Camp Branch Stream Restoration
Project No. 92350
2010 Monitoring Report: Year 4 of 5

July 2011

Prepared for: NCDENR-EEP
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Ecosystem Enhancement PROGRAM

NCDENR

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EXECUTIVE SUMMARY

SECTION 1
EXECUTIVE SUMMARY

The Camp Branch Stream Restoration Project (Site) is located in Anson County, North Carolina on property owned by Mr. John Bishop within the Piedmont Eco-Region of the Yadkin River Basin (USGS Subbasin HUC 03040105) (Appendix 1.1). The Site is one of two separate Ecosystem Enhancement Program (EEP) projects located on the 200-acre Bishop Property, each confined within a North Carolina Department of Transportation (NCDOT)-owned conservation easement. The stream preservation/enhancement/restoration plan was designed by EcoScience Corporation and constructed by Vaughn Construction, Inc. Construction and planting activities were completed in February 2007. As-built surveys for the Site were performed in May 2007. The first annual monitoring activities were conducted in October 2007.

This report serves as the fourth year of the five year monitoring plan for the Site.

1.1 Goals and Objectives

Prior to restoration, the site was predominantly utilized for row cropping and recreational activities, such as hunting and wildlife viewing. Historically, drainage features and wetland areas were dredged, straightened, and filled in to provide land for agricultural purposes. These activities are thought to have inhibited stream channel stability and water quality; therefore, producing an incised, eroded stream. Primary goals for the site were to restore stable dimension, pattern, and profile for impacted on-site stream reaches. Secondary Site restoration goals included stream channel enhancement and preservation. These goals were achieved via planting bare root seedlings to recreate pre-disturbance vegetative communities within their appropriate landscape contexts.

Restoration goals for this project include:

- Re-establishment of the characteristic, pre-disturbance Piedmont Bottomland Forest (Schafale and Weakley 1990) community adjacent to restoration reaches using bare root seedling plantings.

The project objectives include:

- Priority II stream restoration (including all attendant benefits outlined in Rosgen 1996) via excavation of approximately 1,767 linear feet (lf) of a designed E/C-type stream of the main Camp Branch channel on new location, including adjacent floodplain excavation to achieve an entrenchment ratio characteristic of E/C-type streams.

- Priority I stream restoration (including all attendant benefits outlined in Rosgen 1996) of approximately 403 lf and Priority II restoration of approximately 143 lf of a designed E/C-type stream of a UT to Camp Branch, including floodplain excavation along the UT upstream of Camp Branch to achieve a stable confluence.

- Level II stream enhancement of approximately 945 lf of Camp Branch upstream of its confluence with the UT via riparian plantings adjacent to the Camp Branch stream banks.

The main reach of Camp Branch was restored by relocating approximately 1,767 lf of the existing channel (Restoration, Priority 2) and restoring approximately 403 lf (Restoration, Priority 1) and 143 lf (Restoration, Priority 2) of its tributary. Camp Branch (Reach 1) and its tributary (Reach 4) were designed as an E/C-type stream. Bankfull benches were created along Reach 1 and 4 to re-establish floodplain connection at the existing stream elevation. Along Reach 3, the tributary's streambed was raised to re-connect the channel with its floodplain at a higher elevation. The Site's riparian areas were planted to improve habitat and stabilize stream banks via planting bare root seedlings to recreate pre-disturbance vegetative communities within their appropriate landscape contexts. Appendix 2 provides more detailed project activity, history, contact information, and watershed/site background information for this project.

1.2 Vegetative Assessment

JJG conducted the 2010 (year 4 of 5) vegetative assessment and vegetative plot analysis in February 2011 per the 2006 CVS-EEP Level 2 protocol (Lee et al., 2006). The seven vegetative plots previously established in the design phase were selected randomly and represent the riparian buffer zone. Vegetative monitoring success criteria as stated in the 2007 mitigation plan requires an average number of planted stems per acre exceeding 320 stems/acre after the third year of monitoring, 288 stems/acre after the fourth year of monitoring, and 260 stems/acre after the fifth and final year of project monitoring.

The monitoring data recorded an average of 34 planted live stems per plot. The site density is approximately 931 planted stems per acre, which exceeds the year 4 goal of 288 planted stems per acre. Although all plots met the vegetation success threshold with the exception of plot 1, the results from plot 1 did not affect the site's average survivability to be considered unsuccessful. Plot 1 is located in the preservation reach, which has an existing hardwood forest within the floodplain. The vigor of the live planted stems within the plots also appears to have been affected by wildlife activity and drought over the monitoring years. Planted stems that were struggling in previous years have continued to improve in vigor, with the exception of those in plot 1 as discussed above.

In conclusion, the vegetation throughout the stream and riparian restoration project meets the success requirements. Although some loss of vegetation has occurred, the overall growth of the riparian buffer is good. Per the success criterion for the 2010 monitoring year, the site has exceeded 320 stems per acre. Please refer to Appendix 3 for more detailed information on the 2010 vegetation data.

1.3 Stream Assessment

Results from the 2010 stream monitoring effort indicate that Camp Branch and its tributary are maintaining vertical and lateral stability with minimal bank erosion. Although some areas are illustrating minor erosion, visual assessments along the channel indicated that there are no major advancements toward instability within the reach.

Main Channel

Overall, the main channel is maintaining both lateral and vertical stability. The average bankfull width (22.5 ft) of the surveyed cross-sections is very close to the upper range of the proposed design range of 16-22 ft. The thalweg profile appears to be stable, and is characterized by well-defined riffle and pool features. The average water surface slope and the average bankfull slope were very similar for the surveyed reach, 0.0038 ft/ft and 0.0034 ft/ft, respectively.

All four cross-section pebble counts within the Main Channel indicate a trend toward finer sediment composition. Compared to MY-3, the overall trend appears to be toward aggradation of the bedform. The accumulation of finer substrate may indicate erosion in upstream areas.

Tributary

Based on current monitoring data and the visual inspection, the channel's dimension appears to be functioning properly and maintaining stability. No erosional failure was observed along this reach. The average bankfull width (6.6 ft) of the surveyed cross-sections is similar to the proposed design width of 6.4 ft. Compared to the MY3 (2009) data, the thalweg profile appears to have shifted from well-defined riffle and pool features to a continuous run. The reasons for this shift are uncertain at this time, but the tributary will be reevaluated in the MY5 (2011) survey and the results conveyed promptly to EEP to determine if any action is needed. The average water surface slope and the average bankfull slope were very similar for the surveyed reach, 0.0102 ft/ft and 0.0092 ft/ft, respectively.

Pebble counts within the Tributary indicate a trend toward finer sediment composition compared to previous monitoring years. This decrease in bedform distribution diversity may indicate erosion in upstream areas.

Two crest gauges are located on the Camp Branch Site. One is located on the main channel upstream of cross-section 1 and the second is located on the UT upstream of cross-section 5. At least one bankfull event occurred within the 2010 monitoring year, which was verified through field indicators such as wrack lines and other visual observations.

1.5 Annual Monitoring Summary

In summary, the Site has met the stream and vegetation mitigation goals for monitoring year 4. The 2010 vegetation plot monitoring results indicate that the planted and naturally recruited vegetation is doing well at the site, although some minor vegetation problems were noted due to

herbivory from deer and drought. The pattern, profile, and dimension of the restored channel appear to be maintaining vertical and lateral stability with minimal bank erosion. As discussed above, the profile of the unnamed tributary appears to have experienced a relatively significant change from MY3. This reach will be reevaluated in the MY5 (2011) survey. Corrective measures will be discussed with EEP if the MY5 profile characteristics are similar to those found in MY4.

As in previous years, a few problem areas were observed, such as moderate bank erosion, moderate to poor streambank cover, patches of in-stream vegetation, and aggradation. These areas of stream instability do not appear to have advanced from the previous monitoring years; however, these areas will continue to be monitored closely for shifts in the bed features and the channel thalweg. Heavy sediment deposition is occurring on the downstream end of the main channel where the restoration reach converges with the preservation reach but is not causing stream instability at this time.

The background information provided in this report is referenced from the mitigation plan and previous monitoring reports prepared by EcoScience (2007). Summary information/data related to the occurrence of items such as beaver or encroachment and statistics related to performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the mitigation and restoration plan documents available on EEP's website. All raw data supporting the tables and figures in the appendices is available from EEP upon request.

SECTION 2
METHODOLOGY

SECTION 2
METHODOLOGY

2.1 Methodology

Methods employed for the Camp Branch Stream Restoration Project were a combination of those established by standard regulatory guidance and procedures documents as well as previous monitoring reports completed by EcoScience. Geomorphic and stream assessments were performed following guidelines outlined in the Stream Channel Reference Sites: An Illustrated Guide to Field Techniques (Harrelson et al., 1994) and in the Stream Restoration a Natural Channel Design Handbook (Doll et al, 2003). Vegetation assessments were performed following the Carolina Vegetation Survey-NCEEP Level 2 Protocol (Lee et al., 2006). JJG used the *Flora of the Carolinas, Virginia, Georgia, and surrounding areas* by Alan S. Weakley as the taxonomic standard for vegetation nomenclature for this report.

SECTION 3
REFERENCES

SECTION 3
REFERENCES

Doll, B.A., Grabow, G.L., Hall, K.A., Halley, J., Harman, W.A., Jennings, G.D., and Wise, D.E., 2003. Stream Restoration A Natural Channel Design Handbook.

EcoScience Corporation. 2007. Bishop Site Stream and Wetland Restoration 2007 Annual Monitoring Report (Year 1). Raleigh, NC.

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Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2006. CVS-EEP Protocol for Recording Vegetation, Version 4.0 (http://cvs.bio.unc.edu/methods.htm).

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

Weakley, A.S. 2008. *Flora of the Carolinas, Virginia, Georgia, Northern Florida, and Surrounding Areas* (Draft April 2008). University of North Carolina at Chapel Hill: Chapel Hill, NC.

SECTION 4
APPENDICES

Appendix 1 - General Figures and Plan Views

Appendix 2 - General Project Tables

Appendix 3 - Vegetation Assessment Data

Appendix 4 – Stream Assessment Data

APPENDIX 1
GENERAL FIGURES AND PLAN VIEWS

1.1 - Vicinity Map

1.2 - Current Condition Plan View

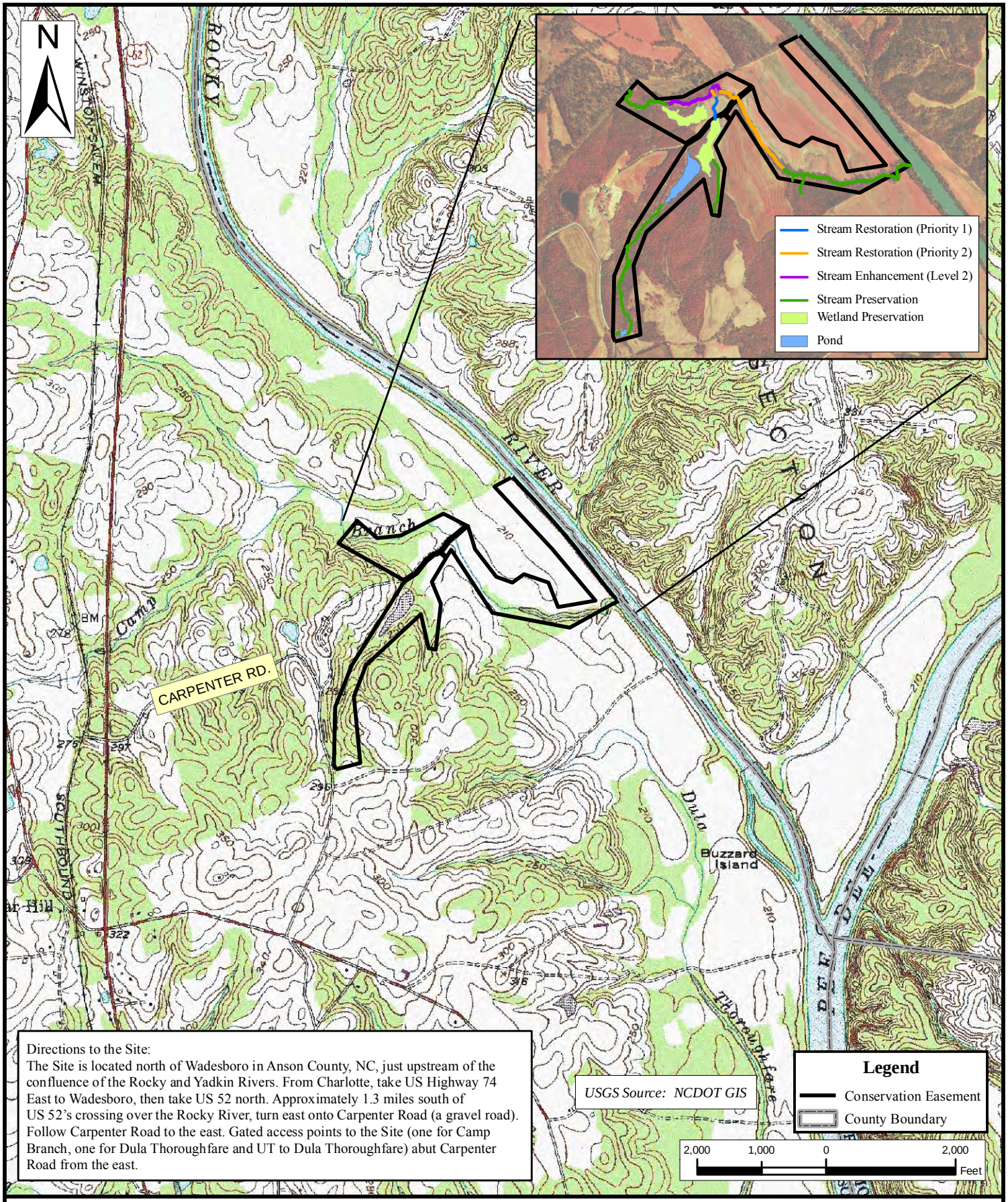
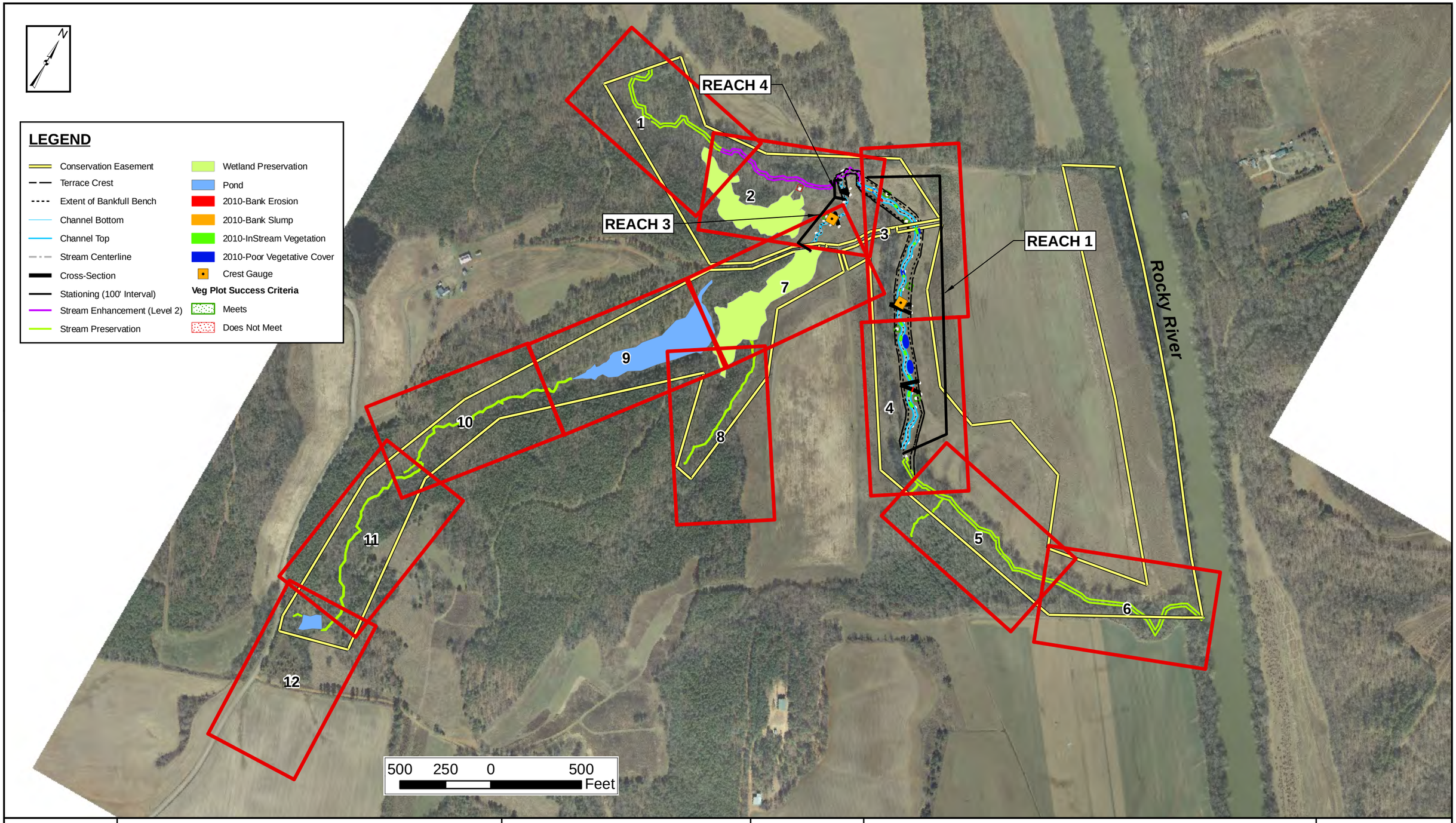


Figure 1. Project Vicinity Map
Camp Branch Stream Restoration/EEP Project No. 92350
Anson County, NC
Monitoring Year 4 of 5
Submittal Date: July 2011



