Mary's Creek (EEP #241)
Restoration Site
2011 Annual Monitoring Report (Year 5)

Alamance County
EEP Project No. 241
Design Firm: Stantec Consulting Services, Inc.

March 2012

Prepared for:

NCDENR/ Ecosystem Enhancement Program
1619 Mail Service Center
Raleigh, NC 27699-1619

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APPENDICES

I. Executive Summary

The Mary's Creek (EEP #241) stream restoration project consists of 2,082 linear feet of stream restoration, and of this length, only 2034 linear feet are counted as the stream restoration assets, which excludes a reserved crossing not within the conservation easement and the cattle crossing. The project is in Alamance County north of Siler City, north of Greensboro Chapel Hill Road (SR 1005) and east of Lindley Mill Road (SR 1003) (Figure 1). Site construction and plantings were completed in March of 2006. The goals and objectives for Mary's Creek (EEP #241) stream restoration are:

- Improving water quality
- Providing wildlife habitat through the creation of a riparian zone
- Improving aquatic habitat with the use of natural material stabilization structures and a riparian buffer
- Excluding cattle from the stream
- Reducing nutrient loads from entering the stream through a filtration buffer
- Increasing the streams access to its floodplain
- Reducing erosion and sedimentation

There are five vegetation monitoring plots within the conservation easement which are all meeting the stem density criteria for total stems with 2894 total stems/acre. The success criterion for total woody stems is 260 stems/acre for Monitoring Year (MY)-05. Post construction only two plots (Plot 4&5) were established. An additional three plots (1, 2, &3) were added during MY-02. Since planted vs. natural stems were indistinguishable, stems, planted or not, were identified as natural stems within the added plots. Three black willow livestakes located within Plot 4, and four black willow livestakes located within Plot 5 were identified as planted stems. Level II of the CVS-EEP protocol was administered for Monitoring Year (MY)-05, which includes planted and natural woody stems. An accurate number of planted stems /acre could not be determined since the planted stems could not be distinguished from natural stems.

Invasive exotics are the only notable vegetation problems areas for MY-05. Tree of heaven (*Ailanthus altissima*) and Chinese privet (*Ligustrum sinense*) have reached levels of concern. Tree of Heaven and Chinese privet are considered a species of "High Concern" according to EEP's invasive plant ranking list. Tree of Heaven is concentrated in patches near southern end of the conservation easement. Chinese privet is scattered throughout with high concentrations occurring between stations 16+00 to 26+00. Areas of low planted stem densities occur in areas near the outer limits of the conservation easement where the invasice exotic, tall fescue (*Schedonurus arundinaceus*), is dominant. These areas were cattle pastures previous to construction. See Current Conditions Plan View (Appendix B). Other invasive exotics observed sparsely scattered within the conservation easement include Gill over the ground (*Glechoma hederacea*), Johnson grass (*Sorghum halapense*), Japanese honeysuckle (*Lonicera japonica*), Japanese stiltgrass (*Microstegium vimineum*), and multiflora rose (*Rosa multiflora*). Tall fescue, Johnson grass, and Japanese stiltgrass are species of "Low/Moderate Concern". Although these species have been given different ranks of severity, the functionality of

the project is not expected to be impaired significantly by these species. For additional information relating to vegetation, see Appendix C.

Overall, the stream banks are stable and well vegetated on Mary's Creek and the unnamed tributary (UT) to Mary's Creek. Neither monitoring reach has notably changed in pattern, profile or dimension as compared to MY-04. The UT and Mary's Creek upstream of the confluence both have large amounts of submerged organic material and woody debris within the channel. This is not affecting the stability of the channel. A woody debris pile is present at station 16+65, Stream Problem Area (SPA) 1. This debris is not causing noticeable backwater or stream stability effects. A large beaver dam was removed at approximate station 24+25 during MY-05. There is still a remnant beaver dam present with a small opening to allow the channel to flow. Debris accumulation is expected to occur at this location in the future. No further beaver activity was observed. The former beaver dam at station 24+25 created substantial impacts upstream to the culvert crossing. The backwater and beaver activity impacted the vegetation of the floodplain and stream banks but vegetation regeneration is evident. The majority of the structures are stable and functioning. The two structures at stations 25+25 and 26+00 still have dislodged boulders that have moved into the center of the channel, however, no bank degradation has occurred in the past two monitoring years. The main channel pebble counts remain stable and consistent comparable to the previous monitoring year data. The tributary pebble count is trending slightly coarser, which is largely due to the absence of the backwater that was a result of the woody debris obstructions, reported in the initial site visit letter.

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

II. Methodology

Methodologies follow the current EEP monitoring report template, Version 1.3 1/15/10, and the version 4.2 of the CVS-EEP protocol for recording vegetation (Lee et al 2008). Photos were taken with a digital camera. A Trimble Geo XT handheld unit with sub-meter accuracy was used to locate stream and vegetation problem areas.

A. Vegetation Methodologies

Level II of the EEP/CVS protocol Version 4.2, which includes natural stems, was used to collect data for MY-05 for five vegetation monitoring plots on August 30, 2011. Data collected for these plots are in Appendix C.

B. Stream Methodologies

Stream profile and cross-sections were surveyed on January 18, 2012 using total station equipment and methods. The survey data was plotted using AutoCAD Civil3D. The longitudinal profile was generated using the MY-02 alignment. Cross sectional data was

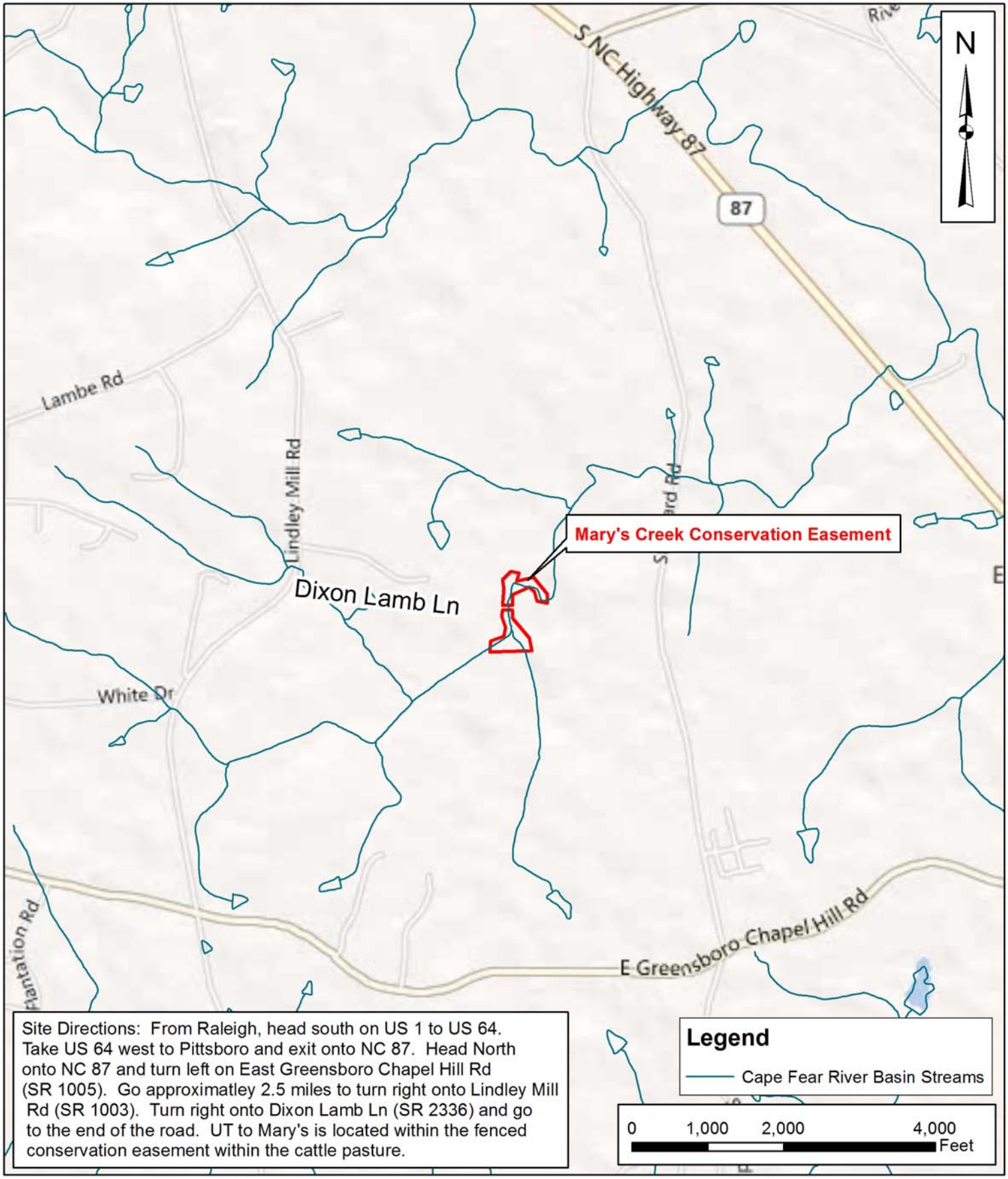
extracted based on a linear alignment between the end pins. Pattern parameters were calculated by measuring the plotted dimensions of the MY-05 surveyed thalweg. Profile parameters were determined through analysis of a Microsoft Excel generated plot of the profile based on the aforementioned baseline alignment.

III. References

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

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

Appendix A. Project Vicinity Map and Background Tables



The Catena Group

Mary's Creek Stream Restoration Site

Site Location Map

Alamance County, North Carolina

Microsoft Virtual Earth Roads Map

EEP Project No. 241

Date: March 2012

Ecosystem Enhancement Program

Figure 1

Table 1a and b. Project Components and Summations

Table 1.a. Project Components Mary's Creek (EEP #241)								
Project Component or Reach ID	**Existing Feet/Acres**	**Restoration Level**	**Approach**	**Footage or Acreage**	**Stationing**	**Buffer Acres**	**BMP Elements[1]**	**Comment**
Mary's Creek	1750	R	P2	1565 lf*	10+00-26+62	5.3	CF=4505 lf	Instream Structure and Vegetated Buffers
UT to Mary's Creek	360	R	P2	469 lf	10+00-14+69	1.5		Instream Structure and Vegetated Buffers

CF = Cattle Fencing; WS = Watering System; CH = Livestock Housing
*Excludes the 68ft reserved crossing length outside of the Conservation Easement and the 30lf culvert within the cattle crossing

Table 1b. Component Summations

Table 1.b. Component Summations Mary's Creek (EEP #241)							
Restoration Level	**Stream (lf)**	**Riparian Wetland (Ac)**		**Non-Riparian (Ac)**	**Upland (Ac)**	**Buffer (Ac)**	**BMP**
		Riverine	**Non-Riverine**				
Restoration	2034						
Enhancement							
Enhancement I							
Enhancement II							
Creation							
Preservation							
HQ Preservation							
		0	0				
Totals	**2034**	**0**		**0**	**0**	**0**	**Count**

Table 2. Project Activity and Reporting History

Mary's Creek (EEP #241)			
Activity or Reporting	**Scheduled Completion**	**Data Collection Complete**	**Actual Completion Date**
Restoration Plan	N/A	-	April 2003
Final Design-90%	N/A	N/A	October 2005
Construction	N/A	N/A	March 2006
Temporary S&E mix applied to entire project area	N/A	N/A	March 2006
Permanent seed mix applied to entire project area	N/A	N/A	March 2006
Bare-Root and Livestake planting	N/A	N/A	March 2006
Mitigation Plan/As-built (Year 0 Monitoring-baseline)	N/A	May 2006	June 2006
Year 1 Monitoring	N/A	February 2007	March 2007
Year 2 Monitoring	N/A	July 2008	December 2008
Year 3 Monitoring	N/A	November 2009	March 2010
Year 4 Monitoring	N/A	January 2011	March 2011
Year 5 Monitoring	N/A	January 2012	March 2012

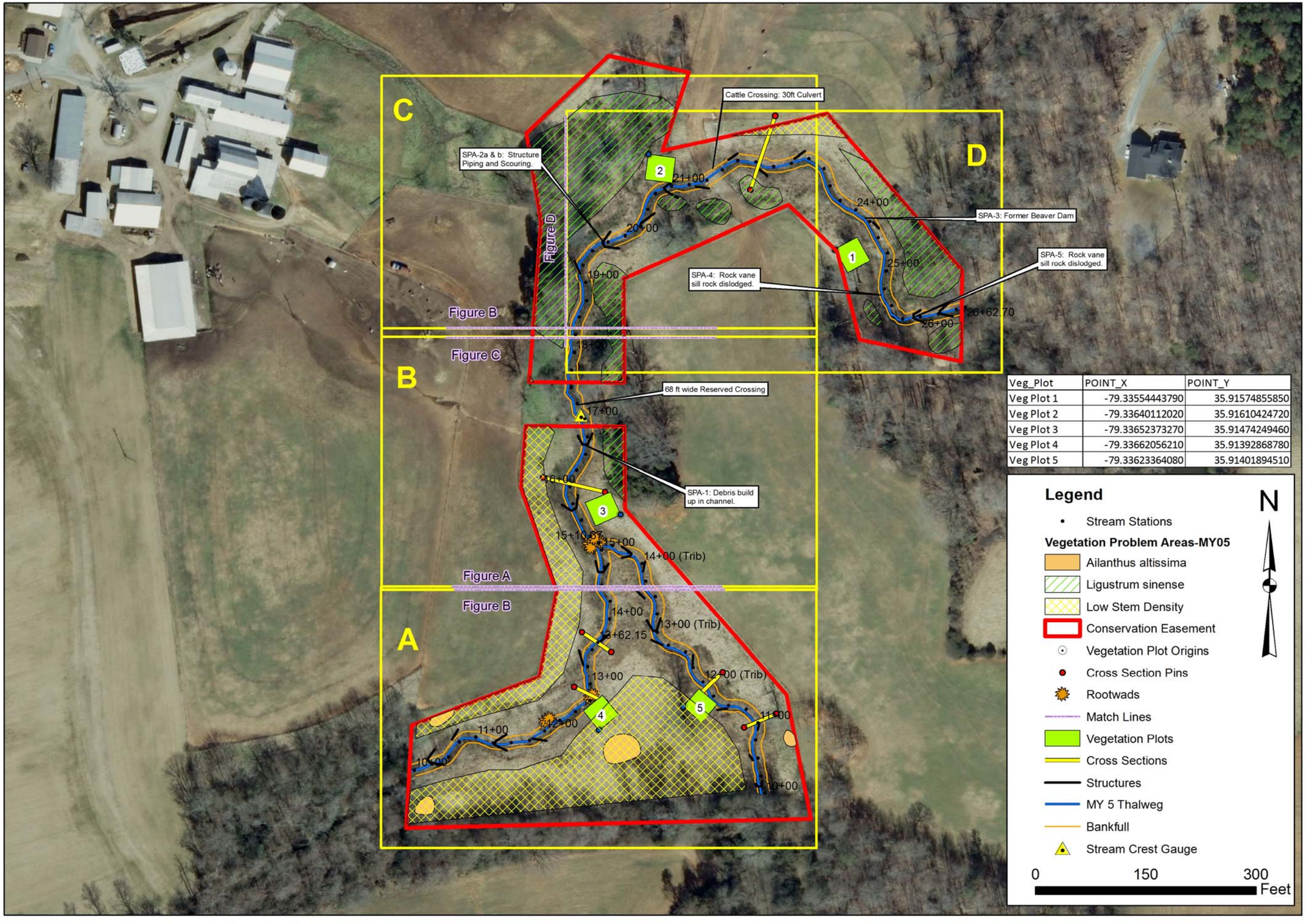
Table 3. Project Contact Table

Project Contact Table Mary's Creek (EEP #241)	
Designer	Stantec Consulting Services Inc 801 Jones Franklin Road, Suite 300 Raleigh, North Carolina 27606 David Bidelspach - (919) 851-6866
Construction Contractor	Shamrock Environmental Corp. 6101 Corporate Park Drive Browns Summit, North Carolina 27699 Bill Wright - (800) 881-1098
Planting Contractor POC	Seal Brothers Contracting, LLC P.O. Box 86 Dobson, North Carolina 27017 Brian Seal
Seeding Contractor POC	Shamrock Environmental Corp. 6101 Corporate Park Drive Browns Summit, North Carolina 27699 Bill Wright - (800) 881-1098
Seed Mix Sources	contact Shamrock Environmental Corp.
Nursery Stock Suppliers	Hills Nursery Co., Inc. (931) 668-4364
Monitoring Performers	
Stream Monitoring	Ward Consulting Engineers 8368 Six Forks Road, Suite 104 Raleigh, NC 27613-5083
Vegetation Monitoring	The Catena Group 410-B Millstone Dr. Hillsborough, NC 27278

