Back Creek Stream and Wetland Restoration
EEP Project No. 17
2010 Monitoring Report: Year 5 of 5

Construction Completed: December 2005
Submission Date: February 2011

Prepared for:

NCDENR-EEP
1652 Mail Service Center
Raleigh, NC 27699

Prepared by:

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SECTION 1
EXECUTIVE SUMMARY

SECTION 1

EXECUTIVE SUMMARY

The Back Creek Stream and Wetland Restoration Project (Site) is a 17.5 acre lot located in Mecklenburg County, North Carolina, northeast of the City of Charlotte (Appendix 1.1). Back Creek drains approximately 4 square miles and is located within the Piedmont Ecoregion in the Yadkin-Peedee River Basin (USGS HUC 03040105). The Site is a mitigation project for the North Carolina Department of Transportation (NCDOT). The project was transferred from NCDOT to the North Carolina Ecosystem Enhancement Program (NCEEP) in 2006. Construction of the restoration project was completed in December 2005, and tree planting was completed in February 2006.

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

1.1 Goals and Objectives

Historically, the Site was utilized for livestock grazing and agricultural hay production. Currently, the Site is dominated by fallow, successional fields, and a few stands of isolated hardwood forests. Sewer line construction and past land use have impaired the streams stability due to dredging and straightening of the upstream reach. Urban development in the watershed has also contributed to the instability of the Site.

The following goals were established for the Site.

1. Restore approximately 3,525 linear feet (lf) of Back Creek.
2. Restore approximately 827 lf of tributaries to Back Creek.
3. Restore approximately 1.5 acres (ac) of jurisdictional wetland, enhance approximately 1.8 ac of jurisdictional wetland, and create approximately 0.5 ac of open water/freshwater marsh adjacent to on-site channels.
4. Reforest approximately 17.5 ac of flood prone area and adjacent upland slopes with native forest species.

TABLE 1: PROJECT TOTALS

	Footage	Creditable Footage
Main stem:	3371 feet	3251 feet*
Upper tributary:	411 feet	411 feet
Central tributary:	354 feet	304 feet*
	4136 feet	3966 feet

*The differences between the creditable footage and the footage have to do with a 120 foot length of the main stem that is within the I-485 ROW, effectively making a single sided easement and therefore not creditable. The central tributary has ~50 feet in the same situation.

The site also contains 3.5 ac (proposed as 1.8 ac) of wetland enhancement and 0.4 ac (proposed as 2.0 ac) of wetland restoration. 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 5 of 5) vegetative assessment and vegetative plot analysis in October 2010. Vegetation assessments were conducted following the NCEEP 2004 Stem Counting Protocol which consists of counting woody stems within the established vegetation plots. The four vegetative plots previously established in the design phase were selected randomly and represent the riparian buffer zone. The planted vegetative community goal for these plots is to establish a Piedmont floodplain forest. The following success criteria for vegetation were established for the Site by EcoScience (2003).

- 320 stems per acre years 1 through 3
- 290 stems per acre year 4
- 260 stems per acre year 5

Vegetation problem areas previously noted along the streambanks that had suffered localized loss of vegetative cover appear to re-stabilizing. In these areas, it is assumed that flood events may have caused bank erosion; therefore, removing vegetation in previous monitoring years. Most of these problem areas have either fully recovered or are continuing to improve with each growing season.

The 2010 vegetation monitoring results indicate that the Site appears to be meeting vegetation success criteria with the exception of Plot 4. The Site's average stem density is approximately 364 planted stems per acre with a plot size of 0.057 ac, which exceeds the year 5 goal of 260 planted stems per acre. Only one of the four vegetation monitoring plots (Plot 4) continues to result in a low survival rate. Initially, planted stem mortality within Plot 4 was most likely due to the severe drought experienced during the 2007 growing season. During the recent growing seasons, volunteer species and resprouting of suspected dead saplings have increased the stems per acre for Plot 4. For the 2010 monitoring year, Plot 4 resulting in a stem density increase due to volunteer species from 140 stems per acre to 404 stems per acre, which meets success critera for the year 5 goal.

In conclusion, the Site has met the vegetation success criteria requirements for monitoring year five (2010). Some loss of streambank vegetation was evident in 2006; however, the overall growth of the streambank vegetation is good and continues to improve as seen over the past few monitoring years. The overall success of the woody vegetation monitored within three of the four plots appears to be better than what was initially assessed in September 2006. This is most likely due to the resprouting of suspected dead saplings and new volunteer species. Although all plots met the vegetation success threshold with the exception of Plot 4, the results from Plot 4 did not affect the site's average planted stem density to be considered unsuccessful. Please refer to Appendix 1.2 and 3 for detailed information regarding the 2010 vegetation current conditions and monitoring data results.

1.3 Stream Assessment

A total of nine cross-sections were established along Back Creek; seven were established along the main channel and one cross-section was established along both the upstream tributary and the central tributary. Stream dimension, profile, and substrate were evaluated along 3,100 lf of the main channel. The upstream and central tributaries were evaluated through visual assessments and cross-sectional surveys.

