

**UT ROCKY RIVER STREAM RESTORATION – NCEEP Project #402**  
2010 FINAL MONITORING REPORT – YEAR 4

CONDUCTED FOR THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT  
AND NATURAL RESOURCES



Submitted on December 20, 2010 to:



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Environment and Natural Resources  
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## 1.0 Executive Summary

The goals of the UT Rocky River Stream Restoration Project are to:

- Improve water quality and reduce erosion through restricting cattle access and improved riparian buffers;
- Improve aquatic habitat using natural material stabilization structures; and
- Provide aesthetic value, wildlife habitat, and bank stability through restoration/enhancement of the riparian zone.

The objectives for this restoration are to:

- Exclude cattle from Reach 1;
- Enhance approximately 150 feet of Reach 1 and stabilize an additional 955 feet of the same reach;
- Reconnect Reach 2 to its floodplain;
- Provide a stable channel for both reaches in terms of pattern, profile, and dimension; and
- Provide a conservation easement and enhance/restore portions of the buffer for both reaches.

The average live planted woody stem density (512 live stems per acre) has exceeded the vegetation success criteria (288 live stems per acre in Year 4) by 77 percent, although vegetation survival in the two vegetation plots in Reach 1 do not met the success criteria. Invasive exotics were treated throughout the conservation easement in the summer of 2010 and will be treated in 2011.

Overall, the restoration project appears to have met morphological goals. The enhanced sections of Reach 1 are stable. Flowing water was present in the Reach 2 channel during the initial 2010 assessment conducted, but there was no flow during the August and October 2010 site visits. As can be seen in the cross-section and stream problem area photos, some herbaceous and woody species have established themselves in the channel throughout Reach 2. The lack of flow during the summer and fall assessments in 2010 corresponds with similar findings in 2007 through 2009. The overgrown channel hampered visual assessment, but overall the channel appears to be stable. Aggradation associated with the downstream-most cross-vane is still present.

Summary information/data related to the occurrence of items such as beaver or encroachment and statistics related to performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the mitigation and restoration plan documents available on EEP's website. All raw data supporting the tables and figures in the appendices is available from EEP upon request.



## **2.0 Methodology**

Monitoring methodologies follow the current EEP-provided templates and guidelines (Lee *et al* 2006). Photographs were taken digitally. A Trimble Geo XT handheld mapping-grade unit was used to collect cross section, vegetation corner, photopoint, and problem area locations. All problem areas identified on the spring 2010 versions of the CCPV were re-evaluated.

### **2.1 Stream Methodology**

Methods employed were a combination of those specified in the Mitigation Plan, the First Annual Monitoring Report, and standard regulatory guidance and procedures documents. Stream monitoring data was collected using the techniques described in USACE *Stream Mitigation Guidelines*, US Forest Service's *Stream Channel Reference Sites*, and *Applied River Morphology* (USACE, 2003; Harrelson et al., 1994; Rosgen, 1996). A South Total Station and Nikon automatic level were used for collecting all geomorphic data. Photographs facing upstream were taken at each cross section.

### **2.2 Vegetation Methodology**

A total of six representative vegetation survey plots were selected and installed in the Reaches 1 and 2 by Ward Engineering in 2007. All plots measure 100 square meters in area and are five meters by 20 meters. Pursuant to the guidelines, the four corners of each plot (0,0; 0,20; 5,0; and 5,20.) are marked with metal pipe.

Level 1 (planted woody stems) and Level 2 (volunteer woody stems) data collection was performed in all plots, pursuant to the most recent CVS/EEP protocol (Lee *et al* 2006). Within each plot, each planted woody stem location (x and y) was recorded, and height and live stem diameter were recorded for each stem location. All planted stems were identified with pink flagging. Vegetation was identified using Weakley (Weakley 2007). Photos were taken of each vegetation plot from the 0,0 corner.

### 3.0 References

- Harrelson, Cheryl, C. L. Rawlins, and John Potpondy. (1994). *Stream Channel Reference Sites: An Illustrated Guide to Field Technique*. USDA, Forest Service. General Technical Report RM-245.
- Lee, Michael T., Peet, Robert K., Roberts, Steven D., Wentworth, Thomas R. (2006). *CVS-EEP Protocol for Recording Vegetation Version 4.0*. Retrieved October 30, 2006, from: <http://www.nceep.net/business/monitoring/veg/datasheets.htm>.
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- USACOE (2003) *Stream Mitigation Guidelines*. USACOE, USEPA, NCWRC, NCDENR-DWQ
- Ward Consulting Engineering (2007). *UT to Rocky River (Smith Tract) Stream and Buffer Restoration, Enhancement, and Preservation, Chatham County, North Carolina Mitigation Report*. March 20, 2007.
- Ward Consulting Engineering (2008). *UT to Rocky River (Smith Tract) Stream and Buffer Restoration, Enhancement, and Preservation, Chatham County, North Carolina Final Monitoring Report*. February 15, 2008.
- Weakley, Alan (2007). *Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas*. Retrieved March 27, 2007 from: <http://www.herbarium.unc.edu/flora.htm>.

## **Appendix A. Project Vicinity Map and Background Tables**

Figure 1.0.	Project Vicinity Map and Directions
Table 1.0-1.1	Project Restoration Components
Table 2.0	Project Activity and Reporting History
Table 3.0	Project Contacts Table
Table 4.0	Project Attribute Table

# UT Rocky River Stream Restoration (EEP Project #402)

Appendix A. Figure 1. Vicinity Map.

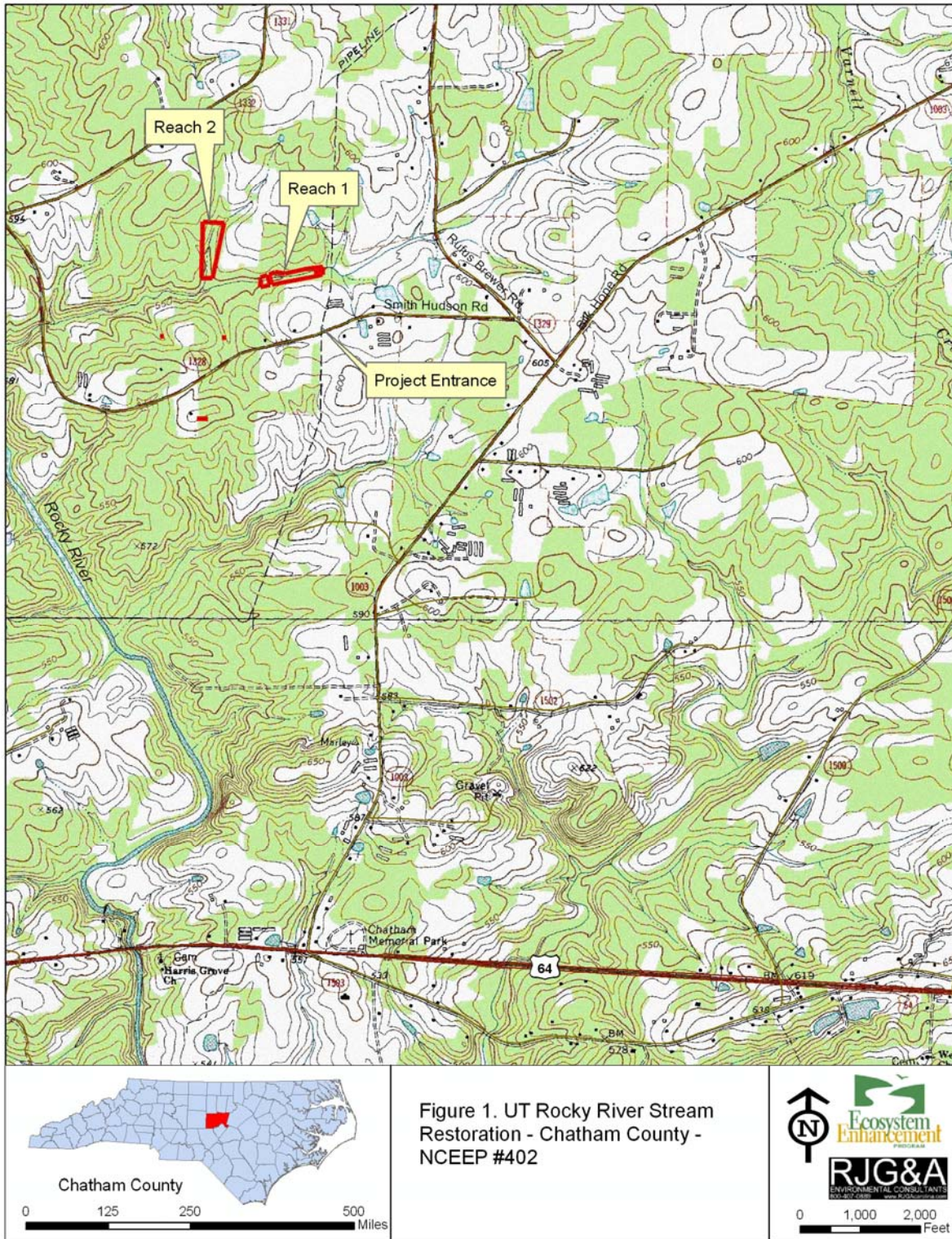


Table 1.0. Project Components UT to Rocky River Stream Restoration – EEP Project #402									
Project Component or Reach ID	Existing Feet/Acres	Restoration Level	Approach	Footage or Acreage	Stationing	Mitigation Ratio	Mitigation Units	BMP Elements <sup>1</sup>	Comment
Reach I	827	EII	SS	827 LF	00+00-00+47; 00+107-08+87	2.5:1	331		Bank stabilization, fence out cattle
Reach i	U	EI	P1	168 LF	08+87-9+10; 9+50-10+95	1.5:1	112		Relocation of channel, improve cattle crossing, re-establish pattern and dimension
Reach 2	U	R	P1	1,111 LF	00+00 - 11+11	1:1	1,111		Reconnect to floodplain, adjust pattern, profile, and dimension, install structures and vegetation

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 1.1. Component Summations						
UT to Rocky River Stream Restoration – EEP Project #402						
Restoration	Stream	Riparian		Non-Ripar	Upland	Buffer
Level	(lf)	Wetland (Ac)		(Ac)	(Ac)	(Ac)
		Riverine	Non-Riverine			
Restoration	1111					
Enhancement						
Enhancement I	168					
Enhancement II	827					
Creation						
Preservation						
HQ Preservation						
<b>Totals (Feet/Acres)</b>	<b>2106</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>MU Totals</b>	<b>1554</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Non-Applicable



<b>Table 2. Project Activity and Reporting History</b> <b>UT to Rocky River Stream Restoration – EEP Project #402</b>		
<b>Elapsed Time Since Grading Complete: 4 yrs 0 months</b> <b>Elapsed Time Since Planting Complete: 3 yrs 10 Months</b> <b>Number of Reporting Years<sup>1</sup>: 4</b>		
<b>Activity or Deliverable</b>	<b>Data Collection Complete</b>	<b>Completion or Delivery</b>
Restoration Plan	2003	Apr-05
Final Design – 90%	NA	--
Construction	NA	Oct-06
Temporary S&E mix applied	NA	July 2006 (R1); Sept 2006 (R2)
Permanent seed mix applied	NA	July 2006 (R1); Sept 2006 (R2)
Bare Root Planting	NA	Dec-06
Mitigation Plan/As-built	--	Mar-07
Year 1 Monitoring		Dec-07
Qualitative Evaluation	Nov-07	
Vegetation	Nov-10	
Geomorphologic	Nov-07	
Year 2 Monitoring		Nov-08
Qualitative Evaluation	Oct-08	
Vegetation	Oct-08	
Geomorphologic	Oct-08	
Year 3 Monitoring		Nov-09
Qualitative Evaluation	Oct-09	
Vegetation	Oct-09	
Geomorphologic	Oct-09	
Year 4 Monitoring		Oct-10
Qualitative Evaluation	Oct-10	
Vegetation	Aug-10	
Geomorphologic	Aug-10	

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

Appendix A.

<b>Table 3. Project Contacts Table</b> <b>UT to Rocky River Stream Restoration – EEP Project #402</b>	
<b>Designer</b>  Primary project design POC	Ward Consulting Engineers 8386 Six Forks Road, Suite 101 Raleigh, NC 27615-5088 Becky Ward (919) 870-0526
<b>Construction Contractor</b>  Construction contractor POC	McQueen Construction 619 Patrick Road Bahama, NC 27503 Harvey McQueen (919) 697-0614
<b>Survey Contractor</b>  Survey contractor POC	NA  NA
<b>Planting Contractor</b>  Planting contractor POC	Southern Garden Inc. P.O. Box 808 Apex, NC 27502 NA (919) 362-1050
<b>Seeding Contractor</b>  Contractor point of contact	McQueen Construction 619 Patrick Road Bahama, NC 27503 Harvey McQueen (919) 697-0614
<b>Seed Mix Sources</b>	Evergreen Seed (919) 567-1333
<b>Nursery Stock Suppliers</b>	Coastal Plain Conserv. Nursery, Inc. (Edenton, NC) Ellen Colodney (252) 482-5707 Cure Nursery (Pittsboro, NC) Bill and Jennifer Cure (919) 542-6186 Brook Run Nursery (Blackstone, VA) Howard Malinski (919) 422-8727
<b>Monitoring Performers</b>  Stream Monitoring POC Vegetation Monitoring POC Wetland Monitoring POC	Robert J. Goldstein & Associates 1221 Corporation Parkway, Raleigh NC 27610 Sean Doig, (919) 872-1174 Sean Doig, (919) 872-1174 NA

<b>Table 4. Project Attribute Table</b>		
<b>UT to Rocky River Stream Restoration – EEP Project #402</b>		
Project County	Chatham	
Physiographic Region	Piedmont	
Ecoregion	45c Carolina Slate Belt	
Project River Basin	Cape Fear	
USGS HUC for Project (14 digit)	3030003070020	
NCDWQ Sub-basin for Project	03-06-12	
Within extent of EEP Watershed Plan?	No	
WRC Hab Class (Warm, Cool, Cold)	Warm	
% of project easement fenced or demarcated	100%	
Beaver activity observed during design phase?	NA	
<b>Restoration Component Attribute Table</b>		
	Reach 1	Reach 2
Drainage area	1.28	0.21
Stream order	Second	Second
Restored length (feet)	1095	1111
Perennial or Intermittent	Perennial	Intermittent
Watershed type (Rural, Urban, Developing etc.)	Rural	Rural
Watershed LULC Distribution (e.g.)	-	-
Residential	-	-
Ag-Row Crop	-	-
Ag-Livestock	-	-
Forested	-	-
Etc.	-	-
Watershed impervious cover (%)	2%	1%
NCDWQ AU/Index number	17-43-9	17-43-9
NCDWQ classification	C	C
303d listed?	No	No
Upstream of a 303d listed segment?	No	No
Reasons for 303d listing or stressor	NA	NA
Total acreage of easement	5.68	3.42
Total vegetated acreage within the easement	-	-
Total planted acreage as part of the restoration	-	-
Rosgen classification of pre-existing	C4/E4	G4
Rosgen classification of As-built <sup>1</sup>	C4/E4	C4
Valley type	-	-
Valley slope	0.012	0.012
Valley side slope range (e.g. 2-3.%)	-	-
Valley toe slope range (e.g. 2-3.%)	-	-
Cowardin classification	NA	NA
Trout waters designation	No	No
Species of concern, endangered etc.? (Y/N)	No	No

Appendix A.

<b>Table 4. Project Attribute Table</b> <b>UT to Rocky River Stream Restoration – EEP Project #402</b>		
Dominant soil series and characteristics	Cid-Lignum Complex 2-6% slopes	Nanford-Badin Complex, 2-6% slopes
Series	Cid-Nanford-Lignum	Cid-Nanford-Lignum
Depth	0-80	0-80
Clay%	10-55%	2-35%
K	.24-.55	.43-.64
T	2-4	4

## **Appendix B. Visual Assessment Data**

Figure 2.0.-2.1	Current Conditions Plan View
Table 5.0-5.1	Visual Morphological Stability Assessment
Table 6.0	Vegetation Condition Assessment Table
e-Table	Stream Problem Areas Inventory Table
e-Table	Vegetation Problem Areas Inventory Table
Figure 3.0-3.4	Stream Station Photos
e-Photos	Stream Problem Area Photos
Figures 4.0-4.1	Vegetation Monitoring Plot Photos
e-Photos	Vegetation Problem Area Photos



Reach 1	Northing	Easting
Cross-section end point		
1A	733824.106	1876704.110
1B	733887.867	1876667.219
Vegetation plot (0,0) corners		
1	733921.773	1877367.424
2	733786.687	1876587.837



Figure 2.0. Current Conditions Plan View. Rocky River (Reach 1) - 2010. Chatham County. NCEEP Project #402

- As-built Thalweg
- Thalweg Monitoring Year 4 (8/20/2010)
- Vegetation Problem Areas
  - Low Planted Stem Density
  - Invasive species (*Ailanthus altissima*)
- As-Built Data (Supplied by Ward Engineering)
  - Conservation Easement
  - Cross Vane
  - Top of Bank
  - Cross-Section
  - Vegetation Monitoring Plot
- Photopoints
- Crest Gauge

0 100 200 Feet



Reach 2	Northing	Easting
Cross-section end point		
1A	734770.682	1875860.234
1B	734765.676	1875825.748
2A	734621.348	1875826.406
2B	734610.913	1875782.013
3A	734295.488	1875723.921
3B	734325.640	1875679.006
4A	734172.300	1875721.546
4B	734182.082	1875674.445
5A	734030.805	1875695.028
5B	734052.832	1875648.378
Vegetation plot (0,0) corners		
3	734674.043	1875847.255
4	734474.961	1875761.754
5	734193.568	1875718.263
6	734019.034	1875676.278

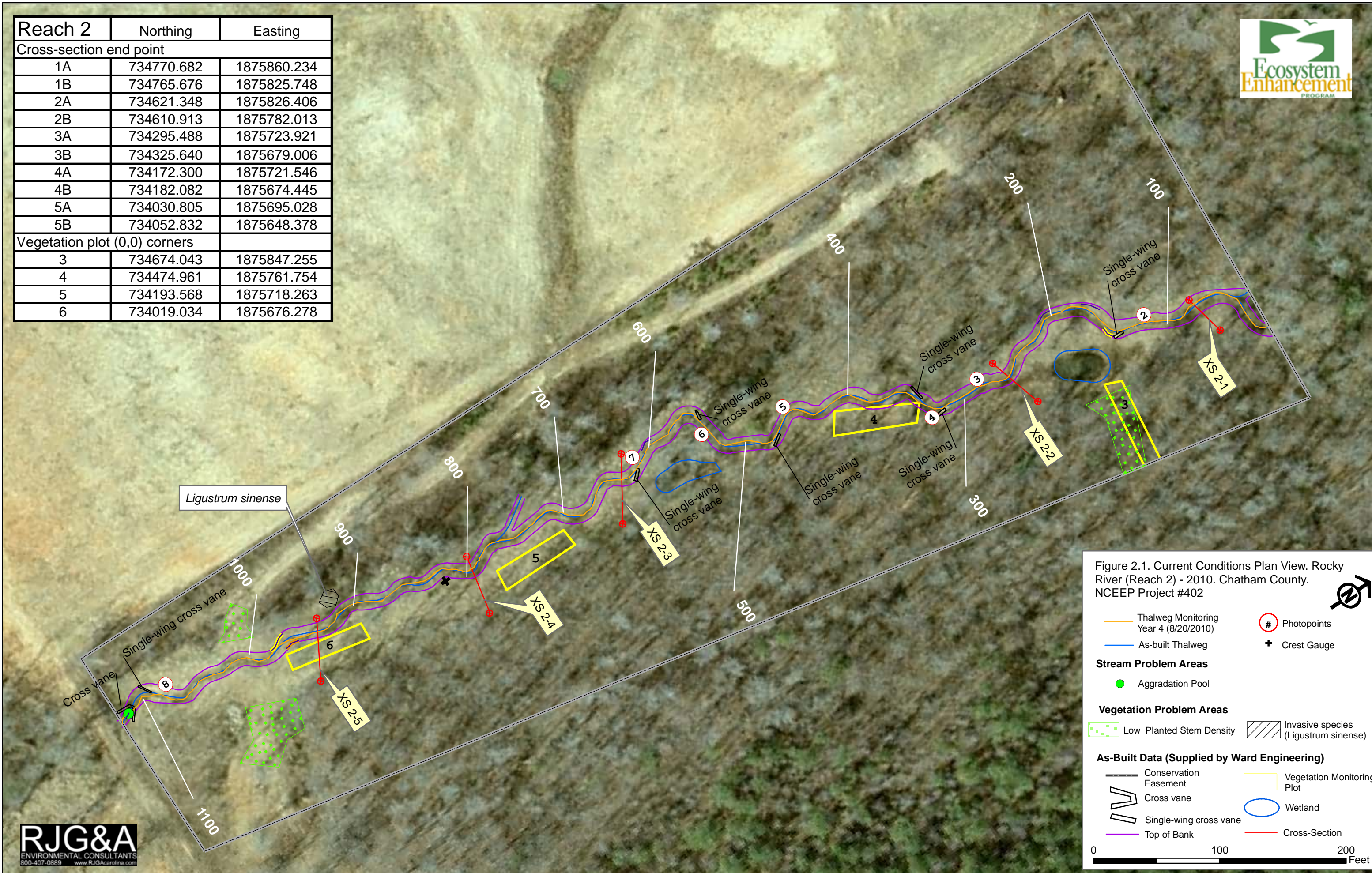


Figure 2.1. Current Conditions Plan View. Rocky River (Reach 2) - 2010. Chatham County. NCEEP Project #402

- Thalweg Monitoring Year 4 (8/20/2010)
- As-built Thalweg
- Photopoints
- Crest Gauge

**Stream Problem Areas**

- Aggradation Pool

**Vegetation Problem Areas**

- Low Planted Stem Density
- Invasive species (*Ligustrum sinense*)

**As-Built Data (Supplied by Ward Engineering)**

- Conservation Easement
- Cross vane
- Single-wing cross vane
- Top of Bank
- Vegetation Monitoring Plot
- Wetland
- Cross-Section

0 100 200 Feet



Table 5.0 **Visual Stream Morphology Stability Assessment**  
 Reach ID **Reach 1**  
 Assessed Length **1095 (reconstructed channel sta 8+87 to 10+95)**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. <u>Degradation</u> - Evidence of downcutting			3	20	90%			
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	4	4			100%			
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	3	3			100%			
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	3	3			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	3	3			100%			
		2. Thalweg centering at downstream of meander (Glide)	3	3			100%			
	<b>Totals</b>					0	0			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does <u>NOT</u> include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	1	1			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	1	1			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	1	1			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	1	1			100%			

Table 5.1 **Visual Stream Morphology Stability Assessment\***  
 Reach ID **Reach 2**  
 Assessed Length **1111**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	1. <u>Aggradation</u> - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			2	12	99%			
		2. <u>Degradation</u> - Evidence of downcutting			1	6	99%			
	2. Riffle Condition	1. <u>Texture/Substrate</u> - Riffle maintains coarser substrate	41	41		100%				
	3. Meander Pool Condition	1. <u>Depth</u> Sufficient (Max Pool Depth : Mean Bankfull Depth $\geq$ 1.6)	34	42		81%				
		2. <u>Length</u> appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle)	33	42		79%				
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	38	42		90%				
		2. Thalweg centering at downstream of meander (Glide)	37	42	88%					
	<b>Totals</b>					0	0			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			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.	8	8			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	8	8			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does <u>not</u> exceed 15%. (See guidance for this table in EEP monitoring guidance document)	8	8			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio $\geq$ 1.6 Rootwads/logs providing some cover at base-flow.	6	8			75%			

\* Low flow in channel has allowed herbaceous material to become established over the course of the year, making visual assessment difficult.

**Table 6** Vegetation Condition Assessment  
**Planted Acreage<sup>1</sup>** **3.4**

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	NA	0	0.00	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.01 acres	Lime Green Stippling	4	0.87	25.6%
<b>Total</b>				4	0.87	25.6%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	NA	0	0.00	0.0%
<b>Cumulative Total</b>				4	0.87	25.6%

**Easement Acreage<sup>2</sup>** **9.1**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern <sup>4</sup>	Areas or points (if too small to render as polygons at map scale).	0.02 acres	Black cross-hatch	2	0.02	0.2%
5. Easement Encroachment Areas <sup>3</sup>	Areas or points (if too small to render as polygons at map scale).	none	NA	0	0.00	0.0%

<sup>1</sup> = 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.

<sup>2</sup> = The acreage within the easement boundaries.

<sup>3</sup> = 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.

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



Stream Problem Areas (electronic submission only)			
UT to Rocky River Stream Restoration - EEP Project #402			
Feature Issue	Station Numbers	Suspected Cause	Photo #
Reach 1. No stream problems identified.			
Reach 2.			
Aggradation/bar formation	1100-1105	Undersized culvert at bottom of restoration	SP1-2

SP1. Aggradation/bar formation downstream of last cross vane at Station 1096. Looking downstream.



SP2. Aggradation/bar formation downstream of last cross vane at Station 1096. Looking upstream.





Stream Problem Areas (electronic submission only)			
UT to Rocky River Stream Restoration - EEP Project #402			
Feature Category	Station Numbers	Probable Cause	Photo #
<b>Reach 1.</b>			
<i>Ailanthus altissima</i> resprouts	approx. station 350	Parent tree just outside conservation easement	VP1
Low planted stem density	entire reach	Mature overstory; competition from <i>Microstegium</i>	VP2
<b>Reach 2.</b>			
<i>Ligustrum sinense</i>	920	2010 invasive treatment did not completely eradicate larger stems	VP3
Low planted stem	160-200	mature overstory; compacted	--
Low planted stem	985-1025	compacted soils; competition	--

VP1. *Ailanthus altissima* resprouts.





VP2. Low planted stem density along Reach 1.



