STILLHOUSE CREEK STREAM RESTORATION – Project # 363
2011 FINAL MONITORING REPORT – YEAR 5
September 19, 2011

Submitted to:

North Carolina Department of
Environment and Natural Resources
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

Designed by:
United States Department of Agriculture
Natural Resources Conservation Services (NRCS)

STILLHOUSE CREEK STREAM RESTORATION – PROJECT #363
2011 FINAL MONITORING REPORT – YEAR 5

CONDUCTED FOR THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

APPENDICES

I. Executive Summary/Project Abstract

As outlined in the 2005 Restoration Plan, the Stillhouse Creek Restoration Project was designed to achieve the following goals and objectives:

- Reduce stream bank erosion and prevent downcutting by restoring degraded, incised stream to stable, referenced condition
- Prevent stream erosion from continuing to threaten existing building foundation located near the head of the stream by implementing natural stream design restoration
- Improve retention of nutrients by restoring woody vegetation to riparian buffer
- Increase environmental education opportunities within a park setting
- Improve wildlife habitat within the conservation easement area and in-stream
- Enhance habitat for wetland dependent plants and animals by use of shallow wetland habitat areas in the floodplain
- Improve water quality by providing temporary stormwater storage in shallow wetland habitat areas in the floodplain
- Improve aesthetics of stream corridor

In July 2011 RJG&A staff evaluated the planted woody stem survival in four permanent vegetation plots using the CVS-EEP monitoring protocol, level 2. Planted woody stem survival and vigor are high. Planted stem density lags behind in plot 2 in Reach 2, but vigor is excellent. The average live planted woody stem density was 343 live stems per acre, exceeding the Year 5 vegetation success criteria of 260 stems/acre. Total (planted and volunteer) stem density was 1,234 live stems per acre. Supplemental planting for areas with low woody stem densities was done in March 2011. Details about this planting can be found in Appendix C. Treatment and removal of targeted invasive exotic plants within the project area was conducted in 2010 and early 2011. No individuals of *Ailanthus altissima* (tree of heaven) were noted during the July 2011 fieldwork, but we identified several small *Ligustrum sinense* (Chinese privet). Invasive treatment and removal will continue through October 2011 and address any isolated *Ligustrum sinense* or other invasives remaining in the buffer.

RJG&A staff collected cross-section, longitudinal, and pebble data in July 2011. Overall, the site is maintaining its as-built dimension, pattern, and profile. Evaluation of the crest gauge on 17 March 2011 and 19 July 2011 indicate that several bankfull events have occurred in 2011. This was supported by on-site qualitative evidence.

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 Baseline Monitoring Report (formerly Mitigation Plan) and in the Mitigation Plan (formerly the Restoration Plan) documents available on EEP's website. All raw data supporting the tables and figures in the appendices are available from EEP upon request.

II. Methodology

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 locate cross section, vegetation corner, photopoint, locations and collect problem area locations. Additional notations were written on the Current Condition Plan View maps created in March 2011.

2.1. Stream Methodology

Methods employed were a combination 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 was used to collect the longitudinal profile data. The location of bedform features, in-stream structures, bankfull, top of bank, water depth, and permanent benchmarks were collected. Data were analyzed using RIVERMorph and Microsoft Excel. Stations were assigned based on a stream centerline created from the as-built survey data. Cross-section data was collected using a Nikon automatic level and analyzed using RIVERMorph. Elevations for the longitudinal profile and cross sections were derived from known permanent benchmarks. Photographs facing downstream were taken at each cross section.

2.2. Vegetation Methodology

Four representative vegetation survey plots were selected and installed in reaches 1, 2, 3 and 4 during October 2007, pursuant to the EEP/CVS vegetation monitoring protocol (Lee *et al* 2006). All plots measure 100 square meters and are either 10 meters by 10 meters, or five meters by 20 meters. The four corners of each plot (either 10x100 or 5x20 feet) were marked with 18-inch long, one-half-inch diameter galvanized steel conduit.

For monitoring year 5, Level 1 (planted woody stems) and Level 2 (volunteer woody stems) data collection was performed in July 2011. 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.

III. References

CDM (2005). *Stillhouse Creek Stream Restoration Project Sediment and Erosion Control Plan*. Provided by NCEEP, November 2007.

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.

NC CRONOS (2010). North Carolina Climate Retrieval and Observations Network of the Southeast Database, Station NC-OR-6, Orange County, NC. Retrieved August 25, 2010 from: http://www.ncclimate.ncsu.edu/cronos.

Radford, A.E., H.E. Ahles, and C.R. Bell (1968). *Manual of the Vascular Flora of the Carolinas*. University of North Carolina Press. Chapel Hill, NC.

Rosgen, D L (1996) *Applied River Morphology*. Wildland Hydrology Books, Pagosa Springs, CO.

Rosgen, DL. (1997). "A Geomorphological Approach to Restoration of Incised Rivers. In *Proceedings of the Conference on Management of Landscapes Disturbed by Channel Incision*, ed. S.S.Y. Wang, E.J. Langendoen and F.B. Shields, Jr. University of Mississippi Press, Oxford, MS.

USACOE (2003) *Stream Mitigation Guidelines*. USACOE, USEPA, NCWRC, NCDENR-DWQ

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

Take I-85 to the Town of Hillsborough. Take exit 164 and head north on South Churton Street for 1.3 miles. Turn east on East Margaret Lane and then right on South Cameron Street. Parking is available in a government lot on the left/west side of South Cameron.

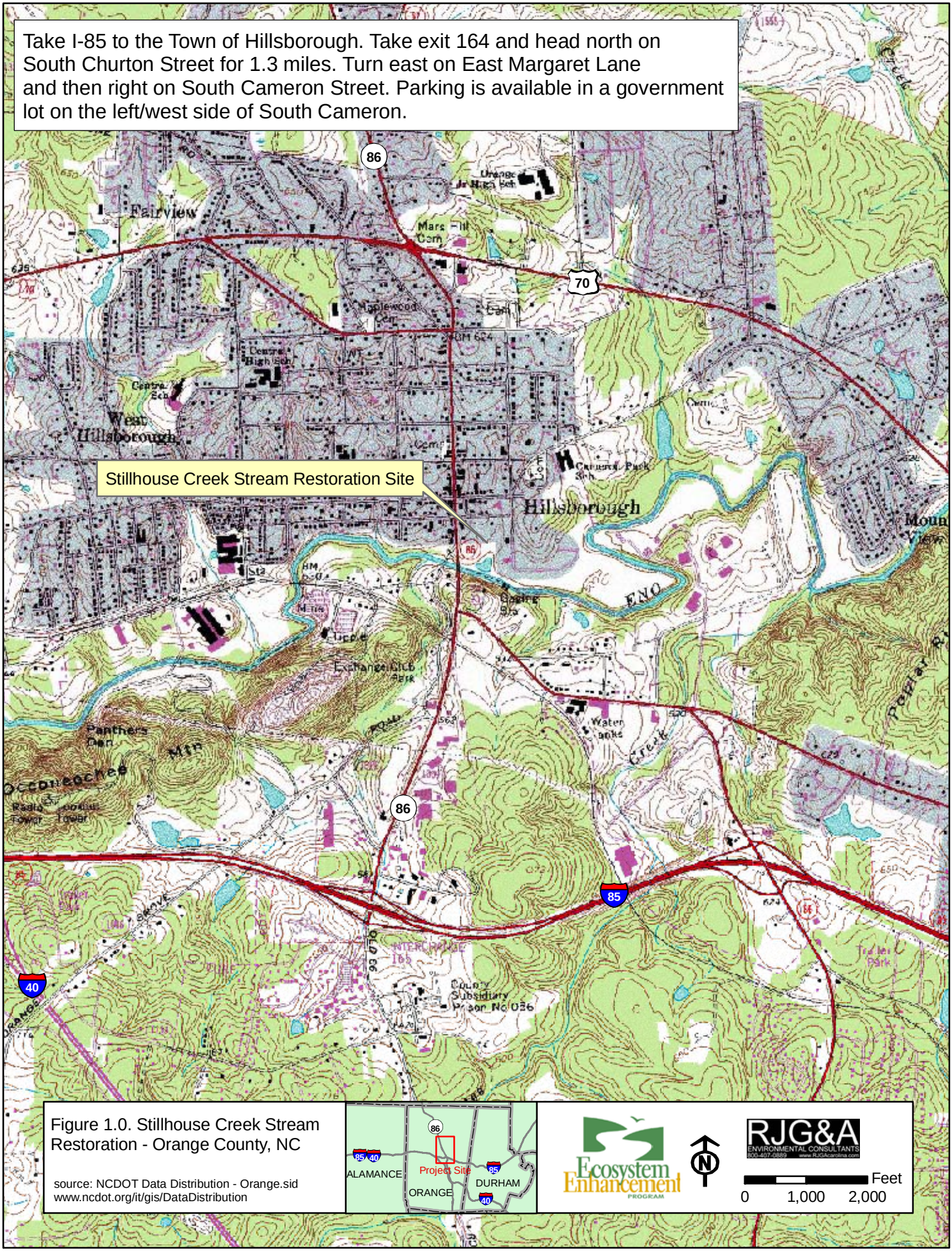


Figure 1.0. Stillhouse Creek Stream Restoration - Orange County, NC

source: NCDOT Data Distribution - Orange.sid
www.ncdot.org/it/gis/DataDistribution

Table 1.0 Project Components
Stillhouse Creek Stream Restoration – EEP Project #363

Project Component or Reach ID	Existing Feet/Acres	Restoration Level	Approach	Footage or Acreage	Stationing	Mitigation Ratio	Mitigation Units	BMP Elements[1]	Comment
Reach I	748	R	P2	223 lf	00+00-02+23	1:1	223		Shallow pools, small meanders, and steep riffles
Reach II		R	P1	400 lf	02+35-6+35	1:1	400		Realigned, reconnected to floodplain
Reach III		EI	P4	196 lf	6+35-6+85, 6+97-8+43	1.5:1	131		Banks stabilized
Reach IV	314	R	P3	355 lf	8+55-12+10	1:1	355		Connected to floodprone area
Riparian Buffer	NA	R		1.12		1:1	1.12		

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

Stillhouse Creek Stream Restoration – EEP Project #363

Restoration	Stream	Riparian		Non-Ripar	Upland	Buffer	
Level	(lf)	Wetland (Ac)		(Ac)	(Ac)	(Ac)	BMP
		Riverine	Non-Riverine				
Restoration	978					1.12	
Enhancement							
Enhancement I	196						
Enhancement II							
Creation							
Preservation							
HQ Preservation							
Totals (Feet/Acres)	**1174**	**0**		**0**	**0**	**1.12**	**0**
MU Totals	**1109**	**0**		**0**	**0**	**1.12**	0

Non-Applicable

Table 2. Project Activity and Reporting History
Stillhouse Creek Stream Restoration – EEP Project #363

Elapsed Time Since Grading Complete: 4 yrs 4 months
Elapsed Time Since Planting Complete: 4 yrs 4 Months
Number of Reporting Years[1]: 4

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Restoration Plan	-	Nov-05
Final Design – 90%	-	Nov-05
Construction	-	Mar-06
Temporary S&E mix applied	-	NA
Permanent seed mix applied	-	NA
Bare Root Planting	-	Mar-06
Mitigation Plan/As-built	Aug-06	Dec-07
Year 1 Monitoring		Dec-07
Qualitative Evaluation	June and November 2007	
Vegetation	Oct-07	
Geomorphologic	Nov-07	
Year 2 Monitoring		Nov-08
Qualitative Evaluation	May and October 2008	
Vegetation	Aug-08	
Geomorphologic	Aug-08	
Year 3 Monitoring		Aug-09
Qualitative Evaluation	March and August 2009	
Vegetation	Aug-09	
Geomorphologic	Aug-09	
Year 4 Monitoring		Aug-10
Qualitative Evaluation	March and July 2010	
Vegetation	Jul-10	
Geomorphologic	Jul-10	
Year 5 Monitoring		Aug-10
Qualitative Evaluation	March and July 2011	Jul-11
Vegetation	Jul-11	
Geomorphologic	Jul-11	

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.
part of this exhibit.
If planting and morphology are on split monitoring schedules that should be made clear in the table
1 = Equals the number of reports or data points produced excluding the baseline

Table 3. Project Contacts Table Stillhouse Creek Stream Restoration – EEP Project #363	
Designer Primary project design POC	NRCS Angela Greene
Construction Contractor Construction contractor POC	Fluvial Solutions Peter Jelenevsky
Survey Contractor Survey contractor POC	NA NA
Planting Contractor Planting contractor POC	Fluvial Solutions Peter Jelenevsky
Seeding Contractor Contractor point of contact	NA NA
Seed Mix Sources	NA
Nursery Stock Suppliers	Mellow Marsh
Monitoring Performers	Robert J. Goldstein & Associates 1221 Corporation Parkway, Raleigh NC 27610
Stream Monitoring POC	Sean Doig, (919) 872-1174
Vegetation Monitoring POC	Sean Doig, (919) 872-1174
Wetland Monitoring POC	NA

Table 4. Project Attribute Table

Stillhouse Creek Stream Restoration – EEP Project #363

Project County	Orange
Physiographic Region	Piedmont
Ecoregion	Carolina Slate Belt
Project River Basin	Neuse
USGS HUC for Project (14 digit)	'3020201030020
NCDWQ Sub-basin for Project	03-04-01
Within extent of EEP Watershed Plan?	No
WRC Hab Class (Warm, Cool, Cold)	Warm
% of project easement fenced or demarcated	25%
Beaver activity observed during design phase?	NA

Restoration Component Attribute Table

	Reach 1	Reach 2	Reach 3	Reach 4
Drainage area	0.19	0.20	0.21	0.22
Stream order	First			
Restored length (feet)	235	400	220	355
Perennial or Intermittent	Perennial			
Watershed type (Rural, Urban, Developing etc.)	Urban	Urban	Urban	Urban
Watershed LULC Distribution (e.g.)	-	-	-	-
Residential	-	-	-	-
Ag-Row Crop	-	-	-	-
Ag-Livestock	-	-	-	-
Forested	-	-	-	-
Etc.	-	-	-	-
Watershed impervious cover (%)	-	-	-	-
NCDWQ AU/Index number	27-2-(7)	27-2-(7)	27-2-(7)	27-2-(7)
NCDWQ classification	C-NSW	C-NSW	C-NSW	C-NSW
303d listed?	No	No	No	No
Upstream of a 303d listed segment?	No	No	No	No
Reasons for 303d listing or stressor	NA	NA	NA	NA
Total acreage of easement	2.09 acres			
Total vegetated acreage within the easement	-	-	-	-
Total planted acreage as part of the restoration	-	-	-	-
Rosgen classification of pre-existing	E4	E4	E4	G4c/1
Rosgen classification of As-built[1]	E4	E4	E4	B4/1
Valley type	-	-	-	-
Valley slope	0.012	0.012	0.012	0.0185
Valley side slope range (e.g. 2-3.%)	-	-	-	-
Valley toe slope range (e.g. 2-3.%)	-	-	-	-
Cowardin classification	NA	NA	NA	NA
Trout waters designation	No	No	No	No
Species of concern, endangered etc.? (Y/N)	No	No	No	No

Table 4. Project Attribute Table Stillhouse Creek Stream Restoration – EEP Project #363				
	Reach 1	Reach 2	Reach 3	Reach 4
Dominant soil series and characteristics				
Series	Georgeville	Georgeville	Georgeville	Congaree
Depth	65	65	65	63
Clay%	5-40	5-40	5-40	5-25
K	0.43	0.43	0.43	0.28
T	3	3	3	5

Appendix B. Visual Assessment Data

Figure 2.0.	Current Conditions Plan View
Table 5.0	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

Figure 2.0. Current Conditions Plan View, 2011 Monitoring, Stillhouse Creek Stream Restoration (Project #363), Hillsborough, Orange County, NC

Photopoints
Cross-Sections
2011 Thalweg
As-Built Thalweg
Rock Structures
Vegetation Monitoring Plots
Easement Boundary

0 50 100 200 300 Feet

1:1,200

Background Image: Orange County 2010 Orthoimagery. Accessed from NCOneMaps.com.

South Cameron Street

South Churton Street

Margaret Lane

Eno River

footbridge

Reach 1
Reach 2
Reach 2/3
Reach 3
Reach 4

pocket wetland

pocket wetland

pp1 pp2 pp3 pp4 pp5 pp6 pp7 pp8 pp9 pp10

xs1 xs2 xs3 xs4 xs5

1 2 3 4

0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1000 1050 1100 1200 1210 1150

Ecosystem Enhancement Program

RJG&A
ENVIRONMENTAL CONSULTANTS
800-407-0889 www.RJGAcarolina.com

Id	Easting	Northing
Veg Plot 1 (0,0)	1971300.99	845889.38
Veg Plot 2 (0,0)	1971201.69	845690.87
Veg Plot 3 (0,0)	1971159.37	845502.81
Veg Plot 4 (0,0)	1970941.67	845327.88
Photopoint 1	1971312.17	846033.08
Photopoint 2	1971326.74	845798.97
Photopoint 3	1971174.37	845520.57
Photopoint 4	1971247.60	845701.45
Photopoint 5	1971283.36	845724.00
Photopoint 6	1971208.72	845637.70
Photopoint 7	1971114.65	845398.23
Photopoint 8	1971057.89	845364.02
Photopoint 9	1970923.38	845266.83
Photopoint 10	1970847.19	845207.74
Cross-section 1L	1971334.03	845870.36
Cross-section 1R	1971299.88	845874.02
Cross-section 2L/3L	1971243.42	845669.42
Cross-section 2R	1971223.29	845676.92
Cross-section 3R	1971223.63	845659.37
Cross-section 4L	1970996.57	845273.99
Cross-section 4R	1970976.65	845314.06
Cross-section 5L	1970966.75	845260.24
Cross-section 5R	1970947.34	845298.51

Stillhouse Creek Stream Restoration – EEP Project #363

Table 5 **Visual Stream Morphology Stability Assessment**

Reach ID **Reach 1**

Assessed Length **223**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. **Vertical Stability** (Riffle and Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	6	6			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	7	7			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	7	7			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	7	7			100%			
		2. Thalweg centering at downstream of meander (Glide)	7	7			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			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%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	7	7			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	7	7			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	7	7			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	7	7			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	7	7			100%			

Stillhouse Creek Stream Restoration – EEP Project #363

Table 5 **Visual Stream Morphology Stability Assessment**

Reach ID **Reach 2**

Assessed Length **400**

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

Stillhouse Creek Stream Restoration – EEP Project #363

Table 5 **Visual Stream Morphology Stability Assessment**

Reach ID **Reach 3**

Assessed Length **196**

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

Stillhouse Creek Stream Restoration – EEP Project #363

Table 5 **Visual Stream Morphology Stability Assessment**

Reach ID **Reach 4**
Assessed Length **355**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. **Vertical Stability** (Riffle and Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			1	15	96%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	4	4			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	7	7			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	7	7			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	7	7			100%			
		2. Thalweg centering at downstream of meander (Glide)	7	7			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			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%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	8	8			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	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 not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	8	8			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	8	8			100%			

Stillhouse Creek Stream Restoration – EEP Project #363

Table 6 **Vegetation Condition Assessment**

Planted Acreage[1] **2.1**

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	Pink	0	0.00	0.0%
			Total	0	0.00	0.0%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	NA	0	0.00	0.0%
			Cumulative Total	0	0.00	0.0%

Easement Acreage[2] **2.1**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern[4]	Areas or points (if too small to render as polygons at map scale).	1000 SF	NA	0	0.00	0.0%
5. Easement Encroachment Areas[3]	Areas or points (if too small to render as polygons at map scale).	NA	NA	0	0.00	0.0%

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

2 = The acreage within the easement boundaries.

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

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

Stream Problem Areas (electronic submission only) Stillhouse Creek Stream Restoration - EEP Project #363			
Feature Issue	**Station Numbers**	**Suspected Cause**	**Photo #**
Reach 1. No stream problems identified.			
Reach 2. No stream problems identified.			
Reach 3. No stream problems identified.			
Reach 4. No stream problems identified.			

Stream Problem Areas (electronic submission only) UT to Rocky River Stream Restoration - EEP Project #402			
Feature Category	**Station Numbers**	**Probable Cause**	**Photo #**
Reach 1. No vegetation problems identified.			
Reach 2. No vegetation problems identified.			
Reach 3. No vegetation problems identified.			
Reach 4. No vegetation problems identified.			

Figure 3.0. Permanent Photopoint Photographs - Year 5 - 2011 - Stillhouse Creek Stream Restoration (EEP Project #363)

PP #1 (Sta. 0+00 – Looking Downstream) (06/14/07)

PP #1 (Sta. 0+00– Looking Downstream) (06/10/11)

PP #2 (Sta. 2+30 – Looking Downstream) (06/14/07)

PP #2 (Sta. 2+30 – Looking Downstream) (06/10/11)

Figure 3.1. Permanent Photopoint Photographs - Year 5 - 2011 - Stillhouse Creek Stream Restoration (EEP Project #363)

PP #3 (Sta. 3+35 – Looking Downstream) (06/14/07)

PP #3 (Sta. 3+35 – Looking Downstream) (07/19/11)

PP #4 (Sta. 4+25 – Looking Downstream) (06/14/07)

PP #4 (Sta. 4+25 – Looking Downstream) (06/10/11)

Figure 3.2. Permanent Photopoint Photographs - Year 5 - 2011 - Stillhouse Creek Stream Restoration (EEP Project #363)

PP #5 (Sta. 5+50 – Looking Upstream) (06/14/07)

PP #5 (Sta. 5+50 – Looking Upstream) (06/10/11)

PP #6 (Sta. 6+95 – Looking Upstream) (06/14/07)

PP #6 (Sta. 6+95 – Looking Upstream) (06/10/11)

Figure 3.3. Permanent Photopoint Photographs - Year 5 - 2011 - Stillhouse Creek Stream Restoration (EEP Project #363)

PP #7 (Sta. 8+50 – Looking Downstream) (06/14/07)

PP #7 (Sta. 8+50 – Looking Downstream) (06/10/11)

PP #8 (Sta. 9+10 – Looking Downstream) (06/14/07)

PP #8 (Sta. 9+10 – Looking Downstream) (06/10/11)

Figure 3.4. Permanent Photopoint Photographs - Year 5 - 2011 - Stillhouse Creek Stream Restoration (EEP Project #363)

PP #9 (Sta. 10+93 – Looking Downstream) (06/14/07)

PP #9 (Sta. 10+93 – Looking Downstream) (06/10/11)

PP #10 (Sta. 11+85 – Looking Upstream) (06/14/07)

PP #10 (Sta. 11+85 – Looking Upstream) (06/10/11)

Figure 4.0. Vegetation Monitoring Plot Photographs - Year 5 - 2011 - Stillhouse Creek Stream Restoration (EEP Project #363)

Plot 1 (Sta. 1+35) (10/31/07)

Plot 1(Sta. 1+35) (7/15/11)

Plot 2 (Sta. 4+60) (10/31/07)

Plot 2 (Sta. 4+60) (7/15/11)

Figure 4.1. Vegetation Monitoring Plot Photographs - Year 5 - 2011 - Stillhouse Creek Stream Restoration (EEP Project #363)

Plot 3 (Sta. 7+20) (10/31/07)

Plot 3 (Sta. 7+20) (7/19/11)

Plot 4 (Sta. 10+55) (11/05/07)

Plot 4 (Sta. 10+55) (7/19/11)

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
Report	2011 Supplemental Planting Report
e-Tables	Raw CVS vegetation data sheets

Table 7. Vegetation Plot Criteria Attainment Stillhouse Creek Stream Restoration - EEP Project #363		
Vegetation Plot ID	Vegetation Survival Threshold Met	Tract Mean
1	Y	75%
2	N	
3	Y	
4	Y	

Table 8. Vegetation Metadata
Stillhouse Creek Stream Restoration - EEP Project #363

Report Prepared By	sean doig
Date Prepared	7/25/2011 13:51
database name	363Stillhouse.mdb
database location	D:\Sean\EEP\Stillhouse\11 Monitoring
computer name	JESSIO
file size	35905536

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

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

PROJECT SUMMARY----------

Project Code	363
project Name	Stillhouse
Description	stream restoration
River Basin	Cape Fear River Basin
length(ft)	1,210
stream-to-edge width (ft)	20-80
area (sq m)	8,457.93
Required Plots (calculated)	4
Sampled Plots	4

Table 9. Pleanted and Total Stem Counts (Species by Plot with Annual Means)
Stillhouse Creek Stream Restoration - EEP Project #363

			Current Plot Data (MY5 2011)												Annual Totals													
			E363-jo&sd-0001			E363-jo&sd-0002			E363-jo&sd-0003			E363-jo&sd-0004			MY5 (2011)			MY4 (2010)			MY3 (2009)			MY2 (2008)			MY1 (2007)		
Scientific Name	**Common Name**	**Species Type**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**	**P-LS**	**P-all**	**T**
Acer negundo	boxelder	Tree						1			5			5			11			11			3						9
Acer rubrum	red maple	Tree												1			1			1									3
Ailanthus altissima	tree of heaven	Tree																		0									2
Betula nigra	river birch	Tree											1	1		1	1												1
Carpinus caroliniana	American hornbeam	Shrub Tree																											2
Carya	hickory	Tree																											2
Carya cordiformis	bitternut hickory	Tree																					1						
Carya illinoinensis	pecan	Tree																											5
Carya ovata	shagbark hickory	Tree																											1
Celtis laevigata	sugarberry	Shrub Tree																					14						63
Cornus amomum	silky dogwood	Shrub	3	3	3				1	1	1				4	4	4	4	4	4	5	5	5	5	5	5	5	5	5
Fraxinus pennsylvanica	green ash	Tree					2	2		1	1		3	3		6	6		6	6		5	8		5	5		6	8
Ilex verticillata	common winterberry	Shrub Tree								1			1	1		2	1		2	1		5	5		6	6		6	6
Juglans nigra	black walnut	Tree						2			6			2			10			10			3						
Lagerstroemia indica	crapemyrtle	Shrub Tree			23												23			23			9						40
Ligustrum sinense	Chinese privet	Shrub Tree			1						1						2			2			4						4
Lindera benzoin	northern spicebush	Shrub Tree								1	2		1	1		2	3			3		2	2		2	2		2	2
Liquidambar styraciflua	sweetgum	Tree																											2
Liriodendron tulipifera	tuliptree	Tree											1	1		1	1		1	1		1	1		1	1		1	1
Morella cerifera	wax myrtle	Shrub Tree		3	3		1	1		6	6		1	1		11	11		11	11		11	12		12	12		12	12
Nyssa sylvatica	blackgum	Tree											2	2		2	2		2	2		1	1		1	1		1	1
Pinus taeda	loblolly pine	Tree			1																								
Platanus occidentalis	American sycamore	Tree					2	2								2	2		2	2		2	2		2	2		2	2
Quercus nigra	water oak	Tree																		0			6						18
Quercus phellos	willow oak	Tree			3					1	1		1	1		2	5		2	5		2	2		2	2		2	2
Quercus rubra	northern red oak	Tree								3	3		1	1		4	4		4	4		3	3		5	5		5	5
Quercus spp.	oak	Tree			4												4			4									
Rhus copallinum	flameleaf sumac	Shrub Tree																											1
Salix nigra	black willow	Tree																											1
Sambucus canadensis	Common Elderberry	Shrub Tree	3	3	4										3	3	4	3	3	4	4	4	4	4	4	4	5	5	5
Ulmus spp.	elm	Tree									4						4			4									
Ulmus rubra	slippery elm	Tree																		0									
Ulmus alata	winged elm	Tree						16			4			1			21			21									1
		Stem count	6	9	42	0	5	24	1	14	34	0	12	21	7	40	120	7	37	119	9	41	85	9	45	45	10	47	204
		size (ares)		1			1			1			1			4			4			4			4			4	
		size (ACRES)		0.02			0.02			0.02			0.02			0.10			0.10			0.10			0.10			0.10	
		Species count	2	3	8	0	3	6	1	7	11	0	9	13	2	12	20	2	10	22	2	11	18	2	11	11	2	11	27
		Stems per ACRE	242.8	364.2	1700	0	202.3	971.2	40.47	566.6	1376	0	485.6	849.8	70.82	404.7	1214	70.82	374.3	1204	91.05	414.8	860	91.05	455.3	455.3	101.2	475.5	2064

WEEKLY INSPECTION REPORT

Date of Inspection: 03-16-2011

Date of Report: 03-17-2011

SCO ID#: 09-0730012 (Axiom)

Supplemental Planting Oversight for *EEP Supplemental Planting 2010-03*

Project: **Stillhouse Creek - EEP #363**

Location: Orange County, North Carolina

Inspection of: Supplemental Planting 2010-03 (Constr Contract D09116s) (Contract(s))

By: Axiom Environmental, Inc. (Designer)
(Name)

Name & Title of Inspector W. Grant Lewis - Senior Project Manager

COMMENTS: The Stillhouse Creek site supplemental planting was initiated and completed on 03-16-2011.

