CROSS CREEK STREAM RESTORATION
MONITORING REPORT (YEAR 5 OF 5)

Cumberland County, North Carolina
EEP Project No. 105

Prepared for:
North Carolina Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

Status of Plan: Final
Submission Date: November 2010

Monitoring Firm:

Stantec Consulting Services, Inc.
801 Jones Franklin Road, Suite 300
Raleigh, NC 27606

Table of Contents

Project Condition and Monitoring Data Appendices

1.0 Executive Summary

Project goals and objectives for the Cross Creek and Little Cross Creek Stream Restoration are to:

- Provide a stable stream channel that neither aggrades nor degrades while maintaining its dimension, pattern, and profile with the capacity to transport its watershed's water and sediment load.
- Provide the stream with a floodplain at the stream's current elevation.
- Improve aquatic habitat with the use of natural material stabilization structures such as root wads, rock vanes, woody debris and a riparian buffer.
- Provide wildlife habitat and bank stability through the creation of a riparian zone.

Year 5 vegetation monitoring was completed on September 9 and 15, 2010 at eight monitoring plots that were originally established by Earth Tech. Level 2 (planted and natural stems) of the Carolina Vegetation Survey (CVS) – NCEEP protocol (version 4.2) protocol was used. The floodplain adjacent to the right banks, mainly in the middle of the floodplain, of Little Cross Creek and Cross Creek below the confluence were bush hogged during MY3. These areas were replanted during MY4. Additional replanting along the left bank of Little Cross Creek and the right bank of Cross Creek below the confluence occurred in the spring of 2010. All plots meet year 5 vegetative success criteria of >260 trees/acre. The site also received invasive species control during the summer of 2010. Much of the kudzu was sprayed and was dead, although in a few areas it appeared to be resprouting. This should not be a major problem as a follow up treatment is scheduled for the 2011 growing season. The Japanese knotweed seemed to be eliminated from the area around the stormwater BMPs but is still present near VP101. A few princess trees were observed to the east of VP105 but are not shown on the CCPV due to the small extent.

Mid-channel bar formations were observed in Little Cross Creek, indicating that the stream may not possess sufficient capacity at this time. Colonization by beavers in this area in more recent years may be a contributing factor as well. EEP indicated that a wildlife control contractor has been dispatched to remove the beavers from the site. The sotrmwater plunge pool and wetland pond area continued to remain unstable and had contributed bank sediments to the channel below. Cross Creek upstream of the confluence with Little Cross Creek appeared to remain relatively stable with no major changes from last year.

The stormwater plunge pool area and wetland pond were continuing to experience mass bank wasting, causing deposition of sediment into the main channel. The energy associated with the flow from the culvert is too great for the plunge pool as it is currently constructed. As a result of this a scour hole has developed. The wetland pond located on the right bank near station 21+60 is continuing to experience bank erosion. The wetland pond erosion is related to the excess energy associated with the culvert/plunge pool area described above. EEP is establishing a repair contract for this area. Many of the projects structures are not functioning as intended and the project has exhibited some minor bank erosion that manifested earlier in the projects history, but Stantec believes that the restoration is generally stable and other than the stormwater outfall area designated for repair, the stability of the project has generally

improved each monitoring year. The channel has good connection to its floodplain and has good vegetation established.

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 is available from EEP upon request.

2.0 Methodology

2.1 VEGETATION ASSESSMENT

Vegetative sample plots were quantitatively monitored during the first growing season. Eight 100m^2 plots were established throughout the project. In each plot, all four plot corners were permanently located with conduit. Species composition, density, and survival were monitored during Year 0 and Year 1. In addition to these parameters height, diameter, and vigor were monitored in Years 2-5 using the Carolina Vegetation Survey (CVS) methodology Version 2.2.5. Level 2 (planted and natural stems) methodology was utilized.

As per the mitigation plan, the vegetative success criteria are based on the US Army Corps of Engineers Stream Mitigation Guidelines (USACE, 2003). The final vegetative success criteria will be the survival of 260 5-year old planted stems per acre at the end of the year 5 monitoring period. An interim measure of vegetation planting success will be the survival of at least 288 4-year old planted trees per acre at the end of Year 4 of the monitoring period.

The Year 5 stem counts for the eight vegetative monitoring plots are included in Table 7 in Appendix C. Photos of the vegetative monitoring plots are also included in Appendix C.

2.2 STREAM ASSESSMENT

A longitudinal profile survey of the entire length of the project was completed in September 2010. Additional data collected included riffle length, riffle slope, pool length and pool spacing. During the longitudinal survey, additional pattern data was collected including channel beltwidth, radius of curvature, meander wavelength and meander width ratio. Stability was also visually assessed. A total of six permanent cross-sections were characterized. Data collected included, at a minimum, cross-sectional area, bankfull width, bankfull mean depth, bankfull max depth, floodprone width, width to depth ratio, and entrenchment ratio. Stream type was determined in riffle cross-sections only. Success will be measured based on whether the channel features stay within the natural variability of the dimensionless ratios of the reference reaches.

2.3 WETLAND ASSESSMENT

No wetland restoration occurred during the Cross Creek Stream Restoration Project.

3.0 References

Harrelson, C.C., C.L. Rawlins and J.P. Potyondy. 1994. Stream Channel Reference Sites: An Illustrated Guide to Field Technique. United States Department of Agriculture, Fort Collins, CO.

Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation, Version 4.2 (http://cvs.bio.unc.edu/methods.htm)

NCEEP. 2009. Revised Table of Contents for 2009 Monitoring Report Submissions. North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program. Raleigh, NC. Version 1.2.1 June 1, 2009.

Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, CO.

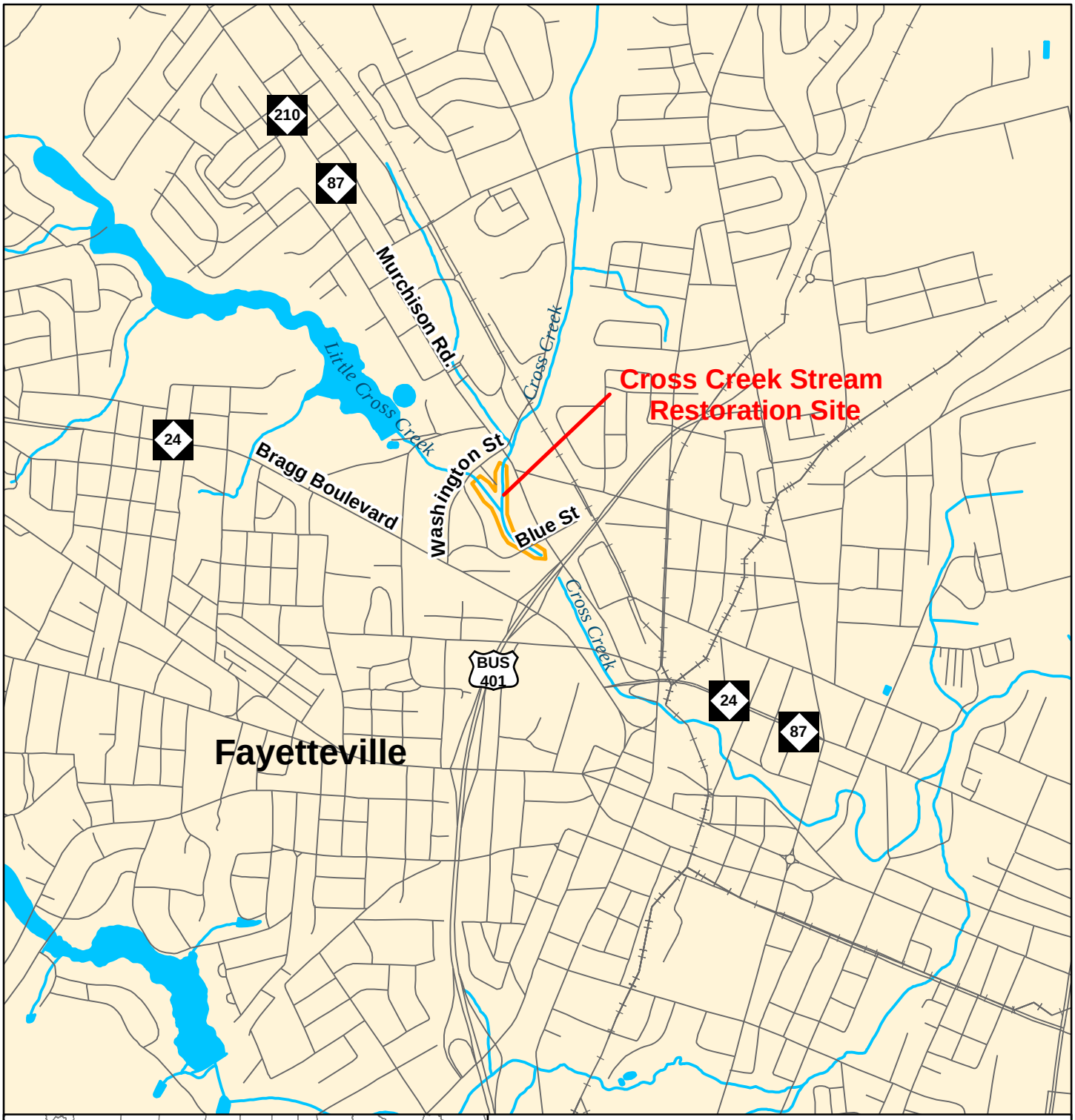
USACE, EPA, NCWRC, NCDWQ. 2003 Stream Mitigation Guidelines

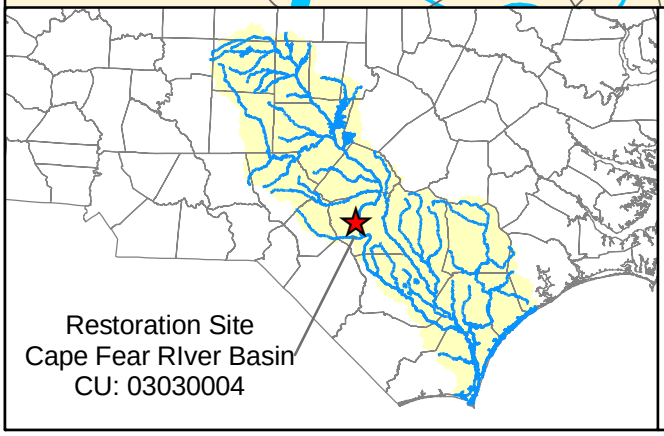
Weakley, Alan S. 2010. Flora of the Southern and Mid-Atlantic States. University of North Carolina Herbarium. Chapel Hill, NC. Working draft of March 8, 2010.