NOTES:
1. GENERAL SITE DATA ARE PROVIDED BY NCEEP.
2. ALL LOCATIONS ARE APPROXIMATE

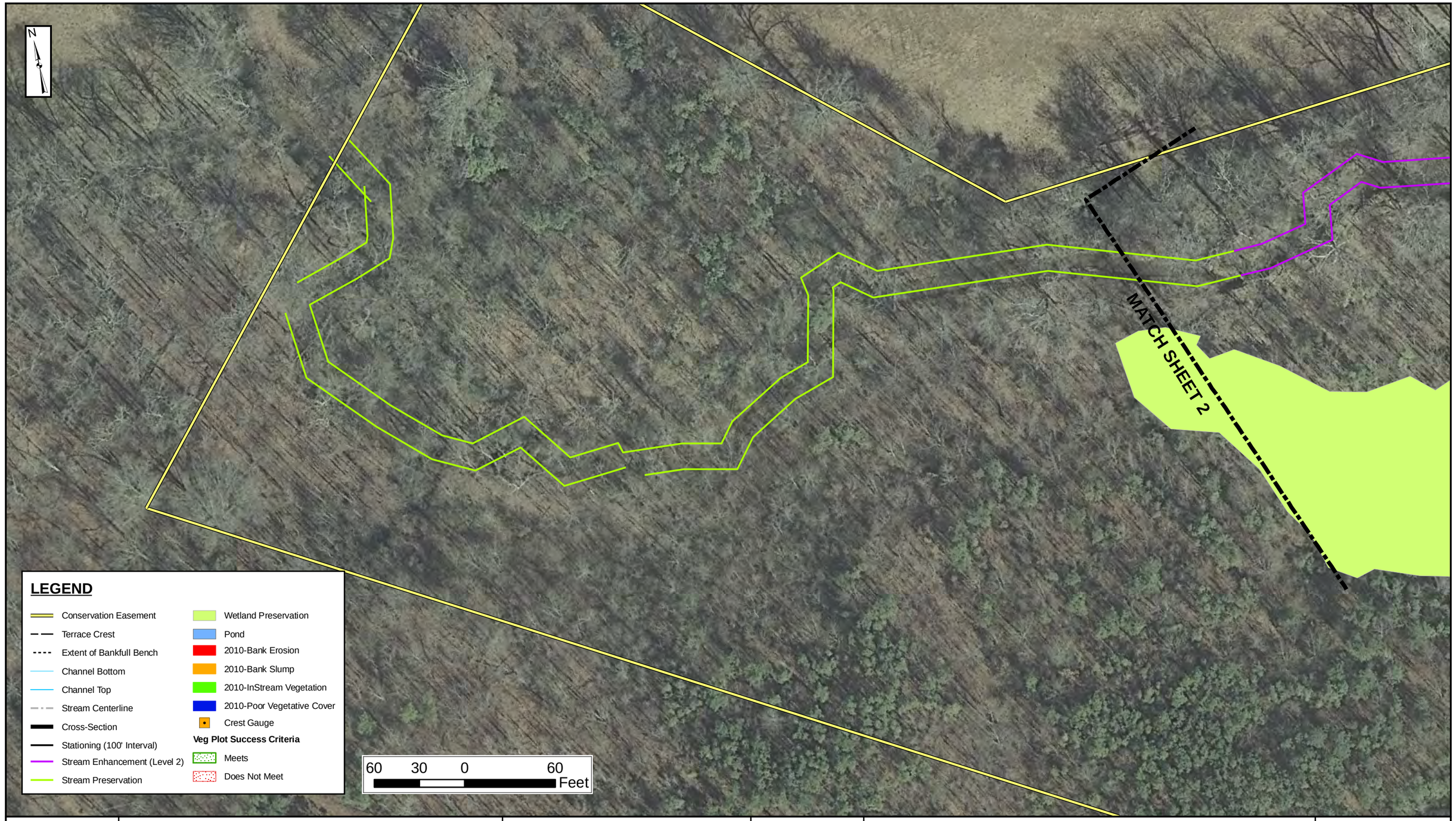
PROJECT NO. 92350
ANSON COUNTY
NORTH CAROLINA
MONITORING YEAR 4 OF 5

NC ECOSYSTEM ENHANCEMENT PROGRAM
CAMP BRANCH STREAM RESTORATION

CURRENT CONDITION PLAN VIEW

DATE: JULY 2011
SCALE: 1" = 60'
JOB NO.: JJX31100

FIGURE 2 INDEX



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NORTH CAROLINA
MONITORING YEAR 4 OF 5

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CAMP BRANCH STREAM RESTORATION

CURRENT CONDITION PLAN VIEW

DATE: JULY 2011
SCALE: 1" = 60'
JOB NO.: JJX31100

FIGURE 1 OF 12

LEGEND

- Conservation Easement
- Terrace Crest
- Extent of Bankfull Bench
- Channel Bottom
- Channel Top
- Stream Centerline
- Cross-Section
- Stationing (100' Interval)
- Stream Enhancement (Level 2)
- Stream Preservation
- Wetland Preservation
- Pond
- 2010-Bank Erosion
- 2010-Bank Slump
- 2010-InStream Vegetation
- 2010-Poor Vegetative Cover
- Crest Gauge

Veg Plot Success Criteria

- Meets
- Does Not Meet

MATCH SHEET 1

MATCH SHEET 7

MATCH SHEET 3

REACH 4

REACH 3

5+37.43

0+00

1+00

XS-4

3+00

XS-3

4+00

2+00

XS-1

XS-2

1+00

1

2

60 30 0 60 Feet

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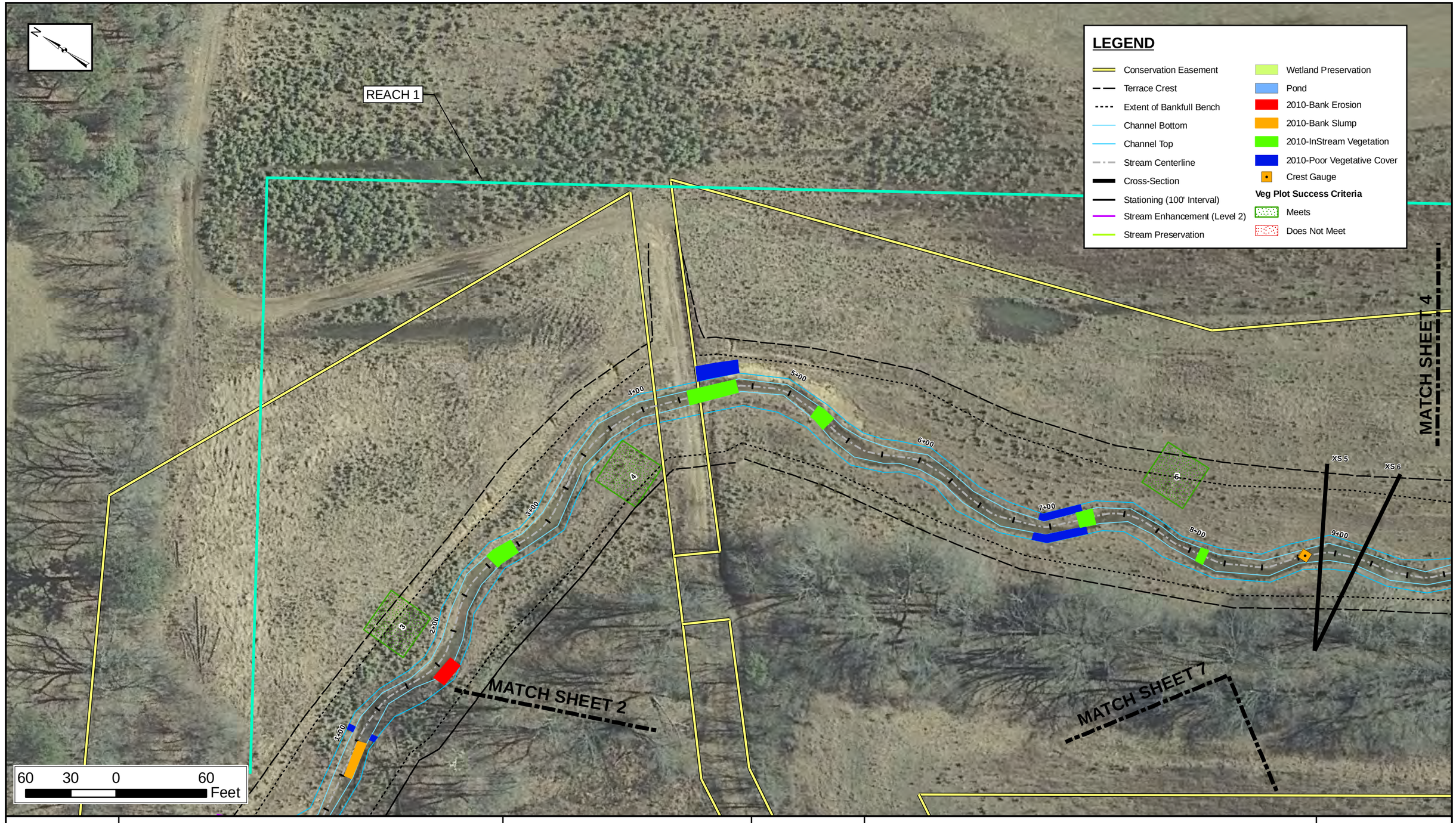
ANSON COUNTY
NORTH CAROLINA
MONITORING YEAR 4 OF 5

NC ECOSYSTEM ENHANCEMENT PROGRAM
CAMP BRANCH STREAM RESTORATION

CURRENT CONDITION PLAN VIEW

DATE: JULY 2011
SCALE: 1" = 60'
JOB NO.: JJX31100

FIGURE 2 OF 12



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CAMP BRANCH STREAM RESTORATION

CURRENT CONDITION PLAN VIEW

DATE: JULY 2011
SCALE: 1" = 60'
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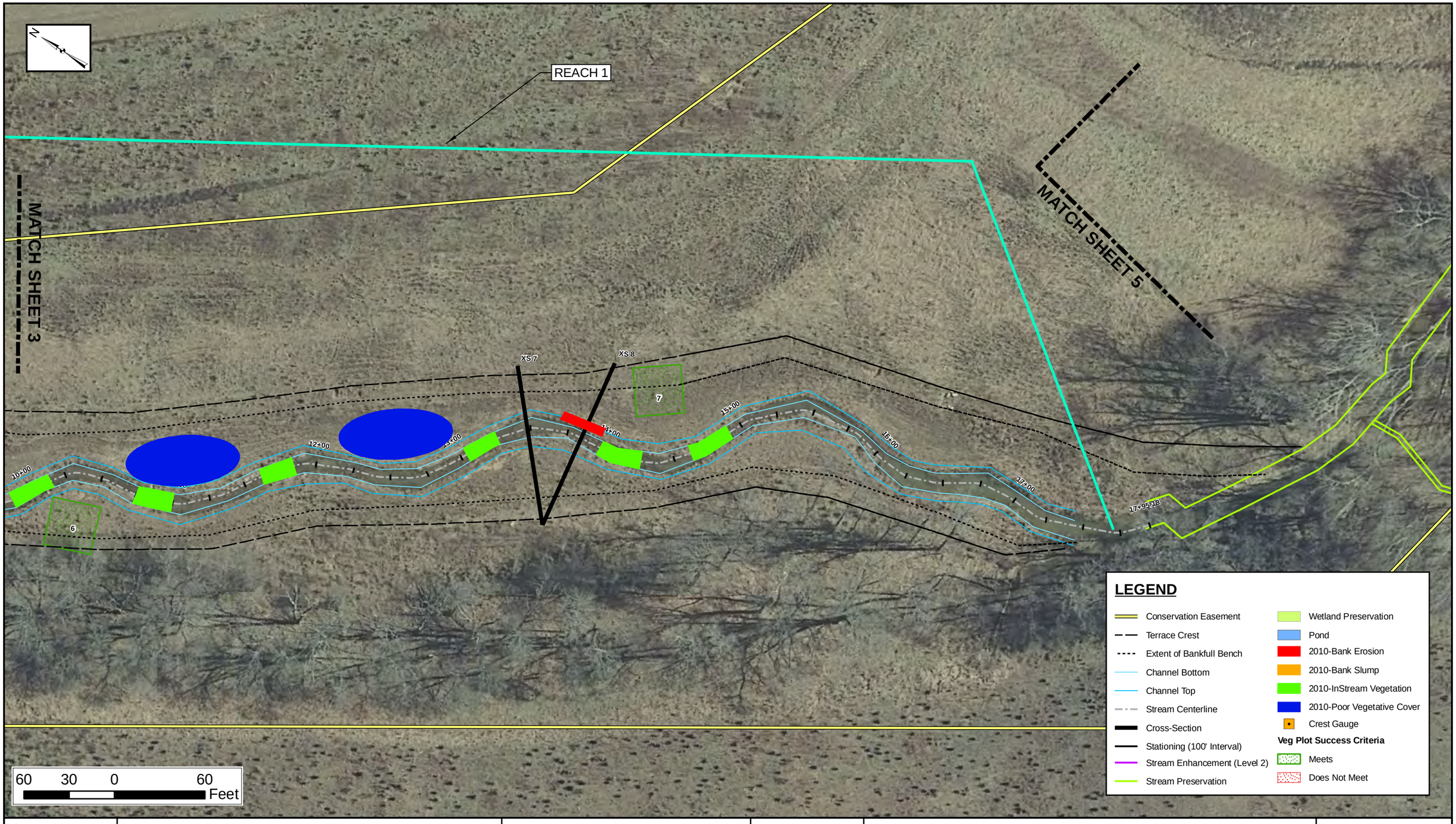
FIGURE 3 OF 12



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MONITORING YEAR 4 OF 5

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CAMP BRANCH STREAM RESTORATION

CURRENT CONDITION PLAN VIEW

DATE: JULY 2011
SCALE: 1" = 60'
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FIGURE 4 OF 12

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ANSON COUNTY
NORTH CAROLINA
MONITORING YEAR 4 OF 5

NC ECOSYSTEM ENHANCEMENT PROGRAM
CAMP BRANCH STREAM RESTORATION

CURRENT CONDITION PLAN VIEW

DATE: JULY 2011
SCALE: 1" = 60'
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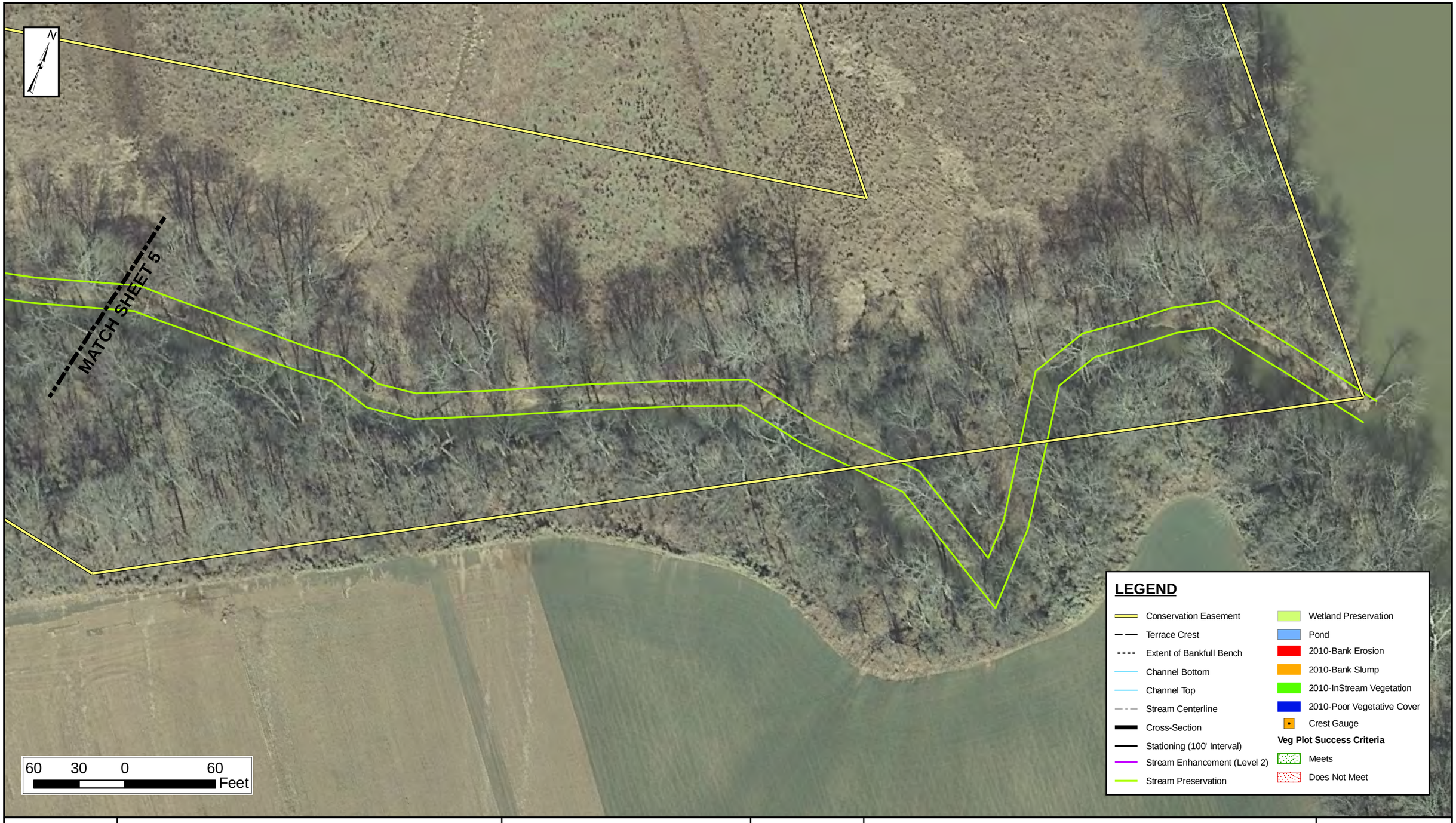
FIGURE 5 OF 12