Axiom arrived before planting contractors to discuss plans with Perry Sugg of NC EEP. Planting material was delivered to the site on planting day in an enclosed trailer by the planting contractor (River Works, George Morris). All plants installed were provided by NCEEP through the WRC Dan River nursery. At the Stillhouse site, a total of 110 containerized plants were installed per the EEP planting plan with some adjustments. NCEEP requested some minor revisions based on site conditions. The original quantity in the plan was increased by the addition of 10 oak species that were installed on the left side of the easement downstream end – see attached planting plan for revisions.

Axiom Environmental verified species, plant size, and distribution in each planting zone. All stems planted met NC EEP size and vigor requirements. A final walk through was conducted by Axiom Environmental at the end of the day on 03-16-2011 and all work was completed as requested.

(This report is to be made weekly by the designer and submitted as a part of monthly progress reports.)

SCO (Rev. 11/6/06)

Species	Quantity Planted	Container Size
Ironwood, *Carpinus caroliniana*	25	#5
Green ash, *Fraxinus pennsylvanica*	15	#5
Red Oak, *Quercus rubra*	20	#5
White Oak, *Quercus alba*	15	#5
Willow Oak, *Q. phellos*	5	#5
Persimmon, *Diospyros virginiana*	15	#5
River Birch, *Betula nigra*	15	#10

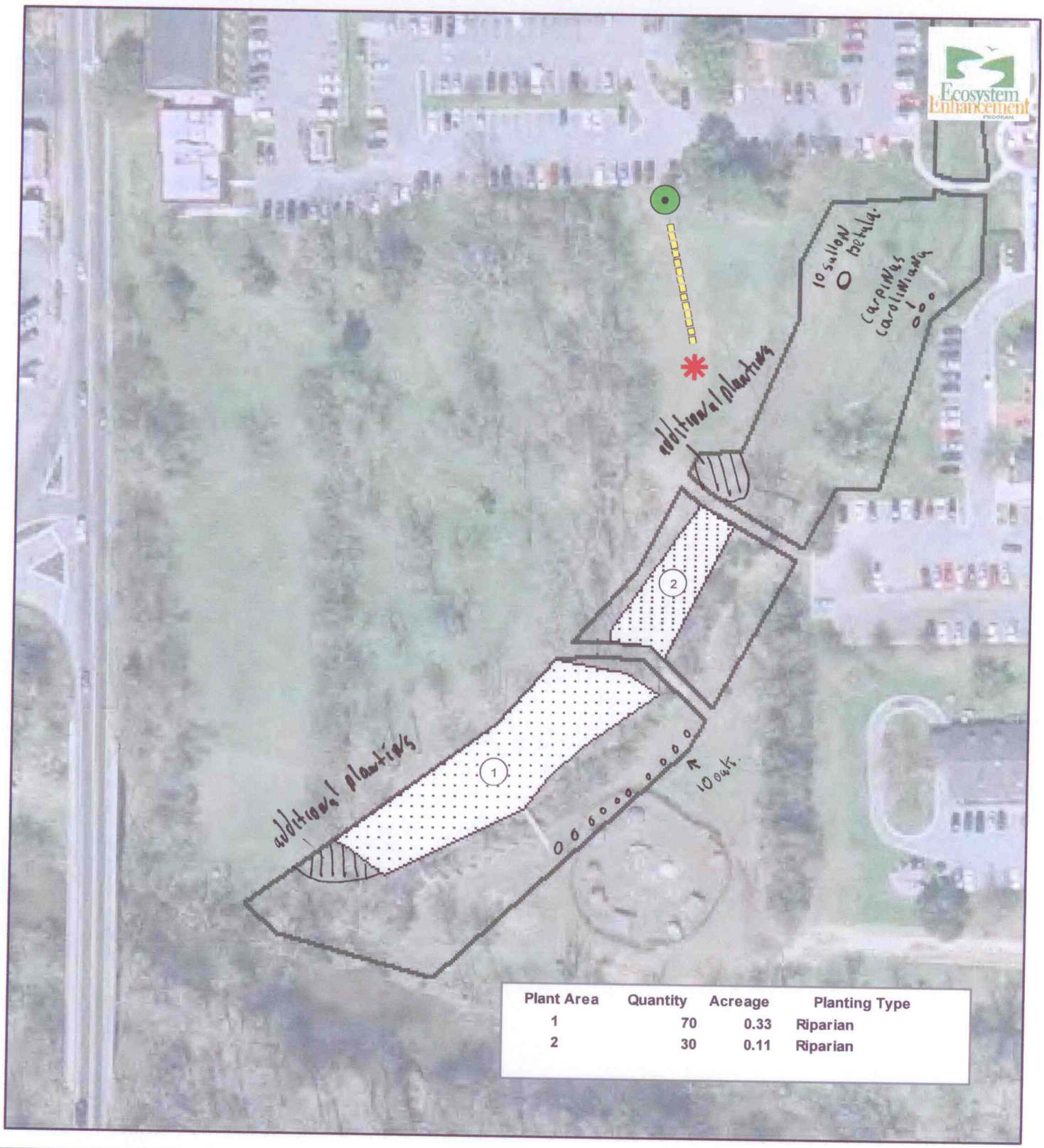
(This report is to be made weekly by the designer and submitted as a part of monthly progress reports.)

EEP Supplemental Planting Species Lists - SP2010-03

(Various Project Sites)

Containerized Plant Measurements - June 2010

Plant Species	Type	Minimum Caliper (inches)	Minimum Height (feet)
Black Cherry	tree	7/16	4.0
Black Willow	tree	11/16	5.5
Carolina Ash 10-gal	tree	3/4	7.0
Cherrybark Oak	tree	3/8	2.5
Green Ash	tree	3/4	7.0
Ironwood	tree	7/16	4.0
Persimmon	tree	5/16	3.5
Red Maple	tree	3/8	3.0
Red Oak	tree	1/2	4.5
River Birch 10-gal	tree	1	7.0
River Birch 5-gal	tree	7/8	6.0
Water Oak	tree	3/8	2.5
White Oak	tree	5/8	3.0
Willow Oak	tree	3/8	3.0
Arrowwood	shrub	3/8	2.5
Button Bush	shrub	1/2	5.0
Elderberry	shrub	1/2	4.5
Red Chokeberry	shrub	3/8	5.0
Silky Dogwood	shrub	5/8	5.0



Plant Area	Quantity	Acreage	Planting Type
1	70	0.33	Riparian
2	30	0.11	Riparian

Legend

- Staging Area
- Site Access
- 2010-03 Planting Areas
- 2010-03 Project Easements

N

0 50 100 200 Feet

Stillhouse Crk - EEP #363
Hillsborough NC

PLANTING PLAN
October 2010

7/21

Plot (continued): E363-jo&sd-0001

ID	Species	map char	source	X (m)	Y (m)	Jun 2010 Data ddh (mm)	Jun 2010 Data Height (cm)	Jun 2010 Data DBH (cm)	Notes*	THIS YEAR'S DATA ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	Vigor*	Damage*	Notes

Plot E363-jo&sd-0001

Please fill in any missing data and fix incorrect data. **Vegetation Monitoring Data (VMD) Datasheet**

VMD Year (1-5): 5 Date: 7/15/2011 – 7/15/2011

Party: SD, CH Role:

Notes on plot:

Taxonomic Standard: Weakley 2009

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 36.07411 Datum: NAD83/WGS84

Longitude or UTM-E: -79.09711 UTM Zone:

Coordinate Accuracy (m): 1 X-Axis bearing (deg): 182

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	Jun 2010 Data ddh 1 mm	Jun 2010 Data Height 1cm*	Jun 2010 Data DBH 1 cm	Notes*	THIS YEAR'S DATA ddh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
9	Ilex verticillata	(h)	R	2.5	0.6	19	29.0		☑				☐	0		cut/dead
10	Morella cerifera	(a)	R	1.1	2.7		284.0	1.5	☐	37	345	2.4	☐	4		
11	Cornus amomum	(i)	L	3.4	4.3		320.0	1.7	☐	n/a	420	↑	☐	4		
12	Ilex verticillata	(j)	R	4.0	2.3	9	71.0		☑	9	74	2.9	☐	2		overgrown/shadowed
13	Sambucus canadensis	(k)	L	5.9	3.2		290.0	1.2	☑	n/a	260	1.7	☐	3		
15	Sambucus canadensis	(l)	L	7.9	1.5		230.0	1.0	☐	22	220	1.0	☐	3		
16	Cornus amomum	(m)	L	9.4	4.0		360.0	2.4	☐	n/a	450	3.3	☐	4		
17	Ilex verticillata	(b)	R	10.2	0.6	8	86.0		☐	9	81		☐	2		Trimmed/Pruned
18	Morella cerifera	(e)	R	12.4	0.5		258.0	1.0	☐	/	270	1.2	☐	4		
19	Morella cerifera	(c)	R	11.0	2.5		350.0	2.0	☐	/	420	2.7	☐	4		
20	Sambucus canadensis	(d)	L	12.3	4.8		350.0	2.6	☐	n/a	365	3.5	☐	4		
21	Cornus amomum	(f)	L	14.8	4.2		300.0	1.9	☐	n/a	380	2.4	☐	4		
22	Sambucus canadensis	(g)	L	16.7	2.5	8	65.0		☐	n/a			☐	0		

 # stems: 13

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

370

***Notes by ID:**
9-someone trimmed morella on border of easement and cut some plants in easement
☐12-cut morella thrown on to veg plot plants
☐13-cut morella thrown on to veg plot plants

*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-EEP Entry Tool ver. 2.2.7

Plot (continued): E363-jo&sd-0001					Jun 2010 Data			Notes*	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

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	☑ 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)
Q. Falcata		___	•			___					
P. taeda		___			•	___					
Pea thing (herb?)		___	••	••	••	___	•				
Crepe myrtle		___			••	___	☒ 1;	••			
Lig.		___		•		___					
Q rubra (? sample taken)		___			•	___	••				
Q phellos		___	•		••	___					

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

●1 ●2 ●3 ●●4 ●●5 ●●6 ●●7 ●●8 ●●9 ●●10

Form WS2, ver 9.1

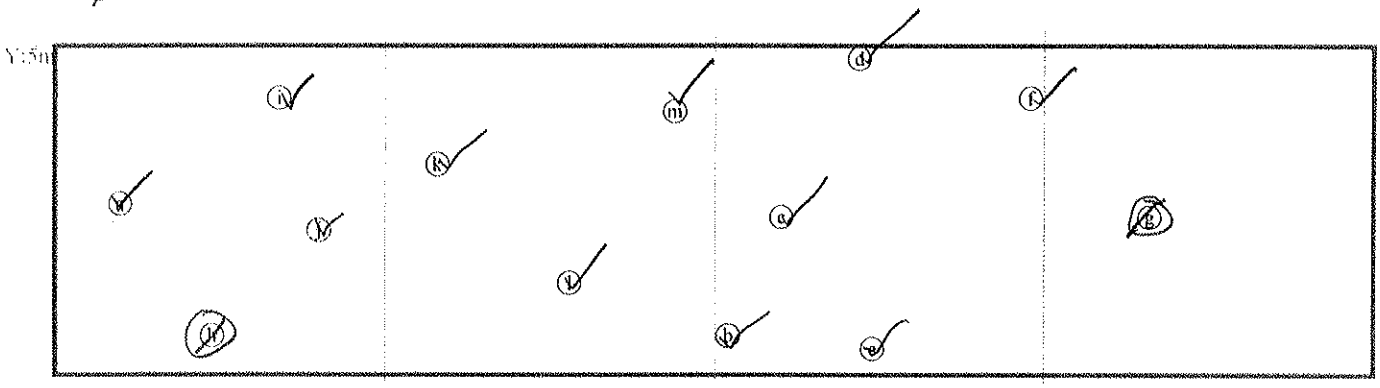
Map of stems on plot E363-jo&sd-0001

X-axis: 182°

 # stems: 13
map size: LARGE

N

✓ = got it X = missing
∅ = dead



E red cedar • (10-50)

*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-EEP Entry Tool ver. 2.2.7

✓ 7/21

Plot E363-jo&sd-0002 — **Please fill in any missing data and fix incorrect data.** — **Vegetation Monitoring Data (VMD) Datasheet**

VMD Year (1-5): 5	Date: 7/15/1 - 7/15/1	Party: SP CH	Role:
Taxonomic Standard:	Wenkley 2009		
Taxonomic Standard DATE:			
Latitude or UTM-N: (dec.deg. or m)	36.07356	Datum: NAD83/W	
Longitude or UTM-E:	-79.09745	UTM Zone:	
Coordinate Accuracy (m):	1	X-Axis bearing (deg): 208	
Plot Dimensions: X:	20 Y: 5	☐ Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X	

Notes on plot: 15 Jul 11

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Jun 2010 Data ddh 1 mm	Height 1cm*	DBH 1 cm	Notes*	THIS YEAR'S DATA ddh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
28	Platanus occidentalis	ⓐ	R	0.8	3.8		700.0	6.6	☐		950	10.3	☐		4	
29	Morella cerifera	ⓒ	R	3.3	0.4		342.0	2.4	☐		400	3.3	☐		4	
30	Fraxinus pennsylvanica	ⓓ	R	5.0	3.2		420.0	4.1	☐		600	6.4	☐		4	
31	Fraxinus pennsylvanica	ⓔ	R	6.8	1.3		470.0	4.1	☐		740	7.7	☐		4	
32	Platanus occidentalis	ⓑ	B	11.3	4.7		1120.0	14.0	☐		1140	20	☐		4	

 # stems: 5 — 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	☑ c	Seedlings — Height Classes: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Saplings — DBH: Sub-Sapl	0-1 cm	1-2.5	Trees — DBH: 2.5-	5-	=10 (write DBH)
Ulmus alata			⊠	••	•						
J. nigra				••							
A. neg				•							
F. pen							•				

**Required if cut-off >10cm or subsample ? 100%. ●1 ●●2 ●●3 ●●4 ●●5 ●●6 ●●7 ●●8 ●●9 ●●10 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, VINE Strangulation, UNKNown, specify other.

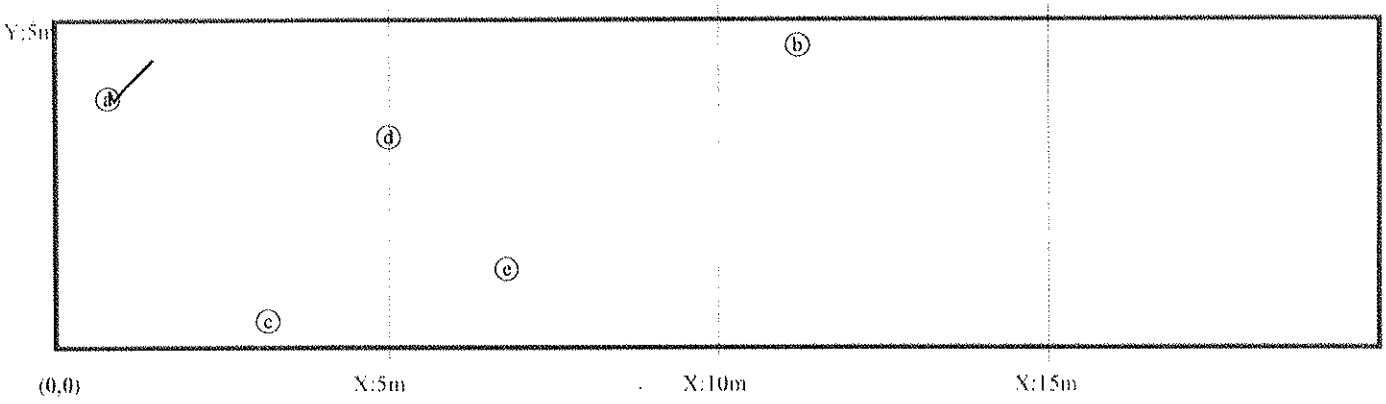
*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Map of stems on plot E363-jo&sd-0002

X-axis: 208 °

N

 # stems: 5
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.

Printed in the CVS-EEP Entry Tool ver. 2.2.7

7/21 ✓

Plot E363-jo&sd-0003 — **Please fill in any missing data and fix incorrect data.** — **Vegetation Monitoring Data (VMD) Datasheet**

VMD Year (1-5): 5 Date: 7/19 - 7/19 Party: SD CH Role:

Taxonomic Standard: Weakley 2007

Taxonomic Standard DATE:

Latitude or UTM-N: (dec.deg. or m) 36.07304 Datum: NAD83/WGS84

Longitude or UTM-E: -79.09759 UTM Zone:

Coordinate Accuracy (m): X-Axis bearing (deg): 196

Plot Dimensions: X: 10 Y: 10 ☐ Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X

Notes on plot: Seam photo - first two

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Jun 2010 Data ddh 1 mm	Jun 2010 Data Height 1cm*	Jun 2010 Data DBH 1 cm	Notes*	THIS YEAR'S DATA ddh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
41	Fraxinus pennsylvanica	(d)	R	1.0	3.1	15	124.0	*DBH?*	☐	17	160	0.4	☐	3		
42	Cornus amomum	(b)	L	0.4	4.6*		88.0		☐	n/a	—	—	☐	Ø		
43	Quercus rubra	(a)	R	1.6	5.7		330.0	2.0	☐		400	3.8	☐	4		
44	Morella cerifera	(e)	R	0.7	6.7		420.0	3.0	☐	/	500	3.6	☐	4		
45	Morella cerifera	(f)	R	0.2	9.2		350.0	1.4	☐	/	400	2.5	☐	4		
47	Lindera benzoin	(g)	R	4.1	4.4	13	178.0	0.3	☐	15	196	0.6	☐	3		
48	Quercus rubra	(k)	R	5.3	4.8		280.0	2.3	☐	41	336	3.2	☐	3		vines! diascaria
49	Morella cerifera	(l)	R	6.9	4.6	33	167.0	1.5	☐	*	357	2.6	☐	3		
50	Morella cerifera	(f)	R	6.4	2.2		360.0	1.7	☐	15	134	/	☐	1		diascaria killing it
54	Quercus phellos	(m)	R	8.0	6.0	16	148.0	0.1	☐	19	151	0.3	☐	3		
55	Ilex verticillata	(n)	R	8.9	6.8		*Missing*		☐	missing						
56	Morella cerifera	(j)	R	6.2	7.3	18	200.0	0.4	☐	23	172	0.4	☐	2		Top broken? Vetch choking it
57	Morella cerifera	(i)	R	7.8	8.7		385.0	1.7	☐	/	430	2.2	☐	4		
58	Quercus rubra	(h)	R	5.7	8.9		310.0	2.0	☐	/	440	4.2	☐	4		

 # stems: 14

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
[illegible]									

(K) + (J) info, possibly mixed up

assume (c) is correct (See plot.

~2m (d)

* - closer to 5.0

*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-EEP Entry Tool ver. 2.2.7

Plot (continued): E363-io&sd-0003

ID	Species	map char	source	X (m)	Y (m)	Jun 2010 Data: ddh (mm)	Height (cm)	DBH (cm)	Notes*	THIS YEAR'S DATA: ddh (mm)	Height (cm)	DBH (cm)	Re-sprout	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	☑ c	SEEDLINGS — HEIGHT CLASSES: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	SAPLINGS — DBH: Sub-Sapl	0-1 cm	1-2.5	TREES — DBH: 2.5-	5-	=10 (write DBH)
Liq Sin											
Ulmus											
J. nigra											
Sugarberry											
A. negundo											
Spicebush											

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

●1 ●2 ●3 ●4 ●5 ●6 ●7 ●8 ●9 ●10

Form WS2, ver 9.1

change to Ulmus sp.

*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.

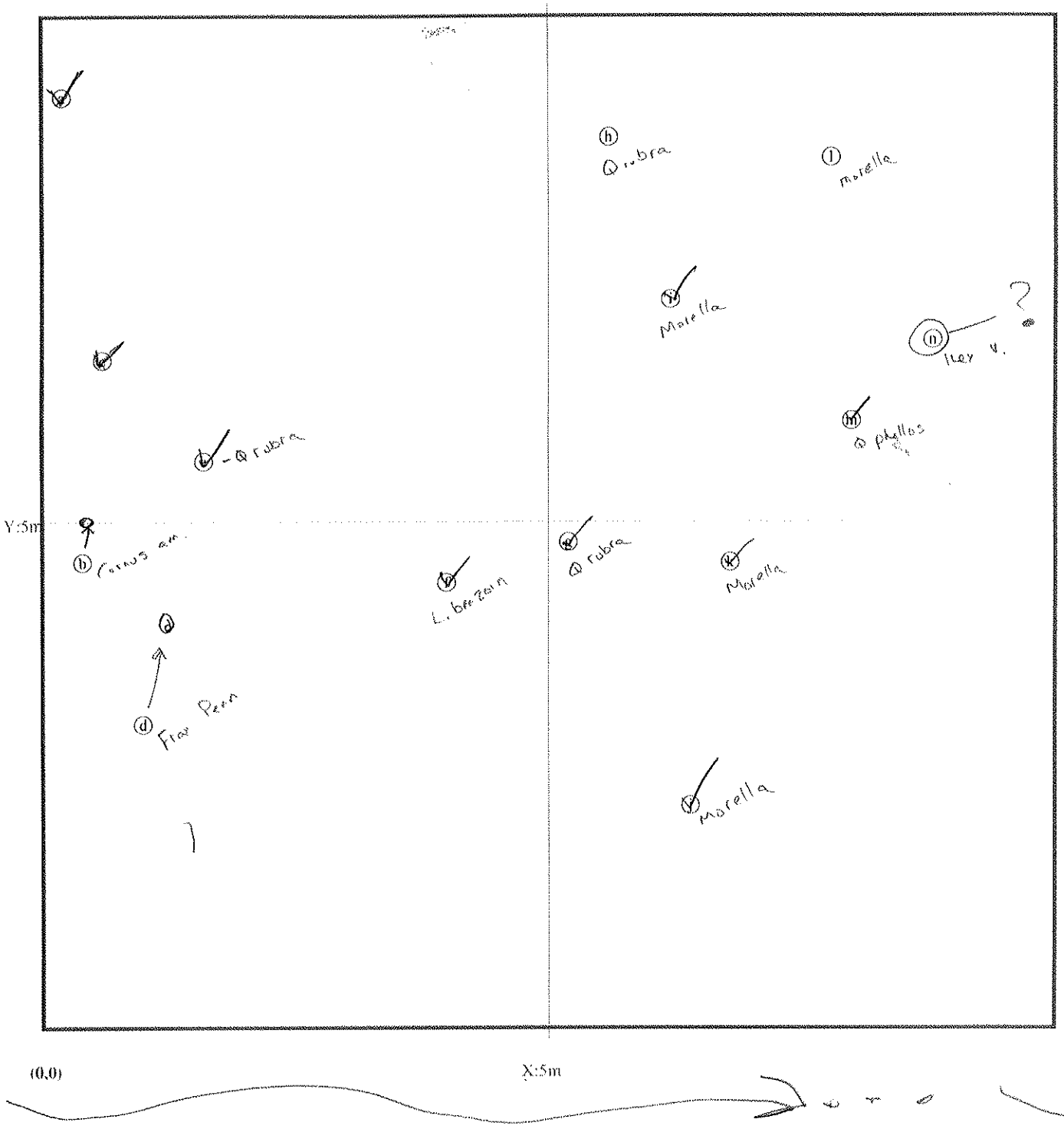
*HEIGHT PRECISION drops to 10cm if >2.5m and 50cm if >4m.

Map of stems on plot E363-jo&sd-0003

X-axis: 196°

N

 # stems: 14
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.

7/21 ✓

Plot E363-jo&sd-0004 — Please fill in any missing data and fix incorrect data. — **Vegetation Monitoring Data (VMD) Datasheet**

VMD Year (1-5): 5	Date: 7/19/ - 7/19/	Party: CH, SD	Role:
Taxonomic Standard:	Wenhoy		
Taxonomic Standard DATE:	2007		
Latitude or UTM-N: (dec.deg. or m)	36.07256	Datum: NAD83/WGS84	
Longitude or UTM-E:	-79.09832	UTM Zone:	
Coordinate Accuracy (m):	1	X-Axis bearing (deg): 247	
Plot Dimensions: X:	10	Y: 10	☐ Plot has reverse orientation for X and Y axis (Y is 90 degrees to the right of X

Notes on plot:

ID	Species Name	Map char	Source*	X 0.1m	Y 0.1m	Jun 2010 Data ddh 1 mm	Height 1cm*	DBH 1 cm	Notes*	THIS YEAR'S DATA ddh 1mm	Height 1cm*	DBH 1 cm	Re-sprout	Vigor*	Damage*	Notes
67	Quercus phellos		R	1.9	2.0	17	122.0	DBH?	☐	21	199	0.7	☐	3		
68	Fraxinus pennsylvanica		R	0.1	7.5	14	134.0	DBH?	☐	24	197	.8	☐	4		
69	Ilex verticillata		R	2.0	9.5	5	35.0		☐	2	37	/	☐	2		overgrown
70	Liriodendron tulipifera		B	4.8	8.5	10	106.0	DBH?	☐		379	2.5	☐	4		
71	Morella cerifera		R	5.2	0.8	14	163.0	0.3	☐	22	267	1.2	☐	4		
72	Nyssa sylvatica		R	7.7	0.6	5	62.0		☐	4	60	/	X	2		
75	Fraxinus pennsylvanica		R	7.3	5.7	11	97.0		☐	15	146	.3	☐	3		
76	Lindera benzoin		R	5.0	6.8	7	111.0	DBH?	☐	11	153	.2	☐	3		

 # 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
Frax penn		8.6	0.7	24	202	1.0	4		
Nyssa		7.2	5.0	15	90	/	3	overgrown (grass)	
Bet nigra		3.6	4.9	42	281	1.7	4		
Q rubra		9.4	8.2	22	133	/	3/4	competing w/grass	

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	☑ c	Seedlings — Height Classes: Sub-Seed	10 cm-50 cm	50 cm-100 cm	100 cm-137 cm	Saplings — DBH: Sub-Sapl	0-1 cm	1-2.5	Trees — DBH: 2.5-	5-	=10 (write DBH)
W. elm			•	•							
A. negundo			••	•							
A. rubra			•								
J. nigra				•				•			

**Required if cut-off >10cm or subsample ? 100%. ●1 ●2 ●3 ●4 ●5 ●6 ●7 ●8 ●9 ●10

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, VINE Strangulation, UNKNown, specify other.

