.024710538			0.370658072			0.370658072			0.370658072		
Exceeds requirements by 10%		**size (ares)**	3	3	6	3	3	6	5	5	6	5	5	8	7	7	11	5	5	9	20	20	27	19	19	19	17	17	21
Exceeds requirements, but by less than 10%		**size (ACRES)**	323.74851	323.7485	2347.1767	283.27995	283.2799	1092.6512	283.27995	283.2799	1416.39975	728.43416	728.4342	9064.95838	485.62277	485.6228	5220.4448	607.02846	607.0285	9469.64402	480.22696	480.227	3155.874	517.99762	517.9976	517.997622	450.55001	450.55	1799.5022
Fails to meet requirements, by less than 10%		**Species count**	5	4	7	5	4	7	7	6	7	7	6	9	9	8	12	7	6	10	22	21	28	21	20	20	19	18	22
Fails to meet requirements by more than 10%		**Stems per ACRE**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix D. Stream Survey Data

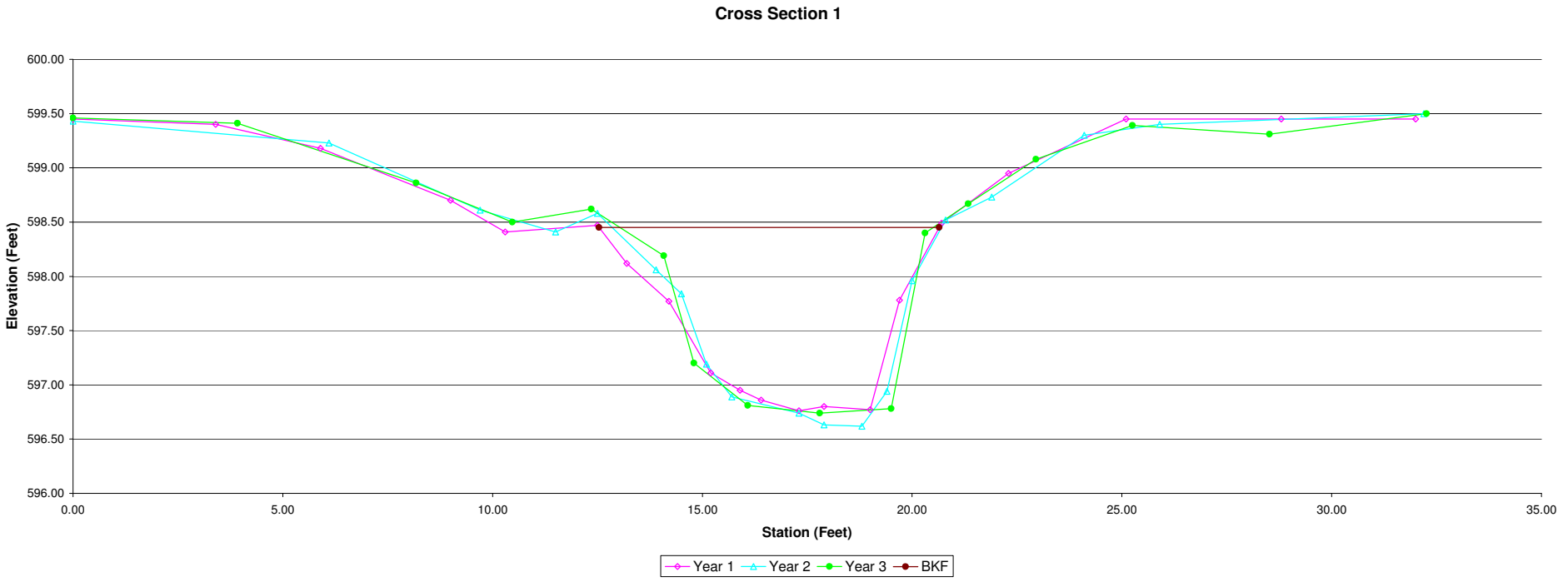
Project:	UT to Cane Creek (Pickard)
Cross Section:	Cross Section 1
Feature	Pool
Station:	13+77 (Reach 1)
Date:	8/17/11
Crew:	BW, SV, ZP

Summary (bankfull)

	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)		9.0	8.8	9.4		
W (BKF)		8.1	7.8	7.5		
Max d		1.7	1.8	1.7		
Mean d		1.1	1.1	1.3		
W/D		N/A	N/A	5.9		

MY00-2009			MY01-2009			MY02-2010			MY03-2011		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
Data Not Available				599.45			599.43			599.46	LPIN
			3.40	599.40		6.10	599.23		3.92	599.41	
			5.90	599.18		9.70	598.61		8.18	598.86	
			9.00	598.70		11.50	598.41	3L Bankfull	10.47	598.50	
			10.30	598.41	3L Bankfull	12.50	598.58		12.35	598.62	BANKFULL LEF
			12.50	598.47		13.90	598.06		14.08	598.19	
			13.20	598.12		14.50	597.84		14.80	597.20	TOE L
			14.20	597.77		15.10	597.19		16.08	596.81	
			15.20	597.11		15.70	596.89	TOE L	17.80	596.74	TW
			15.90	596.95		17.30	596.74		19.50	596.78	TOE R
			16.40	596.86		17.90	596.63		20.31	598.40	
			17.30	596.76	TW	18.80	596.62	TW	21.34	598.67	
			17.90	596.80		19.40	596.94	TOE R	22.95	599.08	TOBR
			19.00	596.77		20.00	597.96		25.25	599.39	
			19.70	597.78		20.80	598.52	R Bankfull	28.52	599.31	
			20.70	598.49	3R Bankfull	21.90	598.73		32.26	599.50	RPIN
			22.30	598.95		24.10	599.30				
			25.10	599.45		25.90	599.40				
			28.80	599.45		32.20	599.50				
			32.00	599.45							

Photo of XS-1, looking in the downstream direction



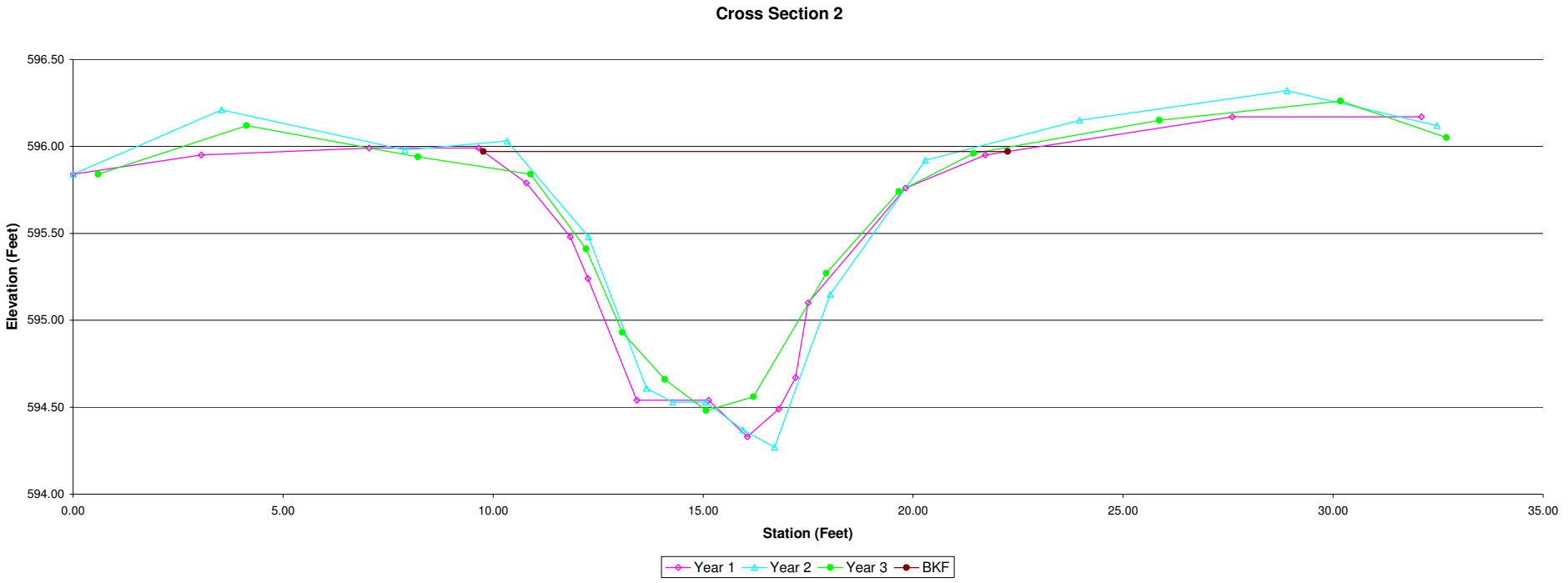
Project:	UT to Cane Creek (Pickard)
Cross Section:	Cross Section 2
Feature	Riffle
Station:	17+52 Downstream of Reach 1
Date:	8/17/11
Crew:	BW, SV, ZP

Summary (bankfull)

	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)		9.3	8.6	8.1		
W (BKF)		12.4	9.7	10.8		
Max d		1.6	1.7	1.5		
Mean d		0.8	0.9	0.8		
W/D		16.5	10.9	14.3		

MY00-2009			MY01-2009			MY02-2010			MY03-2011		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
Data Not Available				595.84			595.84		0.60	595.84	LPIN
			3.05	595.95		3.53	596.21		4.13	596.12	
			7.05	595.99		7.90	595.98	3L Bankfull	8.21	595.94	
			9.65	595.99	3L Bankfull	10.33	596.03		10.89	595.84	BANKFULL LEF
			10.79	595.79		12.27	595.48		12.21	595.41	
			11.84	595.48		13.65	594.61	TOE L	13.08	594.93	
			12.26	595.24		14.27	594.53		14.09	594.66	TOE L
			13.42	594.54	TOE L	15.06	594.53		15.07	594.48	TW
			15.13	594.54		15.94	594.37		16.20	594.56	TOE R
			16.05	594.33	TW	16.70	594.27	TW	17.93	595.27	
			16.80	594.49	TOE R	18.03	595.15		19.66	595.74	
			17.20	594.67		20.29	595.92	R Bankfull	21.44	595.96	TOBR
			17.50	595.10		23.96	596.15		25.86	596.15	
			19.82	595.76		28.90	596.32		30.18	596.26	
			21.72	595.95	R Bankfull	32.47	596.12		32.70	596.05	RPIN
			27.60	596.17							
			32.10	596.17							

Photo of XS-2, looking in the downstream direction



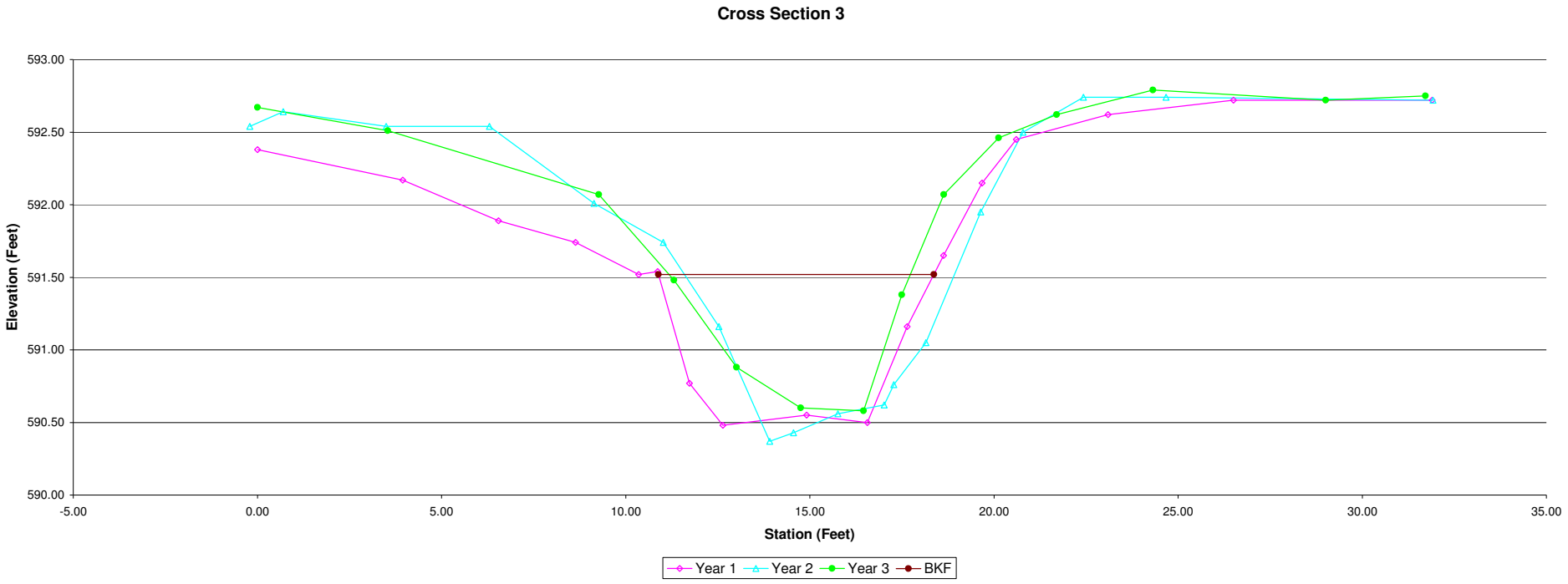
Project:	UT to Cane Creek (Pickard)
Cross Section:	Cross Section 3
Feature	Pool
Station:	106+49 (Reach 2)
Date:	8/17/11
Crew:	BW, SV, ZP

Summary (bankfull)

	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)		6.1	6.9	4.1		
W (BKF)		8.2	8.2	6.6		
Max d		1.1	1.4	0.9		
Mean d		0.7	0.8	0.6		
W/D		N/A	N/A	10.5		

MY00-2009			MY01-2009			MY02-2010			MY03-2011		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
Data Not Available				592.38		-0.21	592.54			592.67	LPIN
			3.95	592.17		0.70	592.64		3.54	592.51	
			6.55	591.89		3.50	592.54		9.27	592.07	BANKFULL LEFT
			8.64	591.74		6.30	592.54		11.31	591.48	
			10.35	591.52	3L Bankfull	9.14	592.01		13.01	590.88	TOE L
			10.87	591.54		11.02	591.74	3L Bankfull	14.75	590.60	TW
			11.73	590.77		12.53	591.16		16.46	590.58	TOE R
			12.64	590.48	TOE L	13.91	590.37	TW	17.50	591.38	
			14.91	590.55	TW	14.56	590.43		18.64	592.07	
			16.56	590.50	TOE R	15.76	590.56		20.13	592.46	TOBR
			17.64	591.16		17.02	590.62	TOE R	21.70	592.62	
			18.63	591.65	R Bankfull	17.28	590.76		24.32	592.79	
			19.68	592.15		18.15	591.05		29.01	592.72	
			20.61	592.45		19.64	591.95	R Bankfull	31.72	592.75	RPIN
			23.10	592.62		20.79	592.50				
			26.50	592.72		22.43	592.74				
			31.90	592.72		24.67	592.74				
						31.92	592.72				

Photo of XS-3 looking in the downstream direction



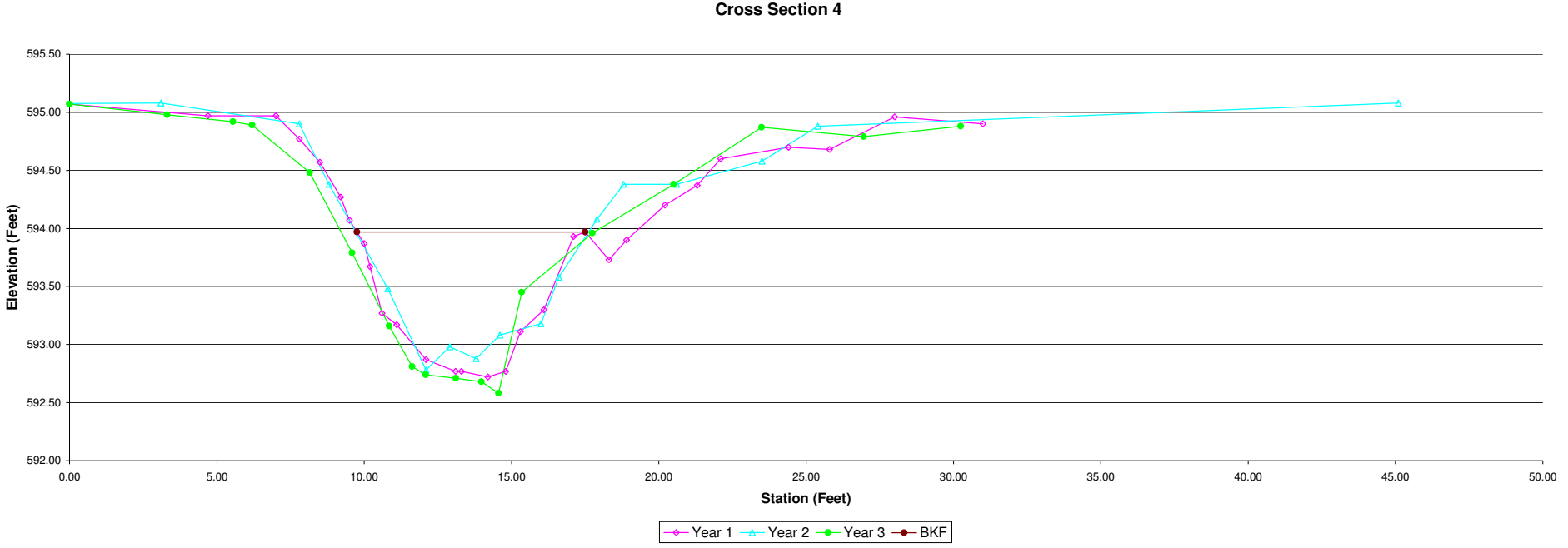
Project:	UT to Cane Creek (Pickard)
Cross Section:	Cross Section 4
Feature	Riffle
Station:	102+05 Upstream of Reach 2
Date:	8/17/11
Crew:	BW, SV, ZP

Summary (bankfull)

	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)		6.1	8.8	6.5		
W (BKF)		8.6	9.8	8.6		
Max d		1.2	1.6	1.4		
Mean d		0.7	0.9	0.8		
W/D		12.1	11.0	11.3		