Main Channel

The pattern, profile, and dimension of the restored channel appear stable for the majority of the project. The structures appear to be in good condition; however, a few structures have moderate scour around the vane arms where they tie into the bankfull elevation. Instances of localized bank scour occurred earlier in the monitoring history and were scattered across the site, but generally did not advance with bank stability percentages at or above 95% for the project's monitoring history. A few of these areas were severe and associated with some mid and transverse bars that subsequently flushed out of the system. Vegetation growth has improved in these areas and is further stabilizing previous bank scour. Within these areas, vegetation growth has improved, which is stabilizing the banks. One (1) area within the restored reach is still illustrating signs of aggradation (approximate stationing 19+93), but there has been little to no changes occurring in the past few monitoring years.

The average bankfull width (26.61 ft) of the surveyed cross-sections is higher than the proposed 22.4 ft, but continues to illustrate a narrowing trend in comparison to the average bankfull width in 2006 (32.40 ft). The average surveyed mean bankfull depth is 2.02 ft compared to the proposed 2.5 ft; however, in comparison to the average mean depth in 2006 (1.89 ft), the Site's average cross-sectional depth continues to increase. The surveyed bankfull widths and depths lead to an average Width/Depth (W/D) ratio of 16.24 and the sinuosity is 1.5. The W/D ratio (16.24) is typical of a C-type channel, but the sinuosity (1.5) is typical of an E-type channel. Therefore, due to these defining characteristics for the 2010 monitoring year, the stream was classified as an E4c. The average W/D ratio (13.65) has decreased since the 2006 monitoring year (18.52) indicating that the channel is becoming more narrow and deep, which is typical for E-type streams.

The 2010 substrate analysis illustrates that all of the cross-sections within the restoration site are recovering from the drought conditions and beaver activity experienced in previous monitoring years. The thalweg profile appears to be stable, and was characterized by well-defined riffle and pool features. The average water surface slope and the average bankfull slope were the same for the surveyed reach, 0.0040 ft/ft. The surveyed water surface slope was slightly steeper than the proposed 0.0034 ft/ft, but similar to the previous monitoring year surveyed slopes.

A crest gauge is located downstream of cross-section 6 within the Back Creek project site. One bankfull or greater event occurred within the Back Creek restoration project in monitoring year 2010. Other indicators such as old wrack lines and staining were observed at the bankfull and greater elevations within the restoration site as well.

Upstream Tributary

Based on current monitoring data and the visual inspection, the channel seems to be functioning properly and maintaining stability. No erosion or structure failure was observed along this reach.
Central Tributary

The tributary appears to be maintaining its proposed function as a B-type storm drain channel. There are some areas with minor bank erosion, but no structural failure is occurring along this reach. Cross-section 9, which is located midway along the tributary has reamined vertically and laterally stable. Minor sediment deposition occurred in 2010, which resulted in a decrease in the cross-sections mean depth (1.04 ft) from previous monitoring year ranges (1.24-1.32 ft). The d50 and d84 particle size has decreased from 0.33 mm to 0.2 mm and 3.43 tp 1.67, respectively. Most likely, these fine particles will be flushed with future rain events.

Overall, the Site appears to be maintaining vertical and lateral stability with stable structures and minimal bank erosion. A few of the areas with aggradation, such as lateral and transverse bars, have adjusted from previous monitoring year. As a result of being flushed out with higher flows, these depositional areas have not advanced from the previous monitoring years. Please refer to Appendix 4 for detailed stream data tables and plots and Appendix 1.2 for the location of the monitoring features.

1.4 Wetland Assessment

Three groundwater monitoring gauges and one rain gauge were installed on-site. Two of these groundwater gauges were installed in close proximity to Vegetation Plot 2. One gauge is located within an emergent wetland area adjacent to the main channel. The monitoring gauges are programmed to download groundwater levels daily and were downloaded monthly from March to November in order to capture hydrological data during the 2010 growing season. The target wetland hydrological success criterion is saturation or inundation for at least 12.5 percent of the growing season in the lower landscape (floodplain) positions. To achieve the above hydrologic success criterion, groundwater levels must be within 12-inches of the ground surface for 30 consecutive days, which is 12.5 percent of the March 21 to November 16 (241 days) growing season.

All gauges on-site achieved the wetland success criterion of soil saturation within the upper 12 inches for 30 consecutive days during the growing season. There were no problem areas observed within the wetland restoration zones for the Site. Within the wetland zones, hydrophytic vegetation and hydrology indicators have developed. In some areas, the appropriate soil chroma has also developed. It is suspected that these areas may have already had hydric conditions present. Hydrophytic vegetation consists of a thick herbaceous layer of sedge species (*Carex* spp.), rush species (*Juncus* spp.), bulrush species (*Scirpus* spp.), spotted touch-me-not (*Impatiens capensis*), and smartweed species (*Polygonum* spp.). The general success of hydrology within the wetland restoration zones is adequate to meet success requirements. Surface inundation to ground saturation was observed throughout the site; therefore, appropriate hydrological condition for the wetland zones appears to be present. Please refer to Appendix 5 for wetland plots and a summary of the wetland criteria attainment.