Project Condition and Monitoring Data Appendices

APPENDIX A. GENERAL FIGURES AND PLAN VIEWS

This page blank intentionally left blank.





Roads
Railroads
Hydrography
City of Fayetteville
Cross Creek
35.066207N, 78.892009W

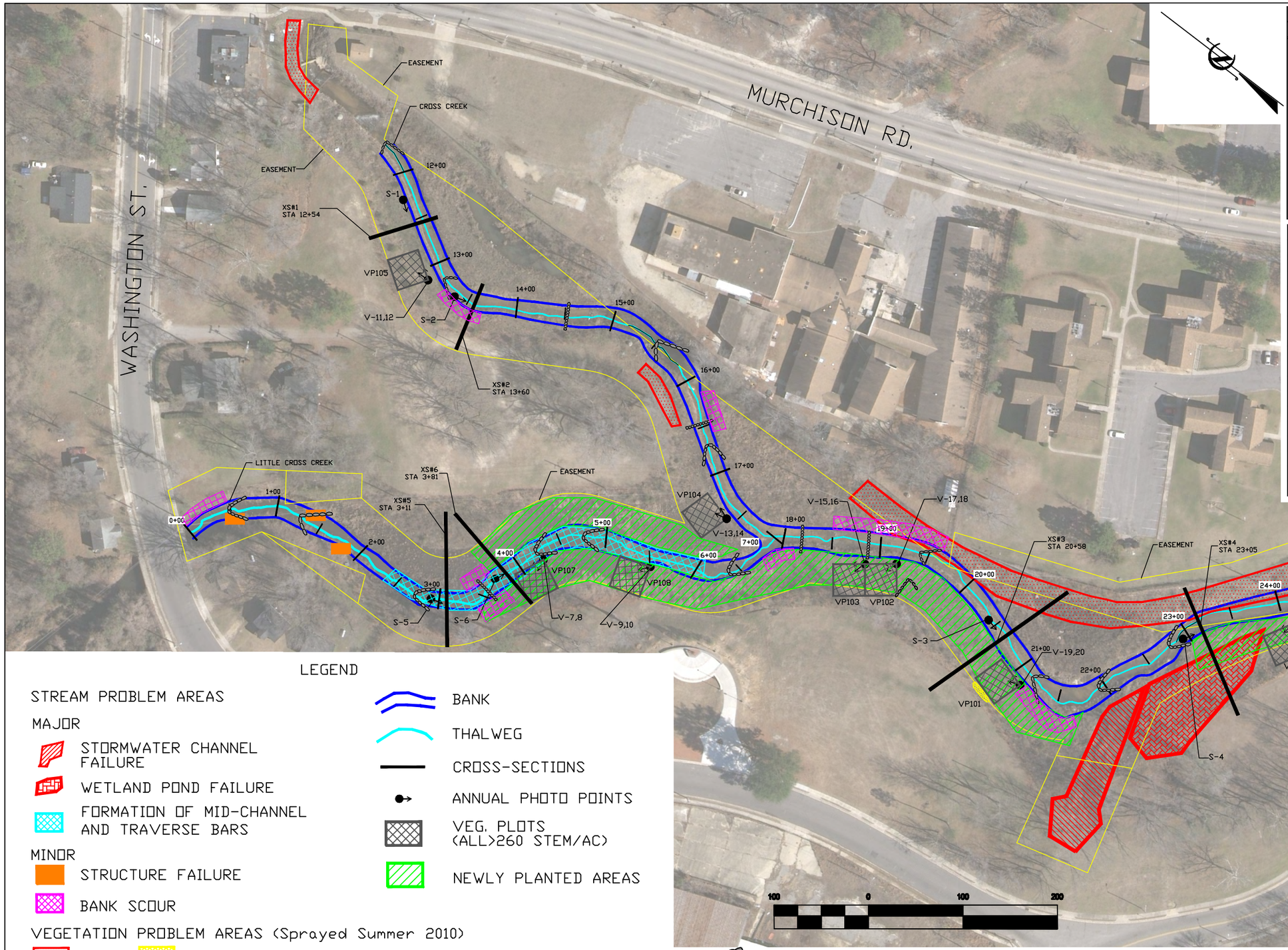
Directions: From Raleigh, take I-40 East to I-95 South. Take I-95 South to NC 24 (Exit 52). Take NC 24 West to Bragg Blvd. Turn right on Bragg Blvd and then right on Blue St. Project is located on Blue St.

Figure 1-Vicinity Map

Cross Creek Stream Restoration Site
NCEEP Project # 105
Cumberland County, NC
Monitoring Year 5

0 1,000 2,000 Feet

Ecosystem Enhancement
Stantec



CROSS SECTION PIN COORDINATES		
pin	Long	Lat
xs1lpin	-78.891863	35.067308
xs1rpin	-78.891863	35.06738
xs2lpin	-78.891903	35.067097
xs2rpin	-78.892061	35.067059
xs3lpin	-78.891713	35.065326
xs3rpin	-78.891837	35.065356
xs4lpin	-78.891283	35.064961
xs4rpin	-78.891351	35.064861
xs5lpin	-78.892872	35.066592
xs5rpin	-78.89273	35.066675
xs6lpin	-78.892642	35.066454
xs6rpin	-78.892593	35.066617

VEG PLOT PIN COORDINATES		
Plot	Long	Lat
V101-1	-78.891839	35.065273
V101-2	-78.891942	35.065352
V102-1	-78.891842	35.06573
V102-2	-78.89199	35.065747
V103-1	-78.891908	35.0658
V103-2	-78.892049	35.065808
V104-1	-78.892009	35.066207
V104-2	-78.892083	35.06632
V105-1	-78.891999	35.067242
V105-2	-78.892013	35.067371
V106-1	-78.891299	35.064845
V106-2	-78.891447	35.064824
V107-1	-78.89257	35.066475
V107-2	-78.892703	35.066407
V108-1	-78.892383	35.066258
V108-2	-78.892525	35.066291

LEGEND

STREAM PROBLEM AREAS

MAJOR

- STORMWATER CHANNEL FAILURE
- WETLAND POND FAILURE
- FORMATION OF MID-CHANNEL AND TRAVERSE BARS

MINOR

- STRUCTURE FAILURE
- BANK SCOUR

- BANK
- THALWEG
- CROSS-SECTIONS
- ANNUAL PHOTO POINTS
- VEG. PLOTS (ALL>260 STEM/AC)
- NEWLY PLANTED AREAS

VEGETATION PROBLEM AREAS (Sprayed Summer 2010)

- KUDZU
- JAPANESE KNOTWEED

- Rock J-Hook
- Sill
- Rock Cross Vane

THIS MAP DEPICTS MY5 CONDITIONS AS OF 9/16/2010.
2008 CUMBERLAND COUNTY AERIAL PHOTO FROM WWW.NCONEMAP.COM

NO	REVISIONS	DRN	CWG	CHK	ALC	DATE
1	CURRENT CONDITION PLAN VIEW – MY5					11/12/2010

Stantec

CROSS CREEK STREAM RESTORATION
EEP PROJECT NUMBER 105
MONITORING REPORT – MY5
CURRENT CONDITION PLAN VIEW

CROSS CREEK STREAM RESTORATION SITE
CUMBERLAND COUNTY, NORTH CAROLINA

NORTH CAROLINA ECOSYSTEM ENHANCEMENT PROGRAM

DATE	11/12/2010
PROJECT NO.	171300316
FILENAME	CROSSCREEK.dwg
SHEET NO.	
DRAWING NO.	

APPENDIX B. GENERAL PROJECT TABLES

Table 1. Project Restoration Components
Cross Creek Stream Restoration - EEP Project No. 105

Reach ID	Existing Feet/Acres	Type	Approach	Footage or Acreage	Creditable Footage	Stationing	Comment
Cross Creek	1295	R	P2	1376.0	1188.0	11+4.00 to 25+16.58	Instream structures and vegetated buffers. The difference between footage and creditable footage is due to three areas of single-sided easement, totaling 188 linear feet of the stream.
Little Cross Creek	705	R	P2	714.0	714.0	10+00 to 17+13.687	Instream structures and vegetated buffers.
Mitigation Unit Summations							
Stream (lf)	Riparian Wetland (ac)		Nonriparian Wetland (ac)	Buffer (ac)			Comment
2090.0	0.0		0.0	0.0			

R = Restoration
P2 = Priority 2

Table 2. Project Activity and Reporting History
Cross Creek Stream Restoration - EEP Project No. 105

Activity or Report	Data Collection Complete	Actual Completion or Delivery
Restoration Plan	2002	Oct 2002
Final Design - 90%	NA	2004
Construction	2004	Jan 2005
Temporary S&E mix applied to entire project area	2004	2004
Permanent seed mix applied to entire project area	2004	2004
Containerized and B&B plantings	Jan 2005	Jan 2005
Mitigation Plan / As-built (Year 0 Monitoring - baseline)	Apr 2006	Jul 2006
Year 1 Monitoring	Nov 2006	Dec 2006
Year 2 Monitoring	Oct 2007	Dec 2007
Year 3 Monitoring	Oct 2008	Nov 2008
Supplementary Planting (Specimen Trees)	NA	Summer 2009
Invasive Species Control	NA	Summer 2009
Year 4 Monitoring	Sept 2009	Nov 2009
Supplementary Planting	NA	March 2010
Invasive Species Control	NA	Summer 2010
Year 5 Monitoring	Sept 2010	Nov 2010

Table 3. Contacts Cross Creek Stream Restoration - EEP Project No. 105	
Designer Primary project design POC	*Earth Tech* 701 Corporate Center Drive, Suite 475 Raleigh, NC 27607 Bill Jenkins, PE (919) 854-6200
Construction Contractor Construction contractor POC	*Backwater Environmental* 2312 New Bern Ave. Raleigh, NC 27610 Wes Newell (919)231-9227
Planting Contractor Planting Contractor POC	*Carolina Silvics, Inc.* 908 Indian Trail Road Edenton, NC 27932 Mary-Margaret McKinney (252)482-8491
Seeding Contractor Seeding Contractor POC	*Backwater Environmental* 2312 New Bern Ave. Raleigh, NC 27610 Wes Newell (919)231-9227
Seed Mix Sources	*Ernst Conservation Seeds* 9006 Mercer Pike Meadville, PA 16335 Stacy Charles (814)336-2404
Nursery Stock Suppliers	*Coastal Plain Conservation Nursery* (container plants) 3067 Conners Drive Edenton, NC 27932 Ellen Colodney (252)482-5707 *Cure Nursery* (container plants) 880 Buteo Road Pittsboro, NC 27312 Jennifer Cure (919)542-6186 *Taylor's Nursery* 3705 New Bern Avenue Raleigh, NC 27610 Richard Taylor (919)231-6161 *International Paper* 55594 Hwy38 S Blenheim, SC 29516 Gary Nelson (1-800-222-1290)
Monitoring Performers (Year 0-1)	*Earth Tech* 701 Corporate Center Drive, Suite 475 Raleigh, NC 27607
Monitoring POC	Ron Johnson (919)854-6210
Monitoring Performers (Year 2-4)	*Stantec Consulting Services, Inc.* 801 Jones Franklin Road, Ste 300 Raleigh, NC 27606
Stream Monitoring POC Vegetation Monitoring POC Wetland Monitoring POC	Nate Jean (919)851-6866 Amber Coleman (919)851-6866 NA