VP3. *Ligustrum sinense* that survived 2010 invasive species treatment





**Appendix B. Figure 3.0. Stream Station Photos**

Photopoint 1-Reach 1-Station 1095



11/14/2007



3/17/2010

Photopoint 2-Reach 2-Station 110



11/14/2007



3/17/2010



**Appendix B. Figure 3.1. Stream Station Photos**

Photopoint 3-Reach 2-Station 285



11/14/2007



3/17/2010

Photopoint 4-Reach 2-Station 325



11/14/2007



3/17/2010



Appendix B. Figure 3.2. Stream Station Photos

Photopoint 5-Reach 2-Station 450



11/14/2007



3/17/2010

Photopoint 6-Reach 2-Station 535



11/14/2007



3/17/2010



Appendix B. Figure 3.3. Stream Station Photos

Photopoint 7-Reach 2-Station 610



11/14/2007



3/17/2010

Photopoint 8-Reach 2-Station 1070



11/14/2007



3/17/2010



Appendix B. Figure 4.0. Vegetation Monitoring Plot Photos

Veg Plot 1-Reach 1-Station 1070



10/29/2007



8/27/2010

Veg Plot 2-Reach 1-Station 240



10/29/2007



8/27/2010



Appendix B. Figure 4.1. Vegetation Monitoring Plot Photos

Veg Plot 3-Reach 2-Station 180



11/16/2007



8/27/2010

Veg Plot 4-Reach 2-Station 425



10/29/2007



8/27/2010



Appendix B. Figure 4.2. Vegetation Monitoring Plot Photos

Veg Plot 5-Reach 2-Station 770



10/30/2007



8/27/2010

Veg Plot 6-Reach 2-Station 960



10/30/2007



8/27/2010

## **Appendix C. Vegetation Plot Data**

Table 7.0	Vegetation Plot Mitigation Success Summary Table
Table 8.0	Vegetation Metadata
Table 9.0	Stem Count Total and Planted by Plot and Species
e-Tables	Raw CVS vegetation data sheets

Appendix C

<p align="center"><b>Table 7. Vegetation Plot Criteria Attainment</b>  <b>UT to Rocky River Stream Restoration - EEP Project #402</b></p>			
Tract	Vegetation Plot ID	Vegetation Survival Threshold Met	Tract Mean
Reach 1	1	N	0%
	2	N	
Reach 2	3	Y	100%
	4	Y	
	5	Y	
	6	Y	

<b>Table 8. Vegetation Metadata</b> <b>UT to Rocky River Stream Restoration - EEP Project #402</b>	
<b>Report Prepared By</b>	sean doig
<b>Date Prepared</b>	9/1/2010 12:02
<b>database name</b>	402UT_RockyRiver.mdb
<b>database location</b>	C:\Documents and Settings\Owner\Desktop\EEP2010
<b>computer name</b>	GATELAP
<b>file size</b>	27389952

**DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT-----**

<b>Metadata</b>	Description of database file, the report worksheets, and a summary of project(s) and project data.
<b>Proj, planted</b>	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
<b>Proj, total stems</b>	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.
<b>Plots</b>	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
<b>Vigor</b>	Frequency distribution of vigor classes for stems for all plots.
<b>Vigor by Spp</b>	Frequency distribution of vigor classes listed by species.
<b>Damage</b>	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
<b>Damage by Spp</b>	Damage values tallied by type for each species.
<b>Damage by Plot</b>	Damage values tallied by type for each plot.
<b>Planted Stems by Plot and Spp</b>	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
<b>ALL Stems by Plot and spp</b>	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-----**

<b>Project Code</b>	402
<b>project Name</b>	UT to Rocky River (Smith Tract)
<b>Description</b>	stream restoration, enhancement, and preservation
<b>River Basin</b>	Cape Fear
<b>length(ft)</b>	R1: 1,095; R2: 1,111
<b>stream-to-edge width (ft)</b>	R1: 25'-64'; R2: 1'-125'
<b>area (sq m)</b>	R1: 3,830; R2: 4,660
<b>Required Plots (calculated)</b>	6
<b>Sampled Plots</b>	6

Table 9. Planted and Total Stem Counts. UT to Rocky River  
Stream Restoration - EEP Project #402

Current Plot Data (MY4 2010)

Scientific Name	Common Name	Species Type	Plot 1			Plot 2			Plot 3			Plot 4			Plot 5			Plot 6			MY4 (2010)			MY3 (2009)			
			P w/o LS	P-all	T	P w/o LS	P-all	T	P w/o LS	P-all	T	P w/o LS	P-all	T	P w/o LS	P-all	T	P w/o LS	P-all	T	P w/o LS	P-all	T	P w/o LS	P-all	T	
<i>Acer rubrum</i>	red maple	Tree									1		8			1						10			21		
<i>Albizia julibrissin</i>	silktree	Shrub Tree																									
<i>Alnus serrulata</i>	hazel alder	Shrub Tree										1	1	1				3	3	3	4	4	4	4	4	4	
<i>Betula nigra</i>	river birch	Tree										3	3	3	5	5	5				8	8	8	9	9	9	
<i>Carpinus caroliniana</i>	American hornbeam	Shrub Tree																									
<i>Carya</i>	hickory	Tree									7						1						8		3		
<i>Carya alba</i>	mockernut hickory	Tree																									
<i>Carya cordiformis</i>	bitternut hickory	Tree				1	1	1	2	2	2							3	3	4	6	6	7	3	3	3	
<i>Carya glabra</i>	pignut hickory	Tree																									
<i>Carya ovata</i>	shagbark hickory	Tree						1															1		2		
<i>Celtis laevigata</i>	sugarberry	Shrub Tree	1	1	1	1	1	2				3	3	3							5	5	6	4	4	4	
<i>Cercis canadensis</i>	eastern redbud	Shrub Tree			8																		8		7		
<i>Elaeagnus umbellata</i>	autumn olive	Shrub																							4		
<i>Fraxinus americana</i>	white ash	Tree						1																1			
<i>Fraxinus pennsylvanica</i>	green ash	Tree	3	3	3	1	1	1				3	3	3	5	5	5	1	1	2	13	13	14	13	13	15	
<i>Gleditsia triacanthos</i>	honeylocust	Shrub Tree			1			2																3		1	
<i>Ilex opaca</i>	American holly	Shrub Tree									1													1		1	
<i>Ilex verticillata</i>	common winterberry	Shrub Tree																2	2	2	2	2	2	4	4	4	
<i>Juglans nigra</i>	black walnut	Tree			4			1																5			
<i>Juniperus virginiana</i>	eastern redcedar	Tree						9																10		4	
<i>Ligustrum sinense</i>	Chinese privet	Shrub Tree									1												6		7	10	
<i>Lindera benzoin</i>	northern spicebush	Shrub Tree	1	1	1							1	1	2				2	2	2	4	4	5	3	3	3	
<i>Liquidambar styraciflua</i>	sweetgum	Tree			5																				165	131	
<i>Liriodendron tulipifera</i>	tuliptree	Tree						1	1	1	6	1	1	17	1	1	4			2	3	3	30	4	4	27	
<i>Morus</i>	mulberry	Shrub Tree																									
<i>Nyssa sylvatica</i>	blackgum	Tree							2	2	4										2	2	4	1	1	2	
<i>Pinus taeda</i>	loblolly pine	Tree			2						1			7			1								11	5	
<i>Platanus occidentalis</i>	American sycamore	Tree													2	2	2	1	1	1	3	3	3	3	3	3	
<i>Prunus serotina</i>	black cherry	Shrub Tree			1																			2		3	1
<i>Quercus alba</i>	white oak	Tree							5	5	5										5	5	5	4	4	4	
<i>Quercus coccinea</i>	scarlet oak	Tree																								1	
<i>Quercus pagoda</i>	cherrybark oak	Tree													2	2	2				2	2	2	2	2	2	
<i>Quercus phellos</i>	willow oak	Tree	1	1	1										3	3	3	1	1	1	5	5	5	5	5	5	
<i>Quercus rubra</i>	northern red oak	Tree			1						2														3		
<i>Quercus velutina</i>	black oak	Tree										2	2	2							2	2	2	2	2	2	
<i>Rhus copallinum</i>	flameleaf sumac	Shrub Tree																								1	
<i>Rosa multiflora</i>	multiflora rose	Shrub Vine																								1	
<i>Sambucus canadensis</i>	Common Elderberry	Shrub Tree											1	1						5	5			6	6	6	
<i>Ulmus</i>	elm	Tree									4			4											8	23	
<i>Ulmus alata</i>	winged elm	Tree			2			4																6		1	
<i>Ulmus americana</i>	American elm	Tree										3	3	4	1	1	1	2	2	2	6	6	7	7	7	7	
Unknown		unknown																								3	
<i>Viburnum nudum</i>	possumhaw	Shrub Tree																								1	
<b>Stem count</b>			6	6	30	3	3	23	10	10	57	17	18	129	19	19	60	15	20	61	70	76	360	68	74	321	
<b>size (ares)</b>			1			1			1			1			1			1			6			6			
<b>size (ACRES)</b>			0.0247			0.0247			0.0247			0.0247			0.0247			0.0247			0.15			0.15			
<b>Species count</b>			4	4	12	3	3	10	4	4	12	8	9	14	7	7	11	8	9	13	15	16	32	15	16	35	
<b>Stems per ACRE</b>			242.81	242.81	1214.1	121.41	121.41	930.78	404.69	404.69	2306.7	687.97	728.43	5220.4	768.9	768.9	2428.1	607.03	809.37	2468.6	472.13	512.6	2428.1	458.64	499.11	2165.1	



Table 9. Planted and Total Stem Counts. UT to Rocky River  
Stream Restoration - EEP Project #402

Annual Means

Scientific Name	Common Name	Species Type	MY2 (2008)			MY1 (2007)			MY0 (2006)		
			P w/o LS	P-all	T	P w/o LS	P-all	T	P w/o LS	P-all	T
<i>Acer rubrum</i>	red maple	Tree						74			
<i>Albizia julibrissin</i>	silktree	Shrub Tree						2			
<i>Alnus serrulata</i>	hazel alder	Shrub Tree	4	4	4	7	7	7	9	9	9
<i>Betula nigra</i>	river birch	Tree	9	9	9	11	11	110	12	12	12
<i>Carpinus caroliniana</i>	American hornbeam	Shrub Tree							6	6	6
<i>Carya</i>	hickory	Tree									
<i>Carya alba</i>	mockernut hickory	Tree						2			
<i>Carya cordiformis</i>	bitternut hickory	Tree	7	7	7	23	23	24	28	28	28
<i>Carya glabra</i>	pignut hickory	Tree						4			
<i>Carya ovata</i>	shagbark hickory	Tree									
<i>Celtis laevigata</i>	sugarberry	Shrub Tree	7	7	7	9	9	10	5	5	5
<i>Cercis canadensis</i>	eastern redbud	Shrub Tree						8			
<i>Elaeagnus umbellata</i>	autumn olive	Shrub									
<i>Fraxinus americana</i>	white ash	Tree									
<i>Fraxinus pennsylvanica</i>	green ash	Tree	14	14	14	17	17	18	16	16	16
<i>Gleditsia triacanthos</i>	honeylocust	Shrub Tree									
<i>Ilex opaca</i>	American holly	Shrub Tree						2			
<i>Ilex verticillata</i>	common winterberry	Shrub Tree	4	4	4	5	5	5	6	6	6
<i>Juglans nigra</i>	black walnut	Tree						4			
<i>Juniperus virginiana</i>	eastern redcedar	Tree									
<i>Ligustrum sinense</i>	Chinese privet	Shrub Tree						8			
<i>Lindera benzoin</i>	northern spicebush	Shrub Tree	5	5	5	6	6	6	8	8	8
<i>Liquidambar styraciflua</i>	sweetgum	Tree						58			
<i>Liriodendron tulipifera</i>	tuliptree	Tree	2	2	2	8	8	30	15	15	15
<i>Morus</i>	mulberry	Shrub Tree						2			
<i>Nyssa sylvatica</i>	blackgum	Tree	2	2	2	6	6	6	6	6	6
<i>Pinus taeda</i>	loblolly pine	Tree						13			
<i>Platanus occidentalis</i>	American sycamore	Tree	5	5	5	6	6	6	7	7	7
<i>Prunus serotina</i>	black cherry	Shrub Tree									
<i>Quercus alba</i>	white oak	Tree	5	5	5	7	7	7	6	6	6
<i>Quercus coccinea</i>	scarlet oak	Tree									
<i>Quercus pagoda</i>	cherrybark oak	Tree	4	4	4	8	8	8	8	8	8
<i>Quercus phellos</i>	willow oak	Tree	5	5	5	9	9	9	10	10	10
<i>Quercus rubra</i>	northern red oak	Tree	2	2	2	4	4	5	5	5	5
<i>Quercus velutina</i>	black oak	Tree									
<i>Rhus copallinum</i>	flameleaf sumac	Shrub Tree									
<i>Rosa multiflora</i>	multiflora rose	Shrub Vine									
<i>Sambucus canadensis</i>	Common Elderberry	Shrub Tree		5	5		5	5		7	7
<i>Ulmus</i>	elm	Tree									
<i>Ulmus alata</i>	winged elm	Tree									
<i>Ulmus americana</i>	American elm	Tree	7	7	7	6	6	44	7	7	7
Unknown		unknown									
<i>Viburnum nudum</i>	possumhaw	Shrub Tree	2	2	2	2	2	2	2	2	2
<b>Stem count</b>			84	89	89	134	139	479	156	163	163
<b>size (ares)</b>			6			6			6		
<b>size (ACRES)</b>			0.15			0.15			0.15		
<b>Species count</b>			16	17	17	16	17	28	17	18	18
<b>Stems per ACRE</b>			566.56	600.28	600.28	903.8	937.52	3230.7	1052.2	1099.4	1099.4

**Plot E402-01-0001**

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5):  Date:  -

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N:  (dec.deg. or m)

Longitude or UTM-E:

Coordinate Accuracy (m):

Plot Dimensions: X:  Y:

Datum:

UTM Zone:

X-Axis bearing (deg):

Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

Party:

Role:

Notes on plot:

<input type="text" value="CH"/>	<input type="text" value="R"/>

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Oct 2009 Data			THIS YEAR'S DATA					
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*
1	Fraxinus pennsylvanica	(a)	C	0.1	3.5	7	75.0		5	73		<input type="checkbox"/>	2	
3	Fraxinus pennsylvanica	(c)	C	2.4	1.7	6	62.0		5	45		<input type="checkbox"/>	2	
6	Fraxinus pennsylvanica	(f)	C	6.2	1.7	6	66.0		7	79		<input type="checkbox"/>	3	
8	Lindera benzoin <i>Betula?</i>	(g)	C	6.9	5.0		Missing		4	55		<input type="checkbox"/>	2	
11	Quercus phellos	(h)	C	8.4	2.4	11	79.0		10	98		<input type="checkbox"/>	A	
14	Platanus occidentalis	(b)	C	10.9	4.2		Missing		MISSING					
15	Celtis laevigata	(c)	C	11.6	2.7	5	66.0		6	88		<input type="checkbox"/>	A	
22	Celtis laevigata	(d)	C	19.9	1.2		Missing		MISSING					

# stems: 8 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

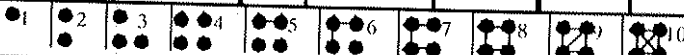
**Natural Woody Stems - tallied by species**

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.):  10cm  50cm  100cm  137cm

Explanation of cut-off & subsampling\*\*:

Species Name	Sub-Seed	SEEDLINGS — HEIGHT CLASSES			SAPLINGS — DBH		TREES — DBH		
		10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Sub-Sapl	0-1 cm	1-2.5	2.5-5-	=10 (write DBH)
Liquidambar styr.									
Quercus nigra 7-9									
Gleditsia triacanthos									
red bud									
prunus									
Carya sp									
Quercus rubra									

\*\*Required if cut-off >10cm or subsample ? 100%.



Form WS2, ver 9.1

*lobolly*  
*Betula Winged Elm* (\*Note: A prev. betula)

\*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown  
 \*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing  
 \*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISensed, VIN\* Strangulation, UNKNown, specify other.

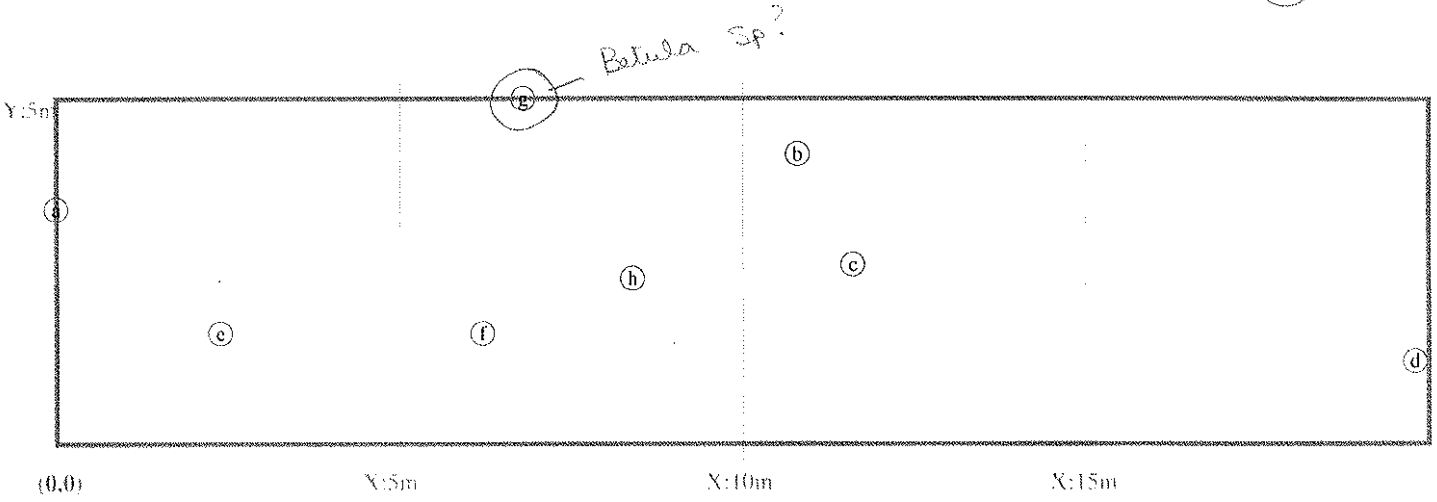
\*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Map of stems on plot E402-01-0001

X-axis: 88°



# stems: 8  
map size:  
LARGE



\*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

\*VIGOR: 4=excellent, 3=good, 2=fair,

1=unlikely to survive year, 0=dead,

M=missing.

\*DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown

ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICane, DISensed, VINE Strangulation, UNKNown, specify other.

\*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Printed in the CVS-FEP Entry Tool ver. 2.2.7



**Plot E402-01-0002**

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring  
Data (VMD) Datasheet

VMD Year (1-5):  Date: 8/27/10 - 8/27/10 Party: \_\_\_\_\_ Role: \_\_\_\_\_ Notes on plot: \_\_\_\_\_

Taxonomic Standard: Wentley \_\_\_\_\_  
Taxonomic Standard DATE: 2007 \_\_\_\_\_

Latitude or UTM-N: 35.765471 Datum: NAD83/W \_\_\_\_\_  
(dec. deg. or m) -79.416007 UTM Zone:  \_\_\_\_\_

Longitude or UTM-E: \_\_\_\_\_  
Coordinate Accuracy (m): \_\_\_\_\_ X-Axis bearing (deg): 92 \_\_\_\_\_

Plot Dimensions: X: 20 Y: 5  Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Oct 2009 Data			THIS YEAR'S DATA						
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
24	<i>Fraxinus pennsylvanica</i>	(a)	C	0.3	3.2	6	55.0		4	22			1		*Dying top down
30	<i>Liriodendron tulipifera</i>	(c)	C	3.4	4.0	6	52.0							Dead	
32	<i>Carya cordiformis</i>	(d)	C	4.0	3.0	<i>Missing</i>			5	19			1		"
38	<i>Celtis laevigata</i>	(b)	C	13.7	3.2	7	90.0		7	104			3		None

# stems: 4 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

**Natural Woody Stems - tallied by species** Explanation of cut-off & subsampling\*\*:

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.):  10cm  50cm  100cm  137cm

Species Name	Sub-Seed	SEEDLINGS — HEIGHT CLASSES			SAPLINGS — DBH			TREES — DBH			
		10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Sub-Sapl	0-1 cm	1-2.5	2.5-	5-	=10 (write DBH)	
<i>Juglans nigra</i>											* (250)
<i>Alnus</i>											
<i>Gleditsia triacanthos</i>											
<i>Frax americana</i>											
<i>Carya ovata</i>											
<i>Juniperus virginiana</i>											

\*\*Required if cut-off >10cm or subsample ? 100%.

Form WS2, ver 9.1

\*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

\*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.

\*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown  
ANIMAl, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRIcane, DISeased, VINI:  
Strangulation, UNKNOwn, specify other.

\*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

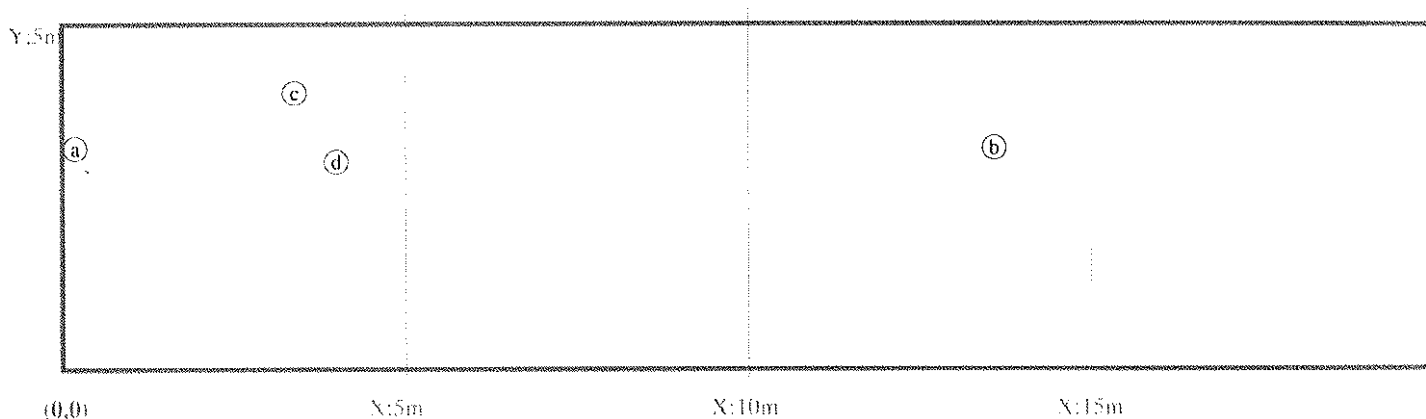
Printed in the CVS-FEP Entry Tool ver. 2.2.7

Map of stems on plot E402-01-0002

X-axis: 92°



# stems: 4  
map size:  
LARGE



\*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown

\*VIGOR: 4=excellent, 3=good, 2=fair,  
1=unlikely to survive year, 0=dead,  
M=missing.

\*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown  
ANIMAL, Human TRAMPled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINe  
Strangulation, UNKNown, specify other.

\*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.



**Plot E402-01-0003**

Please fill in any missing data and fix incorrect data.

**Vegetation Monitoring Data (VMD) Datasheet**

VMD Year (1-5):  Date:  -  Party:  Role:  Notes on plot:

Taxonomic Standard:

Taxonomic Standard DATE:

Latitude or UTM-N:  Datum:

(dec.deg. or m)

Longitude or UTM-E:  UTM Zone:

Coordinate Accuracy (m):  X-Axis bearing (deg):

Plot Dimensions: X:  Y:   Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Oct 2009 Data			THIS YEAR'S DATA								
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes		
44	Liriodendron tulipifera	(h)	C	6.0	1.1	6	55.0		7	73							
	tip broken off																
47	Quercus alba	(i)	C	8.3	0.3	9	76.0		8	91				4			
	tips chomped off																
48	Nyssa sylvatica	(i)	C	8.4	2.2		Missing		3	31				3			
54	Carya cordiformis	(X)	C	11.9	3.6		Missing		1	7				3			
	tips chomped off																
55	Quercus alba	(X)	C	13.2	3.3	6	34.0		5	43				3			
56	Nyssa sylvatica	(X)	C	13.5	1.3	4	12.0		3	19				3			
	yr1: trampled - tip snapped off   yr3: dying																
58	Carya cordiformis	(X)	C	14.7	3.4		Missing		4	12				3			
60	Quercus alba	(e)	C	15.8	0.4		Missing		1	21				3			
	one side stem chomped																
61	Quercus alba	(X)	C	16.3	3.7	9	97.0		9	113				4			
64	Quercus alba	(g)	C	18.7	0.6	5	42.0		5	42				3			
	caterpillars nibbling leaves																

# stems: 10 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

\*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown  
 \*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.  
 \*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown  
 ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICANE, DISEASEd, VINEd  
 Strangulation, UNKNown, specify other.  
 \*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

**Plot (continued): E402-01-0003**

Oct 2009 Data

THIS YEAR'S DATA

ID	Species	map char	source	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
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**Natural Woody Stems - tallied by species**

Explanation of cut-off & subsampling\*\*:

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.):  10cm  50cm  100cm  137cm

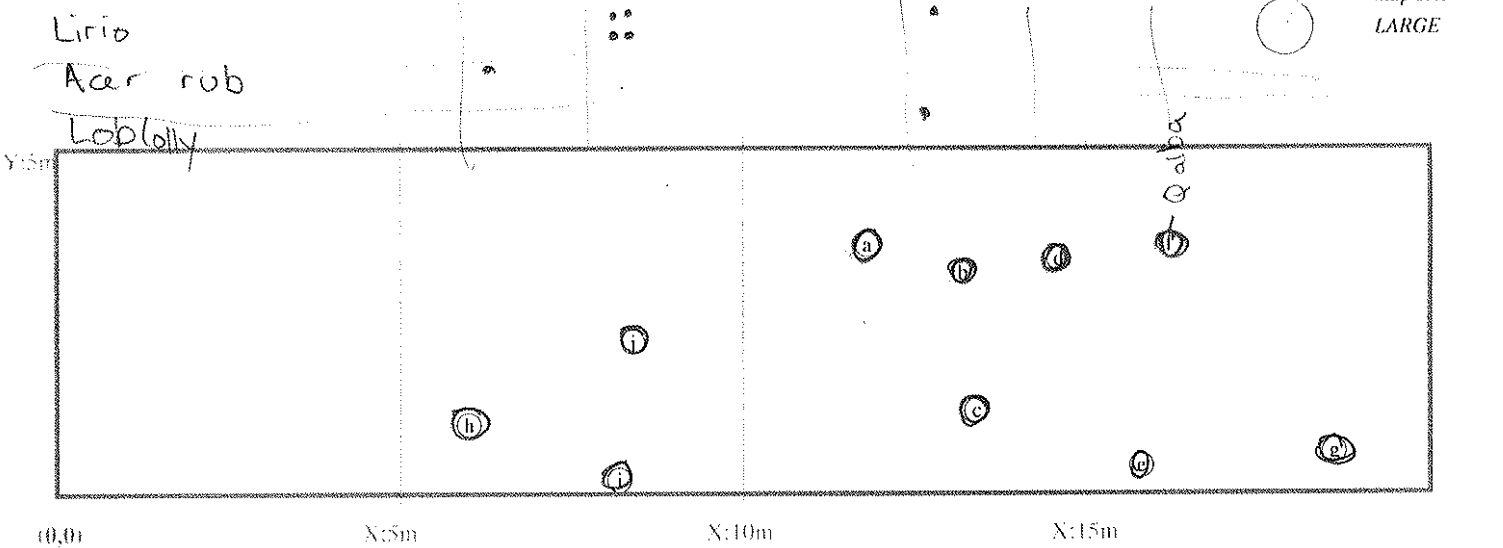
Species Name	Sub-Seed	SEEDLINGS — HEIGHT CLASSES			SAPLINGS — DBH			TREES — DBH							
		10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Sub-Sapl	0-1 cm	1-2.5	2.5-	5-	=10 (write DBH)					
Ulmus		••	••												
Carya		••	••			•									
Ilex sp.			•												
Prinet						•									
Nyssa		••													
S gum		••	••	••		••									
Q rubra		••				•									

\*\*Required if cut-off >10cm or subsample > 100%.



Form WS2, ver 9.1

**Map of stems on plot E402-01-0003**



X-axis: 64°

N

# stems: 10  
map size: LARGE

\*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown  
 \*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.  
 \*DAMAGE: REMOVAL, CUT, MOWING, BEAVER, DEER, RODENTS, INSECTS, GAME, LIVESTOCK, Other/Unknown  
 Strangulation, UNKNOW, specify other.  
 \*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.