1.5 Annual Monitoring Summary

In summary, the Site has met the stream, vegetation, and wetland mitigation goals for monitoring year 5. 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 the severe drought experienced during the 2007 growing season. The pattern, profile, and dimension of the restored channel and the two unnamed tributaries appear to be maintaining vertical and lateral stability with stable structures and minimal bank erosion. A few problem areas were observed, such as moderate bank erosion, moderate to poor streambank cover, loose matting, and aggradation. These areas of stream instability do not appear to have advanced from the previous monitoring years. For the 2010 monitoring year, all gauges achieved the wetland success criterion of soil saturation within the upper 12 inches for 30 consecutive days.

The background information provided in this report is referenced from the mitigation plan and previous monitoring reports prepared by EcoScience (2003). 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 Site were a combination of those established by standard regulatory guidance and procedure 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 conducted following the NCEEP 2004 Stem Counting Protocol which consists of counting woody stems within the established vegetation plots. 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. Precipitation data for the hydrographs was obtained from an off-site resource in Concord, NC weather station (the nearest station offering daily precipitation data) through Weather Underground URL (http://www.wunderground.com/history/airport/KJQF/2010/12/16/CustomHistory.html).

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. 2003. Mitigation Report (Back Creek Stream and Wetland Restoration). Raleigh, NC.

Harrelson, Cheryl C; Rawlins, C.L.; Potyondy, John P. 1994. *Stream Channel Reference Sites: An Illustrated Guide to Field Technique.* Gen. Tech. Rep. RM-245. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 61 p.

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

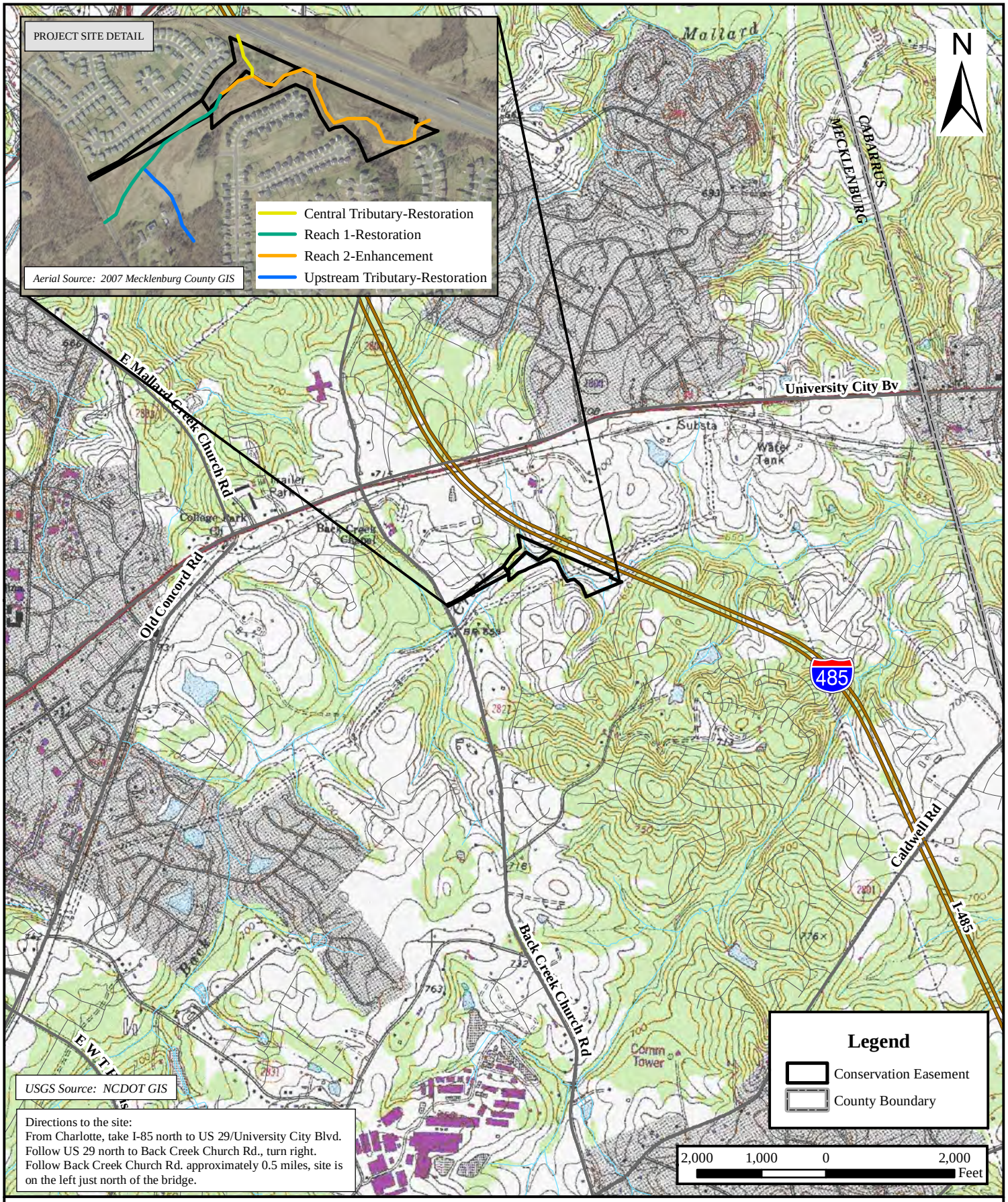
Appendix 4 – Stream Assessment Data

Appendix 5 – Wetland Assessment Data

APPENDIX 1
GENERAL FIGURES AND PLAN VIEWS

1.1 Project Vicinity Map

1.2 Current Condition Plan View



Appendix 1.1 Project Vicinity Map
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Mecklenburg County, NC
Monitoring Year 5 of 5
Submittal Date: February 2011