Ecosystem Enhancement PROGRAM

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ANSON COUNTY
NORTH CAROLINA
MONITORING YEAR 4 OF 5

JJG

NC ECOSYSTEM ENHANCEMENT PROGRAM
CAMP BRANCH STREAM RESTORATION

CURRENT CONDITION PLAN VIEW

DATE: JULY 2011
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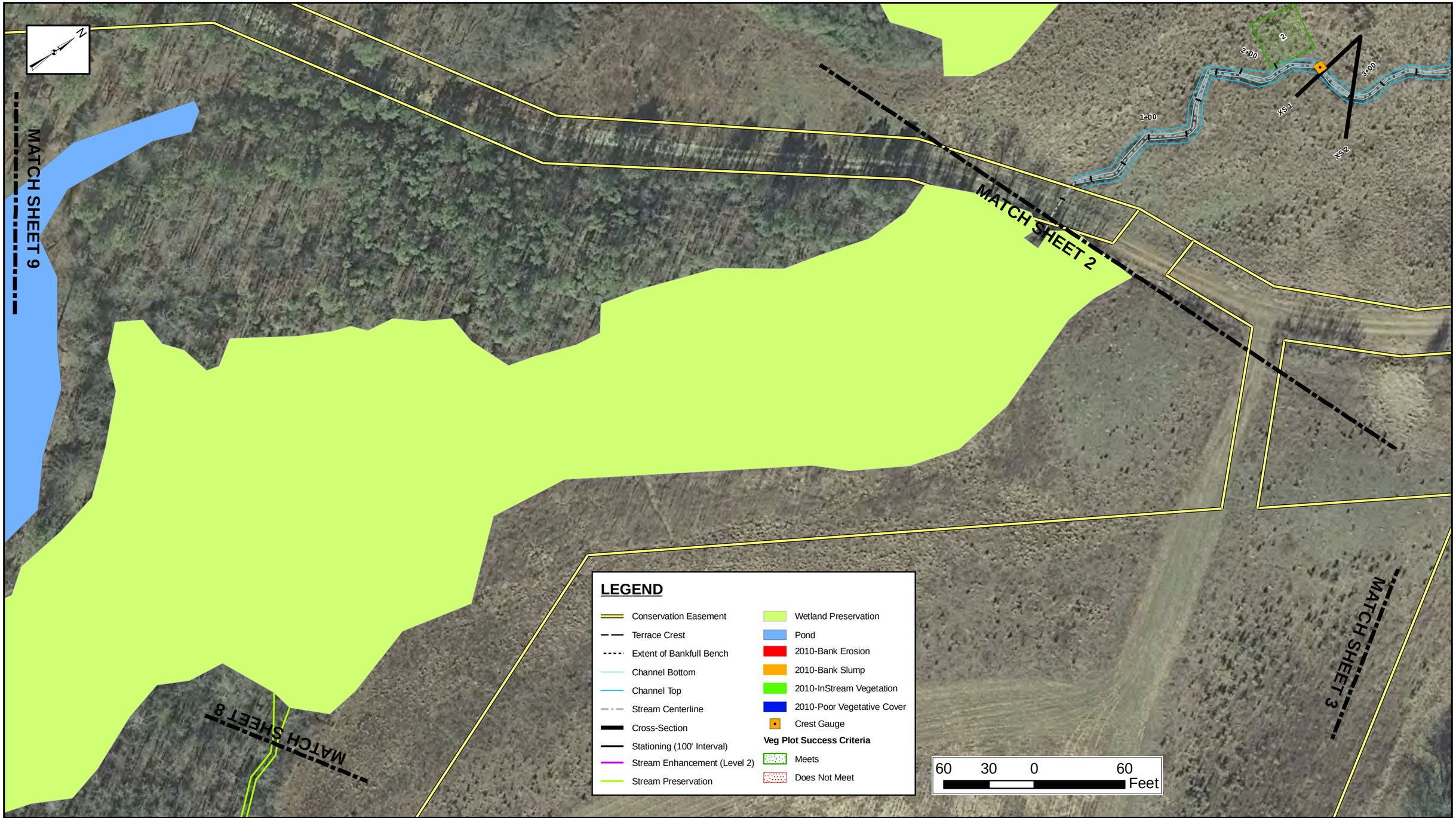
JOB NO.: JJX31100

FIGURE 6 OF 12



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ANSON COUNTY
NORTH CAROLINA
MONITORING YEAR 4 OF 5

NC ECOSYSTEM ENHANCEMENT PROGRAM
CAMP BRANCH STREAM RESTORATION

CURRENT CONDITION PLAN VIEW

DATE: JULY 2011
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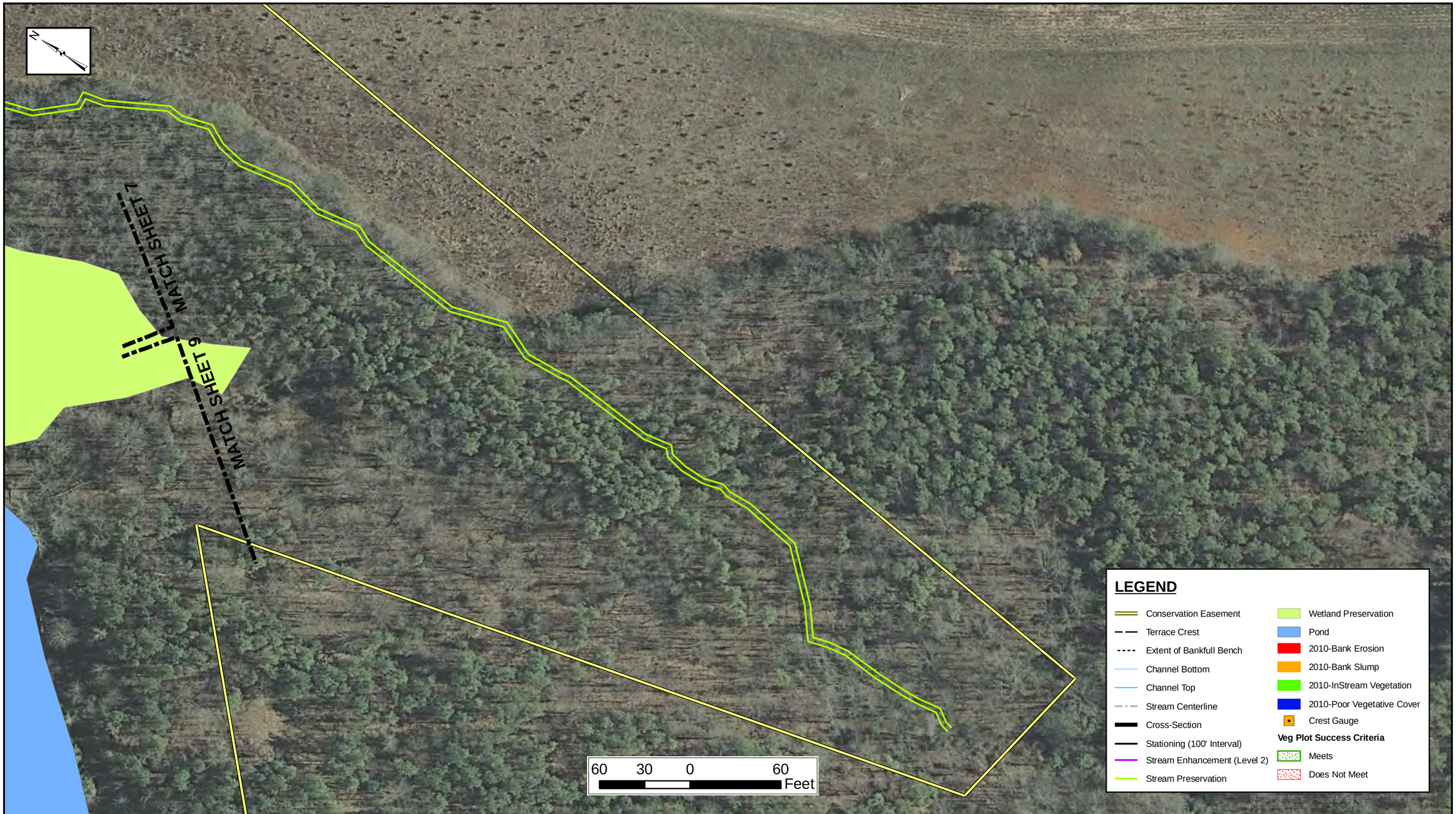
JOB NO.: JJX31100

FIGURE 7 OF 12



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ANSON COUNTY
NORTH CAROLINA
MONITORING YEAR 4 OF 5

NC ECOSYSTEM ENHANCEMENT PROGRAM
CAMP BRANCH STREAM RESTORATION

CURRENT CONDITION PLAN VIEW

DATE: JULY 2011
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JOB NO.: JJX31100

FIGURE 8 OF 12

MATCH SHEET 10

MATCH SHEET 7

MATCH SHEET 8

LEGEND

- Conservation Easement
- Terrace Crest
- Extent of Bankfull Bench
- Channel Bottom
- Channel Top
- Stream Centerline
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Veg Plot Success Criteria

- Meets
- Does Not Meet

60 30 0 60 Feet

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ANSON COUNTY
NORTH CAROLINA
MONITORING YEAR 4 OF 5

NC ECOSYSTEM ENHANCEMENT PROGRAM
CAMP BRANCH STREAM RESTORATION

CURRENT CONDITION PLAN VIEW

DATE: JULY 2011
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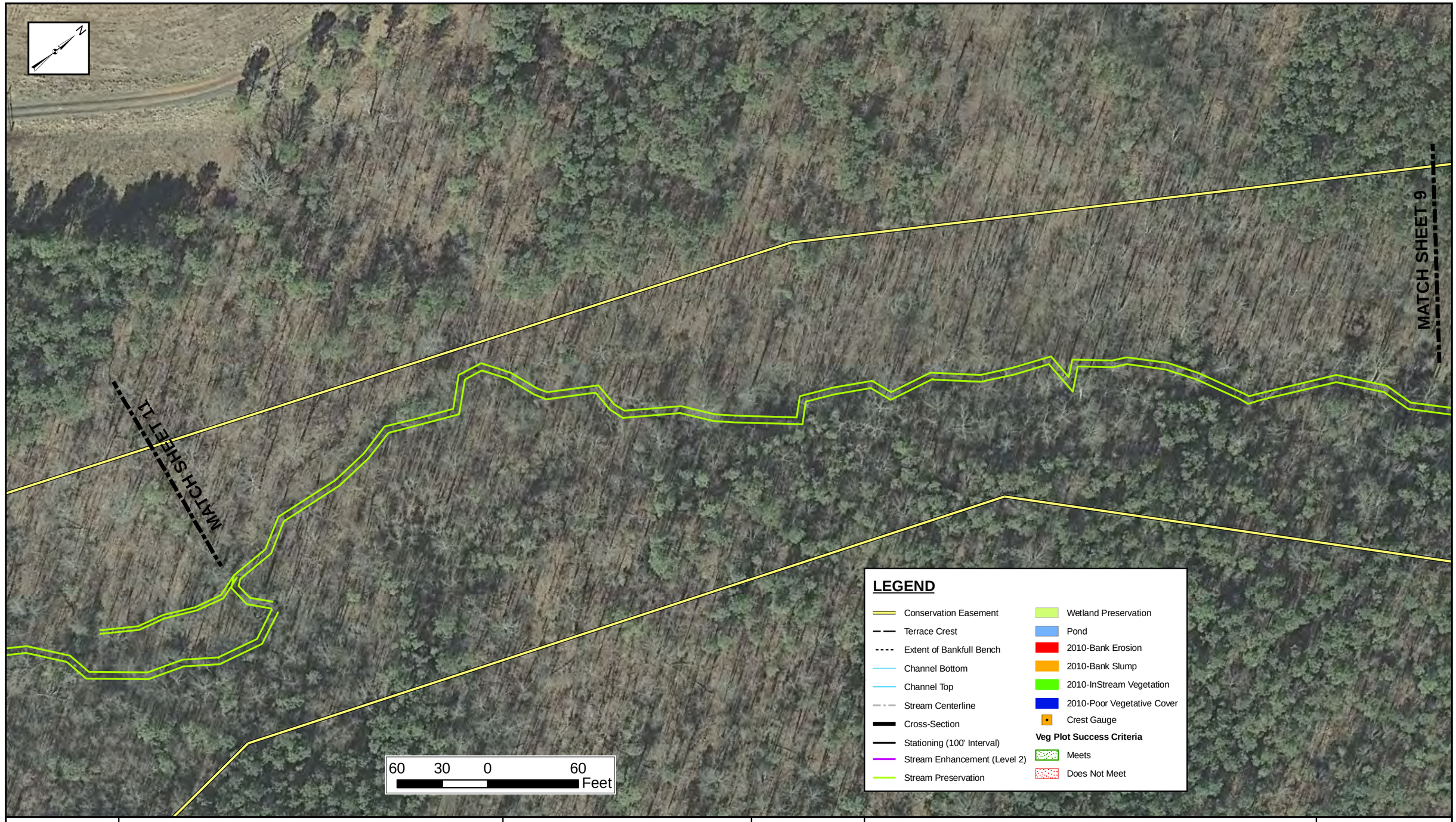
FIGURE 9 OF 12



Ecosystem Enhancement PROGRAM

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ANSON COUNTY
NORTH CAROLINA
MONITORING YEAR 4 OF 5

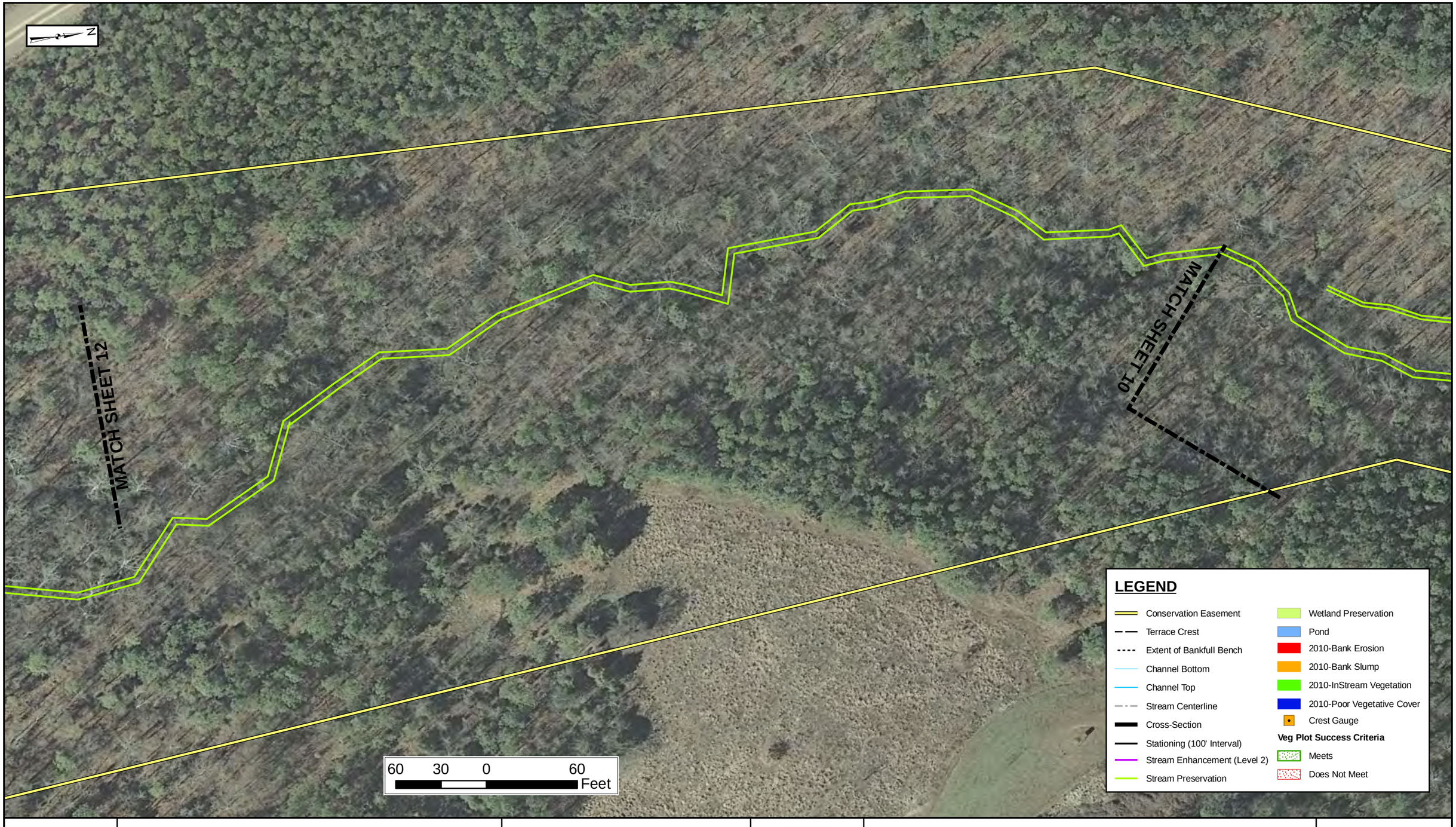
JJG

NC ECOSYSTEM ENHANCEMENT PROGRAM
CAMP BRANCH STREAM RESTORATION

CURRENT CONDITION PLAN VIEW

DATE: JULY 2011
SCALE: 1" = 60'
JOB NO.: JJX31100

FIGURE 10 OF 12



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NORTH CAROLINA
MONITORING YEAR 4 OF 5

NC ECOSYSTEM ENHANCEMENT PROGRAM
CAMP BRANCH STREAM RESTORATION

CURRENT CONDITION PLAN VIEW

DATE: JULY 2011
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FIGURE 11 OF 12

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PROJECT NO. 92350
ANSON COUNTY
NORTH CAROLINA
MONITORING YEAR 4 OF 5