**Plot E402-01-0004**

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5):  Date:  -  Party:  Role:   
 Taxonomic Standard:     
 Taxonomic Standard DATE:   
 Latitude or UTM-N:  Datum:  Notes on plot:  
 Longitude or UTM-E:  UTM Zone:   
 Coordinate Accuracy (m):  X-Axis bearing (deg):   
 Plot Dimensions: X:  Y:   Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Nov 2009 Data			THIS YEAR'S DATA						
						ddh 1mm	Height 1cm*	DBH 1cm	ddh 1mm	Height 1cm*	DBH 1cm	Re-sprout	Vigor*	Damage*	Notes
67	Betula nigra	<input checked="" type="checkbox"/>	C	0.3	2.1	9	96.0		12	181	3	<input type="checkbox"/>	3		
AND trampled by car															
69	Betula nigra	<input checked="" type="checkbox"/>	C	0.7	3.9	16	188.0	0.4	29	335	17	<input type="checkbox"/>	3		Insects
72	Quercus velutina	<input checked="" type="checkbox"/>	C	2.9	4.7	4	43.0		4	47		<input type="checkbox"/>	3		
73	Liriodendron tulipifera	<input checked="" type="checkbox"/>	C	3.5	1.1	3	25.0		3	32		<input type="checkbox"/>	3		
75	Celtis laevigata	<input checked="" type="checkbox"/>	C	4.9	0.5	3	27.0		2	27		<input type="checkbox"/>	3		
76	Carya cordiformis	<input checked="" type="checkbox"/>	C	5.7	2.0	Missing			MISSING						
healthy side stem present															
78	Fraxinus pennsylvanica	<input checked="" type="checkbox"/>	C	6.6	0.4	Missing			MISSING						
79	Betula nigra	<input checked="" type="checkbox"/>	C	7.5	4.5	5	74.0		MISSING						
healthy side stem present															
80	Celtis laevigata	<input checked="" type="checkbox"/>	C	7.6	2.2	4	35.0		5	71		<input type="checkbox"/>	3		
AND ins, healthy side stem present															
82	Quercus velutina	<input checked="" type="checkbox"/>	C	9.7	3.9	9	91.0		8	87		<input type="checkbox"/>	3		
on leaves															
83	Celtis laevigata	<input checked="" type="checkbox"/>	C	9.9	0.5	Missing			MISSING						
84	Lindera benzoin	<input checked="" type="checkbox"/>	C	10.1	4.8	3	48.0					<input type="checkbox"/>	0		Dead
87	Sambucus canadensis	<input checked="" type="checkbox"/>	C	11.8	5.0	12	141.0	0.1	L.S.	135	1	<input type="checkbox"/>	1		
no stem found															
88	Betula nigra	<input checked="" type="checkbox"/>	C	11.9	1.7	5	51.0		6	55		<input type="checkbox"/>	4		
healthy side stem present - mainstem dead															
90	Ilex verticillata	<input checked="" type="checkbox"/>	C	12.5	4.2	5	37.0					<input type="checkbox"/>	M		
91	Ulmus americana	<input checked="" type="checkbox"/>	C	13.0	3.4	4	55.0					<input type="checkbox"/>	D		
main stem dead															
92	Alnus serrulata	<input checked="" type="checkbox"/>	C	13.5	4.2	7	82.0		8	89		<input type="checkbox"/>	3		
healthy side stem present - mainstem knocked down															
93	Lindera benzoin	<input checked="" type="checkbox"/>	C	14.8	5.0	Missing			5	81		<input type="checkbox"/>	4		
probably washed away by stream															
94	Fraxinus pennsylvanica	<input checked="" type="checkbox"/>	C	14.0	1.5	7	58.0		8	97		<input type="checkbox"/>	4		
95	Fraxinus pennsylvanica	<input checked="" type="checkbox"/>	C	15.2	3.8	6	50.0		7	61		<input type="checkbox"/>	3		
98	Ulmus americana	<input checked="" type="checkbox"/>	C	16.9	3.8	6	77.0		6	96		<input type="checkbox"/>	3		
healthy side stem present - mainstem dead															
99	Ulmus americana	<input checked="" type="checkbox"/>	C	17.5	4.9	11	79.0		4	76		<input type="checkbox"/>	3		
healthy side stem present - mainstem dead															
101	Fraxinus pennsylvanica	<input checked="" type="checkbox"/>	C	18.2	0.2	6	58.0		7	62		<input type="checkbox"/>	3		Fungus (with)

\*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown  
 \*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead  
 \*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown  
 ANIMAL, Human TRAMpled, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICANE, DISeased, VIN Strangulation, UNKNown, specify other.  
 \*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.  
 Printed in the CVS-EFP Entry Tool p. 7

Plot (continued): <b>E402-01-0004</b>				Nov 2009 Data			THIS YEAR'S DATA								
ID	Species	map char	source	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes
102	Ulmus americana	ⓐ	C	18.8	4.4	4	71.0		A	77			3		
healthy side stem present - mainstem dead															
103	Celtis laevigata	ⓑ	C	19.3	2.2	Missing			2	40			1		

# stems: 25 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

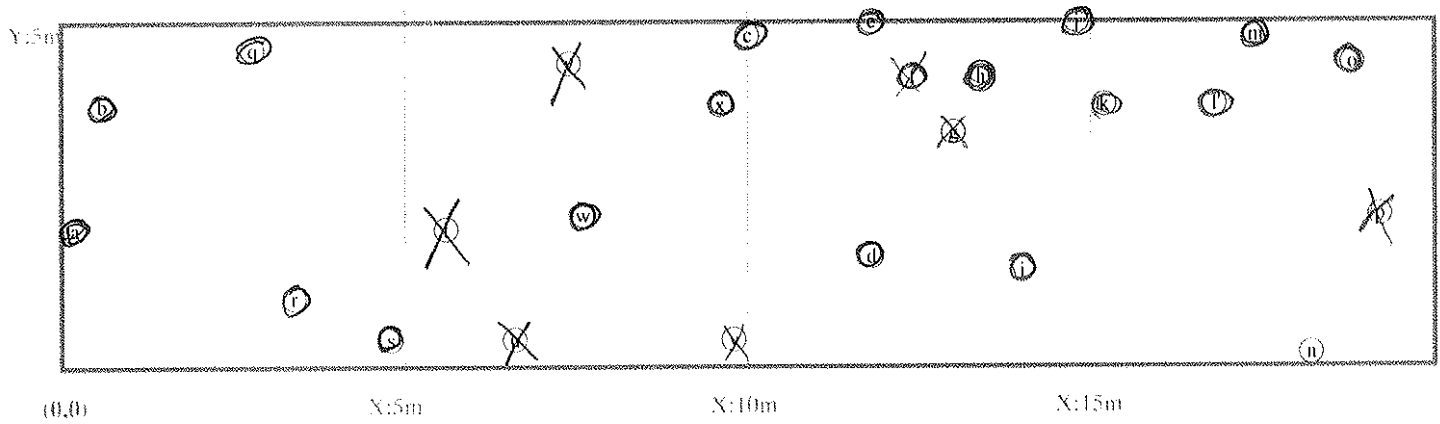
Species Name	Source*	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	Vigor*	Damage*	Notes

Natural Woody Stems - tallied by species												Explanation of cut-off & subsampling**:				
Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right):												<input type="checkbox"/> 10cm	<input type="checkbox"/> 50cm	<input type="checkbox"/> 100cm	<input type="checkbox"/> 137cm	
Species Name	<input checked="" type="checkbox"/> Sub-Seed	SEEDLINGS — HEIGHT CLASSES			SAPLINGS — DBH			TREES — DBH								
		10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Sub-Sapl	0-1 cm	1-2.5	2.5-	5-	=10 (write DBH)						
Lig styr	---	☒☒	☒☒☒☒☒☒	☒☒☒☒☒☒	---	☒	*									
Lirio tulip	---	☐	☐☐	☐☐☐	---	☐☐										
Acer rubrum	---	☐	☐	☐	---											
Ulmus	---	☐☐			---											
Lob	---	☐	☐☐	☐	---	☐										
Juniperus	---	☐			---											

\*\*Required if cut-off >10cm or subsample ? 100%. Form WS2, ver 9.1

Map of stems on plot **E402-01-0004**

X-axis: 44° # stems: 25 map size: LARGE



\*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown  
 \*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing  
 \*DAMAGE: REMOVAL, CUT, MOWING, BEAVER, DEER, RODENTS, INSECTS, GAME, LIVESTOCK, Other/Unknown ANIMAL, Human TRAMPLED, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICANE, DISEASED, VINE Strangulation, UNKNOW, specify other.  
 \*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.  
 Printed in the CVS-FEP Entry Tool ver. 2.2.7



**Plot E402-01-0005**

Please fill in any missing data and fix incorrect data.

Vegetation Monitoring Data (VMD) Datasheet

VMD Year (1-5):  Date:  -  Party:  Role:   
 Taxonomic Standard:     
 Taxonomic Standard DATE:   
 Latitude or UTM-N:  Datum:    
 (dec.deg. or m)  
 Longitude or UTM-E:  UTM Zone:   
 Coordinate Accuracy (m):  X-Axis bearing (deg):   
 Plot Dimensions: X:  Y:   Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Nov 2009 Data			THIS YEAR'S DATA						
						ddh 1 mm	Height 1cm*	DBH 1 cm	ddh 1mm	Height 1cm*	DBH 1 cm	Re- sprout	Vigor*	Damage*	Notes
107	Fraxinus pennsylvanica	(a)	C	0.5	3.2	7	56.0		7	83		<input type="checkbox"/>	4		
side stem - main stem knocked over															
108	Platanus occidentalis	(b)	C	0.6	1.2	15	217.0	1.4	16	170	4	<input type="checkbox"/>	4		
110	Quercus phellos	(l)	C	2.7	4.6	15	119.0	DBH?	20	240	9	<input type="checkbox"/>	4		
chewing evident															
113	Betula nigra	(n)	C	5.0	1.4	10	88.0		12	125		<input type="checkbox"/>	3		insects
tips chewd off															
114	Ulmus americana	(o)	C	5.4	3.9	7	80.0		7	102		<input type="checkbox"/>	4		
tips chewed off															
115	Quercus pagoda	(p)	C	6.8	0.3	10	74.0		10	94		<input type="checkbox"/>	4		
116	Fraxinus pennsylvanica	(q)	C	7.3	2.9	8	79.0		9	100		<input type="checkbox"/>	4		
118	Platanus occidentalis	(r)	C	9.4	1.8	20	190.0	0.6	27	191	6	<input type="checkbox"/>	4		
something rubbing against bark?															
119	Quercus phellos	(s)	C	9.9	4.0	10	103.0	DBH?	13	195	10	<input type="checkbox"/>	4		
mainstem dead - side stem alive															
121	Quercus phellos	(c)	C	11.7	2.1	10	88.0		10	96		<input type="checkbox"/>	4		
tips nibbled															
122	Betula nigra	(d)	C	12.7	4.1	16	138.0	1.0	24	238	6	<input type="checkbox"/>	4		
tips nibbled															
124	Betula nigra	(e)	C	14.9	2.7	13	122.0	DBH?	21	264	7	<input type="checkbox"/>	4		
tips nibbled on all stems															
125	Fraxinus pennsylvanica	(f)	C	16.0	4.5	6	65.0		6	59		<input type="checkbox"/>	3		
knocked over by flood AND car - multiple side stems															
126	Quercus pagoda	(g)	C	17.1	0.6	9	103.0	DBH?	9	122		<input type="checkbox"/>	3		insects
127	Liriodendron tulipifera	(i)	C	19.5	2.7	13	124.0	DBH?	20	225	11	<input type="checkbox"/>	4		
128	Betula nigra	(h)	C	17.7	4.3	14	120.0	DBH?	16	219	7	<input type="checkbox"/>	4		
AND insects - knocked over															
130	Betula nigra	(j)	C	19.2	3.4	10	152.0	0.1	16	275	8	<input type="checkbox"/>	4		
mainstem dead - side stem measured															
131	Fraxinus pennsylvanica	(k)	C	19.9	2.2	7	72.0		7	98		<input type="checkbox"/>	3		
AND trampled by car															
132	Fraxinus pennsylvanica	(m)	C	20.0	4.1	7	78.0		8	129		<input type="checkbox"/>	4		
mainstem dead - side stem measured															

\*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown p. 9  
 \*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing. \*DAMAGE: REMOval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown  
 ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICane, DISeased, VINE  
 Strangulation, UNKNown, specify other.  
 \*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m. Printed in the CVS-FEP Entry Tool ver. 2.2.7

<b>Plot (continued): E402-01-0005</b>				Nov 2009 Data			THIS YEAR'S DATA						
ID	Species	map char	source X (m) Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

# stems: 19 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	Vigor*	Damage*	Notes

**Natural Woody Stems - tallied by species** Explanation of cut-off & subsampling\*\*:

Height Cut-Off (All stems shorter than this are ignored. If >10cm, explain why to the right.):  10cm  50cm  100cm  137cm

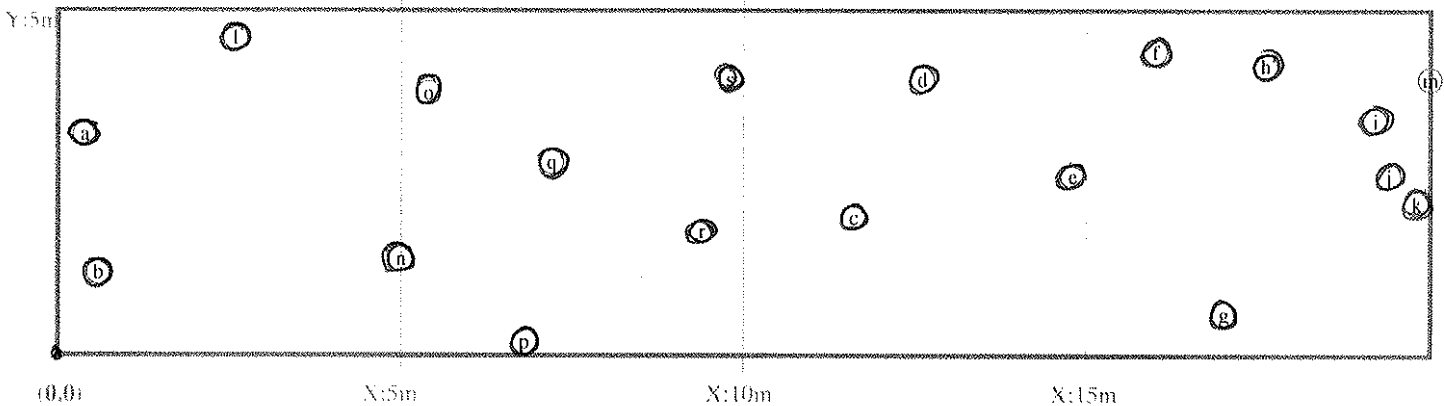
Species Name	Sub-Seed	SEEDLINGS — HEIGHT CLASSES			SAPLINGS — DBH			TREES — DBH		
		10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Sub-Sapl	0-1 cm	1-2.5	2.5-	5-	=10 (write DBH)
Liriodendron tulipifera										
Liriodendron styraciflua										
Acer rubrum										
Carya sp.										
Loblolly										

\*\*Required if cut-off >10cm or subsample < 100%.

Legend for stem counts: 1 dot, 2 dots, 3 dots, 4 dots, 5 dots, 6 dots, 7 dots, 8 dots, 9 dots, 10 dots. Form WS2, ver 9.1

**Map of stems on plot E402-01-0005**

X-axis: 10° # stems: 19  
map size: LARGE



\*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubing, R=bare Root, M=Mechanically, U=Unknown  
 \*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.  
 \*DAMAGE: REMOVAL, CUT, MOWING, BEAVER, DEER, RODENTS, INSECTS, GAME, LIVESTOCK, Other/Unknown  
 ANIMAL, Human TRAMPLED, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICANE, DISEASED, VINE Strangulation, UNKNOW, specify other.  
 \*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.



**Plot E402-01-0006**

Please fill in any missing data and fix incorrect data.

**Vegetation Monitoring Data (VMD) Datasheet**

VMD Year (1-5):  Date:  -  Party:  Role:   
 Taxonomic Standard:  Notes on plot:   
 Taxonomic Standard DATE:     
 Latitude or UTM-N:  Datum:    
 Longitude or UTM-E:  UTM Zone:    
 Coordinate Accuracy (m):  X-Axis bearing (deg):    
 Plot Dimensions: X:  Y:   Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X)

ID	Species Name	Map char	Source*	Nov 2009 Data		THIS YEAR'S DATA								
				X 0.1m	Y 0.1m	ddh 1mm	Height 1cm*	DBH 1cm	ddh 1mm	Height 1cm*	DBH 1cm	Re-sprout	Vigor*	Damage*
135	Viburnum nudum	(a)	C	1.1	4.2	Missing								
143	Viburnum nudum	(l)	C	8.5	5.0	Missing								
144	Fraxinus pennsylvanica	(u)	C	8.9	2.1	5	53.0	5	60			4		
145	Alnus serrulata	(v)	C	9.1	4.2	8	79.0	7	85			4		
146	Sambucus canadensis	(w)	C	9.5	4.7	10	113.0	10	210	8		4		
147	Ilex verticillata	(b)	C	10.0	4.1	5	30.0	Missing						
148	Alnus serrulata	(c)	C	10.4	4.5	11	125.0	11	178	4		4		
151	Sambucus canadensis	(d)	C	11.6	4.5	6	102.0	L.S.	230	9		4		
152	Ilex verticillata	(e)	C	12.3	4.1	5	60.0	5	37			2		
153	Sambucus canadensis	(f)	C	12.8	4.6	13	155.0	L.S.	270	14		4		
154	Ulmus americana	(g)	C	13.2	2.0	6	98.0	7	90			3		
155	Lindera benzoin	(h)	C	13.6	3.8	6	60.0	135	(6)			4		
156	Carya cordiformis	(i)	C	13.9	0.8	5	20.0	6	30			2		
157	Alnus serrulata	(j)	C	14.0	4.6	15	165.0	14	220	4		4	Vines	
158	Ilex verticillata	(k)	C	14.6	3.9	5	70.0	4	65			2		
159	Sambucus canadensis	(l)	C	15.2	4.9	13	215.0		380	14		4		
160	Carya cordiformis	(m)	C	16.0	2.7	6	63.0	11	78			4		
161	Lindera benzoin	(n)	C	16.0	4.4	8	88.0	10	149	2		3		
162	Ulmus americana	(o)	C	16.9	1.0	8	98.0	10	124			3		
163	Quercus phellos	(p)	C	17.8	4.1	14	92.0	16	218	5		4		
165	Carya cordiformis	(q)	C	18.8	3.1	2	29.0	2	41			3		
166	Platanus occidentalis	(r)	C	19.5	1.3	12	265.0		450	30		4		
779	Sambucus canadensis	(s)	U	8.0	4.6	4	45.0	L.S.	48			3		

\*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown  
 \*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing  
 \*DAMAGE: REMoval, CUT, MOWing, BEAVer, DEER, RODents, INSEcts, GAME, LIVESTock, Other/Unknown  
 ANIMAL, Human TRAMpled, Site Too WET, Site Too DRY, FLOOD, DROUght, STORM, HURRICane, DISeased, VINE Strangulation, UNKNown, specify other.  
 \*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.  
 Printed in the CVS-FEP Entry Tool ver. 2.27

<b>Plot (continued): E402-01-0006</b>				Nov 2009 Data			THIS YEAR'S DATA								
ID	Species	map char	source	X (m)	Y (m)	ddh (mm)	Height (cm)	DBH (cm)	ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

# stems: 23 New Stems, not included last year, but are obviously planted. If more space needed, use blank PWS (Planted Woody Stems) Form:

Species Name	Source*	X (m)	Y (m)	ddh 1 mm	Height 1 cm*	DBH 1 cm	Vigor*	Damage*	Notes

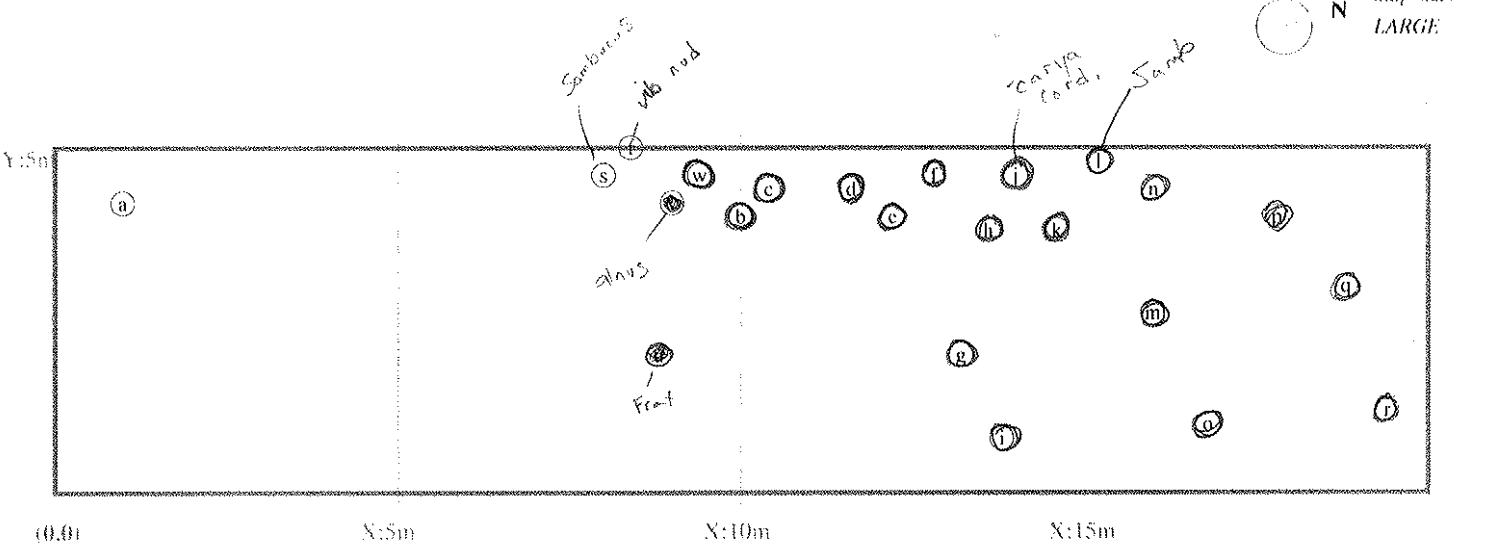
**Natural Woody Stems - tallied by species** Explanation of cut-off & subsampling\*\*:

**Height Cut-Off** (All stems shorter than this are ignored. If >10cm, explain why to the right.):  10cm  50cm  100cm  137cm

Species Name	<input type="checkbox"/> c	SEEDLINGS — HEIGHT CLASSES			SAPLINGS — DBH			TREES — DBH			
		Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Sub-Sapl	0-1 cm	1-2.5	2.5-	5-	=10 (write DBH)
Liriodendron styr.				••	••		••	••			
Ligustrum sin.			•	••			•				
Prunus			••								
Fragaria											
Liriodendron tulip.							•				•
Carya cord.							•				

\*\*Required if cut-off >10cm or subsample > 100%. Form WS2, ver 9.1

**Map of stems on plot E402-01-0006**



\*SOURCE: Tr=Transplant, L=Live stake, B=Ball and burlap, P=Potted, Tu=Tubling, R=bare Root, M=Mechanically, U=Unknown  
 \*VIGOR: 4=excellent, 3=good, 2=fair, 1=unlikely to survive year, 0=dead, M=missing.  
 \*DAMAGE: REMOVAL, CUT, MOWING, BEAVER, DEER, RODENTS, INSECTS, GAME, LIVESTOCK, Other/Unknown ANIMAL, Human TRAMPLED, Site Too WET, Site Too DRY, FLOOD, DROUGHT, STORM, HURRICANE, DISEASED, VINE Strangulation, UNKNOW, specify other.  
 \*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.  
 Printed in the CVS-FEP Entry Tool ver. 2.2.7

## **Appendix D. Stream Survey Data**

Figures 5.0-5.5 e-Tables	Cross sections with Annual Overlays Raw cross-section survey data spreadsheets
Figures 6.0-6.2 e-Tables	Longitudinal Profiles with Annual Overlays Raw longitudinal profile survey data spreadsheets
Figures 7.0-7.5 e-Tables	Pebble Count Plots with Annual Overlays Raw pebble count data spreadsheets
Tables 10.0-10.1	Baseline Stream Data Summary Table
Table 11.0	Monitoring—Cross-Section Morphology Data Table
Table 11.1-11.4	Monitoring—Stream Reach Morphology Data Table



Figure 5.0. Cross Sections with Annual Overlays - UT to Rocky River Stream Restoration – EEP Project #402

**River Basin:** Cape Fear  
**Watershed:** UT to Rocky River  
**XS ID** XS 1-1 (Riffle)  
**Reach:** 1  
**Date:** 8/18/2010  
**Field Crew:** SD & CH



View of XS 1-1 looking downstream

**SUMMARY DATA**

Bankfull Width (ft)	21.14
Floodprone Width (ft)	157.00
Bankfull Mean Depth (ft)	1.54
Bankfull Max Depth (ft)	2.79
Bankfull Area (ft <sup>2</sup> )	32.57
Bankfull Width/Depth Ratio	13.72
Bankfull Entrenchment Ratio	7.43
Bankfull Bank Height Ratio	1.15
d50 (mm)	21.5

Station	Rod Ht.	Elevation
0	6.11	548.28
5.2	6.13	548.26
10.8	6.23	548.16
16.3	6.27	548.12
19.1	6.7	547.69
22.4	7.66	546.73
23.1	8.93	545.46
25.5	9.06	545.33
27.6	8.94	545.45
29.5	8.77	545.62
32.4	8.14	546.25
34.6	7.13	547.26
35.7	6.66	547.73
37.8	6.19	548.2
43.3	5.88	548.51
49.9	5.2	549.19
56.4	5.08	549.31
65.8	5.11	549.28
73.6	4.68	549.71

Stream Type:

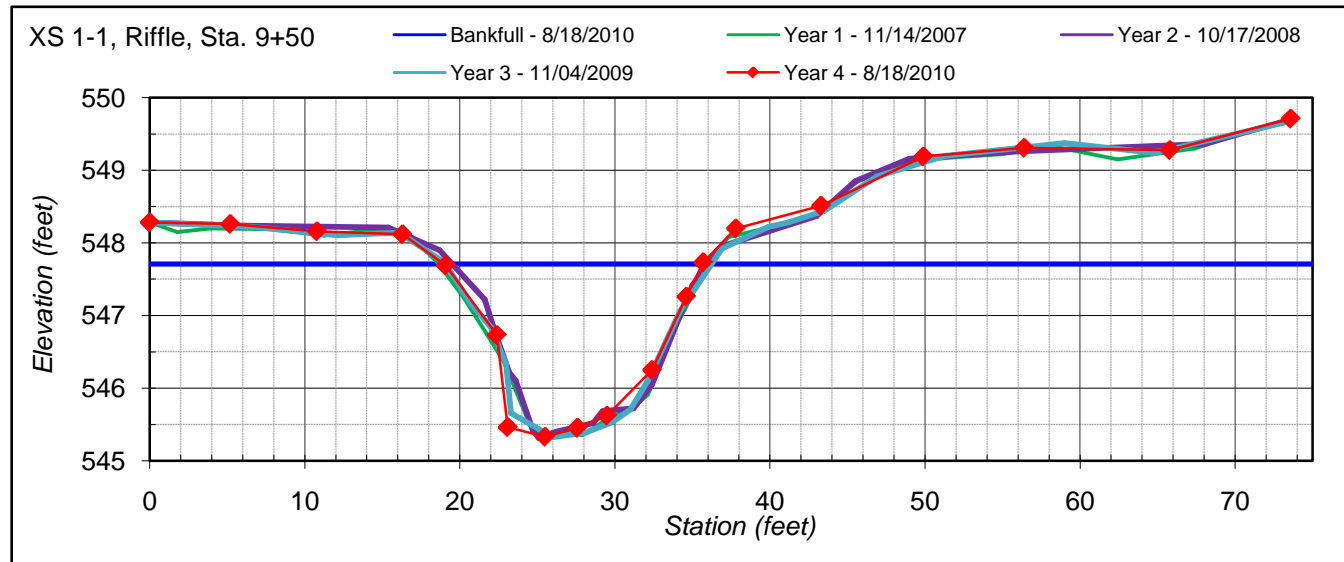


Figure 5.1. Cross Sections with Annual Overlays - UT to Rocky River Stream Restoration – EEP Project #402