Table 4. Project Background Table Cross Creek Stream Restoration - EEP Project No. 105	
Project County	Cumberland
Hydrologic Unit Code	03030004100050
Drainage Area	
Cross Creek	10.5/25.5 sq mi
Drainage impervious cover estimate (%)	71%
Stream Order	
Cross Creek/Little Cross Creek	2nd/1st
Physiographic Region	Sandhills/Coastal Plain
Ecoregion	Atlantic Southern Loam Plains
Rosgen Classification of As-built	C
Cowardin Classification	Riverine
Dominant soil types	Chewacla loam Rion fine sandy loam
Reference site ID	Country Club Branch and Little Rockfish Creek
USGS HUC for Project	03030004
USGS HUC for Reference	03030004
NCDWQ Subbasin for Project	03-06-15
NCDWQ Subbasin for Reference	03-07-01
NCDWQ Classification for Project	Cross Creek (C), Little Cross Creek (C)
NCDWQ Classification for Reference	UT Cross Creek (Country Club Branch, C), Little Rockfish Creek C
Any portion of any project segment 303d listed?	Yes
Any portion of any project segment upstream of a 303d listed segment?	Yes
Reasons for 303d listing or stressor	Imparied Biological Activity, fecal coliform
% of project easement fenced	0%

This page intentionally left blank.

Appendix C. Vegetation Assessment Data

Table 5 - Vegetation Plot Mitigation Success Summary		
Cross Creek Stream Restoration - EEP Project Number 105		
Vegetation Plot ID	**Vegetation Density Met (260 stems/acre)**	**Tract Mean**
VP101	Y (607)	100% (536 stems/acre)
VP102	Y (1012)	
VP103	Y (486)	
VP104	Y (486)	
VP105	Y (688)	
VP106	Y (405)	
VP107	Y (283)	
VP108	Y (324)	

Vegetation Monitoring Plot Photos

Photo Station 7 - Vegetation Plot 107 looking west (9/9/10).

Photo Station 8 – Vegetation Plot 107 looking southwest (9/9/10)

Photo Station 9 – Vegetation Plot 108 looking northwest (9/15/10)

Photo Station 10 – Vegetation Plot 108 looking west (9/15/10)

Photo Station 11 – Vegetation Plot 105 looking northeast (9/15/10)

Photo Station 12 – Vegetation Plot 105 looking north (9/15/10)

Photo Station 13 – Vegetation Plot 104 looking north (9/15/10)

Photo Station 14 – Vegetation Plot 104 looking northwest (9/15/10)

Photo Station 15 – Vegetation Plot 103 looking northwest (9/9/10)

Photo Station 16 – Vegetation Plot 103 looking west (9/9/10)

Photo Station 17 – Vegetation Plot 102 looking northwest (9/9/10)

Photo Station 18 – Vegetation Plot 102 looking west (9/9/10)

Photo Station 19 – Vegetation Plot 101 looking north (9/9/10)

Photo Station 20 – Vegetation Plot 101 looking northwest (9/9/10)

Photo Station 21 – Vegetation Plot 106 looking west (9/9/10)

Photo Station 22 – Vegetation Plot 106 looking southwest (9/9/10)

Table 6. Vegetation Metadata	
Cross Creek Stream Restoration - EEP Project No. 105	
Report Prepared By	Alex Baldwin
Date Prepared	11/2/2010 14:07:37 PM
database name	Stantec_CrossCreek2010_A.mdb
database location	U:\171300316\project\3-CrossCreek\site_data\cvs
computer name	BALDWINA
file size	51118080
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	105
project Name	Cross Creek
Description	Stream Restoration in Fayetteville
River Basin	Cape Fear
length(ft)	2090
stream-to-edge width (ft)	100
area (sq m)	
Required Plots (calculated)	
Sampled Plots	8

Project Code 0105. Project Name: Cross Creek

			Current Plot Data (MY5 2010)																								Annual Means											
			0105-01-0101			0105-01-0102			0105-01-0103			0105-01-0104			0105-01-0105			0105-01-0106			0105-01-0107			0105-01-0108			MY5 (2010)			MY4 (2009)			MY3 (2008)			MY2 (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	P-LS	P-all	T	P-LS	P-all	T	P-LS	P-all	T
Acer negundo	boxelder	Tree			1																								1									
Acer rubrum	red maple	Tree						4									2						9						15									
Acer rubrum var. rubrum	red maple	Tree																																				1
Albizia julibrissin	silktree	Shrub Tree																																	6			4
Alnus serrulata	hazel alder	Shrub Tree		1	8		6	7		2	5								1	3			5		3	16		13	44		12	16		14	25		16	23
Aronia arbutifolia	Red Chokeberry	Shrub														3	5			1			1		1	2		4	9		4	5		3	14		4	28
Baccharis	baccharis	Shrub Tree																																	3			
Baccharis halimifolia	eastern baccharis	Shrub Tree												2			4						2						8			4						8
Betula nigra	river birch	Tree						2			7												1						10			4			1			1
Callicarpa americana	American beautyberry	Shrub		2	2		3	3		3	3					1	1											9	9		9	9		9	9		10	10
Carpinus caroliniana	American hornbeam	Shrub Tree																													1	9			6			
Carpinus caroliniana var. ca	Coastal American Horn	Shrub Tree																													2	2		2	2		6	11
Celtis	hackberry																						2						2									
Cercis canadensis var. cana	eastern redbud	Shrub Tree																																2	2		2	3
Clethra alnifolia	coastal sweetpepperbu	Shrub														1	1											1	1		1	1		1	1		3	3
Cornus	dogwood	Shrub Tree																								3			3									
Cupressus	cypress																						2						2									
Fothergilla	witchalder																									1			1									
Fothergilla gardenii	dwarf witchalder	Shrub																							1	1		1	1		1	1		2	2		2	2
Fraxinus pennsylvanica	green ash	Tree		2	2								1	1					1	1								4	4		3	3		5	5		6	6
Ilex decidua	possumhaw	Shrub Tree																													1	2		1	1			
Ilex decidua var. decidua	Possum-haw	Shrub Tree		1	1		3	3		3	3		2	2														9	9		9	9		7	7		9	9
Ilex glabra	inkberry	Shrub		1	1																							1	1		1	1		1	1		3	4
Juniperus virginiana	eastern redcedar	Tree															4												4									
Ligustrum sinense	Chinese privet	Shrub Tree												1															1			1						1
Liquidambar styraciflua	sweetgum	Tree			18			18			17						36			26			43			12			170			171			215			223
Liriodendron tulipifera	tuliptree	Tree																		1						2			3			2			1			
Liriodendron tulipifera var.	Tulip-tree, Yellow Popl	Tree																																				8
Mimosa	sensitive plant	Vine Shrub						3			2									5									10			7						
Morella cerifera	wax myrtle	Shrub Tree		1	2		2	2								2	6									2		5	12		5	7		6	6		9	10
Morus rubra	red mulberry	Tree																								1			1									
Nyssa	tupelo	Tree																													1	2						
Nyssa biflora	swamp tupelo	Tree														1	1											1	1									
Nyssa sylvatica	blackgum	Tree					2	2		1	1					2	2					1	1					6	6		6	6		4	4		8	8
Paulownia tomentosa	princesstree	Tree						1																					1		1	1						
Pinus taeda	loblolly pine	Tree									2			2			15												19			36			44			38
Platanus	sycamore	Tree																																	17			
Platanus occidentalis	American sycamore	Tree			15			2			8						10			1			1						37			24			11			
Platanus occidentalis var. o	Sycamore, Plane-tree	Tree																														11						50
Populus heterophylla	swamp cottonwood	Tree					2	2											2	2								4	4		3	3		4	4		4	5
Pyrus	pear	Tree																														11						
Pyrus calleryana	Callery pear	Tree						1									2			2									5						4			
Quercus	oak	Shrub Tree		2	2								5	5								1	1					8	8		9	9		8	8		8	8
Quercus falcata	southern red oak	Tree															1												1			1						
Quercus lyrata	overcup oak	Tree											2	2		2	2		1	1		1	1					6	6		4	4		3	3		4	4
Quercus nigra	water oak	Tree																							1	1		1	1									
Quercus phellos	willow oak	Tree					1	1		2	2		2	2								2	2		2	2		9	9		5	6		5	6		5	5
Quercus shumardii var. shu	Shumard oak	Shrub Tree																																			2	2
Rhus copallinum	flameleaf sumac	Shrub Tree			24			4									14						3			14			59			60			111			
Rhus copallinum var. copall	flameleaf sumac	Shrub Tree																																				80
Salix nigra	black willow	Tree																																				1
Sambucus canadensis	Common Elderberry	Shrub Tree			1														1	1		1	2					2	4		2	2		2	4		1	1
Taxodium distichum	bald cypress	Tree		2	2		4	4											4	4								10	10		10	13		10	12		15	18
Toxicodendron radicans	eastern poison ivy	Shrub Vine												5			6												11			4						
Ulmus alata	winged elm	Tree															2												2									
Ulmus americana	American elm	Tree						3			4												4						11			10			19			
Ulmus americana var. amer	American Elm, White E	Tree		2	2		1	1		1	1											1	1					5	5		5	5		5	5		6	10
Ulmus rubra	slippery elm	Tree			11											3	18									4		3	33									
Unknown		unknown			2									1						1									4		1	6			1		1	2
Viburnum nudum	possumhaw	Shrub Tree		1	1		1	1								2	2											4	4		4	4		4	4		5	5
		Stem count	0	15	95	0	25	64	0	12	55	0	12	23	0	17	134	0	10	49	0	7	81	0	8	61	0	106	562	0	100	472	0	98	564	0	129	592
		size (ares)	1			1			1			1			1			1			1			1			8			8			8			8		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.20			0.20			0.20			0.20		
		Species count	0	10	17	0	10	19	0	6	12	0	5	10	0	9	20	0	6	13	0	6	17	0	5	13	0	21	45	0	24	38	0	21	34	0	22	33
		Stems per ACRE	0	607	3845	0	1012	2590	0	485.6	2226	0	485.6	930.8	0	688	5423	0	404.7	1983	0	283.3	3278	0	323.7	2469	0	536.2	2843	0	505.9	2388	0	495.7	2853	0	652.6	2995