NC ECOSYSTEM ENHANCEMENT PROGRAM
CAMP BRANCH STREAM RESTORATION

CURRENT CONDITION PLAN VIEW

DATE: JULY 2011
SCALE: 1" = 60'
JOB NO.: JJX31100

FIGURE 12 OF 12

APPENDIX 2
GENERAL PROJECT TABLES

2.1 - Project Mitigation Structure and Objectives

2.2 - Project Activity and Reporting History

2.3 - Project Contacts

2.4 - Project Attribute Table

Table 2.1. Project Components and Mitigation Credits
Camp Branch Stream Restoration/EEP Project No. 92350

Mitigation Credits

	Stream	Riparian Wetland	Non-riparian Wetland	Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R, EII, P	P	N/A	N/A	N/A	N/A
Totals	9,794 lf	5.2 ac	N/A	N/A	N/A	N/A

Project Components

Project Component/Reach ID	Stationing (ft)	Existing Footage/ Acreage	Approach	Restoration or Restoration Equivalent	Restoration Footage or Acres	Mitigation Ratio
Reach 1-Camp Branch	0+00 – 17+94	1,500 lf	P2	Restoration	1,767 lf	1:1
Reach 2-Camp Branch	N/A*	945 lf	N/A	Enhancement Level 2	945 lf	2.5:1
Reach 3-UT Camp Branch	0+00 – 4+33	220 lf (total)	P1	Restoration	403 lf	1:1
Reach 4-UT Camp Branch	4+33 – 5+76	Included in Reach 3 total	P2	Restoration	143 lf	1:1
Stream Preservation**	N/A*	6,563 lf	N/A	Preservation	6,563 lf	5:1
Wetland Preservation	N/A	5.2 ac	N/A	Preservation	5.2 ac	5:1

Component Summations

Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-riparian Wetland (acres)	Buffer (square feet)	Upland (acres)
		Riverine	Non-Riverine			
Restoration (R)	2,313	N/A	N/A	N/A	N/A	N/A
Enhancement (E)	N/A	N/A	N/A	N/A	N/A	N/A
Enahncement I (E)	N/A	N/A	N/A	N/A	N/A	N/A
Enhancement II (E)	945	N/A	N/A	N/A	N/A	N/A
Creation (C)	N/A	N/A	N/A	N/A	N/A	N/A
Preservation (P)	6,563	5.2	N/A	N/A	N/A	N/A
HQ Preservation (P)	N/A	N/A	N/A	N/A	N/A	N/A
Totals	**9,821**	**5.2**	**N/A**	**N/A**	**N/A**	**N/A**

BMP Elements

Element	Location	Purpose/Function	Notes
N/A	N/A	N/A	N/A

BMP Elements
BR = Bioretention Cell; SF = Sand Filter; SW = Stormwater Wetland; WDP = Wet Detention Pond; DDP - Dry Detention Pond; FS = Filter Strip; S = Grassed Swale; LS = Level Spreader; NI = Natural Infiltration Area; FB = Forested Buffer
*Enhancement and Preservation reaches were not stationed.

Table 2.2 Project Activity and Reporting History
Camp Branch Stream Restoration/EEP Project 92350
Monitoring Year 4 of 5

Elapsed Time Since Grading Complete	**4 yrs 0 months**
Elapsed Time Since Planting Complete	**4 yrs 0 months**
Number of Reporting Years	**4**

Activity or Report	Data Collection Completed	Actual Completion or Delivery
Restoration Plan	Aug-04	Sep-04
Final Design (90%)	Mar-05	Jun-05
Construction	N/A	Feb-07
Temporary S&E mix applied to entire project area *	N/A	Throughout construction
Permanent seed mix applied to reach/segments	N/A	Oct-06
Bare Root Seedling Installation	N/A	Feb-07
Mitigation Plan	Jun-07	Oct-07
Final Report	Jun-07	Oct-07
Year 1 Monitoring	Oct-07 /Dec-07	Oct-07 /Dec-08
Year 2 Monitoring	May-08/Sept-08	Nov-08
Year 3 Monitoring	Jul-09/Jan-10	Jan-10
Year 4 Monitoring	Jun-10/Jan-11	Feb-11
Year 5 Monitoring	TBD	TBD

*Seed and mulch is added as each section of construction is completed.

Table 2.3 Project Contacts Table
Camp Branch Stream Restoration/EEP Project 92350
Monitoring Year 4 of 5

Designer	EcoScience Corporation 1101 Haynes Street, Suite 101 Raleigh, NC 27604 919- 828-3433
Construction	Vaughn Contruction, Inc. Tommy Vaughn and Spencer Walker (Foremen) P.O. Box 796 Wadesboro, NC 28170 704- 694-6450
Planting Contractor	Kiker Forestry and Realty P.O. Box 933 Wadesboro, NC 28170 704- 694-6436
Seeding Contractor	N/A
Monitoring Performers	
Year 1	EcoScience Corporation 1101 Haynes Street, Suite 101 Raleigh, NC 27604 919- 828-3433
Year 2-present	Jordan, Jones & Goulding Inc. 309 E. Morehead St., Suite 110 Charlotte, NC 28202
Stream Monitoring, POC	Alison Nichols, 704-527-4106 ext.227
Vegetation Monitoring, POC	

Table 2.4 Project Attribute Table
Camp Branch Stream Restoration/EEP Project 92350
Monitoring Year 4 of 5

Project County	Anson County, North Carolina
Drainage Area	2.9 square miles
Impervious cover estimate (%)	<1 percent
Stream Orders (per USGS Topo Quad Map):	
Camp Branch/UT to Camp Branch	2nd/1st
Physiographic Region	Piedmont
EcoRegion (Griffith and Omernik)	Triassic Basins
Rosgen Classifications of As-built:	C4 E/C4
Camp Branch/UT to Camp Branch	
Cowardin Classification	Streams: R2UB12/R4SB23
Camp Branch/UT to Camp Branch	
Dominant soil types	Badin Channery Silt Loam (BaB, BaC) Badin-Goldston Complex (BgD) McQueen (MrB) Shellbluff (ShA) Tetotum (ToA) Chewacla (ChA)
Reference Site ID	N/A* (reference areas established on-Site)
USGS HUCs for Project and Reference	3040105
NCDWQ Sub-basins for Project and Reference	03-07-14
NCDWQ classification for Project and Reference	C
Any portion of any project segment 303d listed?	No
Any portion of any project segment upstream of a 303d listed segment?	No
Reasons for 303d listing or stressor	N/A
Percent of project easement fenced	No fencing along easement

*N/A – Not Applicable

APPENDIX 3
VEGETATION ASSESSMENT DATA

3.1 Vegetation Plot Mitigation Success

3.2 Vegetation Monitoring Plot Photos

3.3 Vegetation Plot Summary Data Table

3.4 Vegetation Condition Assessment

Appendix 3.1 Vegetation Plot Mitigation Success
Camp Branch Stream Restoration/EEP Project 92350
Monitoring Year 4 of 5

Vegetation Plot ID	Vegetation Survival Threshold Met (Y/N)
Plot 1	N
Plot 2	Y
Plot 3	Y
Plot 4	Y
Plot 5	Y
Plot 6	Y
Plot 7	Y

Vegetation Plot 1 (2/2011)

Vegetation Plot 2 (2/2011)

Vegetation Plot 3 (2/2011)

Vegetation Plot 4 (2/2011)

Prepared For:

Ecosystem Enhancement Program

Appendix 3.2 Vegetation Monitoring Plot Photos
Camp Branch Stream Restoration/EEP Project No. 92350
Monitoring Year 4
Submittal Date: July 2011

Prepared By:

JJG

Vegetation Plot 5 (2/2011)

Vegetation Plot 6 (2/2011)

Vegetation Plot 7 (2/2011)

Prepared For:

Ecosystem Enhancement Program

Appendix 3.2 Vegetation Monitoring Plot Photos
Camp Branch Stream Restoration/EEP Project No. 92350
Monitoring Year 4
Submittal Date: July 2011

Prepared By:

JJG

Appendix 3.3 Planted and Total Stem counts (Species by Plot with Annual Means)
Camp Branch Stream Restoration/EEP Project 92350
Monitoring Year 4 of 5

			Current Data (MY4-2010)														Annual Means							
			Plot 1		Plot 2		Plot 3		Plot 4		Plot 5		Plot 6		Plot 7		Current Mean		MY1 - 2007		MY2 - 2008		MY3 - 2009	
Species	Common Name	Type	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T
Acer negundo	box elder	T				25				1							N/A	13	N/A	N/A	N/A	20	N/A	N/A
Alnus serrulata	tag alder	S				15								1			N/A	8	N/A	N/A	N/A	N/A	N/A	N/A
Asimina triloba	pawpaw	T	3	3													N/A	N/A	2	2	2	2	2	4
Baccharis hamilifolia	groundsel tree	S								7						1	N/A	7	N/A	N/A	N/A	N/A	N/A	N/A
Betula nigra	river birch	T			7	7			10	16	11	18	10	12	7	7	9	13	6	6	9	9	9	8
Celtis laevigata	sugarberry	T	1	1	1	1	1	1					1	1			1	2	2	2	2	2	1	2
Cephalanthus occidentalis	common buttonbush	S			2	2				2	6	6	2	2	6	6	4	5	4	4	4	4	4	5
Cornus amomum	silky dogwood	T			2	2			12	15	9	11	8	8	10	11	8	8	9	9	8	8	9	9
Fraxinus pennsylvanica	green ash	T			1	1	3	3	3	3			2	2		3	2	3	9	9	8	8		
Liquidambar styraciflua	sweet gum	T				14		12		4		16		15		8	N/A	12	N/A	N/A	N/A	N/A	N/A	1
Nyssa biflora	swamp tupelo	T							1	1							1	2	1	1	1	1	1	1
Pinus taeda	loblolly pine	T				25		27		48		19		4		3	N/A	25	N/A	N/A	N/A	N/A	N/A	N/A
Platanus occidentalis	American sycamore	T			2	7	2	2	1	1	1	1	1	1			N/A	2	2	2	1	3	1	2
Quercus michauxii	swamp chestnut oak	T			5	5	1	1			1	1			1	1	2	3	2	2	2	2	2	2
Quercus pagoda	cherrybark oak	T			3	3			2	2			1	1	3	3	2	2	2	2	2	2	2	2
Quercus phellos	willow oak	T			2	2	4	5			3	3	1	1	1	1	2	2	2	2	3	3	2	2
Salix nigra	black willow	T												1			N/A	1	N/A	N/A	N/A	N/A	N/A	N/A
Ulmus americana	American elm	T					4	4	1	1			1	1	1	1	2	2	3	3	3	3	2	3
Plot Area (acres)			0.0247																					
Species Count			2	2	9	11	6	8	7	11	6	8	9	12	7	11	10	15	7	7	7	7	12	13
Stem Count			4	4	25	69	15	55	30	100	31	75	27	49	29	45	34	89	27	27	25	30	38	42
Stems per Acre			162	162	1012	2794	607	2227	1215	4049	1255	3036	1093	1984	1174	1822	931	2296	1087	1087	995	1215	989	1001

Type=**S**hrub or **T**ree
P = Planted
T = Total

Appendix 3.4 Vegetation Condition Assessment
Camp Branch Stream Restoration/EEP Project 92350
Monitoring Year 4 of 5

Planted Acreage **42**

Vegetation Category	Definitions	Mapping Threshold (acres)	Number of Polygons	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material	0.1	7	0.106	0.25%
Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1	0	0	0%
		Total	**0**	**0**	**0.25%**
Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.				

Easement Acreage **95**

Vegetation Category	Definitions	Mapping Threshold (SF)	Number of Polygons	Combined Acreage	% of Planted Acreage
Invasive Areas of Concern	Areas of points (if too small to render as polygons at map scale).	1000	0	0	0%
Easement Encroachment Areas	Areas of points (if too small to render as polygons at map scale).	none	0	0	0%

APPENDIX 4
STREAM ASSESSMENT DATA

4.1 – Stream Station Photos

4.2 – Qualitative Visual Stability Assessment

4.3 - Verification of Bankfull Events

4.4 - Cross-Sections Plots and Raw Data Tables

4.5 - Longitudinal Profile and Raw Data Tables

4.6 - Pebble Count Plots and Raw Data Tables

Cross-Section 1-View Upstream
Tributary (2/2011)

Cross-Section 1-View Downstream
Tributary (2/2011)

Cross-Section 2-View Upstream
Tributary (2/2011)

Cross-Section 2-View Downstream
Tributary (2/2011)

Prepared For:	Camp Branch Stream Restoration Monitoring Year 4 of 5	Date: July 2011 EEP Project No.: 65
	Appendix 4.1 Stream Cross-Section Photos	

Cross-Section 3-View Upstream
Tributary (2/2011)

Cross-Section 3-View Downstream
Tributary(2/2011)

Cross-Section 4-View Upstream
Tributary (2/2011)

Cross-Section 4-View Downstream
Tributary (2/2011)

Prepared For:	Camp Branch Stream Restoration Monitoring Year 4 of 5	Date: July 2011 EEP Project No.: 65
	Appendix 4.1 Stream Cross-Section Photos	

Cross-Section 5-View Upstream
Main Channel (2/2011)

Cross-Section 5-View Downstream
Main Channel (2/2011)

Cross-Section 6-View Upstream
Main Channel (2/2011)

Cross-Section 6-View Downstream
Main Channel (2/2011)

Cross-Section 7-View Upstream
Main Channel (2/2011)

Cross-Section 7-View Downstream
Main Channel (2/2011)

Cross-Section 8-View Upstream
Main Channel (2/2011)

Cross-Section 8-View Downstream
Main Channel (2/2011)

Prepared For:	Camp Branch Stream Restoration Monitoring Year 4 of 5	Date: July 2011 EEP Project No.: 65
	Appendix 4.1 Stream Cross-Section Photos	

Appendix 4.2 Qualitative Visual Stability Assessment
Main Channel (1,767 lf)
Camp Branch Stream Restoration/EEP Project No. 92350
Monitoring Year 4 of 5

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	Adjust % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability (Riffle and Run units)**	Aggradation			3	212	88%			
		Degredation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	21	24			88%			
	3. Meander Pool Condition	Depth Sufficient	19	24			79%			
		Lenth Appropriate	19	24			79%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	N/A	N/A						
		Thalweg centering at downstream of meander bend (Glide)	N/A	N/A						
2. Bank	**1. Scoured/Eroded**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			9	334	91%	0	0	91%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	9	334	91%	0	0	91%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dilodged boulders or logs.	9	9			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	9	9			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	9	9			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	9	9			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	9	9			100%			

Appendix 4.2 Qualitative Visual Stability Assessment
Tributary (546 lf)
Camp Branch Stream Restoration/EEP Project No. 92350
Monitoring Year 4 of 5

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	Adjust % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability (Riffle and Run units)**	Aggradation			0	0	100%			
		Degredation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	16	16			100%			
	3. Meander Pool Condition	Depth Sufficient	17	17			100%			
		Lenth Appropriate	17	17			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	N/A	N/A						
		Thalweg centering at downstream of meander bend (Glide)	N/A	N/A						
2. Bank	**1. Scoured/Eroded**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dilodged boulders or logs.	1	1			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	1	1			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	1	1			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	1	1			100%			

Appendix 4.3 - Verification of Bankfull Events
Camp Branch Stream Restoration/EEP Project No. 92350
Monitoring Year 4 of 5

Date of Collection	Date of Occurrence	Method	Photo # (if available)
Dec-07	N/A*	Crest Gauge (Main Channel and Tributary)	N/A
Aug-08	Unknown	Crest Gauge (Main Channel and Tributary)	N/A
Jan-10	2009	Visual Assessment-wrack lines	N/A
Feb-11	2010	Visual	N/A

*Note from previous monitoring report: No bankfull events were observed to have occurred during the Year-1 (2007) monitoring period.