Aerial Photo Source: Mecklenburg County Land Use and Environmental Services, March 2004

Ecosystem Enhancement Program

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

EEP PROJECT NO. 17
MECKLENBURG COUNTY,
NORTH CAROLINA
MONITORING YEAR 5 of 5

JJG

NC ECOSYSTEM ENHANCEMENT PROGRAM
BACK CREEK STREAM AND WETLAND RESTORATION

APPENDIX 1.2
CURRENT CONDITION PLAN VIEW

DATE : FEBRUARY 2011
SCALE : 1"=200'
JOB NO.: JJX31100

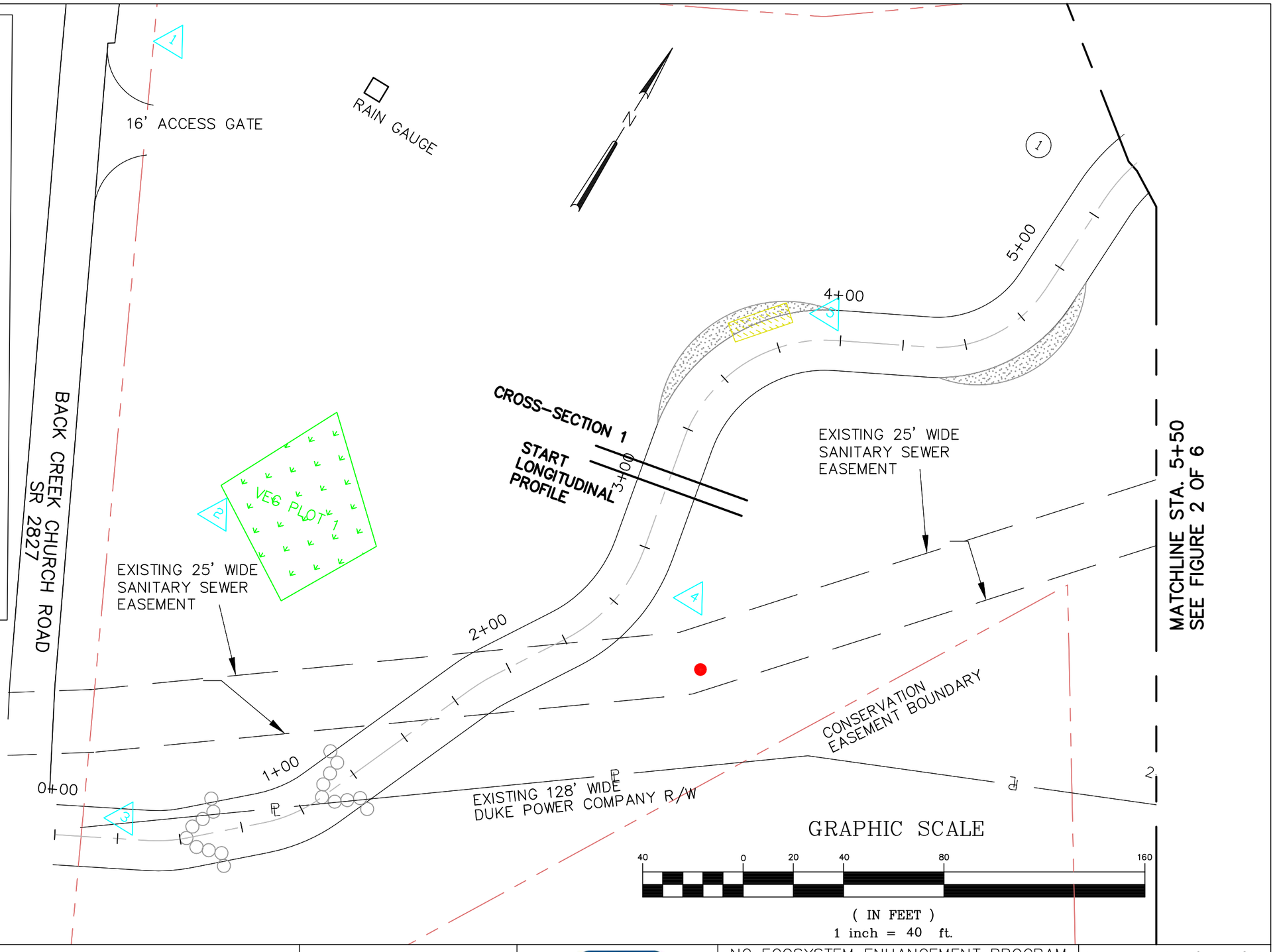
FIGURE KEY

LEGEND

- CROSS VANE
- MEANDER REVETMENT
- MODIFIED CROSS VANE
- GRADE CONTROL SILL
- IMPERVIOUS CHANNEL BLOCK
- J-HOOK VANE
- STEP-POOL STRUCTURE
- PHOTO POINT
- RAIN GAUGE
- GROUNDWATER GAUGE
- MANHOLE
- VEGETATION PLOT
- DOWN TREE

2010 CURRENT CONDITIONS

- BANK SCOUR
- AGGRADATION



NOTES:
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2. ALL LOCATIONS ARE APPROXIMATE.