**River Basin:** Cape Fear  
**Watershed:** UT to Rocky River  
**XS ID** XS 2-1 (Riffle)  
**Reach:** 2  
**Date:** 8/18/2010  
**Field Crew:** SD & CH

**SUMMARY DATA**

Station	Rod Ht.	Elevation
0	4.7	559
4.8	4.92	558.78
14.3	5.2	558.5
16.8	5.22	558.48
18.2	5.58	558.12
20.2	6.08	557.62
21.8	6.3	557.4
23.3	6.26	557.44
24.1	6.58	557.12
25.3	6.82	556.88
26.6	6.99	556.71
27.5	6.88	556.82
28.8	6.1	557.6
32	4.89	558.81
34.8	4.65	559.05

Bankfull Width (ft)	14.33
Floodprone Width (ft)	104.00
Bankfull Mean Depth (ft)	0.96
Bankfull Max Depth (ft)	1.77
Bankfull Area (ft <sup>2</sup> )	13.76
Bankfull Width/Depth Ratio	14.92
Bankfull Entrenchment Ratio	7.26
Bankfull Bank Height Ratio	1.00
d50 (mm)	6.01



View of XS 2-1 looking downstream

Stream Type:

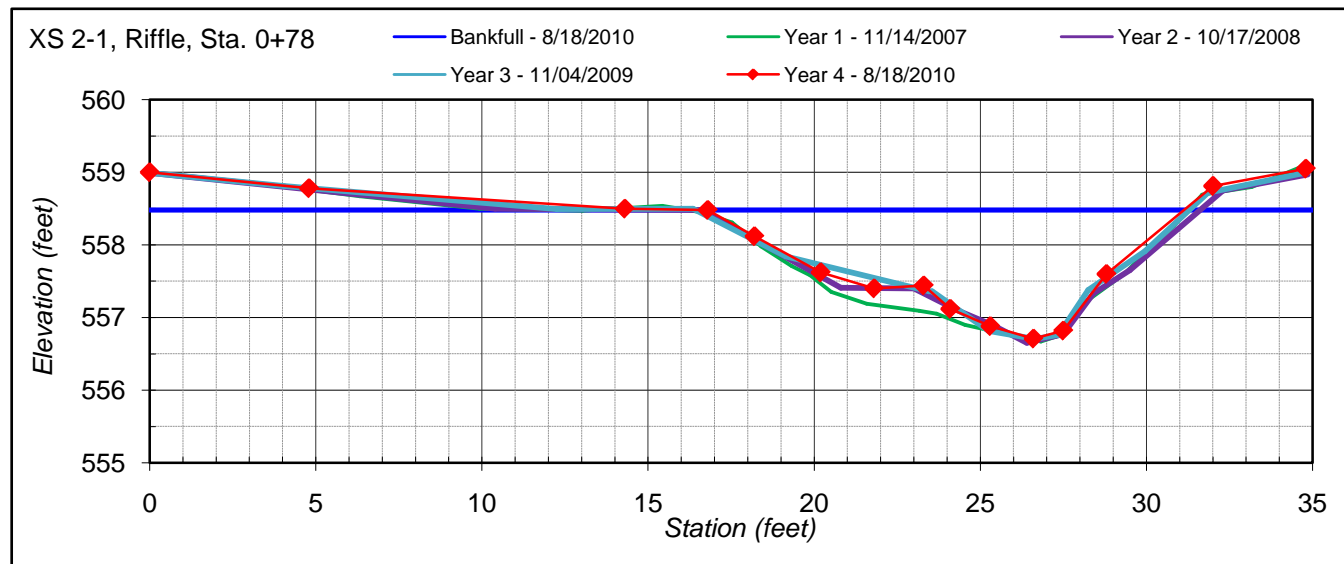


Figure 5.2. Cross Sections with Annual Overlays - UT to Rocky River Stream Restoration – EEP Project #402

**River Basin:** Cape Fear  
**Watershed:** UT to Rocky River  
**XS ID** XS 2-2 (Pool)  
**Reach:** 2  
**Date:** 8/18/2010  
**Field Crew:** SD & CH

**SUMMARY DATA**

Station	Rod Ht.	Elevation
0	5.13	559.02
2.4	5.62	558.53
9.5	6.93	557.22
16.4	7.59	556.56
20.5	7.59	556.56
22.2	7.79	556.36
24.4	8.97	555.18
25.6	9.1	555.05
26.7	9.23	554.92
27.6	9.15	555
28.2	8.65	555.5
29	8.57	555.58
30.2	8.32	555.83
34	7.66	556.49
36.4	7.68	556.47
40.6	7.85	556.3
45.4	7.4	556.75

Bankfull Width (ft)	12.91
Floodprone Width (ft)	112.00
Bankfull Mean Depth (ft)	0.78
Bankfull Max Depth (ft)	1.57
Bankfull Area (ft <sup>2</sup> )	10.04
Bankfull Width/Depth Ratio	16.59
Bankfull Entrenchment Ratio	8.68
Bankfull Bank Height Ratio	1.00
d50 (mm)	0.04



View of XS 2-2 looking downstream

Stream Type:

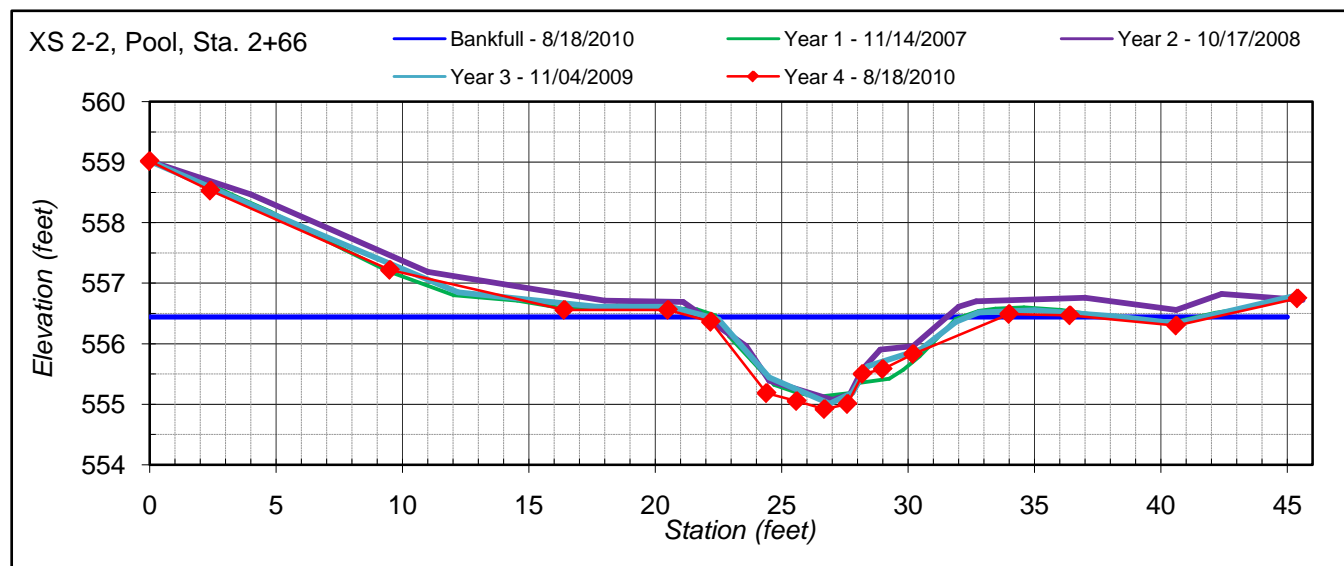




Figure 5.3. Cross Sections with Annual Overlays - UT to Rocky River Stream Restoration – EEP Project #402

**River Basin:** Cape Fear  
**Watershed:** UT to Rocky River  
**XS ID** XS 2-3 (Riffle)  
**Reach:** 2  
**Date:** 8/18/2010  
**Field Crew:** SD & CH

**SUMMARY DATA**

Station	Rod Ht.	Elevation
0	5.72	552.38
9.2	6.16	551.94
14.9	6.44	551.66
20.7	6.56	551.54
25.8	6.57	551.53
28.7	6.54	551.56
30.2	7.01	551.09
31.7	7.35	550.75
32.7	7.85	550.25
33.6	8.11	549.99
35.4	7.81	550.29
37	6.9	551.2
38.7	6.79	551.31
40.2	6.35	551.75
44.8	6.25	551.85
50	6.37	551.73
54.2	6.16	551.94

Bankfull Width (ft)	10.85
Floodprone Width (ft)	200.00
Bankfull Mean Depth (ft)	0.75
Bankfull Max Depth (ft)	1.57
Bankfull Area (ft <sup>2</sup> )	8.15
Bankfull Width/Depth Ratio	14.44
Bankfull Entrenchment Ratio	18.43
Bankfull Bank Height Ratio	1.00
d50 (mm)	0.03



View of XS 2-3 looking downstream

Stream Type:

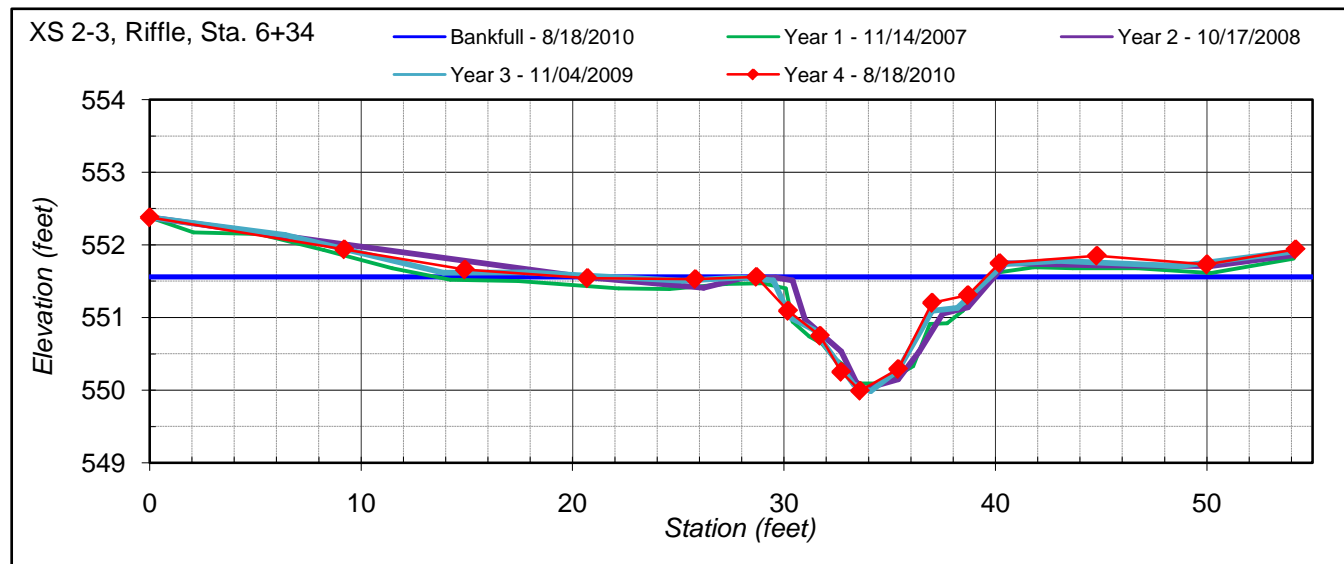


Figure 5.4. Cross Sections with Annual Overlays - UT to Rocky River Stream Restoration – EEP Project #402

**River Basin:** Cape Fear  
**Watershed:** UT to Rocky River  
**XS ID** XS 2-4 (Pool)  
**Reach:** 2  
**Date:** 8/18/2010  
**Field Crew:** SD & CH

**SUMMARY DATA**

Station	Rod Ht.	Elevation
0	5.28	549.84
6.5	5.29	549.83
11	5.45	549.67
17.9	5.48	549.64
22.3	5.37	549.75
27.6	5.38	549.74
28.5	6.55	548.57
30.6	7	548.12
31.1	7.17	547.95
32.5	7.1	548.02
33.6	6.15	548.97
35.5	5.85	549.27
38.3	5.22	549.9
43.2	5.31	549.81
48	5.37	549.75

Bankfull Width (ft)	9.99
Floodprone Width (ft)	160.00
Bankfull Mean Depth (ft)	0.98
Bankfull Max Depth (ft)	1.79
Bankfull Area (ft <sup>2</sup> )	9.80
Bankfull Width/Depth Ratio	10.18
Bankfull Entrenchment Ratio	16.02
Bankfull Bank Height Ratio	1.00
d50 (mm)	0.11



View of XS 2-4 looking downstream

Stream Type:

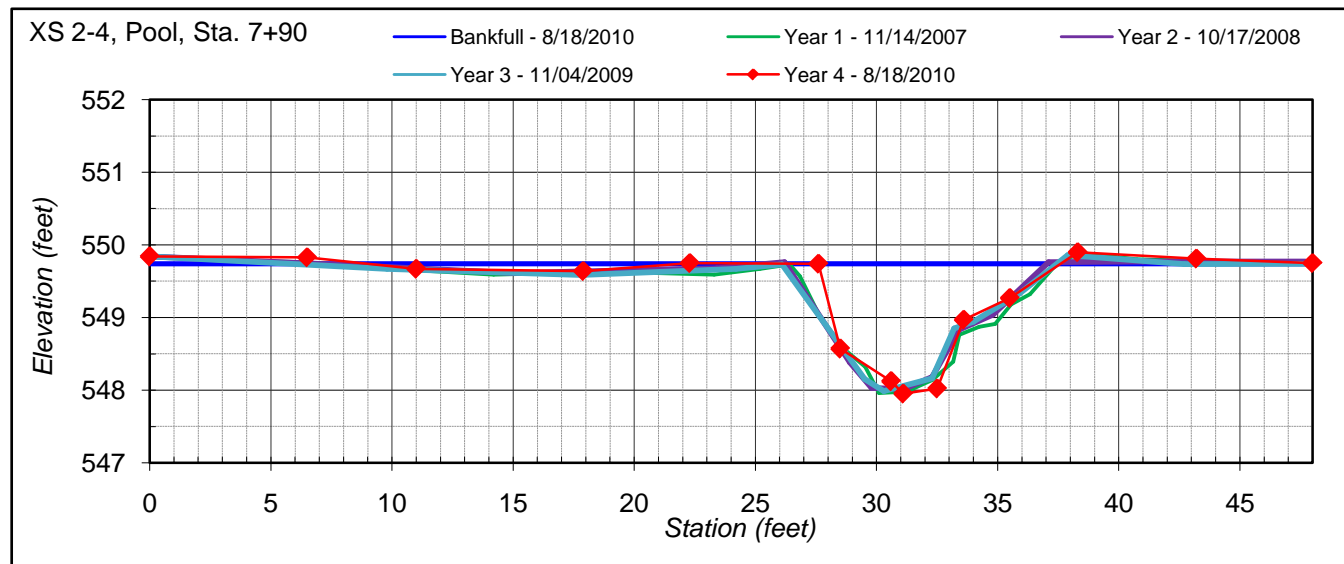


Figure 5.5. Cross Sections with Annual Overlays - UT to Rocky River Stream Restoration – EEP Project #402

**River Basin:** Cape Fear  
**Watershed:** UT to Rocky River  
**XS ID** XS 2-5 (Riffle)  
**Reach:** 2  
**Date:** 8/18/2010  
**Field Crew:** SD & CH

Station	Rod Ht.	Elevation
0	5.62	547.87
7.7	5.86	547.63
13.7	5.85	547.64
18	5.69	547.8
28	5.58	547.91
30.1	5.72	547.77
33.2	5.73	547.76
35	6.38	547.11
35.9	6.92	546.57
36.4	7.28	546.21
38.1	7.68	545.81
38.9	7.62	545.87
40.1	7.22	546.27
42.8	6.21	547.28
46.2	5.82	547.67
49.7	5.62	547.87
51.6	5.27	548.22

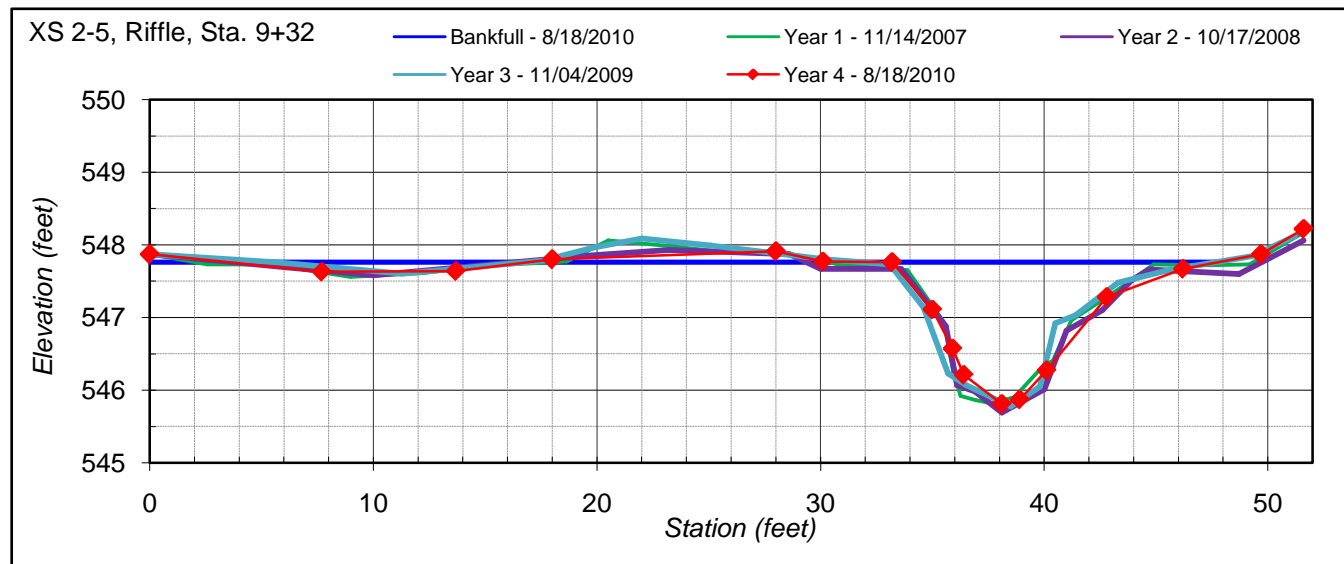
**SUMMARY DATA**

Bankfull Width (ft)	14.58
Floodprone Width (ft)	130.00
Bankfull Mean Depth (ft)	0.85
Bankfull Max Depth (ft)	1.95
Bankfull Area (ft <sup>2</sup> )	12.34
Bankfull Width/Depth Ratio	17.22
Bankfull Entrenchment Ratio	12.34
Bankfull Bank Height Ratio	1.05
d50 (mm)	19



View of XS 2-5 looking downstream

Stream Type:





PHOTO#								
Shot #	EEP ID	MY	XS ID	Survey Date	Channel Unit	Station	Foresight	Notes
1	402	4	1-1	18-Aug	Riffle	0	4.68	
2	402	4	1-1	18-Aug	Riffle	7.8	5.11	
3	402	4	1-1	18-Aug	Riffle	17.2	5.08	
4	402	4	1-1	18-Aug	Riffle	23.7	5.2	
5	402	4	1-1	18-Aug	Riffle	30.3	5.88	
6	402	4	1-1	18-Aug	Riffle	35.8	6.19	
7	402	4	1-1	18-Aug	Riffle	37.9	6.66	
8	402	4	1-1	18-Aug	Riffle	39	7.13	
9	402	4	1-1	18-Aug	Riffle	41.2	6.14	
10	402	4	1-1	18-Aug	Riffle	44.1	8.77	
11	402	4	1-1	18-Aug	Riffle	46	8.94	
12	402	4	1-1	18-Aug	Riffle	48.1	9.06	t
13	402	4	1-1	18-Aug	Riffle	50.5	8.93	
14	402	4	1-1	18-Aug	Riffle	51.2	7.66	
15	402	4	1-1	18-Aug	Riffle	54.5	6.7	
16	402	4	1-1	18-Aug	Riffle	57.3	6.27	
17	402	4	1-1	18-Aug	Riffle	62.8	6.23	
18	402	4	1-1	18-Aug	Riffle	68.4	6.13	
19	402	4	1-1	18-Aug	Riffle	73.6	6.11	



PHOTO#									
Shot #	EEP ID	MY	XS ID	Survey Date	Channel Unit		Foresight	Comment	
1	402	4	2-2	18-Aug	Pool	0	7.4	pin	
2	402	4	2-2	18-Aug	Pool	4.8	7.85		
3	402	4	2-2	18-Aug	Pool	9	7.68		
4	402	4	2-2	18-Aug	Pool	11.4	7.66	bkf	
5	402	4	2-2	18-Aug	Pool	15.2	8.32		
6	402	4	2-2	18-Aug	Pool	16.4	8.57		
7	402	4	2-2	18-Aug	Pool	17.2	8.65		
8	402	4	2-2	18-Aug	Pool	17.8	9.15		
9	402	4	2-2	18-Aug	Pool	18.7	9.23	t	
10	402	4	2-2	18-Aug	Pool	19.8	9.1		
11	402	4	2-2	18-Aug	Pool	21	8.97		
12	402	4	2-2	18-Aug	Pool	23.2	7.79		
13	402	4	2-2	18-Aug	Pool	24.9	7.59		
14	402	4	2-2	18-Aug	Pool	29	7.59		
15	402	4	2-2	18-Aug	Pool	35.9	8.93		
16	402	4	2-2	18-Aug	Pool	43	5.62		
17	402	4	2-2	18-Aug	Pool	45.4	5.13	pin	
done backwards									