Appendix D. Stream Assessment Data

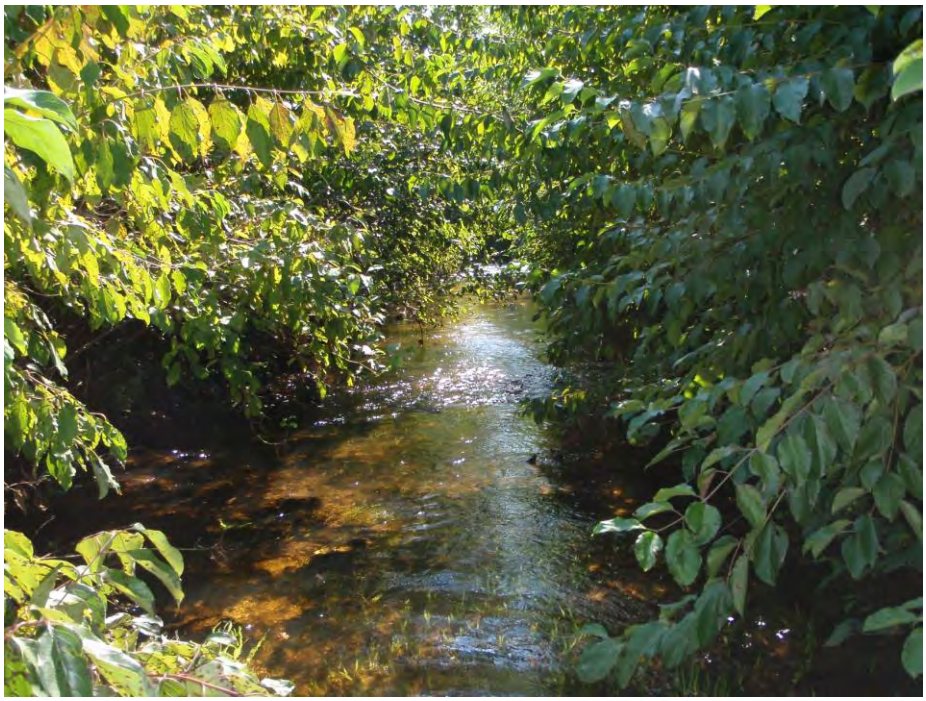


Photo Station 1 – Cross Section 1 looking downstream (9/16/10)

Photo Station 2 – Cross Section 2 looking downstream (9/16/10)

Photo Station 3 – Cross Section 3 looking downstream (9/16/10)

Photo Station 4 – Cross Section 4 looking downstream (9/16/10)

Photo Station 5 – Cross Section 5 looking downstream (9/16/10)

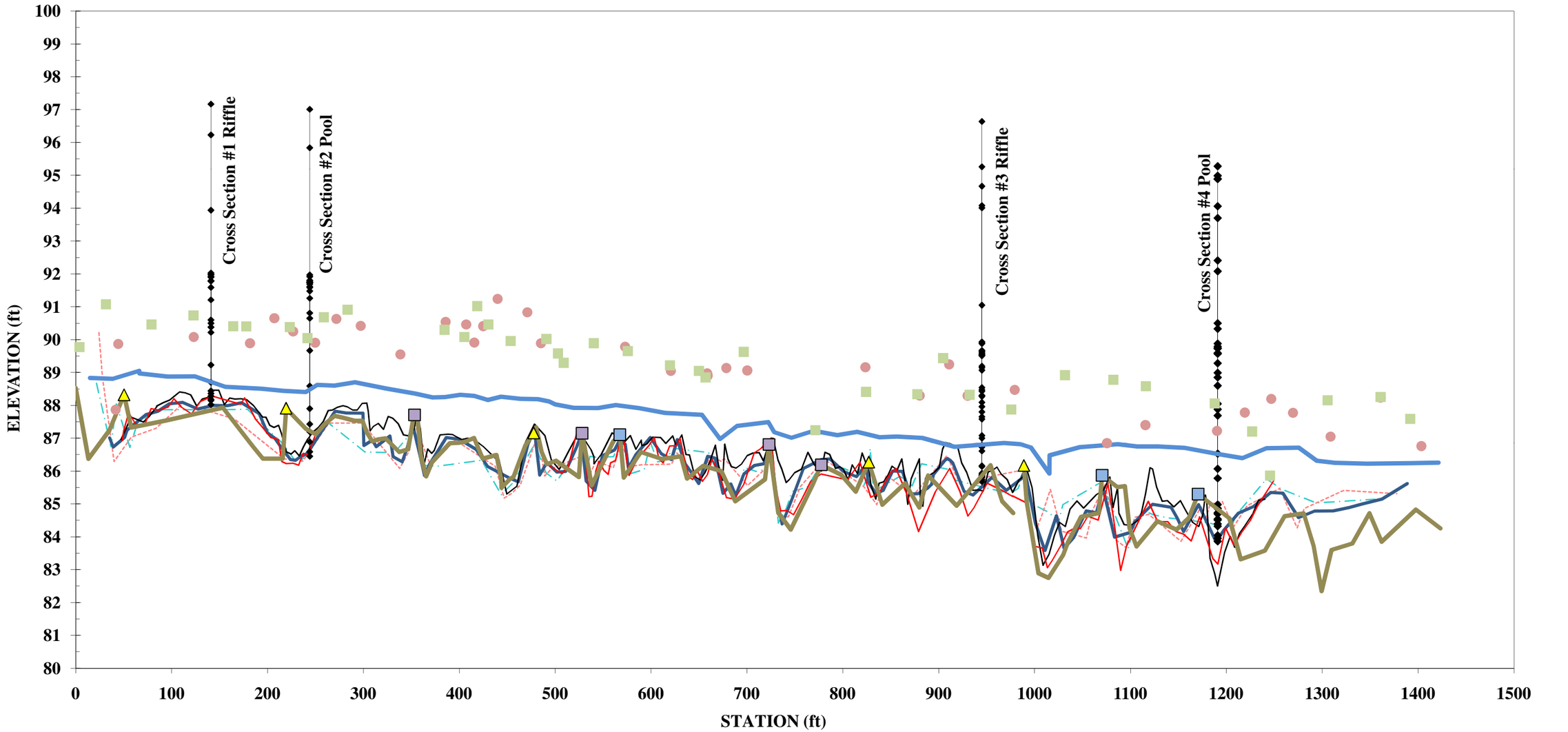
Photo Station 6 – Cross Section 6 looking downstream (9/16/10)

Table 8A - Visual Morphological Stability Assessment Cross Creek Stream Restoration - EEP Project No. 105 (Cross Creek / 1188 feet)						
Feature Category	**Metric (per As-built and reference baselines)**	**(# Stable) Number Performing as Intended**	**Total Number per As-built**	**Total Number/Feet in Unstable State**	**% Perform in Stable Condition**	**Feature Perform. Mean or Total**
A. Riffles	1. Present?	6	8		75%	
	2. Armor stable (eg no displacement?)	N/A	N/A			
	3. Facet grade appears stable?	6	8		75%	
	4. Minimal evidence of embedding/fining?	N/A	N/A			
	5. Length appropiate?	7	8		88%	79%
B. Pools	1. Present? (e.g. not subject to severe aggrad. or migrat.?)	6	8		75%	
	2. Sufficiently deep (Max Pool D:Mean Bkf > 1.6?)	6	8		75%	
	3. Length appropriate?	5	8		63%	71%
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	7	8		88%	
	2. Downstream of meander (glide/inflection) centering?	7	8		88%	88%
D. Meanders	1. Outer bend in state of limited/controlled erosion?	6	8		75%	
	2. Of those eroding, # w/concomitant point bar formation?	1	2		50%	
	3. Apparent Rc within spec?	8	8		100%	
	4. Sufficient floodplain access and relief?	7	8		88%	78%
E. Bed General	1. General channel bed aggradation areas (bar formation)		1400	250	82%	
	2. Channel bed degradation - areas of increasing down-cutting or head-cutting?		1400	200	86%	68%
F. Bank	1. Actively eroding, wasting, or slumping bank?		2800	275	90%	90%
G. Vanes	1. Free of back or arm scour?	7	11		64%	
	2. Height appropriate?	8	11		73%	
	3. Angle and geometry appear appropriate?	6	11		55%	
	4. Free of piping or other structural failures?	9	11		82%	68%
H. Wads/Boulders	1. Free of scour?	0	4		0%	
	2. Footing stable?	N/A	N/A			0%