MY00-2009			MY01-2009			MY02-2010			MY03-2011		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
Data Not Available				595.07		-3.40	595.07			595.07	LPIN
			4.70	594.97		3.10	595.08		3.31	594.98	
			7.00	594.97		7.80	594.90		5.55	594.92	
			7.80	594.77		8.80	594.38	3L Bankfull	6.20	594.89	BANKFULL LEFT
			8.50	594.57		10.80	593.48		8.15	594.48	
			9.20	594.27		12.10	592.78	TW	9.59	593.79	
			9.50	594.07		12.90	592.98		10.85	593.16	
			10.00	593.87	3L Bankfull	13.80	592.88		11.63	592.81	TOE L
			10.20	593.67		14.60	593.08		12.09	592.74	
			10.60	593.27	TOE L	16.00	593.18	TOE R	13.11	592.71	TW
			11.10	593.17		16.60	593.58		13.98	592.68	
			12.10	592.87		17.90	594.08		14.56	592.58	TOE R
			13.10	592.77		18.80	594.38	R Bankfull I	15.35	593.45	
			13.30	592.77		20.60	594.38		17.74	593.96	
			14.20	592.72	TW	23.50	594.58		20.50	594.38	TOBR
			14.80	592.77		25.40	594.88		23.49	594.87	
			15.30	593.11		45.10	595.08		26.95	594.79	
			16.10	593.30	TOE R				30.25	594.88	RPIN
			17.10	593.93							
			17.50	593.97							
			18.30	593.73							
			18.90	593.90	R Bankfull Right						
			20.20	594.20							
			21.30	594.37							
			22.10	594.60							
			24.40	594.70							
			25.80	594.68							
			28.00	594.96							
			31.00	594.90							

Photo of XS-4, looking in the downstream direction



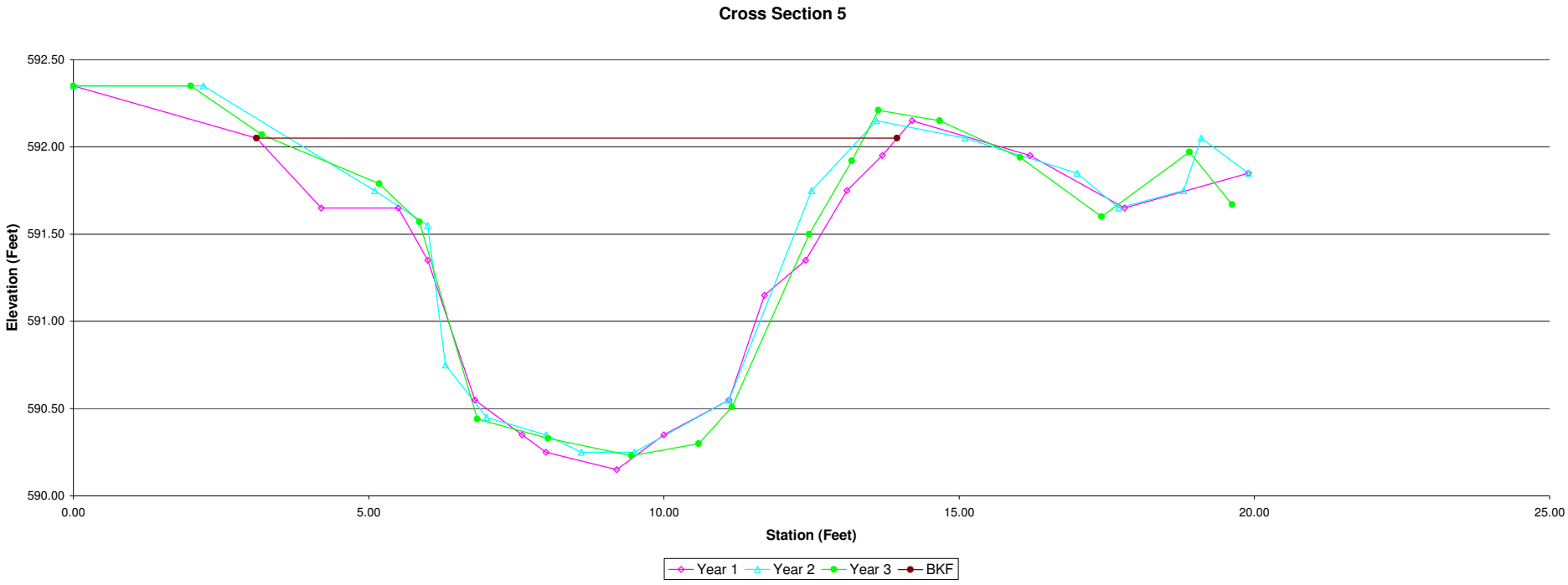
Project:	UT to Cane Creek (Pickard)
Cross Section:	Cross Section 5
Feature	Pool
Station:	23+71
Date:	8/17/11
Crew:	BW, SV, ZP

Summary (bankfull)

	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)		11.1	11.1	10.7		
W (BKF)		10.8	10.4	10.0		
Max d		1.9	1.9	1.8		
Mean d		1.0	1.1	1.1		
W/D		N/A	N/A	9.4		

MY00-2009			MY01-2009			MY02-2010			MY03-2011		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
Data Not Available				592.35			592.35			592.35	LPIN
			3.10	592.05	3L Bankfull	2.20	592.35	3L Bankfull	1.99	592.35	BANKFULL LEFT
			4.20	591.65		5.10	591.75		3.19	592.07	
			5.50	591.65		6.00	591.55		5.18	591.79	
			6.00	591.35		6.30	590.75		5.86	591.57	
			6.80	590.55	TOE L	7.00	590.45	TOE L	6.84	590.44	TOE L
			7.60	590.35		8.00	590.35		8.04	590.33	
			8.00	590.25		8.60	590.25		9.45	590.23	TW
			9.20	590.15	TW	9.50	590.25	TW	10.59	590.30	
			10.00	590.35		11.10	590.55	TOE R	11.15	590.51	TOE R
			11.10	590.55	TOE R	12.50	591.75		12.46	591.50	
			11.70	591.15		13.60	592.15	R Bankfull	13.18	591.92	
			12.40	591.35		15.10	592.05		13.63	592.21	TOBR
			13.10	591.75		17.00	591.85		14.67	592.15	
			13.70	591.95	R Bankfull	17.70	591.65		16.03	591.94	
			14.20	592.15		18.80	591.75		17.41	591.60	
			16.20	591.95		19.10	592.05		18.90	591.97	
			17.80	591.65		19.90	591.85		19.62	591.67	RPIN
			19.90	591.85							

Photo of XS-5, looking in the downstream direction



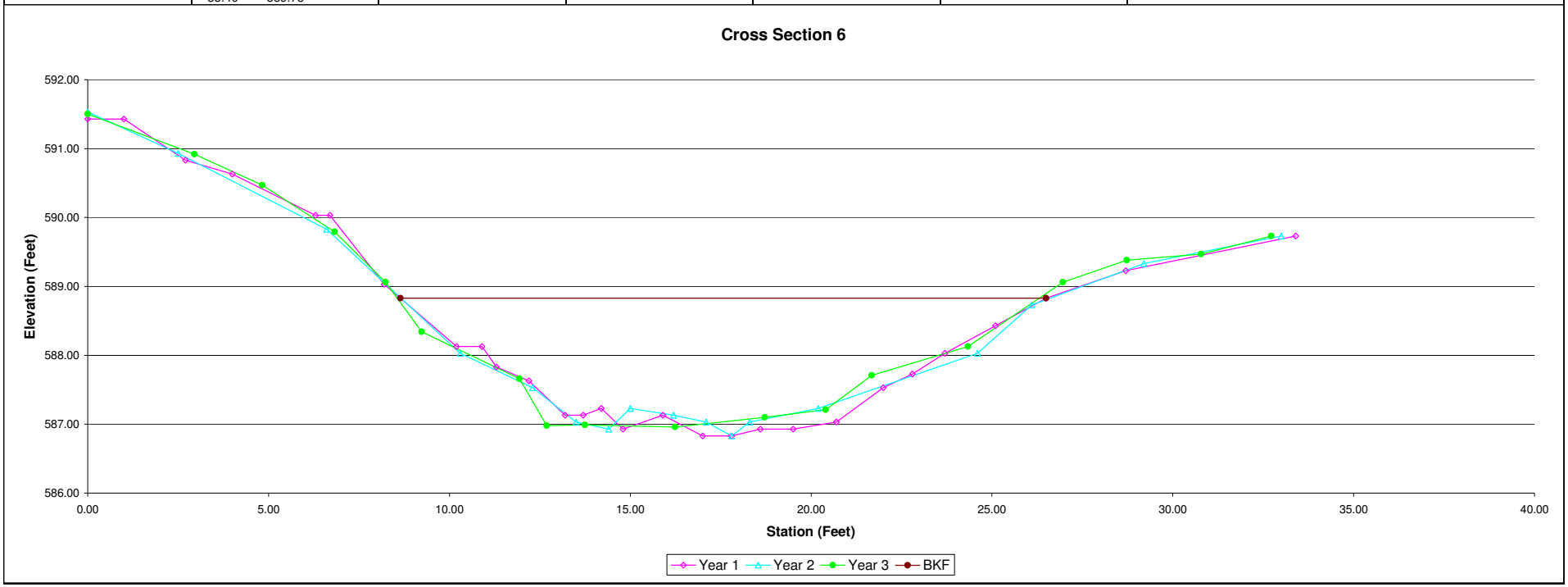
Project:	UT to Cane Creek (Pickard)
Cross Section:	Cross Section 6
Feature	Riffle
Station:	29+10 Upstream of Reach 3
Date:	8/17/11
Crew:	BW, SV, ZP

Summary (bankfull)

	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)		22.2	22.2	21.8		
W (BKF)		17.8	17.8	17.8		
Max d		2.0	2.0	1.9		
Mean d		1.2	1.2	1.2		
W/D		14.3	14.3	14.5		

MY00-2009			MY01-2009			MY02-2010			MY03-2011		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
Data Not Available				591.43			591.53			591.50	LPIN
			1.00	591.43		2.50	590.93		2.95	590.92	
			2.70	590.83		6.60	589.83		4.83	590.47	BANKFULL LEFT
			4.00	590.63		10.30	588.03	BL Bankfull	6.83	589.79	
			6.30	590.03		12.30	587.53		8.23	589.06	
			6.70	590.03		13.50	587.03	TOE L	9.23	588.34	
			8.20	589.03	BL Bankfull	14.40	586.93		11.94	587.66	
			10.20	588.13		15.00	587.23		12.69	586.98	TOE L
			10.90	588.13		16.20	587.13		13.75	586.99	
			11.30	587.83		17.10	587.03		16.24	586.96	TW
			12.20	587.63		17.80	586.83	TW	18.72	587.10	
			13.20	587.13	TOE L	18.30	587.03	TOE R	20.40	587.21	TOE R
			13.70	587.13		20.20	587.23		21.68	587.71	
			14.20	587.23		24.60	588.03		24.34	588.13	
			14.80	586.93		26.10	588.73	R Bankfull	26.96	589.06	
			15.90	587.13		29.20	589.33		28.73	589.38	TOBR
			17.00	586.83	TW	33.00	589.73		30.78	589.47	
			17.80	586.83					32.72	589.73	RPIN
			18.60	586.93							
			19.50	586.93							
			20.70	587.03	TOE R						
			22.00	587.53							
			22.80	587.73							
			23.70	588.03							
			25.10	588.43							
			26.50	588.83	R Bankfull Right						
			28.70	589.23							
			33.40	589.73							

Photo of XS-6, looking in the downstream direction



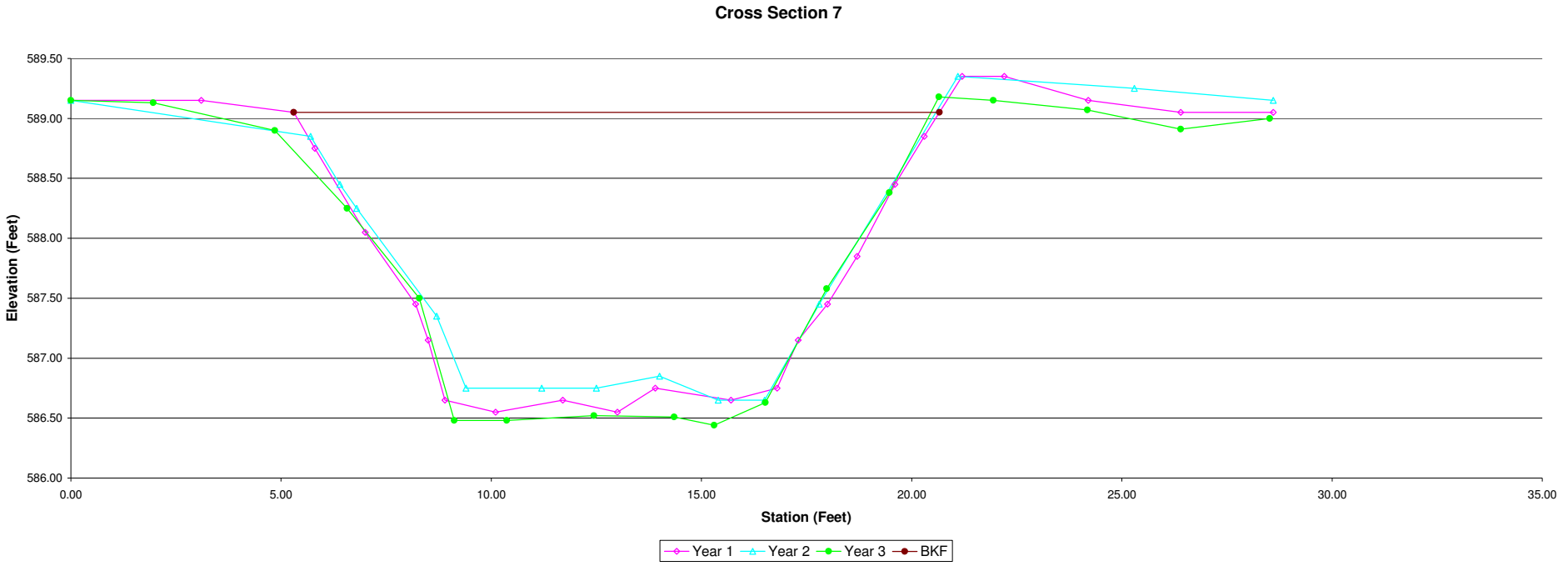
Project:	UT to Cane Creek (Pickard)
Cross Section:	Cross Section 7
Feature	Riffle
Station:	32+03 (Reach 3)
Date:	8/17/11
Crew:	BW, SV, ZP

Summary (bankfull)

	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)		26.3	22.4	21.8		
W (BKF)		15.2	14.5	17.8		
Max d		2.5	2.2	1.9		
Mean d		1.7	1.5	1.2		
W/D		8.8	9.4	14.5		

MY00-2009			MY01-2009			MY02-2010			MY03-2011		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
Data Not Available				589.15			589.15			589.15	LPIN
			3.10	589.15		5.70	588.85	BL Bankfull	1.96	589.13	
			5.30	589.05	BL Bankfull	6.40	588.45		4.85	588.90	BANKFULL LEFT
			5.80	588.75		6.80	588.25		6.57	588.25	
			7.00	588.05		8.70	587.35		8.29	587.50	
			8.20	587.45		9.40	586.75	TOE L	9.12	586.48	TOE L
			8.50	587.15		11.20	586.75		10.37	586.48	
			8.90	586.65	TOE L	12.50	586.75		12.44	586.52	
			10.10	586.55		14.00	586.85		14.35	586.51	
			11.70	586.65		15.40	586.65	TW	15.30	586.44	TW
			13.00	586.55	TW	16.50	586.65	TOE R	16.52	586.63	TOE R
			13.90	586.75		17.80	587.45		17.98	587.58	
			15.70	586.65		21.10	589.35	R Bankfull	19.47	588.38	
			16.80	586.75	TOE R	25.30	589.25		20.65	589.18	TOBR
			17.30	587.15		28.60	589.15		21.94	589.15	
			18.00	587.45					24.18	589.07	
			18.70	587.85					26.40	588.91	
			19.60	588.45					28.52	589.00	RPIN
			20.30	588.85							
			21.20	589.35	BR Bankfull right						
			22.20	589.35							
			24.20	589.15							
			26.40	589.05							
			28.60	589.05							

Photo of XS-7, looking in the downstream direction



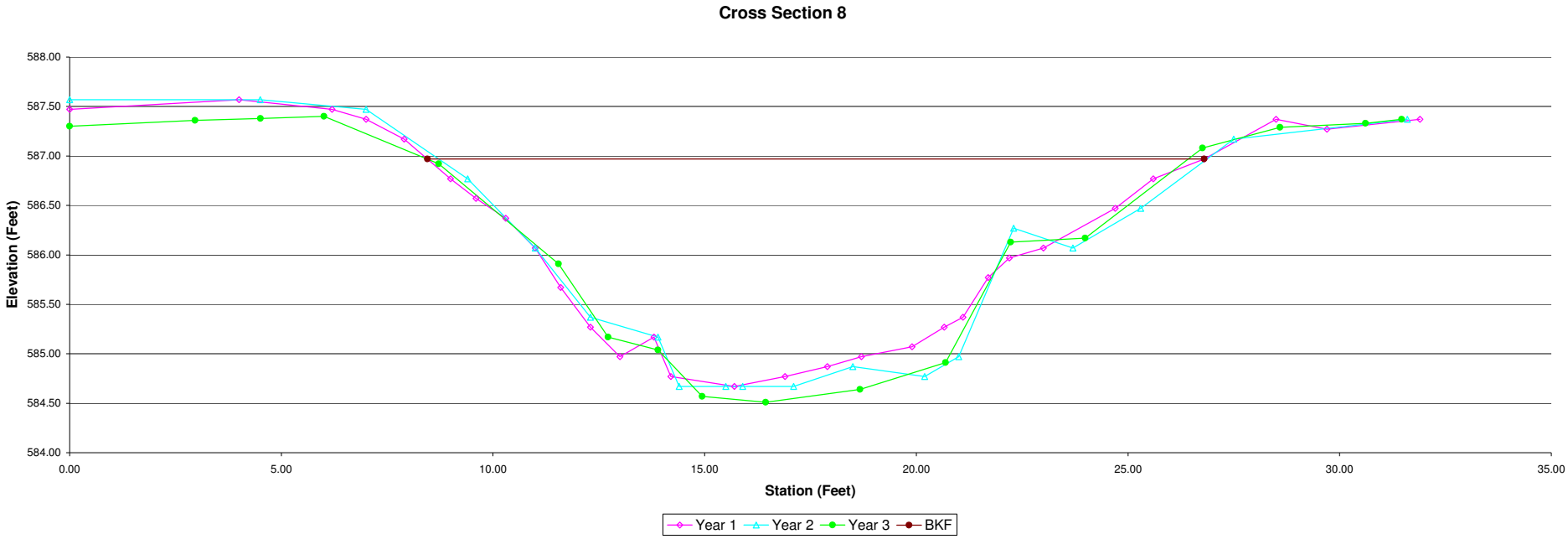
Project:	UT to Cane Creek (Pickard)
Cross Section:	Cross Section 8
Feature	Riffle
Station:	36+76 Downstream of Reach 3
Date:	8/17/11
Crew:	BW, SV, ZP