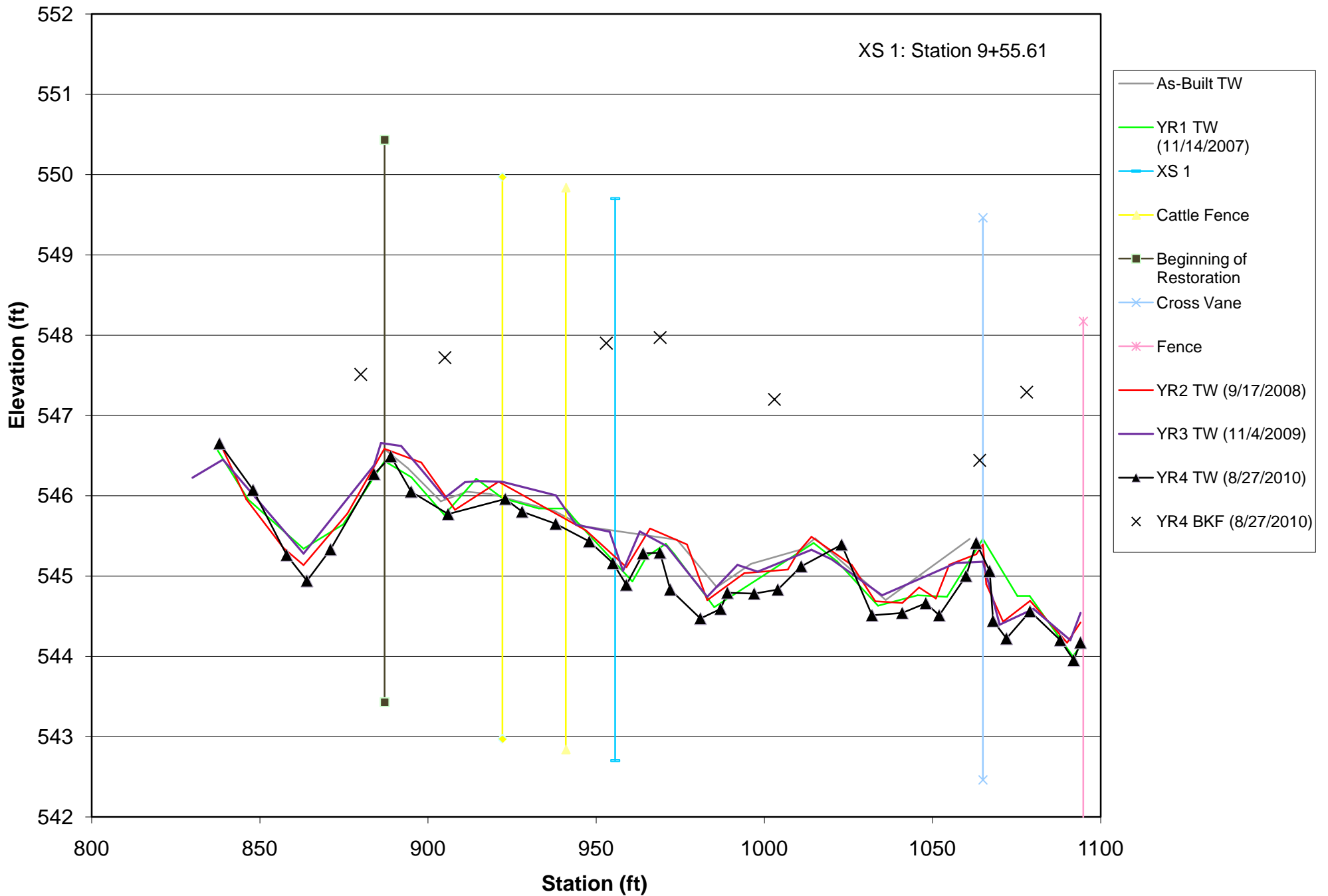




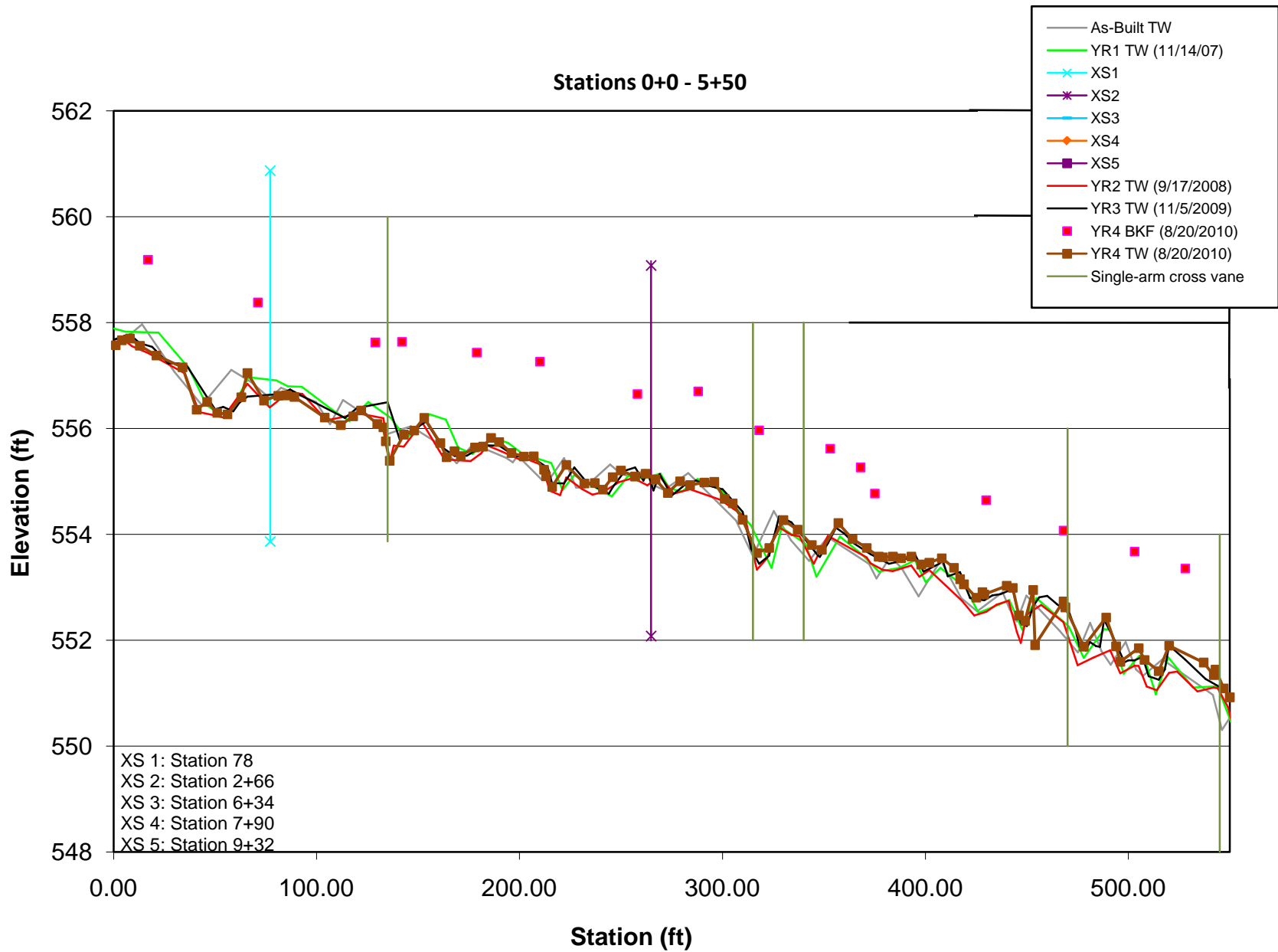


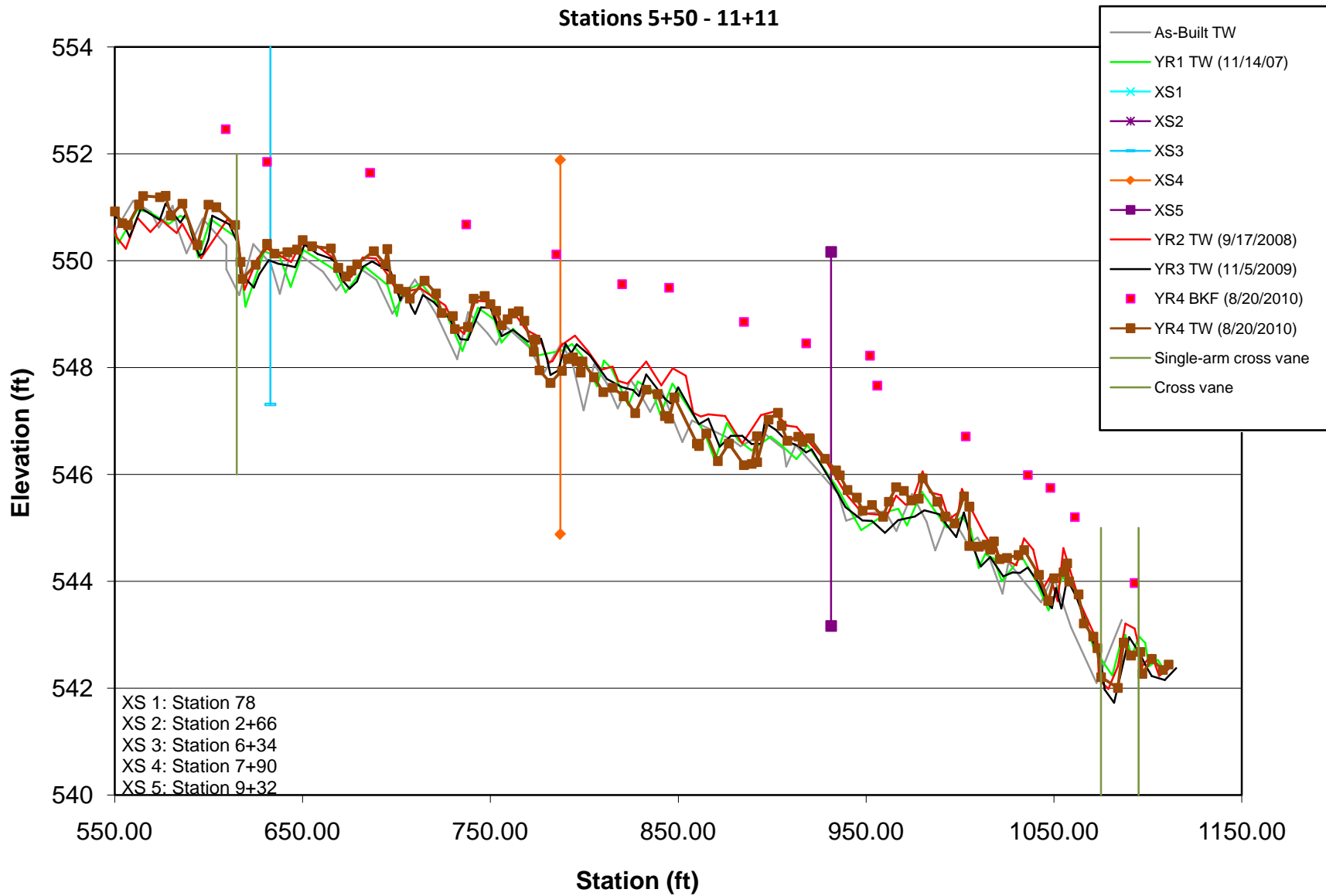


Appendix D. Figure 6.0. Longitudinal Profile with Annual Overlays. Reach 1. UT to Rocky River Stream Restoration - EEP Project #402



Appendix D. Figure 6.1. Longitudinal Profile with Annual Overlays. Reach 2. UT to Rocky River Stream Restoration - EEP Project #402







Shot #	EEP ID	MY	LP ID	Survey Date	Northing	Easting	Elevation	Station	Shot ID	Comment
1	402	4	Reach 1	8/27/2010	1876672.00	733868.64	549.09	NA		first occupypt
3	402	4	Reach 1	8/27/2010	1876719.56	733911.43	550.08	NA		foresight shot1
4	402	4	Reach 1	8/27/2010	1876726.23	733902.95	549.51	NA		tob
5	402	4	Reach 1	8/27/2010	1876740.38	733885.64	547.51	880	bkf	bkf bnch
6	402	4	Reach 1	8/27/2010	1876752.49	733882.84	549.93		tob	tob
7	402	4	Reach 1	8/27/2010	1876783.52	733895.80	546.65	838	thalweg	t
8	402	4	Reach 1	8/27/2010	1876768.96	733899.02	546.07	848	thalweg	t
9	402	4	Reach 1	8/27/2010	1876760.17	733899.72	545.26	858	thalweg	t
10	402	4	Reach 1	8/27/2010	1876753.86	733899.92	544.94	864	thalweg	0.2
11	402	4	Reach 1	8/27/2010	1876746.27	733898.66	545.33	871	thalweg	t
12	402	4	Reach 1	8/27/2010	1876734.86	733896.07	546.27	884	thalweg	t
13	402	4	Reach 1	8/27/2010	1876729.74	733896.46	546.49	889	thalweg	t
14	402	4	Reach 1	8/27/2010	1876723.05	733892.54	546.05	895	thalweg	t
15	402	4	Reach 1	8/27/2010	1876716.32	733884.49	545.77	906	thalweg	t
16	402	4	Reach 1	8/27/2010	1876712.25	733874.02	545.96	923	thalweg	cow crossing
17	402	4	Reach 1	8/27/2010	1876722.01	733871.30	547.72	905	bkf	bkf bnch
18	402	4	Reach 1	8/27/2010	1876707.89	733865.37	545.80	928	thalweg	t
19	402	4	Reach 1	8/27/2010	1876702.81	733855.78	545.65	938	thalweg	t-xing
20	402	4	Reach 1	8/27/2010	1876695.53	733849.10	545.43	948	thalweg	t
21	402	4	Reach 1	8/27/2010	1876690.34	733845.28	545.16	955	thalweg	t at x sect
22	402	4	Reach 1	8/27/2010	1876685.98	733842.61	544.89	959	thalweg	t
23	402	4	Reach 1	8/27/2010	1876681.90	733839.82	545.28	964	thalweg	t
24	402	4	Reach 1	8/27/2010	1876677.35	733837.96	545.29	969	thalweg	t
25	402	4	Reach 1	8/27/2010	1876669.65	733835.90	544.83	972	thalweg	t
26	402	4	Reach 1	8/27/2010	1876665.94	733834.94	544.47	981	thalweg	t
27	402	4	Reach 1	8/27/2010	1876660.44	733833.31	544.59	987	thalweg	t
28	402	4	Reach 1	8/27/2010	1876657.77	733832.93	544.79	989	thalweg	t
29	402	4	Reach 1	8/27/2010	1876650.13	733833.02	544.78	997	thalweg	t
30	402	4	Reach 1	8/27/2010	1876643.69	733830.97	544.83	1004	thalweg	t
31	402	4	Reach 1	8/27/2010	1876636.98	733828.61	545.12	1011	thalweg	t
32	402	4	Reach 1	8/27/2010	1876626.70	733826.53	545.39	1023	thalweg	t
33	402	4	Reach 1	8/27/2010	1876617.85	733823.97	544.51	1032	thalweg	t
34	402	4	Reach 1	8/27/2010	1876608.20	733824.44	544.54	1041	thalweg	t

35	402	4	Reach 1	8/27/2010	1876602.89	733823.34	544.66	1048	thalweg	t
36	402	4	Reach 1	8/27/2010	1876599.03	733822.44	544.51	1052	thalweg	t
37	402	4	Reach 1	8/27/2010	1876591.17	733820.13	545.00	1060	thalweg	t
38	402	4	Reach 1	8/27/2010	1876587.39	733819.97	545.41	1063	thalweg	top xvain
39	402	4	Reach 1	8/27/2010	1876584.50	733818.47	545.06	1067	thalweg	t
40	402	4	Reach 1	8/27/2010	1876583.71	733818.00	544.44	1068	thalweg	t
41	402	4	Reach 1	8/27/2010	1876580.40	733818.48	544.22	1072	thalweg	t
42	402	4	Reach 1	8/27/2010	1876573.05	733814.20	544.56	1079	thalweg	t
43	402	4	Reach 1	8/27/2010	1876567.04	733810.24	544.20	1088	thalweg	t
44	402	4	Reach 1	8/27/2010	1876562.79	733808.16	543.95	1092	thalweg	t
45	402	4	Reach 1	8/27/2010	1876560.79	733807.42	544.17	1094	thalweg	t at fnc
46	402	4	Reach 1	8/27/2010	1876576.91	733808.54	547.29	1078	bkf	bkf
47	402	4	Reach 1	8/27/2010	1876578.89	733806.87	547.91		tob	tob
48	402	4	Reach 1	8/27/2010	1876586.22	733826.76	546.44	1064	bkf	bkf
49	402	4	Reach 1	8/27/2010	1876585.26	733834.12	548.00		tob	tob
50	402	4	Reach 1	8/27/2010	1876607.16	733834.33	546.26		bkf	bkf
51	402	4	Reach 1	8/27/2010	1876645.61	733823.33	547.20	1003	bkf	bkf
52	402	4	Reach 1	8/27/2010	1876680.03	733830.39	547.97	969	bkf	tob
53	402	4	Reach 1	8/27/2010	1876693.60	733837.64	547.90	953	bkf	tob
54	402	4	Reach 1	8/27/2010	1876692.99	733841.97	547.09		bkf	bkf

Shot #	EEP ID	MY	LP ID	Survey Date	Northing	Easting	Elevation	Station	Shot ID	Comment
4	402	4	Reach 2	8/20/2010	734805.74	1875881.32	557.68	-2	Thalweg	at fence
5	402	4	Reach 2	8/20/2010	734803.30	1875880.27	557.58	1	Thalweg	t
6	402	4	Reach 2	8/20/2010	734800.55	1875878.35	557.67	4	Thalweg	t
7	402	4	Reach 2	8/20/2010	734798.05	1875875.40	557.70	8	Thalweg	t
8	402	4	Reach 2	8/20/2010	734797.49	1875870.57	557.57	13	Thalweg	hr
9	402	4	Reach 2	8/20/2010	734797.18	1875862.32	557.38	21	Thalweg	t
10	402	4	Reach 2	8/20/2010	734798.02	1875849.96	557.16	34	Thalweg	con
13	402	4	Reach 2	8/20/2010	734793.83	1875843.39	556.36	41	Thalweg	t
14	402	4	Reach 2	8/20/2010	734791.02	1875839.34	556.51	46	Thalweg	t
15	402	4	Reach 2	8/20/2010	734786.94	1875835.77	556.30	51	Thalweg	t
16	402	4	Reach 2	8/20/2010	734781.96	1875835.01	556.27	56	Thalweg	t
17	402	4	Reach 2	8/20/2010	734774.86	1875833.91	556.59	63	Thalweg	hr
18	402	4	Reach 2	8/20/2010	734771.64	1875833.89	557.05	66	Thalweg	hr
19	402	4	Reach 2	8/20/2010	734762.96	1875833.71	556.53	74	Thalweg	t
20	402	4	Reach 2	8/20/2010	734756.53	1875837.08	556.62	81	Thalweg	t
21	402	4	Reach 2	8/20/2010	734752.11	1875837.67	556.63	85	Thalweg	t
22	402	4	Reach 2	8/20/2010	734748.28	1875836.39	556.60	89	Thalweg	t
23	402	4	Reach 2	8/20/2010	734735.21	1875828.65	556.21	104	Thalweg	t
24	402	4	Reach 2	8/20/2010	734728.64	1875824.89	556.07	112	Thalweg	t
25	402	4	Reach 2	8/20/2010	734723.68	1875822.93	556.23	118	Thalweg	t
26	402	4	Reach 2	8/20/2010	734719.57	1875822.06	556.35	122	Thalweg	t
27	402	4	Reach 2	8/20/2010	734711.32	1875820.04	556.09	130	Thalweg	t
28	402	4	Reach 2	8/20/2010	734709.07	1875819.26	556.03	133	Thalweg	tp
29	402	4	Reach 2	8/20/2010	734707.71	1875818.67	555.76	134	Thalweg	t
30	402	4	Reach 2	8/20/2010	734705.71	1875818.18	555.39	136	Thalweg	max
31	402	4	Reach 2	8/20/2010	734701.84	1875812.86	555.88	143	Thalweg	t
32	402	4	Reach 2	8/20/2010	734700.56	1875807.67	555.96	148	Thalweg	t
33	402	4	Reach 2	8/20/2010	734699.36	1875803.33	556.21	153	Thalweg	hr
34	402	4	Reach 2	8/20/2010	734698.00	1875795.29	555.73	161	Thalweg	tp
35	402	4	Reach 2	8/20/2010	734696.57	1875791.99	555.46	164	Thalweg	t
36	402	4	Reach 2	8/20/2010	734694.91	1875788.83	555.58	168	Thalweg	t
37	402	4	Reach 2	8/20/2010	734692.60	1875786.35	555.49	171	Thalweg	t
38	402	4	Reach 2	8/20/2010	734687.30	1875782.06	555.65	178	Thalweg	t



39	402	4	Reach 2	8/20/2010	734683.14	1875780.90	555.66	182	Thalweg	t
40	402	4	Reach 2	8/20/2010	734677.93	1875780.75	555.83	186	Thalweg	t
41	402	4	Reach 2	8/20/2010	734674.02	1875779.99	555.75	190	Thalweg	t
42	402	4	Reach 2	8/20/2010	734668.76	1875778.33	555.54	196	Thalweg	t
43	402	4	Reach 2	8/20/2010	734662.87	1875778.36	555.48	202	Thalweg	t
44	402	4	Reach 2	8/20/2010	734658.61	1875780.75	555.48	207	Thalweg	t
45	402	4	Reach 2	8/20/2010	734654.83	1875784.26	555.23	212	Thalweg	t
46	402	4	Reach 2	8/20/2010	734654.02	1875784.72	555.10	213	Thalweg	t
47	402	4	Reach 2	8/20/2010	734650.65	1875786.00	554.90	216	Thalweg	max
48	402	4	Reach 2	8/20/2010	734645.18	1875787.47	555.32	223	Thalweg	hr
49	402	4	Reach 2	8/20/2010	734636.35	1875787.73	554.97	232	Thalweg	t
50	402	4	Reach 2	8/20/2010	734631.41	1875788.79	554.98	237	Thalweg	t
51	402	4	Reach 2	8/20/2010	734627.13	1875790.73	554.85	241	Thalweg	t
52	402	4	Reach 2	8/20/2010	734623.75	1875793.81	555.09	246	Thalweg	t
53	402	4	Reach 2	8/20/2010	734620.33	1875796.73	555.21	250	Thalweg	t
54	402	4	Reach 2	8/20/2010	734615.28	1875799.99	555.09	257	Thalweg	t
55	402	4	Reach 2	8/20/2010	734611.41	1875800.29	555.15	262	Thalweg	t
56	402	4	Reach 2	8/20/2010	734606.11	1875798.52	555.04	267	Thalweg	t
57	402	4	Reach 2	8/20/2010	734601.02	1875795.70	554.79	273	Thalweg	t
58	402	4	Reach 2	8/20/2010	734595.35	1875794.68	555.01	279	Thalweg	t
59	402	4	Reach 2	8/20/2010	734590.25	1875793.01	554.93	284	Thalweg	t
60	402	4	Reach 2	8/20/2010	734582.91	1875792.87	554.99	291	Thalweg	t
61	402	4	Reach 2	8/20/2010	734578.01	1875792.68	555.00	296	Thalweg	t
62	402	4	Reach 2	8/20/2010	734573.25	1875792.60	554.67	301	Thalweg	t
63	402	4	Reach 2	8/20/2010	734569.29	1875791.83	554.59	305	Thalweg	t
64	402	4	Reach 2	8/20/2010	734564.62	1875791.25	554.28	310	Thalweg	tp
67	402	4	Reach 2	8/20/2010	734512.66	1875761.13	554.7746	375	BKF	bkf
68	402	4	Reach 2	8/20/2010	734535.45	1875768.37	555.622	353	BKF	bkf
69	402	4	Reach 2	8/20/2010	734554.39	1875794.29	555.9701	318	BKF	bkf
70	402	4	Reach 2	8/20/2010	734587.84	1875798.89	556.707	288	BKF	bkf
71	402	4	Reach 2	8/20/2010	734615.45	1875805.56	556.6548	258	BKF	bkf
72	402	4	Reach 2	8/20/2010	734659.43	1875788.84	557.266	210	BKF	bkf
73	402	4	Reach 2	8/20/2010	734682.89	1875788.14	557.4389	179	BKF	bkf
74	402	4	Reach 2	8/20/2010	734697.73	1875814.80	557.6403	142	BKF	bkf

75	402	4	Reach 2	8/20/2010	734710.03	1875826.16	557.6251	129	BKF	bkf
76	402	4	Reach 2	8/20/2010	734767.99	1875843.21	558.3794	71	BKF	bkf
77	402	4	Reach 2	8/20/2010	734791.40	1875866.32	559.193	17	BKF	bkf
79	402	4	Reach 2	8/20/2010	734557.86	1875791.36	553.65	317	Thalweg	max
80	402	4	Reach 2	8/20/2010	734552.48	1875788.35	553.75	323	Thalweg	t
81	402	4	Reach 2	8/20/2010	734548.09	1875782.00	554.27	330	Thalweg	hr
82	402	4	Reach 2	8/20/2010	734544.54	1875776.24	554.09	337	Thalweg	t
83	402	4	Reach 2	8/20/2010	734543.18	1875770.17	553.80	344	Thalweg	t
84	402	4	Reach 2	8/20/2010	734540.99	1875765.31	553.71	349	Thalweg	t
85	402	4	Reach 2	8/20/2010	734534.50	1875760.32	554.21	357	Thalweg	hr
86	402	4	Reach 2	8/20/2010	734527.41	1875760.32	553.91	364	Thalweg	t
87	402	4	Reach 2	8/20/2010	734519.75	1875758.72	553.75	371	Thalweg	t
88	402	4	Reach 2	8/20/2010	734515.58	1875756.72	553.58	377	Thalweg	t
89	402	4	Reach 2	8/20/2010	734513.42	1875755.56	553.57	379	Thalweg	t
90	402	4	Reach 2	8/20/2010	734510.16	1875752.32	553.59	384	Thalweg	t
91	402	4	Reach 2	8/20/2010	734507.43	1875748.99	553.55	388	Thalweg	t
92	402	4	Reach 2	8/20/2010	734505.45	1875745.56	553.59	393	Thalweg	t
93	402	4	Reach 2	8/20/2010	734502.07	1875740.55	553.43	398	Thalweg	t
94	402	4	Reach 2	8/20/2010	734497.85	1875739.12	553.47	402	Thalweg	t
95	402	4	Reach 2	8/20/2010	734492.36	1875739.30	553.55	408	Thalweg	t
96	402	4	Reach 2	8/20/2010	734486.46	1875739.19	553.37	414	Thalweg	t
97	402	4	Reach 2	8/20/2010	734483.20	1875739.77	553.15	417	Thalweg	t
98	402	4	Reach 2	8/20/2010	734480.73	1875739.86	553.06	419	Thalweg	t
99	402	4	Reach 2	8/20/2010	734475.71	1875739.45	552.81	425	Thalweg	t
100	402	4	Reach 2	8/20/2010	734472.68	1875739.61	552.91	428	Thalweg	t
101	402	4	Reach 2	8/20/2010	734470.46	1875739.00	552.87	429	Thalweg	t
102	402	4	Reach 2	8/20/2010	734464.27	1875730.56	553.03	440	Thalweg	t
103	402	4	Reach 2	8/20/2010	734463.14	1875728.86	552.99	443	Thalweg	tp
104	402	4	Reach 2	8/20/2010	734460.06	1875726.29	552.47	446	Thalweg	tp
105	402	4	Reach 2	8/20/2010	734456.95	1875726.22	552.37	449	Thalweg	tp
106	402	4	Reach 2	8/20/2010	734452.21	1875726.77	552.95	453	Thalweg	tp
107	402	4	Reach 2	8/20/2010	734440.29	1875734.08	552.74	468	Thalweg	t
108	402	4	Reach 2	8/20/2010	734438.65	1875735.23	552.62	469	Thalweg	tp
109	402	4	Reach 2	8/20/2010	734431.84	1875738.05	551.88	478	Thalweg	max

110	402	4	Reach 2	8/20/2010	734426.48	1875736.68	551.91	454	Thalweg	t
111	402	4	Reach 2	8/20/2010	734422.36	1875732.00	552.43	489	Thalweg	hp
112	402	4	Reach 2	8/20/2010	734418.49	1875728.85	551.89	494	Thalweg	t
113	402	4	Reach 2	8/20/2010	734416.55	1875726.83	551.59	496	Thalweg	t
114	402	4	Reach 2	8/20/2010	734408.05	1875723.32	551.85	505	Thalweg	tp
115	402	4	Reach 2	8/20/2010	734406.05	1875722.59	551.63	508	Thalweg	t
116	402	4	Reach 2	8/20/2010	734399.61	1875720.06	551.42	515	Thalweg	t
117	402	4	Reach 2	8/20/2010	734396.87	1875715.79	551.90	520	Thalweg	hr
118	402	4	Reach 2	8/20/2010	734394.89	1875698.63	551.58	537	Thalweg	t
119	402	4	Reach 2	8/20/2010	734393.36	1875694.09	551.34	542	Thalweg	t
120	402	4	Reach 2	8/20/2010	734393.54	1875693.05	551.45	543	Thalweg	tp
121	402	4	Reach 2	8/20/2010	734392.95	1875689.39	551.10	547	Thalweg	t
122	402	4	Reach 2	8/20/2010	734392.63	1875685.11	550.92	550	Thalweg	t
123	402	4	Reach 2	8/20/2010	734389.78	1875683.10	550.71	554	Thalweg	t
124	402	4	Reach 2	8/20/2010	734386.65	1875680.69	550.67	557	Thalweg	max
125	402	4	Reach 2	8/20/2010	734380.90	1875682.53	551.05	563	Thalweg	hr
128	402	4	Reach 2	8/20/2010	734314.59	1875701.82	551.8549	631	BKF	bkf
129	402	4	Reach 2	8/20/2010	734389.68	1875709.15	553.3594	528	BKF	bkf
130	402	4	Reach 2	8/20/2010	734408.02	1875730.13	553.6791	503	BKF	bkf
131	402	4	Reach 2	8/20/2010	734442.98	1875740.39	554.0784	468	BKF	bkf
132	402	4	Reach 2	8/20/2010	734465.36	1875741.06	554.6499	430	BKF	bkf
133	402	4	Reach 2	8/20/2010	734523.81	1875767.54	555.265	368	BKF	bkf
134	402	4	Reach 2	8/20/2010	734378.87	1875682.17	551.22	565	Thalweg	t
135	402	4	Reach 2	8/20/2010	734369.88	1875685.45	551.19	574	Thalweg	t
137	402	4	Reach 2	8/20/2010	734339.54	1875699.27	552.4643	609	BKF	bkf
138	402	4	Reach 2	8/20/2010	734367.79	1875687.59	551.21	577	Thalweg	t
139	402	4	Reach 2	8/20/2010	734364.61	1875687.64	550.84	580	Thalweg	grass
140	402	4	Reach 2	8/20/2010	734358.63	1875687.22	551.07	586	Thalweg	grass end
141	402	4	Reach 2	8/20/2010	734350.31	1875686.61	550.29	594	Thalweg	max .4
142	402	4	Reach 2	8/20/2010	734345.66	1875688.76	551.05	600	Thalweg	t
143	402	4	Reach 2	8/20/2010	734341.49	1875692.12	551.00	604	Thalweg	hr
144	402	4	Reach 2	8/20/2010	734332.61	1875696.07	550.67	614	Thalweg	tp
145	402	4	Reach 2	8/20/2010	734330.65	1875697.04	549.98	617	Thalweg	t
146	402	4	Reach 2	8/20/2010	734328.21	1875697.27	549.66	618	Thalweg	max