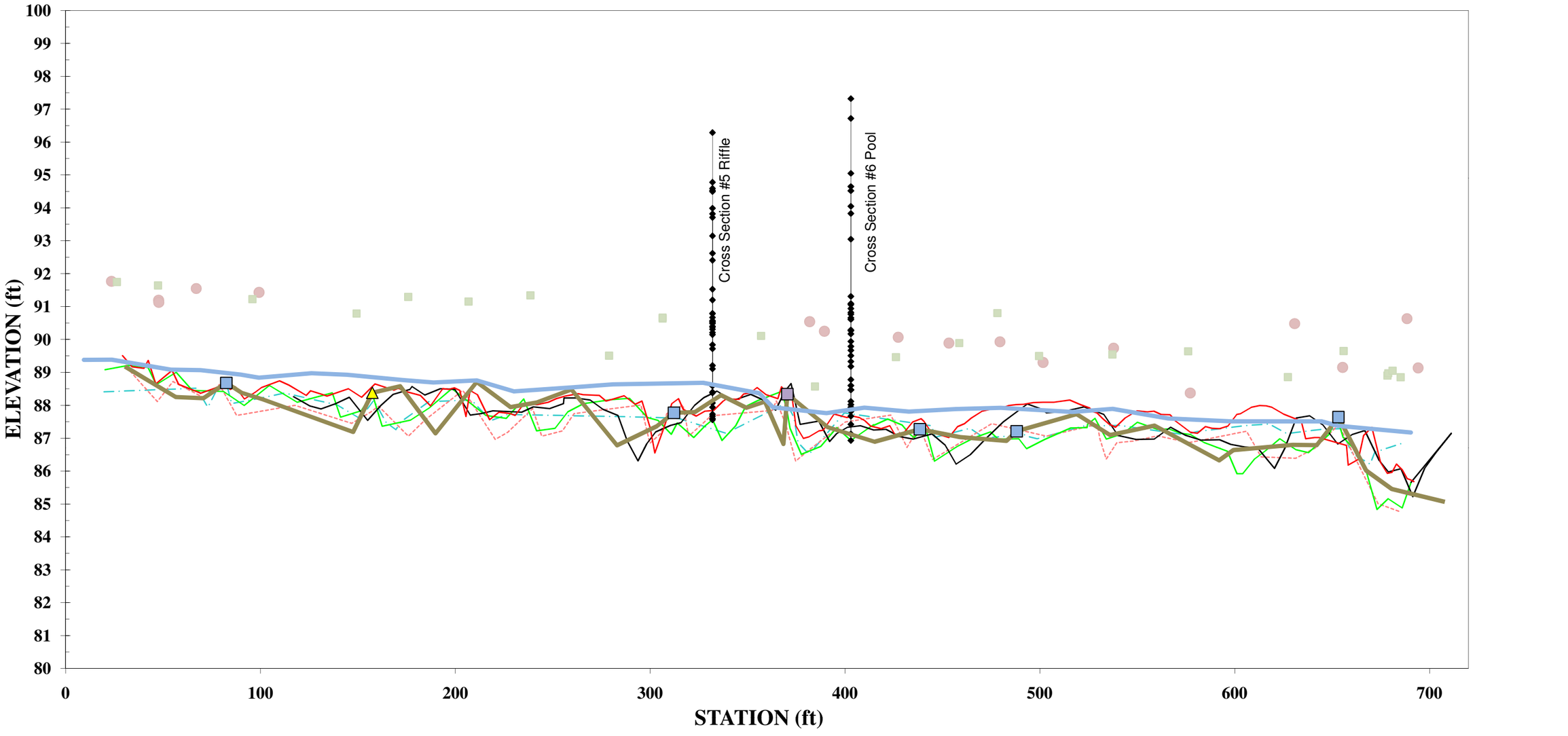
Table 8B - Visual Morphological Stability Assessment Cross Creek Stream Restoration - EEP Project No. 105 (Little Cross Creek / 714 feet)						
Feature Category	**Metric (per As-built and reference baselines)**	**(# Stable) Number Performing as Intended**	**Total Number per As-built**	**Total Number/Feet in Unstable State**	**% Perform in Stable Condition**	**Feature Perform. Mean or Total**
A. Riffles	1. Present?	4	4		100%	
	2. Armor stable (eg no displacement?)	N/A	N/A			
	3. Facet grade appears stable?	4	4		100%	
	4. Minimal evidence of embedding/fining?	N/A	N/A			
	5. Length appropiate?	3	4		75%	92%
B. Pools	1. Present? (e.g. not subject to severe aggrad. or migrat.?)	4	4		100%	
	2. Sufficiently deep (Max Pool D:Mean Bkf > 1.6?)	4	4		100%	
	3. Length appropriate?	3	4		75%	92%
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	4	4		100%	
	2. Downstream of meander (glide/inflection) centering?	4	4		100%	100%
D. Meanders	1. Outer bend in state of limited/controlled erosion?	4	4		100%	
	2. Of those eroding, # w/concomitant point bar formation?	N/A	N/A			
	3. Apparent Rc within spec?	4	4		100%	
	4. Sufficient floodplain access and relief?	4	4		100%	100%
E. Bed General	1. General channel bed aggradation areas (bar formation)		690	330	52%	
	2. Channel bed degradation - areas of increasing down-cutting or head-cutting?		690	50	93%	52%
F. Bank	1. Actively eroding, wasting, or slumping bank?		1380	75	95%	95%
G. Vanes	1. Free of back or arm scour?	4	6		67%	
	2. Height appropriate?	4	6		67%	
	3. Angle and geometry appear appropriate?	4	6		67%	
	4. Free of piping or other structural failures?	4	6		67%	67%
H. Wads/Boulders	1. Free of scour?	2	3		67%	
	2. Footing stable?	N/A	N/A			67%

Table 9 - Verification of Bankfull Events Cross Creek Stream Restoration - EEP Project No. 105			
Date of Data Collection	**Date of Occurrence**	**Method**	**Photo**
2006	None	N/A	N/A
2007	None	N/A	N/A
9/24/2008	9/6/2008	Visual observation of sediment and debris in floodplain	MY3 Report (Appendix B4, Photo 1)
11/19/2009	11/2009	Visual Observation	Evidence of bankfull event.JPG (in digital data submission)
9/1/2010	9/29/2010	Weather Data	No photo available

Reach 1 Longitudinal Profile
Cross Creek Stream Restoration
2010 Monitoring - Year 0, Year 1, Year 2, Year 3, Year 4, Year 5



Reach 2 Longitudinal Profile
Little Cross Creek Stream Restoration
2010 Monitoring - Monitoring Year 0, Year 1, Year 2, Year 3, Year 4, Year 5



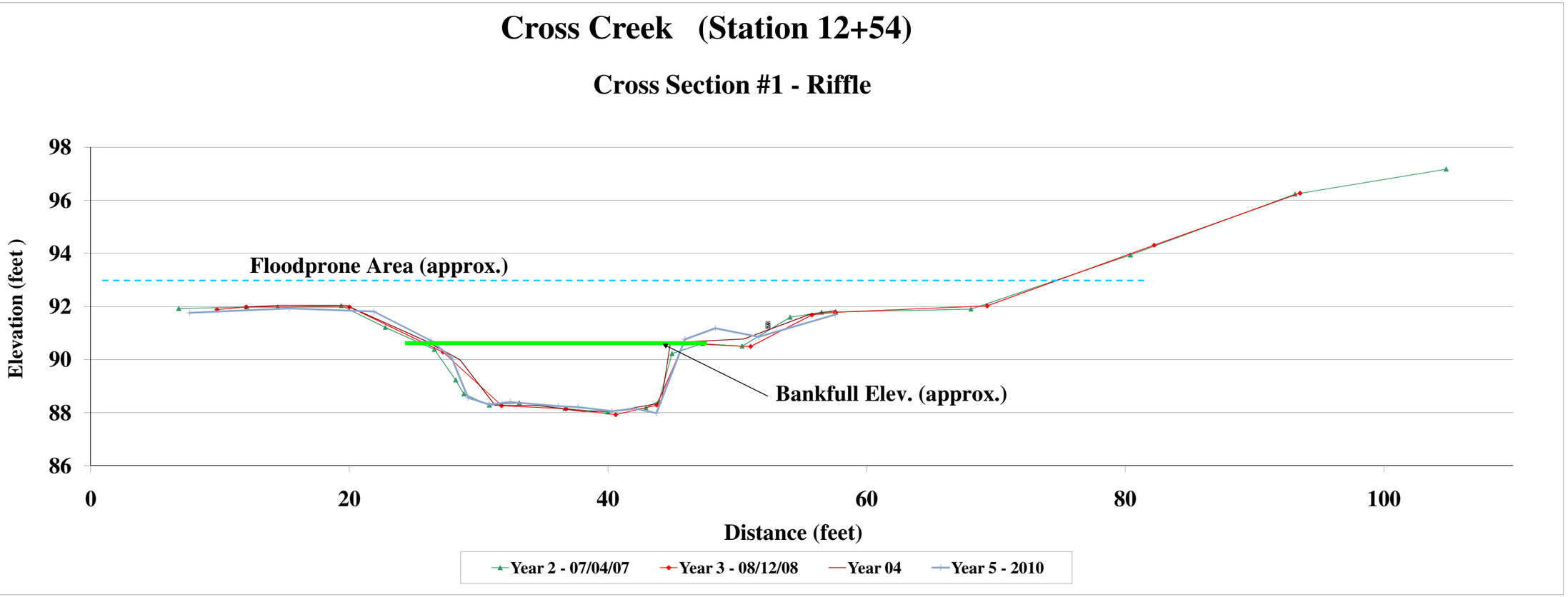
Project Name: Cross Creek **Feature:** Riffle **Date:** Year 5 9/10
Cross Section: Cross Section 1 **Station** 12+54 **Crew:** Geenen, Jean

Year 5 - 2010 2010 Survey			Year 4 - 2009 2009 Survey			Year 3 - 2008 2008 Survey			Year 2 - 2007 2007 Survey			Year 1 - 2006 2006 Survey			AS-BUILT 2005 AS-BUILT Survey		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
7.66	91.76		11.91	91.91		9.78	91.88		6.81	91.92							
15.37	91.927		12.02	91.98		12.02	91.98	Left Pin	12.07	91.98	Left Pin						
21.89	91.808		14.71	92.04		20.01	91.98		14.46	91.98							
26.32	90.709		19.75	92.04		27.25	90.28		19.37	92.03							
27.91	90.068		25.86	90.71		31.78	88.26		22.78	91.21	LBK						
29.18	88.564		28.56	89.99		36.76	88.14		26.58	90.38							
30.8	88.306		31.26	88.27		40.61	87.92		28.22	89.23							
32.45	88.397		34.67	88.26		43.78	88.28		28.85	88.7							
36.16	88.244		38.04	88.04		45.85	90.6	RBK	30.82	88.28							
37.7	88.207		40.62	88.06		51.03	90.49		33.14	88.36							
40.3	88.051		44.11	88.36		55.77	91.68		36.67	88.15							
42.13	88.146		44.83	90.65		57.6	91.78	Right Pin	39.99	88.02							
43.75	87.979		46.97	90.69		69.32	92.02		42.93	88.18							
45.95	90.759	BKF	50.49	90.77		82.23	94.31		43.95	88.44							
48.3	91.174		55.56	91.69		93.51	96.27		44.95	90.22							
51.65	90.857		57.57	91.84					47.31	90.6	RBK						
57.57	91.69								50.36	90.5							
									54.08	91.59							
									56.51	91.78							
									57.59	91.79							
									57.6	91.79	Right Pin						
									68.06	91.9							
									80.39	93.94							
									93.12	96.23							
									104.81	97.17							

Photo of Cross-Section 1 - Reach 1 - Looking Downstream @ STA 12+54

	Year 5 - 2010	Year 4 - 2009	Year 3 - 2008	Year 2 - 2007	Year 1 - 2006	AS-BUILT 2005
Area	42.27	36.59	38.44	39.92	n/a	n/a
Width	19.84	18.54	21.43	21.76	n/a	n/a
Mean Depth	2.13	1.97	1.79	1.84	n/a	n/a
Max Depth	2.78	2.56	2.68	2.58	n/a	n/a
W/D	9.31	9.39	11.95	11.86	n/a	n/a

*Note: The pins for the original cross-sections could not be located, making comparisons with Years 0 and 1 data invalid.