Summary (bankfull)

	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)		24.4	23.7	25.8		
W (BKF)		18.3	17.6	18.0		
Max d		2.3	2.2	2.5		
Mean d		1.3	1.3	1.4		
W/D		13.7	13.1	12.5		

MY00-2009			MY01-2009			MY02-2010			MY03-2011		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
Data Not Available				587.47			587.57			587.30	LPIN
			4.00	587.57		4.50	587.57		2.96	587.36	
			6.20	587.47		7.00	587.47		4.51	587.38	
			7.00	587.37		9.40	586.77	3L Bankfull	6.01	587.40	BANKFULL LEFT
			7.90	587.17	BL Bankfull	11.00	586.07		8.72	586.92	
			9.00	586.77		12.30	585.37		11.55	585.91	
			9.60	586.57		13.90	585.17		12.72	585.17	TOE L
			10.30	586.37		14.40	584.67	TOE L	13.90	585.04	
			11.00	586.07		15.50	584.67	TW	14.94	584.57	
			11.60	585.67		15.90	584.67		16.44	584.51	TW
			12.30	585.27		17.10	584.67		18.67	584.64	
			13.00	584.97	TOE L	18.50	584.87		20.69	584.91	TOE R
			13.80	585.17		20.20	584.77		22.23	586.13	
			14.20	584.77		21.00	584.97	TOE R	23.99	586.17	
			15.70	584.67	TW	22.30	586.27		26.76	587.08	
			16.90	584.77		23.70	586.07		28.59	587.29	TOBR
			17.90	584.87		25.30	586.47	R Bankfull	30.61	587.33	
			18.70	584.97		27.50	587.17		31.47	587.37	RPIN
			19.90	585.07		31.60	587.37				
			20.66	585.27							
			21.10	585.37	TOE R						
			21.70	585.77							
			22.20	585.97							
			23.00	586.07							
			24.70	586.47							
			25.60	586.77							
			26.80	586.97	R Bankfull Right						
			28.50	587.37							
			29.70	587.27							
			31.90	587.37							

Photo of XS-8, looking in the downstream direction



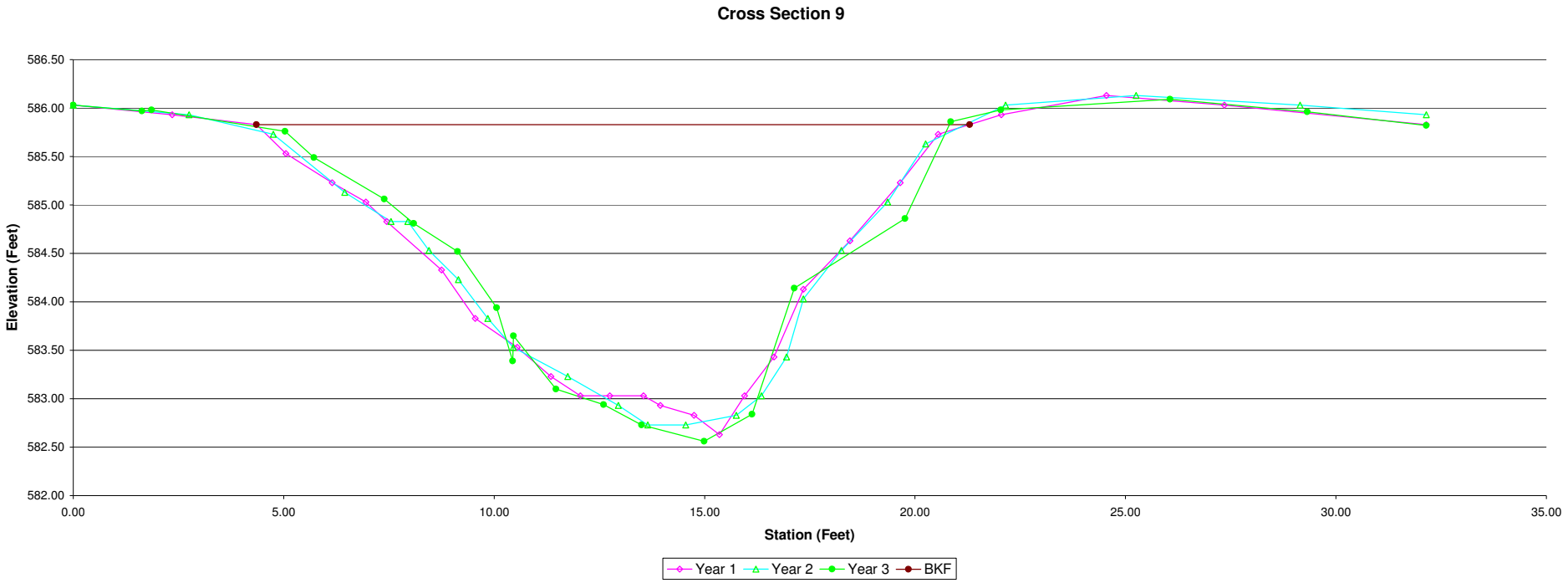
Project:	UT to Cane Creek (Pickard)
Cross Section:	Cross Section 9
Feature	Pool
Station:	43+03 (Reach 4)
Date:	8/17/11
Crew:	BW, SV, ZP

Summary (bankfull)

	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)		28.4	28.5	28.4		
W (BKF)		16.8	17.7	16.8		
Max d		3.2	3.1	3.3		
Mean d		1.7	1.6	1.7		
W/D		N/A	N/A	9.9		

MY00-2009			MY01-2009			MY02-2010			MY03-2011		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
Data Not Available				586.03			586.03			586.03	LPIN
			2.35	585.93		2.75	585.93		1.63	585.97	
			4.35	585.83		4.75	585.73	3L Bankfull	1.86	585.98	
			5.05	585.53		6.45	585.13		5.03	585.76	
			6.15	585.23	3L Bankfull	7.55	584.83		5.72	585.49	BANKFULL LEFT
			6.95	585.03		7.95	584.83		7.39	585.06	
			7.45	584.83		8.45	584.53		8.09	584.81	
			8.75	584.33		9.15	584.23		9.13	584.52	
			9.55	583.83		9.85	583.83		10.06	583.94	
			10.55	583.53		10.45	583.53	TOE L	10.44	583.39	TOE L
			11.35	583.23		11.75	583.23		10.46	583.65	
			12.05	583.03	TOE L	12.95	582.93		11.47	583.10	
			12.75	583.03		13.65	582.73	TW	12.60	582.94	
			13.55	583.03		14.55	582.73		13.50	582.73	TW
			13.95	582.93		15.75	582.83		14.99	582.56	
			14.75	582.83		16.35	583.03	TOE R	16.13	582.84	TOE R
			15.35	582.63	TW	16.95	583.43		17.13	584.14	
			15.95	583.03		17.35	584.03		19.76	584.86	
			16.65	583.43		18.25	584.53		20.85	585.86	TOBR
			17.35	584.13		19.35	585.03		22.04	585.98	
			18.45	584.63		20.25	585.63	R Bankfull	26.06	586.09	
			19.65	585.23	R Bankfull	22.15	586.03		29.32	585.96	
			20.55	585.73		25.25	586.13		32.15	585.82	RPIN
			22.05	585.93		29.15	586.03				
			24.55	586.13		32.15	585.93				
			27.35	586.03							
			32.15	585.83							

Photo of XS-9, looking in the downstream direction



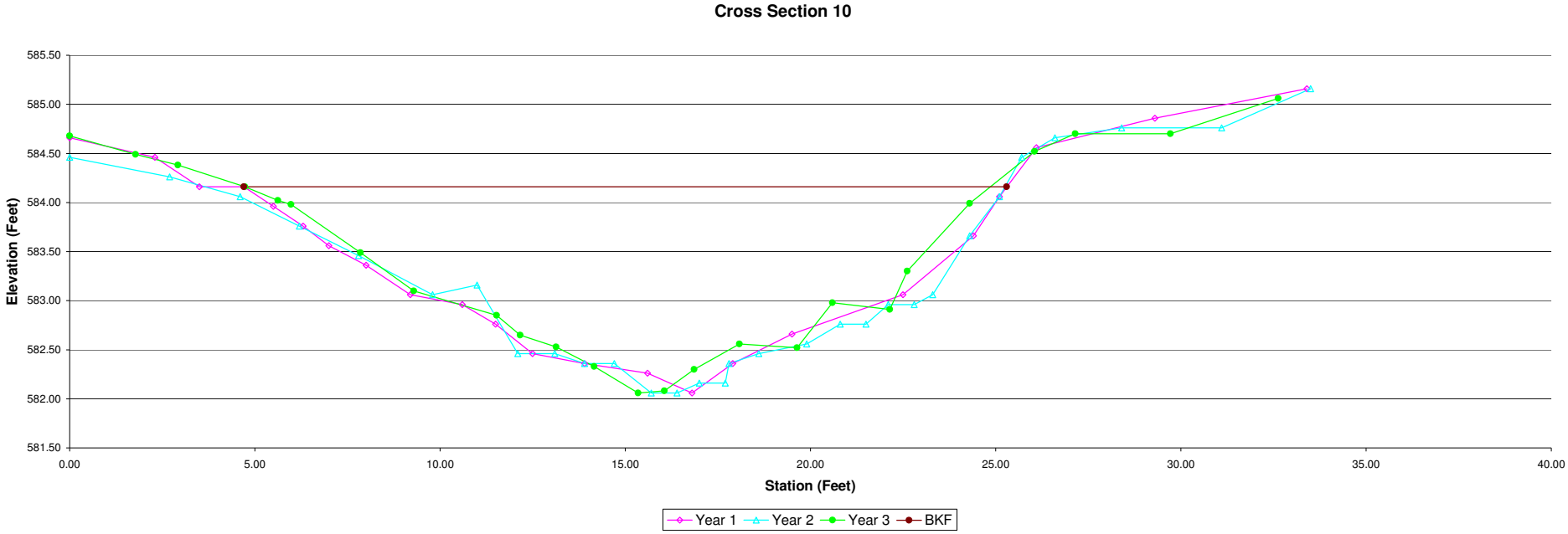
Project:	UT to Cane Creek (Pickard)
Cross Section:	Cross Section 10
Feature	Riffle
Station:	48+08 B/W Reach 4 and 5
Date:	8/17/11
Crew:	BW, SV, ZP

Summary (bankfull)

	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)		24.5	24.9	23.7		
W (BKF)		20.6	21.1	20.1		
Max d		2.0	2.0	2.1		
Mean d		1.2	1.2	1.2		
W/D		17.3	17.9	17.1		

MY00-2009			MY01-2009			MY02-2010			MY03-2011		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
Data Not Available				584.66			584.46			584.68	LPIN
			2.30	584.46		2.70	584.26		1.78	584.49	
			3.50	584.16		4.60	584.06	3L Bankfull	2.92	584.38	
			4.70	584.16	3L Bankfull	6.20	583.76		4.73	584.16	
			5.50	583.96		7.80	583.46		5.62	584.02	BANKFULL LEFT
			6.30	583.76		9.80	583.06		5.98	583.98	
			7.00	583.56		11.00	583.16		7.85	583.49	
			8.00	583.36		12.10	582.46	TOE L	9.29	583.10	
			9.20	583.06		13.10	582.46		11.53	582.85	
			10.60	582.96		13.90	582.36		12.16	582.65	
			11.50	582.76		14.70	582.36		13.13	582.53	
			12.50	582.46		15.70	582.06	TW	14.16	582.33	
			13.90	582.36		16.40	582.06		15.35	582.06	
			15.60	582.26		17.00	582.16		16.06	582.08	TW
			16.80	582.06	TW	17.70	582.16		16.86	582.30	TOE R
			17.90	582.36		17.80	582.36		18.08	582.56	
			19.50	582.66		18.60	582.46		19.64	582.52	
			22.50	583.06		19.90	582.56	TOE R	20.59	582.98	
			24.40	583.66		20.80	582.76		22.14	582.91	
			25.10	584.06	R Bankfull	21.50	582.76		22.61	583.30	
			26.10	584.56		22.10	582.96		24.30	583.99	
			29.30	584.86		22.80	582.96		26.05	584.52	
			33.40	585.16		23.30	583.06		27.15	584.70	TOBR
						24.30	583.66		29.72	584.70	
						25.10	584.06	R Bankfull	32.63	585.06	RPIN
						25.70	584.46				
						26.60	584.66				
						28.40	584.76				
						31.10	584.76				
						33.50	585.16				

Photo of XS-10, looking in the downstream direction



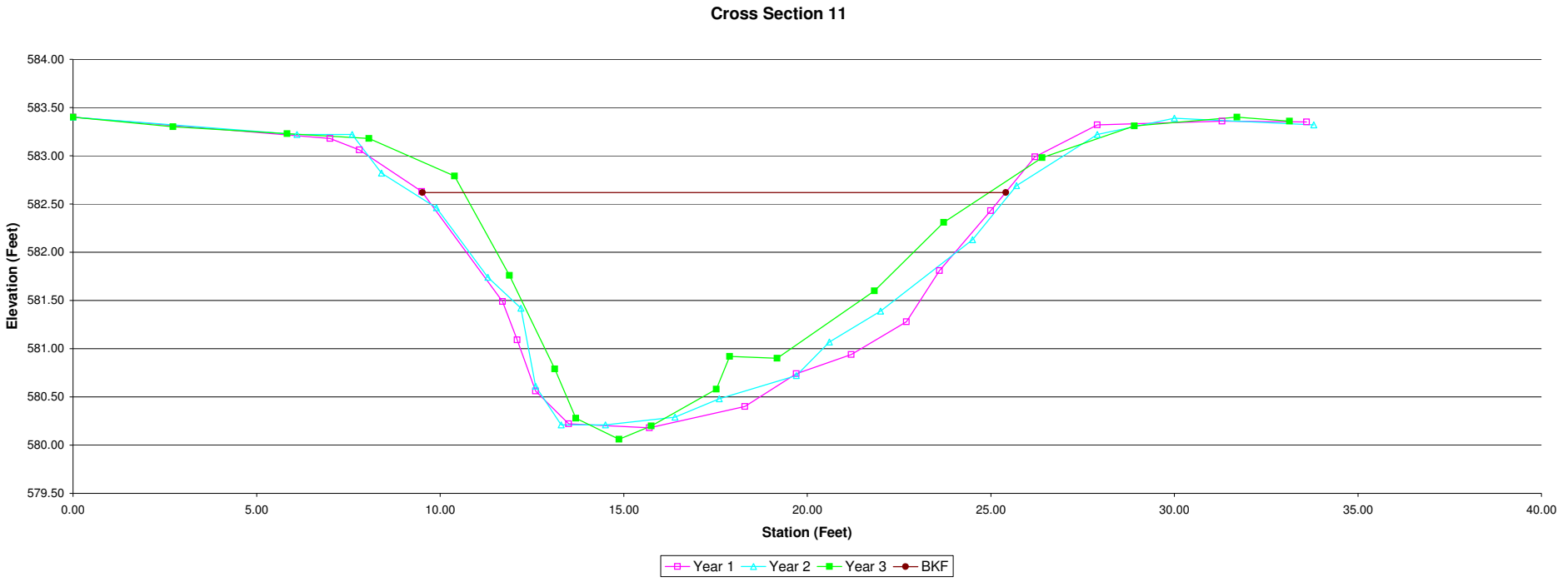
Project:	UT to Cane Creek (Pickard)
Cross Section:	Cross Section 11
Feature	Riffle
Station:	52+76 (Reach 5)
Date:	8/17/11
Crew:	BW, SV, ZP

Summary (bankfull)

	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)		25.7	25.8	20.5		
W (BKF)		15.9	17.0	14.3		
Max d		2.4	2.5	2.6		
Mean d		1.6	1.5	1.4		
W/D		9.8	11.2	10.0		

MY00-2009			MY01-2009			MY02-2010			MY03-2011		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
Data Not Available				583.40			583.40			583.40	LPIN
			7.00	583.18		6.10	583.22		2.72	583.30	
			7.80	583.06		7.60	583.22		5.83	583.23	
			9.50	582.63	BL Bankfull	8.40	582.82	BL Bankfull	8.06	583.18	BANKFULL LEFT
			11.70	581.49		9.90	582.46		10.39	582.79	
			12.10	581.09		11.30	581.74		11.89	581.76	
			12.60	580.56	TOE L	12.20	581.42		13.12	580.79	TOE L
			13.50	580.22		12.60	580.61		13.70	580.28	
			15.70	580.18	TW	13.30	580.21	TOE L	14.87	580.06	TW
			18.30	580.40		14.50	580.21	TW	15.75	580.20	
			19.70	580.74		16.40	580.29		17.52	580.58	TOE R
			21.20	580.94		17.60	580.48		17.89	580.92	
			22.70	581.28	TOE R	19.70	580.72	TOE R	19.18	580.90	
			23.60	581.81		20.60	581.07		21.83	581.60	
			25.00	582.43	R Bankfull	22.00	581.39		23.72	582.31	
			26.20	582.99		24.50	582.13		26.40	582.98	
			27.90	583.32		25.70	582.69	R Bankfull	28.91	583.31	TOBR
			31.30	583.36		27.90	583.22		31.71	583.40	
			33.60	583.35		30.00	583.39		33.14	583.36	RPIN
						33.80	583.32				