Table 4. Project Attribute Table

Project County	Alamance	
Physiographic Region	Piedmont	
Ecoregion	Carolina Slate Belt	
River Basin	Cape Fear	
USGS HUC for Project (14 digit)	03030002050020	
NCDWQ Subbasin for the Project	Mary's Creek	
Within extent of EEP Watershed Plan?	Watershed Restoration Plan for the Cape Fear River Basin 2001	
WRC Hab Class (Warm, Cool, Cold)	Warm water	
% of Project easement fenced or demarcated	100% fenced beyond the 50 ft easement buffer	
Beaver activity observed during the design phase?	Unknown	
Restoration Component Attribute Table	**Reach 1 (Main)**	**Reach 2 (Trib)**
Drainage Area	815acres	330 acres
Stream Order	3rd	1st
Restored Length	1632	450
Perennial or Intermittent	Perennial	Perennial
Watershed Type (Rural, Urban, Developing, etc.)	Rural	Rural
Watershed LUL Distribution:		
Residential	10%*	5%*
Ag – Row Crop	25%*	25%*
Ag – Livestock	20%*	35%*
Forested	45%*	35%*
Watershed Impervious cover (%)	<5%	<5%
NCDWQ AU/Index Number	16-26	16-26
NCDWQ Classification	C, NSW	C, NSW
303d listed?	Downstream of the site, Mary's Creek was listed on the 2002 list, but removed from the 2006 list	
Reasons for 303d listing or stressor	U	U
Total acreage of easement	7.3 acres	
Total Vegetated Acreage within Easement	7.3 acres	
Total Planted Acreage as Part of the Restoration	7.3 acres	
Rosgen Classification of Pre-Existing	C4/F4	C4
Rosgen Classification of As-built	C	C
Valley Type	VIII	VIII
Valley Slope	0.0096 ft/ft	0.0096ft/ft
Valley Side Slope Range	0.1076-0.3285 ft/ft	0.1076-0.3285 ft/ft
Valley Toe Slope Range	0.0111-0.0285ft/ft	0.0111-0.0285ft/ft
Cowardin Classification	Stream (R3UB1)	Stream (R3UB1)
Trout Waters designation	No	No
Species of Concern, Endangered, etc.	No	No
Dominant Soil Series Type		
Series	Herndon	Herndon
Depth	U	U
Clay %	U	U
K	U	U
T	U	U

Appendix B. Visual Assessment Data



Veg_Plot	POINT_X	POINT_Y
Veg Plot 1	-79.33554443790	35.91574855850
Veg Plot 2	-79.33640112020	35.91610424720
Veg Plot 3	-79.33652373270	35.91474249460
Veg Plot 4	-79.33662056210	35.91392868780
Veg Plot 5	-79.33623364080	35.91401894510

Legend

- Stream Stations

Vegetation Problem Areas-MY05

- Ailanthus altissima
- Ligustrum sinense
- Low Stem Density
- Conservation Easement
- Vegetation Plot Origins
- Cross Section Pins
- Rootwads
- Match Lines
- Vegetation Plots
- Cross Sections
- Structures
- MY 5 Thalweg
- Bankfull
- Stream Crest Gauge

N

0 150 300 Feet

The Catena Group

Date: March 2012

Scale: As Shown

EEP Job No.: 241

Title:

Mary's Creek MY-05 Current Conditions Plan View

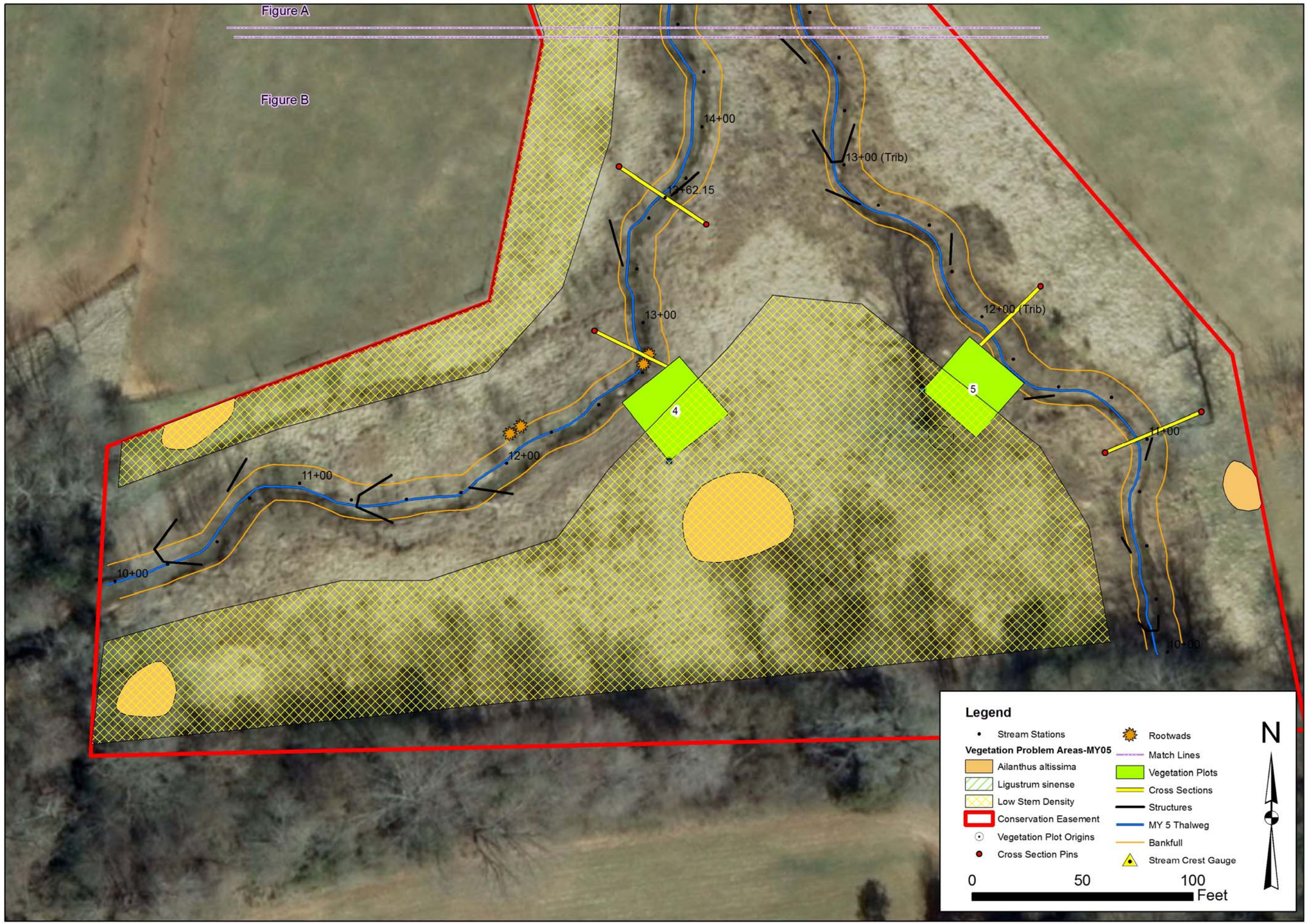
2010 Aerial Orthophotography
Source: NCOneMaps

Client:

Ecosystem Enhancement Program

Figure

Key



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Mary's Creek MY-05 Current Conditions Plan View

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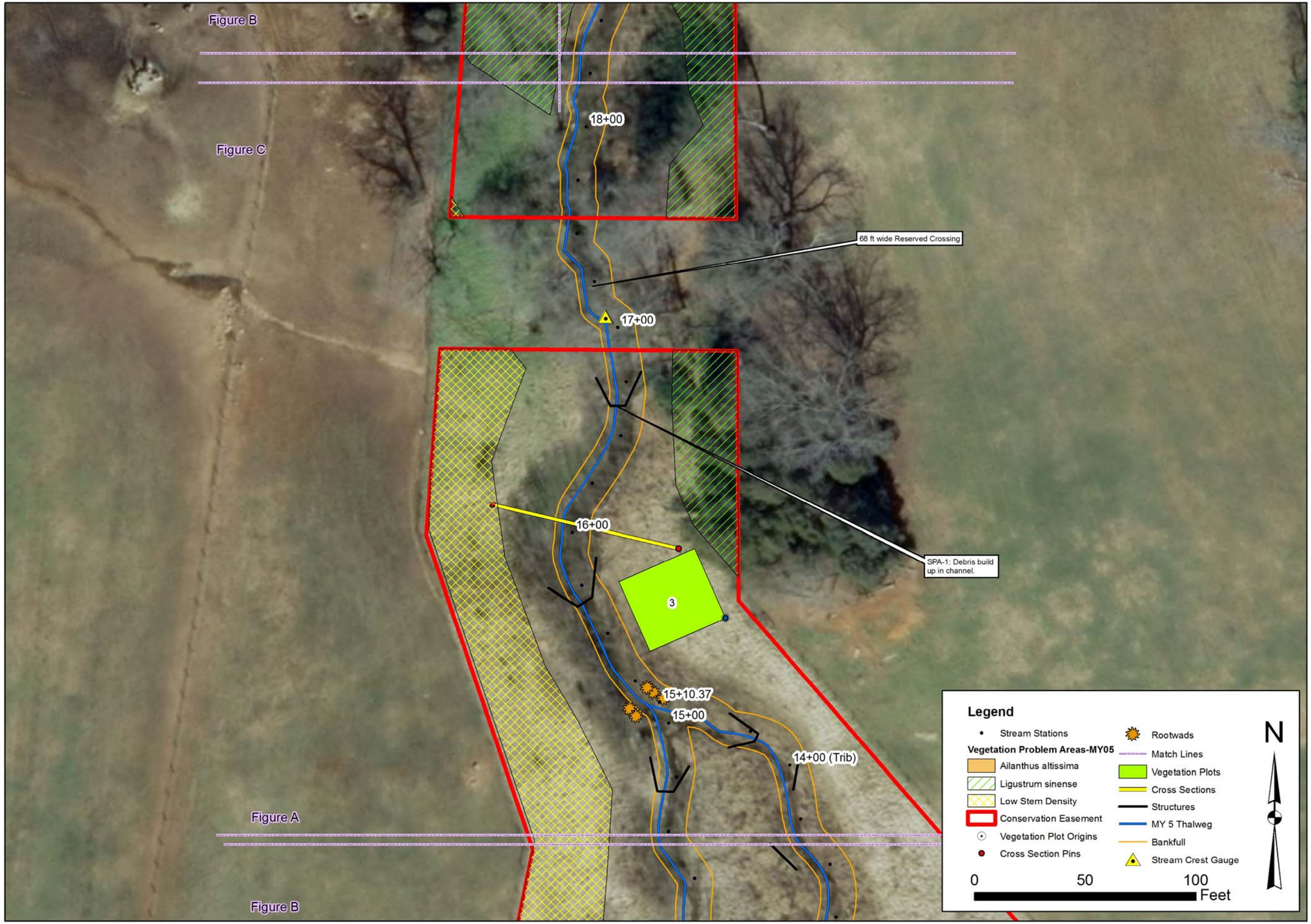
Figure

A



The Catena Group

Date: March 2012

Scale: As Shown

EEP Job No.: 241

Title:

Mary's Creek MY-05 Current Conditions Plan View

2010 Aerial Orthophotography
Source: NCOneMaps

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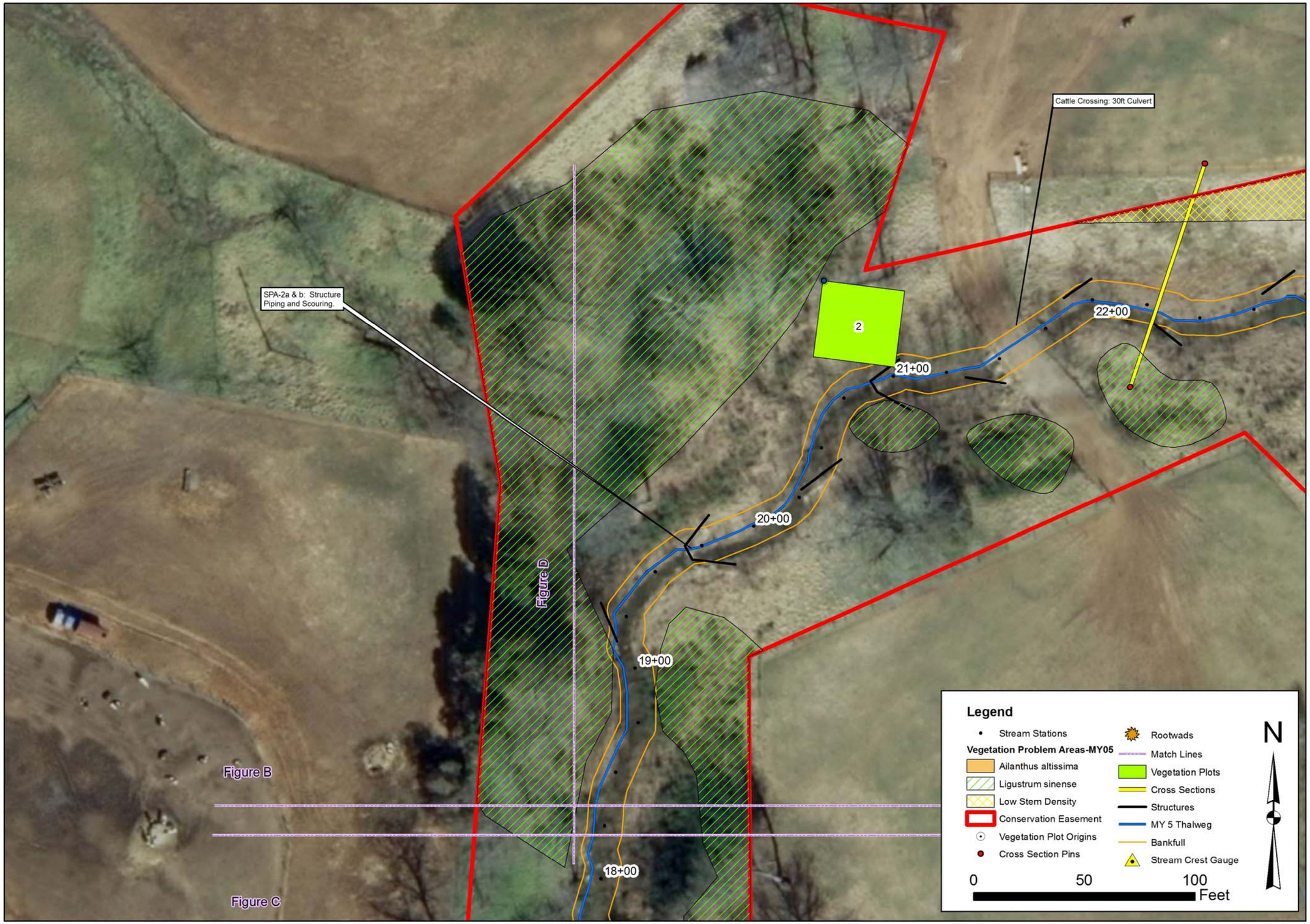
Ecosystem Enhancement Program

Figure

B



The Catena Group

Date: March 2012

Scale: As Shown

EEP Job No.: 241

Title:

Mary's Creek MY-05 Current Conditions Plan View

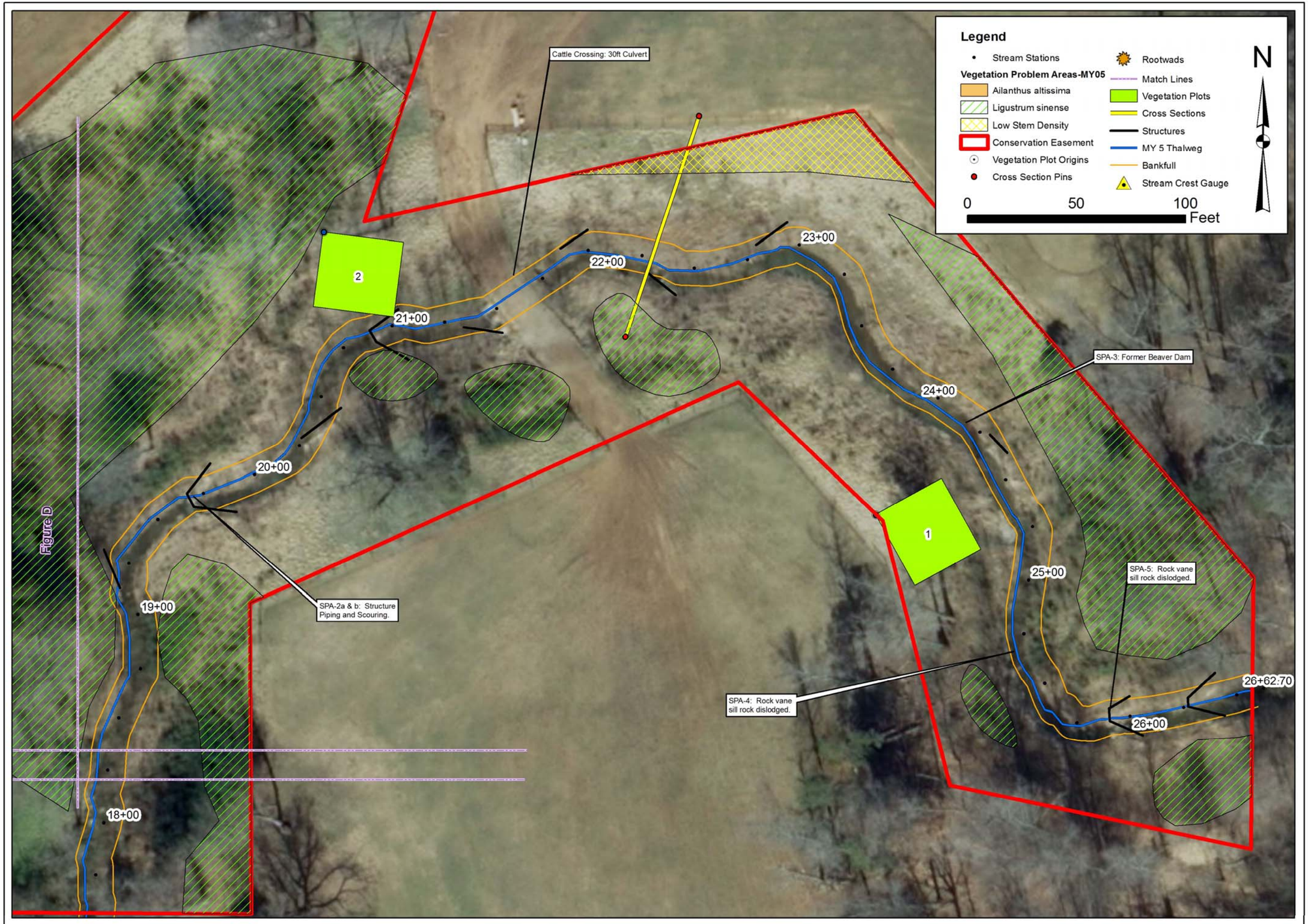
2010 Aerial Orthophotography
Source: NCOneMaps

Client:

Ecosystem Enhancement Program

Figure

C



The Catena Group

Date: March 2012

Scale: As Shown

EEP Job No.: 241

Title:

Mary's Creek MY-05 Current Conditions Plan View

2010 Aerial Orthophotography
Source: NCOneMaps

Client:

Ecosystem Enhancement Program

Figure

D

Table 5 **Visual Stream Morphology Stability Assessment**
Reach ID Main Channel
Assessed Length 1632

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. **Vertical Stability** (Riffle and Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)					100%			
		2. Degradation - Evidence of downcutting					100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	22	23			96%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	21	21			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	21	21			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	20	21			95%			
		2. Thalweg centering at downstream of meander (Glide)	21	21			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion					100%			100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.					100%			100%
	3. Mass Wasting	Bank slumping, calving, or collapse					100%			100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	15	17			88%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	14	17			82%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	14	17			82%			
	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)	16	17			94%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	14	17			82%			

Table 5 **Visual Stream Morphology Stability Assessment**
Reach ID Tributary
Assessed Length 450

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. **Vertical Stability** (Riffle and Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)					100%			
		2. Degradation - Evidence of downcutting					100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	6	10			60%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	6	11			55%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	7	11			64%			
	4.Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	3	11			27%			
		2. Thalweg centering at downstream of meander (Glide)	3	11			27%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion					100%			100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.					100%			100%
	3. Mass Wasting	Bank slumping, calving, or collapse					100%			100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	5	5			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	5	5			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	5	5			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	5	5			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	5	5			100%			

Table 6. **Vegetation Condition Assessment**

Table 6 Vegetation Condition Assessment

Planted Acreage[1] **4.56**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Low Stem Density Areas	Woody stem densities clearly below target levels based visual observation.	0.1 acres	yellow hatch	3	1.59	34.9%
			Total	3	1.59	34.9%

Easement Acreage[2] **7.3**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
2. Invasive Areas of Concern[4]	Areas of *Ailanthus altissima*.	1000 SF	Solid Yellow	4	0.08	1.1%
3. Invasive Areas of Concern[4]	Areas of *Ligustrum sinense.*	1000 SF	Solid Green	5	1.42	19.5%

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.

Mary's Creek EEP# 241
MY-05 Photo Points

Main Channel Cross Section #1 Looking Downstream

Main Channel Cross Section #2 Looking Downstream

Main Channel Cross Section #3 Looking Downstream

Main Channel Cross Section #4 Looking Downstream

Tributary Channel Cross Section #1 Looking Downstream

Tributary Channel Cross Section #2 Looking Downstream

Vegetation Monitoring Plot Photos

Vegetation Monitoring Plot 1

Vegetation Monitoring Plot 2

Vegetation Monitoring Plot 3

Vegetation Monitoring Plot 4

Vegetation Monitoring Plot 5

Appendix C. Vegetation Assessment Data

Table 7. Vegetation Plot Mitigation Success Summary Table

Mary's Creek (EEP #241)		
Veg Plot ID	**Vegetation Survival Threshold Met? (260 total woody stems/acre)**	**Tract Mean**
VP1	Yes	100%
VP2	Yes	
VP3	Yes	
VP4	Yes	
VP5	Yes	

Table 8**. Vegetation Metadata Table**

database name	cvs-eep-entrytool-v2.2.7.mdb
database location	11/5/2011
computer name	
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.
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	241
project Name	Mary's Creek (EEP #241)
Description	2096 lf of stream restoration; no wetlands
River Basin	Cape Fear
length(ft)	2096
stream-to-edge width (ft)	
area (sq m)	
Required Plots (calculated)	
Sampled Plots	5

Table 9. Stem Count Total Planted by Plot and Species

EEP Project Code 241. Project Name: UT to Mary's Creek

			Current Plot Data (MY5 2011)															Annual Means								
			E241-01-VP1			E241-01-VP2			E241-01-VP3			E241-01-VP4			E241-01-VP5			MY5 (2011)			MY4 (2010)			MY3 (2009)		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer rubrum	red maple	Tree									1			26			3			30						
Alnus serrulata	hazel alder	Shrub Tree									1									1						
Carpinus caroliniana	American hornbeam	Shrub Tree			14															14						
Celtis laevigata	sugarberry	Shrub Tree									1									1						
Cornus amomum	silky dogwood	Shrub									3					1	1		1	4						
Diospyros virginiana	common persimmon	Tree			2									1						3						
Fraxinus pennsylvanica	green ash	Tree			28			22			7			13			6			76						
Gleditsia triacanthos	honeylocust	Shrub Tree			1															1						
Juniperus virginiana	eastern redcedar	Tree			5			3			1			5			115.5			129.5						
Liquidambar styraciflua	sweetgum	Tree			6			5			6			20			24			61						
Pinus taeda	loblolly pine	Tree			1						1						3			5						
Platanus occidentalis	American sycamore	Tree									1									1						
Prunus serotina	black cherry	Shrub Tree						1									2			3						
Pyrus	pear	Tree			1															1						
Salix nigra	black willow	Tree						1			1		3	3		4	5		7	10					3	3
Sambucus canadensis	Common Elderberry	Shrub Tree			3						5			4						12						
Ulmus	elm	Tree												1			1			2						
Ulmus alata	winged elm	Tree									1									1						
Ulmus rubra	slippery elm	Tree			1			1												2						
		Stem count	0	0	62	0	0	33	0	0	29	0	3	73	0	5	160.5	0	8	357.5	0	0	0	0	3	3
		size (ares)	1			1			1			1			1			5			5			5		
		size (ACRES)	0.024710538			0.024710538			0.024710538			0.024710538			0.024710538			0.123552691			0.123552691			0.123552691		
		Species count	0	0	10	0	0	6	0	0	12	0	1	8	0	2	9	0	2	19	0	0	0	0	1	1
		Stems per ACRE	0	0	2509	0	0	1335	0	0	1174	0	121.4	2954	0	202.3	6495	0	64.75	2894	0	0	2695	0	24.28	24.28

Appendix D. Stream Assessment Data

Project:	Mary's Creek
Cross Section:	Cross Section 1
Feature	Pool
Station:	12+83
Date:	1/18/12
Crew:	ZAP, SV

Summary (bankfull)

	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)	30.4	27.3	24.5	22.9	24.0	24.5
W (BKF)	19.7	18.3	18.0	18.2	18.0	18.1
Max d	3.0	2.8	2.8	2.7	2.9	2.9
Mean d	1.5	1.5	1.4	1.3	1.3	1.3
W/D	12.8	12.3	13.2	14.5	13.4	13.4

MY00-2006

Station	Elevation	Notes
0.00	506.10	LPIN
13.19	505.91	ıkfull Left T
15.06	505.43	
16.38	504.98	
20.25	504.74	
24.14	503.85	
26.80	502.86	TW
28.82	502.86	
30.37	503.20	
31.74	505.22	
32.91	505.80	ankfull Righ
33.82	506.20	
34.27	506.51	TOBR
37.19	506.16	
47.65	506.52	RPIN
48.65	506.40	

MY01-2007

Station	Elevation	Notes
0.00	505.85	LPIN
3.19	505.80	
7.66	505.95	
13.95	505.81	(FULL Left
18.75	504.71	
20.58	504.63	
21.75	504.57	
23.01	504.20	
23.62	504.14	
23.93	503.89	
24.58	503.67	
25.00	503.35	
26.36	503.18	
27.06	503.15	
28.44	503.07	TW
29.76	503.26	
31.41	505.39	
32.29	505.80	Bankfull Right
34.16	506.51	TOBR
39.08	506.24	
44.58	506.30	
47.50	506.40	RPIN

MY02-2008

Station	Elevation	Notes
0.00	506.11	LPIN
10.12	505.97	
14.20	505.83	ıkfull Left T
17.56	504.93	
20.95	504.80	
22.60	504.36	
23.53	503.99	
24.51	503.99	
25.07	503.61	
26.38	503.15	
27.77	503.06	TW
29.60	503.68	
30.20	505.04	
33.89	506.50	(full Right T
42.26	506.22	
47.61	506.48	RPIN