Project Name:	Cross Creek	**Feature:**	Pool	**Date:**	Year 5 09/10
Cross Section:	Cross Section 2	**Station**	13+60	**Crew:**	Geenen, Jean

Year 5 - 2010 2010 Survey			Year 4 - 2009 2009 Survey			Year 3 - 2008 2008 Survey			Year 2 - 2007 2007 Survey			Year 1 - 2006 2006 Survey			AS-BUILT 2005 AS-BUILT Survey		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**
33.39	90.643		5.52	91.65		22.97	91.65		7.4	91.69							
35.93	91.42		12.3	91.72		23.22	91.75	Left Pin	18.02	91.61							
39.79	89.087		18.52	91.72		29.36	90.92		23.27	91.74	Left Pin						
40.96	87.891		23.22	91.75		35.93	91.13		23.36	91.74	LBK						
42.7	87.738		24.6	91.55		39.87	88.01		25.59	91.48							
44.93	87.59		33.08	90.64		42.62	87.22		30.61	90.81							
46.92	87.423		33.58	90.73		46.13	86.89		34.66	90.65							
47.77	87.317		35.14	90.81		49.25	86.47		37.18	89.67							
51.1	86.921		35.79	90.73		53.27	87.14		38.57	88.59							
52.76	86.93		36.68	90.25		54.98	87.96		42.41	87.43							
54.48	87.237		37.51	89.22		56.34	88.88		45.33	86.89							
55.72	88.296		40.37	87.78		57.89	92.00		48.04	86.45							
55.86	88.195		40.87	87.65		57.87	92.00	RBK	50.41	86.59							
56.76	90.187		42.74	87.37		62.99	91.88		53.27	87.2							
57.08	91.43		48.33	86.63		68.90	91.58		55.14	87.9							
			53.07	87.18		72.62	91.71	Right Pin	55.81	91.26							
			55.88	88.38		73.26	91.57		57.39	91.97	RBK						
			57.08	91.4		79.81	94.19		60.01	91.92							
			58.2	91.99		85.45	96.62		64.95	91.8							
			60.11	92.14					68.63	91.59							
			64.58	91.67					72.63	91.74							
			70.2	91.54					72.66	91.74							
			71.16	91.81					72.68	91.75	Right Pin						
			72.84	91.71					73.73	91.79							
			81.35	95.1					83.64	95.84							
			83.36	95.77					88.38	97.01							
			86.63	96.84													

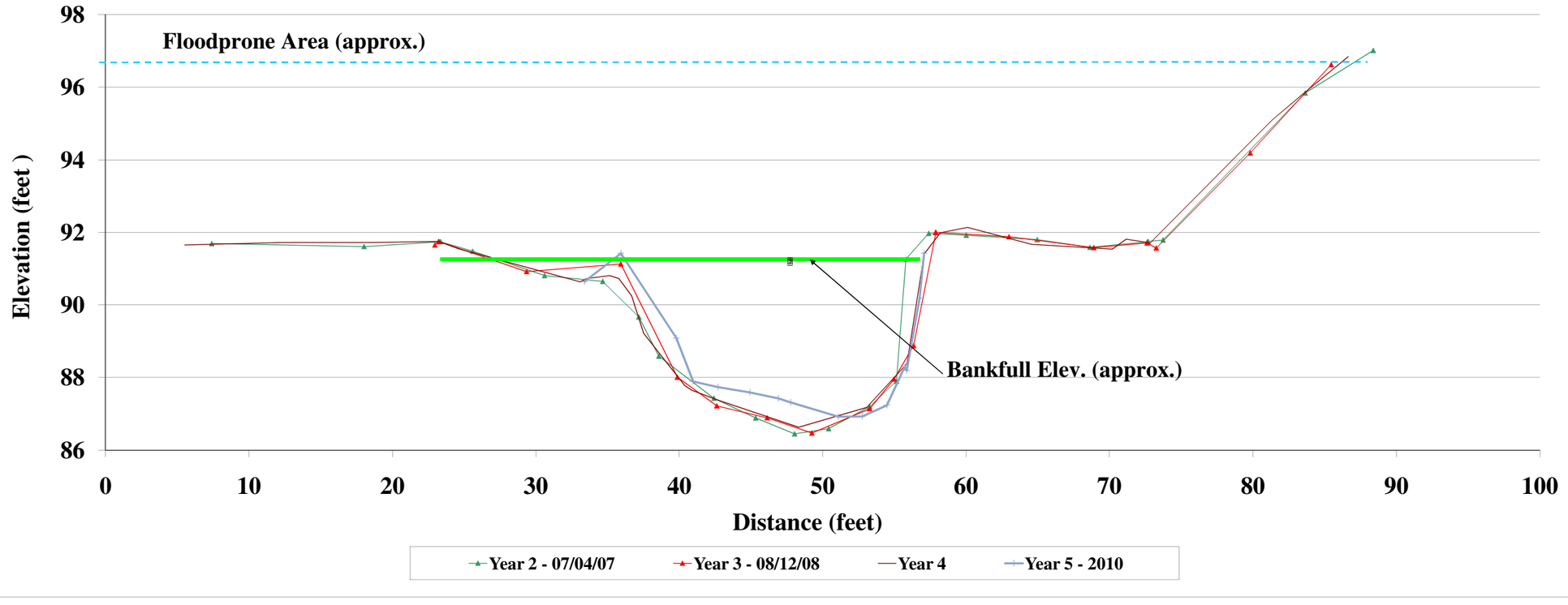
Photo of Cross-Section 2 - Reach 1 - Looking Downstream @ STA 13+60

	Year 5 - 2010	Year 4 - 2009	Year 3 - 2008	Year 2 - 2007	Year 1 - 2006	AS-BUILT 2005
Area	71.22	93.07	92.68	92.18	n/a	n/a
Width	23.69	34.07	33.99	33.44	n/a	n/a
Mean Depth	3.01	2.73	2.73	2.76	n/a	n/a
Max Depth	4.50	5.11	5.27	5.29	n/a	n/a
W/D	7.88	12.47	12.47	12.13	n/a	n/a

*Note: The pins for the original cross-sections could not be located, making comparisons with Years 0 and 1 data invalid.

Cross Creek (Station 13+60)

Cross Section #2 - Pool



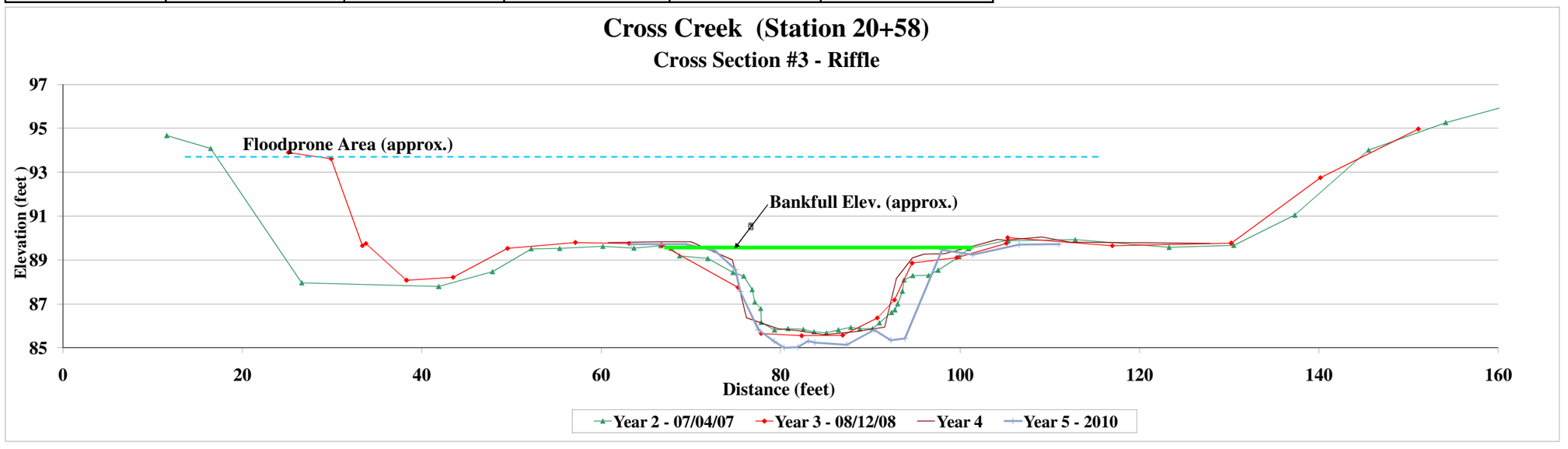
Project Name:	Cross Creek	**Feature:**	Riffle	**Date:**	Year 05 09/10
Cross Section:	Cross Section 3	**Station**	20+58	**Crew:**	Geenen, Jean

Year 5 - 2010 2010 Survey			Year 4 - 2009 2009 Survey			Year 3 - 2008 2008 Survey			Year 2 - 2007 2007 Survey			Year 1 - 2006 2006 Survey			AS-BUILT 2005 AS-BUILT Survey		
Station	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**	**Station**	**Elevation**	**Notes**
63.36	89.726		60.76	89.8		25.13	93.9		11.59	94.67							
69.45	89.72		66.69	89.83		29.9	93.61		16.48	94.08							
72.69	89.426		70.01	89.83		33.38	89.65		26.63	87.96							
74.95	88.572		74.63	89.01		33.77	89.75		41.9	87.80							
75.52	87.572		76.2	86.37		38.3	88.08		47.89	88.47							
77.52	85.822		79.72	85.87		43.49	88.21		52.21	89.51							
79.29	85.295		81.85	85.79		49.57	89.53		55.38	89.53							
80.39	85.006		84.84	85.6		57.13	89.8		60.19	89.62							
81.9	85.031		88.13	85.73		63.11	89.75		63.66	89.54							
83.1	85.311		91.61	85.94		66.69	89.69	Left Pin	66.65	89.65	Left Pin						
83.8	85.236		92.9	88.16		66.83	89.67	LBK	67.78	89.54	LBK						
87.37	85.134		94.69	89.1		75.25	87.75		68.75	89.19							
90.42	85.812		95.99	89.27		77.84	85.65		71.89	89.07							
92.29	85.345		98.28	89.29		82.35	85.55		74.7	88.43							
93.86	85.428		100.69	89.54		86.92	85.57		75.89	88.27							
97.98	89.461		104.04	89.92		90.78	86.36		76.84	87.65							
101.41	89.242		104.17	89.94		92.69	87.18		77.13	87.08							
106.62	89.703	BKF	105	89.9		94.66	88.86		77.79	86.79							
111.04	89.723		109.12	90.05		99.64	89.11		77.85	86.16							
			112.29	89.81		105.17	89.76	RBK	79.33	85.81							
			120.62	89.79		105.31	90.02	Right Pin	80.84	85.88							
			127.88	89.76		116.98	89.65		82.54	85.84							
						130.23	89.77		83.74	85.73							
						140.17	92.75		85.11	85.68							
						151.09	94.97		86.44	85.82							
									87.83	85.93							
									88.83	85.86							
									90.26	85.88							
									91.02	86.14							
									92.37	86.61							
									92.74	86.73							
									93.06	87.00							
									93.59	87.58							
									93.76	88.09							
									94.74	88.29							
									96.49	88.30							
									97.56	88.54							
									99.9	89.15							
									100.98	89.52							
									105.34	89.90	RBK						
									105.39	89.88	Right Pin						
									112.85	89.93							
									123.32	89.58							
									130.51	89.67							
									137.32	91.05							
									145.54	94.01							
									154.14	95.26							
									166.56	96.64							