Photo of XS-11, looking in the downstream direction



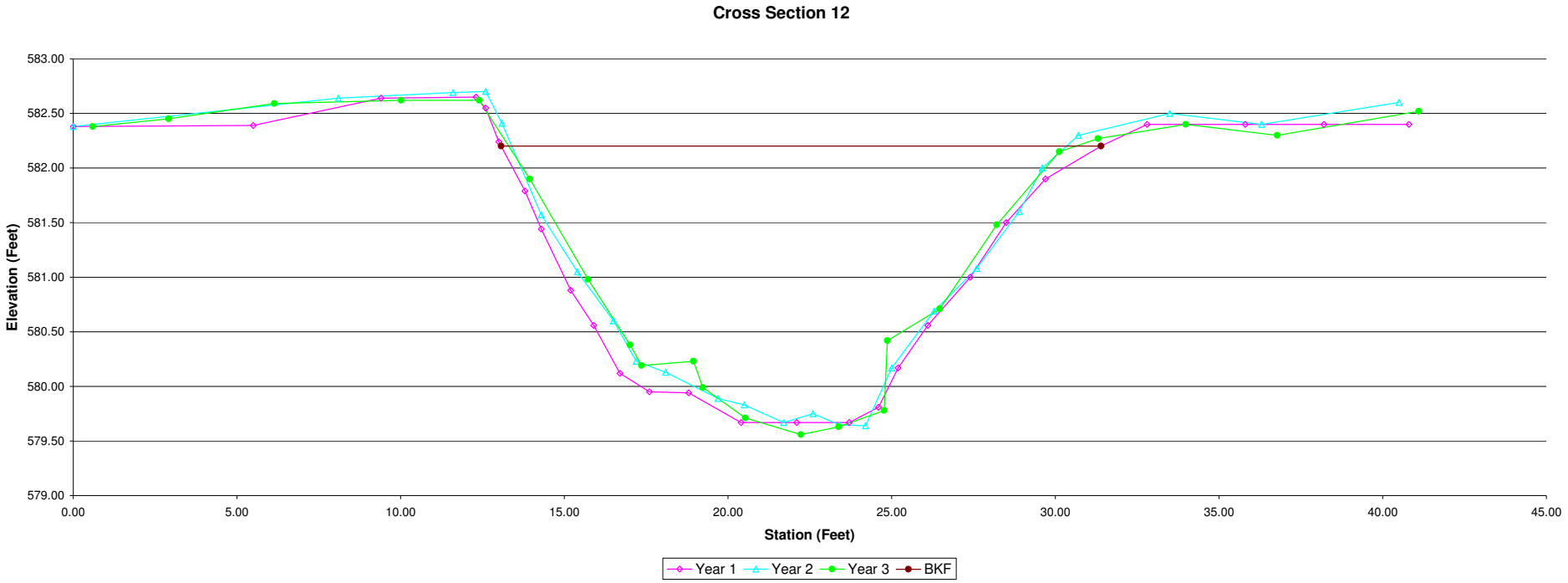
Project:	UT to Cane Creek (Pickard)
Cross Section:	Cross Section 12
Feature	Riffle
Station:	56+11 Downstream of Reach 5
Date:	8/17/11
Crew:	BW, SV, ZP

Summary (bankfull)

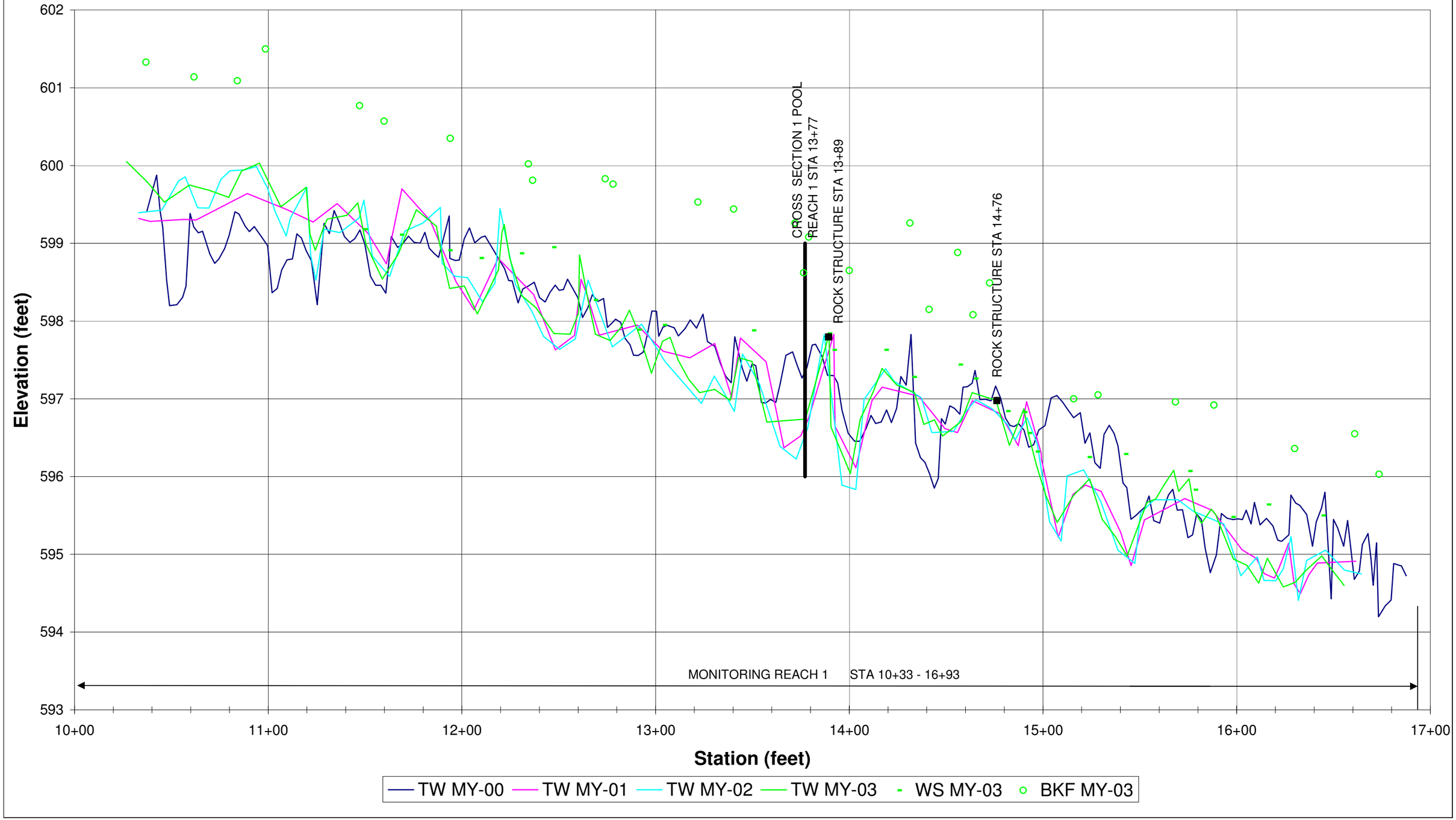
	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)		22.9	21.1	22.3		
W (BKF)		14.5	12.4	15.5		
Max d		2.6	2.6	2.3		
Mean d		1.6	1.7	1.4		
W/D		9.2	7.3	10.7		

MY00-2009			MY01-2009			MY02-2010			MY03-2011		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
Data Not Available				582.38			582.38		0.60	582.38	LPIN
			5.50	582.39		8.10	582.64		2.92	582.45	
			9.40	582.64		11.60	582.69		6.14	582.59	
			12.30	582.65		12.60	582.70		10.02	582.62	
			12.60	582.55		13.10	582.41	3L Bankfull	12.40	582.62	BANKFULL LEFT
			13.00	582.24	3L Bankfull	14.30	581.57		13.95	581.90	
			13.80	581.79		15.40	581.05		15.73	580.98	
			14.30	581.44		16.50	580.60		17.01	580.38	
			15.20	580.88		17.20	580.23	TOE L	17.36	580.19	
			15.90	580.56		18.10	580.13		18.95	580.23	
			16.70	580.12	TOE L	19.70	579.89		19.23	579.99	
			17.60	579.95		20.50	579.83		20.53	579.71	TOE L
			18.80	579.94		21.70	579.67		22.23	579.56	TW
			20.40	579.67		22.60	579.75		23.38	579.63	
			22.10	579.67	TW	23.40	579.65		24.77	579.78	TOE R
			23.70	579.67		24.20	579.64	TW	24.87	580.42	
			24.60	579.81	TOE R	25.00	580.17		26.47	580.71	
			25.20	580.17		26.30	580.69		28.21	581.48	
			26.10	580.56		27.60	581.08		30.12	582.15	TOBR
			27.40	581.00		28.90	581.60		31.31	582.27	
			28.50	581.50		29.60	582.00		33.99	582.40	
			29.70	581.90		30.70	582.30	R Bankfull	36.78	582.30	
			31.40	582.20	R Bankfull	33.50	582.50		41.10	582.52	RPIN
			32.80	582.40		36.30	582.40				
			35.80	582.40		40.50	582.60				
			38.20	582.40							
			40.80	582.40							

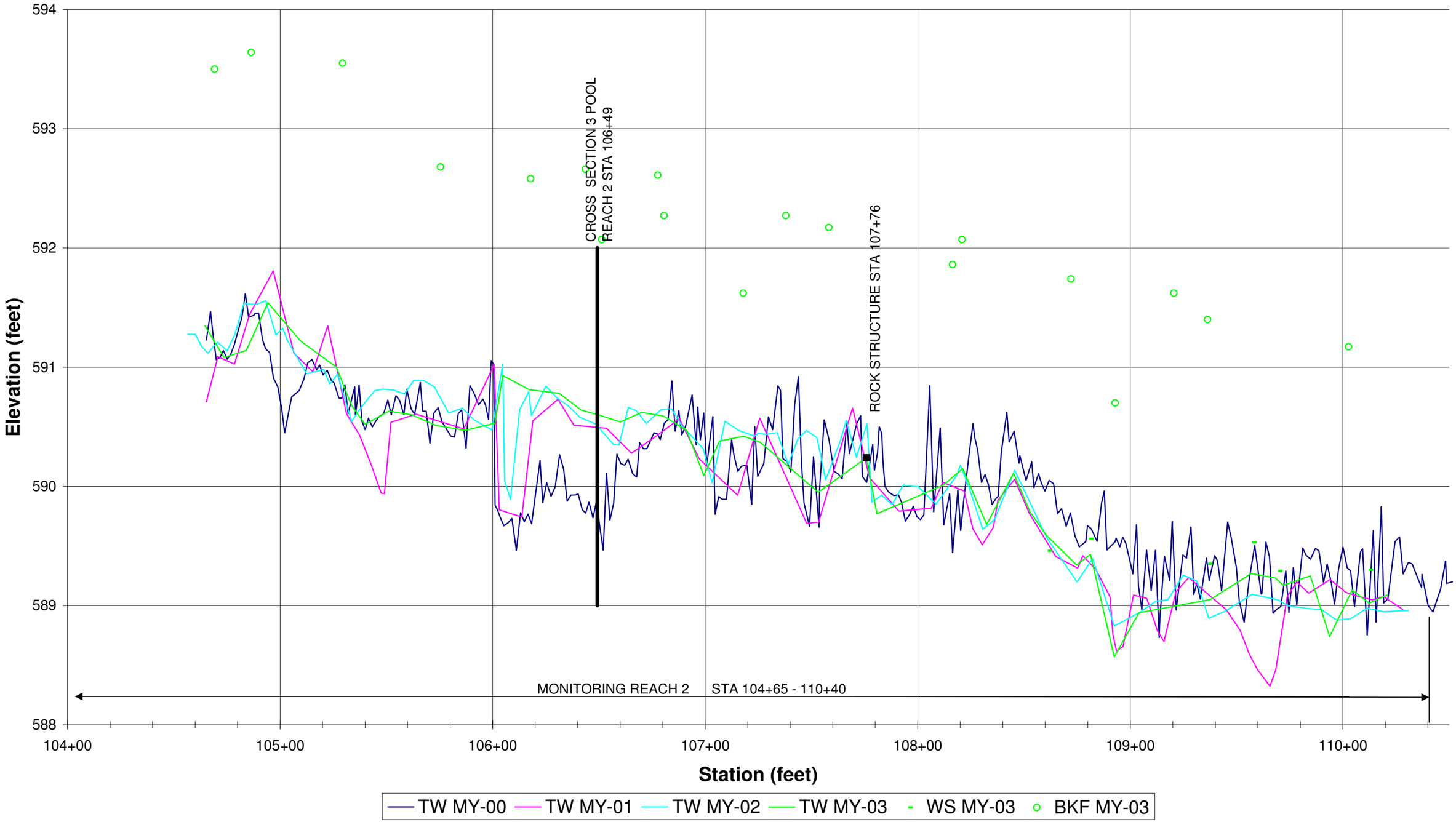
Photo of XS-12, looking in the downstream direction



Upper UT to Cane Creek (Pickard)
Longitudinal Profile
Reach 1



Upper UT to Cane Creek (Pickard)
Longitudinal Profile
Reach 2



Upper UT to Cane Creek (Pickard)
Longitudinal Profile
Reach 3

590
589
588
587
586
585
584
583

Elevation (feet)