EEP PROJECT NO. 17
MECKLENBURG COUNTY,
NORTH CAROLINA
MONITORING YEAR 5 of 5

NC ECOSYSTEM ENHANCEMENT PROGRAM
BACK CREEK STREAM AND WETLAND RESTORATION

APPENDIX 1.2
CURRENT CONDITION PLAN VIEW

DATE : FEBRUARY 2011
SCALE : 1"=40'
JOB NO.: JJX31100

FIGURE 1 OF 6

CONSERVATION EASEMENT BOUNDARY

N

CROSS-SECTION 2

6+00

7+00

8+00

9+00

10+00

11+00

EXISTING 25' WIDE SANITARY SEWER EASEMENT

MATCHLINE STA. 11+50
SEE FIGURE 3 OF 6

PERMANENT SOIL REINFORCEMENT MAT

VEG PLOT 2

CROSS-SECTION 8

4+00

3+00

EPHEMERAL POOL

MATCHLINE STA. 5+50
SEE FIGURE 1 OF 6

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

LEGEND

- CROSS VANE
- MEANDER REVETMENT
- MODIFIED CROSS VANE
- GRADE CONTROL SILL
- IMPERVIOUS CHANNEL BLOCK
- J-HOOK VANE
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- DOWN TREE

2010 CURRENT CONDITIONS

- BANK SCOUR
- AGGRADATION

NOTES:
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EEP PROJECT NO. 17
MECKLENBURG COUNTY,
NORTH CAROLINA
MONITORING YEAR 5 of 5

NC ECOSYSTEM ENHANCEMENT PROGRAM
BACK CREEK STREAM AND WETLAND RESTORATION

APPENDIX 1.2
CURRENT CONDITION PLAN VIEW

DATE : FEBRUARY 2011
SCALE : 1"=40'
JOB NO.: JJX31100

FIGURE 2 OF 6

MATCHLINE STA. 11+50
SEE FIGURE 2 OF 6

N

CROSS-SECTION 3

CROSS-SECTION 4

12+00

13+00

14+00

15+00

16+00

AVOIDANCE AREA

SAFETY FENCE

VEG PLOT 3

MATCHLINE STA. 17+25
SEE FIGURE 4 OF 6

EXISTING 15' WIDE SANITARY SEWER EASEMENT

CONSERVATION EASEMENT BOUNDARY

LEGEND

- CROSS VANE
- MEANDER REVETMENT
- MODIFIED CROSS VANE
- GRADE CONTROL SILL
- IMPERVIOUS CHANNEL BLOCK
- J-HOOK VANE
- STEP-POOL STRUCTURE
- PHOTO POINT
- RAIN GAUGE
- GROUNDWATER GAUGE
- MANHOLE
- DOWN TREE

2010 CURRENT CONDITIONS

- BANK SCOUR
- AGGRADATION

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

NOTES:
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EEP PROJECT NO. 17
MECKLENBURG COUNTY,
NORTH CAROLINA
MONITORING YEAR 5 of 5

NC ECOSYSTEM ENHANCEMENT PROGRAM
BACK CREEK STREAM AND WETLAND RESTORATION

APPENDIX 1.2
CURRENT CONDITION PLAN VIEW

DATE : FEBRUARY 2011
SCALE : 1"=40'
JOB NO.: JJX31100

FIGURE 3 OF 6

LEGEND

- RAIN GAUGE
- GROUNDWATER GAUGE
- MANHOLE
- DOWN TREE
- PHOTO POINT
- CROSS VANE
- MEANDER REVETMENT
- MODIFIED CROSS VANE
- GRADE CONTROL SILL
- IMPERVIOUS CHANNEL BLOCK
- J-HOOK VANE
- STEP-POOL STRUCTURE
- VEGETATION PLOT

2010 CURRENT CONDITIONS

- BANK SCOUR
- AGGRADATION

N

I-48

CONSERVATION EASEMENT BOUNDARY

0+00 SP1 SP2 SP3 SP4 SP5 1+00 SP6 SP7 SP8 SP9 CROSS-SECTION 9 12 2+00 -R- 3+00 MATCHLINE STA. 17+25 SEE FIGURE 3 OF 6 7+00 11 18+00 19+00 14 20+00 CROSS-SECTION 5 21+00 22+00 MATCHLINE STA. 22+75 SEE FIGURE 5 OF 6

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

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EEP PROJECT NO. 17
MECKLENBURG COUNTY,
NORTH CAROLINA
MONITORING YEAR 5 of 5

NC ECOSYSTEM ENHANCEMENT PROGRAM
BACK CREEK STREAM AND WETLAND RESTORATION

APPENDIX 1.2
CURRENT CONDITION PLAN VIEW

DATE : FEBRUARY 2011
SCALE : 1"=40'
JOB NO.: JJX31100

FIGURE 4 OF 6

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)

1 inch = 40 ft.