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

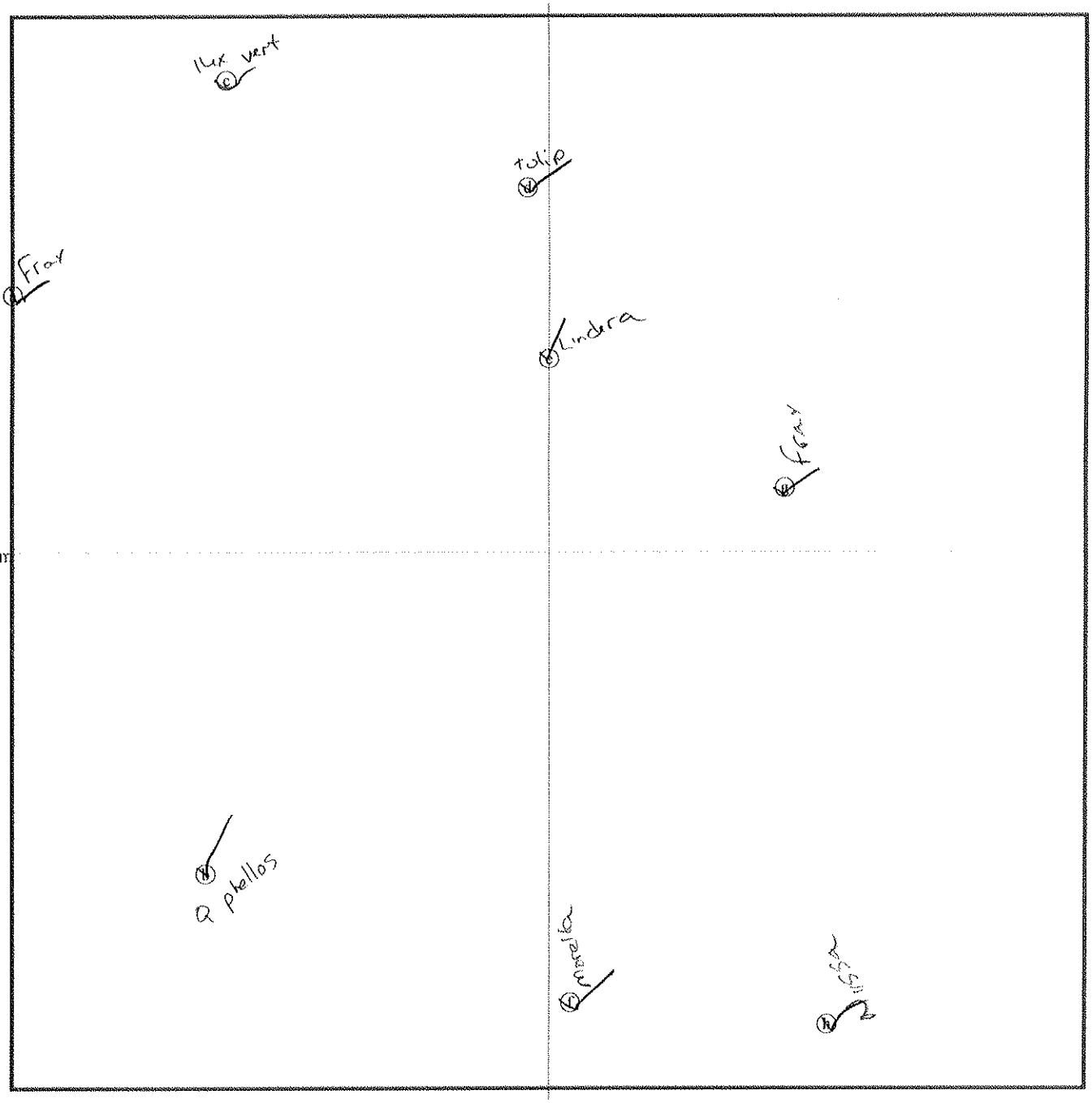
Printed in the CVS-EEP Entry Tool ver. 2.2.7

Map of stems on plot E363-jo&sd-0004

X-axis: 247°

 # stems: 8
map size: LARGE

N



*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.

Appendix D. Stream Survey Data

Figures 5.0-5.4	Cross sections with Annual Overlays
e-Tables	Raw cross-section survey data spreadsheets
Figures 6.0-6.2	Longitudinal Profiles with Annual Overlays
e-Tables	Raw longitudinal profile survey data spreadsheets
Figures 7.0-7.4	Pebble Count Plots with Annual Overlays
e-Tables	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 - Stillhouse Creek Stream Restoration – EEP Project #363

River Basin:	Neuse
Watershed:	Stillhouse Creek
XS ID	XS 1 (pool)
Reach:	1
Date:	7/15/2011
Field Crew:	SD & CH

Station	Rod Ht.	Elevation
0	9.81	508.16
0	9.98	507.99
2.4	10.83	507.14
4.4	11.49	506.48
5.9	12.01	505.96
7.2	12.62	505.35
9.2	12.9	505.07
12.6	13.45	504.52
15.5	13.57	504.4
17	14.64	503.33
18.1	14.92	503.05
19.4	15.27	502.7
20.9	15.09	502.88
22	13.65	504.32
24.7	13.17	504.8
26.8	12.03	505.94
30	11.06	506.91
32.7	10.17	507.8
34.6	9.79	508.18
34.6	9.41	508.56

SUMMARY DATA

Bankfull Width (ft)	13.83
Floodprone Width (ft)	26.84
Bankfull Mean Depth (ft)	0.86
Bankfull Max Depth (ft)	2.10
Bankfull Area (ft^2)	11.89
Bankfull Width/Depth Ratio	16.09
Bankfull Entrenchment Ratio	1.94
Bankfull Bank Height Ratio	1.00
d50 (mm)	0.44

View of cross-section Stillhouse XS-1 looking downstream

Stream Type: B5

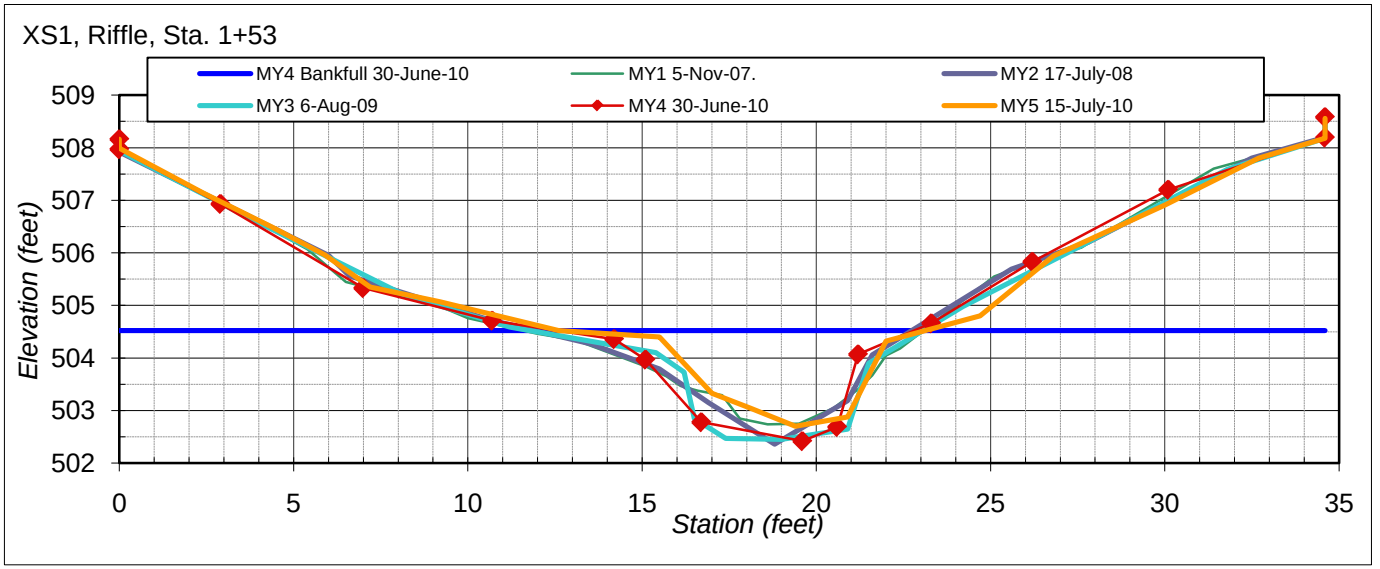


Figure 5.1. Cross Sections with Annual Overlays - Stillhouse Creek Stream Restoration – EEP Project #363

River Basin:	Neuse
Watershed:	Stillhouse Creek
XS ID	XS 2 (pool)
Reach:	2
Date:	7/15/2011
Field Crew:	SD & CH

Station	Rod Ht.	Elevation
0	4.76	502.74
0	4.98	502.52
2	5.08	502.42
4.2	5.29	502.21
5.6	5.52	501.98
7.3	5.7	501.8
8.2	5.87	501.63
9.1	6.15	501.35
9.6	6.22	501.28
10.1	7.19	500.31
11	7.6	499.9
13.1	7.84	499.66
14.8	8.02	499.48
15.6	7.23	500.27
16.6	5.77	501.73
18.5	5.58	501.92
20.3	5.08	502.42
21.4	4.93	502.57
21.4	4.72	502.78

SUMMARY DATA

Bankfull Width (ft)	18.30
Floodprone Width (ft)	94.50
Bankfull Mean Depth (ft)	1.20
Bankfull Max Depth (ft)	2.94
Bankfull Area (ft^2)	21.93
Bankfull Width/Depth Ratio	15.27
Bankfull Entrenchment Ratio	5.16
Bankfull Bank Height Ratio	1.00
d50 (mm)	1.43

View of cross-section Stillhouse XS-2 looking downstream

Stream Type: C5

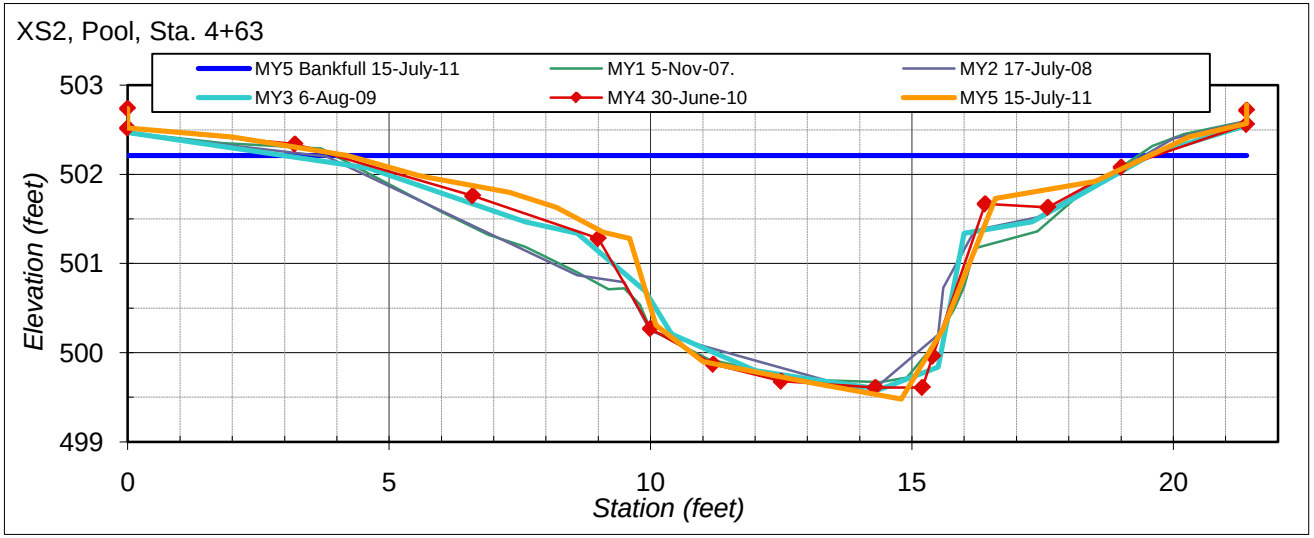


Figure 5.2. Cross Sections with Annual Overlays - Stillhouse Creek Stream Restoration – EEP Project #363

River Basin:	Neuse
Watershed:	Stillhouse Creek
XS ID	XS 3 (riffle)
Reach:	2
Date:	7/15/2011
Field Crew:	SD & CH

Station	Rod Ht.	Elevation
0	4.76	502.74
0	4.98	502.52
1.6	5.09	502.41
3.9	5.34	502.16
5.3	5.71	501.79
7.8	5.91	501.59
9.6	6.07	501.43
10.1	6.05	501.45
11.2	6.88	500.62
12.1	7.04	500.46
12.7	7.08	500.42
13	7.06	500.44
13.8	6.14	501.36
15.1	5.78	501.72
17.1	5.63	501.87
19.4	5.51	501.99
21	5.5	502
22	5.5	502
22	5.38	502.12

SUMMARY DATA

Bankfull Width (ft)	14.86
Floodprone Width (ft)	107.00
Bankfull Mean Depth (ft)	0.52
Bankfull Max Depth (ft)	1.57
Bankfull Area (ft^2)	7.70
Bankfull Width/Depth Ratio	28.65
Bankfull Entrenchment	7.20
Bankfull Bank Height Ratio	1.00
d50 (mm)	19

View of cross-section Stillhouse XS-3 looking downstream

Stream Type:	C4

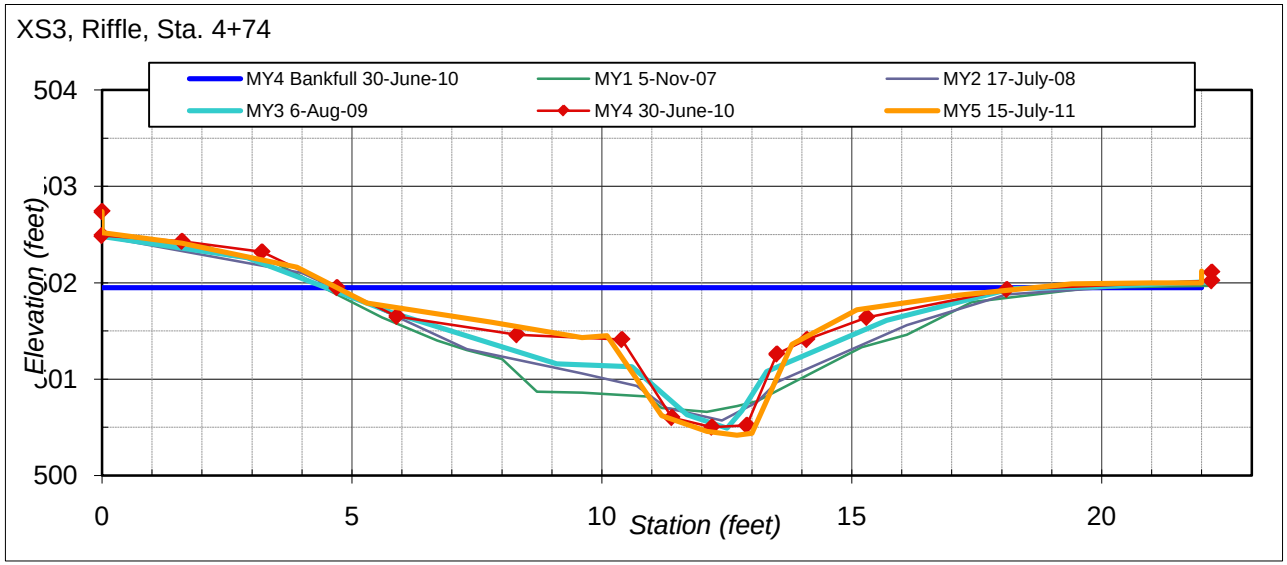


Figure 5.3. Cross Sections with Annual Overlays - Stillhouse Creek Stream Restoration – EEP Project #363

River Basin:	Neuse
Watershed:	Stillhouse Creek
XS ID	XS 4 (riffle)
Reach:	4
Date:	7/19/2011
Field Crew:	SD & CH

Station	Rod Ht.	Elevation
0	2.97	500.46
0	3.1	500.33
1.3	3.38	500.05
2	3.72	499.71
4.4	5.54	497.89
6.7	7.2	496.23
9.9	9.36	494.07
12.8	9.67	493.76
14	9.96	493.47
15.5	10.35	493.08
16	10.72	492.71
16.7	11.49	491.94
18	11.73	491.7
19.6	11.64	491.79
20.1	11.21	492.22
21.9	10.64	492.79
24.2	10.15	493.28
26.9	9.73	493.7
29.9	9.59	493.84
32.3	9.31	494.12
34.7	8.77	494.66
37	7.92	495.51
39.4	6.87	496.56
42.6	5.63	497.8
44.7	5.31	498.12
44.7	5.04	498.39

SUMMARY DATA

Bankfull Width (ft)	15.39
Floodprone Width (ft)	30.40
Bankfull Mean Depth (ft)	0.89
Bankfull Max Depth (ft)	2.06
Bankfull Area (ft^2)	13.66
Bankfull Width/Depth Ratio	17.33
Bankfull Entrenchment	1.98
Bankfull Bank Height Ratio	1.00
d50 (mm)	8.42

Stream Type:	B4

View of cross-section Stillhouse XS-4 looking downstream

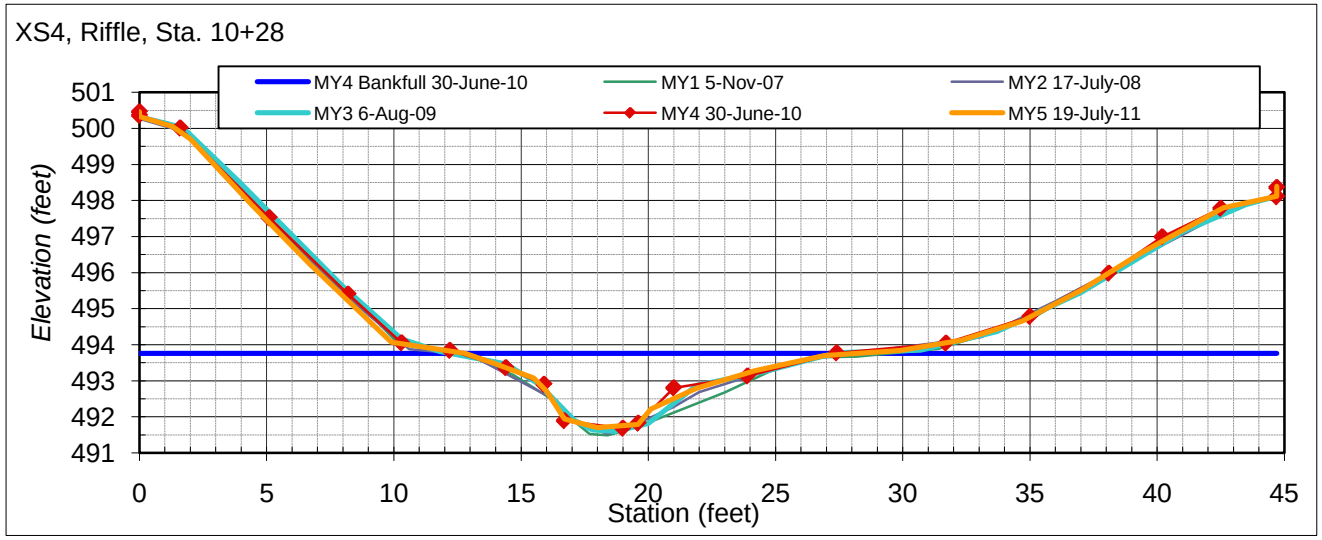


Figure 5.4. Cross Sections with Annual Overlays - Stillhouse Creek Stream Restoration – EEP Project #363

River Basin:	Neuse
Watershed:	Stillhouse Creek
XS ID	XS 5 (pool)
Reach:	4
Date:	7/19/2011
Field Crew:	SD & CH

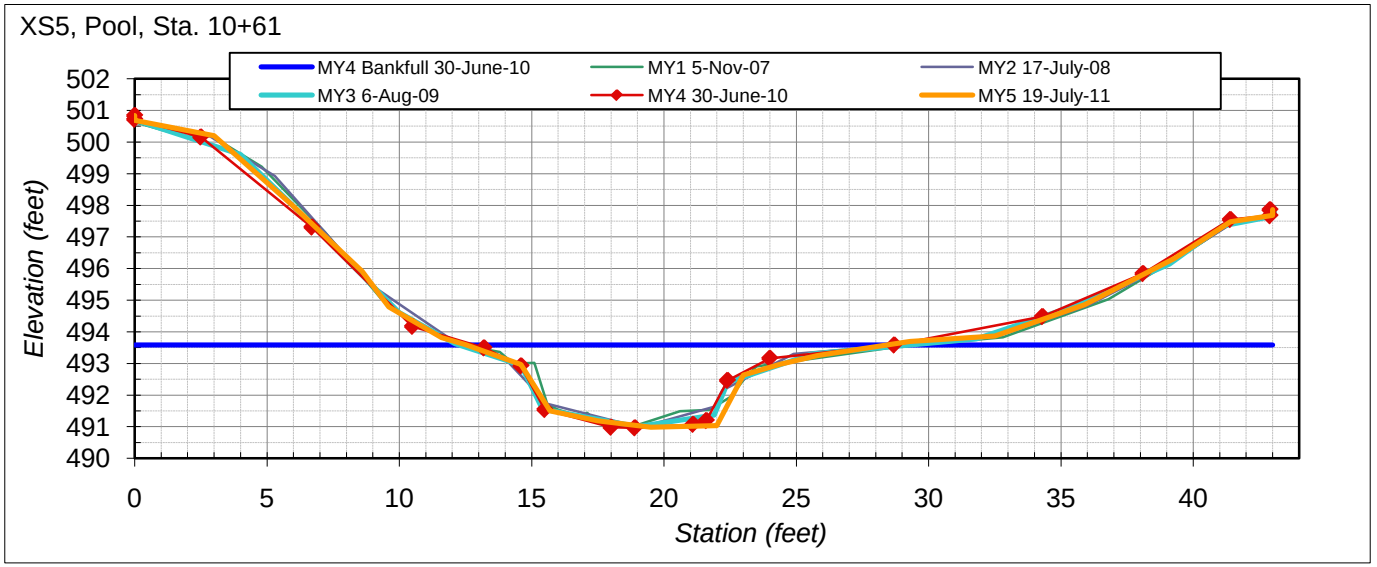
Station	Rod Ht.	Elevation
0	1.56	500.84
0	1.71	500.69
3	2.2	500.2
5.9	4.35	498.05
8.6	6.49	495.91
9.6	7.61	494.79
11.6	8.58	493.82
12.5	8.81	493.59
14.6	9.43	492.97
15.7	10.9	491.5
17.5	11.21	491.19
19.5	11.42	490.98
22	11.36	491.04
23	9.77	492.63
24.4	9.42	492.98
25.8	9.15	493.25
29.3	8.7	493.7
32.5	8.53	493.87
35.9	7.54	494.86
39.3	6.07	496.33
41.4	4.92	497.48
43	4.72	497.68
43	4.54	497.86

SUMMARY DATA

Bankfull Width (ft)	15.94
Floodprone Width (ft)	30.77
Bankfull Mean Depth (ft)	1.36
Bankfull Max Depth (ft)	2.61
Bankfull Area (ft^2)	21.61
Bankfull Width/Depth	11.76
Bankfull Entrenchment	1.93
Bankfull Bank Height	1.00
d50 (mm)	23.54

View of cross-section Stillhouse XS-S looking downstream

Stream Type:	B4



Cross-section 1 Raw Data

MY1(2007)

Station	Rod Ht.	Elevation
0	5	508.16
0	5.22	507.94
2.5	6.06	507.10
4	6.58	506.58
5.4	7.09	506.07
6.5	7.71	505.45
7.6	7.9	505.26
9	8.12	505.04
10	8.4	504.76
12	8.7	504.46
13.1	8.82	504.34
15.1	9.32	503.84
15.7	9.51	503.65
16.1	9.69	503.47
16.6	9.78	503.38
17.3	9.87	503.29
17.8	10.31	502.85
18.6	10.42	502.74
19.5	10.41	502.75
20.5	10.11	503.05
21.2	9.75	503.41
21.6	9.49	503.67
22	9.11	504.05
22.4	8.98	504.18
25.1	7.61	505.55
26.8	7.19	505.97
27.6	7.06	506.10
28.7	6.61	506.55
29.4	6.34	506.82
31.4	5.56	507.60
33.3	5.21	507.95
34.6	4.97	508.19
34.6	4.58	508.58

MY2 (2008)

Station	Rod Ht.	Elevation
0	4.09	508.16
0	4.33	507.92
6	6.3	505.95
6.6	6.69	505.56
10.6	7.52	504.73
13.5	7.98	504.27
15.5	8.46	503.79
16.9	9.1	503.15
18.8	9.89	502.36
20.9	9.06	503.19
21.6	8.19	504.06
25.6	6.56	505.69
27.8	6.05	506.20
32.5	4.45	507.80
34.6	4.05	508.20
34.6	3.71	508.54

MY3 (2009)

Station	Rod Ht.	Elevation
0	4.63	508.16
0	4.85	507.94
3.8	6.15	506.64
8.2	7.6	505.19
11.2	8.2	504.59
15.4	8.69	504.10
16.2	9.06	503.73
16.5	9.94	502.85
17.4	10.32	502.47
19	10.34	502.45
20.9	10.14	502.65
21.5	8.89	503.90
24.2	7.81	504.98
27.3	6.76	506.03
31.8	5.2	507.59
34.6	4.61	508.18
34.6	4.27	508.52

MY4 (2010)

Station	Rod Ht.	Elevation
0	4.83	508.16
0	5.02	507.97
2.9	6.06	506.93
7	7.66	505.33
10.7	8.28	504.71
14.2	8.63	504.36
15.1	9.02	503.97
16.7	10.21	502.78
19.6	10.97	502.42
20.6	10.7	502.69
21.2	9.32	504.07
23.3	8.73	504.66
26.2	7.56	505.83
30.1	6.19	507.2
34.6	5.2	508.19
34.6	4.81	508.58

Cross-section 2 Raw Data

MY1 (2007)

Station	Rod Ht.	Elevation
0	4.66	502.74
0	4.93	502.47
1.8	5.05	502.35
3.7	5.11	502.29
6	5.82	501.58
6.9	6.08	501.32
7.6	6.21	501.19
8.6	6.5	500.90
9.2	6.69	500.71
9.5	6.68	500.72
9.8	6.86	500.54
10	7.14	500.26
11.1	7.47	499.93
12.8	7.7	499.70
14.4	7.73	499.67
14.9	7.68	499.72
15.3	7.4	500.00
15.8	6.92	500.48
16	6.66	500.74
16.2	6.23	501.17
17.4	6.04	501.36
18.2	5.63	501.77
19.6	5.08	502.32
20.2	4.95	502.45
21.4	4.8	502.60
21.4	4.63	502.77

MY2 (2008)

Station	Rod Ht.	Elevation
0	4.71	502.72
0	4.97	502.46
3.8	5.23	502.2
6	5.84	501.59
8.6	6.56	500.87
9.5	6.64	500.79
10	7.19	500.24
14.2	7.88	499.55
15.5	7.23	500.2
15.6	6.7	500.73
16.2	6.06	501.37
17.4	5.91	501.52
20	5.03	502.4
21.4	4.84	502.59
21.4	4.66	502.77

MY3 (2009)