CROSS SECTION 7 RIFFLE
REACH 3 STA 32+03

CATTLE CROSSING REACH 3 STA 35+05 - 35+20

ROCK STRUCTURE STA 32+25

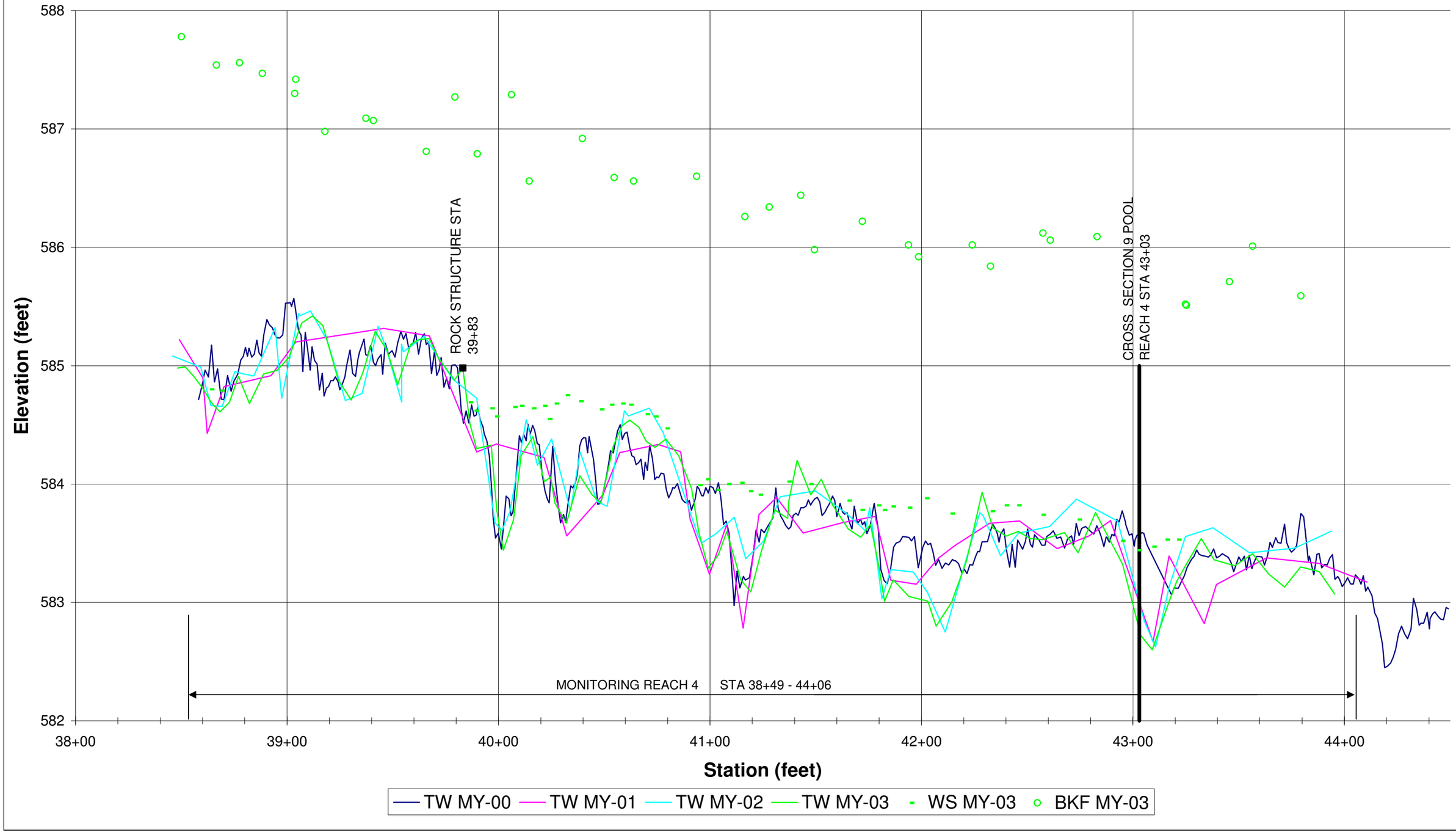
MONITORING REACH 3 STA 31+11 - 36+48

31+00 31+50 32+00 32+50 33+00 33+50 34+00 34+50 35+00 35+50 36+00

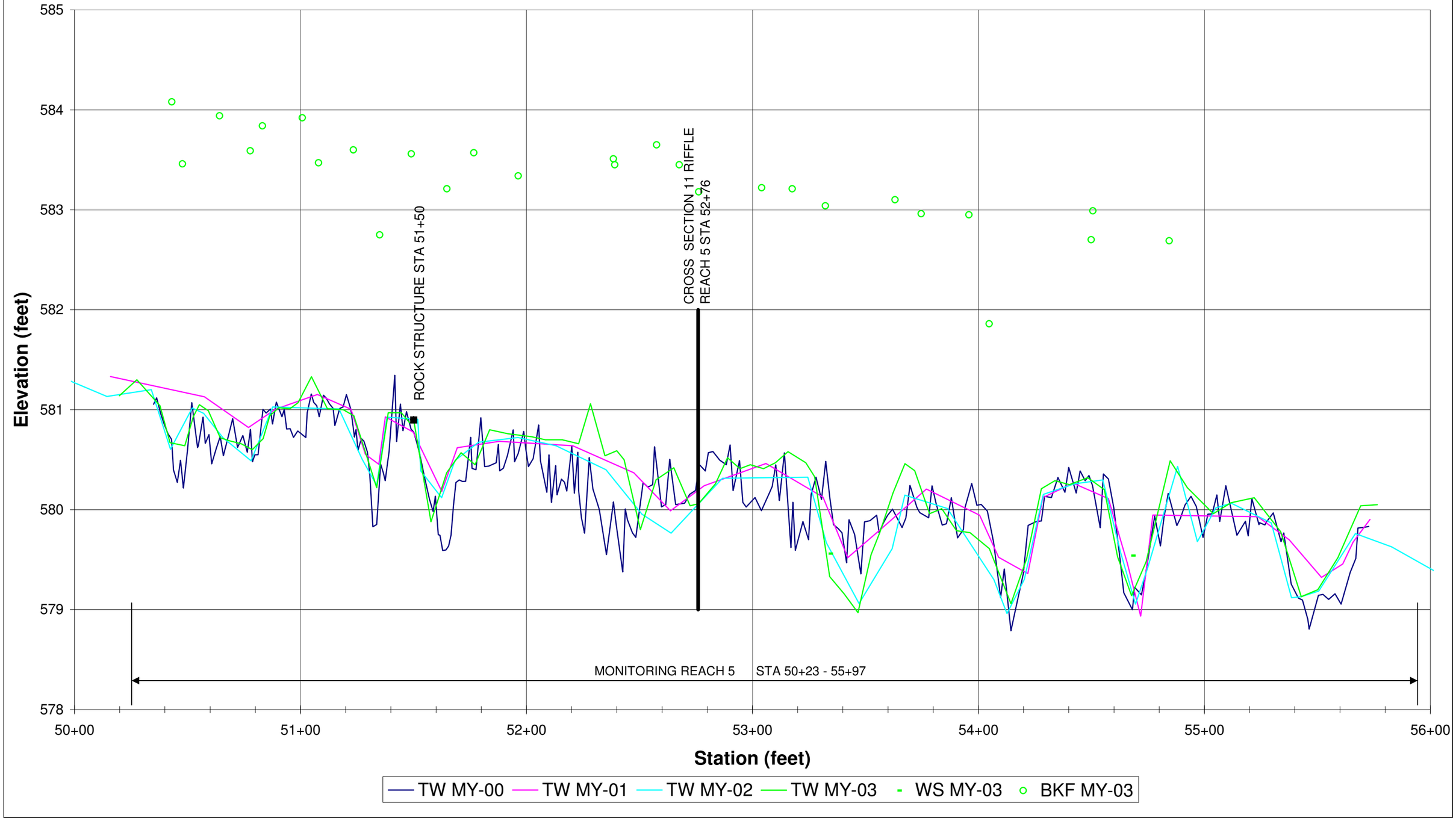
Station (feet)

TW MY-00 TW MY-01 TW MY-02 TW MY-03 WS MY-03 BKF MY-03

Upper UT to Cane Creek (Pickard)
Longitudinal Profile
Reach 4

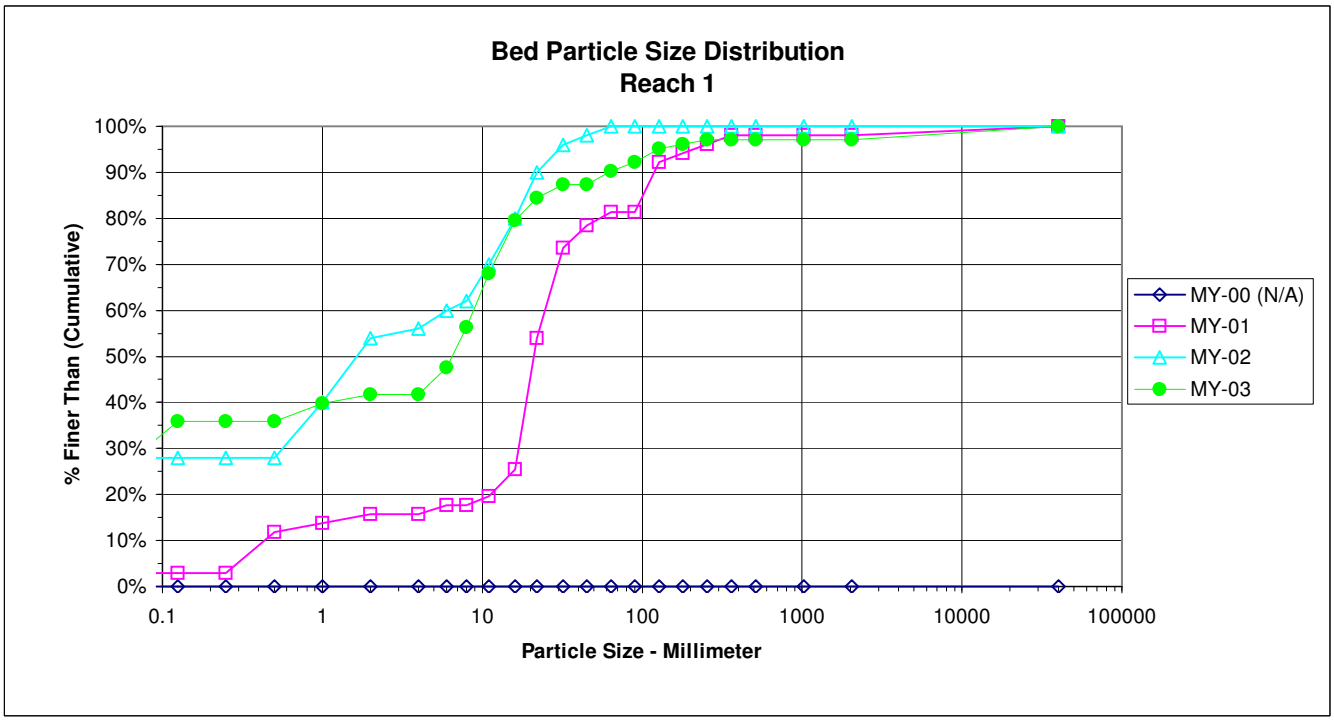


Upper UT to Cane Creek (Pickard)
Longitudinal Profile
Reach 5



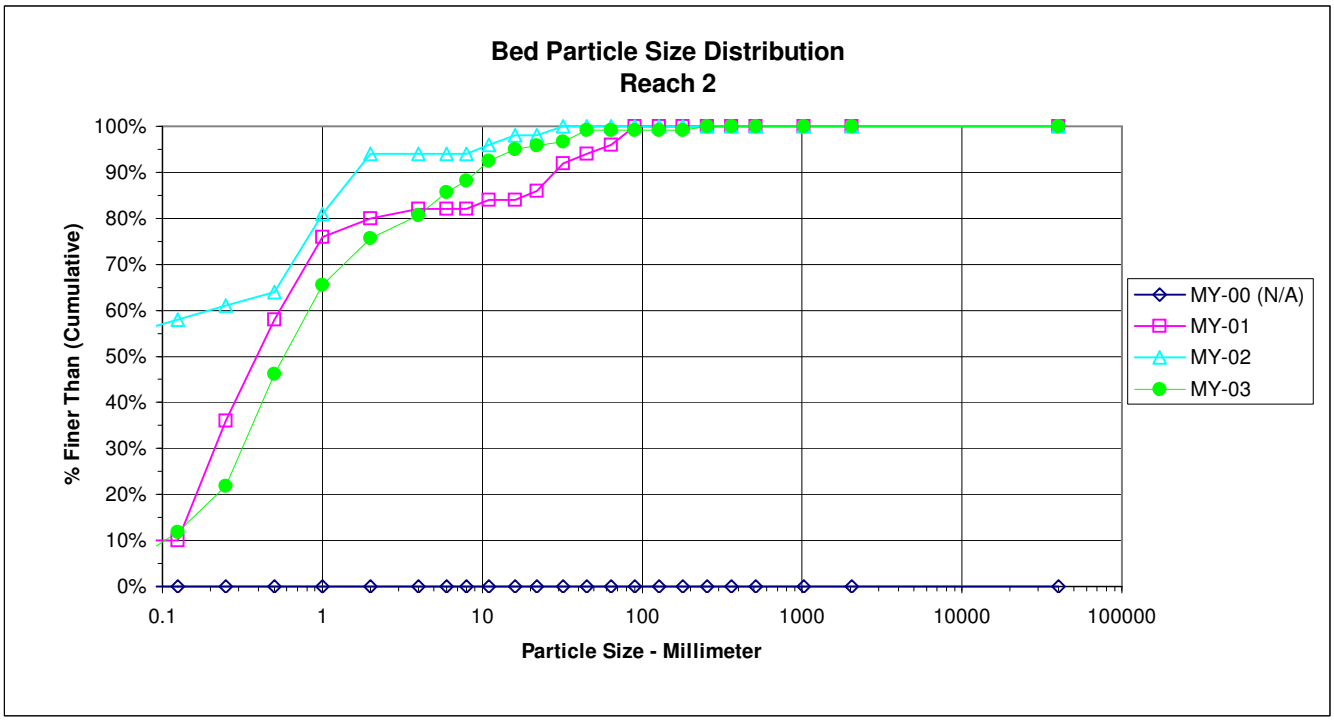
PEBBLE COUNT								
Project:	Upper UT to Cane Creek (Pickard)					**Date:**	8/31/2011	
Location:	Overall Reach 1 Particle Distribution							
				Particle Counts				
Inches	Particle	Millimeter		Riffles	Pools	Total No.	Item %	% Cumulative
	Silt/Clay	< 0.062	S/C	15	13	28	27%	27%
	Very Fine	.062 - .125	S	5	4	9	9%	36%
	Fine	.125 - .25	A	0	0	0	0%	36%
	Medium	.25 - .50	N	0	0	0	0%	36%
	Coarse	.50 - 1.0	D	2	2	4	4%	40%
.04 -.08	Very Coarse	1.0 - 2.0	S	0	2	2	2%	42%
.08 - .16	Very Fine	2.0 - 4.0		0	0	0	0%	42%
.16 - .22	Fine	4.0 - 5.7	G	0	6	6	6%	48%
.22 - .31	Fine	5.7 - 8.0	R	3	6	9	9%	56%
.31 - .44	Medium	8.0 - 11.3	A	5	7	12	12%	68%
.44 - .63	Medium	11.3 - 16.0	V	5	7	12	12%	80%
.63 - .89	Coarse	16.0 - 22.6	E	5	0	5	5%	84%
.89 - 1.26	Coarse	22.6 - 32.0	L	1	2	3	3%	87%
1.26 - 1.77	Very Coarse	32.0 - 45.0	S	0	0	0	0%	87%
1.77 - 2.5	Very Coarse	45.0 - 64.0		1	2	3	3%	90%
2.5 - 3.5	Small	64 - 90	C	2	0	2	2%	92%
3.5 - 5.0	Small	90 - 128	O	3	0	3	3%	95%
5.0 - 7.1	Large	128 - 180	B	0	1	1	1%	96%
7.1 - 10.1	Large	180 - 256	L	0	1	1	1%	97%
10.1 - 14.3	Small	256 - 362	B	0	0	0	0%	97%
14.3 - 20	Small	362 - 512	L	0	0	0	0%	97%
20 - 40	Medium	512 - 1024	D	0	0	0	0%	97%
40 - 80	Lrg- Very Lrg	1024 - 2048	R	0	0	0	0%	97%
	Bedrock		BDRK	3	0	3	3%	100%
			Totals	**50**	**53**	**103**	**100%**	**100%**

d16	d35	d50	d84	d95
0.1	0.1	6.6	21.4	126.1



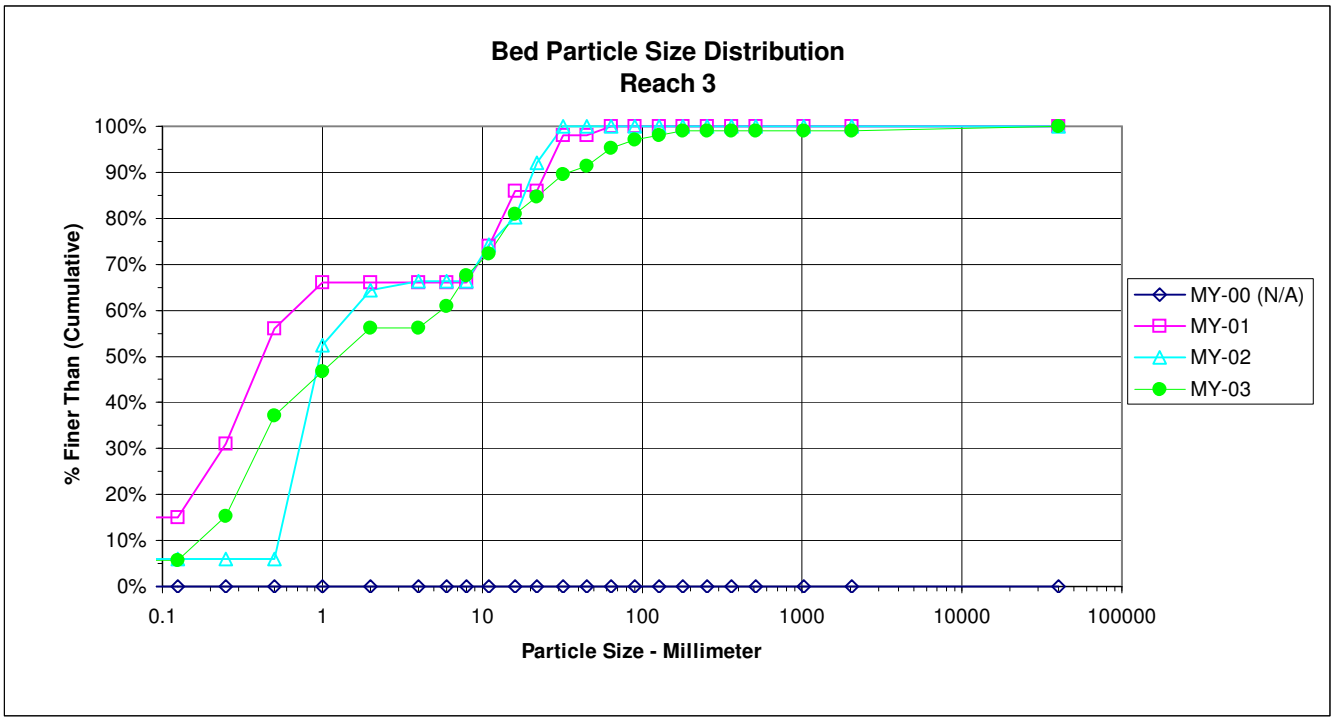
PEBBLE COUNT								
Project:	Upper UT to Cane Creek (Pickard)					**Date:**	8/31/2011	
Location:	Overall Reach 2 Particle Distribution							
				Particle Counts				
Inches	Particle	Millimeter		Riffles	Pools	Total No.	Item %	% Cumulative
	Silt/Clay	< 0.062	S/C	4	2	6	5%	5%
	Very Fine	.062 - .125	S	5	3	8	7%	12%
	Fine	.125 - .25	A	6	6	12	10%	22%
	Medium	.25 - .50	N	12	17	29	24%	46%
	Coarse	.50 - 1.0	D	7	16	23	19%	66%
.04 -.08	Very Coarse	1.0 - 2.0	S	4	8	12	10%	76%
.08 - .16	Very Fine	2.0 - 4.0		4	2	6	5%	81%
.16 - .22	Fine	4.0 - 5.7	G	3	3	6	5%	86%
.22 - .31	Fine	5.7 - 8.0	R	2	1	3	3%	88%
.31 - .44	Medium	8.0 - 11.3	A	3	2	5	4%	92%
.44 - .63	Medium	11.3 - 16.0	V	0	3	3	3%	95%
.63 - .89	Coarse	16.0 - 22.6	E	0	1	1	1%	96%
.89 - 1.26	Coarse	22.6 - 32.0	L	0	1	1	1%	97%
1.26 - 1.77	Very Coarse	32.0 - 45.0	S	0	3	3	3%	99%
1.77 - 2.5	Very Coarse	45.0 - 64.0		0	0	0	0%	99%
2.5 - 3.5	Small	64 - 90	C	0	0	0	0%	99%
3.5 - 5.0	Small	90 - 128	O	0	0	0	0%	99%
5.0 - 7.1	Large	128 - 180	B	0	0	0	0%	99%
7.1 - 10.1	Large	180 - 256	L	0	1	1	1%	100%
10.1 - 14.3	Small	256 - 362	B	0	0	0	0%	100%
14.3 - 20	Small	362 - 512	L	0	0	0	0%	100%
20 - 40	Medium	512 - 1024	D	0	0	0	0%	100%
40 - 80	Lrg- Very Lrg	1024 - 2048	R	0	0	0	0%	100%
	Bedrock		BDRK	0	0	0	0%	100%
			Totals	**50**	**69**	**119**	**100%**	**100%**