MY03-2009

Station	Elevation	Notes
0.00	506.15	LPIN
0.10	505.93	
4.68	506.19	
9.09	505.89	
13.86	505.85	TOBL
16.45	505.20	Bankfull Left
21.49	504.95	
25.42	503.10	TOEL
27.25	503.13	TW
29.97	503.52	TOER
30.73	505.57	
32.22	505.78	
33.58	506.40	ankfull Righ
34.91	506.55	TOBR
36.65	506.38	
38.69	506.34	
45.88	506.42	
47.58	506.48	RPIN

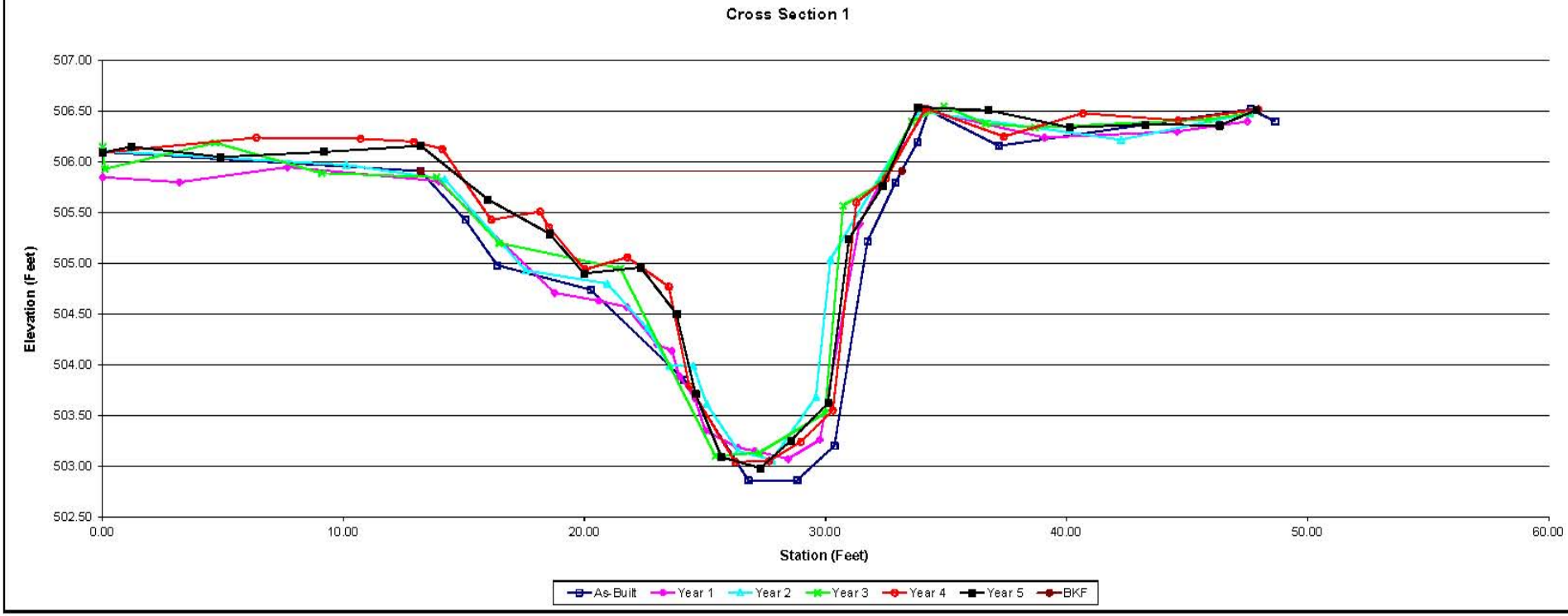
MY04-2010

Station	Elevation	Notes
0.00	506.09	LPIN
6.38	506.24	
10.70	506.23	
12.92	506.20	TOBL
14.09	506.13	
16.13	505.43	
18.15	505.51	
18.51	505.36	NKFULL LE
20.02	504.94	
21.77	505.06	
23.50	504.77	
24.35	503.79	TOE L
26.25	503.04	
27.66	503.05	(WS = 503
28.98	503.24	
30.30	503.55	TOE R
31.28	505.60	
32.52	505.84	NKFULL RI
34.15	506.53	TOBR
37.40	506.25	
40.67	506.48	
44.63	506.41	
47.96	506.52	RPIN

MY05-2011

Station	Elevation	Notes
0.00	506.09	LPIN
1.20	506.15	
4.91	506.05	
9.18	506.10	
13.20	506.16	BL bankfull
15.99	505.63	
18.57	505.29	
19.98	504.90	
22.34	504.96	
23.82	504.50	
24.61	503.71	TOE L
25.68	503.09	
27.30	502.98	TW BROCK
28.56	503.25	
30.11	503.62	TOE R
30.97	505.24	
32.37	505.76	
33.84	506.54	ER bankfull
36.76	506.51	
40.14	506.34	
43.27	506.37	
46.35	506.36	
47.86	506.51	RPIN

Photo of XS-1, looking in the downstream direction



Project:	Mary's Creek
Cross Section:	Cross Section 2
Feature	Riffle
Station:	13+62
Date:	1/18/12
Crew:	ZAP, SV

Summary (bankfull)

	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)	29.6	30.5	21.4	25.4	21.3	22.3
W (BKF)	28.0	29.3	20.2	22.1	16.8	17.6
Max d	2.1	2.4	2.2	2.3	2.4	2.6
Mean d	1.1	1.0	1.1	1.2	1.3	1.3
W/D	26.4	28.1	19.0	19.2	13.3	14.0

MY00-2006

Station	Elevation	Notes
0.00	506.74	LPIN
8.67	505.33	ıkfull Left T
17.19	504.84	
19.72	503.78	
22.65	503.34	
24.19	503.19	TW
25.84	503.30	
27.96	503.40	
29.94	503.71	
31.47	503.82	
32.48	504.25	
35.16	505.18	kfull Right T
35.89	505.28	
47.65	506.06	RPIN
49.72	505.79	

MY01-2007

Station	Elevation	Notes
0.00	506.50	LPIN
3.13	505.89	
7.09	505.50	Bankfull Lef
13.23	505.24	TOBL
17.37	504.83	
19.51	504.48	
20.32	503.86	
21.06	503.29	
21.80	503.13	TW
23.65	503.14	
25.11	503.28	
27.04	503.25	
28.14	503.52	
28.93	503.88	
29.08	504.21	
30.28	504.21	
31.68	504.19	
32.18	504.56	
33.68	504.95	kfull Right TOBR
36.40	505.51	
42.27	505.75	
47.42	505.84	RPIN

MY02-2008

Station	Elevation	Notes
0.00	506.78	LPIN
6.42	505.51	
15.01	505.22	ıkfull Left T
18.81	504.82	
20.40	504.07	
21.26	503.15	
22.93	503.01	
24.45	503.04	TW
25.91	503.34	
27.46	503.46	
29.64	504.35	
33.73	504.97	kfull Right T
37.14	505.55	
43.16	505.81	
46.75	505.80	
47.64	506.11	RPIN

MY03-2009

Station	Elevation	Notes
0.00	506.89	LPIN
2.42	506.33	
4.91	505.79	
12.94	505.48	ıkfull Left T
17.56	505.12	
19.54	504.65	
20.94	503.86	
21.83	503.15	TOEL
24.46	503.26	TW
27.36	503.34	TOER
29.26	504.41	
31.23	504.36	
34.21	505.08	
35.31	505.62	
39.08	505.67	kfull Right T
45.24	505.81	
47.53	506.18	RPIN

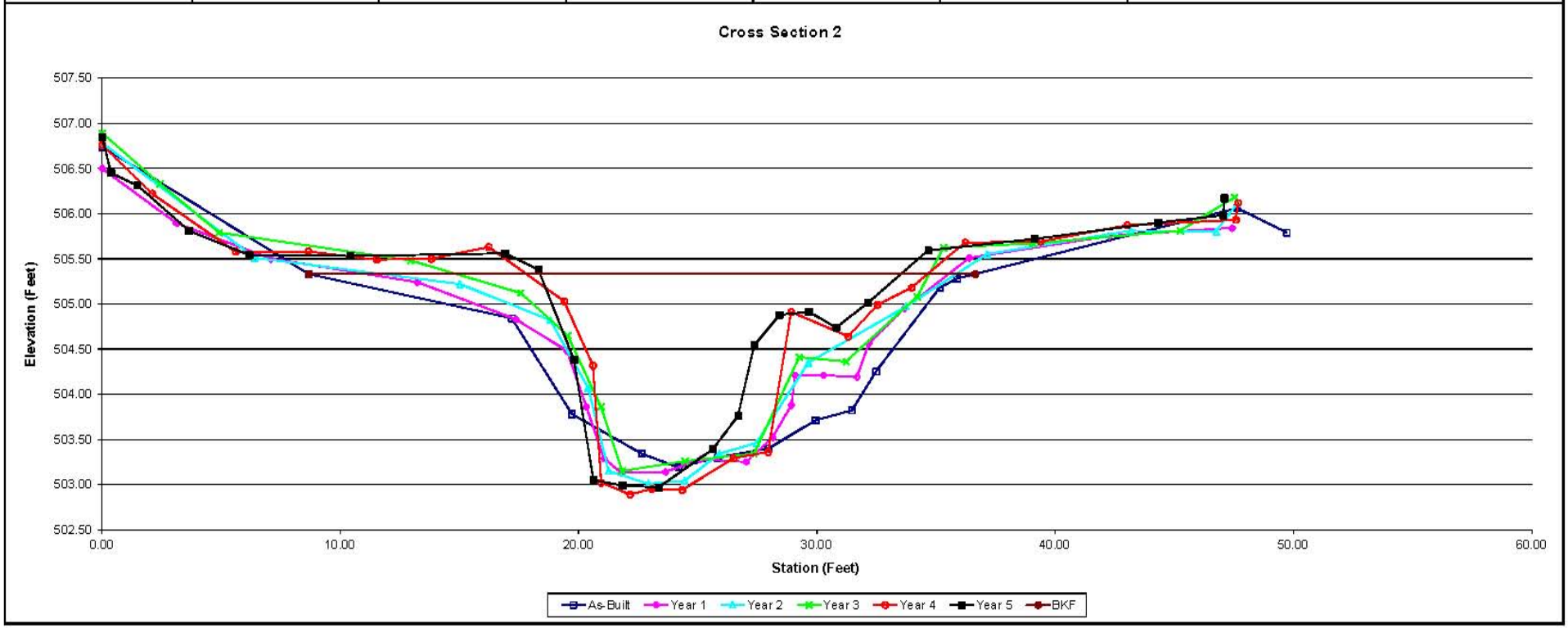
MY04-2010

Station	Elevation	Notes
0.00	506.76	LPIN
2.10	506.22	
5.60	505.58	
8.65	505.58	
11.52	505.49	
13.82	505.50	
16.23	505.63	TOBL
19.39	505.03	Bankfull Lef
20.60	504.32	
20.95	503.02	TOE L
22.16	502.89	
23.07	502.95	
24.35	502.94	/ (WS = 503
26.50	503.29	
27.95	503.36	TOE R
28.92	504.91	
31.31	504.64	
32.54	504.99	Bankfull Righ
33.98	505.18	TOBR
36.22	505.68	
39.40	505.69	
43.02	505.87	
47.58	505.93	
47.68	506.12	RPIN

MY05-2011

Station	Elevation	Notes
0.00	506.85	LPIN
0.38	506.45	
1.49	506.31	
3.64	505.81	
6.18	505.54	
10.43	505.53	
16.91	505.56	BL bankfull
18.31	505.38	
19.81	504.38	
20.62	503.05	TOE L
21.83	502.99	
23.36	502.97	TW
25.63	503.39	
26.69	503.76	TOE R
27.37	504.54	
28.43	504.88	
29.66	504.91	
30.81	504.74	
32.14	505.01	
34.67	505.59	R bankfull
39.14	505.72	
44.32	505.90	
47.05	505.98	
47.10	506.17	RPIN

Photo of XS-2, looking in the downstream direction



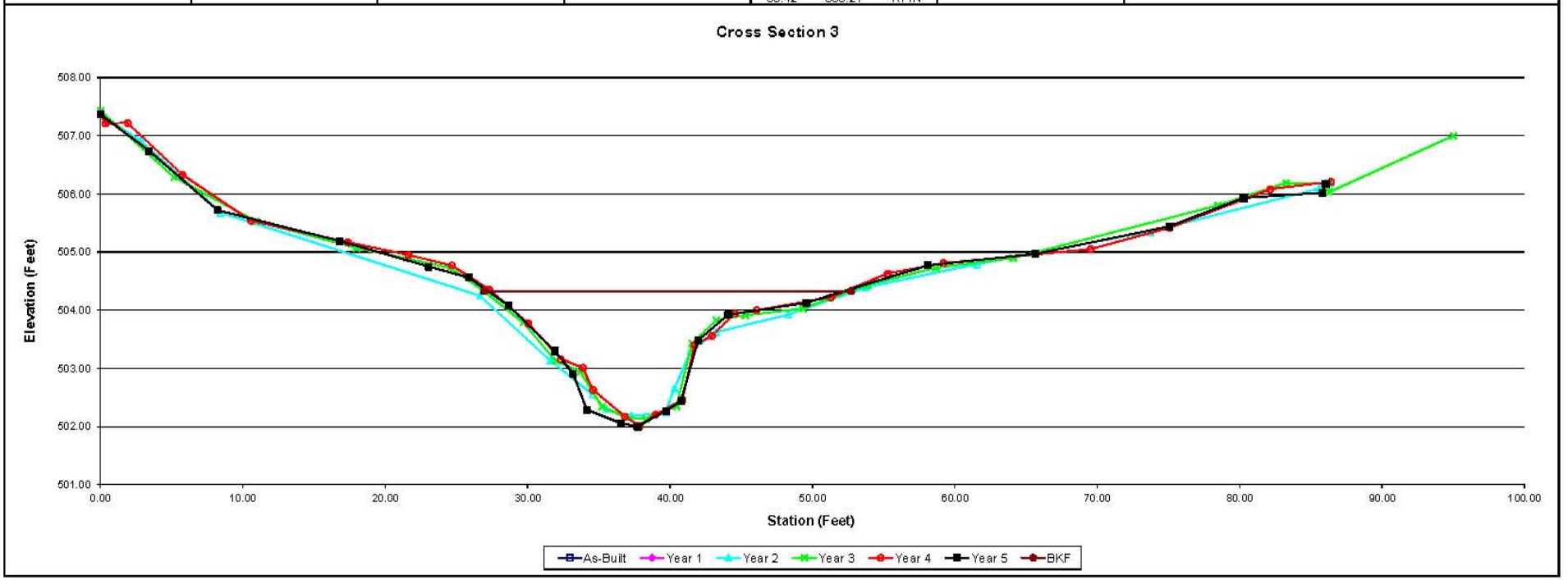
Project:	Mary's Creek
Cross Section:	Cross Section 3
Feature	Pool
Station:	16+04
Date:	1/18/12
Crew:	ZAP, SV