N

MATCHLINE STA. 22+75
SEE FIGURE 4 OF 6

MATCHLINE STA. 28+75
SEE FIGURE 6 OF 6

23+00

24+00

25+00

26+00

27+00

28+00

CROSS-SECTION 6

FENCE

EXISTING 25' WIDE SANITARY SEWER EASEMENT

EXISTING 128' WIDE DUKE POWER COMPANY R/W

FP

LEGEND

- CROSS VANE
- MEANDER REVETMENT
- MODIFIED CROSS VANE
- GRADE CONTROL SILL
- IMPERVIOUS CHANNEL BLOCK
- J-HOOK VANE
- STEP-POOL STRUCTURE
- PHOTO POINT
- RAIN GAUGE
- MANHOLE
- DOWN TREE
- GROUNDWATER GAUGE

2010 CURRENT CONDITIONS

- BANK SCOUR
- AGGRADATION

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EEP PROJECT NO. 17
MECKLENBURG COUNTY,
NORTH CAROLINA
MONITORING YEAR 5 of 5

NC ECOSYSTEM ENHANCEMENT PROGRAM
BACK CREEK STREAM AND WETLAND RESTORATION

APPENDIX 1.2
CURRENT CONDITION PLAN VIEW

DATE : FEBRUARY 2011
SCALE : 1"=40'
JOB NO.: JJX31100

FIGURE 5 OF 6

LEGEND

- CROSS VANE
- MEANDER REVETMENT
- MODIFIED CROSS VANE
- GRADE CONTROL SILL
- IMPERVIOUS CHANNEL BLOCK
- J-HOOK VANE
- STEP-POOL STRUCTURE
- # PHOTO POINT
- RAIN GAUGE
- # GROUNDWATER GAUGE
- MANHOLE
- DOWN TREE

2010 CURRENT CONDITIONS

- BANK SCOUR
- AGGRADATION

EXISTING 25' WIDE SANITARY SEWER EASEMENT

N

36+00

35+00

34+00

33+00

32+00

31+00

30+00

29+00

END LONGITUDINAL PROFILE

CROSS-SECTION 7

VEG PLOT 4

17

18

19

20

MATCHLINE STA. 28+75
SEE FIGURE 5 OF 6

CONSERVATION EASEMENT BOUNDARY

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

NOTES:
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EEP PROJECT NO. 17
MECKLENBURG COUNTY,
NORTH CAROLINA
MONITORING YEAR 5 of 5

NC ECOSYSTEM ENHANCEMENT PROGRAM
BACK CREEK STREAM AND WETLAND RESTORATION

APPENDIX 1.2
CURRENT CONDITION PLAN VIEW

DATE : FEBRUARY 2011
SCALE : 1"=40'
JOB NO.: JJX31100

FIGURE 6 OF 6

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

Appendix 2.1 Project Mitigation Structure and Objectives
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5

Segment/Reach	Mitigation Type	Approach	Linear Footage or Acres	Stationing (ft)	Comments
Back Creek/Reach 1	R	P2	1,300 lf	0+00-13+00	Channel restoration, relocation with use of grade
Back Creek/Reach 2	EI	P2/3	2,000 lf	13+00-33+00	Channel restoration, in-place with use of grade control
Upstream Tributary	R	P2	400 lf	0+00 - 4+00	Channel restoration, relocation with use of grade
Central Tributary	R	P2	375 lf	0+00 - 3+75	Channel restoration, relocation with use of grade
Wetland Areas	R	-	0.4 ac	-	Restoration of wetlands.
Wetland Area	E	-	3.5 ac	-	Enhancement of jurisdictional wetland.

Component Summations

Restoration Level	Stream (lf)	Wetland (ac)		Upland (ac)	Buffer (ac)	BMP
		Riparian	Non-Riparian			
Restoration (R)	2,075	0.4	N/A	N/A	N/A	N/A
Enhancement (E)	N/A	3.5	N/A	N/A	N/A	N/A
Enahncement I (E)	2,000	N/A	N/A	N/A	N/A	N/A
Enhancement II (E)	N/A	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)	N/A	N/A	N/A	N/A	N/A	N/A
HQ Preservation (P)	N/A	N/A	N/A	N/A	N/A	N/A
Totals	**4,075**	**3.9**	**N/A**	**N/A**	**N/A**	**N/A**

Appendix 2.2 Project Activity and Reporting History
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5

Elapsed Time Since Grading Complete: 5 Years
Elapsed Time Since Planting Complete: 4 Years 10 Months
Number of Reporting Years: 5

Activity or Report	Data Collection Completed	Actual Completion or Delivery
Restoration Plan	N/A	Jan-03
Final Design-90%	N/A	N/A
Construction	N/A	Dec-05
Temporary S&E mix applied to entire project area*	N/A	2005
Permanent seed mix applied to reach	N/A	N/A
Woody plantings for reach	N/A	Feb-06
As-Built Plansheet (Design Markups)	N/A	Jul-04
Year 1 Monitoring	Nov-06	Jan-06
Year 2 Monitoring	Aug-07	Nov-07
Year 3 Monitoring	May/Jun-08	Nov-08
Year 4 Monitoring	Jul-09	Nov-09
Year 5 Monitoring	Feb-11	Feb-11

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

Appendix 2.3 Project Contacts Table
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5