Station	Rod Ht.	Elevation
0	4.71	502.73
0	4.97	502.47
4.6	5.37	502.07
7.6	5.97	501.47
8.6	6.1	501.34
9.9	6.75	500.69
10.4	7.23	500.21
12	7.64	499.80
13.1	7.74	499.70
14.4	7.85	499.59
15.5	7.6	499.84
16	6.1	501.34
17.3	5.97	501.47
19.6	5.21	502.23
21.4	4.89	502.55
21.4	4.67	502.77

MY4 (2010)

Station	Rod Ht.	Elevation
0	5	502.74
0	5.22	502.52
3.2	5.4	502.34
6.6	5.98	501.76
9	6.46	501.28
10	7.47	500.27
11.2	7.87	499.87
12.5	8.06	499.68
14.3	8.13	499.61
15.2	8.13	499.61
15.4	7.78	499.96
16.4	6.07	501.67
17.6	6.11	501.63
19	5.66	502.08
21.4	5.18	502.56
21.4	5.02	502.72

Cross-section 3 Raw Data

MY1 (2007)

Station	Rod Ht.	Elevation
0	4.66	502.74
0	4.93	502.47
2.1	5.02	502.38
2.5	5.12	502.28
3.4	5.18	502.22
5.6	5.76	501.64
6.7	6	501.4
7.3	6.1	501.3
8	6.19	501.21
8.7	6.53	500.87
9.6	6.54	500.86
10.9	6.58	500.82
11.2	6.7	500.7
12.1	6.74	500.66
12.7	6.68	500.72
13.1	6.63	500.77
14.7	6.2	501.2
15.2	6.07	501.33
16.1	5.94	501.46
17.4	5.6	501.8
19.8	5.45	501.95
22.2	5.43	501.97
22.2	5.29	502.11

MY2 (2008)

Station	Rod Ht.	Elevation
0	4.71	502.74
0	4.97	502.48
4	5.35	502.10
7.3	6.14	501.31
9.6	6.39	501.06
10.7	6.52	500.93
11.3	6.75	500.70
12.4	6.88	500.57
13.1	6.69	500.76
13.5	6.48	500.97
16.1	5.89	501.56
18.1	5.57	501.88
21	5.47	501.98
22.2	5.45	502.00
22.2	5.32	502.13

MY3 (2009)

Station	Rod Ht.	Elevation
0	4.71	502.74
0	4.97	502.48
2.9	5.19	502.26
5.8	5.76	501.69
9.1	6.29	501.16
10.6	6.32	501.13
11.7	6.82	500.63
12.5	6.96	500.49
12.8	6.78	500.67
13.3	6.37	501.08
15.7	5.84	501.61
18.2	5.51	501.94
19.9	5.49	501.96
22.2	5.44	502.01
22.2	5.32	502.13

MY4 (2010)

Station	Rod Ht.	Elevation
0	5	502.74
0	5.25	502.49
1.6	5.31	502.43
3.2	5.42	502.32
4.7	5.79	501.95
5.9	6.09	501.65
8.3	6.28	501.46
10.4	6.33	501.41
11.4	7.14	500.6
12.2	7.24	500.5
12.9	7.22	500.52
13.5	6.48	501.26
14.1	6.33	501.41
15.3	6.1	501.64
18.1	5.81	501.93
22.2	5.72	502.02
22.2	5.63	502.11

Cross-section 4 Raw Data

MY1 (2007)

Station	Rod Ht.	Elevation
0	2.02	500.46
0	2.22	500.26
1.1	2.31	500.17
2.3	2.88	499.60
3.5	3.87	498.61
6.4	5.95	496.53
9	7.58	494.90
10.2	8.47	494.01
12.8	8.72	493.76
14.7	9.32	493.16
16.5	10.12	492.36
16.8	10.47	492.01
17	10.55	491.93
17.7	10.95	491.53
18.4	10.99	491.49
19.1	10.85	491.63
20.2	10.58	491.90
21.2	10.3	492.18
23	9.8	492.68
24.7	9.24	493.24
25.9	8.93	493.55
26.9	8.82	493.66
28.2	8.8	493.68
31.4	8.59	493.89
33.7	8.09	494.39
35.2	7.7	494.78
40.5	5.46	497.02
42.9	4.62	497.86
44.7	4.35	498.13
44.7	4.08	498.40

MY2 (2008)

Station	Rod Ht.	Elevation
0	2.12	500.46
0	2.31	500.27
1.9	2.7	499.88
3.5	3.87	498.71
8	7.15	495.43
10.6	8.7	493.88
13	8.85	493.73
16.4	10.13	492.45
17	10.67	491.91
18.4	11.05	491.53
19.8	10.69	491.89
21	10.3	492.28
22	9.89	492.69
26	9	493.58
33.1	8.36	494.22
36	7.37	495.21
43.3	4.68	497.90
44.7	4.44	498.14
44.7	4.18	498.40

MY3 (2009)

Station	Rod Ht.	Elevation
0	2.3	500.46
0	2.44	500.32
1.7	2.73	500.03
3.9	4.22	498.54
8	7.14	495.62
10.3	8.6	494.16
11.8	8.94	493.82
14.4	9.29	493.47
15.7	9.85	492.91
17.1	10.85	491.91
17.8	11.12	491.64
18.7	11.16	491.60
20	10.94	491.82
21.9	9.88	492.88
24.6	9.49	493.27
27.4	8.98	493.78
30.7	8.91	493.85
33.7	8.39	494.37
37	7.31	495.45
41	5.62	497.14
43.5	4.87	497.89
44.7	4.64	498.12
44.7	4.36	498.40

MY4 (2010)

Station	Rod Ht.	Elevation
0	2.69	500.46
0	2.79	500.36
1.6	3.14	500.01
5.1	5.63	497.52
8.2	7.75	495.4
10.3	9.1	494.05
12.2	9.31	493.84
14.4	9.79	493.36
15.9	10.25	492.9
16.7	11.26	491.89
19	11.47	491.68
19.6	11.33	491.82
21	10.35	492.8
23.9	10.02	493.13
27.4	9.38	493.77
31.7	9.11	494.04
35	8.37	494.78
38.1	7.17	495.98
40.2	6.16	496.99
42.5	5.37	497.78
44.7	5.05	498.1
44.7	4.79	498.36

Cross-section 5 Raw Data

MY1 (2007)

Station	Rod Ht.	Elevation
0	1.64	500.84
0	1.85	500.63
1.9	2.29	500.19
2.9	2.28	500.20
4.8	3.26	499.22
7.2	5.33	497.15
9.3	7.41	495.07
10.4	8.11	494.37
12.1	8.85	493.63
13.8	9.11	493.37
14.3	9.48	493.00
15.1	9.46	493.02
15.6	10.78	491.70
16	10.93	491.55
16.8	11.15	491.33
17.1	11.03	491.45
17.5	11.36	491.12
18.7	11.5	490.98
20.6	10.98	491.50
21.7	10.94	491.54
22.5	10.54	491.94
23.1	9.9	492.58
23.5	9.57	492.91
26.2	9.25	493.23
28.8	8.95	493.53
32.8	8.65	493.83
36.8	7.44	495.04
38.7	6.49	495.99
39.4	6.16	496.32
41.3	5.12	497.36
42.2	4.87	497.61
43.1	4.83	497.65
43.1	4.62	497.86

MY2 (2008)

Station	Rod Ht.	Elevation
0	1.74	500.84
0	1.93	500.65
2.8	2.38	500.20
5.3	3.65	498.93
9	7.13	495.45
11.8	8.73	493.85
12.3	8.93	493.65
14.1	9.52	493.06
15.6	10.86	491.72
19.1	11.61	490.97
21.9	10.95	491.63
22.2	10.43	492.15
24.9	9.28	493.30
32.5	8.74	493.84
36	7.75	494.83

MY2 (2008)

Station	Rod Ht.	Elevation
38.8	6.56	496.02
41.6	5.08	497.50
43.1	4.92	497.66
43.1	4.71	497.87

MY3 (2009)

Station	Rod Ht.	Elevation
0	2.09	500.84
0	2.23	500.70
4	3.33	499.60
5.9	4.87	498.06
10	8.32	494.61
12.1	9.3	493.63
14.6	9.98	492.95
15.4	11.37	491.56
19	11.92	491.01
21.9	11.56	491.37
22.4	10.53	492.40
25.6	9.63	493.30
28.9	9.38	493.55
31.8	9.15	493.78
35.4	8.14	494.79
39.1	6.79	496.14
41.1	5.58	497.35
43	5.28	497.65
43	5.28	497.65

MY4 (2010)

Station	Rod Ht.	Elevation
0	2.31	500.84
0	2.43	500.72
2.5	2.99	500.16
6.7	5.84	497.31
10.5	8.98	494.17
13.2	9.66	493.49
14.6	10.23	492.92
15.5	11.61	491.54
18	12.17	490.98
18.9	12.19	490.96
21.1	12.08	491.07
21.6	11.96	491.19
22.4	10.69	492.46
24	9.99	493.16
28.7	9.57	493.58
34.3	8.67	494.48
38.1	7.31	495.84
41.4	5.6	497.55
42.9	5.48	497.67
42.9	5.29	497.86

19 July 11
SD+CH

XS-5

STA		FS
43.0	on	4.54
43.0	OFF	47.2
41.4		4.92
39.3		6.07
35.9		7.54
32.5		8.53
29.3		8.70
25.8		9.15
24.4		9.42
23.0		9.77
22.0		11.36
19.5		11.42
17.5		11.21
15.7		10.90
14.6		9.43
12.5		8.81
11.6		8.58
9.6		7.61
8.6		6.99
5.9		4.35
3.0		2.20
0.0	off	1.71
	on	1.56

Seam picture (preceded #4)

XS-4

STA		FS
0.0	on	2.97
	off	3.10
1.3		3.38
2.0		3.72
4.4		5.54
6.7		7.20
9.9		9.36
12.8		9.67
14.0		9.96
15.5		10.35
16.0		10.72
16.7		11.49
18.0		11.73
19.6		11.64
20.1		11.21
21.9		10.64
24.2		10.15
26.9		9.73
29.9		9.59
32.3		9.31
34.7		8.77
37.0		7.92
39.4		6.87
42.6		5.63
44.7	off	5.31
	on	5.04

Seam pic after XS-5

15 July 2011

XS-2

STA	FS
0.0 on	4.76
0.0 off	4.98
2.0	5.08
4.2	5.29
5.6	5.52
7.3	5.70
8.2	5.87
9.1	6.15
9.6	6.22
10.1	7.19
11.0	7.60
13.1	7.84
14.8	8.02
15.6	7.23
16.6	5.77
18.5	5.58
20.3	5.08
21.7 off	4.93
21.7 on	4.72

ph 38 L→R
39 Dwn

ph 36-37
VP #1

XS-3

STA	FS
0.0 on	4.76
0.0 off	4.98
1.6	5.09
3.9	5.34
5.3	5.71
7.8	5.91
9.6	6.07
10.1	6.05
11.2	6.88
12.1	7.04
12.7	7.08
13.0	7.06
13.8	6.14
15.1	5.78
17.1	5.63
19.4	5.51
21.0	5.50
22.0 off	5.50
22.0 on	5.38

ph 40 Dwn
41

XS-1

STA	FS
0.0 on	9.81
0.0 off	9.98
2.4	10.83
4.4	11.49
5.9	12.01
7.2	12.62
9.2	12.90
12.6	13.45
15.5	13.57
17.0	14.64
18.1	14.92
19.4	15.27
20.9	15.09
22.0	13.65
24.7	13.17
26.8	12.03
30.0	11.06
32.7	10.17
35.1 off	9.79
35.1 on	9.41

ph 42 + 43

Figure 6.0. Longitudinal Profile with Annual Overlays – Stillhouse Creek Stream Restoration – MY5 (2011) – EEP Project #363

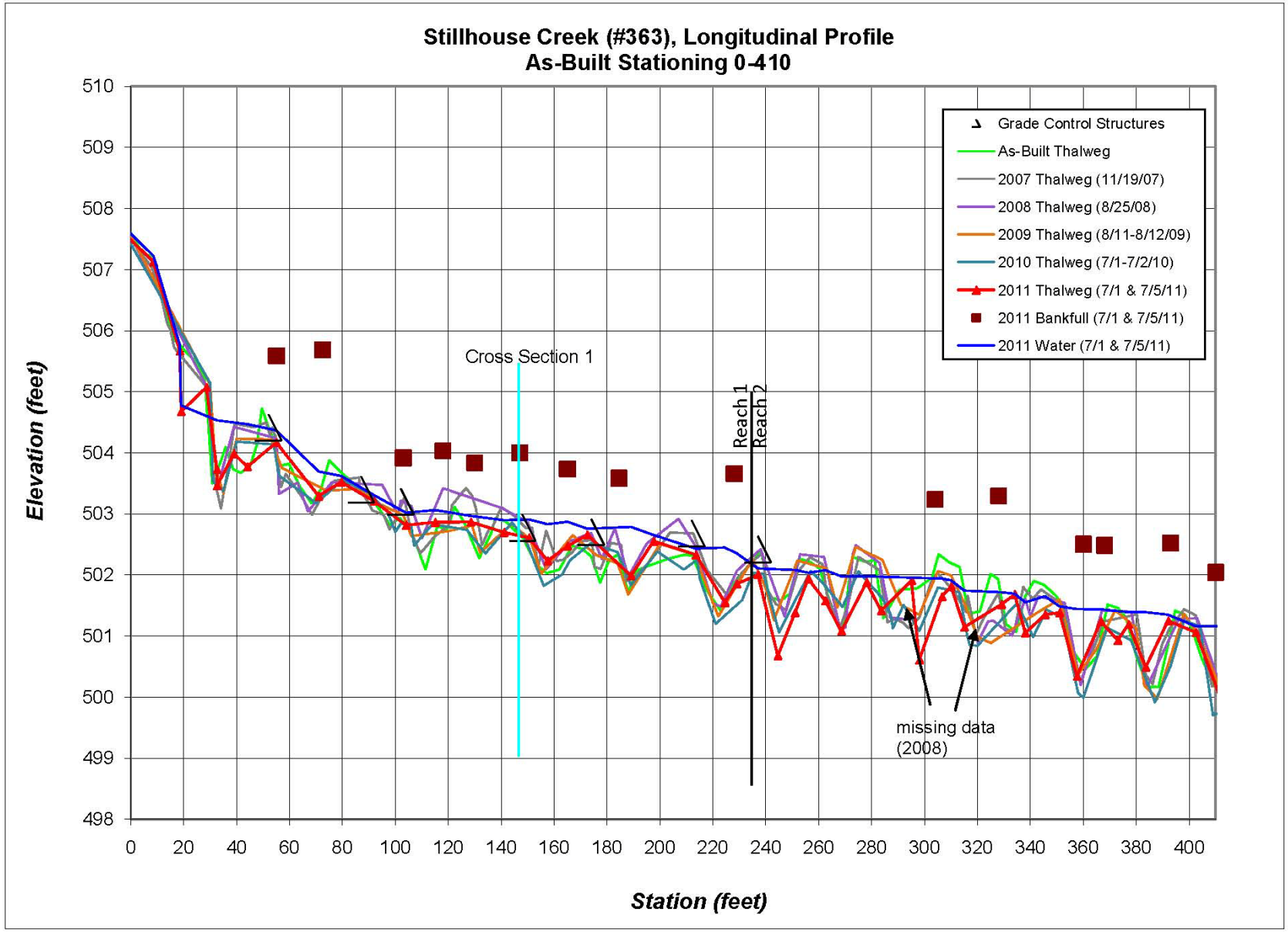


Figure 6.1. Longitudinal Profile with Annual Overlays – Stillhouse Creek Stream Restoration – MY5 (2011) – EEP Project #363

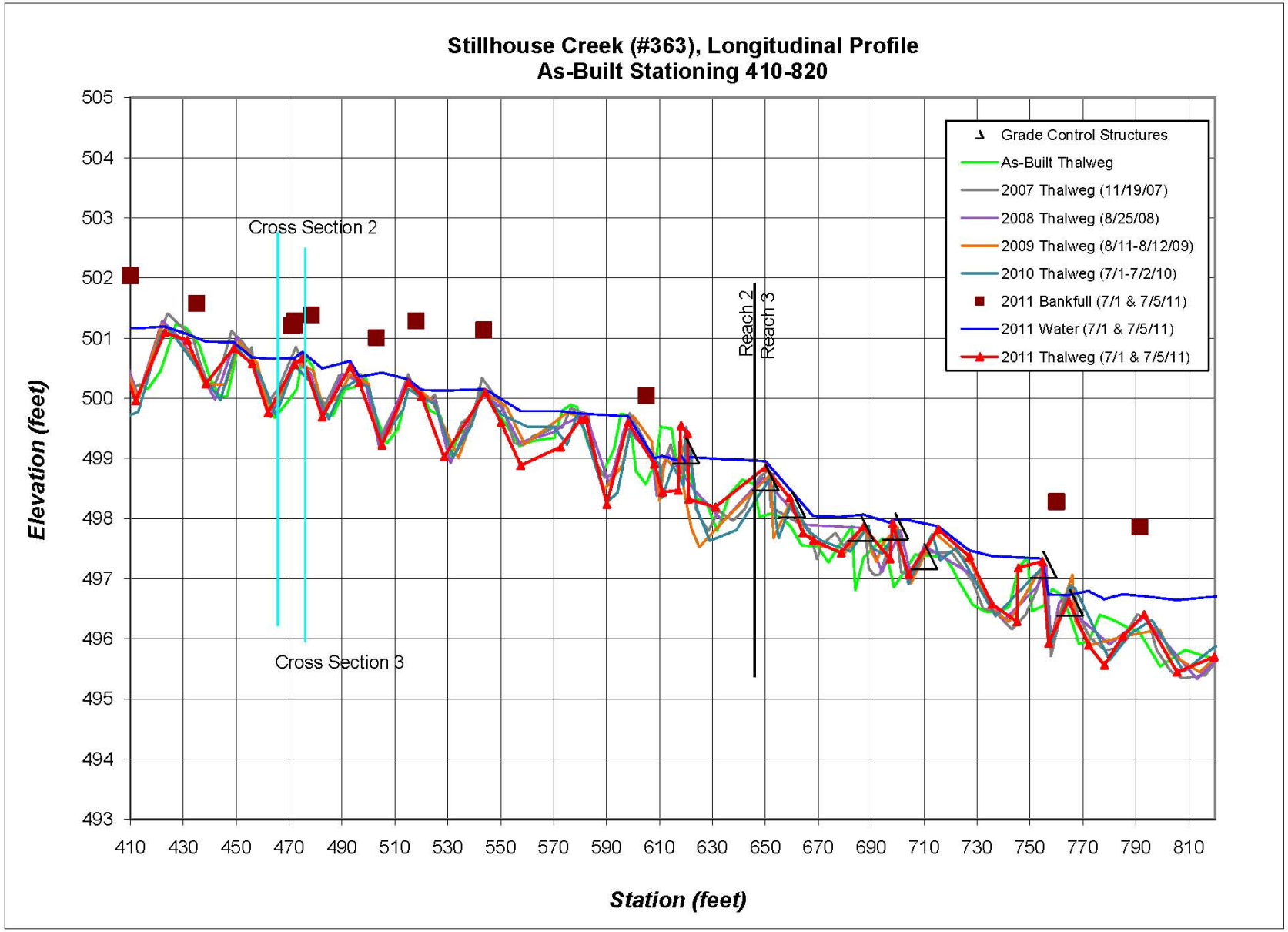
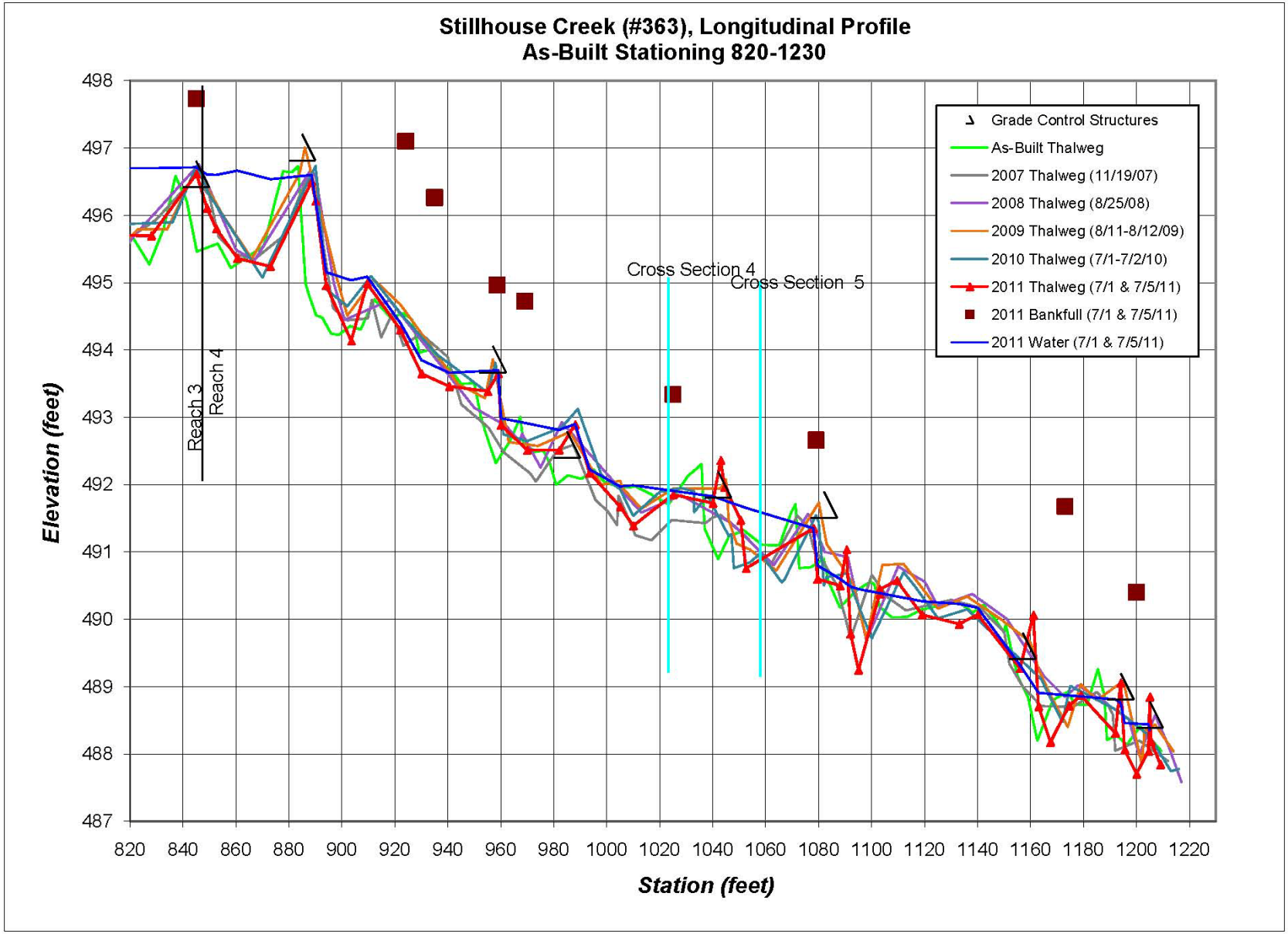


Figure 6.2. Longitudinal Profile with Annual Overlays – Stillhouse Creek Stream Restoration – MY5 (2011) – EEP Project #363



As-Built Data 2006

Station	Thalweg Elevation	Water Surface Elevation
0.00	507.60	507.65
4.56	507.25	507.30
7.45	507.23	507.28
11.01	506.71	506.76
13.03	506.34	506.39
16.55	505.85	505.90
24.23	505.50	505.55
27.94	505.22	505.27
28.85	504.62	504.85
29.17	504.55	504.60
30.70	503.50	504.60
31.32	503.62	504.82
33.68	503.83	504.81
35.85	504.10	504.80
38.62	503.74	504.82
41.52	503.67	504.80
45.08	503.79	504.81
47.54	504.13	504.82
49.50	504.73	504.78
51.85	504.44	504.55
53.85	504.22	504.29
56.20	503.79	504.04
59.71	503.82	504.02
63.91	503.45	504.00
68.31	503.17	503.97
71.80	503.40	504.00
74.95	503.87	503.99
79.81	503.66	503.75
83.04	503.54	503.67
86.10	503.38	503.51
90.25	503.29	503.37
93.62	503.10	503.30
97.97	502.82	503.27
101.63	502.93	503.25
106.12	502.70	503.26
111.38	502.09	503.29
115.86	502.81	503.29
119.36	502.73	503.28
122.30	503.12	503.27
125.91	502.87	503.17
131.71	502.28	503.16
136.08	502.68	503.16
137.80	502.93	503.14
141.76	502.87	503.00
148.26	502.60	502.78
152.93	502.19	502.68
157.14	502.03	502.65

Station	Thalweg Elevation	Water Surface Elevation
161.99	502.09	502.64
166.73	502.48	502.66
170.70	502.42	502.63
173.97	502.31	502.69
177.41	501.88	502.63
180.79	502.25	502.64
184.25	502.34	502.64
187.90	501.72	502.57
191.35	502.08	502.60
196.46	502.16	502.60
203.30	502.27	502.56
209.08	502.33	502.62
212.20	502.32	502.46
217.47	501.76	502.42
222.74	501.43	502.42
227.93	501.87	502.48
234.50	502.19	502.54
238.27	502.39	502.48
241.14	501.64	502.44
245.82	501.59	502.48
248.97	501.69	502.47
252.72	502.26	502.46
256.53	502.22	502.45
260.27	502.11	502.45
264.49	501.52	502.42
269.00	501.07	502.42
272.62	502.30	502.49
277.47	502.21	502.46
281.14	502.24	502.44
284.41	501.29	502.39
290.41	501.75	502.55
297.32	501.78	502.68
302.86	501.96	502.45
305.29	502.34	502.43
309.43	502.20	502.31
313.23	502.13	502.27
316.58	501.37	502.12
320.89	501.40	502.10
324.93	502.02	502.11
327.74	501.93	501.99
330.78	501.19	501.95
334.51	501.07	502.02
337.97	501.65	502.03
341.28	501.90	501.95
345.09	501.84	501.89
349.67	501.66	501.69
352.91	501.42	501.62

Station	Thalweg Elevation	Water Surface Elevation
356.19	500.75	501.53
360.86	500.46	501.56
365.04	500.67	501.57
369.17	501.52	501.82
373.00	501.46	502.26
376.10	501.29	501.55
380.01	500.66	501.48
384.25	500.18	501.48
388.35	500.16	501.41
391.90	500.83	501.49
394.64	501.42	501.51
398.68	501.34	501.40
401.27	501.09	501.37
405.01	500.61	501.36
409.60	500.21	501.37
413.41	500.21	501.40
416.69	500.16	501.37
421.43	500.45	501.35
427.23	501.23	501.35
431.02	501.18	501.27
435.91	500.90	501.04
440.12	500.33	501.01
443.77	500.03	501.02
446.59	500.04	501.00
450.97	500.90	501.00
453.89	500.78	500.85
459.12	500.38	500.78
464.46	499.67	500.79
468.79	499.91	500.80
472.86	500.15	500.79
475.30	500.73	500.78
478.84	500.54	500.62
482.77	499.77	500.39
486.41	499.71	500.47
491.19	500.15	500.54
494.59	500.18	500.36
498.98	500.34	500.42
502.96	499.69	500.33
506.95	499.25	500.34
511.04	499.49	500.32
514.95	500.13	500.36
520.08	500.15	500.23
522.74	499.82	500.20
527.30	499.70	500.23
530.48	498.99	500.23
534.42	499.41	500.23
538.88	499.55	500.20
542.20	500.14	500.22