Summary (bankfull)

	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)	NA	NA	23.6	25.6	23.7	31.0
W (BKF)	NA	NA	25.2	26.6	24.9	29.4
Max d	NA	NA	2.1	2.3	2.3	2.6
Mean d	NA	NA	0.9	1.0	0.9	1.1
W/D	NA	NA	27.0	27.7	26.2	27.9

MY00-2006			MY01-2007			MY02-2008			MY03-2009			MY04-2010			MY05-2011		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
						0.00	507.37	LPIN	0.00	507.43	LPIN	0.00	507.38	LPIN	0.00	507.37	LPIN
						2.84	506.91		5.16	506.29		0.35	507.21		3.42	506.74	
						8.44	505.68		10.92	505.53		1.91	507.22		8.22	505.72	
						26.65	504.25	FULL LEFT	18.00	505.07		5.75	506.33		16.80	505.19	
						31.60	503.13		24.57	504.73		10.57	505.54		23.05	504.75	
						34.56	502.55		26.94	504.33	ıkfull Left T	17.37	505.17		25.88	504.56	BL bankfull left
						35.53	502.30		29.70	503.79		21.61	504.95		28.67	504.08	
						37.28	502.18	TW	31.99	503.13		24.67	504.77	TOBL	31.89	503.30	
						39.70	502.25		33.69	502.94		27.30	504.36		33.19	502.91	
						40.30	502.65		35.23	502.34	TOEL	30.05	503.77	NKFULL LE	34.16	502.29	TOE L
						41.47	503.30		36.84	502.16		32.33	503.16		36.53	502.06	
						43.22	503.62	ULL RIGHT	38.32	502.13	TW	33.88	503.01		37.71	502.00	TW
						48.26	503.92		40.47	502.35	TOER	34.58	502.63	TOE L	39.71	502.27	
						53.74	504.39		41.55	503.43	TOBR	36.83	502.17		40.77	502.43	TOE R
						61.56	504.79		43.25	503.83	ıfull Right T	37.86	502.01	(WS = 502	41.96	503.48	
						73.73	505.35		45.29	503.91		38.97	502.20		44.07	503.92	ЭR bankfull
						85.60	506.09		49.35	504.03		40.86	502.46	TOE R	49.58	504.13	
						86.38	506.19	RPIN	53.83	504.43		41.70	503.40		58.09	504.77	
									58.66	504.73		42.94	503.56	NKFULL RI	65.68	504.97	
									64.10	504.90		44.54	503.94	TOBR	75.06	505.44	
									78.48	505.80		46.07	504.00		80.28	505.93	
									83.26	506.19		51.29	504.22		85.82	506.02	
									86.24	506.19	RPIN	55.28	504.63		86.04	506.17	RPIN
									86.29	506.03		59.19	504.81				
									95.00	507.00		69.53	505.05				
												75.09	505.42				
												82.14	506.08				
												86.42	506.21	RPIN			

Photo of XS-3 looking in the downstream direction



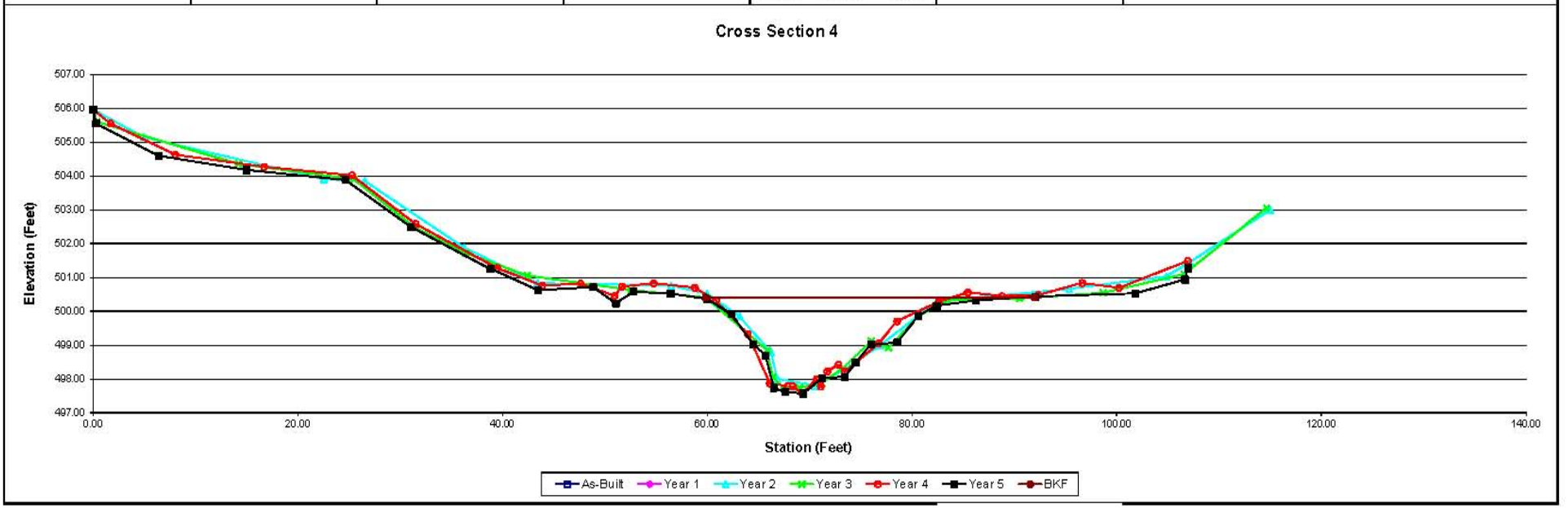
Project:	Mary's Creek
Cross Section:	Cross Section 4
Feature	Riffle
Station:	22+30
Date:	1/18/12
Crew:	ZAP, SV

Summary (bankfull)

	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)	NA	NA	35.2	34.2	48.4	39.4
W (BKF)	NA	NA	30.6	32.1	25.0	33.6
Max d	NA	NA	2.7	2.7	2.9	2.9
Mean d	NA	NA	1.2	1.1	1.9	1.2
W/D	NA	NA	26.6	30.1	12.9	28.6

MY00-2006			MY01-2007			MY02-2008			MY03-2009			MY04-2010			MY05-2011		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
						0.00	505.96	LPIN	0.00	505.96	LPIN	0.00	505.96	LPIN	0.00	505.96	LPIN
						4.91	505.15		0.35	505.60		1.69	505.55		0.28	505.55	
						22.52	503.91		14.19	504.36		8.03	504.63		6.38	504.60	
						26.54	503.85		25.49	503.90		16.70	504.27		14.97	504.18	
						36.24	501.88		31.39	502.48		25.27	504.02		24.66	503.88	
						43.42	500.83		36.35	501.73		31.48	502.59		31.01	502.50	
						56.44	500.76		42.42	501.06		39.45	501.28		38.80	501.25	
						59.97	500.52	ıkfull Left T	52.55	500.63		43.87	500.76		38.87	501.26	
						63.15	499.85		59.84	500.41	ıkfull Left T	47.62	500.82		43.45	500.62	
						66.23	498.78		65.84	498.85		50.92	500.46		48.85	500.72	
						66.83	498.01		66.40	498.06	TOEL	51.66	500.73		51.07	500.24	
						70.49	497.81	TW	67.38	497.77		54.74	500.83		52.76	500.58	
						73.45	498.30		69.00	497.75	TW	58.79	500.70		56.42	500.52	BL bankfull
						76.93	499.00		71.18	497.88	TOER	60.84	500.32	TOBL	59.94	500.37	
						82.39	500.28	ıfull Right T	73.26	498.32		63.96	499.33	NKFULL LE	62.34	499.93	
						95.33	500.66		76.02	499.12		66.11	497.87	TOE L	64.48	499.02	
						104.85	501.03		77.70	498.93		67.84	497.79		65.67	498.70	
						107.13	501.45	RPIN	80.62	499.86		68.32	497.79		66.48	497.74	TOE L
						115.00	503.00		83.44	500.33	ıfull Right T	69.27	497.58	(WS = 497	67.60	497.62	
									90.49	500.38		70.68	498.00		69.38	497.57	TW
									98.66	500.55		71.08	497.78	TOE R	71.17	498.02	
									106.60	501.10	RPIN	71.70	498.23		73.45	498.07	TOE R
									114.63	503.05		72.81	498.42		74.50	498.49	
												73.42	498.21		75.98	499.01	
												76.71	499.05	ıKFULL RI	78.56	499.08	
												78.54	499.71		80.62	499.87	
												82.61	500.28	TOBR	82.41	500.17	
												85.45	500.56		86.23	500.32	
												88.78	500.45		92.07	500.44	
												92.31	500.48		101.82	500.53	ɜR bankfull right
												96.62	500.84		106.66	500.94	
												100.22	500.69		106.96	501.28	RPIN
												106.94	501.49	RPIN			

Photo of XS-4, looking in the downstream direction



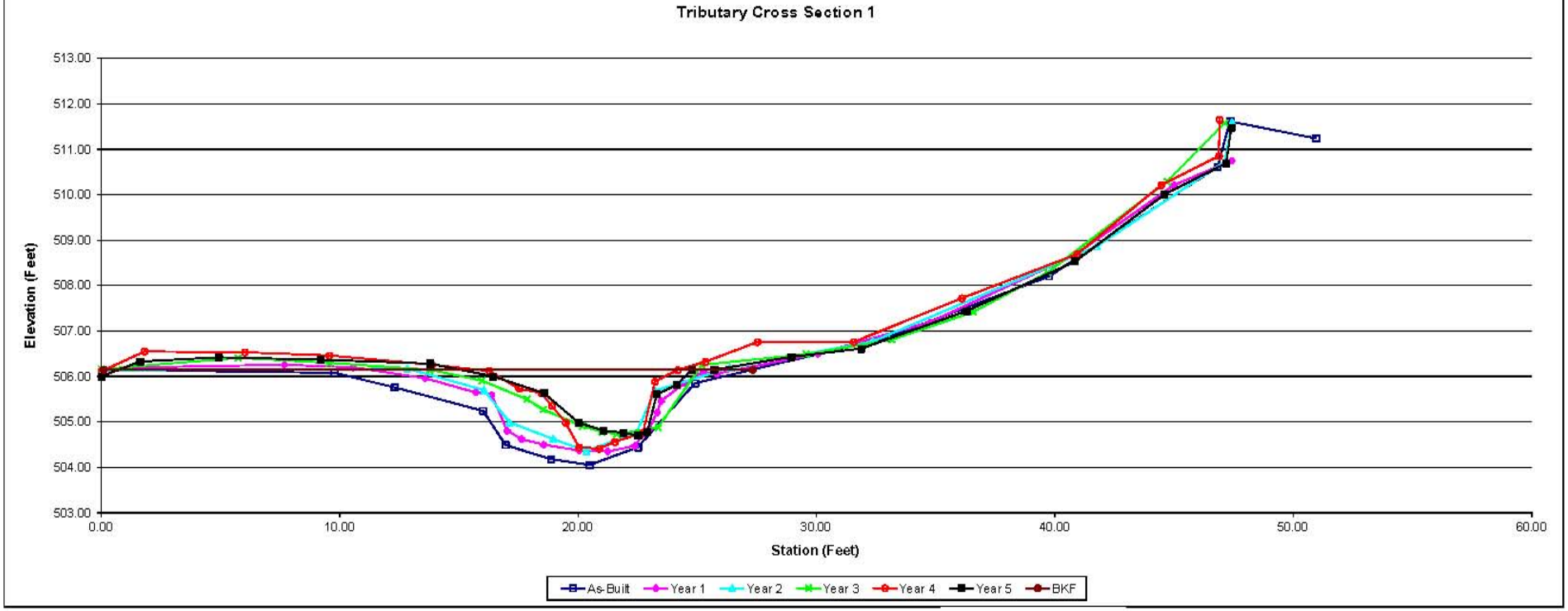
Project:	Mary's Creek Tributary
Cross Section:	Cross Section 1
Feature	Pool
Station:	11+02
Date:	12/30/10
Crew:	ZAP, SV

Summary (bankfull)

	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)	17.2	13.0	11.3	9.4	7.4	6.9
W (BKF)	15.1	14.7	13.4	12.8	8.7	9.8
Max d	2.1	1.8	1.8	1.5	1.8	1.4
Mean d	1.1	0.9	0.8	0.7	0.9	0.7
W/D	13.3	16.5	15.8	17.2	10.2	13.8

MY00-2006			MY01-2007			MY02-2008			MY03-2009			MY04-2010			MY05-2011		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
0.04	506.13	LPIN	0.18	506.15	LPIN	0.00	506.13	LPIN	0.00	506.16	LPIN	0.00	506.11	LPIN	0.00	506.00	LPIN
0.09	506.15	Bankfull Lef	1.71	506.20		12.84	506.17	Bankfull Lef	5.73	506.41		1.81	506.55		1.63	506.33	
9.78	506.08	TOBL	7.67	506.26		16.05	505.70		9.55	506.30		6.02	506.53		4.93	506.42	
12.30	505.76		10.57	506.20	ıkfull Left T	17.11	504.99		13.77	506.15	ıkfull Left T	9.57	506.46		9.21	506.37	
16.01	505.24		13.58	505.96		18.96	504.62		15.96	505.91		13.86	506.26		13.79	506.28	
16.96	504.49		15.70	505.65		20.35	504.36	TW	17.85	505.50		16.27	506.12	TOBL	16.43	506.00	BL Bankfull
18.86	504.18		16.37	505.60		22.44	504.76		18.53	505.27		17.53	505.73	NKFULL LE	18.57	505.63	
20.48	504.05	TW	17.01	504.81		23.23	505.69		20.17	504.91	TOEL	18.46	505.63		20.02	504.98	TOE L
22.51	504.44		17.63	504.62		26.36	506.19	lankfull Rig	21.00	504.78	TW	18.91	505.35		21.06	504.81	
24.91	505.85	TOBR	18.55	504.50		32.36	506.77		21.62	504.73		19.48	504.98	TOE L	21.89	504.76	
32.88	506.84	lankfull Rig	20.04	504.37		41.74	506.86		23.36	504.88	TOER	20.04	504.44		22.52	504.70	TW
39.75	508.20		21.25	504.35	TW	47.13	510.73		25.19	506.25	cfull Right T	20.89	504.41	(WS = 505	22.91	504.79	TOE R
46.83	510.61	RPIN	22.37	504.47		47.43	511.60	RPIN	29.56	506.49		21.54	504.56		23.30	505.61	
47.34	511.61		22.98	504.85					33.17	506.81		22.72	504.76	TOE R	24.13	505.81	
47.37	511.58		23.31	505.21					36.57	507.42		23.22	505.89	NKFULL RI	24.77	506.15	R Bankfull
47.37	511.61		23.49	505.46					39.70	508.29		24.18	506.14		25.71	506.15	
50.96	511.24		24.46	505.85					44.71	510.29		25.34	506.32	TOBR	28.95	506.43	
			25.26	506.10	cfull Right TOBR				47.13	511.58	RPIN	27.52	506.76		31.87	506.61	
			25.82	506.06								31.56	506.76		36.30	507.44	
			30.06	506.50								36.10	507.72		40.84	508.53	
			34.75	507.19								40.93	508.69		44.60	510.01	
			40.80	508.66								44.46	510.21		47.18	510.69	
			45.00	510.21								46.88	510.85		47.41	511.48	RPIN
			47.43	510.75	RPIN							46.91	511.65	RPIN			