Photo of Cross-Section 3 - Reach 1- Looking Downstream @ STA 20+58

	Year 5 - 2010	Year 4 - 2009	Year 3 - 2008	Year 2 - 2007	Year 1 - 2006	AS-BUILT 2005
Area	92.00	66.97	75.96	71.91	n/a	n/a
Width	36.90	29.00	35.52	33.47	n/a	n/a
Mean Depth	2.49	2.31	2.14	2.15	n/a	n/a
Max Depth	4.69	3.94	3.99	3.86	n/a	n/a
W/D	14.80	12.55	16.61	15.58	n/a	n/a

*Note: The pins for the original cross-sections could not be located, making comparisons with Years 0 and 1 data invalid.



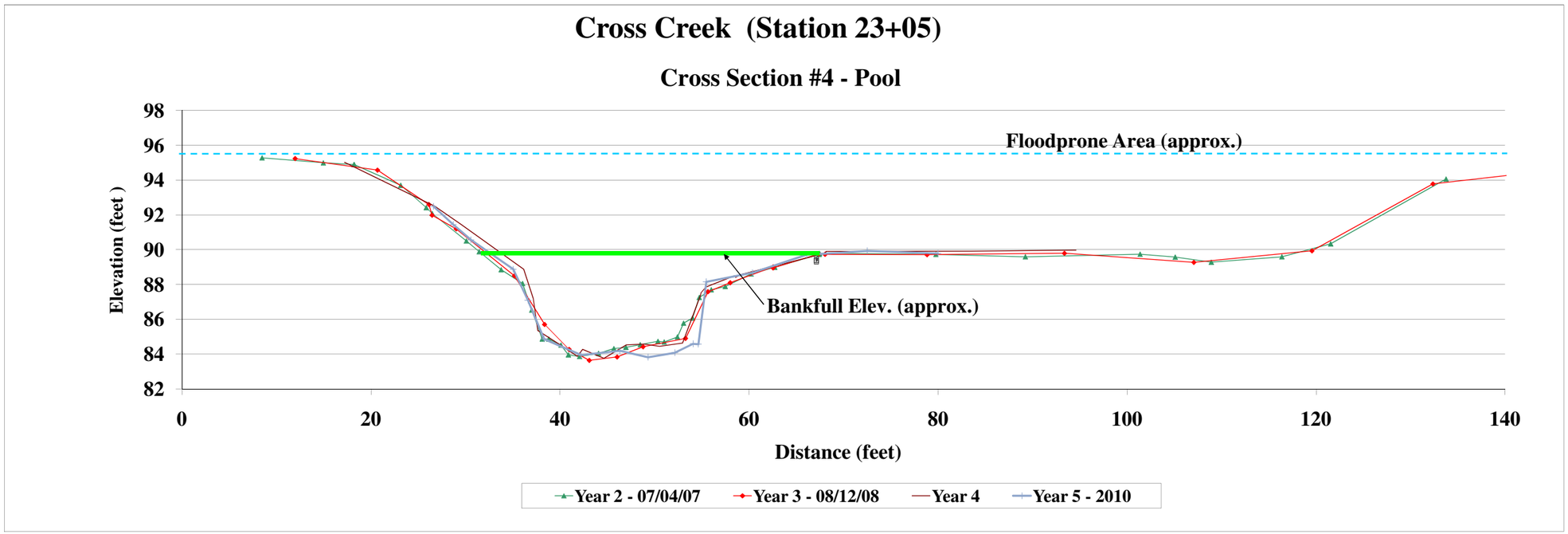
Project Name: Cross Creek **Feature:** Pool **Date:** Year 5 09/10
Cross Section: Cross Section 4 **Station** 23+05 **Crew:** Geenen, Jean

Year 5 - 2010 2010 Survey			Year 4 - 2009 2009 Survey			Year 3 - 2008 2008 Survey			Year 2 - 2007 2007 Survey			Year 1 - 2006 2006 Survey			AS-BUILT 2005 AS-BUILT Survey		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
26.61	92.481		17.2	95.02		11.98	95.23		8.48	95.28							
28.71	91.439		26.75	92.5		20.69	94.57		14.96	94.99							
30.57	90.564		29.51	91.45		26.13	92.59		18.21	94.89							
35.06	88.869		36.16	88.87		26.46	91.98	Left Pin	18.22	94.89							
36.61	87.094		37.17	87.19		29.02	91.19	LBK	23.15	93.70							
38.31	84.868		37.64	85.35		35.17	88.5		25.85	92.41							
42.23	83.939		39.8	84.61		38.37	85.7		26.48	92.08	Left Pin						
46.34	84.191		41.84	83.87		40.96	84.27		30.09	90.50							
49.32	83.816		42.38	84.27		43.09	83.64		31.45	89.88	LBK						
52.15	84.072		44.65	83.75		46.04	83.83		33.77	88.85							
54.09	84.584		47.01	84.53		48.79	84.42		36.04	88.05							
54.64	84.562		48.87	84.57		53.28	84.9		37.01	86.53							
55.47	88.148		50.54	84.44		55.65	87.58		38.12	84.86							
60.37	88.671		52.97	84.63		58.01	88.1		38.81	84.86							
66.08	89.7		54.87	87.4		62.55	89.01		40.1	84.51							
72.52	89.928	BKF	54.92	87.52		62.54	88.95	RBK	40.89	83.95							
79.98	89.78		55.45	87.85		67.38	89.75	Right Pin	42.07	83.86							
			58.41	88.49		68.04	89.73		44.07	84.04							
			58.54	88.5		78.83	89.71		45.7	84.32							
			58.57	88.4		93.37	89.79		46.97	84.39							
			59.04	88.56		107.06	89.27		48.48	84.54							
			68.08	89.79		119.56	89.93		50.36	84.73							
			68.16	89.9		132.35	93.78		51.02	84.69							
			83.53	89.91		141.86	94.36		52.42	84.98							
			94.59	89.97					53.07	85.78							
									54.02	86.07							
									54.73	87.25							
									56	87.69							
									57.48	87.88							
									60.21	88.60							
									62.73	88.99							
									67.41	89.73	RBK						
									67.45	89.79	Right Pin						
									79.77	89.73							
									89.23	89.59							
									101.37	89.74							
									105.08	89.57							
									108.9	89.28							
									116.37	89.59							
									121.53	90.33							
									133.74	94.06							

Photo of Cross-Section 4 - Reach 1 - Looking Downstream @ STA 23+05

	Year 5 - 2010	Year 4 - 2009	Year 3 - 2008	Year 2 - 2007	Year 1 - 2006	AS-BUILT 2005
Area	121.00	106.67	112.61	111.50	n/a	n/a
Width	40.30	33.66	35.33	35.82	n/a	n/a
Mean Depth	3.00	3.17	3.19	3.11	n/a	n/a
Max Depth	6.11	6.03	6.15	5.93	n/a	n/a
W/D	13.42	10.62	11.08	11.51	n/a	n/a

*Note: The pins for the original cross-sections could not be located, making comparisons with Years 0 and 1 data invalid.



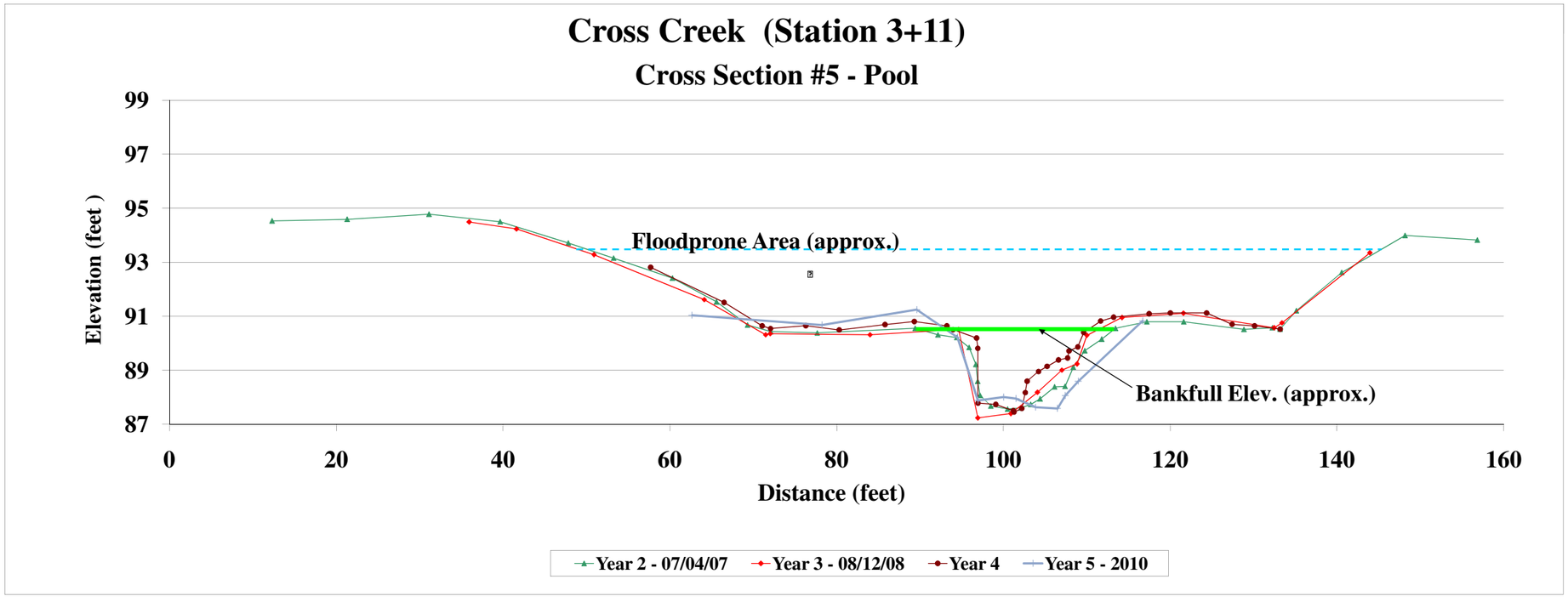
Project Name: Cross Creek **Feature:** Pool **Date:** Year 5 09/10
Cross Section: Cross Section 5 **Station** 3+11 **Crew:** Geenen, Jean