Appendix 4.4 Cross-Section Plots and Raw Data Tables
Camp Branch Stream Restoration/EEP Project No. 92350
Camp Branch Tributary
Monitoring Year 4 of 5

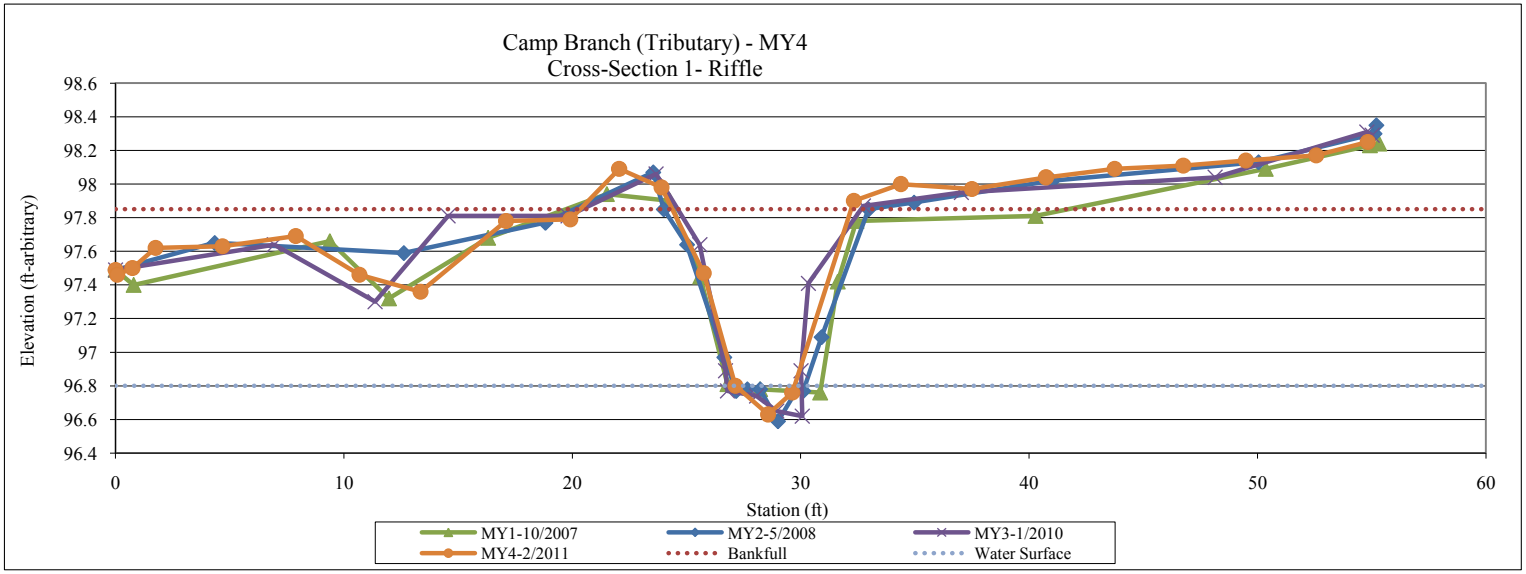
Project Name	**Camp Branch**
EEP Project Number	**92350**
Cross-Section ID	**XS-1, Riffle, 02+50**
Survey Date	**2/2011**

SUMMARY DATA	
Bankfull Elevation (ft)	97.85
Bankfull Cross-Sectional Area (ft^2)	5.50
Bankfull Width (ft)	7.83
Flood Prone Area Elevation (ft)	99.07
Flood Prone Width (ft)	54.83
Bankfull Mean Depth (ft)	0.70
Bankfull Max Depth (ft)	1.22
W/D Ratio	11.19
Entrenchment Ratio	7.00
Bank Height Ratio	1.00

XS-1: View Upstream

XS-1: View Downstream

Station	Elevation	Notes
0	97.49	xs1-lpt
0.07	97.46	xs1
0.74	97.5	xs1-rpt
1.76	97.62	xs1
4.69	97.63	xs1
7.89	97.69	xs1
10.68	97.46	xs1
13.35	97.36	xs1
17.1	97.78	xs1
19.91	97.79	xs1
22.05	98.09	xs1
23.91	97.98	xs1-lb
25.76	97.47	xs1
27.14	96.8	xs1-lew
28.57	96.63	xs1
29.63	96.76	xs1-rew
32.33	97.9	xs1-rb
34.39	98	xs1
37.5	97.97	xs1
40.74	98.04	xs1
43.75	98.09	xs1
46.75	98.11	xs1
49.49	98.14	xs1
52.57	98.17	xs1
54.83	98.25	xs1



Appendix 4.4 Cross-Section Plots and Raw Data Tables
Camp Branch Stream Restoration/EEP Project No. 92350
Camp Branch Tributary
Monitoring Year 4 of 5

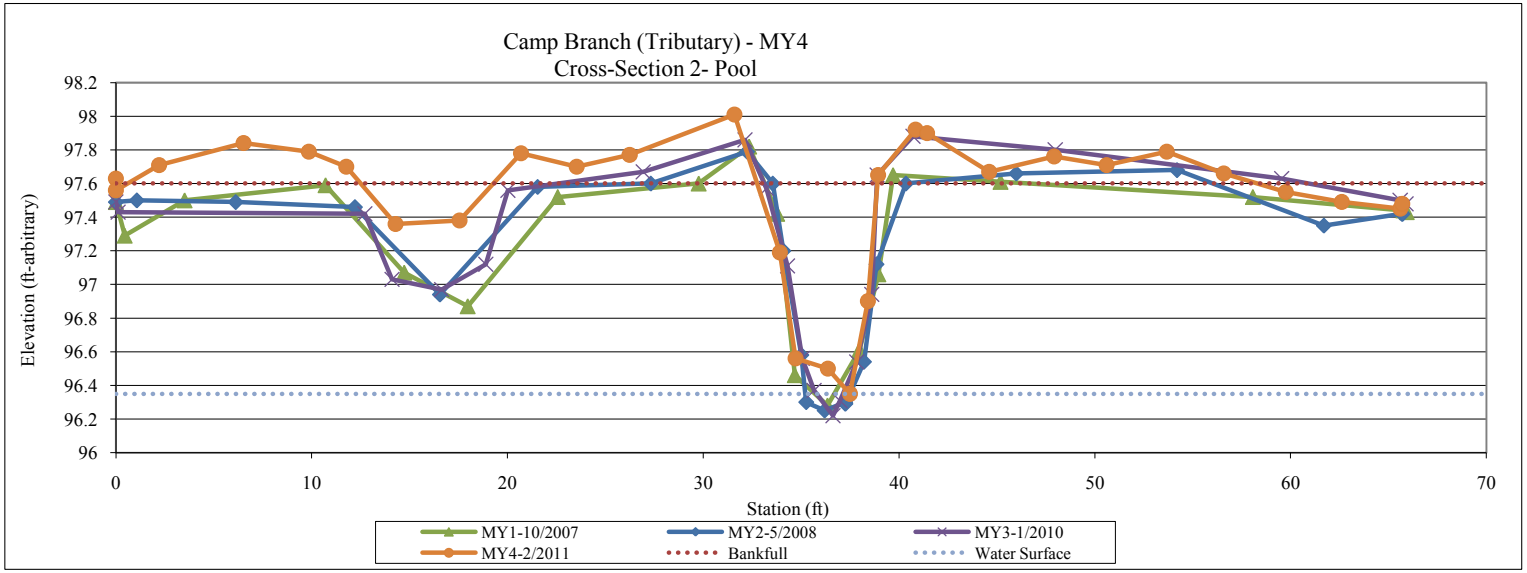
Project Name	**Camp Branch**
EEP Project Number	**92350**
Cross-Section ID	**XS-2, Pool, 02+77**
Survey Date	**2/2011**

SUMMARY DATA	
Bankfull Elevation (ft)	97.60
Bankfull Cross-Sectional Area (ft^2)	4.97
Bankfull Width (ft)	6.14
Flood Prone Area Elevation (ft)	98.85
Flood Prone Width (ft)	65.71
Bankfull Mean Depth (ft)	0.81
Bankfull Max Depth (ft)	1.25
W/D Ratio	7.58
Entrenchment Ratio	10.71
Bank Height Ratio	1.00

XS-2: View Upstream

XS-2: View Downstream

Station	Elevation	Notes
0	97.63	xs2-lpt
0	97.56	xs2
2.21	97.71	xs2
6.52	97.84	xs2
9.86	97.79	xs2
11.77	97.7	xs2
14.29	97.36	xs2
17.56	97.38	xs2
20.69	97.78	xs2
23.54	97.7	xs2
26.24	97.77	xs2
31.6	98.01	xs2-lb
33.92	97.19	xs2
34.71	96.56	xs2-lew
36.37	96.5	xs2
37.5	96.35	xs2-rew
38.41	96.9	xs2
38.93	97.65	xs2
40.84	97.92	xs2-rb
41.43	97.9	xs2
44.6	97.67	xs2
47.93	97.76	xs2
50.61	97.71	xs2
53.68	97.79	xs2
56.59	97.66	xs2
59.75	97.55	xs2
62.62	97.49	xs2
65.61	97.45	xs2
65.71	97.48	xs2-rpt



Appendix 4.4 Cross-Section Plots and Raw Data Tables
Camp Branch Stream Restoration/EEP Project No. 92350
Camp Branch Tributary
Monitoring Year 4 of 5

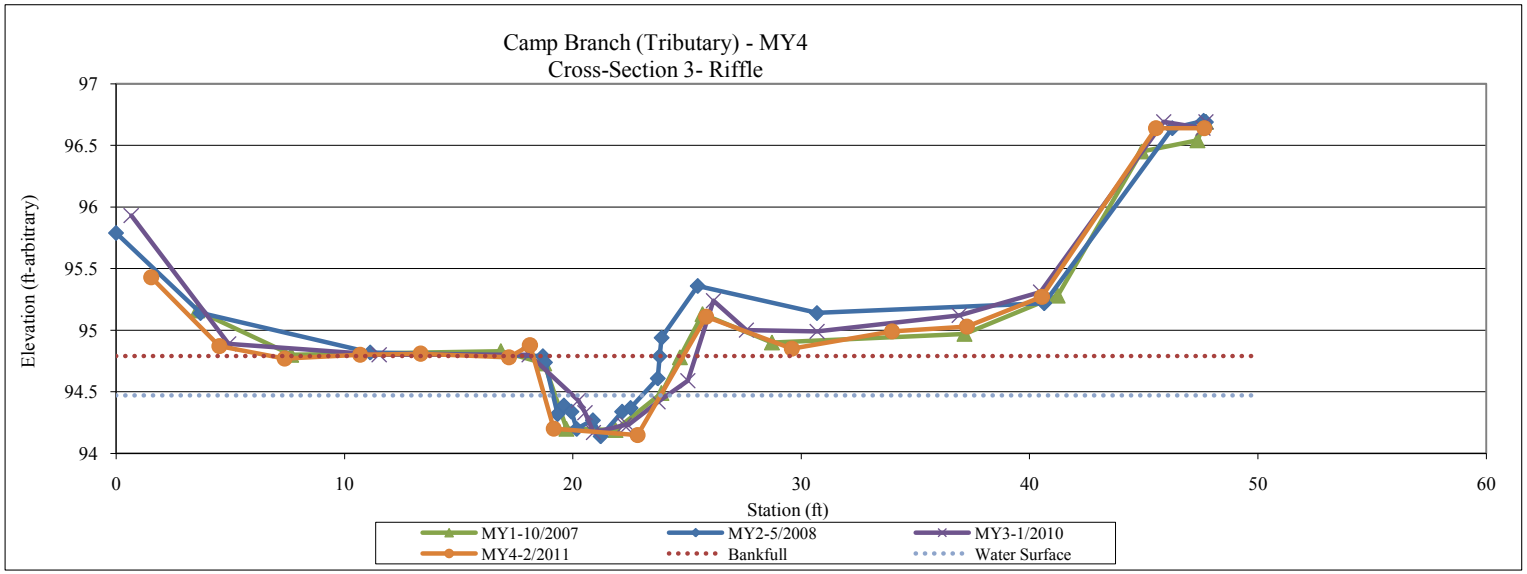
Project Name	**Camp Branch**
EEP Project Number	**92350**
Cross-Section ID	**XS-3, Riffle, 04+68**
Survey Date	**2/2011**

SUMMARY DATA	
Bankfull Elevation (ft)	94.79
Bankfull Cross-Sectional Area (ft^2)	3.17
Bankfull Width (ft)	6.58
Flood Prone Area Elevation (ft)	95.43
Flood Prone Width (ft)	39.58
Bankfull Mean Depth (ft)	0.48
Bankfull Max Depth (ft)	0.64
W/D Ratio	13.71
Entrenchment Ratio	6.02
Bank Height Ratio	1.00

XS-3: View Upstream

XS-3: View Downstream

Station	Elevation	Notes
-4.68	97.28	xs3-lpt
-4.19	97.21	xs3
-1.59	96.4	xs3
1.54	95.43	xs3
4.52	94.87	xs3
7.38	94.77	xs3
10.68	94.8	xs3
13.34	94.81	xs3
17.2	94.78	xs3
18.12	94.88	xs3-lb
19.16	94.2	xs3-lew
22.84	94.15	xs3-rew
25.83	95.11	xs3-rb
29.59	94.85	xs3
33.97	94.99	xs3
37.25	95.03	xs3
40.54	95.27	xs3
45.54	96.64	xs3
47.65	96.64	xs3
47.72	96.54	xs3-rpt



Appendix 4.4 Cross-Section Plots and Raw Data Tables
Camp Branch Stream Restoration/EEP Project No. 92350
Camp Branch Tributary
Monitoring Year 4 of 5

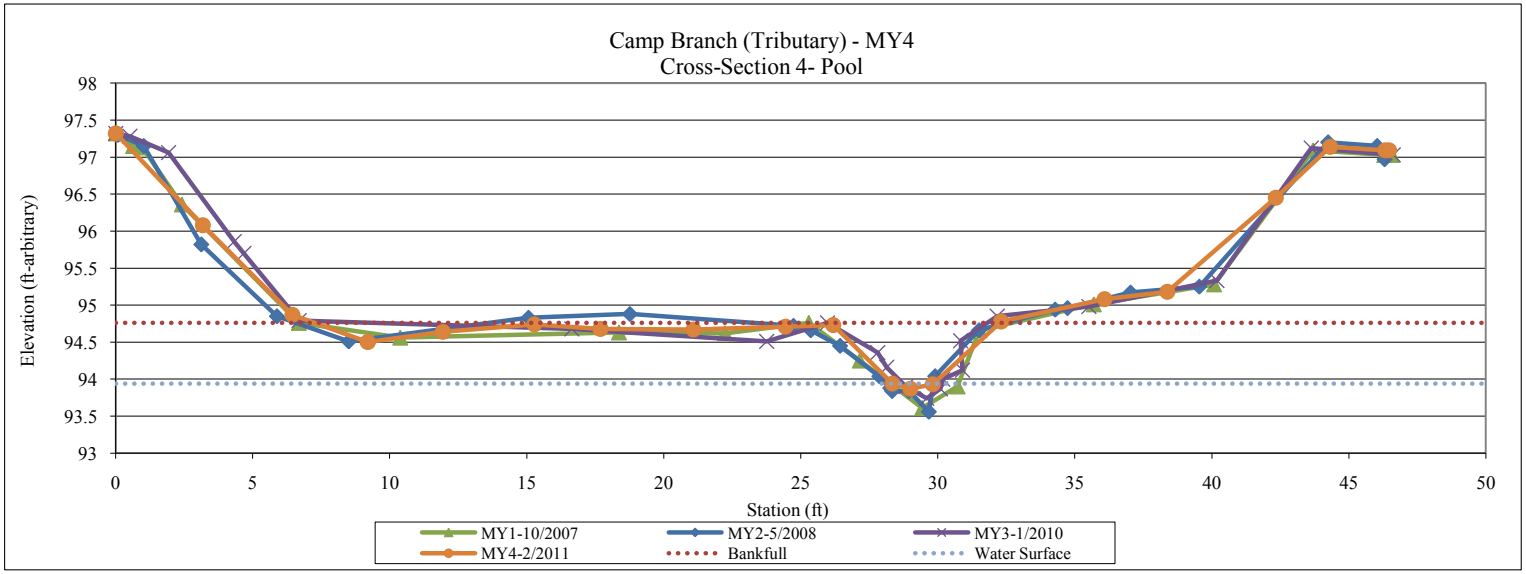
Project Name	**Camp Branch**
EEP Project Number	**92350**
Cross-Section ID	**XS-4, Pool, 04+84**
Survey Date	**2/2011**

SUMMARY DATA	
Bankfull Elevation (ft)	94.76
Bankfull Cross-Sectional Area (ft^2)	3.19
Bankfull Width (ft)	6.03
Flood Prone Area Elevation (ft)	95.65
Flood Prone Width (ft)	35.50
Bankfull Mean Depth (ft)	0.53
Bankfull Max Depth (ft)	0.89
W/D Ratio	11.38
Entrenchment Ratio	5.89
Bank Height Ratio	1.00

XS-4: View Upstream

XS-4: View Downstream

Station	Elevation	Notes
0	97.32	xs4-lpt
3.18	96.08	xs4
6.45	94.87	xs4
9.2	94.5	xs4
11.94	94.64	xs4
15.28	94.74	xs4
17.69	94.68	xs4
21.08	94.67	xs4
24.45	94.71	xs4
26.19	94.73	xs4-lb
28.35	93.94	xs4-lew
29	93.87	xs4
29.82	93.93	xs4-rew
32.31	94.78	xs4-rb
36.09	95.08	xs4
38.38	95.18	xs4
42.33	96.45	xs4
44.32	97.14	xs4
46.33	97.09	xs4
46.47	97.09	xs4-rpt



Appendix 4.4 Cross-Section Plots and Raw Data Tables
Camp Branch Stream Restoration/EEP Project No. 92350
Camp Branch Main Channel
Monitoring Year 4 of 5

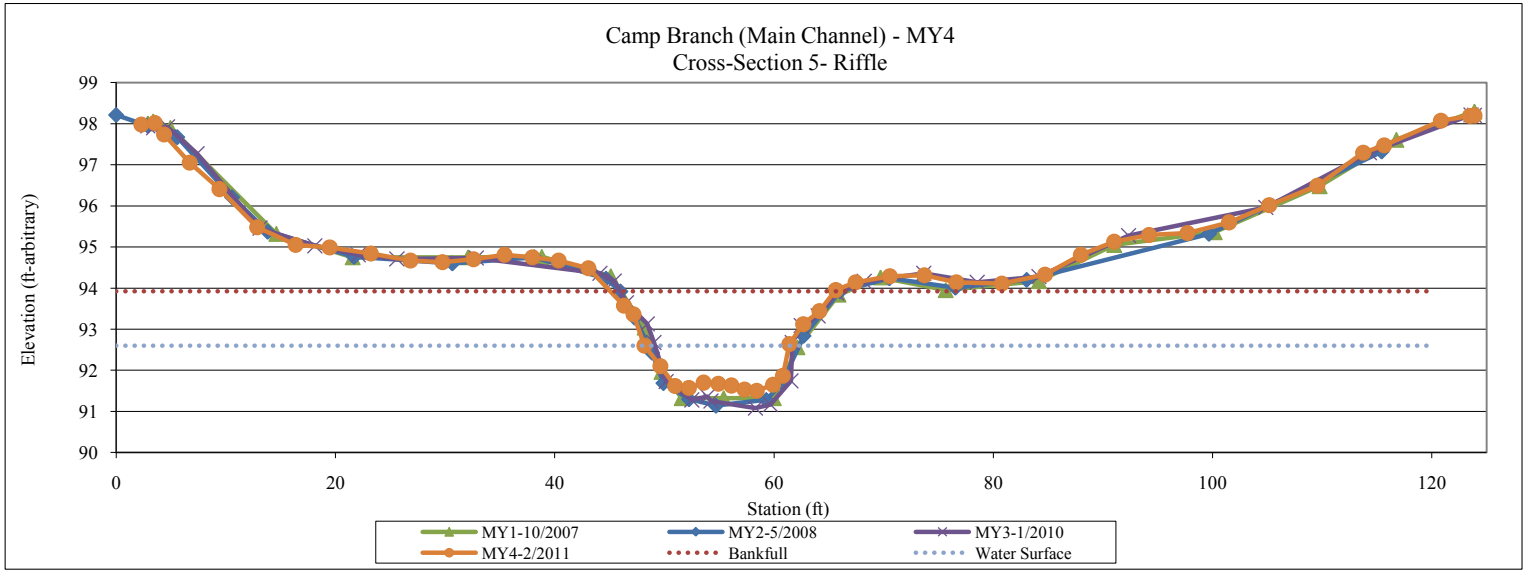
Project Name	**Camp Branch**
EEP Project Number	**92350**
Cross-Section ID	**XS-5, Riffle, 08+95**
Survey Date	**2/2011**