Photo of XS-T1, looking in the downstream direction
*Cross Section labeled XS-11 to differentiate between main channel XS-1



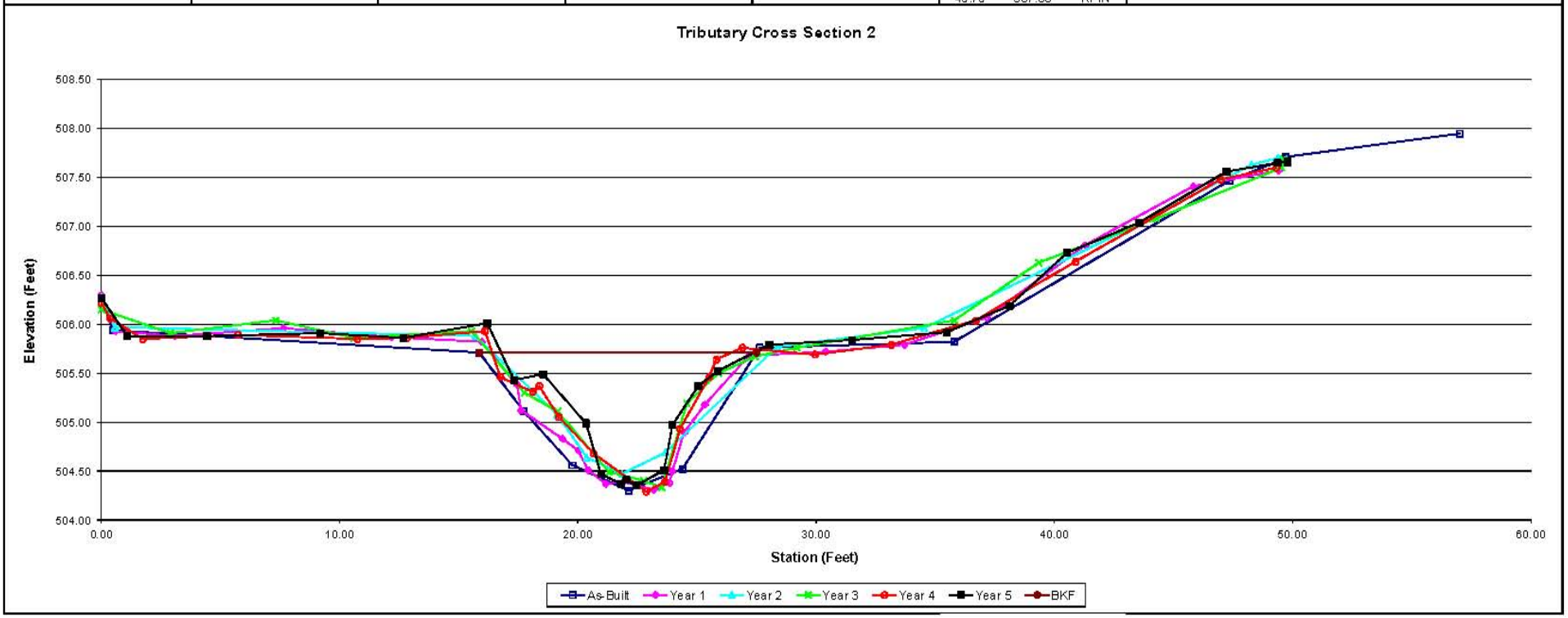
Project:	Mary's Creek Tributary
Cross Section:	Cross Section 2
Feature	Riffle
Station:	11+91
Date:	12/30/10
Crew:	ZAP, SV

Summary (bankfull)

	MY0	MY1	MY2	MY3	MY4	MY5
A (BKF)	10.0	8.8	8.9	7.4	7.3	6.4
W (BKF)	11.8	11.2	12.2	12.0	10.1	10.6
Max d	1.4	1.4	1.3	1.4	1.4	1.4
Mean d	0.8	0.8	0.7	0.6	0.7	0.6
W/D	13.9	14.3	16.8	19.5	14.0	17.7

MY00-2006			MY01-2007			MY02-2008			MY03-2009			MY04-2010			MY05-2011		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
0.00	506.27	LPIN	0.00	506.30	LPIN	0.00	506.28	LPIN	0.00	506.15	LPIN	0.00	506.22	LPIN	0.00	506.27	LPIN
0.01	506.27		0.59	505.93		0.57	505.97		2.90	505.91		0.37	506.06		1.09	505.88	
0.50	505.94		3.09	505.88		15.70	505.88	NKFULL LE	7.32	506.04		1.74	505.85		4.43	505.88	
15.86	505.71	NKFULL LE	7.64	505.96		19.13	505.08		10.59	505.86		5.74	505.89		9.19	505.91	
17.73	505.11		12.19	505.87		20.37	504.64		15.54	505.93	ıkfull Left T	10.75	505.85		12.67	505.86	
19.77	504.56		15.96	505.82	NKFULL LE	21.85	504.47	TW	17.75	505.30		12.82	505.86		16.20	506.01	3L Bankfull
22.14	504.30	TW	17.46	505.38		23.68	504.69		19.16	505.11		16.10	505.93	TOBL	17.32	505.43	
24.39	504.52		17.62	505.12		28.37	505.77	NKFULL RI	21.31	504.49	TOEL	16.75	505.46	Bankfull Lef	18.54	505.49	
27.63	505.76	NKFULL RI	19.36	504.83		34.52	505.96		22.77	504.40	TW	18.11	505.31		20.34	504.99	
35.79	505.82		20.02	504.71		42.91	506.95		23.52	504.33	TOER	18.38	505.37		20.97	504.47	TOE L
47.35	507.47		20.43	504.51		48.27	507.63		24.58	505.19		19.21	505.05	TOE L	21.80	504.37	TW
49.66	507.69		21.17	504.37		49.39	507.70	RPIN	25.90	505.50	ıfull Right T	20.66	504.68		22.03	504.41	
49.72	507.71	RPIN	21.91	504.39					27.44	505.67		22.87	504.29	/ (WS = 505	22.44	504.35	
57.01	507.95		23.19	504.31	TW				29.19	505.76		23.66	504.39		23.62	504.51	TOE R
			23.85	504.38					35.80	506.04		24.29	504.93	TOE R	23.97	504.97	
			23.97	504.50					39.35	506.63		25.51	505.46	Bankfull Righ	25.06	505.37	R Bankfull
			24.46	504.89					44.27	507.08		25.81	505.64		25.86	505.52	
			25.33	505.18					49.54	507.60		26.91	505.76	TOBR	28.04	505.79	
			27.19	505.68	NKFULL RIGHT				49.62	507.69	RPIN	29.95	505.69		31.51	505.84	
			30.40	505.72								33.15	505.79		35.49	505.92	
			33.71	505.79								36.70	506.04		38.13	506.19	
			37.17	506.07								40.89	506.64		40.53	506.73	
			41.30	506.81								46.98	507.48		43.57	507.04	
			45.83	507.41								49.32	507.60	RPIN	47.23	507.56	
			49.41	507.57											49.37	507.65	
															49.79	507.66	RPIN

Photo of XS-T2, looking in the downstream direction
*Cross Section labeled XS-12 to differentiate between main channel XS-2



Mary's Creek
Longitudinal Profile
Main Channel: Station 10+00 - 27+00

Elevation (feet)

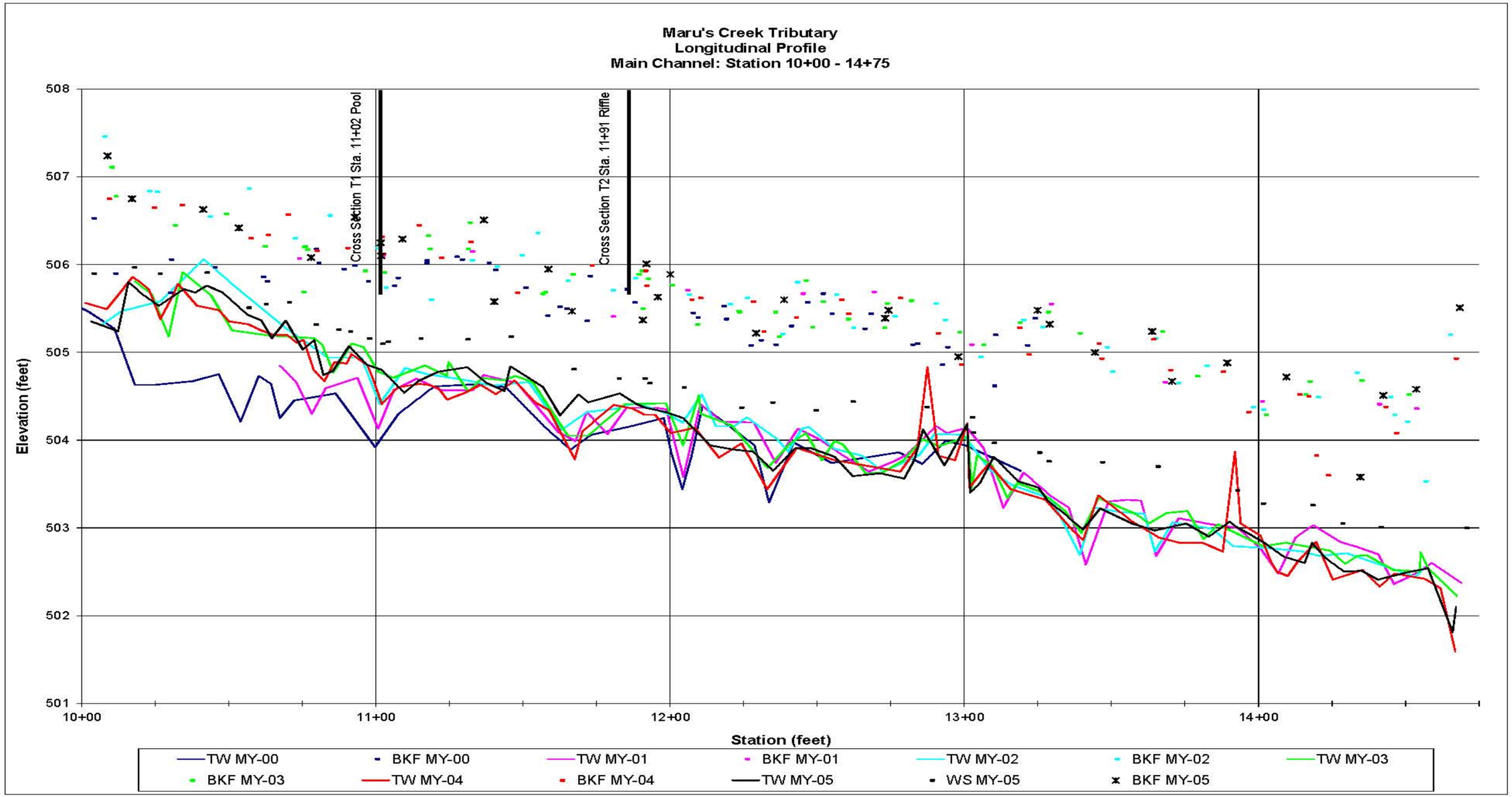
510
508
506
504
502
500
498
496
494
492

Cross Section 1 Sta. 12+83 Pool
Cross Section 2 Sta. 13+62 Riffle
Cross Section 3 Sta. 16+04 Pool
Cross Section 4 Sta. 22+30 Riffle
Stream Crossing Sta. 21+50-21+80
Bedrock Channel
Bedrock Outcrop

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00 25+00 26+00 27+00

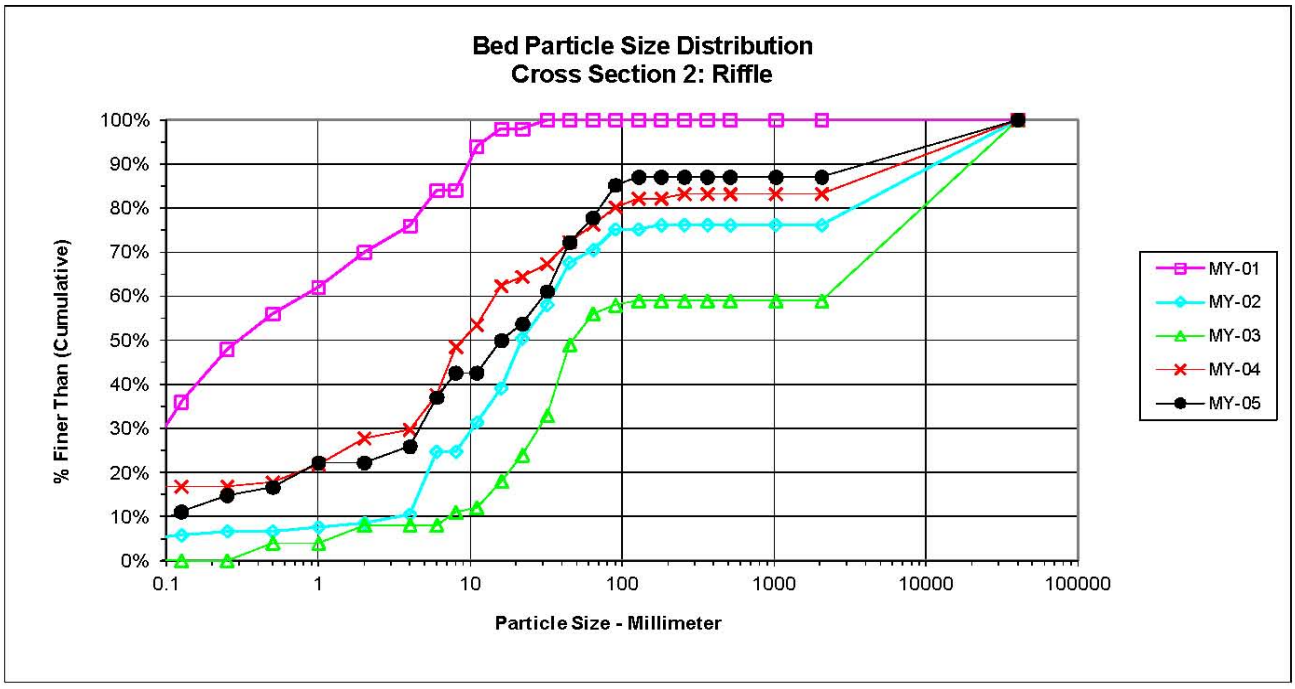
Station (feet)