Designer	EcoScience Corporation 1101 Haynes Street, Suite 101 Raleigh, NC 27604
Construction	Shamrock Environmental Corportation 503 Patton Avenue Greensboro, NC 27406
Planting Contractor	Henry Rosso
Seeding Contractor	Shamrock Environmental Corportation 503 Patton Avenue Greensboro, NC 27406
Monitoring Performers	Jordan, Jones and Goulding 309 E. Morehead Street, Suite 110 Charlotte, NC 28202
Stream Monitoring, POC	Alison Nichols, 704-527-4106 ext.227
Vegetation Monitoring, POC	
Wetland Monitoring, POC	

Table 2.4 Project Attribute Table
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5

Project County	Mecklenburg County, North Carolina		
Physiographic Region	Piedmont		
Ecoregion	Southern Outer Piedmont		
Project River Basin	Yadkin PeeDee		
USGS HUC for Project (14 digit)	03040105010050		
NCDWQ Sub-basin for Project and Reference	03-07-11		
Within extent of EEP Watershed Plan?	U		
WRC Class (Warm, Cool, Cold)	U		
% of project easement fenced or demarcated?	100%		
Beaver activity observed during design phase?	U		
Restoration Component Attribute Table			
	Main Channel	**Upstream Tributary**	**Central Tributary**
Drainage Area (sq.mi.)	4.1	0.1	.04
Stream Order	3rd	1st	1st
Restored Length (ft)	3,300	400	375
Perennial or Intermittent	Perennial	Intermittent	Intermittent
Watershed type (Rural, Urban, Developing)	Urban		
Watershed LULC Distribution			
Agriculture	-		
Commercial	-		
Public/Institutional	-		
Residential	-		
Transportation	-		
Watershed Impervious Cover (%)	~20%		
NCDWQ AU/Index number	13-17-7		
NCDWQ classification	WS-II, HQW,C		
303d listed?	No		
Upstream of a 303d listed sedment?	Yes		
Reasons for 303d listing or stressor	4s,4t,5		
Total acreage of easement	14 acres		
Total vegetated acreage within the easement	3.9		
Total planted acreage as part of the restoration	U		
Rosgen classification of the pre-existing	C4	N/A	B-type
Rosgen classification of the As-Built	C5	N/A	B-type
Valley Type	-		
Valley slope	-		
Valley side slope range	-		
Valley toe slope range	-		
Cowardin classification	N/A		
Trout waters designation	No		
Species of concern, endangered, etc? (Y/N)	N/A		
Dominant soil series and characteristics	Aab, CcB2, CcD2, Ch, CuD2, EnD, PaF, MeB, MeD		
Series	Monacan	Enon	Wilkes
Depth	-		
Clay %	-		
K	-		
T	-		

"N/A": items do not apply / "-": items are unavailable / "U": items are unknown

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
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5

Vegetation Plot ID	Vegetation Survival Threshold Met
Plot 1	Y
Plot 2	Y
Plot 3	Y
Plot 4	N*

*Plot 4 did not meet based on planted stems, but with volunteers demonstrates a density of 404 stems per acre.

1. Vegetation Plot 1
(10/2010)

2. Vegetation Plot 2
(10/2010)

3. Vegetation Plot 3
(10/2010)

4. Vegetation Plot 4
(10/2010)

Prepared For:

Ecosystem Enhancement Program

Appendix 3.2 Vegetation Monitoring Plot Photos
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5
Submittal Date: December 2010

Prepared by:

JJG

Appendix 3.3 Vegetation Plot Summary Data Table
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5

			Current Data (MY5-2010)								Annual Means									
			Plot 1		Plot 2		Plot 3		Plot 4		Current Mean		MY1 - 2006		MY2 - 2007		MY3- 2008		MY4- 2009	
Species	**Common Name**	**Type**	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T
Quercus michauxii	swamp chestnut oak	T	4	4	6	8					**5**	**6**	**3**	**3**	**5**	**5**	**5**	**5**	**5**	**7**
Fraxinus pennsylvanica	green ash	T	6	17	8	12	12	29	4	8	**8**	**17**	**7**	**7**	**7**	**7**	**8**	**8**	**8**	**17**
Platanus occidentalis	american sycamore	T	5	3	6	6	6	8	1	1	**5**	**5**	**4**	**4**	**5**	**5**	**5**	**8**	**5**	**6**
Betula nigra	river birch	T	4	5	4	4	10	14	3	3	**5**	**7**	**4**	**4**	**6**	**6**	**6**	**6**	**5**	**6**
Ulmus americana	american elm	T	2	2							**2**	**2**	**1**	**1**	**2**	**2**	**2**	**2**	**2**	**2**
Liquidambar styraciflua	sweet gum	T		3	2	52		4		2	**2**	**15**	**N/A**	**6**	**N/A**	**10**	**N/A**	**10**	**2**	**15**
Acer rubrum	red maple	T				1		1		1	**N/A**	**1**	**N/A**	**2**	**N/A**	**1**	**N/A**	**2**	**N/A**	**1**
Acer negundo	boxelder	T		1						8	**N/A**	**4.5**	**N/A**		**N/A**		**N/A**	**1**	**N/A**	**5**
Quercus sp.	oak species	T				2					**N/A**	**2**	**N/A**		**N/A**		**N/A**		**N/A**	**2**
Plot Area (acres)			**0.057**																	
Species Count			**5**	**7**	**5**	**7**	**3**	**5**	**3**	**6**	**4**	**6**	**4**	**5**	**4**	**5**	**4**	**3**	**4**	**6**
Stem Count			**21**	**35**	**26**	**85**	**28**	**56**	**8**	**23**	**21**	**50**	**16**	**20**	**21**	**26**	**21**	**13**	**21**	**51**
Stems per Acre			**368**	**614**	**456**	**1491**	**491**	**982**	**140**	**404**	**364**	**873**	**285**	**346**	**364**	**461**	**364**	**224**	**364**	**886**