d16	d35	d50	d84	d95
0.2	0.4	0.6	5.3	16.3



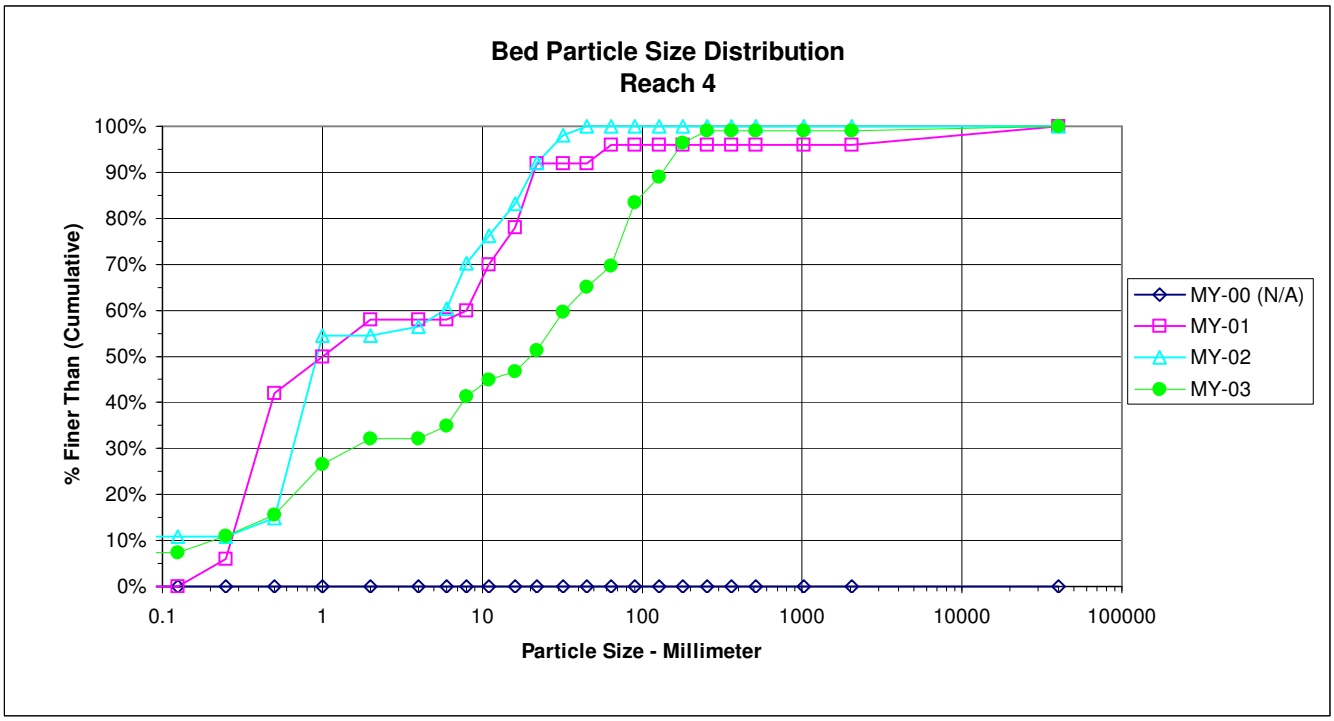
PEBBLE COUNT								
Project:	Upper UT to Cane Creek (Pickard)					**Date:**	8/31/2011	
Location:	Overall Reach 3 Particle Distribution							
				Particle Counts				
Inches	Particle	Millimeter		Riffles	Pools	Total No.	Item %	% Cumulative
	Silt/Clay	< 0.062	S/C	4	2	6	6%	6%
	Very Fine	.062 - .125	S	0	0	0	0%	6%
	Fine	.125 - .25	A	3	7	10	10%	15%
	Medium	.25 - .50	N	5	18	23	22%	37%
	Coarse	.50 - 1.0	D	7	3	10	10%	47%
.04 -.08	Very Coarse	1.0 - 2.0	S	5	5	10	10%	56%
.08 - .16	Very Fine	2.0 - 4.0		0	0	0	0%	56%
.16 - .22	Fine	4.0 - 5.7	G	4	1	5	5%	61%
.22 - .31	Fine	5.7 - 8.0	R	7	0	7	7%	68%
.31 - .44	Medium	8.0 - 11.3	A	3	2	5	5%	72%
.44 - .63	Medium	11.3 - 16.0	V	4	5	9	9%	81%
.63 - .89	Coarse	16.0 - 22.6	E	3	1	4	4%	85%
.89 - 1.26	Coarse	22.6 - 32.0	L	3	2	5	5%	90%
1.26 - 1.77	Very Coarse	32.0 - 45.0	S	1	1	2	2%	91%
1.77 - 2.5	Very Coarse	45.0 - 64.0		0	4	4	4%	95%
2.5 - 3.5	Small	64 - 90	C	1	1	2	2%	97%
3.5 - 5.0	Small	90 - 128	O	1	0	1	1%	98%
5.0 - 7.1	Large	128 - 180	B	0	1	1	1%	99%
7.1 - 10.1	Large	180 - 256	L	0	0	0	0%	99%
10.1 - 14.3	Small	256 - 362	B	0	0	0	0%	99%
14.3 - 20	Small	362 - 512	L	0	0	0	0%	99%
20 - 40	Medium	512 - 1024	D	0	0	0	0%	99%
40 - 80	Lrg- Very Lrg	1024 - 2048	R	0	0	0	0%	99%
	Bedrock		BDRK	0	1	1	1%	100%
			Totals	**51**	**54**	**105**	**100%**	**100%**

d16	d35	d50	d84	d95
0.3	0.5	1.4	20.8	62.8



PEBBLE COUNT								
Project:	Upper UT to Cane Creek (Pickard)					**Date:**	8/31/2011	
Location:	Overall Reach 4 Particle Distribution							
				Particle Counts				
Inches	Particle	Millimeter		Riffles	Pools	Total No.	Item %	% Cumulative
	Silt/Clay	< 0.062	S/C	6	2	8	7%	7%
	Very Fine	.062 - .125	S	0	0	0	0%	7%
	Fine	.125 - .25	A	3	1	4	4%	11%
	Medium	.25 - .50	N	3	2	5	5%	16%
	Coarse	.50 - 1.0	D	9	3	12	11%	27%
.04 -.08	Very Coarse	1.0 - 2.0	S	1	5	6	6%	32%
.08 - .16	Very Fine	2.0 - 4.0		0	0	0	0%	32%
.16 - .22	Fine	4.0 - 5.7	G	2	1	3	3%	35%
.22 - .31	Fine	5.7 - 8.0	R	5	2	7	6%	41%
.31 - .44	Medium	8.0 - 11.3	A	0	4	4	4%	45%
.44 - .63	Medium	11.3 - 16.0	V	1	1	2	2%	47%
.63 - .89	Coarse	16.0 - 22.6	E	2	3	5	5%	51%
.89 - 1.26	Coarse	22.6 - 32.0	L	2	7	9	8%	60%
1.26 - 1.77	Very Coarse	32.0 - 45.0	S	1	5	6	6%	65%
1.77 - 2.5	Very Coarse	45.0 - 64.0		2	3	5	5%	70%
2.5 - 3.5	Small	64 - 90	C	11	4	15	14%	83%
3.5 - 5.0	Small	90 - 128	O	5	1	6	6%	89%
5.0 - 7.1	Large	128 - 180	B	5	3	8	7%	96%
7.1 - 10.1	Large	180 - 256	L	1	2	3	3%	99%
10.1 - 14.3	Small	256 - 362	B	0	0	0	0%	99%
14.3 - 20	Small	362 - 512	L	0	0	0	0%	99%
20 - 40	Medium	512 - 1024	D	0	0	0	0%	99%
40 - 80	Lrg- Very Lrg	1024 - 2048	R	0	0	0	0%	99%
	Bedrock		BDRK	1	0	1	1%	100%
			Totals	**60**	**49**	**109**	**100%**	**100%**

d16	d35	d50	d84	d95
0.5	6.0	20.2	93.5	170.6



PEBBLE COUNT								
Project:	Upper UT to Cane Creek (Pickard)					**Date:**	8/31/2011	
Location:	Overall Reach 5 Particle Distribution							
				Particle Counts				
Inches	Particle	Millimeter		Riffles	Pools	Total No.	Item %	% Cumulative
	Silt/Clay	< 0.062	S/C	5	5	10	10%	10%
	Very Fine	.062 - .125	S	0	0	0	0%	10%
	Fine	.125 - .25	A	2	8	10	10%	19%
	Medium	.25 - .50	N	0	0	0	0%	19%
	Coarse	.50 - 1.0	D	7	7	14	14%	33%
.04 -.08	Very Coarse	1.0 - 2.0	S	10	1	11	11%	44%
.08 - .16	Very Fine	2.0 - 4.0		0	0	0	0%	44%
.16 - .22	Fine	4.0 - 5.7	G	0	2	2	2%	46%
.22 - .31	Fine	5.7 - 8.0	R	0	2	2	2%	48%
.31 - .44	Medium	8.0 - 11.3	A	4	3	7	7%	54%
.44 - .63	Medium	11.3 - 16.0	V	0	1	1	1%	55%
.63 - .89	Coarse	16.0 - 22.6	E	0	3	3	3%	58%
.89 - 1.26	Coarse	22.6 - 32.0	L	4	2	6	6%	64%
1.26 - 1.77	Very Coarse	32.0 - 45.0	S	3	3	6	6%	70%
1.77 - 2.5	Very Coarse	45.0 - 64.0		9	5	14	14%	83%
2.5 - 3.5	Small	64 - 90	C	3	2	5	5%	88%
3.5 - 5.0	Small	90 - 128	O	0	7	7	7%	95%
5.0 - 7.1	Large	128 - 180	B	1	2	3	3%	98%
7.1 - 10.1	Large	180 - 256	L	0	2	2	2%	100%
10.1 - 14.3	Small	256 - 362	B	0	0	0	0%	100%
14.3 - 20	Small	362 - 512	L	0	0	0	0%	100%
20 - 40	Medium	512 - 1024	D	0	0	0	0%	100%
40 - 80	Lrg- Very Lrg	1024 - 2048	R	0	0	0	0%	100%
	Bedrock		BDRK	0	0	0	0%	100%
			Totals	**48**	**55**	**103**	**100%**	**100%**

d16	d35	d50	d84	d95
0.2	1.2	9.1	66.7	127.2

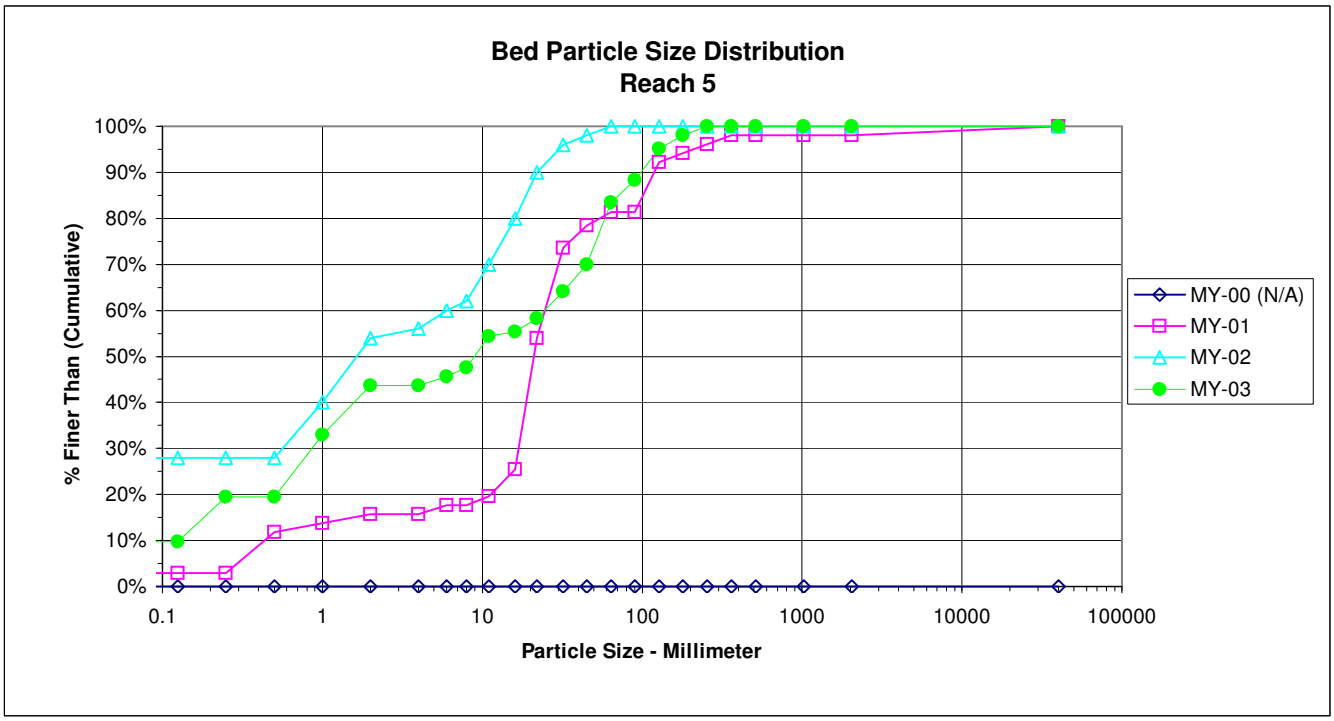


Table 10a. Baseline Stream Data Summary
Upper UT to Cane Creek (Pickard) / EEP# 395 - Reach: 1 (641 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)							11.6						11.2					10				12.4			
Floodprone Width (ft)							65						100					65				150			
Bankfull Mean Depth (ft)							14.3						10.1					11				9			
[1]Bankfull Max Depth (ft)							1.2328						0.9018					1.1				0.7258			
Bankfull Cross Sectional Area (ft^2)							1.6						1.7					1.5				1.6			
Width/Depth Ratio							9.4098						12.42					9.0909				17.084			
Entrenchment Ratio							5.6034						8.9286					6.5				12.097			
[1]Bank Height Ratio							1.2						1					1				1			
Profile																									
Riffle Length (ft)																				5		17	66		
Riffle Slope (ft/ft)							0.008						0.0073					0.0065		0.0014		0.0066	0.0212		
Pool Length (ft)																									
Pool Max depth (ft)																				12		20	33		
Pool Spacing (ft)					100			240			15			87			13		66	39		70	113		
Pattern																									
Channel Beltwidth (ft)					20			50			15			50			35		70	24		64	64		
Radius of Curvature (ft)					40			385			8.6			25.6			23		42	16		68	68		
Rc:Bankfull width (ft/ft)																									
Meander Wavelength (ft)					80			460			29			57			40		140	74		198	198		
Meander Width Ratio					1.7			4.3			1.3			4.5			3.5		7	6		16	16		
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2																									
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m^2																									
Additional Reach Parameters																									
Rosgen Classification					Degraded E4						E4						E4			C4					
Bankfull Velocity (fps)																									
Bankfull Discharge (cfs)																									
Valley length (ft)					1375																				
Channel Thalweg length (ft)					1430												1737			1811					
Sinuosity (ft)					1.04						1.24						1.26			1.31					
Water Surface Slope (Channel) (ft/ft)					0.008						0.0046						0.0043			0.0066					
BF slope (ft/ft)																									
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

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

1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

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

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

Table 10a. Baseline Stream Data Summary
Upper UT to Cane Creek (Pickard) / EEP# 395 - Reach: 2 (587 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)							13.8						11					14				8.6			
Floodprone Width (ft)							150						105					100				150			
Bankfull Mean Depth (ft)							27.4						16.2					24				6.1			
[1]Bankfull Max Depth (ft)							1.9855						1.4727					1.7143				0.7093			
Bankfull Cross Sectional Area (ft^2)							2.9						2					2.1				1.2			
Width/Depth Ratio							6.9504						7.4691					8.1667				12.125			
Entrenchment Ratio							10.87						9.5455					7.1429				17.442			
[1]Bank Height Ratio							1.1						1.4					1				1			
Profile																									
Riffle Length (ft)																				6		13	54		
Riffle Slope (ft/ft)							0.0044						0.0112					0.0055		N/A		N/A	N/A		
Pool Length (ft)																									
Pool Max depth (ft)																				15		22	84		
Pool Spacing (ft)					31			295			2			95			19		93	64		82	109		
Pattern																									
Channel Beltwidth (ft)					20			40			50			77			49	98		33		44	61		
Radius of Curvature (ft)					22			70			11.3			27.1			32	58		19		36	45		
Rc:Bankfull width (ft/ft)																									
Meander Wavelength (ft)					80			540			29			96			56	140		122		144	159		
Meander Width Ratio					1.4			2.9			4.5			7			3.5	7		14		17	19		
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2																									
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m^2																									
Additional Reach Parameters																									
Rosgen Classification					Degraded E4						E4						E4			E/C5					
Bankfull Velocity (fps)																									
Bankfull Discharge (cfs)																									
Valley length (ft)					1986																				
Channel Thalweg length (ft)					2065												1322			1357					
Sinuosity (ft)					1.04						1.62						1.26			1.21					
Water Surface Slope (Channel) (ft/ft)					0.0044						0.0008						0.0037								
BF slope (ft/ft)																									
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

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

1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

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

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

Table 10a. Baseline Stream Data Summary
Upper UT to Cane Creek (Pickard) / EEP# 395 - Reach: 3 (531 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)							16						11.2					16		15.2		17.8	18.3		
Floodprone Width (ft)							300						100					200		150		150	150		
Bankfull Mean Depth (ft)							34.2						10.1					32		22.2		24.4	26.3		
[1]Bankfull Max Depth (ft)							2.1375						0.9018					2		1.2472		1.3333	1.7303		
Bankfull Cross Sectional Area (ft^2)							3.3						1.7					2.4		2		2.3	2.5		
Width/Depth Ratio							7.4854						12.42					8		8.7848		13.725	14.272		
Entrenchment Ratio							18.75						8.9286					12.5		8.1967		8.427	9.8684		
[1]Bank Height Ratio							1.3						1					1		1		1	1		
Profile																									
Riffle Length (ft)																				5		33	136		
Riffle Slope (ft/ft)							0.007						0.0073					0.0049		0		0.0033	0.0108		
Pool Length (ft)																									
Pool Max depth (ft)																				10		31	54		
Pool Spacing (ft)					29			395			15			87			21		106	58		113	180		
Pattern																									
Channel Beltwidth (ft)					18			148			15			50			56		112	15		63	100		
Radius of Curvature (ft)					23			32			8.6			25.6			37		66	23		45	72		
Rc:Bankfull width (ft/ft)																									
Meander Wavelength (ft)					120			340			29			57			64		160	105		182	274		
Meander Width Ratio					1.1			9.2			1.3			4.5			3.5		7	5.9		10.2	15.4		
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2																									
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m^2																									
Additional Reach Parameters																									
Rosgen Classification							Degraded E4						E4					E4				E/C/5			
Bankfull Velocity (fps)																									
Bankfull Discharge (cfs)																									
Valley length (ft)							1541																		
Channel Thalweg length (ft)							2065											1984				2119			
Sinuosity (ft)							1.34						1.24					1.27				1.27			
Water Surface Slope (Channel) (ft/ft)							0.0031						0.0046					0.0032				0.0031			
BF slope (ft/ft)																									
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