Station	Thalweg Elevation	Water Surface Elevation
546.91	499.96	500.04
549.39	499.74	499.97
552.81	499.50	499.96
556.97	499.21	500.00
561.54	499.28	500.00
567.04	499.33	499.99
570.18	499.34	499.97
573.25	499.80	500.00
576.40	499.89	499.97
578.80	499.85	499.93
582.93	499.24	499.81
588.25	498.73	499.83
592.80	499.16	499.81
595.35	499.74	499.85
598.58	499.70	499.78
601.09	498.79	499.64
604.78	498.57	499.60
608.52	498.96	499.68
610.46	499.53	499.65
614.48	499.50	499.57
617.36	498.68	498.94
621.27	498.75	498.90
624.10	498.33	498.79
627.56	498.27	498.79
631.73	497.79	498.79
636.38	498.40	498.80
641.28	498.65	499.75
645.60	498.57	498.72
647.75	498.03	498.41
652.55	498.09	498.38
656.96	497.99	498.17
659.50	497.87	498.02
663.65	497.56	498.06
669.74	497.53	498.01
673.81	497.27	497.99
682.72	497.88	497.99
683.94	496.81	497.81
687.17	497.35	497.80
694.36	497.67	497.75
698.55	496.86	497.62
706.63	497.40	497.59
712.87	497.38	497.49
717.72	497.36	497.45
720.53	497.17	497.47
723.61	496.91	497.49
728.32	496.57	497.49
733.17	496.45	497.46
737.97	496.44	497.46

Station	Thalweg Elevation	Water Surface Elevation
742.04	496.54	497.50
745.69	497.18	497.48
748.94	497.36	497.45
750.78	496.46	496.96
755.15	496.55	496.94
758.34	496.83	496.92
761.11	496.75	496.90
764.96	496.40	496.89
768.42	495.92	496.87
772.18	495.97	496.85
776.32	496.40	496.85
781.54	496.31	496.87
786.42	496.20	496.88
791.02	496.13	496.84
799.17	495.54	496.85
808.57	495.82	496.81
814.53	495.73	496.91
821.34	495.66	496.86
827.27	495.27	496.85
832.69	495.81	496.83
837.11	496.58	496.88
841.40	496.21	496.89
845.22	495.46	496.84
853.16	495.58	496.89
858.04	495.22	496.87
870.49	495.54	496.82
874.99	496.24	496.87
877.80	496.65	496.85
881.11	496.64	496.80
883.44	496.73	496.75
885.27	495.60	495.62
886.27	494.98	495.19
887.57	494.82	494.97
890.21	494.52	494.92
892.67	494.47	494.77
895.94	494.24	494.82
898.82	494.22	494.91
903.17	494.36	494.86
907.03	494.30	494.92
912.23	494.75	494.89
918.44	494.47	494.80
923.14	494.55	494.76
926.53	494.45	494.60
929.25	493.96	494.11
933.54	494.01	494.21
937.37	493.83	494.05
941.84	493.67	493.93

Station	Thalweg Elevation	Water Surface Elevation
944.95	493.50	493.79
949.92	493.51	493.56
952.36	493.02	493.20
954.12	492.79	493.04
958.04	492.33	493.06
958.11	492.32	493.05
963.52	492.65	493.08
967.36	493.00	493.05
968.42	492.64	492.79
972.84	492.48	492.75
976.11	492.51	492.69
978.60	492.31	492.41
980.88	492.00	492.41
985.23	492.14	492.36
990.50	492.09	492.35
994.97	492.22	492.37
999.27	492.03	492.34
1005.15	491.96	492.37
1011.12	491.97	492.38
1016.70	491.86	492.36
1023.33	491.71	492.26
1030.75	492.13	492.33
1033.88	492.24	492.34
1035.77	492.31	492.32
1036.95	491.35	491.84
1041.99	490.89	491.84
1046.00	491.23	491.82
1051.75	491.32	491.81
1058.68	491.10	491.78
1065.16	491.10	491.79
1069.63	491.59	491.83
1071.28	491.71	491.76
1072.64	490.76	491.31
1076.99	490.77	491.29
1081.92	490.90	491.30
1083.71	490.56	490.91
1088.03	490.18	490.91
1094.13	490.42	490.88
1099.49	490.56	490.88
1100.95	490.52	490.64
1103.00	490.19	490.49
1107.45	490.03	490.49
1113.36	490.04	490.52
1118.60	490.14	490.52
1123.33	490.18	490.50
1128.43	490.24	490.45
1133.14	490.25	490.45

Station	Thalweg Elevation	Water Surface Elevation
1138.23	490.10	490.43
1142.11	490.22	490.44
1146.41	490.01	490.23
1149.82	489.81	490.01
1150.65	489.92	490.02
1152.53	489.58	489.77
1155.07	489.16	489.36
1159.03	488.84	489.33
1162.58	488.20	488.39
1168.41	488.80	489.30
1174.14	488.92	489.34
1176.54	488.74	489.34
1181.31	488.73	489.32
1185.46	489.26	489.31
1187.92	488.85	488.92
1188.79	488.21	488.86
1192.29	488.28	488.87
1196.42	488.14	488.86
1201.33	488.41	488.87
1209.39	488.04	488.84

Longitudinal Profile 2007

Station	Thalweg Elevation	Water Surface Elevation
0.00	507.49	507.49
8.15	507.02	507.02
11.79	506.50	506.50
13.64	506.13	506.13
14.90	506.02	506.02
16.39	505.72	505.72
26.25	505.21	505.21
29.22	505.04	505.04
29.31	505.07	505.07
29.78	504.51	504.51
30.43	504.42	504.45
30.90	503.70	504.46
34.06	503.09	504.49
37.39	503.91	504.46
39.15	504.48	504.48
46.46	504.42	504.42
51.08	504.50	504.50
52.53	504.30	504.30
53.45	504.42	504.42
54.65	504.25	504.25
54.80	504.28	504.28
55.22	503.87	503.87
55.91	503.74	503.80
56.72	503.44	503.84
58.54	503.65	503.82
64.62	503.28	503.80
68.49	502.98	503.80
71.72	503.25	503.80
76.92	503.54	503.81
86.17	503.59	503.63
86.63	503.42	503.46
91.36	503.05	503.40
95.58	502.99	503.39
97.80	502.75	503.40
99.89	502.89	503.39
103.40	503.27	503.37
105.91	502.70	503.40
109.41	502.35	503.35
114.79	502.63	503.33
120.13	502.81	503.39
121.39	503.14	503.70
124.48	503.31	503.69
126.64	503.42	503.64
128.90	503.30	503.48
130.44	503.09	503.30
132.72	502.49	503.27
135.64	502.78	503.28
136.52	502.77	503.27

Station	Thalweg Elevation	Water Surface Elevation
140.06	503.11	503.28
145.29	502.96	503.26
149.34	502.76	503.24
151.31	502.77	503.23
151.65	502.77	503.23
154.00	502.14	503.20
156.98	502.72	503.22
160.93	502.23	503.21
163.46	502.25	503.15
166.64	502.36	503.18
170.14	502.55	503.19
174.23	502.57	503.07
175.27	502.13	503.73
177.56	502.10	503.20
181.47	502.53	503.21
185.30	502.49	503.19
187.18	501.90	503.20
189.65	501.94	503.14
195.60	502.19	503.15
203.71	502.69	503.14
212.58	502.68	502.88
217.68	502.09	502.73
225.91	501.64	502.74
229.26	501.95	502.74
234.96	502.22	502.67
238.60	502.35	502.69
240.48	501.77	502.67
243.82	501.52	502.72
247.68	501.42	501.68
252.03	502.05	502.69
256.70	502.29	502.64
261.49	502.17	502.52
263.00	501.69	502.51
268.04	501.14	502.31
271.04	501.51	502.46
275.02	502.29	502.49
282.93	502.08	502.23
285.99	501.23	502.20
288.91	501.28	502.25
291.93	501.22	502.14
293.96	501.13	502.17
297.94	501.31	502.23
302.40	501.88	502.26
304.80	502.03	502.20
310.68	501.76	502.01
312.36	501.64	501.94
315.78	501.39	501.89
316.24	501.66	502.11

Station	Thalweg Elevation	Water Surface Elevation
319.31	501.02	502.10
322.16	501.28	502.10
327.89	501.70	502.08
330.44	501.12	502.09
333.84	501.07	502.08
337.23	501.80	502.08
340.85	501.61	502.08
344.00	501.76	501.96
352.34	501.51	501.73
354.08	500.96	501.72
355.94	500.58	501.72
358.82	500.24	501.70
364.95	500.92	501.80
367.30	501.24	501.78
380.26	501.35	501.57
383.61	500.36	501.66
386.17	500.22	501.59
389.70	500.85	501.61
392.43	501.12	501.63
398.07	501.44	501.62
402.46	501.34	501.54
405.54	500.81	501.55
408.61	500.17	501.57
415.93	500.25	501.55
421.55	501.12	501.52
424.04	501.41	501.57
433.57	501.02	501.18
436.15	500.61	501.25
438.12	500.38	501.24
440.85	500.14	501.24
443.82	500.43	501.27
448.25	501.12	501.30
452.10	500.95	501.11
455.32	500.75	500.99
455.74	500.85	501.00
457.27	500.43	500.88
459.47	500.32	500.87
462.03	499.93	500.96
466.10	500.18	500.99
472.51	500.85	500.95
481.38	500.04	500.57
483.63	499.89	500.56
488.91	500.38	501.18
496.92	500.40	500.52
500.34	500.14	500.52
503.84	499.29	500.54
507.68	499.64	500.52
510.88	499.93	500.51

Station	Thalweg Elevation	Water Surface Elevation
515.06	500.40	500.52
517.54	500.08	500.50
525.06	500.06	500.51
529.82	499.13	500.50
532.74	499.32	500.51
535.33	499.60	500.48
539.52	499.71	500.51
542.87	500.34	500.48
550.74	499.86	500.01
555.03	499.25	499.99
558.45	499.22	499.97
562.23	499.37	499.97
567.24	499.45	500.01
570.09	499.53	500.02
573.26	499.51	499.99
576.37	499.83	500.00
582.97	499.74	499.83
586.18	498.92	499.82
589.27	498.68	499.80
593.03	498.75	499.80
595.80	499.37	499.82
598.67	499.75	499.80
604.49	499.28	499.33
608.17	498.80	499.30
610.17	498.75	499.32
614.12	499.23	499.28
616.23	498.89	499.14
617.36	498.96	499.14
618.92	499.54	499.54
619.88	499.29	499.29
620.27	498.79	498.99
620.84	498.73	498.98
621.13	499.14	499.14
621.95	499.14	499.14
622.27	498.86	498.98
623.26	498.53	498.97
623.75	498.16	498.96
625.67	497.98	498.98
628.49	497.80	499.00
632.31	498.13	498.98
637.75	497.96	498.98
642.08	498.15	499.00
647.30	498.67	499.02
651.05	498.81	498.87
652.05	498.19	498.49
666.49	497.83	498.03
669.41	497.33	498.01
671.19	497.56	498.05

Station	Thalweg Elevation	Water Surface Elevation
676.39	497.76	498.04
679.46	497.55	498.01
686.39	497.84	498.04
687.75	497.81	497.95
688.97	497.17	497.93
691.15	497.06	497.94
693.06	497.07	497.95
699.18	497.87	497.91
701.30	497.11	497.66
705.29	497.06	497.72
708.52	497.43	497.73
713.48	497.44	497.55
720.56	497.43	497.52
728.20	496.96	497.13
732.15	496.51	497.11
736.97	496.44	497.16
743.13	496.16	497.10
748.24	496.39	497.08
752.46	496.81	497.11
754.84	497.21	497.21
756.66	496.55	497.01
757.93	495.71	496.96
762.26	496.54	496.99
764.69	496.69	496.99
765.34	496.90	496.98
767.18	496.69	497.39
768.11	496.39	496.75
772.72	496.01	496.79
778.50	495.81	496.71
782.87	495.85	496.81
790.60	496.41	496.80
794.70	496.30	496.77
797.82	495.82	496.79
803.17	495.46	496.80
807.61	495.35	496.79
816.07	495.40	496.80
822.22	495.73	496.78
829.85	495.94	496.84
843.38	496.52	496.78
844.78	496.61	496.78
846.66	496.45	496.72
849.87	496.29	496.74
853.50	495.68	496.76
859.93	495.42	496.72
866.95	495.35	496.75
877.70	495.69	496.79
886.57	496.53	496.73
890.27	496.63	496.63

Station	Thalweg Elevation	Water Surface Elevation
892.15	495.99	495.99
892.87	495.60	495.60
896.59	494.62	494.87
902.04	494.44	494.88
909.74	494.47	494.85
911.32	494.74	494.84
914.78	494.18	494.70
919.07	494.55	494.74
923.21	494.06	494.28
929.63	494.25	494.32
939.91	493.90	493.94
945.06	493.19	493.28
955.38	492.85	492.87
961.09	492.48	492.73
966.26	492.32	492.82
971.00	492.17	492.81
973.21	492.05	492.83
981.19	492.51	492.84
987.37	492.59	492.65
995.74	491.77	491.88
1000.28	491.61	491.90
1003.80	491.40	491.77
1004.42	491.84	492.24
1006.68	491.63	491.83
1010.78	491.25	491.81
1016.79	491.17	491.75
1024.54	491.48	491.80
1037.15	491.43	491.70
1040.00	491.51	491.66
1042.00	491.40	491.55
1042.00	491.33	491.33
1042.00	490.73	490.73
1042.00	493.56	493.68
1065.00	490.51	491.38
1065.00	493.33	493.42
1065.00	493.24	493.37
1065.00	493.24	493.29
1065.00	493.86	494.28
1097.00	489.50	490.62
1110.00	490.30	490.59
1113.00	490.41	490.47
1116.00	490.15	490.23
1116.00	492.29	492.46
1126.00	489.82	490.16
1133.00	489.98	490.18
1144.00	489.91	490.06
1157.00	489.48	489.54
1161.00	489.17	489.27

Station	Thalweg Elevation	Water Surface Elevation
1165.00	488.93	489.73
1167.00	488.50	488.86
1167.00	491.22	491.53
1167.00	491.29	491.42
1198.00	488.23	488.49
1212.00	487.97	488.49
1212.00	487.89	488.48
1212.00	488.91	489.97
1221.00	487.41	488.53
1221.00	488.75	490.65
1221.00	486.73	488.53

Station	Bankfull Elevation
80	505.70
120	504.91
140	505.41
157	505.79
270	503.81
375	503.52
465	502.62
530	501.93
762	498.60
810	498.67
976	494.63
1023	493.51
1057	493.12
1174	491.43
1128	492.59

Longitudinal Profile Data 2008

Station	Thalweg Elevation	Water Surface Elevation
0	507.55	
29	505.05	
30	504.45	
33	503.48	504.46
39	504.43	504.44
53	504.26	504.26
55	504.22	504.22
56	503.33	503.69
63	503.51	503.68
67	503.04	503.68
76	503.52	503.69
95	503.47	503.65
101	502.99	503.59
102	503.21	503.59
106	503.13	503.55
110	502.60	503.58
118	503.42	503.57
140	503.10	503.35
150	502.87	503.19
157	502.10	503.20
166	502.55	503.20
174	502.69	503.24
178	502.27	503.23
183	502.76	503.14
188	501.97	503.17
195	502.51	503.18
207	502.92	503.17
213	502.50	502.80
220	501.54	502.76
223	501.48	502.78
229	502.07	502.77
238	502.42	502.61
247	501.32	502.62
253	502.34	502.57
262	502.29	502.59
268	501.11	502.61
270	501.14	502.54
273	502.36	502.56
274	502.49	502.63
283	502.20	502.30
287	501.31	502.36
294	501.27	502.32
295		
320	500.89	502.09
324	501.24	502.12
326	501.25	502.13

Station	Thalweg Elevation	Water Surface Elevation
333	501.01	502.11
338	501.61	502.13
340	501.32	502.12
343	501.65	502.11
353	501.54	501.75
359	500.20	501.74
367	501.41	501.71
378	501.40	501.60
384	500.16	501.56
396	501.29	501.63
403	501.29	501.54
413	500.03	501.53
422	501.29	501.51
430	500.94	501.04
442	499.98	501.09
450	501.02	501.12
456	500.66	500.81
463	499.69	500.83
472	500.65	500.82
478	500.42	500.58
483	499.71	500.60
490	500.40	500.60
499	500.24	500.41
504	499.20	500.40
514	500.25	500.45
525	499.95	500.35
531	498.92	500.27
543	500.07	500.42
550	499.85	499.95
557	499.26	499.94
570	499.44	500.04
574	499.58	499.96
582	499.74	499.79
591	498.56	499.76
597	499.53	499.78
607	499.06	499.11
609	498.38	499.14
613	499.08	499.08
623	498.48	498.98
634	497.95	498.93
649	498.68	498.93
665	497.90	498.00
688	497.84	497.89
690	497.55	497.93
694	497.11	497.90
701	497.80	497.81

Station	Thalweg Elevation	Water Surface Elevation
705	497.06	497.78
710	497.54	497.74
730	497.02	497.04
740	496.31	497.03
753	496.88	496.98
756	497.23	497.23
758	495.94	496.94
761	496.60	497.00
766	496.80	496.81
767	496.41	496.79
780	495.90	496.85
793	496.36	496.72
813	495.33	496.81
829	496.02	496.83
846	496.76	496.84
860	495.49	496.75
867	495.33	496.73
888	496.66	496.71
890	496.58	496.70
897	494.98	495.10
901	494.45	495.15
918	494.74	494.99
950	493.14	493.24
962	492.87	493.17
967	492.64	493.14
968	492.75	493.25
975	492.25	493.15
983	492.93	493.13
1006	491.89	492.04
1013	491.59	492.04
1028	491.84	492.04
1047	491.43	491.68
1063	490.81	491.71
1076	491.56	491.71
1082	491.04	491.19
1082	491.00	491.17
1091	490.92	490.94
1098	489.68	490.98
1110	490.78	491.01
1120	490.56	490.66
1125	490.19	490.59
1138	490.38	490.58
1151	490.01	490.02
1165	489.16	489.21
1173	488.84	489.17
1178	489.02	489.12
1192	488.66	489.06

Station	Thalweg Elevation	Water Surface Elevation
1197	488.52	488.87
1201	487.98	488.83
1207	488.58	488.83
1212	488.13	488.78
1217	487.58	488.80

Bankfull	
Station	Elevation
75	506.9564
92	506.2907
110	506.4334
160	506.0059
191	505.6203
210	505.8466
265	504.1124
353	503.4299
403	502.9306
452	502.7058
540	501.7816
560	501.6463
575	501.295
615	501.04
657	501.2255
747	499.2093
907	497.9035
953	495.7756
1000	494.828
1037	493.9069
1072	493.5685
1126	492.9265
1156	492.1404
1210	491.0386

Longitudinal Profile Data 2009

Station	Thalweg Elevation	Water Surface Elevation
0	507.55	507.59
30	505.12	505.14
32	503.73	504.44
35	503.34	504.44
40	504.23	504.43
53	504.22	504.36
57	503.75	503.85
74	503.38	503.78
86	503.41	503.57
94	503.16	503.26
103	502.98	503.14
106	502.64	503.14
120	502.72	503.12
129	502.81	503.15
132	502.36	503.08
144	502.84	503.04
151	502.57	502.87
153	502.31	502.84
155	502.01	502.68
167	502.65	502.75
176	502.32	502.72
184	502.19	502.76
188	501.68	502.76
200	502.51	502.73
213	502.33	502.69
222	501.32	502.62
229	501.83	502.60
235	502.26	502.56
240	501.78	502.44
243	501.26	502.44
252	502.24	502.74
263	502.11	502.67
267	501.47	502.67
274	502.46	502.66
284	502.25	502.37
291	501.51	502.21
298	501.35	502.29
305	502.06	502.28
310	501.99	502.19
315	501.55	502.05
320	500.98	502.06
325	500.89	502.01
334	501.14	502.07
343	501.39	502.09
351	501.60	501.85
358	500.37	501.85
365	500.79	501.90
372	501.42	501.82
380	501.13	501.79
383	500.19	501.85

Station	Thalweg Elevation	Water Surface Elevation
388	499.97	501.87
398	501.36	501.87
404	500.99	501.43
413	499.99	501.47
422	501.24	501.44
432	500.76	501.12
433	500.74	501.16
438	500.24	501.16
446	500.23	501.16
451	500.94	501.12
458	500.58	500.86
462	499.82	500.85
466	499.96	500.87
473	500.61	500.79
479	500.46	500.69
483	499.83	500.65
489	500.05	500.63
493	500.40	500.67
500	500.24	500.48
504	499.34	500.49
508	499.42	500.47
515	500.30	500.44
524	499.96	500.36
534	499.01	500.41
543	500.12	500.36
552	499.87	500.12
559	499.23	499.99
568	499.53	500.08
575	499.76	500.07
580	499.69	500.03
589	498.47	499.99
596	498.89	499.96
600	499.71	499.91
607	499.28	499.30
610	498.30	499.10
612	499.03	499.05
617	498.75	498.93
618	499.32	498.82
619	498.53	498.73
622	497.84	498.79
625	497.52	498.74
635	498.00	498.92
652	498.74	498.84
653	497.68	498.48
659	498.24	498.44
670	497.57	498.09
680	497.43	498.09
688	497.83	498.01
690	497.47	497.96
692	497.28	497.96

Station	Thalweg Elevation	Water Surface Elevation
694	497.57	497.97
700	497.86	497.88
703	497.12	497.90
705	496.93	497.89
714	497.76	497.77
728	497.24	497.34
735	496.51	497.26
742	496.28	497.20
755	497.24	497.24
757	496.29	497.09
758	495.99	497.09
766	497.07	497.09
767	496.30	496.80
773	495.90	496.82
785	496.04	496.81
799	496.16	496.82
803	495.76	496.81
814	495.45	496.75
823	495.79	496.81
834	495.79	496.81
845	496.70	496.80
855	496.00	496.76
866	495.35	496.76
884	496.62	496.78
886	497.01	496.71
898	495.07	495.43
902	494.51	495.38
912	495.05	495.41
922	494.68	494.76
944	493.49	493.59
954	493.29	493.61
957	493.86	493.86
963	492.63	493.28
974	492.57	493.28
986	492.78	493.23
998	492.00	492.34
1005	492.06	492.17
1006	491.95	492.23
1013	491.64	492.19
1025	491.94	492.26
1043	491.94	491.96
1045	492.08	492.09
1046	491.48	491.89
1049	491.12	491.85
1054	491.04	491.90
1064	490.72	491.83
1080	491.73	491.89
1083	491.11	491.28

Station	Thalweg Elevation	Water Surface Elevation
1089	490.78	491.15
1093	490.52	491.03
1098	489.71	491.02
1104	490.81	491.05
1112	490.82	490.94
1125	490.16	490.51
1136	490.34	490.52
1149	489.99	490.19
1160	489.66	489.67
1163	489.26	489.52
1168	488.83	489.27
1174	488.40	489.21
1179	489.04	489.20
1185	488.80	489.20
1195	489.09	489.15
1202	487.84	488.91
1203	488.34	488.98
1207	488.43	489.02
1214	488.04	489.04

Station	Bankfull Elevation
98	505.01
165	503.94
340	504.04
385	502.91
463	502.94
563	501.36
610	500.84
630	500.77
762	498.22
985	494.82
1128	492.78
1175	491.69
1205	490.57

Longitudinal Profile Data 2010

Station	Thalweg Elevation	Water Surface Elevation
-2	507.5711	507.6311
30	505.1424	505.1524
31	503.5356	504.3356
35	503.3737	504.3737
40	504.1836	504.3236
54	504.1394	504.3394
56	503.6235	503.8435
65	503.3428	503.6428
70	503.1721	503.7421
80	503.554	503.724
90	503.3455	503.5255
97	503.0342	503.2542
100	502.7057	503.2857
102	502.8426	503.2426
106	502.797	503.087
107	502.482	503.142
114	502.8309	503.1009
127	502.7384	503.0584
134	502.3542	503.0742
144	502.8563	503.0863
149	502.607	502.817
156	501.8233	502.8333
163	502.009	502.809
166	502.2404	502.8304
174	502.5263	502.7763
184	502.3733	502.5833
189	501.8322	502.5522
199	502.383	502.513
209	502.0885	502.3685
214	502.2512	502.4012
215	501.9504	502.4504
221	501.2006	502.3806
231	501.5896	502.3196
235	502.0331	502.3731
239	502.0245	502.3045
245	501.0548	502.3048
251	501.5802	502.2602
257	502.0623	502.2823
261	501.8952	502.2052
269	501.4776	502.2576
275	502.055	502.265
284	501.617	502.097
287	501.3744	502.0244
288	501.1296	502.0896
292	501.5095	502.0195
298	501.0855	502.0455
305	501.7962	502.0462
313	501.7179	501.8679
316	501.0267	501.8467
317	500.8525	501.8225

Station	Thalweg Elevation	Water Surface Elevation
320	500.8427	501.8427
335	501.5403	501.8203
341	500.9819	501.7219
346	501.4295	501.6895
352	501.2979	501.4779
358	500.0636	501.4236
360	499.9911	501.4311
369	501.137	501.477
378	500.9322	501.3722
387	499.9165	501.4065
393	500.511	501.371
398	501.2541	501.5841
404	501.1584	501.3784
409	499.7022	501.3222
413	499.7748	501.3648
421	501.0039	501.3239
424	501.2	501.34
434	500.5847	501.0247
444	499.9713	501.0913
450	500.8571	501.1171
459	500.3848	500.7648
465	499.7276	500.8276
472	500.5493	500.8893
479	500.2285	500.5785
485	499.6568	500.6368
490	500.1523	500.6223
495	500.2879	500.5879
500	500.1911	500.4511
505	499.3061	500.4661
513	499.8079	500.4479
515	500.1534	500.3934
525	499.9073	500.2673
532	499.0211	500.3211
539	499.555	500.325
543	500.1318	500.3518
550	499.7405	500.1005
560	499.526	499.526
570	499.5228	500.0328
575	499.2289	500.0489
579	499.7659	500.0059
581	499.5153	499.7553
581	499.5543	499.8143
590	498.2733	499.7933
594	498.4256	499.7456
599	499.4934	499.7334
610	498.8883	499.0683
611	498.3499	499.0099
615	498.8798	498.9798
619	498.5465	498.9465
620	499.5209	499.5209

Bankfull

Station	Elevation
64	505.40
86	505.02
118	504.12
156	504.02
208	503.26
244	503.40
260	503.13
276	502.97
307	503.36
350	502.67
371	502.41
398	502.31
427	502.01
456	501.34
490	501.58
542	501.10
600	500.14
638	500.28
753	498.49
808	498.07
954	495.08
1034	493.66
1065	493.76
1095	492.69
1121	492.47
1148	492.10
1172	491.45

Station	Thalweg Elevation	Water Surface Elevation
624	498.1677	498.9277
629	497.6304	499.0004
639	497.8082	498.9182
647	498.3554	498.9654
653	498.7477	498.9277
654	497.9403	498.5303
655	497.6742	498.5942
660	498.2941	498.5241
666	497.8022	497.8022
671	497.6349	498.1049
682	497.4549	498.2149
689	497.8857	498.1057
690	497.5177	497.9977
694	497.4187	498.0387
700	497.811	499.611
704	496.9138	497.9638
713	497.7371	497.8871
716	497.3092	497.6692
722	497.5104	497.6504
725	497.2906	497.4506
737	496.3806	497.4606
755	497.2053	497.4253
757	496.2912	497.0412
758	495.9449	497.1149
758	495.9244	497.1244
763	496.5979	497.0979
765	496.8722	497.1122
767	496.8339	496.9739
780	495.6459	496.9659
788	496.094	497.004
796	496.3137	496.9637
808	495.4566	496.9966
820	495.8755	496.9955
836	495.8945	496.9945
845	496.7339	496.9239
850	496.3057	496.9757
870	495.0757	496.9657
890	496.7325	496.8325
894	494.9001	495.2601
902	494.6517	495.3017
911	495.0964	495.2664
923	494.4993	494.7193
936	493.9295	494.0995
943	493.7243	493.8943
955	493.3653	493.9253
958	493.8102	493.8702
961	492.7443	493.2643
970	492.6471	493.2571
983	492.8512	493.3712
989	493.1223	493.1423