TW MY-00 BKF MY-00 TW MY-01 BKF MY-01 TW MY-02 BKF MY-02 TW MY-03
BKF MY-03 TW MY-04 BKF MY-04 TW MY-05 WS MY-05 BKF MY-05


Maru's Creek Tributary
Longitudinal Profile
Main Channel: Station 10+00 - 14+75
Cross Section T1 Sta. 11+02 Pool
Cross Section T2 Sta. 11+91 Riffle
Elevation (feet)
508
507
506
505
504
503
502
501
10+00
11+00
12+00
13+00
14+00
Station (feet)
TW MY-00
BKF MY-00
TW MY-01
BKF MY-01
TW MY-02
BKF MY-02
TW MY-03
BKF MY-03
TW MY-04
BKF MY-04
TW MY-05
WS MY-05
BKF MY-05

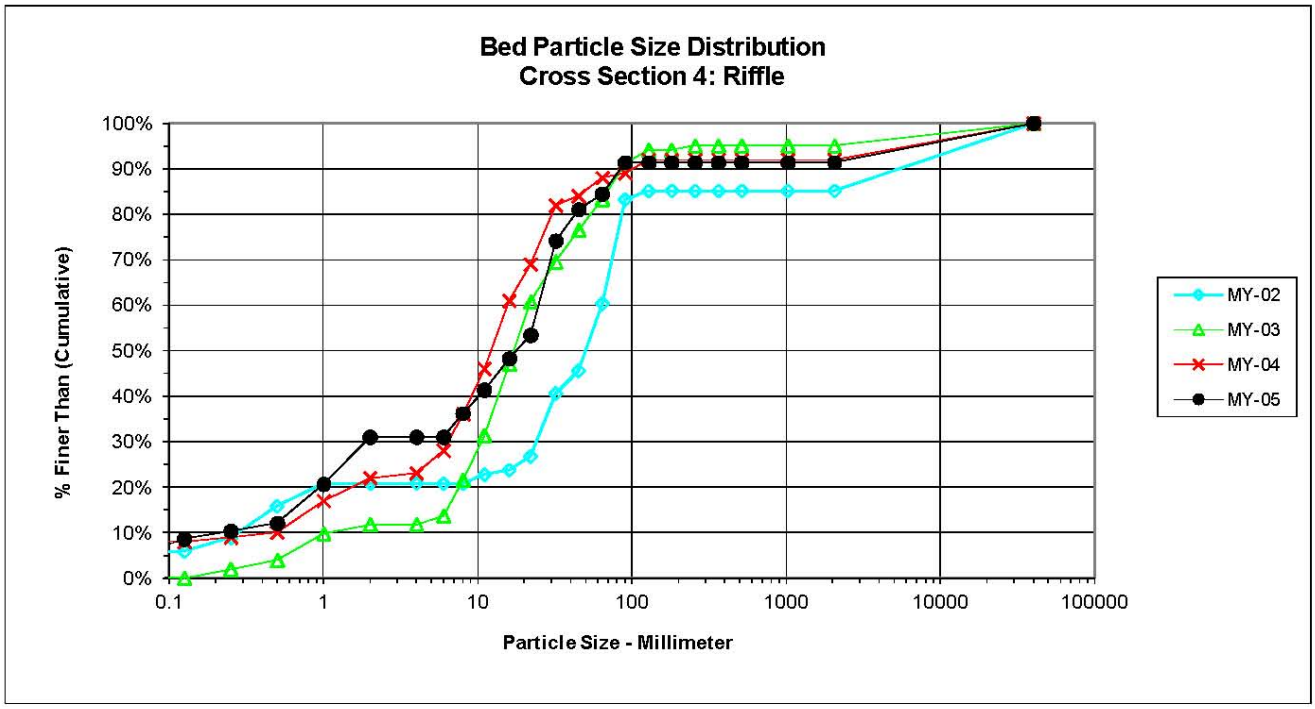
PEBBLE COUNT								
Project:	Mary's Creek					**Date:**	1/18/2012	
Location:	Cross Section #2							
				Particle Counts				
Inches	Particle	Millimeter		Riffles	Pools	Total No.	Item %	% Cumulative
	Silt/Clay	< 0.062	S/C	8	0	8	7%	7%
	Very Fine	.062 - .125	S	4	0	4	4%	11%
	Fine	.125 - .25	A	4	0	4	4%	15%
	Medium	.25 - .50	N	2	0	2	2%	17%
	Coarse	.50 - 1.0	D	6	0	6	6%	22%
.04 - .08	Very Coarse	1.0 - 2.0	S	0	0	0	0%	22%
.08 - .16	Very Fine	2.0 - 4.0		4	0	4	4%	26%
.16 - .22	Fine	4.0 - 5.7	G	12	0	12	11%	37%
.22 - .31	Fine	5.7 - 8.0	R	6	0	6	6%	43%
.31 - .44	Medium	8.0 - 11.3	A	0	0	0	0%	43%
.44 - .63	Medium	11.3 - 16.0	V	8	0	8	7%	50%
.63 - .89	Coarse	16.0 - 22.6	E	4	0	4	4%	54%
.89 - 1.26	Coarse	22.6 - 32.0	L	8	0	8	7%	61%
1.26 - 1.77	Very Coarse	32.0 - 45.0	S	12	0	12	11%	72%
1.77 - 2.5	Very Coarse	45.0 - 64.0		6	0	6	6%	78%
2.5 - 3.5	Small	64 - 90	C	8	0	8	7%	85%
3.5 - 5.0	Small	90 - 128	O	2	0	2	2%	87%
5.0 - 7.1	Large	128 - 180	B	0	0	0	0%	87%
7.1 - 10.1	Large	180 - 256	L	0	0	0	0%	87%
10.1 - 14.3	Small	256 - 362	B	0	0	0	0%	87%
14.3 - 20	Small	362 - 512	L	0	0	0	0%	87%
20 - 40	Medium	512 - 1024	D	0	0	0	0%	87%
40 - 80	Lrg- Very Lrg	1024 - 2048	R	0	0	0	0%	87%
	Bedrock		BDRK	14	0	14	13%	100%
			Totals	**108**	**0**	**108**	**100%**	**100%**

d16	d35	d50	d84	d95
0.4	5.6	16.0	85.8	Bedrock



PEBBLE COUNT								
Project:	Mary's Creek					**Date:**	1/18/2012	
Location:	Cross Section #4							
				Particle Counts				
Inches	Particle	Millimeter		Riffles	Pools	Total No.	Item %	% Cumulative
	Silt/Clay	< 0.062	S/C	6	0	6	5%	5%
	Very Fine	.062 - .125	S	4	0	4	3%	9%
	Fine	.125 - .25	A	2	0	2	2%	10%
	Medium	.25 - .50	N	2	0	2	2%	12%
	Coarse	.50 - 1.0	D	10	0	10	9%	21%
.04 -.08	Very Coarse	1.0 - 2.0	S	12	0	12	10%	31%
.08 - .16	Very Fine	2.0 - 4.0		0	0	0	0%	31%
.16 - .22	Fine	4.0 - 5.7	G	0	0	0	0%	31%
.22 - .31	Fine	5.7 - 8.0	R	6	0	6	5%	36%
.31 - .44	Medium	8.0 - 11.3	A	6	0	6	5%	41%
.44 - .63	Medium	11.3 - 16.0	V	8	0	8	7%	48%
.63 - .89	Coarse	16.0 - 22.6	E	6	0	6	5%	53%
.89 - 1.26	Coarse	22.6 - 32.0	L	24	0	24	21%	74%
1.26 - 1.77	Very Coarse	32.0 - 45.0	S	8	0	8	7%	81%
1.77 - 2.5	Very Coarse	45.0 - 64.0		4	0	4	3%	84%
2.5 - 3.5	Small	64 - 90	C	8	0	8	7%	91%
3.5 - 5.0	Small	90 - 128	O	0	0	0	0%	91%
5.0 - 7.1	Large	128 - 180	B	0	0	0	0%	91%
7.1 - 10.1	Large	180 - 256	L	0	0	0	0%	91%
10.1 - 14.3	Small	256 - 362	B	0	0	0	0%	91%
14.3 - 20	Small	362 - 512	L	0	0	0	0%	91%
20 - 40	Medium	512 - 1024	D	0	0	0	0%	91%
40 - 80	Lrg- Very Lrg	1024 - 2048	R	0	0	0	0%	91%
	Bedrock		BDRK	10	0	10	9%	100%
			Totals	**116**	**0**	**116**	**100%**	**100%**

d16	d35	d50	d84	d95
0.7	7.5	18.0	61.3	Bedrock



PEBBLE COUNT								
Project:	Mary's Creek Tributary					**Date:**	1/18/2012	
Location:	Cross Section #2							
				Particle Counts				
Inches	Particle	Millimeter		Riffles	Pools	Total No.	Item %	% Cumulative
	Silt/Clay	< 0.062	S/C	20	0	20	19%	19%
	Very Fine	.062 - .125	S	4	0	4	4%	23%
	Fine	.125 - .25	A	4	0	4	4%	26%
	Medium	.25 - .50	N	0	0	0	0%	26%
	Coarse	.50 - 1.0	D	0	0	0	0%	26%
.04 -.08	Very Coarse	1.0 - 2.0	S	14	0	14	13%	40%
.08 - .16	Very Fine	2.0 - 4.0		0	0	0	0%	40%
.16 - .22	Fine	4.0 - 5.7	G	24	0	24	23%	62%
.22 - .31	Fine	5.7 - 8.0	R	14	0	14	13%	75%
.31 - .44	Medium	8.0 - 11.3	A	14	0	14	13%	89%
.44 - .63	Medium	11.3 - 16.0	V	6	0	6	6%	94%
.63 - .89	Coarse	16.0 - 22.6	E	2	0	2	2%	96%
.89 - 1.26	Coarse	22.6 - 32.0	L	0	0	0	0%	96%
1.26 - 1.77	Very Coarse	32.0 - 45.0	S	0	0	0	0%	96%
1.77 - 2.5	Very Coarse	45.0 - 64.0		0	0	0	0%	96%
2.5 - 3.5	Small	64 - 90	C	2	0	2	2%	98%
3.5 - 5.0	Small	90 - 128	O	2	0	2	2%	100%
5.0 - 7.1	Large	128 - 180	B	0	0	0	0%	100%
7.1 - 10.1	Large	180 - 256	L	0	0	0	0%	100%
10.1 - 14.3	Small	256 - 362	B	0	0	0	0%	100%
14.3 - 20	Small	362 - 512	L	0	0	0	0%	100%
20 - 40	Medium	512 - 1024	D	0	0	0	0%	100%
40 - 80	Lrg- Very Lrg	1024 - 2048	R	0	0	0	0%	100%
	Bedrock		BDRK	0	0	0	0%	100%
			Totals	**106**	**0**	**106**	**100%**	**100%**