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

1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

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

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

Table 10a. Baseline Stream Data Summary
Upper UT to Cane Creek (Pickard) / EEP# 395 - Reach: 4 (570 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)							16						11.2					16		15.2		17.8	18.3		
Floodprone Width (ft)							300						100					200		150		150	150		
Bankfull Mean Depth (ft)							34.2						10.1					32		22.2		24.4	26.3		
[1]Bankfull Max Depth (ft)							2.1375						0.9018					2		1.2472		1.3333	1.7303		
Bankfull Cross Sectional Area (ft^2)							3.3						1.7					2.4		2		2.3	2.5		
Width/Depth Ratio							7.4854						12.42					8		8.7848		13.725	14.272		
Entrenchment Ratio							18.75						8.9286					12.5		8.1967		8.427	9.8684		
[1]Bank Height Ratio							1.3						1					1		1		1	1		
Profile																									
Riffle Length (ft)																				5		33	136		
Riffle Slope (ft/ft)							0.007						0.0073					0.0049		0		0.0033	0.0108		
Pool Length (ft)																									
Pool Max depth (ft)																				10		31	54		
Pool Spacing (ft)					29			395			15			87			21		106	58		113	180		
Pattern																									
Channel Beltwidth (ft)					18			148			15			50			56		112	15		63	100		
Radius of Curvature (ft)					23			32			8.6			25.6			37		66	23		45	72		
Rc:Bankfull width (ft/ft)																									
Meander Wavelength (ft)					120			340			29			57			64		160	105		182	274		
Meander Width Ratio					1.1			9.2			1.3			4.5			3.5		7	5.9		10.2	15.4		
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2																									
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m^2																									
Additional Reach Parameters																									
Rosgen Classification							Degraded E4						E4					E4				E/C/5			
Bankfull Velocity (fps)																									
Bankfull Discharge (cfs)																									
Valley length (ft)							1541																		
Channel Thalweg length (ft)							2065											1984				2119			
Sinuosity (ft)							1.34						1.24					1.27				1.27			
Water Surface Slope (Channel) (ft/ft)							0.0031						0.0046					0.0032				0.0031			
BF slope (ft/ft)																									
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

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

1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

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

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

Table 10a. Baseline Stream Data Summary
Upper UT to Cane Creek (Pickard) / EEP# 395 - Reach: 5 (634 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)							20.3						11					18		14.5		15.9	20.6		
Floodprone Width (ft)							300						105					300		150		150	150		
Bankfull Mean Depth (ft)							42.9						16.2					38		22.9		24.5	25.7		
[1]Bankfull Max Depth (ft)							2.1133						1.4727					2.1111		1.1893		1.5793	1.6164		
Bankfull Cross Sectional Area (ft^2)							2.9						2					2.7		2		2.4	2.6		
Width/Depth Ratio							9.6058						7.4691					8.5263		9.1812		9.837	17.321		
Entrenchment Ratio							14.778						9.5455					16.667		7.2816		9.434	10.345		
[1]Bank Height Ratio							1.6						1.4					1		1		1	1		
Profile																									
Riffle Length (ft)																				12		33	78		
Riffle Slope (ft/ft)													0.0112							0		0.0036	0.0238		
Pool Length (ft)																				15		28	54		
Pool Max depth (ft)																									
Pool Spacing (ft)											2			95						58		83	201		
Pattern																									
Channel Beltwidth (ft)					23			91			50			77			63		126	34		82	104		
Radius of Curvature (ft)					19			34			11.3			27.1			41		75	33		54	90		
Rc:Bankfull width (ft/ft)																									
Meander Wavelength (ft)					99			150			29			96			72		180	124		156	303		
Meander Width Ratio					1.1			4.5			4.5			7			3.5		7	7.8		9.8	19.1		
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2																									
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m^2																									
Additional Reach Parameters																									
Rosgen Classification					Degraded E4						E4						E4			E/C4					
Bankfull Velocity (fps)																									
Bankfull Discharge (cfs)																									
Valley length (ft)					1112																				
Channel Thalweg length (ft)					1435												1174			1194					
Sinuosity (ft)					1.29						1.62						1.09			1.24					
Water Surface Slope (Channel) (ft/ft)					0.0035						0.0008						0.0041			0.0023					
BF slope (ft/ft)																									
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

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

1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

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

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

Table 10b. Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions)
Upper UT to Cane Creek (Pickard) / EEP# 395

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

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

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

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

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

Footnotes 2,3 - These classes are loosley built around the Rosgen classification and hazard ranking breaks, but were adjusted slightly to make for easier assignment to somewhat coarser bins based on visual estimates in the field such that measurement of every segment for ER would not be necessary. The intent here is to provide the reader/consumer of design and monitoring information with a good general sense of the extent of hydrologic containment in the pre-existing and the rehabilitated states as well as comparisons to the reference distributions. ER and BHR have been addressed in prior submissions as a subsample (cross-sections as part of the design survey), however, these subsamples have often focused entirely on facilitating design without providing a thorough pre-constrution distribution of these parameters, leaving the reader/consumer with a sample that is weighted heavily on the stable sections of the reach. This means that the distributions for these parameters should include data from both the cross-section surveys and the longitudinal profile and in the case of ER, visual estimates. For example, the typical longitudinal profile permits sampling of the BHR at riffles beyond those subject to cross-sections and therefore can be readily integrated and provide a more complete sample distribution for these parameters, thereby providing the distribution/coverage necessary to provide meaningful comparisons.

Data for Table 10b. Baseline Stream Summary Table is not available (Reaches 1-5)

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)

Upper UT to Cane Creek (Pickard) / EEP# 395

	Cross Section 1 (Pool)							Cross Section 2 (Riffle)							Cross Section 3 (Pool)							Cross Section 4 (Riffle)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used		598.5	598.4	598.5					596	596	596					591.5	591.8	591.5					594	594.4	594			
Bankfull Width (ft)		8.1	7.8	7.467					12.4	9.7	10.78					8.2	8.2	6.56					8.6	9.8	8.591			
Floodprone Width (ft)		-	-	-					150	150	150					-	-	-					150	150	150			
Bankfull Mean Depth (ft)		1.111	1.1	1.26					0.75	0.9	0.752					0.744	0.8	0.627					0.709	0.9	0.759			
Bankfull Max Depth (ft)		1.7	1.8	1.71					1.6	1.7	1.49					1.1	1.4	0.94					1.2	1.6	1.39			
Bankfull Cross Sectional Area (ft^2)		9	8.8	9.409					9.3	9.7	8.107					6.1	6.9	4.114					6.1	8.8	6.525			
Bankfull Width/Depth Ratio		-	-	-					16.53	11.1	14.34					-	-	-					12.12	11	11.31			
Bankfull Entrenchment Ratio		-	-	-					12.1	15.4	13.91					-	-	-					17.44	15.2	17.46			
Bankfull Bank Height Ratio		-	-	-					1	1	0.913					-	-	-					1	1	1.201			
Cross Sectional Area between end pins (ft^2)		-	-	25.62					-	-	11.1					-	-	18.75					-	-	20.96			
d50 (mm)		22	1.9	7.667					19.9	1.2	13.5					0.5	0.4	0.458					0.4	-	12.67			
	Cross Section 5 (Pool)							**Cross Section 6 (Riffle)**							**Cross Section 7 (Riffle)**							**Cross Section 8 (Riffle)**						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used		592.1	592.2	592.1					588.8	588.8	588.8					589.1	588.9	589.1					587	586.9	587			
Bankfull Width (ft)		10.8	10.4	10.05					17.8	17.8	17.76					15.2	14.5	17.49					18.3	17.6	17.99			
Floodprone Width (ft)		-	-	-					150	150	150					150	150	150					150	150	150			
Bankfull Mean Depth (ft)		1.028	1.1	1.065					1.247	1.2	1.229					1.73	1.7	1.646					1.333	1.3	1.437			
Bankfull Max Depth (ft)		1.9	1.9	1.82					2	2	1.87					2.5	2.2	2.61					2.3	2.2	2.46			
Bankfull Cross Sectional Area (ft^2)		11.1	11.1	10.71					22.2	22.1	21.83					26.3	22.4	28.79					24.4	23.7	25.84			
Bankfull Width/Depth Ratio		-	-	-					14.27	14.3	14.45					8.785	9.4	10.63					13.73	13.1	12.52			
Bankfull Entrenchment Ratio		-	-	-					8.427	8.4	8.445					9.868	10.3	8.575					8.197	8.5	8.339			
Bankfull Bank Height Ratio		-	-	-					1	1	1.294					1	1	0.943					1	1	1.13			
Cross Sectional Area between end pins (ft^2)		-	-	12.4					-	-	67.28					-	-	29.78					-	-	33.55			
d50 (mm)		0.2	0.8	6.333					11.3	1.5	1.313					11.3	1.5	9.25					10.6	0.9	11.83			
	Cross Section 9 (Pool)							**Cross Section 10 (Riffle)**							**Cross Section 11 (Riffle)**							**Cross Section 12 (Riffle)**						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used		585.8	585.8	585.8					584.2	584.2	584.2					582.6	582.7	582.6					582.2	582.2	582.2			
Bankfull Width (ft)		16.8	17.7	16.8					20.6	21.1	20.13					15.9	17	14.32					14.5	12.4	15.46			
Floodprone Width (ft)		-	-	-					150	150	150					150	150	150					150	150	150			
Bankfull Mean Depth (ft)		1.69	1.6	1.692					1.189	1.2	1.176					1.616	1..5	1.429					1.579	1.7	1.444			
Bankfull Max Depth (ft)		3.2	3.1	3.27					2	2	2.1					2.4	2.5	2.56					2.6	2.6	2.34			
Bankfull Cross Sectional Area (ft^2)		28.4	28.5	28.43					24.5	24.9	23.68					25.7	25.8	20.46					22.9	21.1	22.32			
Bankfull Width/Depth Ratio		-	-	-					17.32	17.9	17.11					9.837	11.2	10.02					9.181	7.3	10.7			
Bankfull Entrenchment Ratio		-	-	-					7.282	7.1	7.451					9.434	8.8	10.47					10.34	12.1	9.704			
Bankfull Bank Height Ratio		-	-	-					1	1	0.924					1	1	-226.6					1	1	1.107			
Cross Sectional Area between end pins (ft^2)		-	-	31.3					-	-	41.94					-	-	34.82					-	-	34.34			
d50 (mm)		0.4	0.9	13.5					20.3	6	7.25					20.3	6	14.75					20.3	6	13.5			

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

Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
Upper UT to Cane Creek (Pickard) / EEP# 395 - Reach: 1 (641 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)			12.4						12.4						9.7						7.467															
Floodprone Width (ft)			150						150						150						0															
Bankfull Mean Depth (ft)			9						0.75						0.9						1.26															
[1]Bankfull Max Depth (ft)			0.726						1.6						1.7						1.71															
Bankfull Cross Sectional Area (ft^2)			1.6						9.3						9.7						9.409															
Width/Depth Ratio			17.08						16.53						11.1						5.926															
Entrenchment Ratio			12.1						12.1						15.4						0															
[1]Bank Height Ratio			1						1						1						1.099															
Profile																																				
Riffle Length (ft)	5		17	66			5		17	66			4		19	65			3.88	12.62	10.37	29.11	9.361	11												
Riffle Slope (ft/ft)	0.001		0.007	0.021			0.001		0.007	0.012			0		0.009	0.086			0.013	0.047	0.023	0.131	0.042	8												
Pool Length (ft)							12		20	33			3		6	23			10.83	37.24	33.84	74.92	21.23	11												
Pool Max depth (ft)	12		20	33															1.98	2.331	2.21	3.21	0.366	11												
Pool Spacing (ft)	39		70	113			39		70	113			39		70	113			21.36	48.71	44.15	95.34	21.61	10												
Pattern																																				
Channel Beltwidth (ft)	24		64	64																																
Radius of Curvature (ft)	16		68	68																																
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)	74		198	198																																
Meander Width Ratio	6		16	16																																

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

Additional Reach Parameters																																				
Rosgen Classification	C4						C type						E type						E type																	
Channel Thalweg length (ft)	1811						650						642						642																	
Sinuosity (ft)	1.31						1.31						1.31						1.31																	
Water Surface Slope (Channel) (ft/ft)	0.0066						0.0066						0.0071						0.00744																	
BF slope (ft/ft)																			0.00832																	
[3]Ri% / Ru% / P% / G% / S%																			22%		66%															
[3]SC% / Sa% / G% / C% / B% / Be%																			27%	15%	48%	7%	0%	3%												
[3]d16 / d35 / d50 / d84 / d95 /																			0.09	0.123	6.556	21.42	126.1													
[2]% of Reach with Eroding Banks																			0%																	
Channel Stability or Habitat Metric																																				
Biological or Other																																				

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

Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
Upper UT to Cane Creek (Pickard) / EEP# 395 - Reach: 2 (587 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)			8.6						8.6						9.8						9.134															
Floodprone Width (ft)			150						150						150						150															
Bankfull Mean Depth (ft)			6.1						0.709						0.9						0.874															
[1]Bankfull Max Depth (ft)			0.709						1.2						1.6						1.47															
Bankfull Cross Sectional Area (ft^2)			1.2						6.1						8.8						7.988															
Width/Depth Ratio			12.12						12.12						11						10.45															
Entrenchment Ratio			17.44						17.44						15.2						17.4															
[1]Bank Height Ratio			1						1						1						0.932															
Profile																																				
Riffle Length (ft)	6		13	54			6		13	54			6		10	15			19.16	40.18	31.24	86.49	26.62	5												
Riffle Slope (ft/ft)	N/A		N/A	N/A			N/A		N/A	N/A			N/A		N/A	N/A			5E-04	0.009	0.005	0.019	0.009	5												
Pool Length (ft)							15		22	84			17		20	25			15.52	61.65	75.69	119.2	43.79	5												
Pool Max depth (ft)	15		22	84															2.16	2.53	2.48	3.055	0.381	5												
Pool Spacing (ft)	64		82	109			64		82	109			64		82	109			60	113.4	117.2	159.3	42.79	4												
Pattern																																				
Channel Beltwidth (ft)	33		44	61																																
Radius of Curvature (ft)	19		36	45																																
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)	122		144	159																																
Meander Width Ratio	14		17	19																																

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

Additional Reach Parameters																																				
Rosgen Classification	E/C5						C/E type						E type						E type																	
Channel Thalweg length (ft)	1357						570						588						588																	
Sinuosity (ft)	1.21						1.21						1.21						1.21																	
Water Surface Slope (Channel) (ft/ft)	N/A						N/A						N/A						N/A																	
BF slope (ft/ft)																			0.00437																	
[3]Ri% / Ru% / P% / G% / S%																			36%		56%															
[3]SC% / Sa% / G% / C% / B% / Be%																			5%	71%	23%	1%	0%	0%												
[3]d16 / d35 / d50 / d84 / d95 /																			0.178	0.385	0.598	5.32	16.3													
[2]% of Reach with Eroding Banks																			0%																	
Channel Stability or Habitat Metric																																				
Biological or Other																																				

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

Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
Upper UT to Cane Creek (Pickard) / EEP# 395 - Reach: 3 (531 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	15.2		17.8	18.3					15.2						14.5						17.49															
Floodprone Width (ft)	150		150	150					150						150						150															
Bankfull Mean Depth (ft)	22.2		24.4	26.3					1.73						1.7						1.646															
[1]Bankfull Max Depth (ft)	1.247		1.333	1.73					2.5						2.2						2.61															
Bankfull Cross Sectional Area (ft^2)	2		2.3	2.5					26.3						22.4						28.79															
Width/Depth Ratio	8.785		13.73	14.27					8.785						9.4						10.63															
Entrenchment Ratio	8.197		8.427	9.868					9.868						10.3						8.575															
[1]Bank Height Ratio	1		1	1					1						1						0.943															
Profile																																				
Riffle Length (ft)	5		33	136			29		96	136			10		54	144			11.38	33.07	20.6	74.1	26.88	5												
Riffle Slope (ft/ft)	0		0.003	0.011			8E-04		0.004	0.006			0		0.002	0.007			0.003	0.008	0.008	0.011	0.004	4												
Pool Length (ft)							17		37	59			4		20	35			21.25	46.9	49.39	71.31	17.92	5												
Pool Max depth (ft)	10		31	54															3	3.38	3.51	3.74	0.341	5												
Pool Spacing (ft)	58		113	180			58		113	180			58		113	180			56.31	83.63	79.47	119.3	30.87	4												
Pattern																																				
Channel Beltwidth (ft)	15		63	100																																
Radius of Curvature (ft)	23		45	72																																
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)	105		182	274																																
Meander Width Ratio	5.9		10.2	15.4																																

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

Additional Reach Parameters																																				
Rosgen Classification	E/C5						C/E type						C/E type						C/E type																	
Channel Thalweg length (ft)	2119						518						531						531																	
Sinuosity (ft)	1.27						1.27						1.27						1.27																	
Water Surface Slope (Channel) (ft/ft)	0.0031						0.0025						0.0027						0.003																	
BF slope (ft/ft)																			0.00189																	
[3]Ri% / Ru% / P% / G% / S%																			34%		48%															
[3]SC% / Sa% / G% / C% / B% / Be%																			6%	50%	39%	4%	0%	1%												
[3]d16 / d35 / d50 / d84 / d95 /																			0.259	0.476	1.35	20.8	62.81													
[2]% of Reach with Eroding Banks																			0%																	
Channel Stability or Habitat Metric																																				
Biological or Other																																				

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

Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
Upper UT to Cane Creek (Pickard) / EEP# 395 - Reach: 4 (570 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	15.2		17.8	18.3					18.3						17.6						17.99															
Floodprone Width (ft)	150		150	150					150						150						150															
Bankfull Mean Depth (ft)	22.2		24.4	26.3					1.333						1.3						1.437															
[1]Bankfull Max Depth (ft)	1.247		1.333	1.73					2.3						2.2						2.46															
Bankfull Cross Sectional Area (ft^2)	2		2.3	2.5					24.4						23.7						25.84															
Width/Depth Ratio	8.785		13.73	14.27					13.73						13.1						12.52															
Entrenchment Ratio	8.197		8.427	9.868					8.197						8.5						8.339															
[1]Bank Height Ratio	1		1	1					1						1						1.13															
Profile																																				
Riffle Length (ft)	5		33	136			7		23	97			5		37	47			3.86	23.51	17.32	55.73	20.66	8												
Riffle Slope (ft/ft)	0		0.003	0.011			0		0.003	0.006			0.004		0.006	0.015			0.002	0.012	0.011	0.029	0.009	8												
Pool Length (ft)							10		31	54			7		12	17			11.23	49.71	51.05	78.86	24.78	7												
Pool Max depth (ft)	10		31	54															2.16	2.934	3.275	3.325	0.488	7												
Pool Spacing (ft)	58		113	180			58		113	180			58		113	180			21.99	73.49	74.9	117	35.35	6												
Pattern																																				
Channel Beltwidth (ft)	15		63	100																																
Radius of Curvature (ft)	23		45	72																																
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)	105		182	274																																
Meander Width Ratio	5.9		10.2	15.4																																