Station	Thalweg Elevation	Water Surface Elevation
998	492.1433	492.4433
1005	491.9309	492.2709
1010	491.54	492.32
1020	491.8936	492.2936
1028	491.9506	492.3006
1033	491.8998	492.1898
1033	491.5908	491.5908
1038	491.8392	491.9892
1046	491.2381	491.8181
1047	491.2637	491.8137
1048	490.7586	491.7486
1054	490.8476	491.7976
1058	490.9799	491.8199
1066	490.5508	491.8008
1067	490.588	491.818
1079	491.5444	491.7844
1080	491.4437	491.7437
1082	490.507	491.007
1083	490.6251	491.0751
1091	490.6821	490.9421
1092	490.4988	490.8488
1100	489.7122	490.9222
1112	490.6992	490.9192
1116	490.5056	490.6056
1125	490.0132	490.5132
1136	490.1494	490.4394
1164	489.1109	489.3209
1172	488.475	489.155
1175	489.0107	489.1007
1193	488.6413	489.0513
1205	488.2629	488.7529
1213	487.7461	488.7661
1216	487.7764	488.7164

Stillhouse Creek (#363) MY 5 2011 Longitudinal Profile Raw Data

ID	Northing	Easting	Elevation	H2O Depth	Comment	Station
1	845825.0545	1971346.9491	500.0000	0.0000	BS	0.00
2	845134.5184	1971194.7655	500.0000	0.0000	BS	0.00
3	845801.3693	1971341.8030	495.6275	0.0000	BS	0.00
4	845789.4157	1971341.0631	495.3414	0.0000	BS	0.00
5	845736.6194	1971308.4657	489.8097	0.0000	T	298.00
6	845736.5928	1971311.6384	490.8068	0.0000	T	295.00
7	845744.4676	1971317.6212	488.3162	0.0000	T	283.50
8	845750.3782	1971317.9552	490.2757	0.0000	T	278.00
9	845750.3137	1971317.7490	490.2708	0.0000	T	278.00
10	845759.5053	1971321.6637	489.4776	0.9000	T	268.50
11	845765.4011	1971322.4174	488.9743	0.5000	T	262.50
12	845771.3087	1971324.0171	489.3359	0.1000	T	256.00
13	845776.4224	1971325.5999	488.7800	0.7000	T	251.00
14	845783.0201	1971325.6665	487.0763	0.7000	T	244.50
15	845790.3589	1971323.9169	487.9040	0.1000	T	237.00
16	845797.9252	1971322.5493	490.7522	0.5000	T	229.00
17	845802.2927	1971322.5783	490.4489	0.9000	T	224.50
18	845812.6610	1971320.5441	491.2280	0.0000	T	213.50
19	845828.9295	1971321.2591	491.4526	0.0000	T	197.50
20	845801.3881	1971341.8072	495.6104	0.0000	BS	0.00
21	845837.3499	1971320.5694	490.8860	0.8000	T	189.00
22	845852.1436	1971315.1060	491.5564	0.1000	T	172.50
23	845859.8223	1971312.1082	491.3711	0.4000	T	165.00
24	845867.8823	1971313.2320	491.1310	0.6000	T	157.50
25	845874.0751	1971313.0912	491.5068	0.3000	T	150.50
26	845883.5203	1971316.1495	491.5955	0.2000	T	141.00
27	845895.2167	1971317.1732	491.7653	0.1000	T	128.50
28	845908.8801	1971316.1177	491.7613	0.2000	T	115.00
29	845919.0770	1971312.4350	491.7155	0.2000	T	104.00
30	845930.7362	1971309.2150	492.1047	0.1000	T	92.00
31	845942.3917	1971311.8748	492.4199	0.1000	T	79.50
32	845950.7412	1971314.6266	492.1915	0.4000	T	71.00
33	845967.2075	1971312.6764	493.0659	0.2000	T	55.00
34	845976.7738	1971309.9985	492.6699	0.7000	T	44.00
35	845987.9257	1971310.9428	492.6305	0.8000	T	32.50
36	846028.4649	1971294.5881	504.2524	0.0000	BS	0.00
37	845996.3765	1971284.0256	500.7889	0.0000	BS	0.00
38	845996.5825	1971283.9895	500.7293	0.0000	BS	0.00
39	846021.2859	1971306.2220	496.4683	0.1000	T	0.10
40	846010.6345	1971307.7575	496.0251	0.1000	T	8.50
41	846000.4798	1971310.1956	493.5742	0.1000	T	19.00
42	846000.8775	1971310.1098	494.5641	0.1000	T	18.50
43	845991.2793	1971311.3849	493.9701	0.1000	T	28.50
44	845988.3082	1971314.2511	492.3596	0.8000	T	32.50
45	845981.9887	1971311.5874	492.8837	0.3000	T	39.00
46	845968.1714	1971319.5000	494.8866	0.0000	BKF	55.00

47	845948.5123	1971319.5967	494.9842	0.0000	BKF	72.50
48	845921.2721	1971317.0858	493.2166	0.0000	BKF	103.00
49	845801.3954	1971341.8088	495.7530	0.0000	BS	0.00
50	845906.5318	1971318.6592	493.3345	0.0000	BKF	118.00
51	845893.2707	1971315.1863	493.1307	0.0000	BKF	130.00
52	845878.7668	1971311.7746	493.3009	0.0000	BKF	147.00
53	845860.4092	1971318.4505	493.0316	0.0000	BKF	165.00
54	845842.9109	1971324.0163	492.8840	0.0000	BKF	184.50
55	845799.9554	1971328.2281	492.9593	0.0000	BKF	228.00
56	845765.3373	1971264.0913	493.6194	0.0000	BS	0.00
57	845794.7700	1971294.2311	495.7037	0.0000	BS	0.00
58	845794.5648	1971294.0213	495.7361	0.0000	BS	0.00
59	845735.8836	1971308.9245	490.2220	0.9000	T	297.50
60	845744.8208	1971307.0894	492.5333	0.0000	BKF	304.00
61	845740.9024	1971301.4467	490.8420	0.3000	T	306.50
62	845742.7735	1971298.1467	491.0123	0.0000	T	310.00
63	845745.0546	1971294.0875	490.3435	0.6000	T	315.00
64	845739.3591	1971281.6332	490.7174	0.2000	T	329.00
65	845743.1049	1971279.1590	492.5893	0.0000	BKF	328.00
66	845737.0770	1971277.2176	490.8802	0.0100	T	334.00
67	845735.5305	1971273.9675	489.9523	0.5000	T	338.00
68	845736.7662	1971266.7701	490.2495	0.3000	T	345.50
69	845738.7382	1971261.3267	490.2828	0.1000	T	351.00
70	845734.5847	1971258.5135	491.8045	0.0000	BKF	360.00
71	845738.2614	1971255.8194	489.2390	1.1000	T	357.50
72	845729.7773	1971253.1489	490.1385	0.2000	T	366.50
73	845723.8599	1971255.4847	489.8311	0.3000	T	373.00
74	845728.9442	1971258.0577	491.7811	0.0000	BKF	368.00
75	845720.3691	1971257.4033	490.0885	0.2000	T	377.00
76	845713.6143	1971257.1976	489.3902	0.9000	T	383.50
77	845701.3378	1971247.2907	491.8735	0.0000	BS	0.00
78	845706.8799	1971248.7453	491.8215	0.0000	BKF	393.00
79	845710.5352	1971249.8774	490.1476	0.1000	T	392.00
80	845710.5832	1971239.8567	489.9569	0.1000	T	402.50
81	845705.0653	1971239.4532	491.3422	0.0000	BKF	410.00
82	845705.8697	1971233.2861	488.8608	1.2000	T	412.00
83	845696.3122	1971238.8996	489.9931	0.1000	T	423.00
84	845691.8295	1971245.8585	489.8660	0.1000	T	431.50
85	845686.4407	1971249.1672	489.1413	0.7000	T	438.50
86	845686.6202	1971245.1341	490.8806	0.0000	BKF	435.00
87	845679.2655	1971243.4020	489.7321	0.1000	T	449.00
88	845678.1839	1971235.9560	489.4779	0.1000	T	456.00
89	845675.2174	1971230.4515	488.6571	0.9000	T	462.00
90	845665.2239	1971232.6569	489.4661	0.1000	T	472.00
91	845667.4446	1971235.4181	490.5112	0.0000	BKF	471.00
92	845658.2282	1971229.2928	490.6841	0.0000	BKF	478.50
93	845666.7707	1971235.6729	490.5234	0.0000	BKF	472.00

94	845666.4775	1971235.4538	490.5808	0.0000	BKF	472.00
95	845662.4088	1971234.5432	489.5680	0.0000	T	475.00
96	845655.8723	1971235.7923	488.5933	0.8000	T	482.50
97	845652.1963	1971226.7055	489.4180	0.1000	T	493.00
98	845651.5883	1971223.1615	489.1580	0.1000	T	496.50
99	845647.7640	1971215.6786	488.1220	1.2000	T	505.00
100	845638.5820	1971218.5605	489.1650	0.0500	T	515.00
101	845634.4633	1971221.1473	488.9354	0.1000	T	520.00
102	845626.5576	1971225.0288	487.9257	1.1000	T	528.50
103	845625.7500	1971211.7338	488.9995	0.0500	T	544.00
104	845627.7982	1971205.1924	488.5012	0.1000	T	550.00
105	845625.1737	1971199.0144	487.7841	0.9000	T	557.50
106	845621.2976	1971210.5709	490.4339	0.0000	BKF	543.50
107	845633.7762	1971216.9380	490.5827	0.0000	BKF	518.00
108	845646.8362	1971220.5981	490.3070	0.0000	BKF	503.00
109	845601.6532	1971197.8285	490.2335	0.0000	BS	0.00
110	845616.8237	1971209.0481	490.4445	0.0000	BS	575.00
111	845616.7490	1971208.9928	490.4899	0.0000	BS	575.00
112	845611.9744	1971202.6872	488.0867	0.6000	T	572.50
113	845607.6244	1971208.9434	488.5431	0.1000	T	580.00
114	845606.2859	1971210.2876	488.5637	0.2000	T	582.00
115	845599.7118	1971214.1721	487.1397	1.5000	T	590.00
116	845593.3764	1971209.7308	488.4991	0.1000	T	598.00
117	845588.2578	1971201.0122	492.8031	0.1000	T	608.00
118	845585.1164	1971203.2152	492.3385	0.6000	T	611.00
119	845579.8308	1971205.8716	492.3666	0.5000	T	617.00
120	845578.5448	1971206.2795	493.4467	0.0000	T	618.00
121	845576.5339	1971207.0073	493.3073	0.0000	T	620.50
122	845576.1230	1971207.5228	487.2228	0.7000	T	621.00
123	845568.2750	1971210.9268	487.0929	0.8000	T	631.00
124	845589.1348	1971205.0156	488.9413	0.0000	BKF	605.00
125	845566.8102	1971193.2703	490.2402	0.0000	BS	0.00
126	845601.5052	1971197.8031	490.2053	0.0000	BS	0.00
127	845553.2839	1971199.4793	487.7519	0.0000	T	650.00
128	845550.1398	1971198.3697	486.6644	0.8000	T	664.00
129	845545.8029	1971194.9536	487.2442	0.0000	T	659.00
130	845537.9225	1971191.7937	486.5383	0.4000	T	668.00
131	845528.6253	1971187.0546	486.3268	0.6000	T	678.50
132	845521.5367	1971183.0869	486.7660	0.0000	T	687.00
133	845518.0489	1971179.3839	486.2305	0.0000	T	697.00
134	845524.6190	1971162.5344	490.6851	0.0000	BS	0.00
135	845538.2485	1971136.1703	491.4304	0.0000	BS	0.00
136	845538.2264	1971136.2114	491.5113	0.0000	BS	0.00
137	845513.6470	1971174.3100	486.8201	0.0000	T	698.00
138	845507.8334	1971172.6533	485.9727	0.9000	T	704.00
139	845507.6640	1971165.0705	486.7220	0.0500	T	715.20
140	845504.9772	1971150.9063	486.2676	0.1000	T	727.00

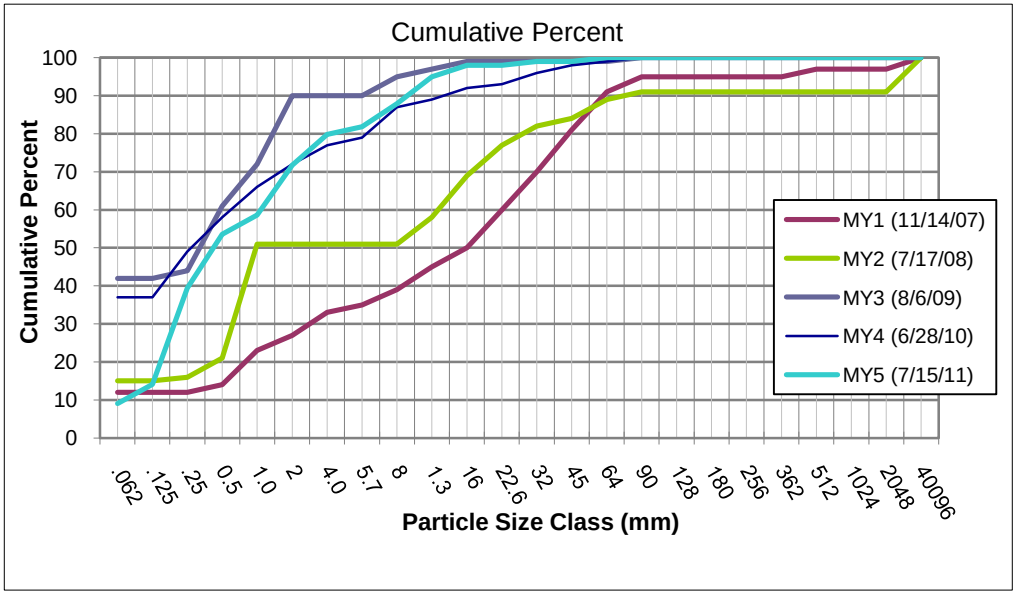
141	845498.7339	1971143.3311	485.4750	0.8000	T	735.50
142	845490.4295	1971138.4935	485.1855	1.2000	T	745.00
143	845487.0745	1971111.2693	490.0306	0.0000	BS	0.00
144	845459.3614	1971093.9301	494.1125	0.0000	BS	0.00
145	845459.3250	1971093.8918	489.6164	0.0000	BS	0.00
146	845486.8500	1971111.1287	489.8593	0.0000	BS	0.00
147	845538.0110	1971136.3585	491.6131	0.0000	BS	0.00
148	845524.3187	1971162.6375	490.6942	0.0000	BS	0.00
149	845476.6156	1971139.9688	487.1790	0.0000	BKF	760.00
150	845483.0309	1971133.6252	486.1839	0.0000	T	754.50
151	845486.8275	1971111.1146	489.8035	0.0000	BS	0.00
152	845483.0340	1971133.6444	486.0805	0.0000	T	745.50
153	845480.6113	1971134.7565	484.8313	0.8000	T	757.00
154	845473.8231	1971134.7018	485.5246	0.0000	T	764.50
155	845467.7112	1971132.3716	484.7951	0.9000	T	772.00
156	845462.2306	1971135.1253	484.4596	1.1000	T	778.00
157	845455.2786	1971135.0687	484.9408	0.0000	T	785.00
158	845446.8587	1971134.3635	485.3052	0.3000	T	793.00
159	845448.8090	1971131.8162	486.7639	0.0000	BKF	791.50
160	845439.2948	1971127.6696	484.3431	1.2000	T	805.50
161	845430.7238	1971117.0241	484.5977	1.0000	T	819.50
162	845422.2283	1971113.5081	484.5971	1.0000	T	828.00
163	845406.3077	1971110.8902	485.5134	0.0000	T	845.00
164	845409.5284	1971106.8999	486.6343	0.0000	BKF	845.00
165	845401.6954	1971109.7938	485.0062	0.0000	T	849.00
166	845399.6930	1971107.3349	484.6982	0.0000	T	852.50
167	845393.4748	1971101.0211	484.2624	0.0000	T	860.50
168	845384.3477	1971094.1709	484.1361	1.3000	T	873.00
169	845371.2016	1971085.3827	485.3982	0.1000	T	888.50
170	845369.1606	1971084.9371	485.1121	0.0000	T	890.00
171	845368.4310	1971081.5400	483.8552	0.2000	T	894.00
172	845362.2129	1971074.3325	483.0331	0.9000	T	903.50
173	845358.6510	1971068.8520	483.8874	0.1000	T	909.50
174	845351.1800	1971062.3544	483.2005	0.1000	T	922.00
175	845348.7630	1971054.4039	482.5467	0.2000	T	930.00
176	845344.8186	1971044.6235	482.3602	0.2000	T	940.50
177	845381.7661	1970957.4741	490.5782	0.0000	BS	0.00
178	845343.1085	1970969.6939	487.8229	0.0000	BS	0.00
179	845381.6365	1970957.5150	490.6480	0.0000	BS	0.00
180	845359.4423	1971058.5758	485.9992	0.0000	BKF	924.00
181	845352.0436	1971046.6397	485.1615	0.0000	BKF	935.00
182	845339.9372	1971025.2701	483.8634	0.0000	BKF	958.50
183	845335.6795	1971033.2051	482.2846	0.2000	T	955.00
184	845333.3345	1971029.9698	482.5462	0.0000	T	959.00
185	845333.3495	1971028.2537	481.7841	0.1000	T	960.00
186	845328.9723	1971019.5808	481.4091	0.0000	T	970.00
187	845331.2155	1971019.0168	483.6219	0.0000	BKF	969.00

188	845318.8625	1971011.9062	481.4090	0.3000	T	982.00
189	845312.3918	1971012.6042	481.7892	0.0000	T	988.00
190	845306.7853	1971012.5158	481.0767	0.0500	T	993.50
191	845298.1977	1971004.0660	480.5705	0.3000	T	1005.00
192	845296.0474	1971000.2259	480.2872	0.6000	T	1010.00
193	845291.4045	1970985.8823	480.7511	0.2000	T	1025.00
194	845296.3962	1970984.9573	482.2411	0.0000	BKF	1025.00
195	845283.6813	1970972.4288	480.6246	0.1000	T	1040.00
196	845283.8513	1970970.2762	481.2621	0.0000	T	1043.00
197	845282.9372	1970968.8910	479.8647	0.5000	T	1044.50
198	845280.7252	1970962.8477	479.3733	0.7000	T	1050.50
199	845284.2394	1970959.7049	481.2345	0.0000	BKF	1052.00
200	845277.8682	1970951.6409	478.6536	0.0000	T	1052.50
201	845269.6148	1970937.8936	479.5175	0.0000	T	1078.00
202	845269.5958	1970937.8855	480.5490	0.0000	T	1078.00
203	845272.9174	1970935.1095	481.5611	0.0000	BKF	1079.00
204	845268.8607	1970937.0502	479.7991	0.2000	T	1079.50
205	845264.3319	1970929.4676	479.6962	0.0000	T	1093.00
206	845263.2564	1970926.8387	480.2357	0.0000	T	1090.50
207	845262.2238	1970925.7430	478.9825	0.7000	T	1092.00
208	845259.8756	1970923.1887	478.4469	1.2000	T	1095.00
209	845258.5895	1970915.7386	479.5779	0.1000	T	1103.00
210	845259.9271	1970871.2242	486.3975	0.0000	BS	0.00
211	845272.9062	1970887.0319	486.2954	0.0000	BS	0.00
212	845272.8027	1970886.9059	486.3867	0.0000	BS	0.00
213	845268.5924	1970906.6881	482.3947	0.0000	BS	0.00
214	845258.2202	1970916.0267	479.6451	0.2000	T	1103.00
215	845256.1006	1970909.5002	479.7752	0.0000	T	1109.50
216	845252.2397	1970901.8199	479.2674	0.0000	T	1119.00
217	845245.4964	1970890.8088	479.1276	0.0000	T	1133.00
218	845241.5737	1970884.7125	479.2711	0.0000	T	1140.00
219	845236.6570	1970885.1787	480.6479	0.0000	T	1142.50
220	845227.5863	1970877.0899	479.9118	0.0000	BKF	1157.00
221	845231.2245	1970872.1316	478.4689	0.0000	T	1156.00
222	845226.6132	1970868.4585	479.2605	0.0000	T	1161.00
223	845227.1712	1970862.4339	480.0694	0.0000	BKF	1163.00
224	845224.1485	1970868.7508	477.9067	0.2000	T	1163.00
225	845221.4557	1970866.0582	477.3752	0.8000	T	1167.50
226	845215.9468	1970861.3429	477.9155	0.2000	T	1174.50
227	845211.9027	1970861.5459	478.0694	0.1000	T	1179.00
228	845199.1171	1970860.7871	477.5083	0.5000	T	1192.00
229	845196.8922	1970860.9114	478.2561	0.0000	T	1194.00
230	845194.7686	1970860.9945	477.2597	0.4000	T	1195.50
231	845190.3342	1970861.5534	476.9020	0.8000	T	1200.00
232	845186.4307	1970860.6919	477.2390	0.4000	T	1204.50
233	845185.6081	1970861.5449	478.0463	0.0000	T	1205.00
234	845185.0890	1970861.2465	477.3808	0.4000	T	1205.50

235	845181.7948	1970862.4888	477.0419	0.7000	T	1209.00
236	845190.4412	1970867.1424	479.3029	0.0000	BKF	1200.00
237	845221.5272	1970855.9101	480.5754	0.0000	BKF	1173.00

Figure 7.0. Pebble Counts - Year 5 - 2011 - Stillhouse Creek Stream Restoration (EEP Project #363)

Cross Section One-Reach 1			2011		
Descript.	**Material**	**Size (mm)**	**Total #**	**Class %**	**Cum %**
Silt/Clay	Silt/Clay	.062	9	9	9
Sand	Very Fine Sand	.125	5	5	14
	Fine Sand	.25	25	25	39
	Medium Sand	0.5	14	14	54
	Coarse Sand	1.0	5	5	59
	Very Course Sand	2	13	13	72
Gravel	Very Fine Gravel	4.0	8	8	80
	Fine Gravel	5.7	2	2	82
	Fine Gravel	8	6	6	88
	Medium Gravel	1.3	7	7	95
	Medium Gravel	16	3	3	98
	Coarse Gravel	22.6		0	98
	Coarse Gravel	32	1	1	99
	Very Course Gravel	45		0	99
	Very Course Gravel	64	1	1	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		99		



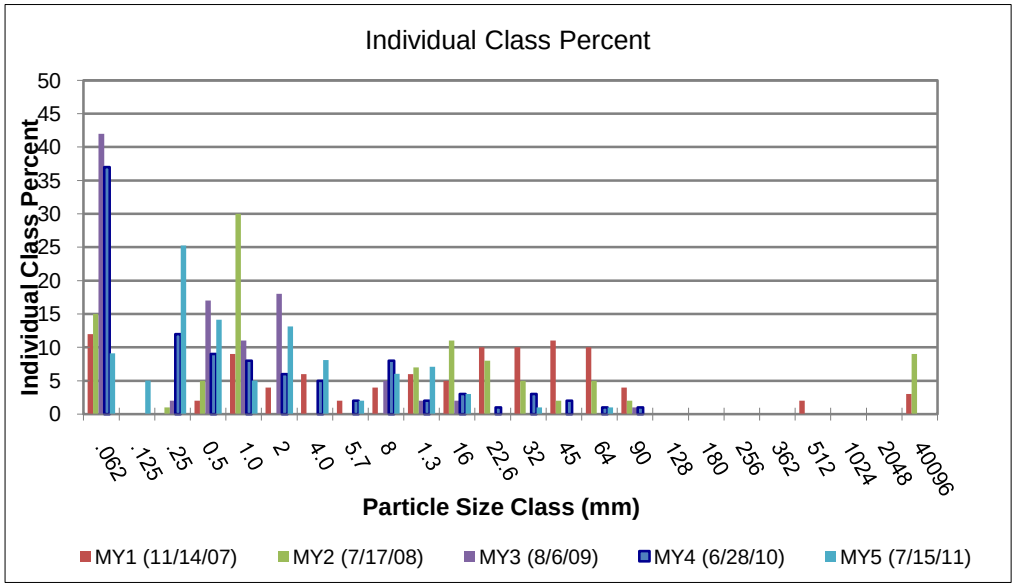
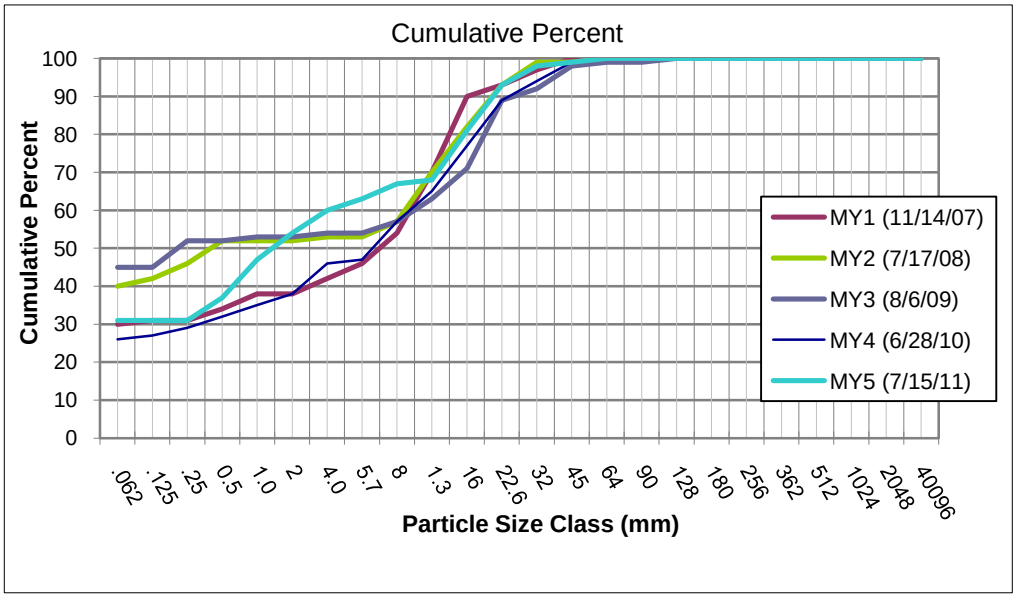


Figure 7.1. Pebble Counts - Year 5 - 2011 - Stillhouse Creek Stream Restoration (EEP Project #363)

Cross Section Two-Reach 2			2011		
Descript.	**Material**	**Size (mm)**	**Total #**	**Class %**	**Cum %**
Silt/Clay	Silt/Clay	.062	31	31	31
Sand	Very Fine Sand	.125		0	31
	Fine Sand	.25		0	31
	Medium Sand	0.5	6	6	37
	Coarse Sand	1.0	10	10	47
	Very Course Sand	2	7	7	54
Gravel	Very Fine Gravel	4.0	6	6	60
	Fine Gravel	5.7	3	3	63
	Fine Gravel	8	4	4	67
	Medium Gravel	1.3	1	1	68
	Medium Gravel	16	13	13	81
	Coarse Gravel	22.6	12	12	93
	Coarse Gravel	32	5	5	98
	Very Course Gravel	45	1	1	99
	Very Course Gravel	64	1	1	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		