SUMMARY DATA	
Bankfull Elevation (ft)	93.92
Bankfull Cross-Sectional Area (ft^2)	32.91
Bankfull Width (ft)	20.47
Flood Prone Area Elevation (ft)	96.34
Flood Prone Width (ft)	98.48
Bankfull Mean Depth (ft)	1.60
Bankfull Max Depth (ft)	2.42
W/D Ratio	12.79
Entrenchment Ratio	4.81
Bank Height Ratio	1.00

XS-5: View Upstream

XS-5: View Downstream

Station	Elevation	Notes
2.3	97.98	xs5-lpt
3.51	98.02	xs5
4.37	97.74	xs5
6.71	97.05	xs5
9.42	96.41	xs5
12.85	95.48	xs5
16.37	95.05	xs5
19.47	94.99	xs5
23.22	94.84	xs5
26.84	94.67	xs5
29.75	94.63	xs5
32.59	94.7	xs5
35.42	94.81	xs5
37.97	94.75	xs5
40.35	94.67	xs5
43.08	94.48	xs5-lb
46.32	93.57	xs5
47.18	93.36	xs5
48.17	92.6	xs5-lew
49.64	92.1	xs5
50.97	91.62	xs5
52.23	91.57	xs5
53.59	91.7	xs5
54.93	91.67	xs5
56.12	91.63	xs5
57.31	91.53	xs5
58.41	91.5	xs5
59.91	91.65	xs5
60.83	91.87	xs5



Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
61.41	92.64	xs5-rew	76.65	94.14	xs5	101.51	95.6	xs5	123.89	98.2	xs5-rpt			
62.67	93.12	xs5	80.77	94.11	xs5	105.17	96.02	xs5						
64.14	93.44	xs5	84.73	94.33	xs5	109.56	96.49	xs5						
65.63	93.95	xs5	87.99	94.81	xs5	113.75	97.29	xs5						
67.45	94.14	xs5-rb	91.02	95.13	xs5	115.65	97.47	xs5						
70.56	94.29	xs5	94.22	95.29	xs5	120.83	98.07	xs5						
73.72	94.31	xs5	97.72	95.34	xs5	123.49	98.19	xs5						

Appendix 4.4 Cross-Section Plots and Raw Data Tables
Camp Branch Stream Restoration/EEP Project No. 92350
Camp Branch Main Channel
Monitoring Year 4 of 5

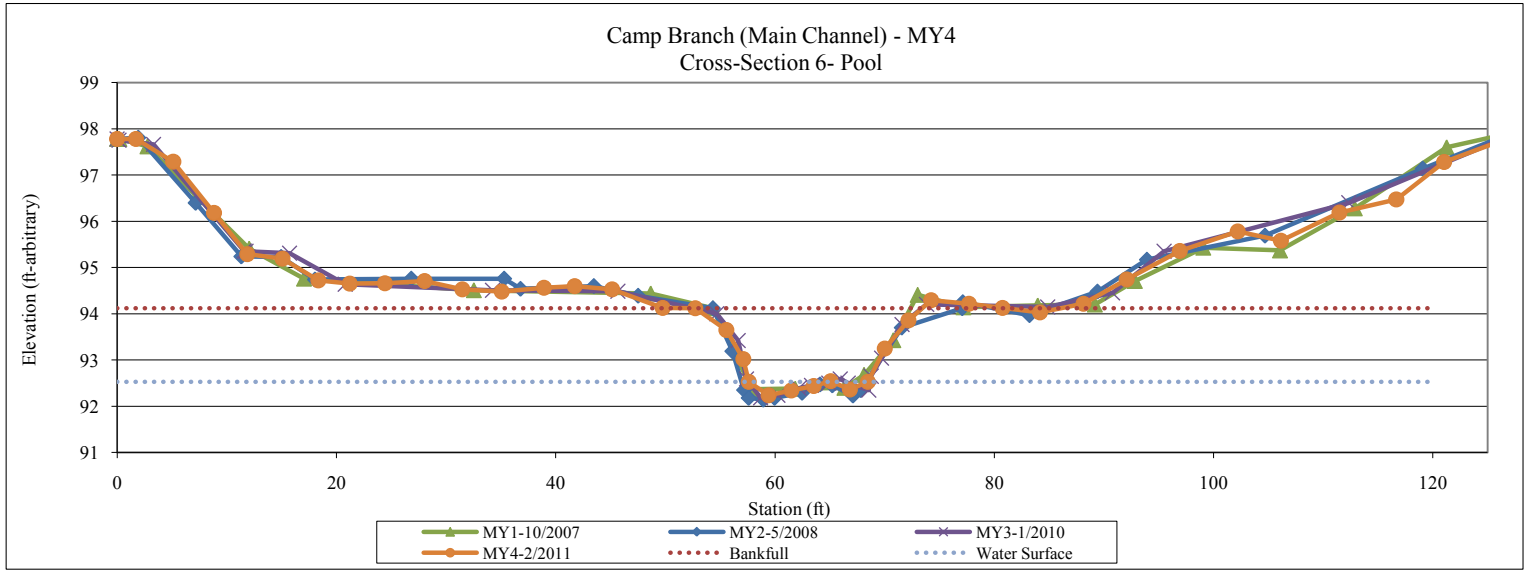
Project Name	**Camp Branch**
EEP Project Number	**92350**
Cross-Section ID	**XS-6, Pool**
Survey Date	**2/2011**

SUMMARY DATA	
Bankfull Elevation (ft)	94.12
Bankfull Cross-Sectional Area (ft^2)	24.28
Bankfull Width (ft)	20.67
Flood Prone Area Elevation (ft)	96.00
Flood Prone Width (ft)	100.39
Bankfull Mean Depth (ft)	1.18
Bankfull Max Depth (ft)	1.88
W/D Ratio	17.52
Entrenchment Ratio	4.86
Bank Height Ratio	1.00

XS-6: View Upstream

XS-6: View Downstream

Station	Elevation	Notes
0	97.78	xs6-lpt
1.72	97.78	xs6
5.11	97.29	xs6
8.82	96.18	xs6
11.87	95.29	xs6
15.08	95.19	xs6
18.34	94.72	xs6
21.22	94.65	xs6
24.41	94.66	xs6
28.04	94.71	xs6
31.48	94.53	xs6
35.08	94.48	xs6
38.92	94.56	xs6
41.72	94.6	xs6
45.14	94.53	xs6
49.75	94.13	xs6-lb
52.73	94.12	xs6
55.57	93.65	xs6
57.12	93.02	xs6
57.6	92.53	xs6-lew
59.41	92.24	xs6
61.5	92.34	xs6
63.52	92.44	xs6
65.09	92.54	xs6
66.82	92.36	xs6
68.47	92.53	xs6-rew
70.01	93.25	xs6
72.17	93.86	xs6
74.24	94.29	xs6-rb



Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
			77.68	94.22	xs6	106.16	95.58	xs6
			80.75	94.13	xs6	111.49	96.19	xs6
			84.16	94.03	xs6	116.67	96.47	xs6
			88.13	94.22	xs6	121.03	97.28	xs6
			92.09	94.74	xs6	129.54	98.03	xs6
			96.92	95.36	xs6	130.82	98.17	xs6
			102.2	95.78	xs6	131.16	98.16	xs6-rpt

Appendix 4.4 Cross-Section Plots and Raw Data Tables
Camp Branch Stream Restoration/EEP Project No. 92350
Camp Branch Main Channel
Monitoring Year 4 of 5

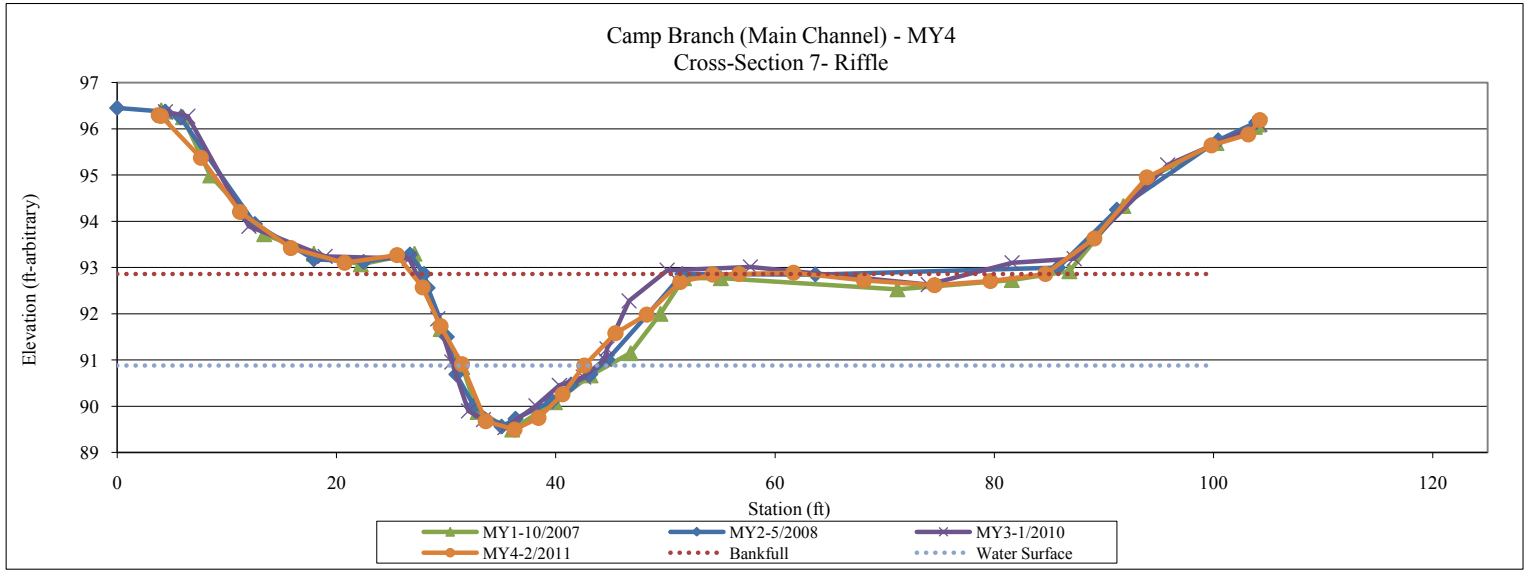
Project Name	**Camp Branch**
EEP Project Number	**92350**
Cross-Section ID	**XS-7, Riffle**
Survey Date	**2/2011**

SUMMARY DATA	
Bankfull Elevation (ft)	92.86
Bankfull Cross-Sectional Area (ft^2)	45.66
Bankfull Width (ft)	24.44
Flood Prone Area Elevation (ft)	96.22
Flood Prone Width (ft)	98.94
Bankfull Mean Depth (ft)	1.87
Bankfull Max Depth (ft)	3.36
W/D Ratio	13.07
Entrenchment Ratio	4.05
Bank Height Ratio	1.00

XS-7: View Upstream

XS-7: View Downstream

Station	Elevation	Notes
3.77	96.29	xs7-lpt
4	96.28	xs7
7.64	95.37	xs7
11.19	94.2	xs7
15.83	93.42	xs7
20.73	93.1	xs7
25.52	93.27	xs7-lb
27.87	92.57	xs7
29.5	91.73	xs7
31.44	90.91	xs7-lew
33.6	89.68	xs7
36.24	89.5	xs7
38.42	89.75	xs7
40.61	90.26	xs7
42.61	90.88	xs7-rew
45.45	91.58	xs7
48.3	91.98	xs7
51.37	92.69	xs7
54.3	92.85	xs7-rb
56.73	92.86	xs7
61.7	92.89	xs7
68.11	92.72	xs7
74.55	92.62	xs7
79.64	92.71	xs7
84.66	92.86	xs7
89.13	93.63	xs7
93.93	94.95	xs7
99.82	95.64	xs7
103.18	95.88	xs7



Station	Elevation	Notes
104.22	96.19	xs7-rpt

Appendix 4.4 Cross-Section Plots and Raw Data Tables
Camp Branch Stream Restoration/EEP Project No. 92350
Camp Branch Main Channel
Monitoring Year 4 of 5

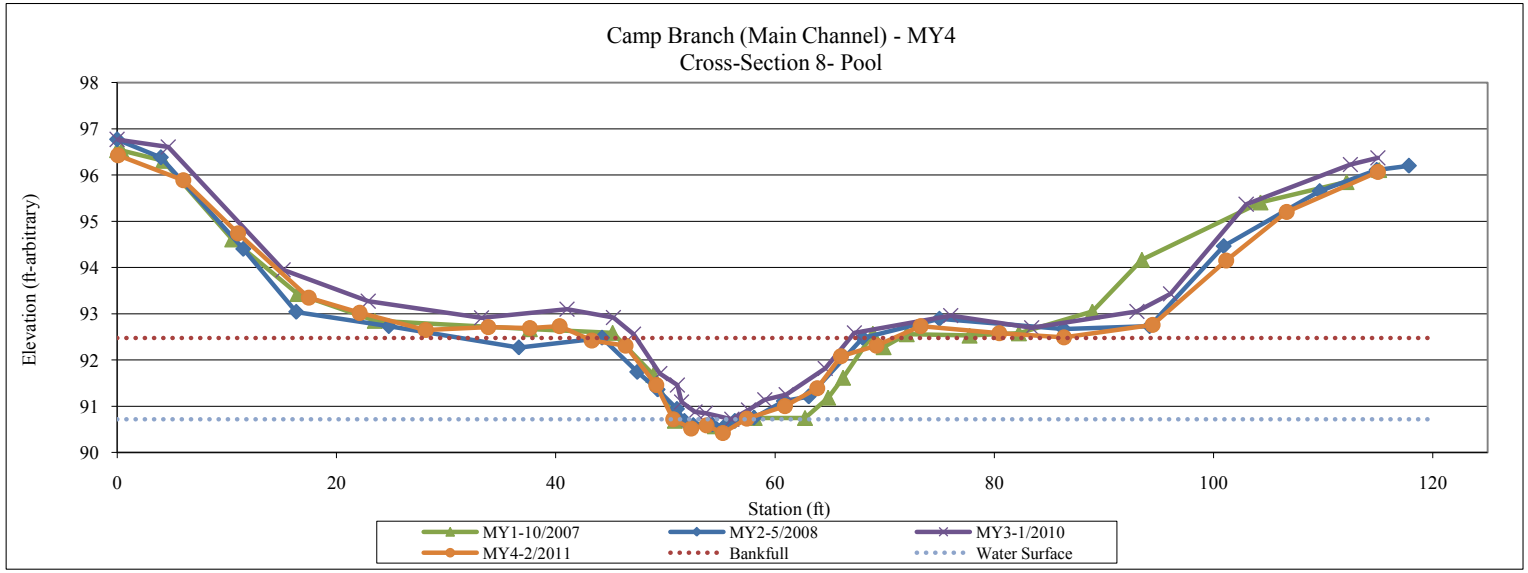
Project Name	**Camp Branch**
EEP Project Number	**92350**
Cross-Section ID	**XS-8, Pool**
Survey Date	**2/2011**

SUMMARY DATA	
Bankfull Elevation (ft)	92.48
Bankfull Cross-Sectional Area (ft^2)	28.73
Bankfull Width (ft)	24.44
Flood Prone Area Elevation (ft)	94.54
Flood Prone Width (ft)	91.26
Bankfull Mean Depth (ft)	1.18
Bankfull Max Depth (ft)	2.06
W/D Ratio	20.71
Entrenchment Ratio	3.73
Bank Height Ratio	1.00