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

Additional Reach Parameters																																				
Rosgen Classification	E/C5						C type						C/E type						C/E type																	
Channel Thalweg length (ft)	2119						571						570						570																	
Sinuosity (ft)	1.27						1.27						1.27						1.27																	
Water Surface Slope (Channel) (ft/ft)	0.0031						0.0037						0.039						0.00278																	
BF slope (ft/ft)																			0.00414																	
[3]Ri% / Ru% / P% / G% / S%																			34%		63%															
[3]SC% / Sa% / G% / C% / B% / Be%																			7%	25%	38%	29%	0%	1%												
[3]d16 / d35 / d50 / d84 / d95 /																			0.518	6.043	20.2	93.55	170.6													
[2]% of Reach with Eroding Banks																			0%																	
Channel Stability or Habitat Metric																																				
Biological or Other																																				

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

Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
Upper UT to Cane Creek (Pickard) / EEP# 395 - Reach: 5 (634 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	14.5		15.9	20.6					15.9						17						14.32															
Floodprone Width (ft)	150		150	150					150						150						150															
Bankfull Mean Depth (ft)	22.9		24.5	25.7					1.616						1..5						1.429															
[1]Bankfull Max Depth (ft)	1.189		1.579	1.616					2.4						2.5						2.56															
Bankfull Cross Sectional Area (ft^2)	2		2.4	2.6					25.7						25.8						20.46															
Width/Depth Ratio	9.181		9.837	17.32					9.837						11.2						10.02															
Entrenchment Ratio	7.282		9.434	10.34					9.434						8.8						10.47															
[1]Bank Height Ratio	1		1	1					1						1						1.219															
Profile																																				
Riffle Length (ft)	12		33	78			12		33	78			6		29	56			3.99	25.55	27.82	59.49	18.07	9												
Riffle Slope (ft/ft)	0		0.004	0.024			0		0.004	0.024			7E-04		0.004	0.011			4E-04	0.007	0.006	0.016	0.006	9												
Pool Length (ft)	15		28	54			15		28	54			5		14	35			15.2	35.48	33.61	56.09	13.85	9												
Pool Max depth (ft)																			3.025	3.507	3.575	4.155	0.34	9												
Pool Spacing (ft)	58		83	201			58		83	201			58		83	201			23.99	61.76	61.37	96.27	26.51	8												
Pattern																																				
Channel Beltwidth (ft)	34		82	104																																
Radius of Curvature (ft)	33		54	90																																
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)	124		156	303																																
Meander Width Ratio	7.8		9.8	19.1																																

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

Additional Reach Parameters																																				
Rosgen Classification	E/C4						C/E type						C/E type						C/E type																	
Channel Thalweg length (ft)	1194						565						634						634																	
Sinuosity (ft)	1.24						1.24						1.24						1.24																	
Water Surface Slope (Channel) (ft/ft)	0.0023						0.0023						0.0028						N/A																	
BF slope (ft/ft)																			0.00315																	
[3]Ri% / Ru% / P% / G% / S%																			41%		58%															
[3]SC% / Sa% / G% / C% / B% / Be%																			10%	34%	39%	17%	0%	0%												
[3]d16 / d35 / d50 / d84 / d95 /																			0.206	1.186	9.071	66.7	127.2													
[2]% of Reach with Eroding Banks																			0%																	
Channel Stability or Habitat Metric																																				
Biological or Other																																				

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

Appendix E. Hydrologic Data

Table 12. Verification of Bankfull Events Upper UT to Cane Creek (Pickard) / EEP# 395			
Date of Data Collection	**Date of Occurrence**	**Method**	**Photo #**
16-Nov-09	11-Nov-09	Visual observation of wrack adjacent to the stream channel and within the floodplain as the result of Tropical Storm Ida	1-2 (MY-02 Report)
17-Feb-10	5-Feb-10	Visual observations of overbank event including wrack lines and sediment deposition resulting from a 1.36 inch* rainfall event on February 5, 2010 that occurred after numerous rainfall events, within the 3 weeks prior, that totaled 3.52 inches	3-4 (MY-02 Report)
16-Jun-10	17-May-10	Visual observations of overbank event including wrack lines and sediment deposition resulting from a 4.1 inch* rainfall event on May 16-17, 2010	N/A
5-Oct-10	30-Sep-10	A 4.43 inch* rainfall event occurring between September 26-October 2, 2010	N/A

* - Reported at KBUY Weather Station in Burlington

No new bankfull events were recorded or observed in 2011.

Appendix F. Miscellaneous Data

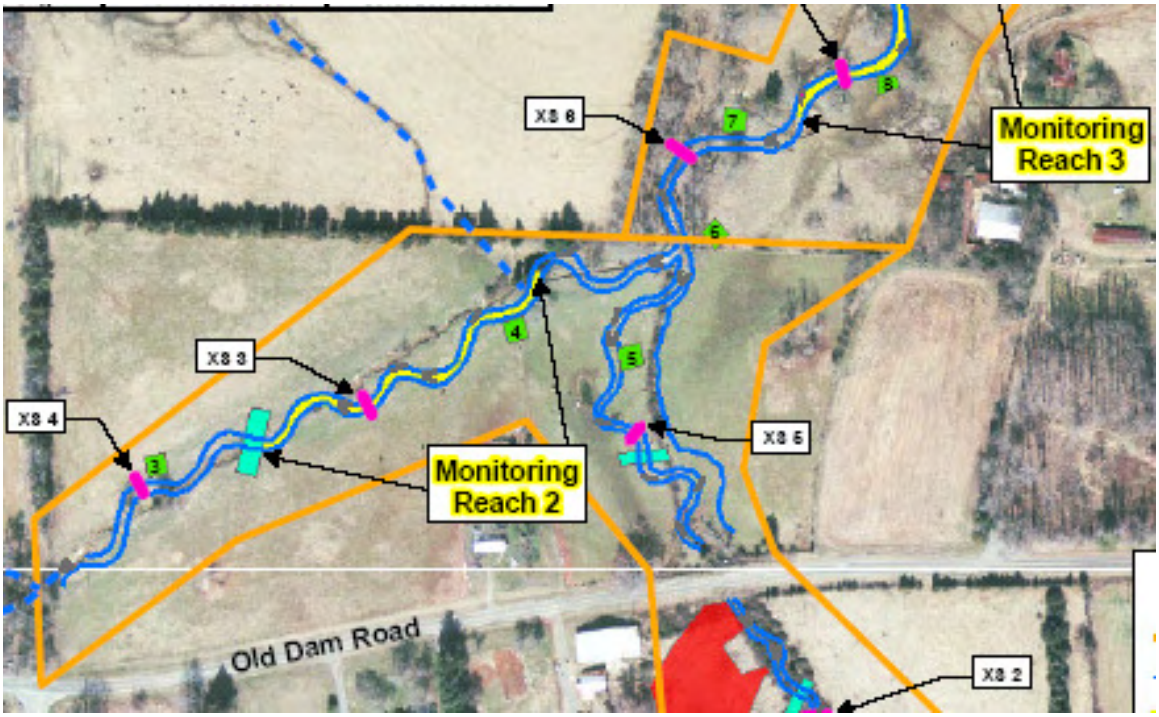
April 5, 2011

Mr. Perry Sugg
Project Manager
NCDENR Ecosystem Enhancement Program
2728 Capital Blvd. Ste. 1H-103
1652 Mail Service Center
Raleigh, North Carolina 27699-1652

RE: UT to Cane Creek (Pickard) (EEP# 395)
MY-03: Encroachment Issues

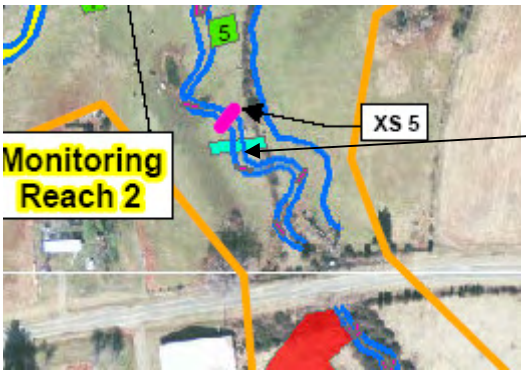
Dear Mr. Sugg,

The initial site visit was conducted for UT to Cane Creek (Pickard) Stream Restoration Project site on April 4, 2011. Several areas of encroachment were noted.



Vicinity map, from the Monitoring Plan View map from the Final Mitigation Plan

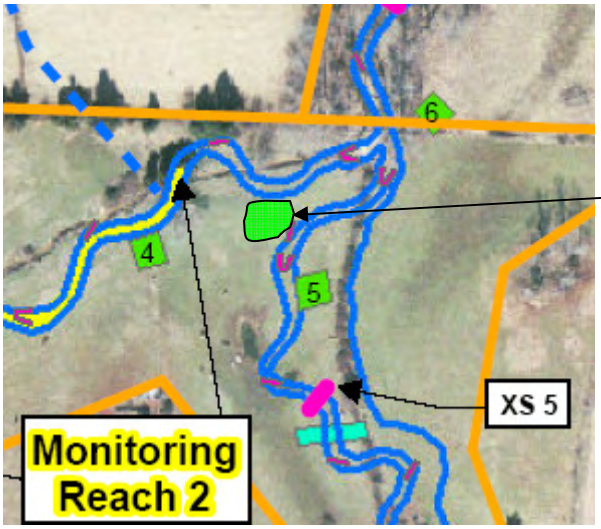
Encroachment 1: Debris blockage in stream creating backwater



Encroachment 1 – Upstream side of stream crossing

Photo taken from the stream crossing looking upstream

Encroachment 2: Corn remnants used for baiting deer



Encroachment 2 – Corn on ground for deer baiting

Encroachment 2 – Corn on ground for deer baiting

Photo taken on Left floodplain of main stream

Encroachment 3: Debris blockage in stream creating backwater

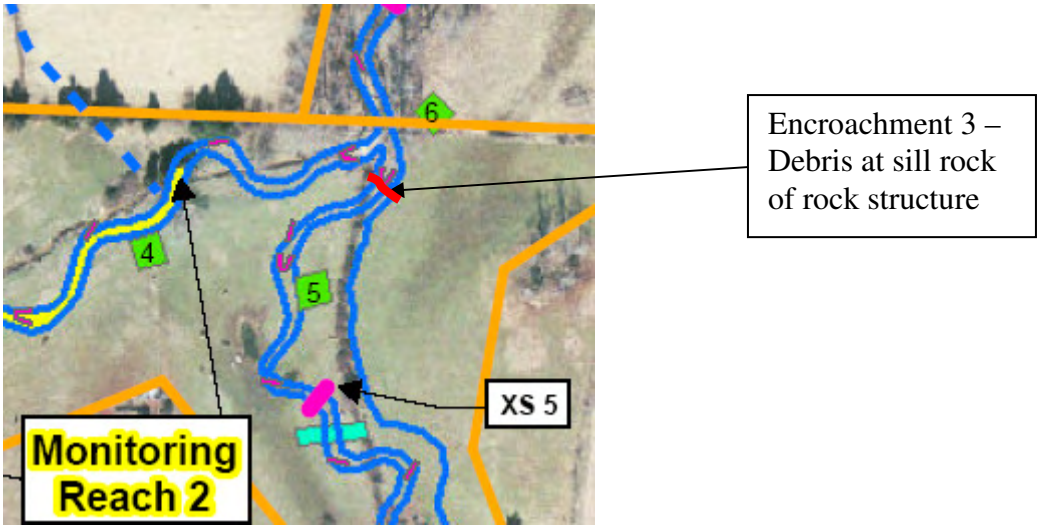


Photo taken from right bank looking upstream

Encroachment 4: Debris blockage on Tributary creating backwater effects for approximately 200 feet upstream

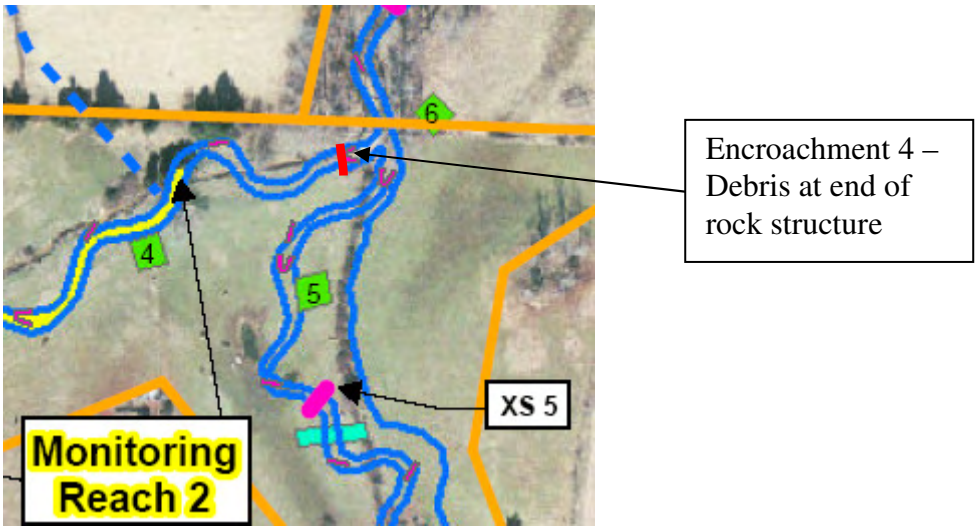
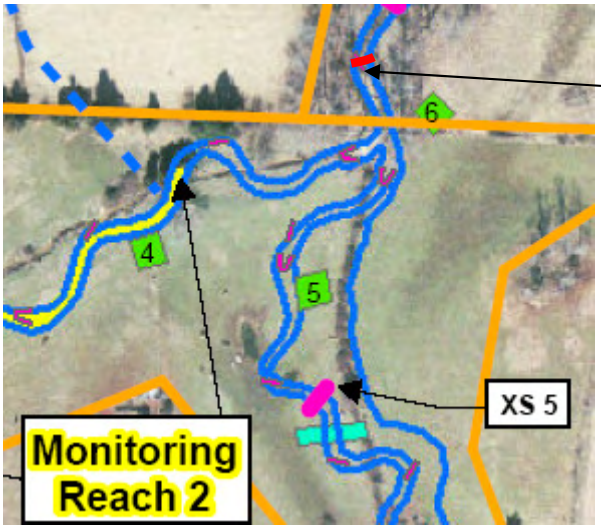


Photo taken from left bank looking upstream

Encroachment 5: Debris pile resembling the beginning of a blockage



Encroachment 5 – Debris pile

Cinder Block

Photo taken from right bank looking at the log structure (note cinder block on left bank

Encroachment 6: Fence hanging low at tributary (Reach 2) stream crossing allowing animal access

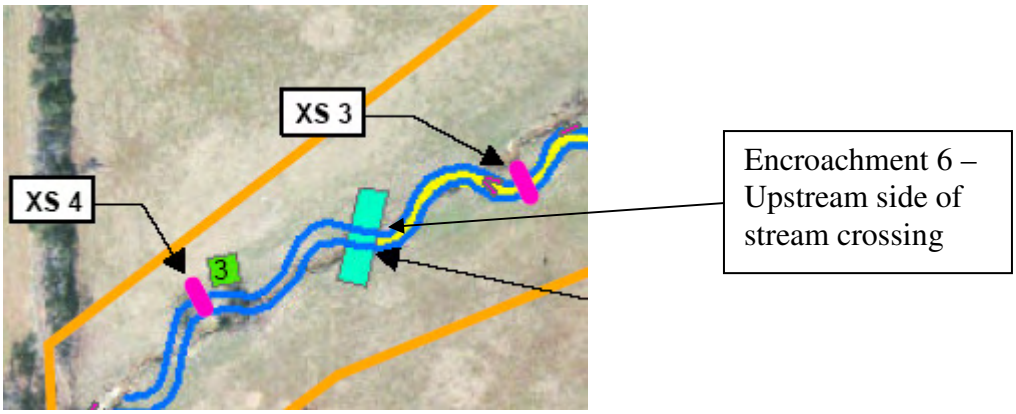


Photo taken from stream crossing looking upstream (note cattle footprints on left bank)

Encroachment 7: Fence wires hanging low in stream crossing near horse pasture, allowing animal access

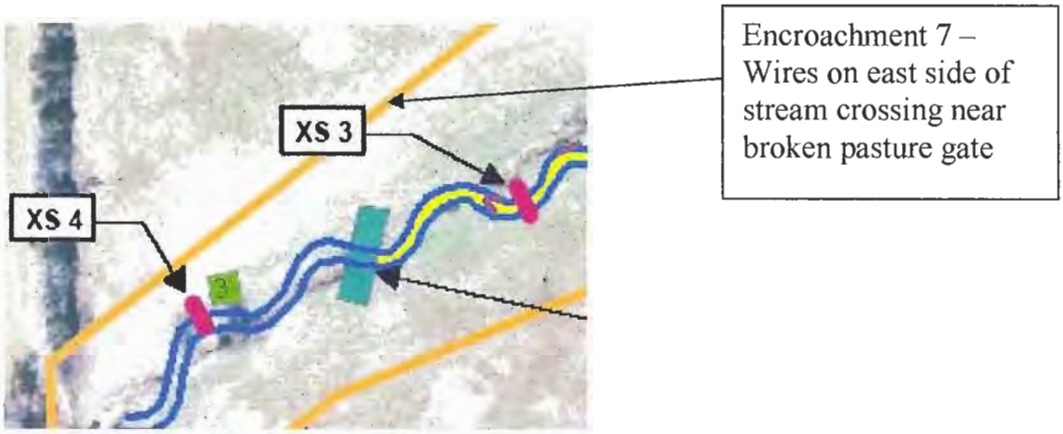


Photo taken from stream crossing looking north toward horse pasture

Please feel free to contact us with any questions or comments.
Sincerely,
Ward Consulting Engineers, P.C.

Zachary Pitts, Monitoring Specialist

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Fax: 919-870-5359