d16	d35	d50	d84	d95
0.1	1.7	4.9	9.9	18.1

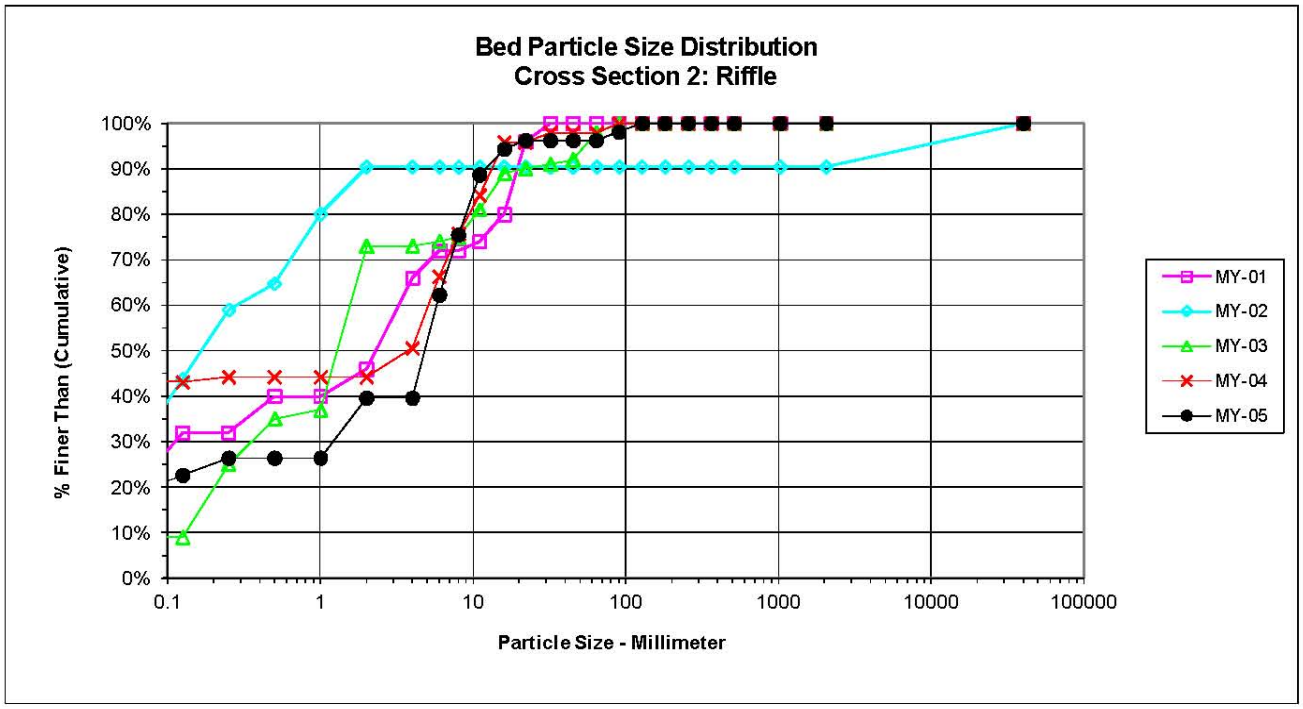


Table 10a. Baseline Stream Data Summary
Mary's Creek (241) - Main Channel (1632 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Mn	Mean	Med	Max	SD[5]	n	Mn	Mean	Med	Max	SD[5]	n	Mn	Med	Max	Mn	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)							34.5											18				26.5			
Floodprone Width (ft)							37											54				54			
Bankfull Mean Depth (ft)							0.7											1.5				1.1			
[1]Bankfull Max Depth (ft)																									
Bankfull Cross Sectional Area (ft^2)							24.1											28				28.1			
Width/Depth Ratio							50											12				25			
Entrenchment Ratio							1.07											3				2			
[1]Bank Height Ratio							2.9											1				1			
Profile																									
Riffle Length (ft)																				17		45	31		
Riffle Slope (ft/ft)							0.023											0.005		0.004		0.01	0.007		
Pool Length (ft)																				20		34	27		
Pool Max depth (ft)																									
Pool Spacing (ft)					28			148										41		30		90	45		
Pattern																									
Channel Beltwidth (ft)							105										54	81	108	30		65	100		
Radius of Curvature (ft)																	36	45	54	40		59	78		
Rc:Bankfull width (ft/ft)																									
Meander Wavelength (ft)					330		585	840									54	99	144	68		100	133		
Meander Width Ratio							3										3	4.5	6	1.1		2.5	3.8		
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2																									
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m^2																									
Additional Reach Parameters																									
Rosgen Classification							F4											C4				C4			
Bankfull Velocity (fps)																									
Bankfull Discharge (cfs)																									
Valley length (ft)																									
Channel Thalweg length (ft)							1750											1632				1632			
Sinuosity (ft)							1.03											1.2				1.2			
Water Surface Slope (Channel) (ft/ft)							0.0057											0.0031				0.0033			
BF slope (ft/ft)							0.0057											0.0031				0.0034			
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Table 10b. Baseline Stream Data Summary
Mary's Creek (241) - Tributary (450 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)																		12							
Floodprone Width (ft)																		36							
Bankfull Mean Depth (ft)																		1							
[1]Bankfull Max Depth (ft)																									
Bankfull Cross Sectional Area (ft^2)																		11							
Width/Depth Ratio																		12							
Entrenchment Ratio																		3							
[1]Bank Height Ratio																		1							
Profile																									
Riffle Length (ft)																				16		30	44		
Riffle Slope (ft/ft)																		0.008		0.005		0.007	0.01		
Pool Length (ft)																									
Pool Max depth (ft)																				14		28	41		
Pool Spacing (ft)																		28		45		56	67		
Pattern																									
Channel Beltwidth (ft)																	36	54	72	28			35		
Radius of Curvature (ft)																	24	30	36	38		46	54		
Rc:Bankfull width (ft/ft)																									
Meander Wavelength (ft)																	36	66	96	na		108	na		
Meander Width Ratio																	3	4.5	6	2.4			3		
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2																									
Max part size (mm) mobilized at bankfull																									
Stream Power (transport capacity) W/m^2																									
Additional Reach Parameters																									
Rosgen Classification																		C4				C4			
Bankfull Velocity (fps)																									
Bankfull Discharge (cfs)																									
Valley length (ft)																									
Channel Thalweg length (ft)																		450				450			
Sinuosity (ft)																		1.2				1.2			
Water Surface Slope (Channel) (ft/ft)																		0.0044				0.0039			
BF slope (ft/ft)																		0.0044				0.0037			
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

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

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

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

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

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)																										
Mary's Creek (241) - Main Channel (1632 feet)																										
	Cross Section 1 (Pool)							Cross Section 2 (Riffle)							Cross Section 3 (Pool)							Cross Section 4 (Riffle)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used		505.9	505.8	505.2	505.9	505.9			505.3	505.2	505.5	505.3	505.3			NA	N/A	502.1	504.3	504.3			NA	500.5	500.4	500.5	500.4	
Bankfull Width (ft)		18.3	18	18.2	17.95	18.14			26.6	20.19	24.74	16.84	16.84			NA	25.22	26.63	24.92	24.92			NA	21.28	23.29	24.97	24.97	
Floodprone Width (ft)		54	54	54	54	54			54	54	54	54	54			NA	81.88	88.06	82	82			NA	81.77	84.45	82	82	
Bankfull Mean Depth (ft)		1.5	1.361	1.259	1.337	1.349			1	1.061	1.127	1.265	1.265			NA	0.935	0.961	0.95	0.95			NA	1.381	1.45	1.936	1.936	
Bankfull Max Depth (ft)		2.8	2.77	2.7	2.87	2.93			2.2	2.21	2.425	2.44	2.44			NA	2.055	2.25	2.32	2.32			NA	2.47	2.58	2.92	2.92	
Bankfull Cross Sectional Area (ft^2)		27.3	24.49	22.92	24	24.46			26.6	21.41	27.87	21.3	21.3			NA	23.57	25.59	23.66	23.66			NA	29.4	33.78	48.35	48.35	
Bankfull Width/Depth Ratio		12.3	13.22	14.46	13.43	13.45			26.6	19.04	21.96	13.32	13.32			NA	26.98	27.71	26.25	26.25			NA	15.4	16.06	12.9	12.9	
Bankfull Entrenchment Ratio		2.95	3.001	2.966	3.008	2.977			2	2.675	2.183	3.206	3.206			NA	3.247	3.307	3.29	3.29			NA	3.843	3.626	3.284	3.284	
Bankfull Bank Height Ratio		1	1	1	1.098	1.085			1	0.873	0.915	0.918	0.918			NA	0.701	0.978	0.832	0.832			NA	1	1	0.925	0.925	
Cross Sectional Area between end pins (ft^2)					35.79	36.69						61.85	61.85						173.9	173.9						282.2	282.2	
d50 (mm)		NA	NA	NA	NA	NA			0.23	21.75	47.7	8.9	16			NA	N/A	NA	NA	NA			NA	50.7	17.3	12.3	18	

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 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)Mary's Creek (241) - Tributary (450 feet)														
	Cross Section 1 (Pool)							Cross Section 2 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	506.2	506.2	506.2	506.2	506.2	506.2		506.7	505.8	505.9	505.9	505.7	505.7	
Bankfull Width (ft)	15.1	14.7	13.39	12.76	8.727	9.754		11.8	11.2	12.2	12.02	10.1	10.61	
Floodprone Width (ft)	36	36	36	36	36	36		36	36	36	36	36	36	
Bankfull Mean Depth (ft)	1.1	0.9	0.845	0.74	0.9	0.705		8	0.8	0.728	0.617	0.7	0.6	
Bankfull Max Depth (ft)	2.1	1.8	1.81	1.47	1.8	1.45		1.4	1.4	1.3	1.385	1.4	1.36	
Bankfull Cross Sectional Area (ft^2)	17.2	13	11.32	9.443	7.4	6.875		10	8.8	8.881	7.421	7.3	6.373	
Bankfull Width/Depth Ratio	13.3	16.5	15.85	17.24	10.2	13.84		13.9	14.3	16.76	19.47	14	17.68	
Bankfull Entrenchment Ratio		2.4	2.688	2.821	4.125	3.691			3.2	2.951	2.995	3.564	3.392	
Bankfull Bank Height Ratio		1	1	0.966	0.977	0.897			1	1	0.794	1.032	0.735	
Cross Sectional Area between end pins (ft^2)					103.2	103.6						54.08	53.67	
d50 (mm)	NA	NA	NA	NA	NA	NA		NA	1.8	0.18	1.4	3.8	4.9	

Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary
Mary's Creek (241) - Main Channel (1632 feet)

Parameter	Baseline						MY-1						MY-2						MY-3						MY-4						MY-5					
Dimension and Substrate - Riffle only	Mn	Mean	Med	Max	SD[4]	n	Mn	Mean	Med	Max	SD[4]	n	Mn	Mean	Med	Max	SD[4]	n	Mn	Mean	Med	Max	SD[4]	n	Mn	Mean	Med	Max	SD[4]	n	Mn	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)			28						29.3				20.2		25.4	30.6			22.1		27.1	32.1			16.8		20.9	25			17.6		25.6	33.6		
Floodprone Width (ft)			54						54				54		68	82			54		68	82			54		68	82			54		68	82		
Bankfull Mean Depth (ft)			1.06						1.04				1.06		1.11	1.15			1.07		1.11	1.15			1.26		1.6	1.94			1.17		1.22	1.26		
[1]Bankfull Max Depth (ft)			2.14						2.37				2.21		2.46	2.71			2.33		2.5	2.66			2.44		2.68	2.92			2.59		2.77	2.95		
Bankfull Cross Sectional Area (ft^2)			29.6						30.5				21.4		28.3	35.2			25.4		29.8	34.2			21.3		34.8	48.4			22.3		30.8	39.4		
Width/Depth Ratio			26.4						28.1				19		22.8	26.6			19.2		24.6	30.1			12.9		13.1	13.3			14		21.3	28.6		
Entrenchment Ratio			1.93						1.85				2.67		2.68	2.68			2.45		2.5	2.56			3.21		3.24	3.28			2.44		2.75	3.06		
[1]Bank Height Ratio			0.93						0.77				0.87		0.89	0.91			0.95		0.96	0.97			0.92		0.92	0.92			1		1	1		
Profile																																				
Riffle Length (ft)							18		19.5	23			2.2		27	108			3.3		20.5	65.1			2.55	24.5	16.4	66.3	19	23	3.1	23.4	18.2	60.3	17.5	21
Riffle Slope (ft/ft)							0.01		0.01	0.02			0		0.02	0.05			0.01		0.02	0.05			0	0.03	0.02	0.1	0.02	20	0	0.03	0.02	0.13	0.03	18
Pool Length (ft)							22		31	67			7.7		41.6	98			15		30	89			14.6	39.8	33.8	93.4	21.6	25	17.8	56.8	42.6	252	52.3	20
Pool Max depth (ft)																									1.88	2.82	2.69	4.42	0.61	25	1.94	8.14	3.27	103	22.4	20
Pool Spacing (ft)							35		70	92			36		85	222			27		57	148			20.8	64.2	59.4	125	29.3	24	21.3	81.4	71.3	178	46.1	19
Pattern																																				
Channel Beltwidth (ft)																																				
Radius of Curvature (ft)																																				
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)																																				
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							C4						C4						C4						C4						C4					
Channel Thalweg length (ft)							1632						1662						1662						1662						1662					
Sinuosity (ft)							1.2						1.09						1.09						1.11						1.11					
Water Surface Slope (Channel) (ft/ft)							0.0038						0.0062						0.0065						0.0063						0.00655					
BF slope (ft/ft)							0.0034						0.0057						0.006						0.0063						0.00636					
[3]Ri% / Ru% / P% / G% / S%													26%		43%				39%		55%				36%		61%				30%		70%			
[3]SC% / Sa% / G% / C% / B% / Be%													5%	10%	51%	15%	0%	19%	0%	10%	60%	7%	0%	23%	12%	12%	57%	5%	0%	12%	6%	20%	55%	8%	0%	11%
[3]d16 / d35 / d50 / d84 / d95 /													2.64	20.7	36.2	53	Be		10.5	22.9	32.5	33.1	124		0.53	6.54	10.6	22.5	Bdrk		0.57	6.58	17	73.6	Bdrk	
[2]% of Reach with Eroding Banks															2%						1%						2%						0%			
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Exhibit Table 11b. Monitoring Data - Stream Reach Data Summary Mary's Creek (241) - Tributary (450 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)								11.2						12.2						12						10.1						10.6				
Floodprone Width (ft)								36						36						36						36						36				
Bankfull Mean Depth (ft)								0.8						0.73						0.62						0.72						0.6				
[1]Bankfull Max Depth (ft)								1.4						1.3						1.39						1.42						1.36				
Bankfull Cross Sectional Area (ft^2)								8.8						8.88						7.42						7.28						6.37				
Width/Depth Ratio								14.3						16.8						19.5						14						17.7				
Entrenchment Ratio								3.2						2.95						2.99						3.56						3.39				
[1]Bank Height Ratio								1						1						0.79						1.03						0.74				
Profile																																				
Riffle Length (ft)							17		29	34			3		21	42			3		10	38			2.43	16.1	11.7	42.8	12.4	11	4.79	13	11.7	21.5	5.8	9
Riffle Slope (ft/ft)							0.01		0.01	0.02			0		0.02	0.03			0		0.01	0.03			0.01	0.03	0.02	0.08	0.02	10	0.01	0.02	0.02	0.03	0.01	8
Pool Length (ft)							13		18	50			10		18	30			3		12	31			7.24	23.1	17.9	79	20.3	11	8.22	38.9	26	81.6	30.2	9
Pool Max depth (ft)																									1.22	1.84	1.92	2.22	0.32	11	1.09	1.68	1.6	2.69	0.47	9
Pool Spacing (ft)							32		65	74			26		44	67			12		26	56			19.4	41.4	38.8	68.7	16.7	10	17.5	55	45.7	126	34.2	8
Pattern																																				
Channel Beltwidth (ft)																																				
Radius of Curvature (ft)																																				
Rc:Bankfull width (ft/ft)																																				
Meander Wavelength (ft)																																				
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							C4						C4						C4						C4						C4					
Channel Thalweg length (ft)							450						469						469						469						469					
Sinuosity (ft)							1.2						1.11						1.11						1.15						1.15					
Water Surface Slope (Channel) (ft/ft)							0.0034						0.0076						0.0076						0.0073						0.00621					
BF slope (ft/ft)							0.0037						0.0062						0.0052						0.003						0.00376					
[3]Ri% / Ru% / P% / G% / S%													37%		28%				40%		53%				40%		57%				25%		75%			
[3]SC% / Sa% / G% / C% / B% / Be%													29%	61%	0%	0%	0%	10%	9%	64%	25%	2%	0%	0%	43%	1%	54%	2%	0%	0%	19%	21%	56%	2%	2%	0%
[3]d16 / d35 / d50 / d84 / d95 /															0.18	1.38			SC	0.5	1.4	12.9	54.5		0.1	0.1	3.8	10.9	15.7		0.11	1.65	4.92	9.94	18.1	
[2]% of Reach with Eroding Banks													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
4. = Of value/needed only if the n exceeds 3

Appendix E. Stream Assessment Data

Table 12. Verification of Bankful Events

Mary's Creek (EEP #241)			
Date of Data Collection	**Date of Occurrence**	**Method**	**Photo #**
Late 2005/Early 2006	Late 2005/Early 2006	Visual during construction	N/A
September 18, 2008	September 7, 2008	Wrack lines	N/A
July 24, 2009	Unsure (June 6, 2009)	Crest Gauge	N/A
June 15, 2010	May 17, 2010 (3.3" rain event)	Wrack lines/Crest Gauge	N/A
August 30, 2011	Unknown	Wrack lines	N/A