147	402	4	Reach 2	8/20/2010	734322.82	1875698.98	549.93	625	Thalweg	t
148	402	4	Reach 2	8/20/2010	734317.05	1875696.86	550.32	631	Thalweg	t
149	402	4	Reach 2	8/20/2010	734313.91	1875694.71	550.14	635	Thalweg	t
150	402	4	Reach 2	8/20/2010	734307.91	1875691.35	550.16	642	Thalweg	t
151	402	4	Reach 2	8/20/2010	734303.27	1875690.05	550.21	647	Thalweg	t
152	402	4	Reach 2	8/20/2010	734299.73	1875691.00	550.39	650	Thalweg	t
153	402	4	Reach 2	8/20/2010	734293.71	1875695.27	550.27	655	Thalweg	t
154	402	4	Reach 2	8/20/2010	734288.45	1875700.21	550.23	665	Thalweg	t
155	402	4	Reach 2	8/20/2010	734284.06	1875702.52	549.87	669	Thalweg	t
156	402	4	Reach 2	8/20/2010	734280.31	1875702.43	549.70	673	Thalweg	t
157	402	4	Reach 2	8/20/2010	734277.04	1875703.23	549.82	676	Thalweg	t
158	402	4	Reach 2	8/20/2010	734274.18	1875702.66	549.94	679	Thalweg	t
159	402	4	Reach 2	8/20/2010	734267.52	1875697.95	550.18	688	Thalweg	t
160	402	4	Reach 2	8/20/2010	734264.51	1875693.06	549.94	694	Thalweg	t
161	402	4	Reach 2	8/20/2010	734263.86	1875691.91	550.22	695	Thalweg	tp
162	402	4	Reach 2	8/20/2010	734261.91	1875690.48	549.65	697	Thalweg	t
163	402	4	Reach 2	8/20/2010	734259.18	1875687.25	549.48	701	Thalweg	t
164	402	4	Reach 2	8/20/2010	734255.65	1875684.50	549.42	705	Thalweg	t
165	402	4	Reach 2	8/20/2010	734253.45	1875684.02	549.29	707	Thalweg	t
166	402	4	Reach 2	8/20/2010	734245.68	1875684.81	549.63	715	Thalweg	t
167	402	4	Reach 2	8/20/2010	734239.46	1875686.82	549.39	721	Thalweg	t
168	402	4	Reach 2	8/20/2010	734236.32	1875686.70	549.02	724	Thalweg	t
169	402	4	Reach 2	8/20/2010	734230.75	1875687.24	548.97	730	Thalweg	t
170	402	4	Reach 2	8/20/2010	734229.22	1875687.14	548.72	731	Thalweg	t
171	402	4	Reach 2	8/20/2010	734223.07	1875687.97	548.76	738	Thalweg	t
172	402	4	Reach 2	8/20/2010	734219.99	1875687.40	549.30	741	Thalweg	t
173	402	4	Reach 2	8/20/2010	734215.01	1875684.81	549.34	747	Thalweg	t
174	402	4	Reach 2	8/20/2010	734211.18	1875682.95	549.19	750	Thalweg	t
175	402	4	Reach 2	8/20/2010	734209.05	1875682.70	549.07	753	Thalweg	t
176	402	4	Reach 2	8/20/2010	734205.99	1875681.60	548.79	756	Thalweg	t
177	402	4	Reach 2	8/20/2010	734202.79	1875680.58	548.90	759	Thalweg	grass
178	402	4	Reach 2	8/20/2010	734199.61	1875681.21	549.01	762	Thalweg	t
179	402	4	Reach 2	8/20/2010	734196.94	1875682.17	549.06	765	Thalweg	t
180	402	4	Reach 2	8/20/2010	734194.61	1875683.61	548.88	768	Thalweg	t



183	402	4	Reach 2	8/20/2010	734179.20	1875696.15	550.1235	785	BKF	bkf
184	402	4	Reach 2	8/20/2010	734222.63	1875693.01	550.6841	737	BKF	bkf
185	402	4	Reach 2	8/20/2010	734264.71	1875701.28	551.6494	686	BKF	bkf
186	402	4	Reach 2	8/20/2010	734190.33	1875685.48	548.30	773	Thalweg	tp
187	402	4	Reach 2	8/20/2010	734188.93	1875686.82	548.52	774	Thalweg	t
188	402	4	Reach 2	8/20/2010	734187.15	1875686.80	547.95	776	Thalweg	t
189	402	4	Reach 2	8/20/2010	734182.05	1875689.18	547.71	782	Thalweg	t
190	402	4	Reach 2	8/20/2010	734178.04	1875689.01	547.94	788	Thalweg	t
191	402	4	Reach 2	8/20/2010	734174.81	1875688.76	548.17	791	Thalweg	t
192	402	4	Reach 2	8/20/2010	734173.06	1875686.42	548.19	794	Thalweg	t
193	402	4	Reach 2	8/20/2010	734171.93	1875684.92	548.12	796	Thalweg	t
194	402	4	Reach 2	8/20/2010	734170.83	1875683.96	547.91	798	Thalweg	t
195	402	4	Reach 2	8/20/2010	734169.65	1875682.50	548.12	799	Thalweg	t
196	402	4	Reach 2	8/20/2010	734164.55	1875679.00	547.82	805	Thalweg	t
197	402	4	Reach 2	8/20/2010	734160.57	1875675.77	547.55	810	Thalweg	t
198	402	4	Reach 2	8/20/2010	734155.49	1875675.26	547.63	815	Thalweg	t
199	402	4	Reach 2	8/20/2010	734149.48	1875676.42	547.46	821	Thalweg	t
200	402	4	Reach 2	8/20/2010	734144.06	1875676.09	547.15	827	Thalweg	t
201	402	4	Reach 2	8/20/2010	734139.32	1875674.29	547.59	833	Thalweg	hr
202	402	4	Reach 2	8/20/2010	734133.64	1875671.69	547.51	839	Thalweg	t
203	402	4	Reach 2	8/20/2010	734130.04	1875670.50	547.09	843	Thalweg	t
204	402	4	Reach 2	8/20/2010	734128.10	1875669.02	547.05	845	Thalweg	t
205	402	4	Reach 2	8/20/2010	734124.51	1875669.09	547.44	848	Thalweg	t
206	402	4	Reach 2	8/20/2010	734127.38	1875674.70	554.0267	843	BKF	bkf
207	402	4	Reach 2	8/20/2010	734113.41	1875670.09	546.58	860	Thalweg	er
208	402	4	Reach 2	8/20/2010	734111.82	1875669.78	546.54	861	Thalweg	t
209	402	4	Reach 2	8/20/2010	734107.95	1875671.02	546.77	865	Thalweg	tp
210	402	4	Reach 2	8/20/2010	734101.90	1875667.50	546.25	871	Thalweg	t
211	402	4	Reach 2	8/20/2010	734097.42	1875664.24	546.58	877	Thalweg	t
212	402	4	Reach 2	8/20/2010	734090.22	1875660.84	546.18	885	Thalweg	t
213	402	4	Reach 2	8/20/2010	734086.37	1875659.60	546.20	889	Thalweg	t
214	402	4	Reach 2	8/20/2010	734083.73	1875659.09	546.24	892	Thalweg	t
215	402	4	Reach 2	8/20/2010	734083.85	1875659.31	546.72	892	Thalweg	t
216	402	4	Reach 2	8/20/2010	734077.75	1875659.47	547.03	898	Thalweg	t

217	402	4	Reach 2	8/20/2010	734072.49	1875659.27	547.15	903	Thalweg	t
218	402	4	Reach 2	8/20/2010	734070.81	1875661.16	546.91	905	Thalweg	t
219	402	4	Reach 2	8/20/2010	734067.40	1875663.30	546.63	908	Thalweg	t
220	402	4	Reach 2	8/20/2010	734062.28	1875664.05	546.71	914	Thalweg	t
221	402	4	Reach 2	8/20/2010	734060.10	1875664.59	546.61	916	Thalweg	t
224	402	4	Reach 2	8/20/2010	734087.95	1875665.75	548.8583	885	BKF	bkf
225	402	4	Reach 2	8/20/2010	734125.68	1875674.92	549.4971	845	BKF	bkf
226	402	4	Reach 2	8/20/2010	734150.63	1875683.53	549.5602	820	BKF	bkf
227	402	4	Reach 2	8/20/2010	734027.50	1875661.11	548.2224	952	BKF	bkf
228	402	4	Reach 2	8/20/2010	734056.16	1875664.21	546.68	920	Thalweg	t
229	402	4	Reach 2	8/20/2010	734058.50	1875657.39	548.4537	918	BKF	bkf
230	402	4	Reach 2	8/20/2010	734048.69	1875661.12	546.30	928	Thalweg	t
231	402	4	Reach 2	8/20/2010	734042.94	1875660.01	546.08	934	Thalweg	t
232	402	4	Reach 2	8/20/2010	734040.07	1875659.08	545.99	936	Thalweg	t
233	402	4	Reach 2	8/20/2010	734036.61	1875657.60	545.71	940	Thalweg	t
234	402	4	Reach 2	8/20/2010	734033.12	1875656.71	545.56	945	Thalweg	t
235	402	4	Reach 2	8/20/2010	734030.09	1875655.29	545.33	948	Thalweg	t
236	402	4	Reach 2	8/20/2010	734024.92	1875654.66	545.43	953	Thalweg	t
237	402	4	Reach 2	8/20/2010	734020.94	1875650.32	547.6624	956	BKF	bkf
238	402	4	Reach 2	8/20/2010	734019.37	1875654.66	545.21	959	Thalweg	t
239	402	4	Reach 2	8/20/2010	734015.51	1875655.62	545.49	962	Thalweg	t
240	402	4	Reach 2	8/20/2010	734011.96	1875656.57	545.77	966	Thalweg	t
241	402	4	Reach 2	8/20/2010	734008.53	1875657.96	545.70	970	Thalweg	t
242	402	4	Reach 2	8/20/2010	734004.51	1875657.23	545.51	974	Thalweg	t
243	402	4	Reach 2	8/20/2010	734000.76	1875656.02	545.55	978	Thalweg	t
244	402	4	Reach 2	8/20/2010	733999.45	1875654.49	545.93	980	Thalweg	t
245	402	4	Reach 2	8/20/2010	733994.34	1875648.15	545.49	988	Thalweg	t
246	402	4	Reach 2	8/20/2010	733990.29	1875646.34	545.21	992	Thalweg	t
247	402	4	Reach 2	8/20/2010	733985.55	1875645.09	545.09	997	Thalweg	t
248	402	4	Reach 2	8/20/2010	733981.27	1875645.09	545.59	1002	Thalweg	hr
249	402	4	Reach 2	8/20/2010	733978.59	1875641.72	546.7147	1003	BKF	bkf
250	402	4	Reach 2	8/20/2010	733977.78	1875646.25	545.40	1005	Thalweg	t
251	402	4	Reach 2	8/20/2010	733977.27	1875646.02	544.66	1005	Thalweg	t
252	402	4	Reach 2	8/20/2010	733972.80	1875647.26	544.65	1010	Thalweg	t

253	402	4	Reach 2	8/20/2010	733968.87	1875645.90	544.69	1014	Thalweg	t
254	402	4	Reach 2	8/20/2010	733966.98	1875645.33	544.60	1016	Thalweg	t
255	402	4	Reach 2	8/20/2010	733964.54	1875644.41	544.75	1018	Thalweg	t
256	402	4	Reach 2	8/20/2010	733962.19	1875644.18	544.42	1021	Thalweg	t
257	402	4	Reach 2	8/20/2010	733957.91	1875643.17	544.44	1025	Thalweg	t
258	402	4	Reach 2	8/20/2010	733952.64	1875642.51	544.49	1031	Thalweg	t
259	402	4	Reach 2	8/20/2010	733949.57	1875644.45	544.59	1034	Thalweg	t
260	402	4	Reach 2	8/20/2010	733949.76	1875650.77	545.9947	1036	BKF	bkf
261	402	4	Reach 2	8/20/2010	733942.45	1875645.97	544.12	1042	Thalweg	t
262	402	4	Reach 2	8/20/2010	733937.70	1875647.38	543.64	1047	Thalweg	t
263	402	4	Reach 2	8/20/2010	733934.34	1875647.37	544.06	1050	Thalweg	cv
264	402	4	Reach 2	8/20/2010	733929.47	1875644.70	544.17	1055	Thalweg	cv
265	402	4	Reach 2	8/20/2010	733927.85	1875642.72	544.34	1057	Thalweg	tp
266	402	4	Reach 2	8/20/2010	733926.46	1875641.58	544.00	1058	Thalweg	t
267	402	4	Reach 2	8/20/2010	733924.50	1875638.20	543.75	1063	Thalweg	t
268	402	4	Reach 2	8/20/2010	733922.42	1875634.78	543.21	1066	Thalweg	t
269	402	4	Reach 2	8/20/2010	733918.36	1875632.13	542.97	1071	Thalweg	t
270	402	4	Reach 2	8/20/2010	733916.57	1875631.18	542.75	1073	Thalweg	tp
271	402	4	Reach 2	8/20/2010	733914.93	1875631.00	542.21	1075	Thalweg	t
272	402	4	Reach 2	8/20/2010	733908.84	1875627.16	542.00	1084	Thalweg	t
273	402	4	Reach 2	8/20/2010	733906.38	1875628.98	542.85	1087	Thalweg	t
274	402	4	Reach 2	8/20/2010	733902.86	1875631.22	542.61	1091	Thalweg	t
275	402	4	Reach 2	8/20/2010	733898.30	1875631.95	542.68	1096	Thalweg	t
276	402	4	Reach 2	8/20/2010	733896.80	1875632.45	542.27	1097	Thalweg	t
277	402	4	Reach 2	8/20/2010	733891.29	1875632.10	542.55	1102	Thalweg	t
278	402	4	Reach 2	8/20/2010	733886.37	1875633.39	542.35	1108	Thalweg	t
279	402	4	Reach 2	8/20/2010	733884.33	1875636.56	542.45	1111	Thalweg	fence
280	402	4	Reach 2	8/20/2010	733902.71	1875635.39	543.9674	1093	BKF	bkf
281	402	4	Reach 2	8/20/2010	733922.30	1875643.93	545.2058	1061	BKF	bkf
282	402	4	Reach 2	8/20/2010	733936.06	1875652.63	545.7533	1048	BKF	bkf

Figure 7.0. Pebble Counts. UT to Rocky River Stream Restoration (EEP Project #402)

XS1-1 (Riffle)			2010		
Descript.	Material	Size (mm)	Total #	Class %	Cum %
Silt/Clay	Silt/Clay	.062		0	0
Sand	Very Fine Sand	.125	2	2	2
	Fine Sand	.25	6	6	8
	Medium Sand	0.5	3	3	11
	Coarse Sand	1.0	5	5	16
	Very Course Sand	2	2	2	18
Gravel	Very Fine Gravel	4.0	1	1	19
	Fine Gravel	5.7	1	1	20
	Fine Gravel	8	9	9	29
	Medium Gravel	11.3	3	3	32
	Medium Gravel	16	8	8	40
	Coarse Gravel	22.6	12	12	52
	Coarse Gravel	32	19	19	71
	Very Course Gravel	45	14	14	85
	Very Course Gravel	64	15	15	100
Cobble	Small Cobble	90		0	100
	Small Cobble	128		0	100
	Medium Cobble	180		0	100
	Large Cobble	256		0	100
Boulder	Small Boulders	362		0	100
	Small Boulders	512		0	100
	Medium Boulders	1024		0	100
	Large Boulders	2048		0	100
Bedrock	Bedrock	40096		0	100
Total			100		

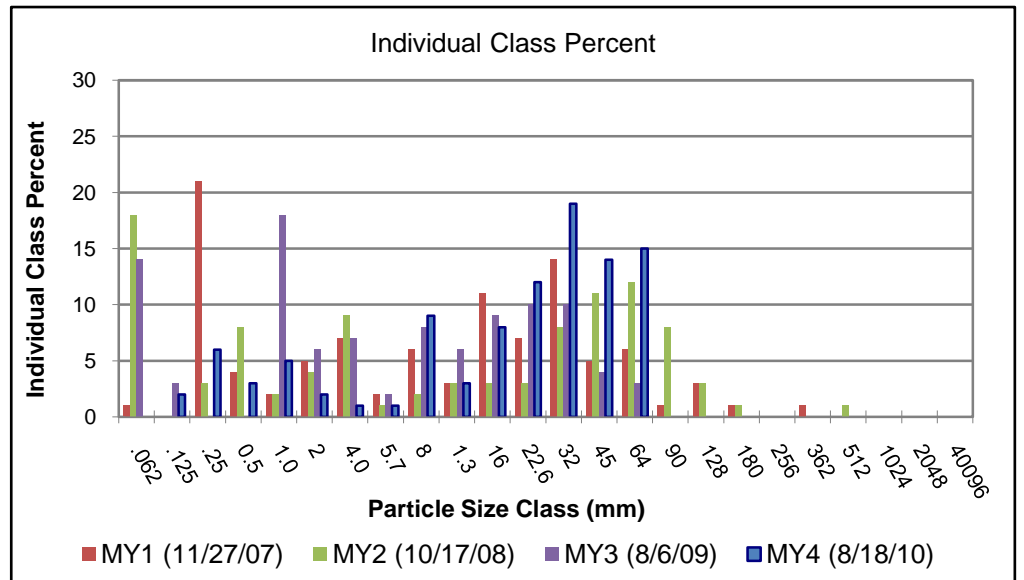
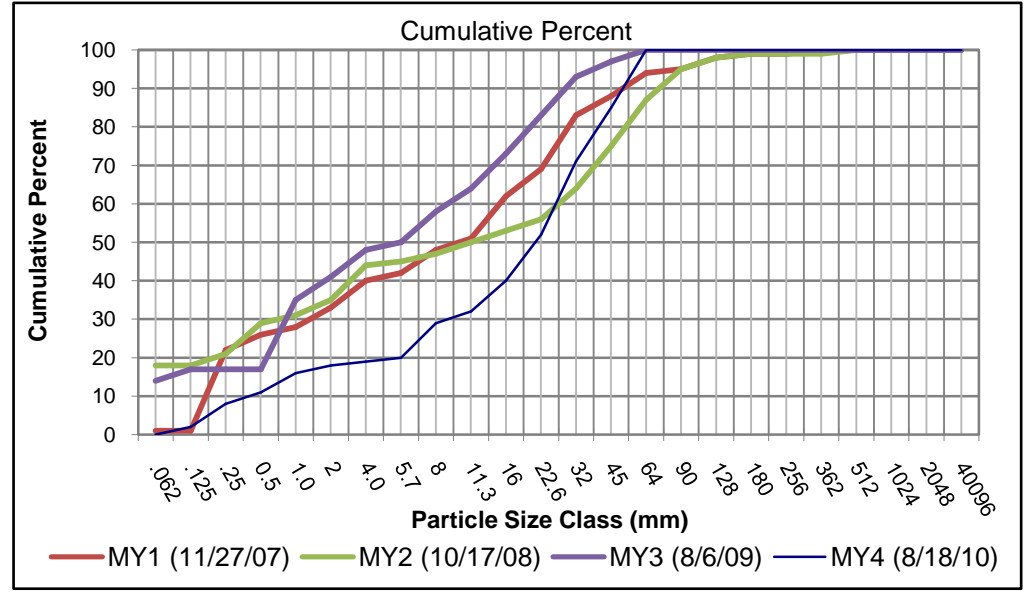




Figure 7.1. Pebble Counts. UT to Rocky River Stream Restoration (EEP Project #402)

XS2-1 (Riffle)			2010		
Descript.	Material	Size (mm)	Total #	Class %	Cum %
Silt/Clay	Silt/Clay	.062	32	32	32
Sand	Very Fine Sand	.125		0	32
	Fine Sand	.25	1	1	33
	Medium Sand	0.5	6	6	39
	Coarse Sand	1.0	1	1	40
	Very Course Sand	2	3	3	43
Gravel	Very Fine Gravel	4.0	4	4	47
	Fine Gravel	5.7	2	2	49
	Fine Gravel	8	11	11	59
	Medium Gravel	11.3	10	10	69
	Medium Gravel	16	16	16	85
	Coarse Gravel	22.6	6	6	91
	Coarse Gravel	32	3	3	94
	Very Course Gravel	45		0	94
	Very Course Gravel	64		0	94
Cobble	Small Cobble	90	2	2	96
	Small Cobble	128	1	1	97
	Medium Cobble	180	2	2	99
	Large Cobble	256		0	99
Boulder	Small Boulders	362		0	99
	Small Boulders	512	1	1	100
	Medium Boulders	1024		0	100
Bedrock	Large Boulders	2048		0	100
	Bedrock	40096		0	100

Total 101

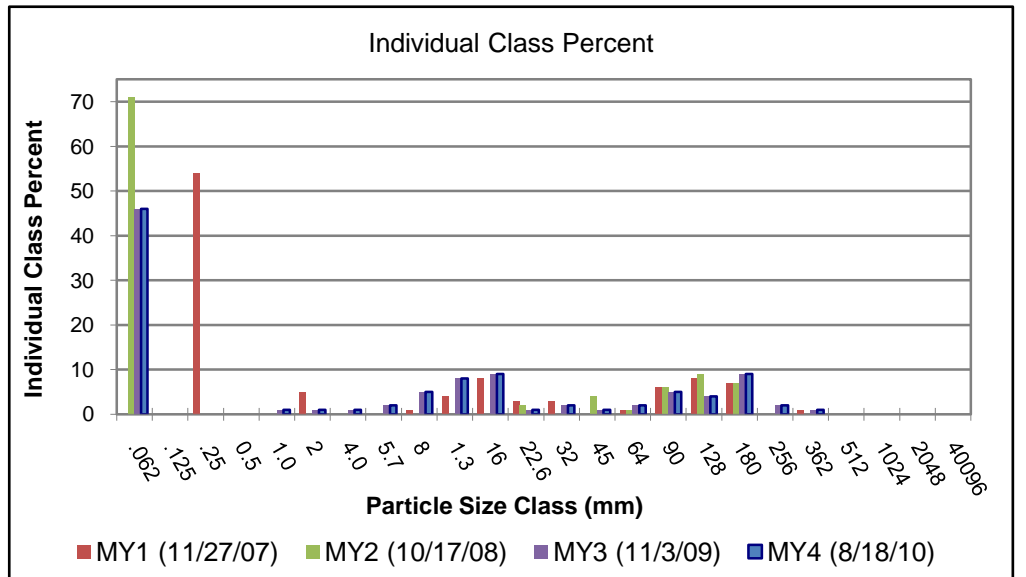
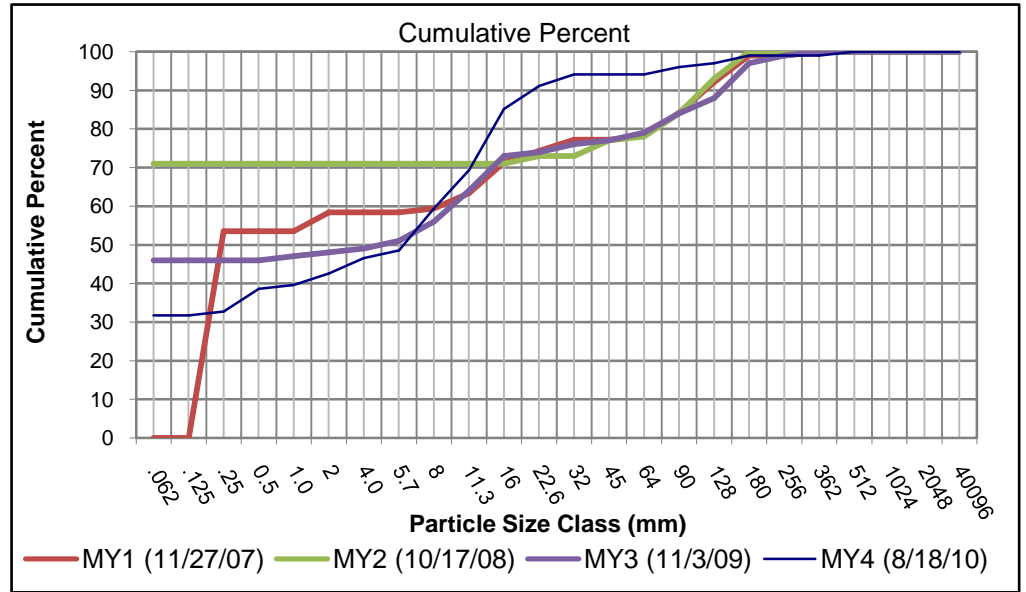


Figure 7.2. Pebble Counts. UT to Rocky River Stream Restoration (EEP Project #402)

XS2-2 (Pool)			2010		
Descript.	Material	Size (mm)	Total #	Class %	Cum %
Silt/Clay	Silt/Clay	.062	87	87	87
Sand	Very Fine Sand	.125		0	87
	Fine Sand	.25		0	87
	Medium Sand	0.5		0	87
	Coarse Sand	1.0		0	87
	Very Course Sand	2		0	87
Gravel	Very Fine Gravel	4.0		0	87
	Fine Gravel	5.7	1	1	88
	Fine Gravel	8	5	5	93
	Medium Gravel	11.3	4	4	97
	Medium Gravel	16	1	1	98
	Coarse Gravel	22.6		0	98
	Coarse Gravel	32	2	2	100
	Very Course Gravel	45		0	100
	Very Course Gravel	64		0	100
Cobble	Small Cobble	90		0	100
	Small Cobble	128		0	100
	Medium Cobble	180		0	100
	Large Cobble	256		0	100
Boulder	Small Boulders	362		0	100
	Small Boulders	512		0	100
	Medium Boulders	1024		0	100
	Large Boulders	2048		0	100
Bedrock	Bedrock	40096		0	100
Total			100		

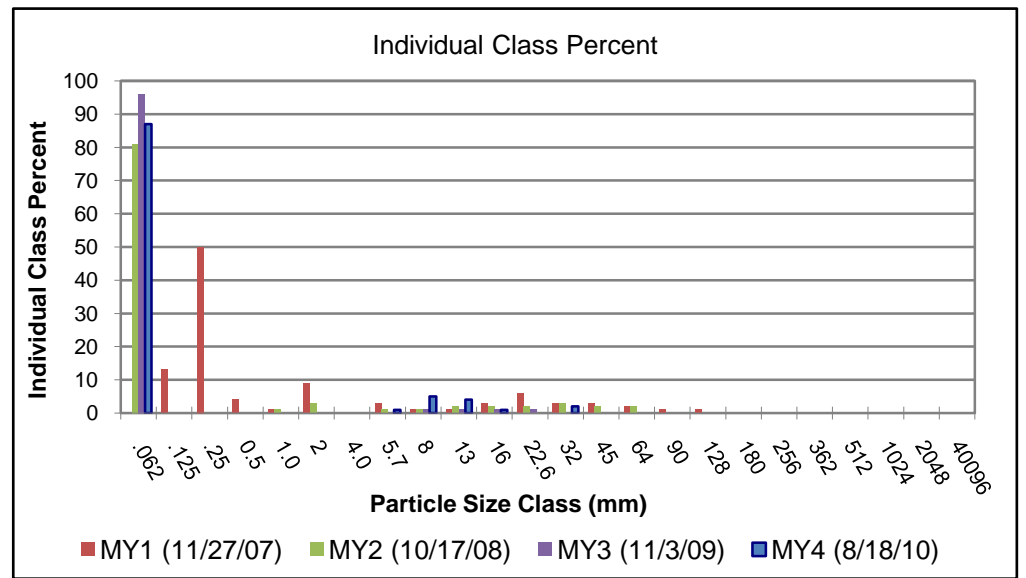
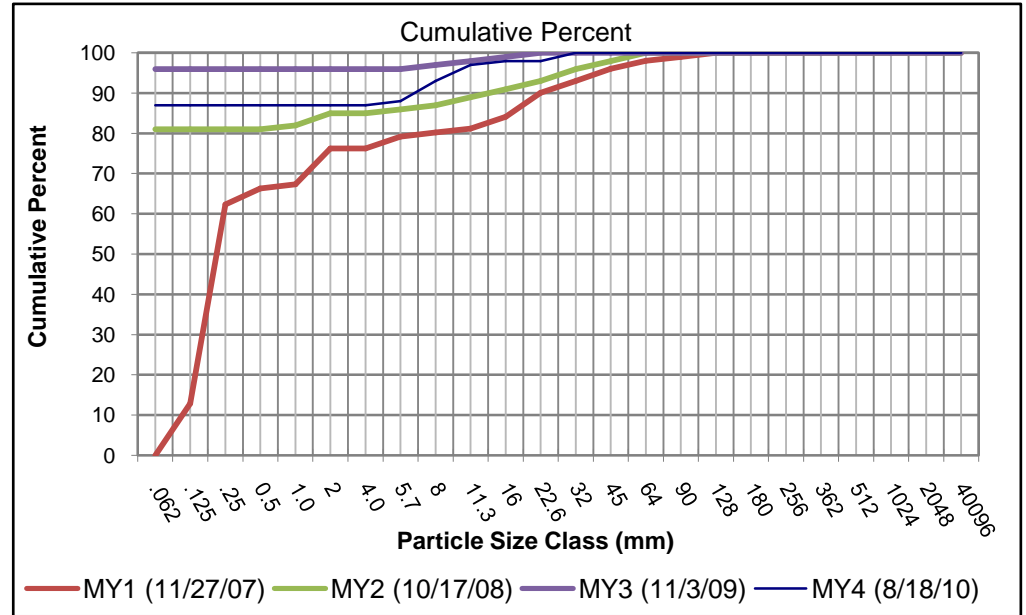