XS-8: View Upstream

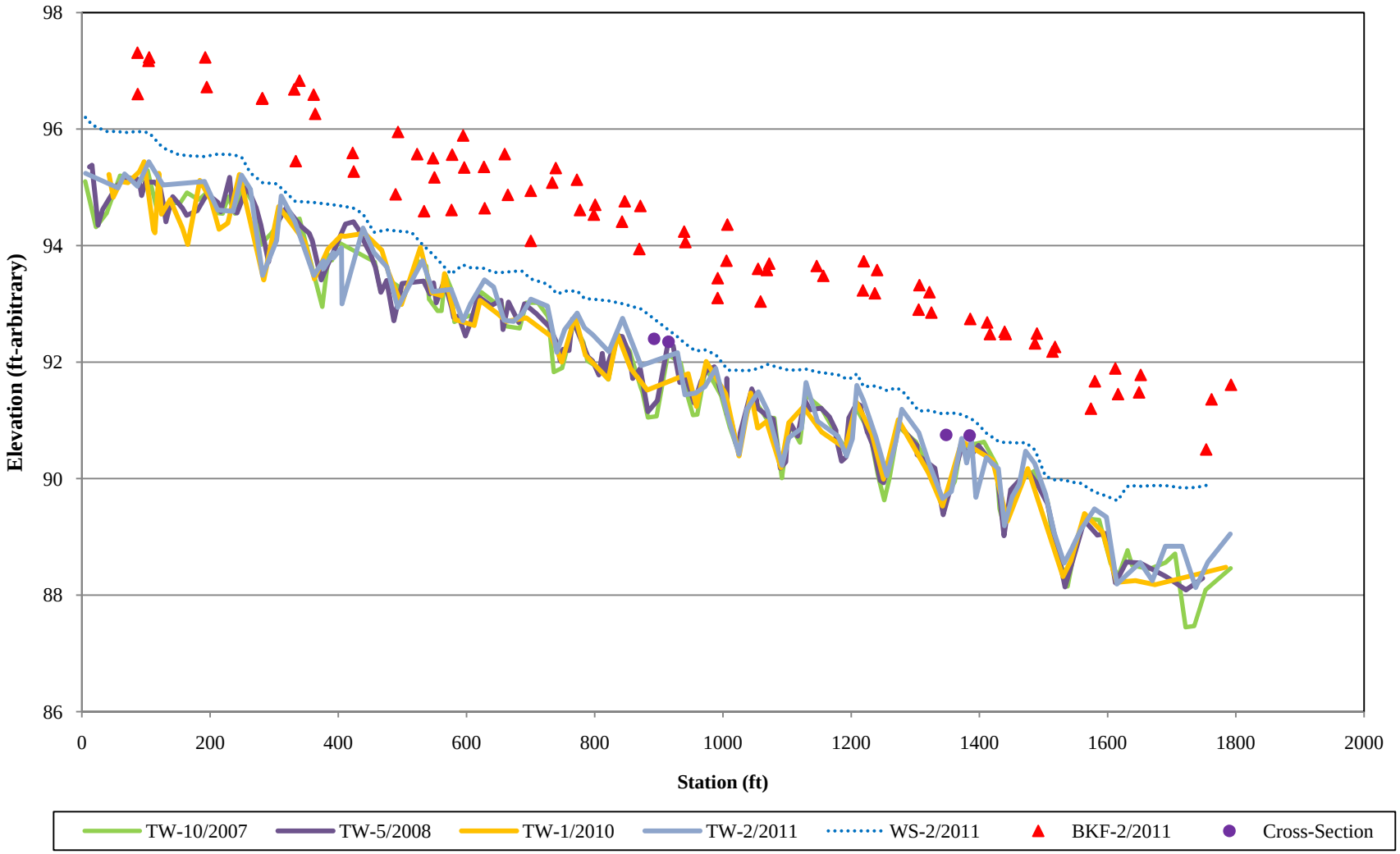
XS-8: View Downstream

Station	Elevation	Notes
-4.6	96.77	xs8-lpt
-4.34	96.75	xs8
0.07	96.43	xs8
6.03	95.89	xs8
11.01	94.74	xs8
17.48	93.35	xs8
22.1	93.02	xs8
28.14	92.65	xs8
33.85	92.71	xs8
37.64	92.69	xs8-lb
40.36	92.73	xs8
43.29	92.42	xs8
46.36	92.31	xs8
49.17	91.46	xs8
50.73	90.72	xs8-lew
52.36	90.52	xs8
53.75	90.59	xs8
55.24	90.42	xs8
57.42	90.73	xs8-rew
60.91	91	xs8
63.86	91.39	xs8
66.02	92.08	xs8
69.26	92.31	xs8-rb
73.27	92.73	xs8
80.47	92.58	xs8
86.37	92.49	xs8
94.45	92.76	xs8
101.15	94.15	xs8
106.67	95.2	xs8

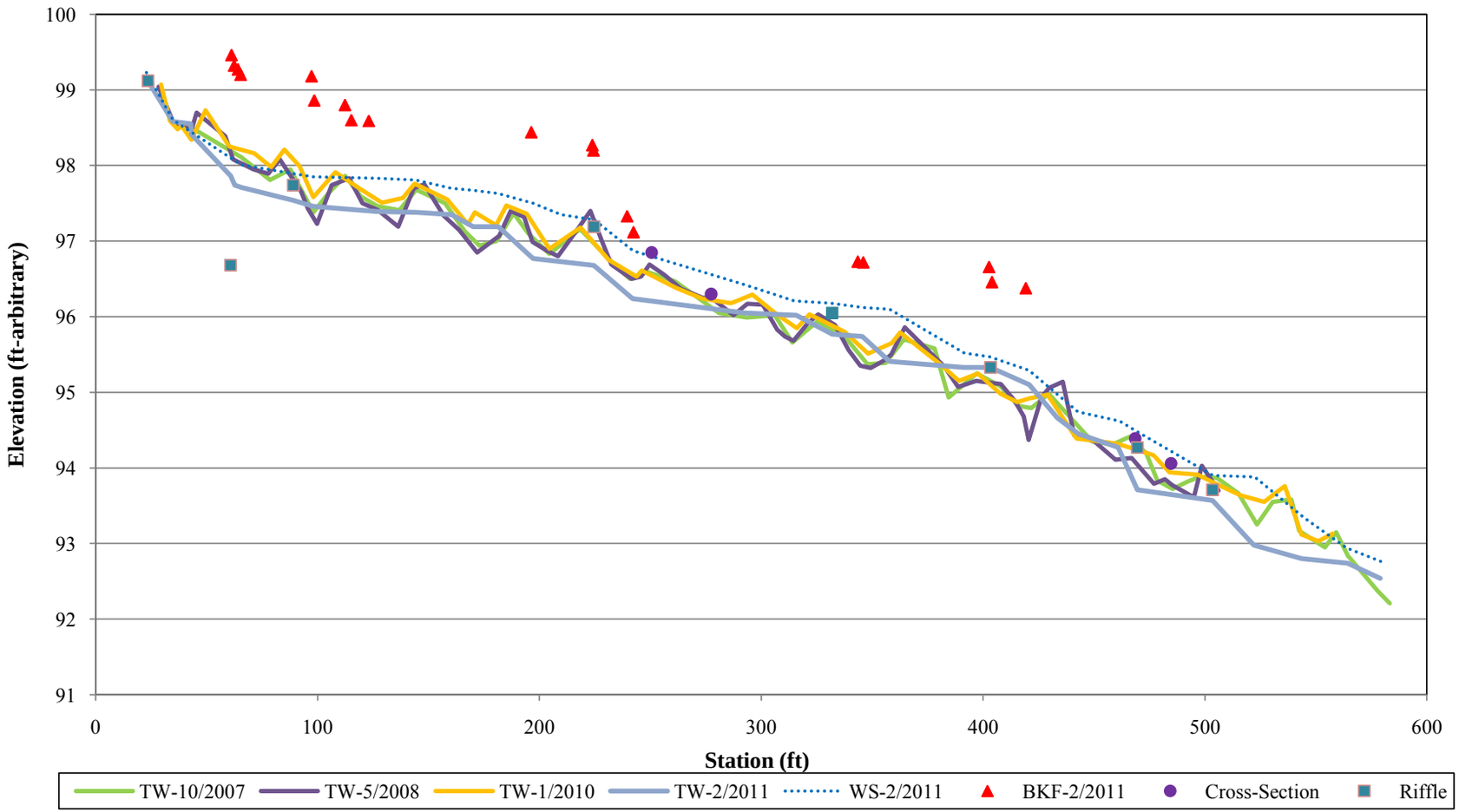


Station	Elevation	Notes
114.98	96.07	xs8-rpt

Appendix 4.5 Longitudinal Profiles with Annual Overlays
Camp Branch-Main Channel
Longitudinal Profile
2010 Monitoring Year
MY 4 of 5



Appendix 4.5. Longitudinal Profiles with Annual Overlays
Camp Branch-Tributary
Longitudinal Profile
2010Monitoring Year
MY 4 of 5

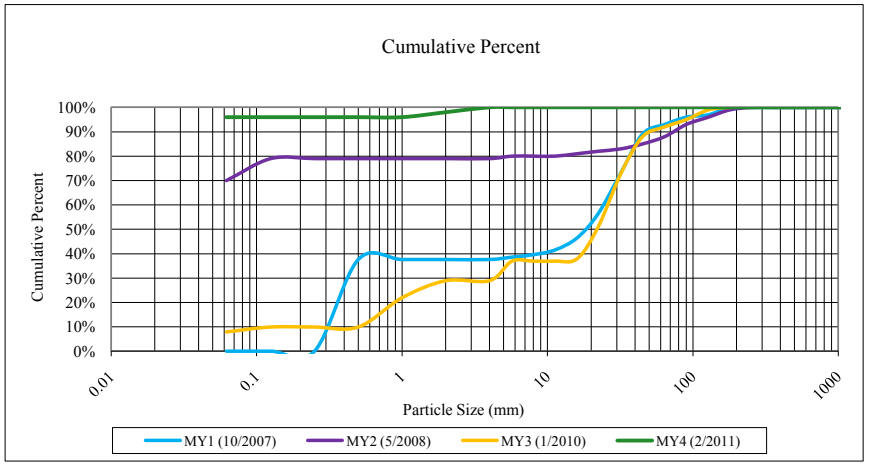


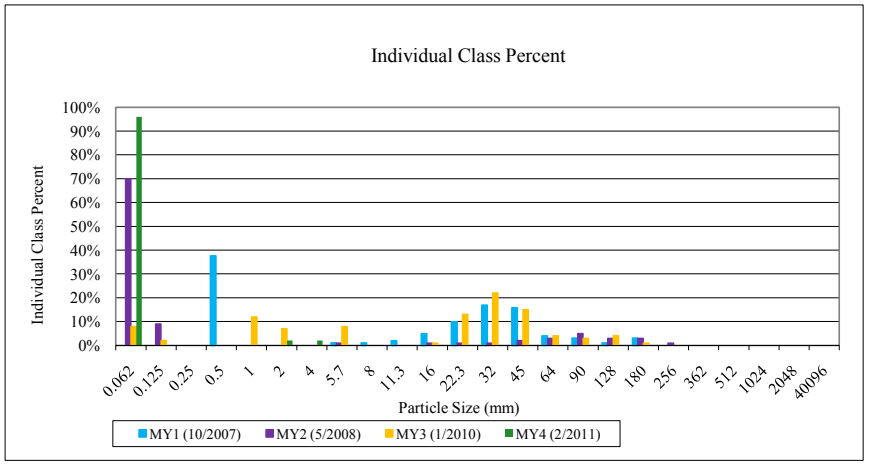
Appendix 4.6 Pebble Count Plots and Raw Data Tables
Camp Branch Stream Restoration/EEP Project No. 92350
Camp Branch Tributary
Monitoring Year 4 of 5

Project Name: Camp Branch-Tributary					
Cross-Section: 1					
Feature: Riffle					
			MY4-2/2011		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	96	96%	96%
Sand	very fine sand	0.125	0	0%	96%
	fine sand	0.250	0	0%	96%
	medium sand	0.50	0	0%	96%
	coarse sand	1.00	0	0%	96%
	very coarse sand	2.0	2	2%	98%
Gravel	very fine gravel	4.0	2	2%	100%
	fine gravel	5.7	0	0%	100%
	fine gravel	8.0	0	0%	100%
	medium gravel	11.3	0	0%	100%
	medium gravel	16.0	0	0%	100%
	course gravel	22.3	0	0%	100%
	course gravel	32.0	0	0%	100%
	very coarse gravel	45	0	0%	100%
	very coarse gravel	64	0	0%	100%
Cobble	small cobble	90	0	0%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	
D84	
D95	0.06

D50 and D84 were not calculated due to particle size.



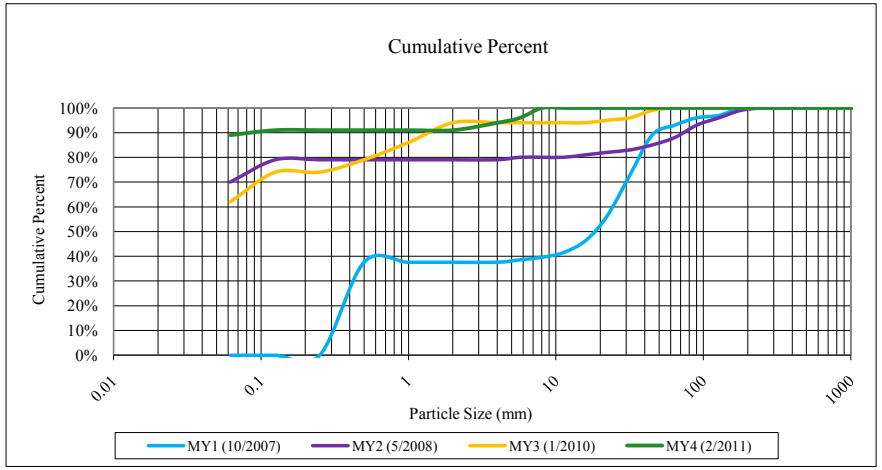


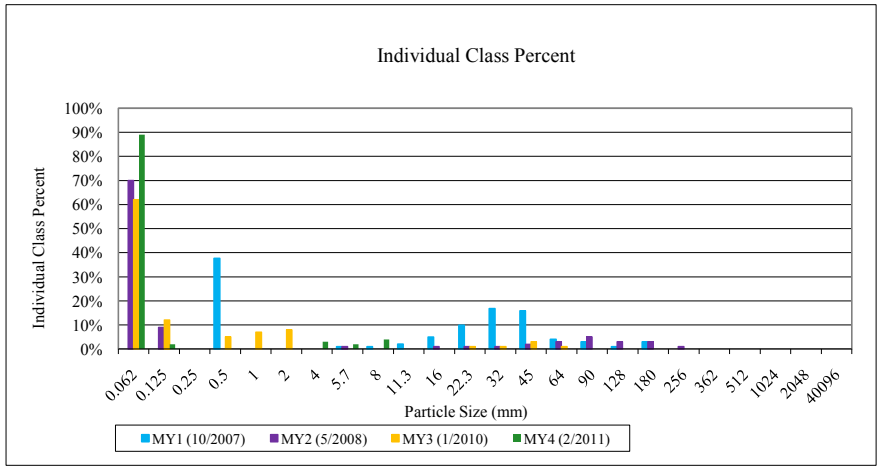
Appendix 4.6 Pebble Count Plots and Raw Data Tables
Camp Branch Stream Restoration/EEP Project No. 92350
Camp Branch Tributary
Monitoring Year 4 of 5

Project Name: Camp Branch-Tributary					
Cross-Section: 2					
Feature: Pool					
			MY4-2/2011		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	89	89%	89%
Sand	very fine sand	0.125	2	2%	91%
	fine sand	0.250	0	0%	91%
	medium sand	0.50	0	0%	91%
	coarse sand	1.00	0	0%	91%
	very coarse sand	2.0	0	0%	91%
Gravel	very fine gravel	4.0	3	3%	94%
	fine gravel	5.7	2	2%	96%
	fine gravel	8.0	4	4%	100%
	medium gravel	11.3	0	0%	100%
	medium gravel	16.0	0	0%	100%
	course gravel	22.3	0	0%	100%
	course gravel	32.0	0	0%	100%
	very coarse gravel	45	0	0%	100%
	very coarse gravel	64	0	0%	100%
Cobble	small cobble	90	0	0%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	
D84	
D95	4.85

D50 and D84 were not calculated due to particle size.



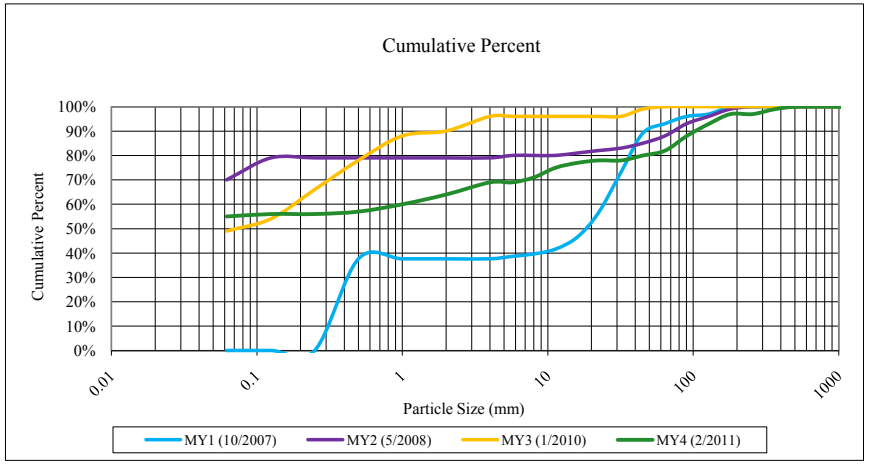


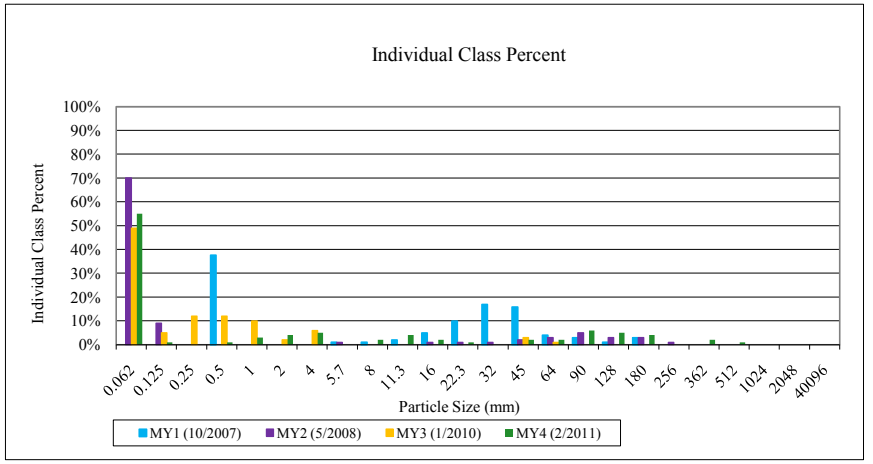
Appendix 4.6 Pebble Count Plots and Raw Data Tables
Camp Branch Stream Restoration/EEP Project No. 92350
Camp Branch Tributary
Monitoring Year 4 of 5

Project Name: Camp Branch-Tributary					
Cross-Section: 3					
Feature: Riffle					
			MY4-2/2011		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	55	55%	55%
Sand	very fine sand	0.125	1	1%	56%
	fine sand	0.250	0	0%	56%
	medium sand	0.50	1	1%	57%
	coarse sand	1.00	3	3%	60%
	very coarse sand	2.0	4	4%	64%
Gravel	very fine gravel	4.0	5	5%	69%
	fine gravel	5.7	0	0%	69%
	fine gravel	8.0	2	2%	71%
	medium gravel	11.3	4	4%	75%
	medium gravel	16.0	2	2%	77%
	course gravel	22.3	1	1%	78%
	course gravel	32.0	0	0%	78%
	very coarse gravel	45	2	2%	80%
	very coarse gravel	64	2	2%	82%
Cobble	small cobble	90	6	6%	88%
	medium cobble	128	5	5%	93%
	large cobble	180	4	4%	97%
	very large cobble	256	0	0%	97%
Boulder	small boulder	362	2	2%	99%
	small boulder	512	1	1%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	
D84	72.67
D95	154

D50 were not calculated due to particle size.