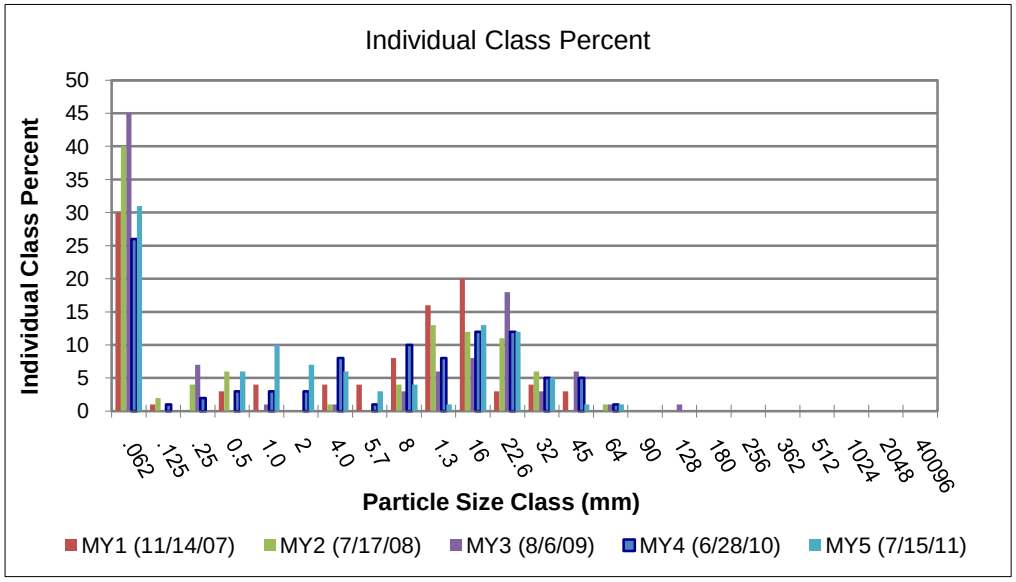
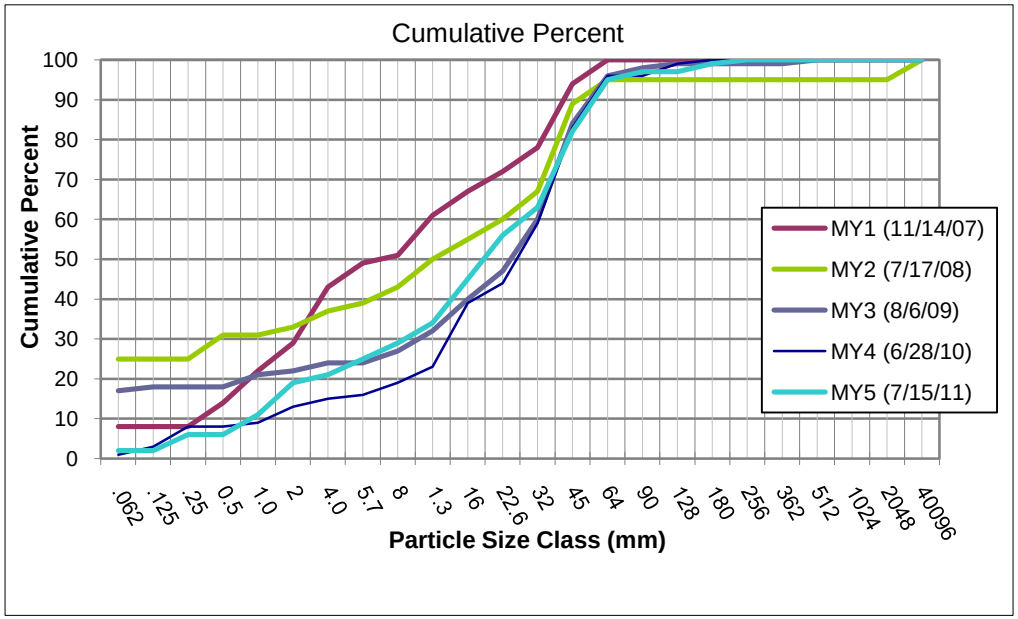


Figure 7.2. Pebble Counts - Year 5 - 2011 - Stillhouse Creek Stream Restoration (EEP Project #363)

Cross Section Three-Reach 2			2011		
Descript.	**Material**	**Size (mm)**	**Total #**	**Class %**	**Cum %**
Silt/Clay	Silt/Clay	.062	2	2	2
Sand	Very Fine Sand	.125		0	2
	Fine Sand	.25	4	4	6
	Medium Sand	0.5		0	6
	Coarse Sand	1.0	5	5	11
	Very Course Sand	2	8	8	19
Gravel	Very Fine Gravel	4.0	2	2	21
	Fine Gravel	5.7	4	4	25
	Fine Gravel	8	4	4	29
	Medium Gravel	1.3	5	5	34
	Medium Gravel	16	11	11	45
	Coarse Gravel	22.6	11	11	56
	Coarse Gravel	32	7	7	63
	Very Course Gravel	45	19	19	82
	Very Course Gravel	64	13	13	95
Cobble	Small Cobble	90	2	2	97
	Small Cobble	128		0	97
	Medium Cobble	180	2	2	99
	Large Cobble	256	1	1	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		



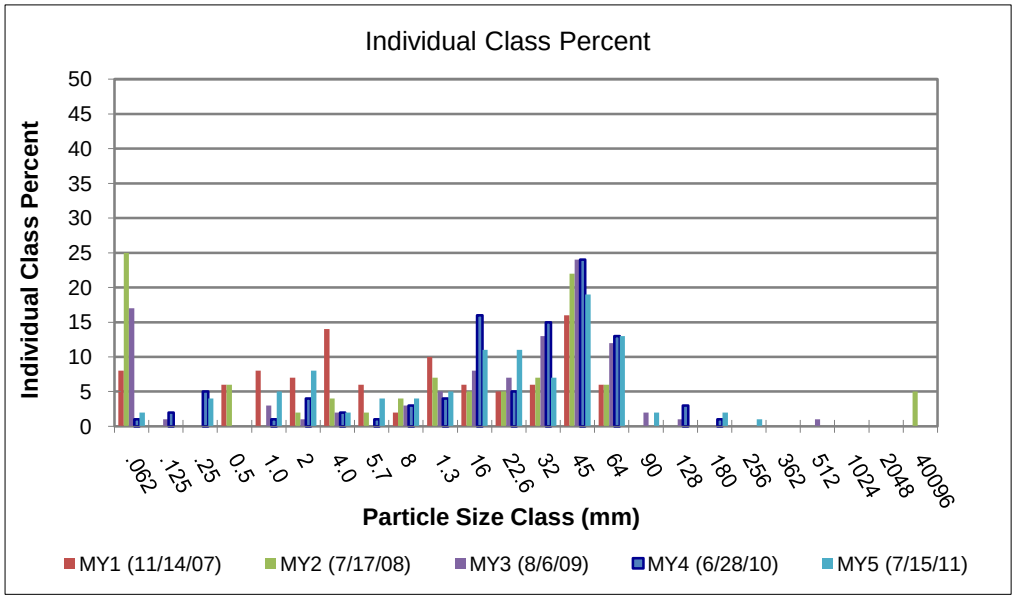
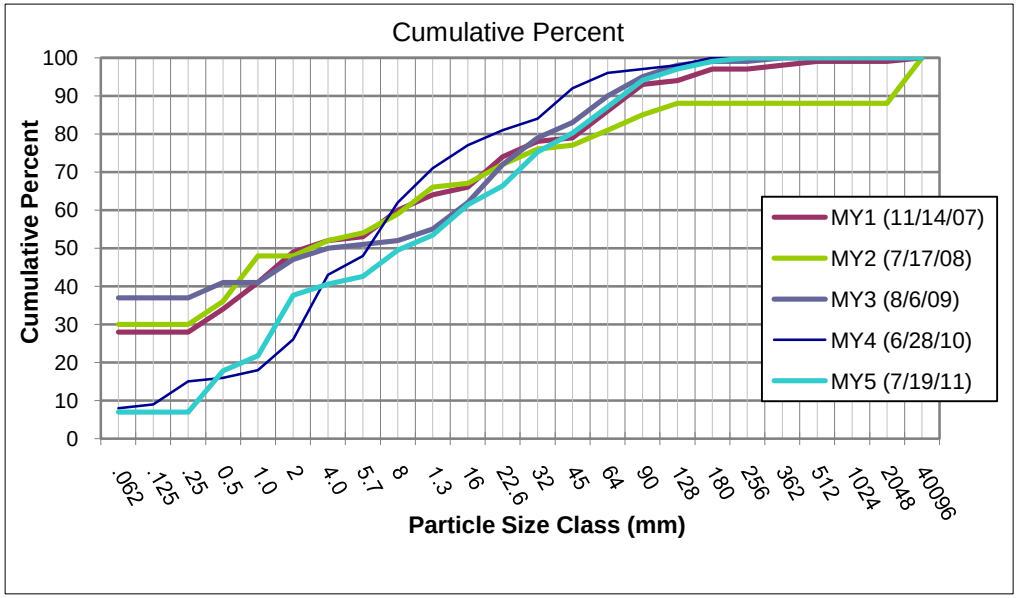


Figure 7.3. Pebble Counts - Year 5 - 2011 - Stillhouse Creek Stream Restoration (EEP Project #363)

Cross Section Four-Reach 4			2011		
Descript.	**Material**	**Size (mm)**	**Total #**	**Class %**	**Cum %**
Silt/Clay	Silt/Clay	.062	7	7	7
Sand	Very Fine Sand	.125		0	7
	Fine Sand	.25		0	7
	Medium Sand	0.5	11	11	18
	Coarse Sand	1.0	4	4	22
	Very Course Sand	2	16	16	38
Gravel	Very Fine Gravel	4.0	3	3	41
	Fine Gravel	5.7	2	2	43
	Fine Gravel	8	7	7	50
	Medium Gravel	1.3	4	4	53
	Medium Gravel	16	8	8	61
	Coarse Gravel	22.6	5	5	66
	Coarse Gravel	32	9	9	75
	Very Course Gravel	45	5	5	80
	Very Course Gravel	64	7	7	87
Cobble	Small Cobble	90	7	7	94
	Small Cobble	128	3	3	97
	Medium Cobble	180	2	2	99
	Large Cobble	256	1	1	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		101		



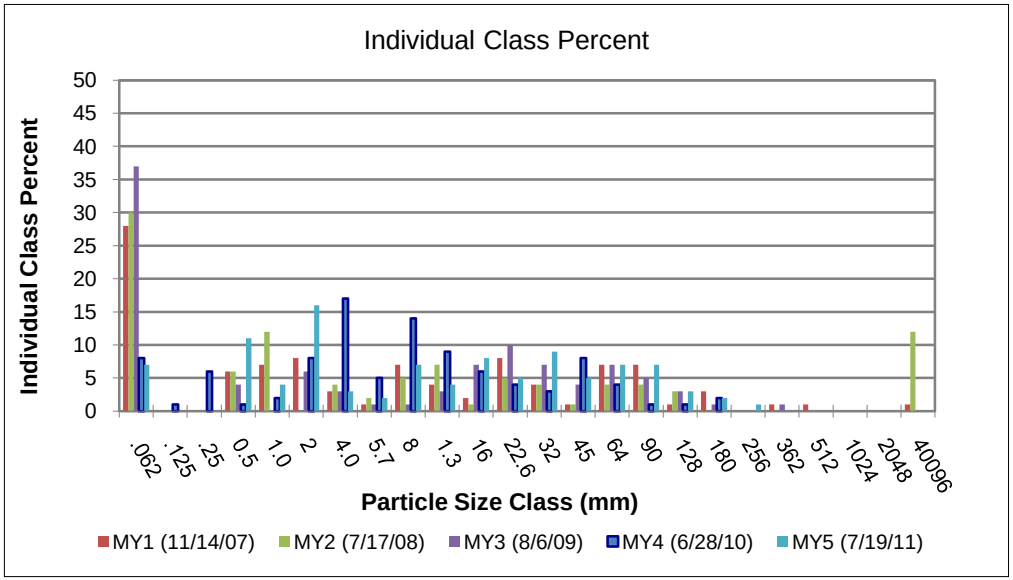
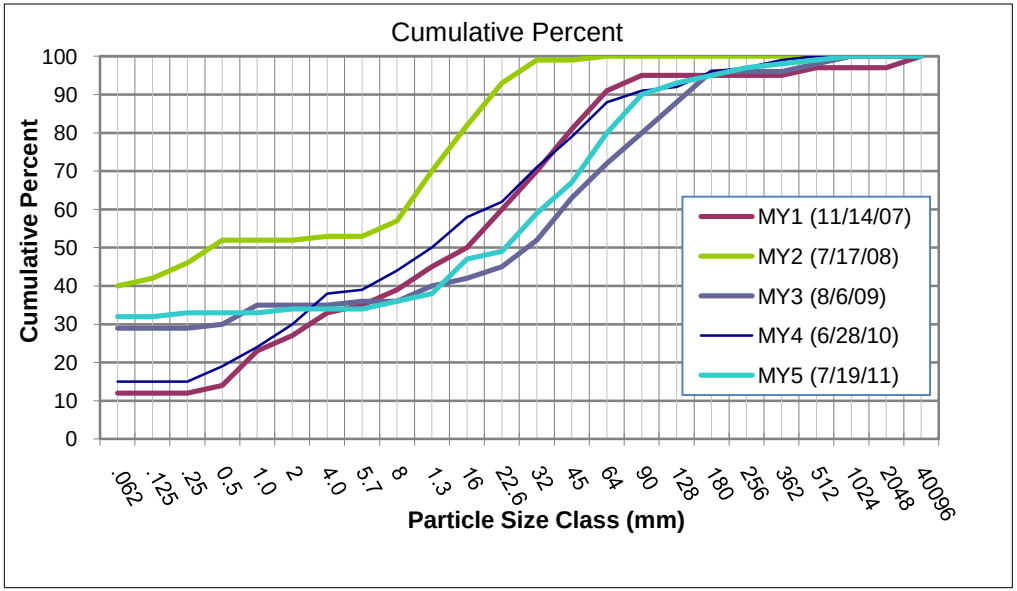
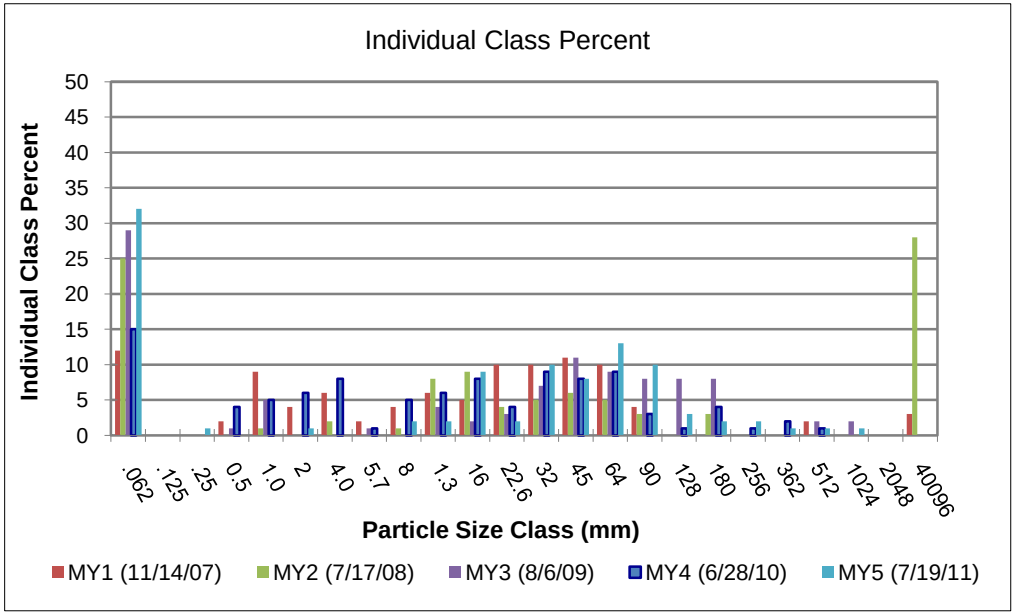


Figure 7.4. Pebble Counts - Year 5 - 2011 - Stillhouse Creek Stream Restoration (EEP Project #363)

Cross Section Five-Reach 4			2011		
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		0	33
	Coarse Sand	1.0		0	33
	Very Course Sand	2	1	1	34
Gravel	Very Fine Gravel	4.0		0	34
	Fine Gravel	5.7		0	34
	Fine Gravel	8	2	2	36
	Medium Gravel	1.3	2	2	38
	Medium Gravel	16	9	9	47
	Coarse Gravel	22.6	2	2	49
	Coarse Gravel	32	10	10	59
	Very Course Gravel	45	8	8	67
	Very Course Gravel	64	13	13	80
Cobble	Small Cobble	90	10	10	90
	Small Cobble	128	3	3	93
	Medium Cobble	180	2	2	95
	Large Cobble	256	2	2	97
Boulder	Small Boulders	362	1	1	98
	Small Boulders	512	1	1	99
	Medium Boulders	1024	1	1	100
	Large Boulders	2048		0	100
Bedrock	Bedrock	40096		0	100
	Total		100		





Pebble Count

Site XS 2 Stillhouse Date 15 July 11

Survey Crew SD + CH

XS-2 XS-3 XS-4

Particle	Description	Size (mm)	Particle Count Pool ~~Riffle~~	Riffle ~~Pool~~	Pool ~~Other~~	Total	%	Cum %
Silt/Clay	Silt/Clay	< 0.062	31	2	9			
Sand	Very Fine	0.062 – 0.125			6			
	Fine	0.125 – 0.25		4	25			
	Medium	0.25 – 0.5	6		14			
	Coarse	0.5 – 1.0	10	5	5			
	Very Coarse	1.0 – 2.0	7	8	13			
Gravel	Very Fine	2.0 – 4.0	6	2	16			
	Fine	4.0 – 5.7	3	4	2			
	Fine	5.7 – 8.0	4	4	6			
	Medium	8.0 – 11.3	1	5	7			
	Medium	11.3 – 16.0	13	11	3			
	Coarse	16.0 – 22.6	12	11				
	Coarse	22.6 – 32	5	7	1			
	Very Coarse	32 – 45	1	19				
	Very Coarse	45 – 64	1	13	1			
Cobble	Small	64 – 90		2				
	Small	90 – 128						
	Large	128 – 180		2				
	Large	180 – 256		1				
Boulder	Small	256 – 362						
	Small	362 – 512						
	Medium	512 – 1024						
	Large	1024 – 2048						
Bedrock	Bedrock	> 2048						
Total								

Pebble Count

Site _____ Date 19 July 11

Survey Crew _____

XS-5

Particle	Description	Size (mm)	XS-4 Particle Count				%	Cum %
			Riffle ✓	Pool ✓	Other	Total		
Silt/Clay	Silt/Clay	< 0.062	7		32			
Sand	Very Fine	0.062 – 0.125						
	Fine	0.125 – 0.25			1			
	Medium	0.25 – 0.5	11					
	Coarse	0.5 – 1.0	4					
	Very Coarse	1.0 – 2.0	16		1			
Gravel	Very Fine	2.0 – 4.0	3					
	Fine	4.0 – 5.7	2					
	Fine	5.7 – 8.0	7		2			
	Medium	8.0 – 11.3	4		2			
	Medium	11.3 – 16.0	8		9			
	Coarse	16.0 – 22.6	5		2			
	Coarse	22.6 – 32	9		10			
	Very Coarse	32 – 45	5		8			
	Very Coarse	45 – 64	7		13			
Cobble	Small	64 – 90	7		10			
	Small	90 – 128	3		3			
	Large	128 – 180	2		2			
	Large	180 – 256	1		2			
Boulder	Small	256 – 362			1			
	Small	362 – 512			1			
	Medium	512 – 1024			1			
	Large	1024 – 2048						
Bedrock	Bedrock	> 2048						
Total								

Table 10.0 Baseline Stream Data Summary
Stillhouse Creek (NCEEP# 363) - Reaches 1-3 (855 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med*	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)	NA				6.0	7.0	--	7.6	--	--	7.3	9.7	--	12.4	--	--	7.5	-	9.5	--	--	--	--	--	--
Floodprone Width (ft)					17.1	35.1	--	47.0	--	--	27.0	49.6	--	74.0	--	--	23.0	-	176.0	--	--	--	--	--	--
Bankfull Mean Depth (ft)	NA				5.6	7.3	--	8.1	--	--	7.3	10.4	--	13.2	--	--	-	9.0	-	--	--	--	--	--	--
[1]Bankfull Max Depth (ft)	NA				0.8	1.0	--	1.4	--	--	0.9	1.1	--	1.3	--	--	1.0	-	1.2	--	--	--	--	--	--
Bankfull Cross Sectional Area (ft^2)	NA				1.2	1.7	--	2.0	--	--	1.6	1.8	--	2.0	--	--	1.3	-	2.4	--	--	--	--	--	--
Width/Depth Ratio	NA				4.4	7.1	--	9.3	--	--	7.3	9.3	--	14.0	--	--	6.0	-	10.0	--	--	--	--	--	--
Entrenchment Ratio	NA				2.3	5.1	--	6.3	--	--	2.7	5.6	--	10.1	--	--	2.7	-	20.7	--	--	--	--	--	--
[1]Bank Height Ratio	NA				1.0	1.1	--	1.4	--	--	1.0	1.1	--	1.3	--	--	--	1.0	--	--	--	--	--	--	--
Profile																									
Riffle Length (ft)					-	-	-	--	--	--	-	-	-	--	--	--	-	-	-	2.4	6.6	--	15.3	--	--
Riffle Slope (ft/ft)					-	-	-	--	--	--	0	0.0204	-	0.054	--	--	0.006	-	0.017	-0.003	0.029	--	0.14	--	--
Pool Length (ft)					11.0	-	22.5	46.5	--	--	7.5	11.8	-	17.0	--	--	8.5	-	19.6	9.4	22.8	--	76.0	--	--
Pool Max depth (ft)					-		--	--	--	--	-	-	-	--	--	--	-	-	-	0.0	5.0	--	18.2	--	--
Pool Spacing (ft)					-	37.2	--	--	--	--		21.5	--		--	--		15.3	-			--		--	--
Pattern																									
Channel Beltwidth (ft)					6.0	11.6	--	19.0	--	--	12.4	13.7	--	16.7	--	--	8.5		19.6	8.7	16.3	--	24.7	--	--
Radius of Curvature (ft)					8.7	12.2	--	16.5	--	--	6.5	14.6	--	20.5	--	--	12.8		23.8	4.6	10.0	--	32.7	--	--
Rc:Bankfull width (ft/ft)							--		--	--		--	--	--	--	--						--		--	--
Meander Wavelength (ft)					29.0	63.0	--	116.0	--	--	21.2	34.7	--	57.0	--	--	12.8		39.1	23.8	37.8	--	75.4	--	--
Meander Width Ratio					0.9	1.7	--	2.7	--	--	1.0	1.4	--	2.3	--	--	1.0		2.3			--		--	--
Transport parameters																									
Reach Shear Stress (competency) lb/f^2								--										--					--		
Max part size (mm) mobilized at bankfull								--										--					--		
Stream Power (transport capacity) W/m^2								--										--					--		
Additional Reach Parameters																									
Rosgen Classification	NA							E4						E4/5				E4					--		
Bankfull Velocity (fps)	NA							--										--					--		
Bankfull Discharge (cfs)	NA							--																	
Valley length (ft)								672						168											
Channel Thalweg length (ft)								748						267.5				946					855		
Sinuosity (ft)								1.1						1.6				1.4					1.30		
Water Surface Slope (Channel) (ft/ft)	NA							0.0126						0.0094				0.0086					0.011		
BF slope (ft/ft)	NA							--						--				--					--		
[3]Bankfull Floodplain Area (acres)								--						--				--					--		
[4]% of Reach with Eroding Banks								--						--											
Channel Stability or Habitat Metric								--						--											
Biological or Other								--						--											

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

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

3. Utilizing survey data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope. 4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

* Mean, not median, provided for design numbers.

Table 10.1 Baseline Stream Data Summary
Stillhouse Creek (NCEEP# 363) - Reaches 4 (355 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med*	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)	NA				9.8	11.8	--	14.8	--	--	23.1	25.6	--	28.0	--	--	14.9	--	19.5	--	--	--	--	--	--
Floodprone Width (ft)					15.5	19.3	--	26.8	--	--	33.0	33.7	--	35.0	--	--	17.9	--	35.1	--	--	--	--	--	--
Bankfull Mean Depth (ft)	NA				19.2	21.7	--	24.7	--	--	68.5	43.5	--	48.9	--	--	18.0	--	22.0	--	--	--	--	--	--
[1]Bankfull Max Depth (ft)	NA				1.7	1.9	--	2.0	--	--	1.5	1.7	--	1.9	--	--	1.1	--	1.2	--	--	--	--	--	--
Bankfull Cross Sectional Area (ft^2)	NA				2.6	2.7	--	2.8	--	--	2.4	2.7	--	2.9	--	--	1.7	--	1.9	--	--	--	--	--	--
Width/Depth Ratio	NA				4.9	6.2	--	8.6	--	--	12.4	15.2	--	17.2	--	--	12.4	--	17.2	--	--	--	--	--	--
Entrenchment Ratio	NA				1.4	1.6	--	1.8	--	--	1.2	1.3	--	1.4	--	--	1.2	--	1.8	--	--	--	--	--	--
[1]Bank Height Ratio	NA				2.5	2.6	--	2.9	--	--	1.0	1.0	--	1.0	--	--	1.0	--	1.0	--	--	--	--	--	--
Profile																									
Riffle Length (ft)					--	--	--	--	--	--	9.5	18.4	--	29.0	--	--	6.0	--	19.5	2.5	17.3	--	40.1	--	--
Riffle Slope (ft/ft)					--	--	--	--	--	--	0.008	0.012	--	0.016	--	--	0.017	--	0.034	0.043	0.129	--	0.164	--	--
Pool Length (ft)					--	--	--	--	--	--	8.2	31.2	--	68.0	--	--	5.0	--	53.0	15.0	70.1	--	42.6	--	--
Pool Max depth (ft)					--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pool Spacing (ft)					--	--	--	--	--	--	27.2	62.4	--	129.0	--	--	39.0	--	94.0	0.0	11.1	--	40.1	--	--
Pattern																									
Channel Beltwidth (ft)					--	--	--	--	--	--	40.0	43.7	-	51.0	--	--	23.8	--	39.0	12.0	19.6	--	27.9	--	--
Radius of Curvature (ft)					--	--	--	--	--	--	19.5	41.3	-	54.0	--	--	29.8	--	39.0	25.4	40.3	--	55.4	--	--
Rc:Bankfull width (ft/ft)					--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Meander Wavelength (ft)					--	--	--	--	--	--	130.0	168.0	--	245.0	--	--	39.0	--	94.0	96.2	132.6	--	187.8	--	--
Meander Width Ratio					--	--	--	--	--	--	1.6	1.7	--	2.0	--	--	1.6	--	2.0			--		--	--
Transport parameters																									
Reach Shear Stress (competency) lb/f^2					--															--					
Max part size (mm) mobilized at bankfull					--															--					
Stream Power (transport capacity) W/m^2					--															--					
Additional Reach Parameters																									
Rosgen Classification	NA				G4/1						B4c/1						B4/1			--					
Bankfull Velocity (fps)	NA				--												--			--					
Bankfull Discharge (cfs)	NA				--																				
Valley length (ft)					282						325														
Channel Thalweg length (ft)					314						348						314			355					
Sinuosity (ft)					1.1						1.07						1.1			1.30					
Water Surface Slope (Channel) (ft/ft)	NA				0.017						0.008						0.017			0.02					
BF slope (ft/ft)	NA				--						--						--			--					
[3]Bankfull Floodplain Area (acres)					--						--						--			--					
[4]% of Reach with Eroding Banks					--						--														
Channel Stability or Habitat Metric					--						--														
Biological or Other					--						--														

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

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

3. Utilizing survey data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope. 4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

* Mean, not median, provided for design numbers.