Figure 7.3. Pebble Counts. UT to Rocky River Stream Restoration (EEP Project #402)

XS2-3 (Riffle)			2010		
Descript.	Material	Size (mm)	Total #	Class %	Cum %
Silt/Clay	Silt/Clay	.062	93	93	93
Sand	Very Fine Sand	.125		0	93
	Fine Sand	.25		0	93
	Medium Sand	0.5		0	93
	Coarse Sand	1.0		0	93
	Very Course Sand	2		0	93
Gravel	Very Fine Gravel	4.0		0	93
	Fine Gravel	5.7		0	93
	Fine Gravel	8	2	2	95
	Medium Gravel	11.3	2	2	97
	Medium Gravel	16	1	1	98
	Coarse Gravel	22.6	1	1	99
	Coarse Gravel	32		0	99
	Very Course Gravel	45	1	1	100
	Very Course Gravel	64		0	100
Cobble	Small Cobble	90		0	100
	Small Cobble	128		0	100
	Medium Cobble	180		0	100
	Large Cobble	256		0	100
Boulder	Small Boulders	362		0	100
	Small Boulders	512		0	100
	Medium Boulders	1024		0	100
Large Boulders	2048		0	100	
Bedrock	Bedrock	40096		0	100
Total			100		

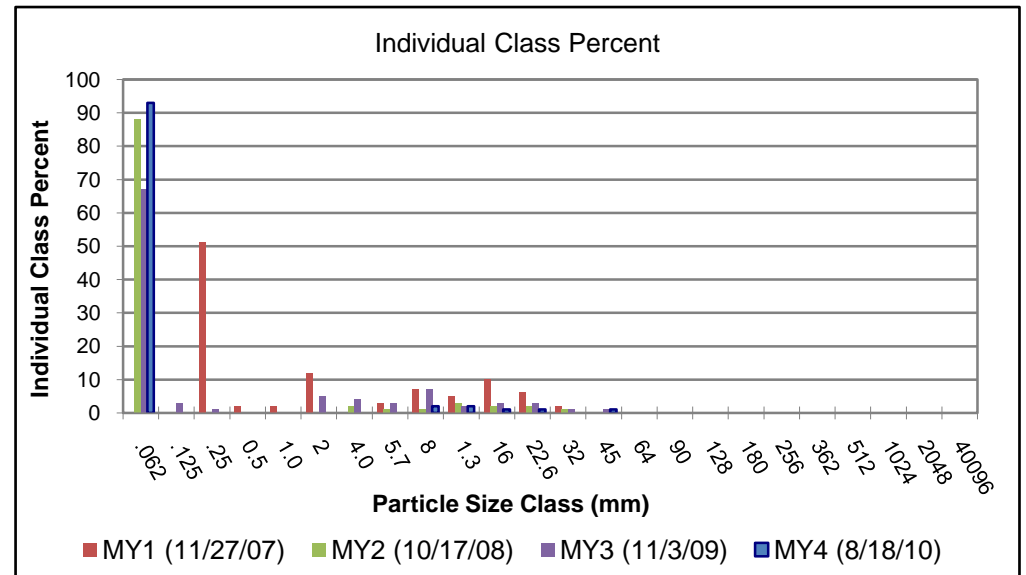
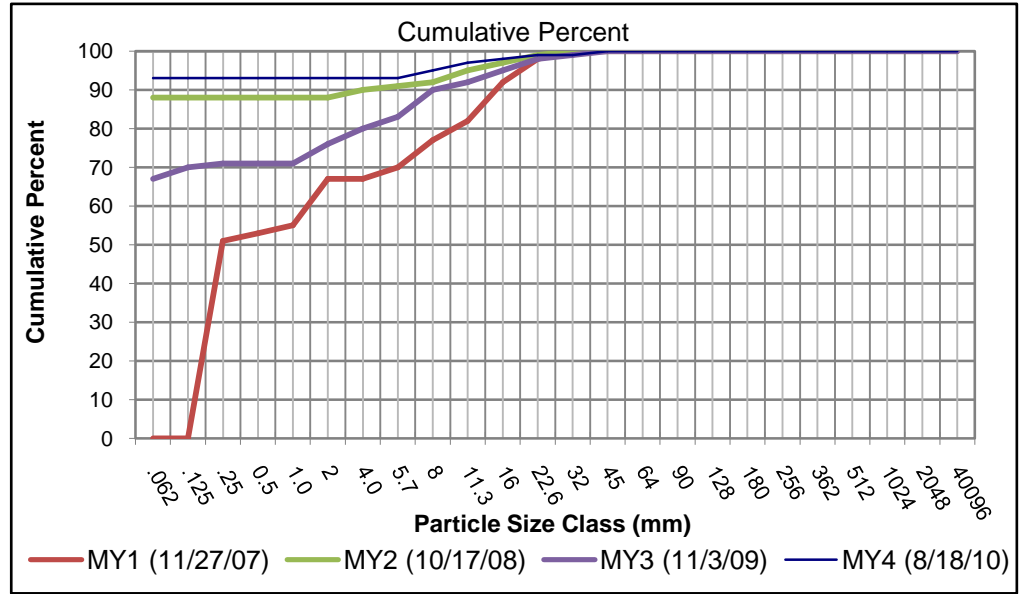


Figure 7.4. Pebble Counts. UT to Rocky River Stream Restoration (EEP Project #402)

XS2-4 (Pool)			2010		
Descript.	Material	Size (mm)	Total #	Class %	Cum %
Silt/Clay	Silt/Clay	.062		0	0
Sand	Very Fine Sand	.125	65	65	65
	Fine Sand	.25		0	65
	Medium Sand	0.5	6	6	71
	Coarse Sand	1.0		0	71
	Very Course Sand	2		0	71
Gravel	Very Fine Gravel	4.0		0	71
	Fine Gravel	5.7	3	3	74
	Fine Gravel	8	3	3	77
	Medium Gravel	11.3	4	4	81
	Medium Gravel	16	8	8	89
	Coarse Gravel	22.6	7	7	96
	Coarse Gravel	32	2	2	98
	Very Course Gravel	45		0	98
	Very Course Gravel	64	1	1	99
Cobble	Small Cobble	90	1	1	100
	Small Cobble	128		0	100
	Medium Cobble	180		0	100
	Large Cobble	256		0	100
Boulder	Small Boulders	362		0	100
	Small Boulders	512		0	100
	Medium Boulders	1024		0	100
	Large Boulders	2048		0	100
Bedrock	Bedrock	40096		0	100
Total			100		

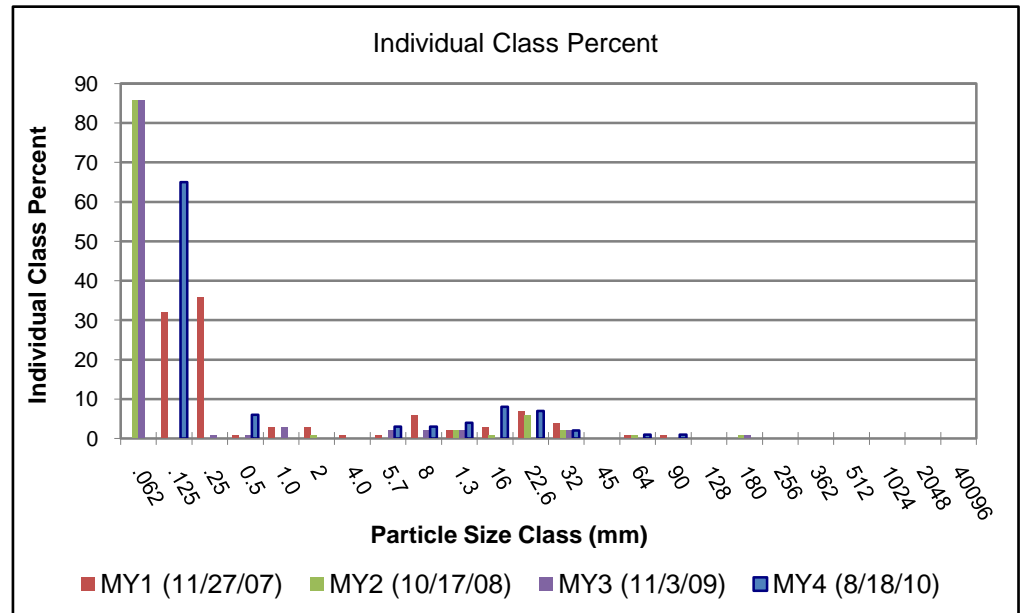
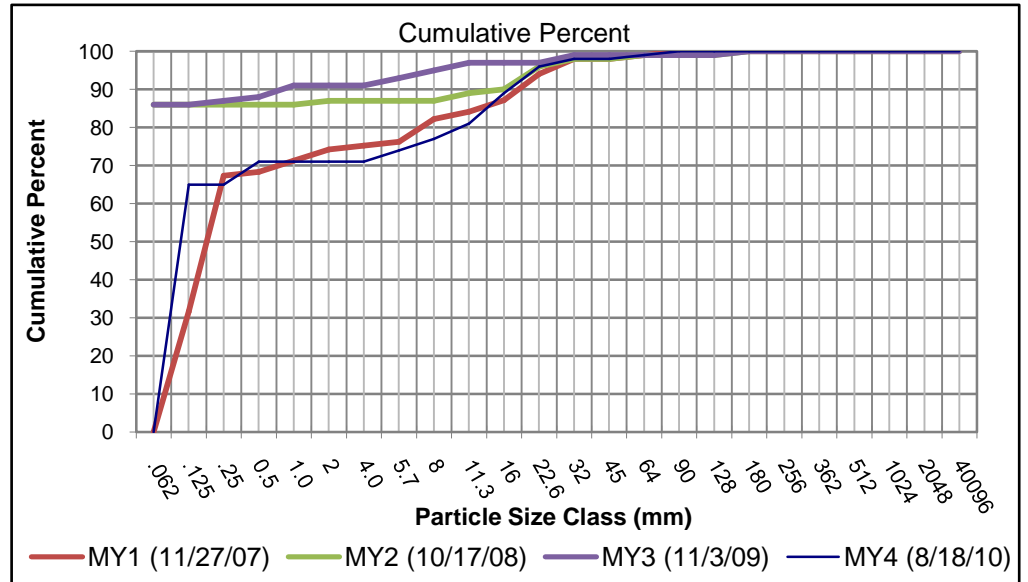
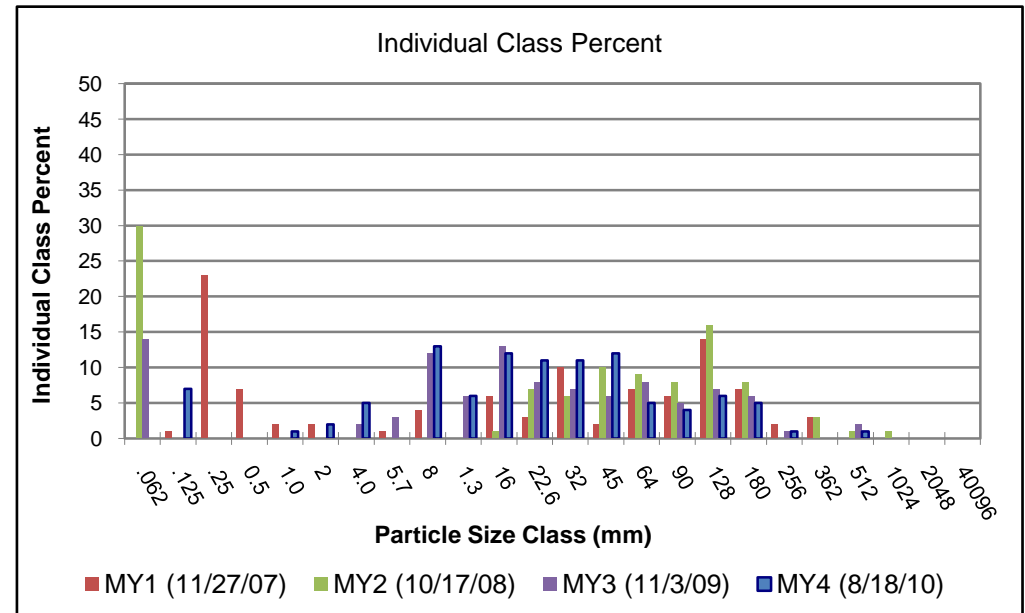
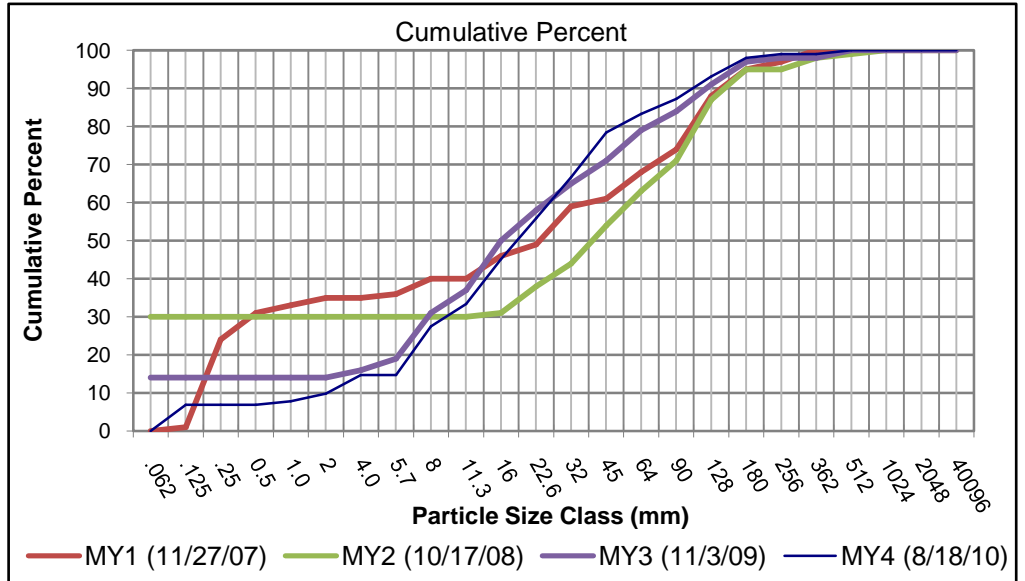




Figure 7.5. Pebble Counts. UT to Rocky River Stream Restoration (EEP Project #402)

XS2-5 (Riffle)			2010		
Descript.	Material	Size (mm)	Total #	Class %	Cum %
Silt/Clay	Silt/Clay	.062		0	0
Sand	Very Fine Sand	.125	7	7	7
	Fine Sand	.25		0	7
	Medium Sand	0.5		0	7
	Coarse Sand	1.0	1	1	8
	Very Course Sand	2	2	2	10
Gravel	Very Fine Gravel	4.0	5	5	15
	Fine Gravel	5.7		0	15
	Fine Gravel	8	13	13	27
	Medium Gravel	11.3	6	6	33
	Medium Gravel	16	12	12	45
	Coarse Gravel	22.6	11	11	56
	Coarse Gravel	32	11	11	67
	Very Course Gravel	45	12	12	78
	Very Course Gravel	64	5	5	83
Cobble	Small Cobble	90	4	4	87
	Small Cobble	128	6	6	93
	Medium Cobble	180	5	5	98
	Large Cobble	256	1	1	99
Boulder	Small Boulders	362		0	99
	Small Boulders	512	1	1	100
	Medium Boulders	1024		0	100
	Large Boulders	2048		0	100
Bedrock	Bedrock	40096		0	100
Total			102		



# Pebble Count

Site RR XS 2-1

Date 8/20/2010

Survey Crew CH & SD

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Particle	Description	Size (mm)	Particle Count				%	Cum %
			Riffle	Pool	Other	Total		
Silt/Clay	Silt/Clay	< 0.062		32				
Sand	Very Fine	0.062 - 0.125						
	Fine	0.125 - 0.25		1				
	Medium	0.25 - 0.5		6				
	Coarse	0.5 - 1.0		1				
	Very Coarse	1.0 - 2.0		3				
Gravel	Very Fine	2.0 - 4.0		4				
	Fine	4.0 - 5.7		2				
	Fine	5.7 - 8.0		11				
	Medium	8.0 - 11.3		10				
	Medium	11.3 - 16.0		16				
	Coarse	16.0 - 22.6		6				
	Coarse	22.6 - 32		3				
	Very Coarse	32 - 45						
	Very Coarse	45 - 64						
Cobble	Small	64 - 90		2				
	Small	90 - 128		1				
	Large	128 - 180		2				
	Large	180 - 256						
Boulder	Small	256 - 362						
	Small	362 - 512		1				
	Medium	512 - 1024						
	Large	1024 - 2048						
Bedrock	Bedrock	> 2048						
Total								

PH 1-2  
 XS 2-1

PH XS 2-1  
 3

## Pebble Count

 Site RR1 X1

Date \_\_\_\_\_

Survey Crew \_\_\_\_\_

Particle	Description	Size (mm)	Particle Count				%	Cum %
			Riffle	Pool	Other	Total		
Silt/Clay	Silt/Clay	< 0.062						
Sand	Very Fine	0.062 - 0.125		49	2			
	Fine	0.125 - 0.25	4	52	6			
	Medium	0.25 - 0.5		55	3			
	Coarse	0.5 - 1.0	8	56	5			
	Very Coarse	1.0 - 2.0	10		2			
Gravel	Very Fine	2.0 - 4.0	11		1			
	Fine	4.0 - 5.7		57	1			
	Fine	5.7 - 8.0	14	62	9			
	Medium	8.0 - 11.3		64	3			
	Medium	11.3 - 16.0	18	66	8			
	Coarse	16.0 - 22.6	23	69	12			
	Coarse	22.6 - 32	31	78	<del>12</del> 19			
	Very Coarse	32 - 45	40	82	<del>12</del> 14			
	Very Coarse	45 - 64	48	88	<del>12</del> 15			
Cobble	Small	64 - 90						
	Small	90 - 128						
	Large	128 - 180						
	Large	180 - 256						
Boulder	Small	256 - 362						
	Small	362 - 512						
	Medium	512 - 1024						
	Large	1024 - 2048						
Bedrock	Bedrock	> 2048						
Total								

48      88      100

## Pebble Count

Site 2-2 Date 8/18

Survey Crew \_\_\_\_\_

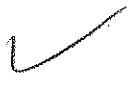
Particle	Description	Size (mm)	Particle Count				%	Cum %
			Riffle	Pool	Other	Total		
Silt/Clay	Silt/Clay	< 0.062	87					
Sand	Very Fine	0.062 - 0.125						
	Fine	0.125 - 0.25						
	Medium	0.25 - 0.5						
	Coarse	0.5 - 1.0						
	Very Coarse	1.0 - 2.0						
Gravel	Very Fine	2.0 - 4.0						
	Fine	4.0 - 5.7						
	Fine	5.7 - 8.0	1					
	Medium	8.0 - 11.3	5					
	Medium	11.3 - 16.0	4					
	Coarse	16.0 - 22.6	1					
	Coarse	22.6 - 32						
	Very Coarse	32 - 45	2					
Cobble	Very Coarse	45 - 64						
	Small	64 - 90						
	Small	90 - 128						
	Large	128 - 180						
Boulder	Large	180 - 256						
	Small	256 - 362						
	Small	362 - 512						
	Medium	512 - 1024						
Bedrock	Large	1024 - 2048						
	Bedrock	> 2048						
Total								



# Pebble Count

Site XS 2-3 Date \_\_\_\_\_

Survey Crew \_\_\_\_\_



Particle	Description	Size (mm)	Particle Count				%	Cum %
			Riffle	Pool	Other	Total		
Silt/Clay	Silt/Clay	< 0.062	93					
Sand	Very Fine	0.062 - 0.125						
	Fine	0.125 - 0.25						
	Medium	0.25 - 0.5						
	Coarse	0.5 - 1.0						
	Very Coarse	1.0 - 2.0						
Gravel	Very Fine	2.0 - 4.0						
	Fine	4.0 - 5.7						
	Fine	5.7 - 8.0						
	Medium	8.0 - 11.3	95	2				
	Medium	11.3 - 16.0	97	2				
	Coarse	16.0 - 22.6	98	1				
	Coarse	22.6 - 32	99	1				
	Very Coarse	32 - 45						
	Very Coarse	45 - 64	100	1				
Cobble	Small	64 - 90						
	Small	90 - 128						
	Large	128 - 180						
	Large	180 - 256						
Boulder	Small	256 - 362						
	Small	362 - 512						
	Medium	512 - 1024						
	Large	1024 - 2048						
Bedrock	Bedrock	> 2048						
Total								

# Pebble Count

Site XS 2-4 Date \_\_\_\_\_

Survey Crew \_\_\_\_\_

Particle	Description	Size (mm)	Particle Count				%	Cum %
			Riffle	Pool	Other	Total		
Silt/Clay	Silt/Clay	< 0.062						
Sand	Very Fine	0.062 - 0.125	☒☒☒☒	☒☒☒☒	☒☒☒☒	65		
	Fine	0.125 - 0.25						
	Medium	0.25 - 0.5						
	Coarse	0.5 - 1.0	☒☒☒☒	☒☒☒☒	☒☒☒☒	6		
	Very Coarse	1.0 - 2.0						
Gravel	Very Fine	2.0 - 4.0						
	Fine	4.0 - 5.7						
	Fine	5.7 - 8.0	☒☒☒☒	☒☒☒☒	☒☒☒☒	3		
	Medium	8.0 - 11.3	☒☒☒☒	☒☒☒☒	☒☒☒☒	3		
	Medium	11.3 - 16.0	☒☒☒☒	☒☒☒☒	☒☒☒☒	4		
	Coarse	16.0 - 22.6	☒☒☒☒	☒☒☒☒	☒☒☒☒	8		
	Coarse	22.6 - 32	☒☒☒☒	☒☒☒☒	☒☒☒☒	7		
	Very Coarse	32 - 45	☒☒☒☒	☒☒☒☒	☒☒☒☒	2		
	Very Coarse	45 - 64						
Cobble	Small	64 - 90				1		
	Small	90 - 128	☒☒☒☒			1		
	Large	128 - 180						
	Large	180 - 256						
Boulder	Small	256 - 362						
	Small	362 - 512						
	Medium	512 - 1024						
	Large	1024 - 2048						
Bedrock	Bedrock	> 2048						
Total								

64 95 100

# Pebble Count

Site RR X5-6 2-5 Date 8/18

Survey Crew \_\_\_\_\_

Particle	Description	Size (mm)	Particle Count				%	Cum %
			Riffle	Pool	Other	Total		
Silt/Clay	Silt/Clay	< 0.062						
Sand	Very Fine	0.062 - 0.125	7					
	Fine	0.125 - 0.25						
	Medium	0.25 - 0.5						
	Coarse	0.5 - 1.0	1					
	Very Coarse	1.0 - 2.0	2					
Gravel	Very Fine	2.0 - 4.0	5					
	Fine	4.0 - 5.7						
	Fine	5.7 - 8.0	13					
	Medium	8.0 - 11.3	6					
	Medium	11.3 - 16.0	12					
	Coarse	16.0 - 22.6	11					
	Coarse	22.6 - 32	11					
	Very Coarse	32 - 45	12					
	Very Coarse	45 - 64	5					
Cobble	Small	64 - 90	4					
	Small	90 - 128	6					
	Large	128 - 180	5					
	Large	180 - 256	1					
Boulder	Small	256 - 362						
	Small	362 - 512	1					
	Medium	512 - 1024						
	Large	1024 - 2048						
Bedrock	Bedrock	> 2048						
Total								

Table 10.0 Baseline Stream Data Summary																									
UT to Rocky River (NCEEP# 402) - Reach 1 (1,095 feet total, Enhancement I length 208 feet Station 8+87 to 10+95)																									
Parameter	Gauge <sup>2</sup>	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 <sup>5</sup>	n	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Med*	Max	Min	Mean	Med	Max	SD <sup>5</sup>	n
Bankfull Width (ft)	NA	8.1	28	14	17	--	19.9	22.3	--	--	12.7	--	13.3	13.9	--	--	--	24	--	--	--	24	--	--	--
Floodprone Width (ft)					95	--	153	196	--	--	27	--	35.3	45	--	--	125	140	155	125	--	140	155	--	--
Bankfull Mean Depth (ft)	NA	1.03	2.6	1.6	1.5	--	1.74	2.08	--	--	0.85	--	0.88	0.91	--	--	--	1.6	--	--	--	1.44	-	--	--
<sup>1</sup> Bankfull Max Depth (ft)	NA				2.45	--	2.62	3	--	--	1.26	--	1.34	1.44	--	--	2.3	2.45	2.6	2.3	--	2.8	2.6	--	--
Bankfull Cross Sectional Area (ft <sup>2</sup> )	NA	13	50	25	31.4	--	34	36	--	--	11.03	--	11.59	11.95	--	--	38	38.4	53	--	--	34.4	-	--	--
Width/Depth Ratio	NA				8.17	--	11.75	14.87	--	--	14.5	--	15.15	16.35	--	--	--	15	--	--	--	16.6	-	--	--
Entrenchment Ratio	NA				4.8	--	6	7	--	--	2.13	--	2.65	3.24	--	--	5.2	5.8	6.45	5.23	--	5.85	6.48	--	--
<sup>1</sup> Bank Height Ratio	NA				1	--	1.2	1.3	--	--	0.84	--	1.19	1.8	--	--	1	1.1	1.2	1	--	1.15	1.2	--	--
<b>Profile</b>																									
Riffle Length (ft)					8	--	24.5	45	--	--	5	--	15.92	24	--	--	10	30	60	7	--	24	53	--	--
Riffle Slope (ft/ft)					0.003	--	0.015	0.036	--	--	0.0156	--	0.0257	0.149	--	--	0.033	0.034	0.037	0.012	--	0.03	0.032	--	--
Pool Length (ft)					7	--	23	46	--	--	5	--	9.99	19	--	--	19	40	55	19	--	36	50	--	--
Pool Max depth (ft)					--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pool Spacing (ft)					26	--	43.7	57.5	--	--	22.8	--	40.3	64	--	--	27	52.6	60	24	--	45.8	60	--	--
<b>Pattern</b>																									
Channel Beltwidth (ft)					40	--	60	80	--	--	15	--	21.7	32	--	--	40	50	70	40	--	50	70	--	--
Radius of Curvature (ft)					15	--	40	70	--	--	11.7	--	21.5	35.9	--	--	55	60	70	55	--	62	70	--	--
Rc:Bankfull width (ft/ft)					--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Meander Wavelength (ft)					65	--	112	160	--	--	35	--	45.8	57.5	--	--	100	105	110	100	--	105	110	--	--
Meander Width Ratio					2.35	--	3.01	3.58	--	--	1.13	--	1.63	2.41	--	--	1.6	2	2.9	1.67	--	2.1	2.93	--	--
<b>Transport parameters</b>																									
Reach Shear Stress (competency) lb/f <sup>2</sup>								--										--				--			
Max part size (mm) mobilized at bankfull								--										--				--			
Stream Power (transport capacity) W/m <sup>2</sup>								--										--				--			
<b>Additional Reach Parameters</b>																									
Rosgen Classification	NA							C4/E4						C4				C4					C4		
Bankfull Velocity (fps)	NA							--										--				--			
Bankfull Discharge (cfs)	NA							--										--				--			
Valley length (ft)								185						312											
Channel Thalweg length (ft)								222						397				208					208		
Sinuosity (ft)								1.2						1.27				1.12					1.12		
Water Surface Slope (Channel) (ft/ft)	NA							0.0088						0.0078				0.0103					0.0093		
BF slope (ft/ft)	NA							0.0103						0.0079				0.0105					0.0105		
<sup>3</sup> Bankfull Floodplain Area (acres)								--						--				--				--			
<sup>4</sup> % 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

\* Mean, not median, provided for design numbers. +Numbers provided may not be for riffles only.