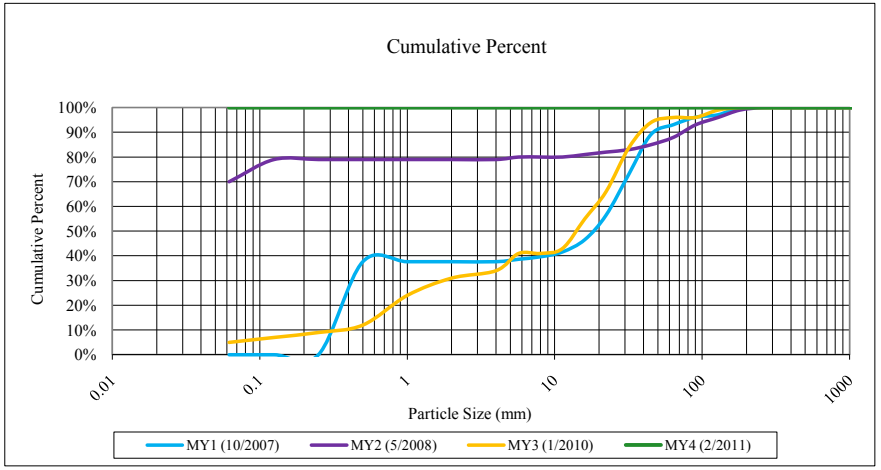


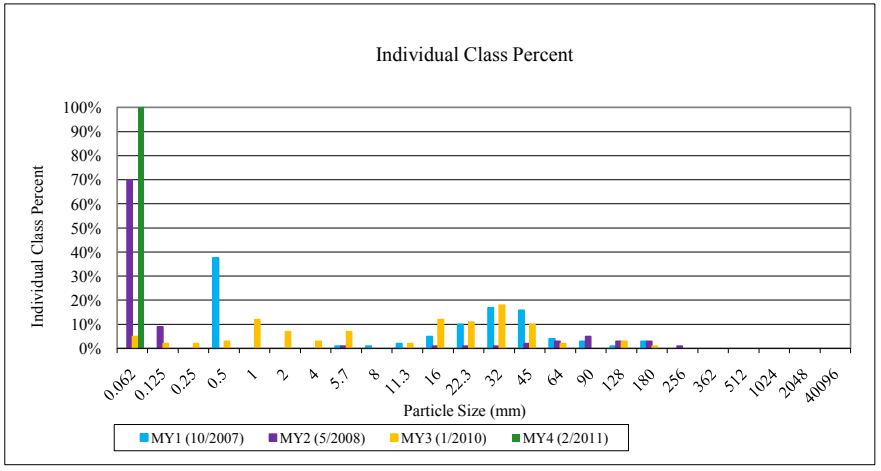
Appendix 4.6 Pebble Count Plots and Raw Data Tables
Camp Branch Stream Restoration/EEP Project No. 92350
Camp Branch Tributary
Monitoring Year 4 of 5

Project Name: Camp Branch-Tributary					
Cross-Section: 4					
Feature: Pool					
			MY4-2/2011		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	100	100%	100%
Sand	very fine sand	0.125	0	0%	100%
	fine sand	0.250	0	0%	100%
	medium sand	0.50	0	0%	100%
	coarse sand	1.00	0	0%	100%
	very coarse sand	2.0	0	0%	100%
Gravel	very fine gravel	4.0	0	0%	100%
	fine gravel	5.7	0	0%	100%
	fine gravel	8.0	0	0%	100%
	medium gravel	11.3	0	0%	100%
	medium gravel	16.0	0	0%	100%
	course gravel	22.3	0	0%	100%
	course gravel	32.0	0	0%	100%
	very coarse gravel	45	0	0%	100%
	very coarse gravel	64	0	0%	100%
Cobble	small cobble	90	0	0%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	
D84	
D95	

D50, D84, and D95 were not calculated due to particle size.

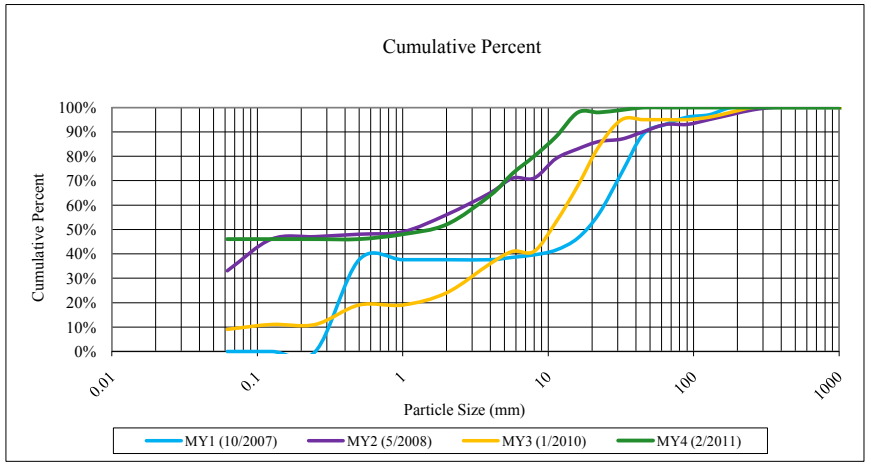


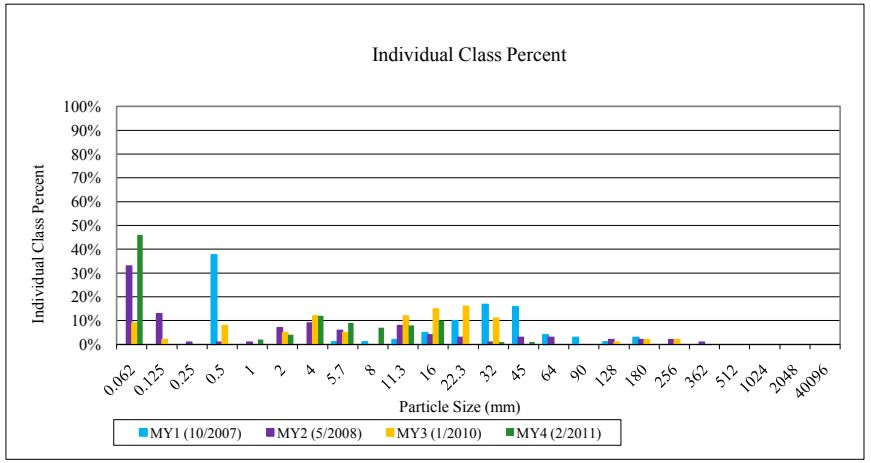


Appendix 4.6 Pebble Count Plots and Raw Data Tables
Camp Branch Stream Restoration/EEP Project No. 92350
Camp Branch Main Channel
Monitoring Year 4 of 5

Project Name: Camp Branch-Main Channel					
Cross-Section: 5					
Feature: Riffle					
			MY4-2/2011		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	46	46%	46%
Sand	very fine sand	0.125	0	0%	46%
	fine sand	0.250	0	0%	46%
	medium sand	0.50	0	0%	46%
	coarse sand	1.00	2	2%	48%
	very coarse sand	2.0	4	4%	52%
Gravel	very fine gravel	4.0	12	12%	64%
	fine gravel	5.7	9	9%	73%
	fine gravel	8.0	7	7%	80%
	medium gravel	11.3	8	8%	88%
	medium gravel	16.0	10	10%	98%
	course gravel	22.3	0	0%	98%
	course gravel	32.0	1	1%	99%
	very coarse gravel	45	1	1%	100%
	very coarse gravel	64	0	0%	100%
Cobble	small cobble	90	0	0%	100%
	medium cobble	128	0	0%	100%
	large cobble	180	0	0%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	1.5
D84	9.65
D95	14.59



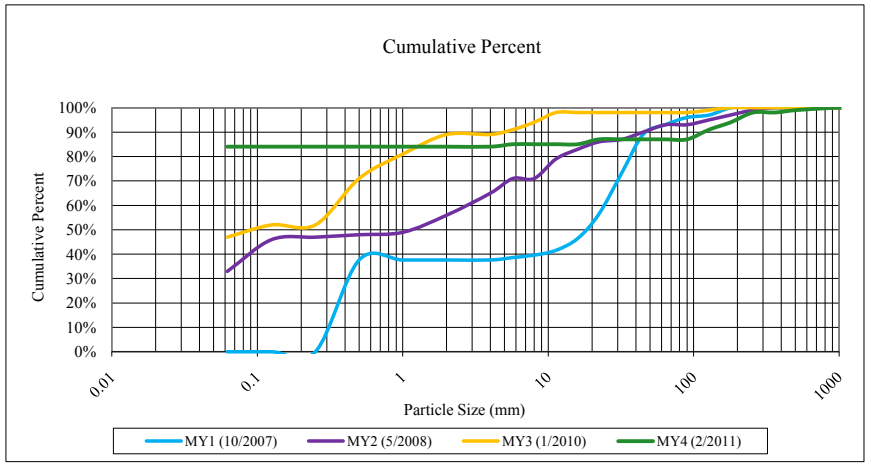


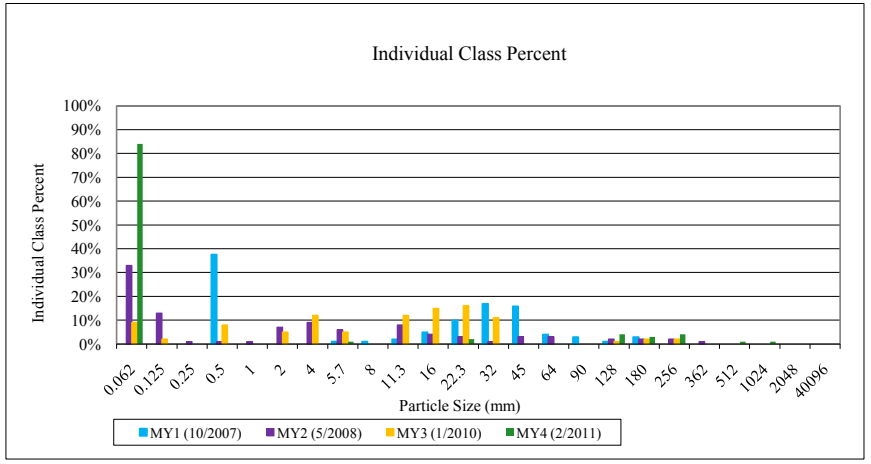
Appendix 4.6 Pebble Count Plots and Raw Data Tables
Camp Branch Stream Restoration/EEP Project No. 92350
Camp Branch Main Channel
Monitoring Year 4 of 5

Project Name: Camp Branch-Main Channel					
Cross-Section: 6					
Feature: Pool					
			MY4-2/2011		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	84	84%	84%
Sand	very fine sand	0.125	0	0%	84%
	fine sand	0.250	0	0%	84%
	medium sand	0.50	0	0%	84%
	coarse sand	1.00	0	0%	84%
	very coarse sand	2.0	0	0%	84%
Gravel	very fine gravel	4.0	0	0%	84%
	fine gravel	5.7	1	1%	85%
	fine gravel	8.0	0	0%	85%
	medium gravel	11.3	0	0%	85%
	medium gravel	16.0	0	0%	85%
	course gravel	22.3	2	2%	87%
	course gravel	32.0	0	0%	87%
	very coarse gravel	45	0	0%	87%
	very coarse gravel	64	0	0%	87%
Cobble	small cobble	90	0	0%	87%
	medium cobble	128	4	4%	91%
	large cobble	180	3	3%	94%
	very large cobble	256	4	4%	98%
Boulder	small boulder	362	0	0%	98%
	small boulder	512	1	1%	99%
	medium boulder	1024	1	1%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	
D84	0.06
D95	199

D50 was not calculated due to particle size.



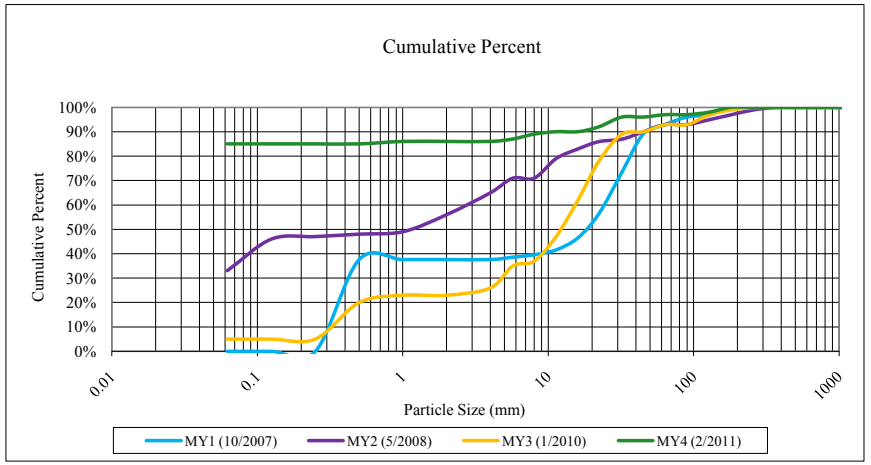


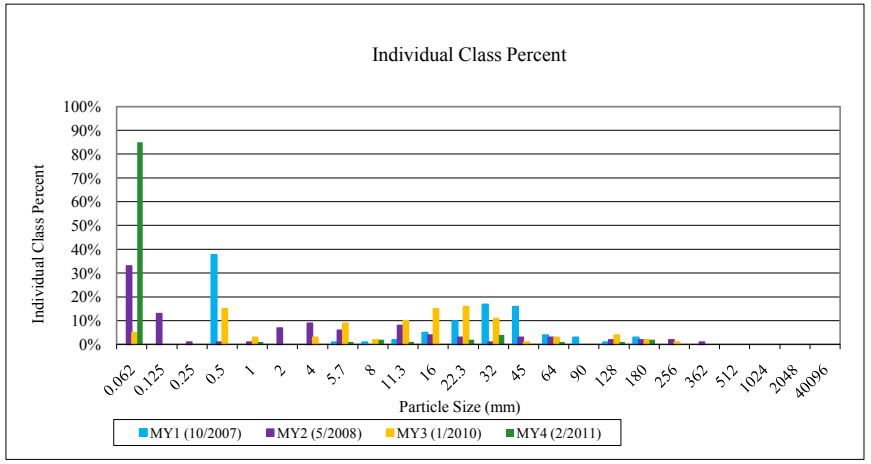
Appendix 4.6 Pebble Count Plots and Raw Data Tables
Camp Branch Stream Restoration/EEP Project No. 92350
Camp Branch Main Channel
Monitoring Year 4 of 5

Project Name: Camp Branch-Main Channel					
Cross-Section: 7					
Feature: Riffle					
			MY4-2/2011		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	85	85%	85%
Sand	very fine sand	0.125	0	0%	85%
	fine sand	0.250	0	0%	85%
	medium sand	0.50	0	0%	85%
	coarse sand	1.00	1	1%	86%
	very coarse sand	2.0	0	0%	86%
Gravel	very fine gravel	4.0	0	0%	86%
	fine gravel	5.7	1	1%	87%
	fine gravel	8.0	2	2%	89%
	medium gravel	11.3	1	1%	90%
	medium gravel	16.0	0	0%	90%
	course gravel	22.3	2	2%	92%
	course gravel	32.0	4	4%	96%
	very coarse gravel	45	0	0%	96%
	very coarse gravel	64	1	1%	97%
Cobble	small cobble	90	0	0%	97%
	medium cobble	128	1	1%	98%
	large cobble	180	2	2%	100%
	very large cobble	256	0	0%	100%
Boulder	small boulder	362	0	0%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	
D84	0.06
D95	29.58

D50 was not calculated due to particle size.





Appendix 4.6 Pebble Count Plots and Raw Data Tables
Camp Branch Stream Restoration/EEP Project No. 92350
Camp Branch Main Channel
Monitoring Year 4 of 5

Project Name: Camp Branch-Main Channel					
Cross-Section: 8					
Feature: Pool					
			MY4-2/2011		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	55	55%	55%
Sand	very fine sand	0.125	0	0%	55%
	fine sand	0.250	0	0%	55%
	medium sand	0.50	0	0%	55%
	coarse sand	1.00	1	1%	56%
	very coarse sand	2.0	0	0%	56%
Gravel	very fine gravel	4.0	1	1%	57%
	fine gravel	5.7	1	1%	58%
	fine gravel	8.0	5	5%	63%
	medium gravel	11.3	4	4%	67%
	medium gravel	16.0	4	4%	71%
	course gravel	22.3	0	0%	71%
	course gravel	32.0	0	0%	71%
	very coarse gravel	45	1	1%	72%
	very coarse gravel	64	3	3%	75%
Cobble	small cobble	90	10	10%	85%
	medium cobble	128	3	3%	88%
	large cobble	180	3	3%	91%
	very large cobble	256	5	5%	96%
Boulder	small boulder	362	4	4%	100%
	small boulder	512	0	0%	100%
	medium boulder	1024	0	0%	100%
	large boulder	2048	0	0%	100%
Bedrock	bedrock	40096	0	0%	100%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	
D84	87.4
D95	240.8

D50 was not calculated due to particle size.