Table 11.0. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)

Stillhouse Creek (NCEEP# 363) - Reaches 1-4 (1,210 feet)

	Cross Section 1 (Riffle)-Reach 1							Cross Section 2 (Pool)-Reach 2							Cross Section 3 (Riffle)-Reach 2						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	NA	508.16	508.16	508.16	508.16	508.16		NA	502.74	502.74	502.74	502.74	502.74		NA	502.74	502.74	502.74	502.74	502.74	
Bankfull Width (ft)	NA	13.54	12.64	12.03	12.72	13.83		NA	17.94	19.12	16.84	17.10	18.30		NA	12.41	13.18	15.47	14.31	14.86	
Floodprone Width (ft)	NA	25.87	27.95	25.78	26.83	26.84		NA	94.50	94.50	94.5	94.50	94.50		NA	107.00	107.00	107.00	107.00	107.00	
Bankfull Mean Depth (ft)	NA	0.99	1.03	1.03	1.02	0.86		NA	1.32	1.25	1.19	1.26	1.20		NA	0.69	0.64	0.54	0.51	0.52	
Bankfull Max Depth (ft)	NA	2.02	2.37	2.14	2.29	2.10		NA	2.68	2.85	2.64	2.73	2.94		NA	1.14	1.31	1.47	1.45	1.57	
Bankfull Cross Sectional Area (ft^2)	NA	13.39	13.01	12.36	13.04	11.89		NA	23.64	23.90	20.00	21.60	21.93		NA	8.61	8.43	8.39	7.27	7.70	
Bankfull Width/Depth Ratio	NA	13.70	12.29	11.70	12.42	16.09		NA	13.61	15.30	14.18	13.54	15.27		NA	17.87	20.60	28.53	28.18	28.65	
Bankfull Entrenchment Ratio	NA	1.91	2.21	2.14	2.11	1.94		NA	5.27	4.94	5.61	5.53	5.16		NA	8.70	8.12	6.91	7.48	7.20	
Bankfull Bank Height Ratio	NA	1.00	1.00	1.00	1.00	1.00		NA	1.00	1.00	1.00	1.00	1.00		NA	1.00	1.00	1.00	1.00	1.00	
Cross Sectional Area between end pins (ft^2)	NA	95.00	96.20	98.40	97.00	91.80		NA	28.20	27.20	26.20	25.70	25.20		NA	19.20	18.60	17.40	15.90	15.90	
d50 (mm)	NA	0.04	0.98	0.34	0.28	0.44		NA	6.85	0.42	0.21	6.39	1.43		NA	6.85	11.30	24.8	26.36	19.00	
	Cross Section 4 (Riffle)-Reach 4							**Cross Section 5 (Pool)-Reach 4**													
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	NA	500.46	500.46	500.46	500.46	500.46		NA	500.84	500.84	500.84	500.84	500.84								
Bankfull Width (ft)	NA	12.40	14.70	15.30	14.88	15.39		NA	12.41	11.53	12.29	15.86	15.94								
Floodprone Width (ft)	NA	29.30	30.64	30.68	30.26	30.40		NA	28.91	29.07	28.76	30.75	30.77								
Bankfull Mean Depth (ft)	NA	1.06	0.99	0.94	0.92	0.89		NA	1.21	1.38	1.35	1.29	1.36								
Bankfull Max Depth (ft)	NA	2.06	2.20	2.18	2.09	2.06		NA	2.27	2.33	2.29	2.62	2.61								
Bankfull Cross Sectional Area (ft^2)	NA	13.20	14.50	15.30	13.72	13.66		NA	14.97	15.87	16.58	20.40	21.61								
Bankfull Width/Depth Ratio	NA	11.75	14.86	16.25	16.13	17.33		NA	10.29	8.38	9.10	12.33	11.76								
Bankfull Entrenchment Ratio	NA	2.36	2.00	1.91	2.09	1.98		NA	2.33	2.52	2.34	1.67	1.93								
Bankfull Bank Height Ratio	NA	1.00	1.00	1.00	1.00	1.00		NA	1.00	1.00	1.00	1.00	1.00								
Cross Sectional Area between end pins (ft^2)	NA	202.80	201.20	199.80	198.00	200.90		NA	204.00	198.40	195.60	198.60	200.50								
d50 (mm)	NA	2.67	3.00	4.00	6.03	8.42		NA	16.00	22.60	29.30	13.00	23.54								

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
Stillhouse Creek (NCEEP# 363) - Reach 1 (235 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	NA	NA	NA	NA	NA	0	13.5	13.5	13.5	13.5	NA	1	12.6	12.6	12.6	12.6	NA	1	12.0	12.0	12.0	12.0	NA	1	12.7	12.7	12.7	12.7	NA	1	13.8	13.8	13.8	13.8	NA	1
Floodprone Width (ft)	NA	NA	NA	NA	NA	0	25.9	25.9	25.9	25.9	NA	1	28.0	28.0	28.0	28.0	NA	1	25.8	25.8	25.8	25.8	NA	1	26.8	26.8	26.8	26.8	NA	1	26.8	26.8	26.8	26.8	NA	1
Bankfull Mean Depth (ft)	NA	NA	NA	NA	NA	0	1.0	1.0	1.0	1.0	NA	1	1.0	1.0	1.0	1.0	NA	1	1.0	1.0	1.0	1.0	NA	1	1.0	1.0	1.0	1.0	NA	1	0.9	0.9	0.9	0.9	NA	1
[1]Bankfull Max Depth (ft)	NA	NA	NA	NA	NA	0	2.0	2.0	2.0	2.0	NA	1	2.4	2.4	2.4	2.4	NA	1	2.1	2.1	2.1	2.1	NA	1	2.3	2.3	2.3	2.3	NA	1	2.1	2.1	2.1	2.1	NA	1
Bankfull Cross Sectional Area (ft^2)	NA	NA	NA	NA	NA	0	13.4	13.4	13.4	13.4	NA	1	13.0	13.0	13.0	13.0	NA	1	12.4	12.4	12.4	12.4	NA	1	13.0	13.0	13.0	13.0	NA	1	11.9	11.9	11.9	11.9	NA	1
Width/Depth Ratio	NA	NA	NA	NA	NA	0	13.7	13.7	13.7	13.7	NA	1	12.3	12.3	12.3	12.3	NA	1	11.7	11.7	11.7	11.7	NA	1	12.4	12.4	12.4	12.4	NA	1	16.1	16.1	16.1	16.1	NA	1
Entrenchment Ratio	NA	NA	NA	NA	NA	0	1.9	1.9	1.9	1.9	NA	1	2.2	2.2	2.2	2.2	NA	1	2.1	2.1	2.1	2.1	NA	1	2.1	2.1	2.1	2.1	NA	1	1.9	1.9	1.9	1.9	NA	1
[1]Bank Height Ratio	NA	NA	NA	NA	NA	0	1.0	1.0	1.0	1.0	NA	1	1.0	1.0	1.0	1.0	NA	**1**	1.0	1.0	1.0	1.0	NA	1	1.0	1.0	1.0	1.0	NA	1	1.0	1.0	1.0	1.0	NA	1
Profile																																				
Riffle Length (ft)	4.35	9.75	10.5	15.3	4.16	5	2.0	11.0	9.0	29.0	8.9	7	4.0	18.0	18.0	32.0	10.1	7	7.0	16.3	17.0	30.0	7.0	7	5.0	14.5	11.5	32.0	9.4	6	5	16.8	16	28.5	8.98	5
Riffle Slope (ft/ft)	0.02	0.053	0.04	0.12	0.04	5	-0.01	0.03	0.01	0.08	0.03	7	-0.02	0.02	0.01	0.09	0.03	7	0.00	0.03	0.03	0.08	0.03	7	0.01	0.03	0.03	0.08	0.02	6	0.01	0.04	0.03	0.09	0.03	5
Pool Length (ft)	15.5	21.74	32	32.8	43.1	7	10.0	18.6	18.5	30.0	7.2	8	7.0	14.0	12.5	25.0	6.3	8	10.0	17.5	16.0	26.0	5.6	6	10.0	18.7	17.0	26.0	5.7	7	10.5	18.8	19.3	25	6.11	6
Pool Max depth (ft)	1.8	2.5	2.4	3.2	0.4	7.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.6	2.0	2.1	2.2	0.3	6	1.1	1.8	1.9	2.4	0.5	6
Pool Spacing (ft)	20.3	32	32.8	43.1	8.28	7	11.0	26.8	27.0	39.0	9.0	8	9.0	27.1	25.0	47.1	14.1	8	19.0	31.8	25.5	71.0	19.5	6	22.0	30.0	32.0	37.0	5.7	7	20	34.7	33	53.5	12.1	5
Pattern																																				
Channel Beltwidth (ft)	10.4	11.4	--	12.9	0.97	5																														
Radius of Curvature (ft)	13.3	21.53	--	27.2	4.64	5																														
Rc:Bankfull width (ft/ft)	NA	NA	--	NA	NA	0																														
Meander Wavelength (ft)	46.3	65.2	--	82.9	12.6	5																														
Meander Width Ratio	NA	NA	--	NA	NA	0																														
Additional Reach Parameters																																				
Rosgen Classification	--						B6						B5						B5						B5						B5					
Channel Thalweg length (ft)	855 (Reaches 1-3)						227						226						228						225						225					
Sinuosity (ft)	1.3 (Reaches 1-3)						1.05						1.04						1.05						1.04						1.05					
Water Surface Slope (Channel) (ft/ft)	0.011 (Reaches 1-3)						0.009						0.009						0.011						0.03						0.03					
BF slope (ft/ft)	--						0.01						0.008						0.02						0.014						0.011					
[3]Ri% / Ru% / P% / G% / S%	NA	NA	NA	NA	NA		34	0	66	0	0		53	0	47	0	0		52	0	48	0	0		40	0	60	0	0		40	0	53	7	0	
[3]SC% / Sa% / G% / C% / B% / Be%													15	36	38	2	0	9	42	48	9	1	0	0	37	35	27	1	0	0	9	63	28	0	0	0
[3]d16 / d35 / d50 / d84 / d95 /													0.25	0.73	0.98	45	2048		0.02	0.05	0.34	1.67	8		0.03	0.062	0.28	7.14	28.9		0.13	0.23	0.44	6.53	11.4	
[2]% of Reach with Eroding Banks	NA						0.0						0.0						0.0						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

Table 11.2. Monitoring Data - Stream Reach Data Summary
Stillhouse Creek (NCEEP# 363) - Reach 2 (400 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	NA	NA	NA	NA	NA	0	12.4	12.4	12.4	12.4	NA	1	13.2	13.2	13.2	13.2	NA	1	15.5	15.5	15.5	15.5	NA	1	14.3	14.3	14.3	14.3	NA	1	14.9	14.9	14.9	14.9	NA	1
Floodprone Width (ft)	NA	NA	NA	NA	NA	0	107.0	107.0	107.0	107.0	NA	1	107.0	107.0	107.0	107.0	NA	1	107.0	107.0	107.0	107.0	NA	1	107.0	107.0	107.0	107.0	NA	1	107.0	107.0	107.0	107.0	NA	1
Bankfull Mean Depth (ft)	NA	NA	NA	NA	NA	0	0.7	0.7	0.7	0.7	NA	1	0.6	0.6	0.6	0.6	NA	1	0.5	0.5	0.5	0.5	NA	1	0.5	0.5	0.5	0.5	NA	1	0.5	0.5	0.5	0.5	NA	1
[1]Bankfull Max Depth (ft)	NA	NA	NA	NA	NA	0	1.1	1.1	1.1	1.1	NA	1	1.3	1.3	1.3	1.3	NA	1	1.5	1.5	1.5	1.5	NA	1	1.5	1.5	1.5	1.5	NA	1	1.6	1.6	1.6	1.6	NA	1
Bankfull Cross Sectional Area (ft^2)	NA	NA	NA	NA	NA	0	8.6	8.6	8.6	8.6	NA	1	8.4	8.4	8.4	8.4	NA	1	8.4	8.4	8.4	8.4	NA	1	7.3	7.3	7.3	7.3	NA	1	7.7	7.7	7.7	7.7	NA	1
Width/Depth Ratio	NA	NA	NA	NA	NA	0	17.9	17.9	17.9	17.9	NA	1	20.6	20.6	20.6	20.6	NA	1	28.5	28.5	28.5	28.5	NA	1	28.2	28.2	28.2	28.2	NA	1	28.7	28.7	28.7	28.7	NA	1
Entrenchment Ratio	NA	NA	NA	NA	NA	0	8.7	8.7	8.7	8.7	NA	1	8.1	8.1	8.1	8.1	NA	1	6.9	6.9	6.9	6.9	NA	1	7.5	7.5	7.5	7.5	NA	1	7.2	7.2	7.2	7.2	NA	1
[1]Bank Height Ratio	NA	NA	NA	NA	NA	0	1.0	1.0	1.0	1.0	NA	1	1.0	1.0	1.0	1.0	NA	1	1.0	1.0	1.0	1.0	NA	1	1.0	1.0	1.0	1.0	NA	1	1.0	1.0	1.0	1.0	NA	1
Profile																																				
Riffle Length (ft)	2.4	5.95	5.13	11.63	2.72	15	4.0	8.3	8.0	15.0	3.4	12	6.0	10.0	9.0	28.0	5.3	15	5.0	7.5	7.0	11.0	2.0	14	2.0	6.9	7.0	11.0	2.6	14	2.5	6.292	6.25	10.5	2.463	12
Riffle Slope (ft/ft)	0.007	0.029	0.028	0.064	0.17	15	-0.01	0.03	0.02	0.09	0.03	12	-0.02	0.02	0.02	0.06	0.02	15	0.011	0.033	0.03	0.062	0.017	14	0.01	0.043	0.044	0.106	0.03	14	0.015	0.062	0.056	0.157	0.038	12
Pool Length (ft)	11.7	17.12	15.97	28.55	5.2	17.0	9.0	18.4	17.0	28.0	6.0	16	6.0	17.8	17.0	28.0	6.1	16	5.0	19.4	18.5	41.0	8.4	16	5.0	17.8	18.0	33.0	6.3	17	10	18	17.75	29.5	4.712	16
Pool Max depth (ft)	1.47	2.26	2.35	2.95	0.4	17.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.7	2.2	2.2	2.8	0.4	13	1.3	2.0	2.1	2.7	0.4	16
Pool Spacing (ft)	15.41	24.06	26.35	32.17	5.1	16.0	15.0	29.5	26.0	63.0	12.0	16	18.0	28.6	26.0	71.0	12.5	16	7.0	18.6	18.0	33.0	6.1	16	18.0	24.1	24.0	35.0	4.7	16	17	27.13	25	47.5	8.105	16
Pattern																																				
Channel Beltwidth (ft)	9.66	17.14	--	24.88	4.44	15																														
Radius of Curvature (ft)	4.25	6.83	--	11.09	1.44	15																														
Rc:Bankfull width (ft/ft)	NA	NA	--	NA	NA	0																														
Meander Wavelength (ft)	28.84	32.71	--	39.58	3.33	15																														
Meander Width Ratio	NA	NA	--	NA	NA	0																														
Additional Reach Parameters																																				
Rosgen Classification	--						C4						C4						C4						C4						C4					
Channel Thalweg length (ft)	855 (Reaches 1-3)						385						368						371						374						377					
Sinuosity (ft)	1.3 (Reaches 1-3)						1.57						1.5						1.51						1.53						1.55					
Water Surface Slope (Channel) (ft/ft)	0.011 (Reaches 1-3)						0.008						0.009						0.008						0.03						0.05					
BF slope (ft/ft)	--						0.007						0.007						0.011						0.008						0.01					
[3]Ri% / Ru% / P% / G% / S%	NA	NA	NA	NA	NA		23	0	77	0	0		34	0	66	0	0		24	0	76	0	0		22	0	78	0	0		19	1	74	6	0	
[3]SC% / Sa% / G% / C% / B% / Be%													33	10	55	0	0	2	31	6	60	2	1	0	14	12	72	2	0	0	16.5	20	61	2.5	0	0
[3]d16 / d35 / d50 / d84 / d95 /													0.04	1.53	5.86	29.63	44.87		0.04	6.56	12.49	32.89	50.46		2.87	7.92	16.38	33.16	48.57		0.83	6.075	10.22	32.79	45.18	
[2]% of Reach with Eroding Banks	NA						0.0						0.0						0.0						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

Table 11.3. Monitoring Data - Stream Reach Data Summary
Stillhouse Creek (NCEEP# 363) - Reach 3 (220 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0
Floodprone Width (ft)	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0
Bankfull Mean Depth (ft)	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0
[1]Bankfull Max Depth (ft)	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0
Bankfull Cross Sectional Area (ft^2)	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0
Width/Depth Ratio	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0
Entrenchment Ratio	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0
[1]Bank Height Ratio	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA	NA	0
Profile																																				
Riffle Length (ft)	7.0	11.4	11.9	14.7	3.3	4	4.0	8.3	7.0	14.0	5.1	3	20.0	29.5	29.5	39.0	13.4	2	14.0	21.5	21.5	29.0	10.6	2	6.0	7.5	7.5	9.0	2.1	2	9	10.4	10.4	11.8	1.98	2
Riffle Slope (ft/ft)	0.00	0.03	0.02	0.07	0.03	4	0.026	0.04	0.027	0.07	0.022	3	0.02	0.02	0.02	0.03	0.00	2	0.014	0.026	0.026	0.037	0.016	2	0.025	0.029	0.029	0.032	0.00	2	0.039	0.047	0.047	0.056	0.013	2
Pool Length (ft)	17.6	24.0	23.9	28.0	4.2	5	21.0	33.0	31.5	48.0	11.7	4	22.0	35.4	37.0	53.0	13.1	5	7.0	40.6	27.0	99.0	35.2	5	7.0	23.0	23.0	41.0	12.9	6	10	18.81	18.5	28	6.925	7
Pool Max depth (ft)	2.2	2.5	2.4	2.8	0.3	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.0	2.4	2.5	2.7	0.2	6	1.7	2.2	2.2	2.4	0.3	7
Pool Spacing (ft)	10.1	33.5	30.8	54.0	16.3	5	15.0	44.0	51.0	59.0	19.7	4	33.0	40.5	37.5	54.0	9.5	5	23.0	43.6	35.0	88.0	25.7	5	10.0	30.6	33.0	43.0	12.9	5	7	27.79	21	67.5	20.68	7
Pattern																																				
Channel Beltwidth (ft)	12.64	18.78	--	27.37	6.26	3																														
Radius of Curvature (ft)	12.77	19.09	--	27.36	6.11	3																														
Rc:Bankfull width (ft/ft)	NA	NA	--	NA	NA	0																														
Meander Wavelength (ft)	45.11	60.64	--	73.62	11.78	3																														
Meander Width Ratio	NA	NA	--	NA	NA	0																														

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

Additional Reach Parameters																																				
Rosgen Classification	--						NA						NA						NA						NA						NA					
Channel Thalweg length (ft)	855 (Reaches 1-3)						205						202						207						208						209					
Sinuosity (ft)	1.3 (Reaches 1-3)						1.07						1.05						1.08						1.08						1.08					
Water Surface Slope (Channel) (ft/ft)	0.011 (Reaches 1-3)						0.01						0.01						0.008						0.05						0.04					
BF slope (ft/ft)	--						0.012						0.016						0.017						0.012						0.009					
[3]Ri% / Ru% / P% / G% / S%	NA	NA	NA	NA	NA		12	24	64	0	0		29	10	61	0	0		21	10	69	0	0		23	10	67	0	0		12	5	74	9	0	
[3]SC% / Sa% / G% / C% / B% / Be%													NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
[3]d16 / d35 / d50 / d84 / d95 /													NA	NA	NA	NA	NA		NA	NA	NA	NA	NA		NA	NA	NA	NA	NA		NA	NA	NA	NA	NA	
[2]% of Reach with Eroding Banks	NA						0.0						0.0						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

Table 11.4. Monitoring Data - Stream Reach Data Summary
Stillhouse Creek (NCEEP# 363) - Reach 4 (355 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	NA	NA	NA	NA	NA	0	12.4	12.4	12.4	12.4	NA	1	14.7	14.7	14.7	14.7	NA	1	15.3	15.3	15.3	15.3	NA	1	14.9	14.9	14.9	14.9	NA	1	14.9	14.9	14.9	14.9	NA	1
Floodprone Width (ft)	NA	NA	NA	NA	NA	0	29.3	29.3	29.3	29.3	NA	1	30.6	30.6	30.6	30.6	NA	1	30.7	30.7	30.7	30.7	NA	1	30.3	30.3	30.3	30.3	NA	1	30.3	30.3	30.3	30.3	NA	1
Bankfull Mean Depth (ft)	NA	NA	NA	NA	NA	0	1.1	1.1	1.1	1.1	NA	1	1.0	1.0	1.0	1.0	NA	1	0.9	0.9	0.9	0.9	NA	1	0.9	0.9	0.9	0.9	NA	1	0.9	0.9	0.9	0.9	NA	1
[1]Bankfull Max Depth (ft)	NA	NA	NA	NA	NA	0	2.1	2.1	2.1	2.1	NA	1	2.2	2.2	2.2	2.2	NA	1	2.2	2.2	2.2	2.2	NA	1	2.1	2.1	2.1	2.1	NA	1	2.1	2.1	2.1	2.1	NA	1
Bankfull Cross Sectional Area (ft^2)	NA	NA	NA	NA	NA	0	13.2	13.2	13.2	13.2	NA	1	14.5	14.5	14.5	14.5	NA	1	15.3	15.3	15.3	15.3	NA	1	13.7	13.7	13.7	13.7	NA	1	13.7	13.7	13.7	13.7	NA	1
Width/Depth Ratio	NA	NA	NA	NA	NA	0	11.8	11.8	11.8	11.8	NA	1	14.9	14.9	14.9	14.9	NA	1	16.3	16.3	16.3	16.3	NA	1	16.1	16.1	16.1	16.1	NA	1	16.1	16.1	16.1	16.1	NA	1
Entrenchment Ratio	NA	NA	NA	NA	NA	0	2.4	2.4	2.4	2.4	NA	1	2.0	2.0	2.0	2.0	NA	1	1.9	1.9	1.9	1.9	NA	1	2.1	2.1	2.1	2.1	NA	1	2.1	2.1	2.1	2.1	NA	1
[1]Bank Height Ratio	NA	NA	NA	NA	NA	0	1.0	1.0	1.0	1.0	NA	1	1.0	1.0	1.0	1.0	NA	1	1.0	1.0	1.0	1.0	NA	1	1.0	1.0	1.0	1.0	NA	1	1.0	1.0	1.0	1.0	NA	1
Profile																																				
Riffle Length (ft)	7.7	15.9	14.3	28.4	7.6	5	6.0	21.0	20.0	44.0	14.5	5	6.0	20.4	19.0	44.0	12.7	7	8.0	30.4	24.0	59.0	21.1	5	13	25.75	23	44	13.67	4	9.5	14.8	15	20.5	4.04	5
Riffle Slope (ft/ft)	0.017	0.034	0.021	0.081	0.027	5	0.00	0.03	0.03	0.06	0.02	5	0.022	0.041	0.04	0.09	0.02	7	0.00	0.01	0.01	0.03	0.02	5	0.021	0.037	0.038	0.053	0.013	4	0.008	0.044	0.05	0.065	0.022	5
Pool Length (ft)	9.1	25.7	27.8	36.4	9.7	8	21.0	31.9	35.0	47.0	9.6	7	6.0	19.1	20.0	29.0	7.2	9	8.0	21.9	24.0	35.0	9.1	7	11	33	32	58	15.29	7	11	23.89	21	43.5	12.49	9
Pool Max depth (ft)	1.9	2.4	2.4	2.9	0.4	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2.1	2.7	2.9	3.0	0.4	5	2.0	2.8	2.7	3.6	0.6	9
Pool Spacing (ft)	19.4	45.4	50.6	61.1	16.6	7	30.0	49.5	44.5	72.0	17.9	6	8.0	36.7	35.0	66.0	16.6	8	5.0	33.6	34.0	71.0	23.2	6	32	50.33	48	72	17.45	6	7	40.88	37.75	72.5	20.75	8
Pattern																																				
Channel Beltwidth (ft)	18.38	25.32	--	37.74	7.54	4																														
Radius of Curvature (ft)	27.8	41.72	--	49.7	8.96	4																														
Rc:Bankfull width (ft/ft)	--	--	--	--	--	--																														
Meander Wavelength (ft)	105.6	143.6	--	178.9	31.28	4																														
Meander Width Ratio			--		--	--																														

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

Additional Reach Parameters																																				
Rosgen Classification	--						B4						B4						B4						B4						B4					
Channel Thalweg length (ft)	355						363						359						359						357						360					
Sinuosity (ft)	1.08						1.11						1.09						1.09						1.09						1.1					
Water Surface Slope (Channel) (ft/ft)	0.02						0.023						0.023						0.017						0.03						0.04					
BF slope (ft/ft)	--						0.023						0.023						0.019						0.015						0.021					
[3]Ri% / Ru% / P% / G% / S%	--	--	--	--	--		30	0	70	0	3		40	0	60	0	3		42	0	58	0	3		29	0	71	0	3		24	0	71	3	3	
[3]SC% / Sa% / G% / C% / B% / Be%													35	15	40	4	0	6	33	8	40	16	3	0	12	16	64	6	2	0	19	16	48	15	2	0
[3]d16 / d35 / d50 / d84 / d95 /													0.04	5.48	12.8	1066	2048		0.03	0.53	16.7	78.4	131		0.41	3.16	8.57	43.8	113		0.245	4.34	15.98	64.91	141	
[2]% of Reach with Eroding Banks	NA						0.0						0.0						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

Appendix E. Hydrologic Data

Table 12.0 Verification of Bankfull Events

Table 12. Verification of Bankfull Events Stillhouse Creek Stream Restoration - EEP Project #363			
Date of Data Collection	**Date of Occurrence (mm/dd/yy)**	**Method**	**Photo (if available)**
14 June 2007	Unknown	On-site high water indicators	NA
7 October 2007	None	Crest gauge	NA
27 November 2007	24-27 October 2007 (4.47”)	Crest gauge	NA
1 May 2008	4 March 2008 (2.00”)	Crest gauge	NA
26 August 2008	5 July 2008 (2.39”)	Crest gauge	NA
6 March 2009	August 28 (4.82”), September 6 (3.98”), and September 26 (2.18”) December 12, 2008 (2.43”) or March 1-2, 2009 (1.33”)	Crest gauge	NA
12 August 2009	6 June 2009 (2.39”), 10 June 2009 (1.31”), or 1 August 2009 (1.38”)	Crest gauge	NA
16 March 2010	11-13 November 2009 (5.21”), 19 December 2009 (1.62”), 26 December 2009 (1.34”), 6 February 2010 (2.01”)	Crest gauge; On-site high water indicators	NA
14 July 2010	29 May 2010 (1.19”)	Crest gauge; On-site high water indicators	

17 March 2011	September 27, 2010 (1.01”), October 14, 2010 (1.13”)	Crest gauge; On-site high water indicators	NA
19 July 2011	April 9, 2011 (1.05”); May 27, 2011 (2.69”)	Crest gauge; On-site high water indicators	NA