Table 10.0 Baseline Stream Data Summary  
 UT to Rocky River (NCEEP# 402) - Reach 2 (1,111 feet)

Parameter	Gauge <sup>2</sup>	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
		LL	UL	Eq.	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Mean	Med	Max	SD <sup>5</sup>	n	Min	Med*	Max	Min	Mean	Med	Max	SD <sup>5</sup>	n
<b>Dimension and Substrate - Riffle Only+</b>																									
Bankfull Width (ft)	NA	3.7	14	7.6	7.7	--	8.13	8.7	--	--	12.7	--	13.3	13.9	--	--	--	11	--	9.89	--	11.15	14.57	--	--
Floodprone Width (ft)					11	--	11.33	12	--	--	27	--	35.3	45	--	--	100	144	200	104	--	141.2	200	--	--
Bankfull Mean Depth (ft)	NA	0.59	1.55	1.02	0.75	--	0.82	0.91	--	--	0.85	--	0.88	0.91	--	--	0.74	0.74	0.84	0.77	--	0.87	1.02	--	--
<sup>1</sup> Bankfull Max Depth (ft)	NA				1.2	--	1.26	1.37	--	--	1.26	--	1.34	1.44	--	--	1.05	1.16	1.33	1.34	--	1.51	1.64	--	--
Bankfull Cross Sectional Area (ft <sup>2</sup> )	NA	3.4	15	7.5	6.03	--	6.7	7.04	--	--	11.03	--	11.59	11.95	--	--	8.2	8.2	9.2	8.04	--	9.86	14.87	--	--
Width/Depth Ratio	NA				8.42	--	10	10.94	--	--	14.5	--	15.15	16.35	--	--	13	15	16.35	11.16	--	12.75	14.28	--	--
Entrenchment Ratio	NA				1.26	--	1.4	1.56	--	--	2.13	--	2.65	3.24	--	--	9.9	13	18	7.9	--	13.56	21.85	--	--
<sup>1</sup> Bank Height Ratio	NA				1.46	--	1.66	1.83	--	--	0.84	--	1.02	1.18	--	--	0.84	1.0	1.15	1.0	--	1.04	1.12	--	--
<b>Profile</b>																									
Riffle Length (ft)					4	--	22.78	117.5	--	--	5	--	15.92	24	--	--	4	9.5	26	3	--	9.48	26.3	--	--
Riffle Slope (ft/ft)					0.005	--	0.0305	0.0722	--	--	0.0156	--	0.0257	0.149	--	--	0.02	0.035	0.083	0.012	--	0.033	0.064	--	--
Pool Length (ft)					6	--	9.75	13	--	--	5	--	9.99	19	--	--	13	16.4	27	7.88	--	15.84	29.5	--	--
Pool Max depth (ft)					--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pool Spacing (ft)					14	--	40	139	--	--	22.8	--	40.3	64	--	--	17	27.5	51	12.3	--	28	63	--	--
<b>Pattern</b>																									
Channel Beltwidth (ft)					13	--	20	35	--	--	15	--	21.7	32	--	--	12.5	18	26.5	14.3	--	21	35	--	--
Radius of Curvature (ft)					7.6	--	12.3	21.2	--	--	11.7	--	21.5	35.9	--	--	10	13.5	20	10	--	13.8	20	--	--
Rc:Bankfull width (ft/ft)					--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Meander Wavelength (ft)					35	--	57	85	--	--	35	--	45.8	57.5	--	--	24	38	65	24	--	37.1	65	--	--
Meander Width Ratio					1.6	--	2.46	4.3	--	--	1.13	--	1.63	2.41	--	--	1.13	1.63	2.41	1.3	--	1.98	2.7	--	--
<b>Transport parameters</b>																									
Reach Shear Stress (competency) lb/f <sup>2</sup>								--										--				--			
Max part size (mm) mobilized at bankfull								--										--				--			
Stream Power (transport capacity) W/m <sup>2</sup>								--										--				--			
<b>Additional Reach Parameters</b>																									
Rosgen Classification	NA							G4						C4				C4				C4			
Bankfull Velocity (fps)	NA							--										--				--			
Bankfull Discharge (cfs)	NA							--										--				--			
Valley length (ft)								950						312											
Channel Thalweg length (ft)								1011						397											
Sinuosity (ft)								1.06						1.27											
Water Surface Slope (Channel) (ft/ft)	NA							0.015						0.008											no water in channel
BF slope (ft/ft)	NA							0.014						0.008											0.009 (upper portion); 0.014 (lower portion)
<sup>3</sup> Bankfull Floodplain Area (acres)								--						--								0.013			--
<sup>4</sup> % 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

\* Mean, not median, provided for design numbers. +Numbers provided may not be for riffles only.

**Table 10.1. Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions)  
UT to Rocky River (NCEEP# 402) - Reach 1 (1,095 feet total, Enhancement I length 208 feet Station 8+87 to 10+95)**

Parameter	Pre-Existing Condition							Reference Reach(es) Data							Design							As-built/Baseline						
<sup>1</sup> Ri% / Ru% / P% / G% / S%	U	U	U	U	U			U	U	U	U	U			U	U	U	U	U	U	U							
<sup>1</sup> SC% / Sa% / G% / C% / B% / Be%	U	U	U	U	U	U		U	U	U	U	U	U															
<sup>1</sup> d16 / d35 / d50 / d84 / d95 / di <sup>p</sup> / di <sup>sp</sup> (mm)	U	U	37	79	U	U	U	U	U	3	31	U	U	U														
<sup>2</sup> Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10	U	U	U	U	U			U	U	U	U	U										U	U	U	U	U		
>2.0	U	U	U	U				U	U	U	U											U	U	U	U			

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

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

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

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

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

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

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

**Table 10.1. Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions)  
UT to Rocky River (NCEEP# 402) - Reach 2 (1,111 feet)**

Parameter	Pre-Existing Condition							Reference Reach(es) Data							Design							As-built/Baseline						
<sup>1</sup> Ri% / Ru% / P% / G% / S%	U	U	U	U	U			U	U	U	U	U			U	U	U	U	U	U	U	U	U	U	U	U		
<sup>1</sup> SC% / Sa% / G% / C% / B% / Be%	U	U	U	U	U	U		U	U	U	U	U	U															
<sup>1</sup> d16 / d35 / d50 / d84 / d95 / di <sup>P</sup> / di <sup>SP</sup> (mm)	U	U	29	110	U	U	U	U	U	3	31	U	U	U														
<sup>2</sup> Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10	U	U	U	U	U			U	U	U	U	U										U	U	U	U	U		
<sup>3</sup> Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0	U	U	U	U				U	U	U	U											U	U	U	U			

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

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

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

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

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

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

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

**Table 11.0. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)****UT to Rocky River (NCEEP# 402) - Reaches 1-2**

	Cross Section 1-1 (Riffle)							Cross Section 2-1 (Riffle)							Cross Section 2-2 (Pool)						
<b>Based on fixed baseline bankfull elevation<sup>1</sup></b>	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
<b>Record elevation (datum) used</b>	NA	548.3	548.3	548.3	548.3			NA	559.0	559.0	559.0	559.0			NA	559.0	559.0	559.0	559.0		
Bankfull Width (ft)	NA	18.2	18.1	19.2	21.1			NA	13.2	15.0	15.0	14.3			NA	9.9	13.2	11.4	12.9		
Floodprone Width (ft)	NA	157.7	157.0	157.0	157.0			NA	104.0	104.0	104.0	104.0			NA	112.0	112.0	112.0	112.0		
Bankfull Mean Depth (ft)	NA	1.5	1.5	1.5	1.5			NA	1.0	1.0	0.9	1.0			NA	0.9	0.7	0.8	0.8		
Bankfull Max Depth (ft)	NA	2.5	2.6	2.6	2.8			NA	1.6	1.8	1.8	1.8			NA	1.4	1.6	1.5	1.6		
Bankfull Cross Sectional Area (ft <sup>2</sup> )	NA	27.8	27.3	29.1	32.6			NA	12.6	14.8	14.1	13.8			NA	8.6	9.8	8.5	10.0		
Bankfull Width/Depth Ratio	NA	11.9	12.0	12.7	13.7			NA	13.8	15.3	15.9	14.9			NA	11.5	17.7	15.3	16.6		
Bankfull Entrenchment Ratio	NA	8.4	8.7	8.2	7.4			NA	7.9	6.9	6.9	7.3			NA	11.3	8.5	9.8	8.7		
Bankfull Bank Height Ratio	NA	1.1	1.1	1.1	1.2			NA	1.1	1.0	1.0	1.0			NA	1.0	1.0	1.1	1.0		
Cross Sectional Area between end pins (ft <sup>2</sup> )	NA	71.0	68.4	70.3	56.2			NA	31.5	29.7	22.0	22.1			NA	57.2	49.2	56.5	58.3		
d50 (mm)	NA	10.00	11.30	5.70	21.50			NA	22.00	0.04	4.85	6.01			NA	0.18	0.04	0.03	0.04		
	Cross Section 2-3 (Riffle)							Cross Section 2-4 (Pool)							Cross Section 2-5 (Riffle)						
<b>Based on fixed baseline bankfull elevation<sup>1</sup></b>	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
<b>Record elevation (datum) used</b>	NA	552.4	552.4	552.4	552.4			NA	549.8	549.8	549.8	549.8			NA	547.9	547.9	547.9	547.9		
Bankfull Width (ft)	NA	9.2	10.3	11.8	10.9			NA	11.0	10.9	11.3	10.0			NA	10.6	13.1	12.3	14.6		
Floodprone Width (ft)	NA	200.0	200.0	200.0	200.0			NA	160.0	160.0	160.0	160.0			NA	130.0	130.0	130.0	130.0		
Bankfull Mean Depth (ft)	NA	0.8	0.8	0.7	0.8			NA	1.0	1.0	0.9	1.0			NA	1.0	0.9	0.9	0.9		
Bankfull Max Depth (ft)	NA	1.3	1.6	1.6	1.6			NA	1.8	1.8	1.7	1.8			NA	1.8	2.0	1.9	2.0		
Bankfull Cross Sectional Area (ft <sup>2</sup> )	NA	7.2	8.2	8.3	8.2			NA	11.0	10.9	10.5	9.8			NA	10.3	11.3	10.8	12.3		
Bankfull Width/Depth Ratio	NA	11.7	12.9	16.8	14.4			NA	11.0	10.9	12.2	10.2			NA	11.0	15.2	14.1	17.2		
Bankfull Entrenchment Ratio	NA	21.9	19.4	16.9	18.4			NA	14.6	14.7	14.2	16.0			NA	12.2	9.9	10.6	12.3		
Bankfull Bank Height Ratio	NA	1.0	1.0	1.0	1.0			NA	1.0	1.0	1.0	1.0			NA	1.0	1.0	1.0	1.1		
Cross Sectional Area between end pins (ft <sup>2</sup> )	NA	33.1	41.8	20.7	30.7			NA	17.1	14.1	14.4	12.5			NA	24.3	21.9	15.9	26.1		
d50 (mm)	NA	0.25	0.04	0.05	0.03			NA	0.20	0.04	0.04	0.11			NA	0.23	39.80	15.00	19.00		

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."



**Table 11.1. Monitoring Data - Stream Reach Data Summary  
UT to Rocky River (NCEEP# 402) - Reach 1 (1,095 feet total, Enhancement I length 208 feet Station 8+87 to 10+95)**

Parameter	Baseline						MY-1						MY-2						MY-3											
	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n						
<b>Dimension and Substrate - Riffle only</b>																														
Bankfull Width (ft)	NA	NA	NA	NA	NA	0	18.2	18.2	18.2	18.2	NA	1	18.1	18.1	18.1	18.1	NA	1	19.2	19.2	19.2	19.2	NA	1	19.2	19.2	19.2	19.2	NA	1
Floodprone Width (ft)	NA	NA	NA	NA	NA	0	157.7	157.7	157.7	157.7	NA	1	157.0	157.0	157.0	157.0	NA	1	157.0	157.0	157.0	157.0	NA	1	157.0	157.0	157.0	157.0	NA	1
Bankfull Mean Depth (ft)	NA	NA	NA	NA	NA	0	1.5	1.5	1.5	1.5	NA	1	1.5	1.5	1.5	1.5	NA	1	1.5	1.5	1.5	1.5	NA	1	1.5	1.5	1.5	1.5	NA	1
<sup>1</sup> Bankfull Max Depth (ft)	NA	NA	NA	NA	NA	0	2.5	2.5	2.5	2.5	NA	1	2.6	2.6	2.6	2.6	NA	1	2.6	2.6	2.6	2.6	NA	1	2.6	2.6	2.6	2.6	NA	1
Bankfull Cross Sectional Area (ft <sup>2</sup> )	NA	NA	NA	NA	NA	0	27.8	27.8	27.8	27.8	NA	1	27.3	27.3	27.3	27.3	NA	1	29.1	29.1	29.1	29.1	NA	1	29.1	29.1	29.1	29.1	NA	1
Width/Depth Ratio	NA	NA	NA	NA	NA	0	11.9	11.9	11.9	11.9	NA	1	12.0	12.0	12.0	12.0	NA	1	12.7	12.7	12.7	12.7	NA	1	12.7	12.7	12.7	12.7	NA	1
Entrenchment Ratio	NA	NA	NA	NA	NA	0	8.4	8.4	8.4	8.4	NA	1	8.7	8.7	8.7	8.7	NA	1	8.2	8.2	8.2	8.2	NA	1	8.2	8.2	8.2	8.2	NA	1
<sup>1</sup> Bank Height Ratio	NA	NA	NA	NA	NA	0	1.1	1.1	1.1	1.1	NA	1	1.1	1.1	1.1	1.1	NA	1	1.1	1.1	1.1	1.1	NA	1	1.1	1.1	1.1	1.1	NA	1
<b>Profile</b>																														
Riffle Length (ft)	7	--	24	53	--	--	2.6	6.4	7.4	8.0	2.5	4	11.0	15.0	11.5	26.0	7.4	4	6.0	9.0	7.0	16.0	4.8	4	6.0	9.0	7.0	16.0	4.8	4
Riffle Slope (ft/ft)	0.012	--	0.03	0.032	--	--	0.03	0.03	0.03	0.05	0.01	4	0.02	0.02	0.02	0.03	0.01	4	0.01	0.02	0.02	0.02	0.01	4	0.01	0.02	0.02	0.02	0.01	4
Pool Length (ft)	19	--	36	50	--	--	19.3	31.4	27.5	49.5	12.3	6	19.0	30.8	29.0	48.0	10.4	6	19.0	34.3	37.0	45.0	10.3	6	19.0	34.3	37.0	45.0	10.3	6
Pool Max depth (ft)	--	--	--	--	--	--	0.5	0.9	0.7	1.5	0.4	6	0.5	0.8	0.6	1.4	0.4	6	0.5	0.8	0.8	1.2	0.3	6	0.5	0.8	0.8	1.2	0.3	6
Pool Spacing (ft)	24	--	45.8	60	--	--	24.4	45.8	48.7	57.9	13.5	5	24.0	45.4	49.0	58.0	12.9	5	25.0	50.0	53.0	74.0	18.1	5	25.0	50.0	53.0	74.0	18.1	5
<b>Pattern</b>																														
Channel Beltwidth (ft)	40	--	50	70	--	--																								
Radius of Curvature (ft)	55	--	62	70	--	--																								
Rc:Bankfull width (ft/ft)	--	--	--	--	--	--																								
Meander Wavelength (ft)	100	--	105	110	--	--																								
Meander Width Ratio	1.67	--	2.1	2.93	--	--																								
<b>Additional Reach Parameters</b>																														
Rosgen Classification							C4						C4						C4											
Channel Thalweg length (ft)							208						207						208											
Sinuosity (ft)							1.12						1.12						1.12											
Water Surface Slope (Channel) (ft/ft)							0.0093						No water in channel at time of survey						0.013											
BF slope (ft/ft)							0.01505						0.0093						0.0055											
<sup>3</sup> Ri% / Ru% / P% / G% / S%	--	--	--	--	--	--	10	4	73	12	0		24	0	73	3	0		14	0	81	5	0		14	0	81	5	0	
<sup>3</sup> SC% / Sa% / G% / C% / B% / Be%													18	17	52	12	1	0	14	27	59	0	0	0	14	27	59	0	0	0
<sup>3</sup> d16 / d35 / d50 / d84 / d95 /													0.06	2	11.3	59.25	90		0.1	1	5.7	23.54	38.5		0.1	1	5.7	23.54	38.5	
<sup>2</sup> % of Reach with Eroding Banks							NA						0.0						0.0											
Channel Stability or Habitat Metric							--						--						--											
Biological or Other							--						--						--											

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

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

1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile.

2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table

3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave 4. = Of value/needed only if the n exceeds 3

Parameter	MY- 4						MY- 5					
	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n
<b>Dimension and Substrate - Riffle only</b>												
Bankfull Width (ft)	21.1	21.1	21.1	21.1	NA	1						
Floodprone Width (ft)	157.0	157.0	157.0	157.0	NA	1						
Bankfull Mean Depth (ft)	1.5	1.5	1.5	1.5	NA	1						
<sup>1</sup> Bankfull Max Depth (ft)	2.8	2.8	2.8	2.8	NA	1						
Bankfull Cross Sectional Area (ft <sup>2</sup> )	32.6	32.6	32.6	32.6	NA	1						
Width/Depth Ratio	13.7	13.7	13.7	13.7	NA	1						
Entrenchment Ratio	7.4	7.4	7.4	7.4	NA	1						
<sup>1</sup> Bank Height Ratio	1.2	1.2	1.2	1.2	NA	1						
<b>Profile</b>												
Riffle Length (ft)	6.0	13.0	10.5	25.0	8.4	4						
Riffle Slope (ft/ft)	0.02	0.07	0.06	0.15	0.06	4						
Pool Length (ft)	12.0	27.8	28.0	46.0	14.2	6						
Pool Max depth (ft)	0.3	0.8	0.7	1.7	0.5	6						
Pool Spacing (ft)	16.0	40.8	42.0	71.0	22.5	5						
<b>Pattern</b>												
Channel Beltwidth (ft)												
Radius of Curvature (ft)												
Rc:Bankfull width (ft/ft)												
Meander Wavelength (ft)												
Meander Width Ratio												
<b>Additional Reach Parameters</b>												
Rosgen Classification	C4											
Channel Thalweg length (ft)	205											
Sinuosity (ft)	1.11											
Water Surface Slope (Channel) (ft/ft)	No water in channel at time of survey											
BF slope (ft/ft)	0.0048											
<sup>3</sup> Ri% / Ru% / P% / G% / S%	20	8	56	16	0							
<sup>3</sup> SC% / Sa% / G% / C% / B% / Be%	0	18	82	0	0	0						
<sup>3</sup> d16 / d35 / d50 / d84 / d95 /	1	13.05	21.5	44.07	57.67							
<sup>2</sup> % of Reach with Eroding Banks	0.0											
Channel Stability or Habitat Metric	--											
Biological or Other	--											

Table 11.1. Monitoring Data - Stream Reach Data Summary UT to Rocky River (NCEEP# 402) - Reach 2 (1,111 feet)																								
Parameter	Baseline						MY-1						MY-2						MY-3					
	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n
<b>Dimension and Substrate - Riffle only</b>																								
Bankfull Width (ft)	NA	NA	NA	NA	NA	0	9.2	11.0	10.6	13.2	NA	3	10.3	12.8	13.1	15.0	NA	3	11.8	13.0	12.3	15.0	NA	3
Floodprone Width (ft)	NA	NA	NA	NA	NA	0	104	145	130	200	NA	3	104	145	130	200.0	NA	3	104	145	130	200.0	NA	3
Bankfull Mean Depth (ft)	NA	NA	NA	NA	NA	0	0.8	0.9	1.0	1.0	NA	3	0.8	0.9	0.9	1.0	NA	3	0.7	0.8	0.9	0.9	NA	3
<sup>1</sup> Bankfull Max Depth (ft)	NA	NA	NA	NA	NA	0	1.3	1.6	1.6	1.8	NA	3	1.6	1.8	1.8	2.0	NA	3	1.6	1.7	1.8	1.9	NA	3
Bankfull Cross Sectional Area (ft <sup>2</sup> )	NA	NA	NA	NA	NA	0	7.2	10.0	10.3	12.6	NA	3	8.2	11.4	11.3	14.8	NA	3	8.3	11.1	10.8	14.1	NA	3
Width/Depth Ratio	NA	NA	NA	NA	NA	0	11.0	12.2	11.7	13.8	NA	3	12.9	14.5	15.2	15.3	NA	3	14.1	15.6	15.9	16.8	NA	3
Entrenchment Ratio	NA	NA	NA	NA	NA	0	7.9	14.0	12.2	21.9	NA	3	6.9	12.1	9.9	19.4	NA	3	6.9	11.5	10.6	16.9	NA	3
<sup>1</sup> Bank Height Ratio	NA	NA	NA	NA	NA	0	1.0	1.0	1.0	1.1	NA	3	1.0	1.0	1.0	1.0	NA	3	1.0	1.0	1.0	1.0	NA	3
<b>Profile</b>																								
Riffle Length (ft)	3	--	9.48	26.3	--	--	2.66	10.7	11	27.6	5.9	35	5.0	13.7	11.0	32.0	7.6	25	5.0	15.0	11.0	43.0	9.2	29
Riffle Slope (ft/ft)	0.012	--	0.033	0.064	--	--	0	0.03	0.03	0.06	0.02	35	-0.02	0.03	0.03	0.11	0.02	25	0.002	0.013	0.014	0.023	0.006	28
Pool Length (ft)	7.88	--	15.84	29.5	--	--	9.7	18.7	15	47.8	10.1	26	8.0	20.1	17.5	51.0	9.7	28	13.0	18.7	17.0	30.0	5.2	30
Pool Max depth (ft)	--	--	--	--	--	--	0.3	0.7	0.6	1.5	0.3	26	0.1	0.7	0.7	1.6	0.4	28	0.2	0.6	0.6	1.2	0.3	30
Pool Spacing (ft)	12.3	--	28	63	--	--	15.9	42.9	34	124.2	26.7	25	13.0	40.4	29.0	84.0	22.4	27	12.0	38.1	31.0	109.0	20.9	29
<b>Pattern</b>																								
Channel Beltwidth (ft)	14.3	--	21	35	--	--																		
Radius of Curvature (ft)	10	--	13.8	20	--	--							Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline											
Rc:Bankfull width (ft/ft)	--	--	--	--	--	--																		
Meander Wavelength (ft)	24	--	37.1	65	--	--																		
Meander Width Ratio	1.3	--	1.98	2.7	--	--																		
<b>Additional Reach Parameters</b>																								
Rosgen Classification	C4						C4						C4						C4					
Channel Thalweg length (ft)	1111						1200						1111						1112					
Sinuosity (ft)	1.2						1.17						1.17						1.17					
Water Surface Slope (Channel) (ft/ft)	No water in channel at time of survey						No water in the channel at time of survey.						No water in the channel at time of survey.						No water in the channel at time of survey.					
BF slope (ft/ft)	0.009 (upper portion); 0.014 (lower portion)						0.009 (upper portion); 0.014 (lower portion)						0.014						0.013					
<sup>3</sup> Ri% / Ru% / P% / G% / S%	NA	NA	NA	NA	NA																			
<sup>3</sup> SC% / Sa% / G% / C% / B% / Be%													64	0.9	14.1	16.5	4.5	0	58.1	3	24.9	12.6	1.4	0
<sup>3</sup> d16 / d35 / d50 / d84 / d95 /													0.01	4	8	42.5	76.9		0.8	2.1	4.2	37.2	71	
<sup>2</sup> % of Reach with Eroding Banks	NA						0.0						0.0						0.0					
Channel Stability or Habitat Metric	--						--						--						--					
Biological or Other	--						--						--						--					

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

1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile.

2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table

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

Parameter	MY- 4						MY- 5					
	Min	Mean	Med	Max	SD <sup>4</sup>	n	Min	Mean	Med	Max	SD <sup>4</sup>	n
<b>Dimension and Substrate - Riffle only</b>												
Bankfull Width (ft)	10.9	13.3	14.3	14.6	NA	3						
Floodprone Width (ft)	104	145	130	200	NA	3						
Bankfull Mean Depth (ft)	0.8	0.9	0.9	1.0	NA	3						
<sup>1</sup> Bankfull Max Depth (ft)	1.6	1.8	1.8	2.0	NA	3						
Bankfull Cross Sectional Area (ft <sup>2</sup> )	8.2	11.4	12.3	13.8	NA	3						
Width/Depth Ratio	14.4	15.5	14.9	17.2	NA	3						
Entrenchment Ratio	7.3	12.7	12.3	18.4	NA	3						
<sup>1</sup> Bank Height Ratio	1.0	1.0	1.0	1.1	NA	3						
<b>Profile</b>												
Riffle Length (ft)	3.0	11.6	8.5	26.0	7.2	30						
Riffle Slope (ft/ft)	0.01	0.04	0.04	0.11	0.02	30						
Pool Length (ft)	6.0	16.4	15.5	43.0	7.3	32						
Pool Max depth (ft)	0.1	0.5	0.5	1.0	0.3	32						
Pool Spacing (ft)	5.0	35.6	32.0	80.0	18.9	31						
<b>Pattern</b>												
Channel Beltwidth (ft)												
Radius of Curvature (ft)												
Rc:Bankfull width (ft/ft)												
Meander Wavelength (ft)												
Meander Width Ratio												
<b>Additional Reach Parameters</b>												
Rosgen Classification	C4											
Channel Thalweg length (ft)	1119											
Sinuosity (ft)	1.18											
Water Surface Slope (Channel) (ft/ft)	No water in the channel at time of survey.											
BF slope (ft/ft)	0.014											
<sup>3</sup> Ri% / Ru% / P% / G% / S%												
<sup>3</sup> SC% / Sa% / G% / C% / B% / Be%	41	18	34	6	1	0						
<sup>3</sup> d16 / d35 / d50 / d84 / d95 /	1.2	2.5	5	19.5	52.7							
<sup>2</sup> % of Reach with Eroding Banks	0.0											
Channel Stability or Habitat Metric	--											
Biological or Other	--											



**Appendix E. Hydrologic Data**

Table 12.0 Verification of Bankfull Events

<b>Table 12.0. Bankfull Verification UT to Rocky River (NCEEP# 402)</b>			
Date of Data Collection	Date of Occurrence	Method	Photo # (if available)
14-Apr-08	March 5, 2008, April 5, 2008	Crest gauge evaluation, presence of wrack and drift lines, evaluation of NC CRONOS data	NA
17-Oct-08	August 27, 2008, September 6, 2008	Crest gauge evaluation, presence of wrack and drift lines, evaluation of NC CRONOS data	NA
12-Mar-09	December 11-12, 2008, January 6, 2009, March 2, 2009	Crest gauge evaluation, presence of wrack and drift lines, evaluation of NC CRONOS data	NA
4-Nov-09	None	Crest gauge evaluation and absence of wrack and drift lines indicates bankfull event has not occurred since assessment in March 2009	NA
17-Mar-10	November 11, 2009 (2.34"), December 2, 2009 (1.73") and February 5, 2010 (1.94").	Presence of wrack and drift lines, evaluation of NC CRONOS data	NA
27-Aug-10	None	Crest gauge evaluation and absence of wrack and drift lines indicates bankfull event has not occurred since assessment in March 2010	NA
21-Oct-10	September 30, 2010 (2.87")	Crest gauge evaluation, presence of wrack and drift lines, evaluation of NC CRONOS data	NA