Year 5 - 2010 2010 Survey			Year 4 - 2009 2009 Survey			Year 3 - 2008 2008 Survey			Year 2 - 2007 2007 Survey			Year 1 - 2006 2006 Survey			AS-BUILT 2005 AS-BUILT Survey		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
62.66	91.034		57.7	92.81		35.94	94.49		12.32	94.53							
78.23	90.674		66.51	91.51		41.61	94.23		21.31	94.59							
89.61	91.24		71.07	90.64		50.91	93.28		31.13	94.78							
94.5	90.218		72.07	90.54		64.13	91.61		39.66	94.5							
96.95	87.877		76.3	90.65		71.49	90.31		47.84	93.71							
100.02	88		80.31	90.49		72.04	90.35		53.27	93.15							
101.5	87.946		85.8	90.69		84.01	90.31		60.33	92.41							
103.86	87.627		89.31	90.8		94.62	90.51		65.6	91.53							
106.48	87.581		93.22	90.64		96.94	87.23		69.32	90.67							
107.42	88.057		93.96	90.5		100.9	87.39		72.1	90.43							
108.98	88.59		96.78	90.19		104.09	88.18		77.69	90.38	Left Pin						
116.7	90.823	BKF	96.93	89.81		107.02	89		89.43	90.55							
			96.95	87.78		108.84	89.23		92.16	90.31	LBK						
			99.08	87.73		110.01	90.29		94.42	90.21							
			101.19	87.5		114.23	90.95		95.9	89.84							
			101.27	87.45		121.6	91.11		96.71	89.21							
			102.21	87.58		132.46	90.57		96.92	88.59							
			102.62	88.17		133.41	90.75		97.21	88.07							
			102.85	88.59		143.95	93.35		98.5	87.67							
			104.21	88.95		153.06	94.05		100.51	87.56							
			105.24	89.14					102.1	87.6							
			106.61	89.38					103.28	87.73							
			107.7	89.45					104.4	87.94							
			107.87	89.71					106.14	88.38							
			108.92	89.86					107.4	88.4							
			109.63	90.4					108.39	89.11							
			111.66	90.82					109.77	89.72							
			113.22	90.96					111.8	90.15							
			117.47	91.09					113.45	90.55							
			120.02	91.12					117.21	90.79	RBK						
			124.37	91.12					121.63	90.79							
			127.42	90.7					128.85	90.51							
			130.12	90.64					132.26	90.57							
			133.19	90.52					133.19	90.52	Right Pin						
									135.14	91.2							
									140.57	92.62							
									148.17	93.99							
									156.83	93.82							

Photo of Cross-Section 5 - Reach 2 - Looking Downstream @ STA 3+11

	Year 5 - 2010	Year 4 - 2009	Year 3 - 2008	Year 2 - 2007	Year 1 - 2006	AS-BUILT 2005
Area	49.17	25.87	35.51	35.90	n/a	n/a
Width	25.07	16.65	22.25	23.99	n/a	n/a
Mean Depth	1.96	1.55	1.60	1.50	n/a	n/a
Max Depth	3.30	3.09	3.32	2.99	n/a	n/a
W/D	12.78	10.72	13.95	16.03	n/a	n/a

*Note: The pins for the original cross-sections could not be located, making comparisons with Years 0 and 1 data invalid.



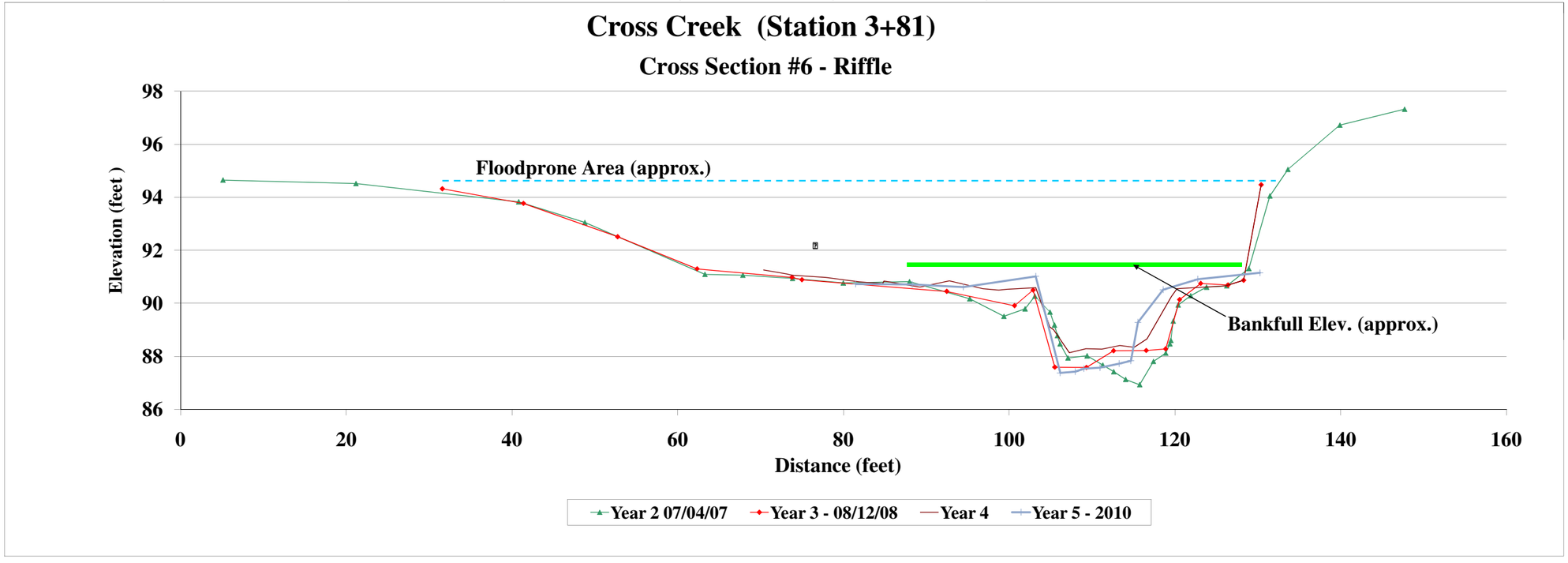
Project Name: Cross Creek **Feature:** Riffle **Date:** Year 5 09/10
Cross Section: Cross Section 6 **Station** 3+81 **Crew:** Geenen, Jean

Year 5 - 2010 2010 Survey			Year 4 - 2009 2009 Survey			Year 3 - 2008 2008 Survey			Year 2 - 2007 2007 Survey			Year 1 - 2006 2006 Survey			AS-BUILT 2005 AS-BUILT Survey		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
81.47	90.72		70.35	91.26		31.59	94.32		5.13	94.65							
88.30	90.72		73.18	91.11		41.38	93.77		21.18	94.52							
94.46	90.61		73.78	91.06		52.74	92.51		40.81	93.83							
103.19	91.02		77.84	90.98		62.33	91.30		48.79	93.05							
106.14	87.38		81.88	90.81		73.78	90.98	Left Pin	63.28	91.09							
107.95	87.43		84.74	90.75		74.98	90.89	LBK	67.86	91.06							
109.01	87.53		84.88	90.84		92.46	90.45		73.84	90.94	Left Pin						
110.95	87.58		89.22	90.61		100.63	89.91		79.97	90.77							
113.26	87.73		92.77	90.85		102.88	90.50		87.96	90.82	LBK						
114.67	87.84		96.80	90.55		105.50	87.59		95.23	90.17							
115.52	89.28		98.71	90.50		109.31	87.58		99.35	89.51							
118.56	90.51		99.67	90.53		112.58	88.21		101.90	89.79							
122.76	90.91		103.19	90.59		116.53	88.22		103.08	90.27							
130.25	91.15		104.43	89.53		118.87	88.28		104.91	89.67							
			104.89	89.11		120.55	90.14		105.45	89.18							
			105.35	89.00		123.10	90.75		105.80	88.78							
			107.24	88.14		126.40	90.69	Right Pin	106.12	88.47							
			109.26	88.29		128.28	90.87	RBK	107.08	87.94							
			111.17	88.27		130.39	94.47		109.38	88.02							
			113.34	88.41					111.28	87.67							
			115.07	88.34					112.60	87.42							
			116.61	88.66					114.04	87.13							
			119.56	90.26					115.73	86.93							
			120.23	90.55					117.39	87.81							
			126.08	90.66					118.87	88.12							
			128.28	90.87					119.37	88.47							
			130.39	94.47					119.49	88.60							
									119.78	89.33							
									120.37	89.94							
									121.88	90.29							
									123.79	90.61							
									126.23	90.66	Right Pin						
									128.90	91.31	RBK						
									131.44	94.05							
									133.61	95.05							
									139.88	96.72							
									147.69	97.32							

Photo of Cross-Section 6 - Reach 2 - Looking Downstream @ STA 3+81

	Year 5 - 2010	Year 4 - 2009	Year 3 - 2008	Year 2 - 2007	Year 1 - 2006	AS-BUILT 2005
Area	37.85	38.48	54.95	59.50	n/a	n/a
Width	36.23	38.86	39.82	38.92	n/a	n/a
Mean Depth	1.04	0.99	1.38	1.53	n/a	n/a
Max Depth	3.30	2.68	3.24	3.88	n/a	n/a
W/D	34.84	39.24	28.85	25.46	n/a	n/a

*Note: The pins for the original cross-sections could not be located, making comparisons with Years 0 and 1 data invalid.



Appendix E - Wetland Assessment

No wetland monitoring has taken place at the Cross Creek Stream Restoration Site.