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

Appendix 3.4 Vegetation Condition Assessment
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5

Planted Acreage **17.2**

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	0.008	0.05%
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**	**0.05%**
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 **14**

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-Section Plots and Raw Data Tables*

4.5 Longitudinal Plots and Raw Data Tables*

4.6 Pebble Count Plots and Raw Data Tables*

*Raw data tables have been provided electronically.

Photo Point 1-View Southeast (11/2010)

Photo Point 2-View South (11/2010)

Prepared For:

Ecosystem Enhancement Program

Appendix 4.1 Stream Station Photos
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5
Submittal Date: December 2010

Prepared by:

JJG

Photo Point 3-View Upstream
Main Channel (11/2010)

Photo Point 3-View Downstream
Main Channel (11/2010)

Photo Point 4-View Upstream
Main Channel (11/2010)

Photo Point 4-View Downstream
Main Channel (11/2010)

Prepared For:

Ecosystem Enhancement Program

Appendix 4.1 Stream Station Photos
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5
Submittal Date: December 2010

Prepared by:

JJG

Photo Point 5-View Upstream
Main Channel (11/2010)

Photo Point 5-View Downstream
Main Channel (11/2010)

Photo Point 6-View Upstream
Main Channel (11/2010)

Photo Point 6-View Downstream
Main Channel (11/2010)

Prepared For:

Ecosystem Enhancement Program

Appendix 4.1 Stream Station Photos
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5
Submittal Date: December 2010

Prepared by:

JJG

Photo Point 7 View Southwest (11/2010)

Photo Point 8-View Upstream
Main Channel(11/2010)

Photo Point 8-View Downstream
Main Channel (11/2010)

Prepared For:

Ecosystem Enhancement Program

Appendix 4.1 Stream Station Photos
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5
Submittal Date: December 2010

Prepared by:

JJG

Photo Point 9-View Upstream
Main Channel (11/2010)

Photo Point 9-View Downstream
Main Channel (11/2010)

Photo Point 10-View Upstream
Main Channel (11/2010)

Photo Point 10-View Downstream
Main Channel (11/2010)

Prepared For:

Ecosystem Enhancement Program

Appendix 4.1 Stream Station Photos
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5
Submittal Date: December 2010

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Photo Point 11-View Upstream
Main Channel (11/2010)

Photo Point 11-View Downstream
Main Channel (12/2010)

Photo Point 12-View Upstream
Central Tributary (12/2010)

Photo Point 12-View Downstream
Central Tributary (12/2010)

Prepared For:

Ecosystem Enhancement Program

Appendix 4.1 Stream Station Photos
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5
Submittal Date: December 2010

Prepared by:

JJG

Photo Point 13 View Northwest (11/2010)

Photo Point 14-View Upstream
Main Channel (11/2010)

Photo Point 14-View Downstream
Main Channel (11/2010)

Prepared For:

Ecosystem Enhancement Program

Appendix 4.1 Stream Station Photos
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5
Submittal Date: December 2010

Prepared by:

JJG

Photo Point 15-View Upstream
Main Channel (11/2010)

Photo Point 15-View Downstream
Main Channel (11/2010)

Photo Point 16-View Upstream
Main Channel (11/2010)

Photo Point 16-View Downstream
Main Channel (11/2010)

Prepared For:

Ecosystem Enhancement Program

Appendix 4.1 Stream Station Photos
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5
Submittal Date: December 2010

Prepared by:

JJG

Photo Point 17-View Veg Plot 4 (11/2010)

Photo Point 18-View Upstream
Main Channel (11/2010)

Photo Point 18-View Downstream
Main Channel (11/2010)

Prepared For:

Ecosystem Enhancement Program

Appendix 4.1 Stream Station Photos
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5
Submittal Date: December 2010

Prepared by:

JJG

Photo Point 19-View Upstream
Main Channel (11/2010)

Photo Point 19-View Downstream
Main Channel (11/2010)

Photo Point 20-View Upstream
Main Channel (11/2010)

Photo Point 20-View Downstream
Main Channel (11/2010)

Prepared For:

Ecosystem Enhancement Program

Appendix 4.1 Stream Station Photos
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5
Submittal Date: December 2010

Prepared by:

JJG

Photo Point 21-View Upstream
Upstream Tributary (11/2010)

Photo Point 21-View Downstream
Upstream Tributary (11/2010)

Photo Point 22-View Upstream
Upstream Tributary (11/2010)

Photo Point 22-View Downstream
Upstream Tributary (11/2010)

Prepared For:

Ecosystem Enhancement Program

Appendix 4.1 Stream Station Photos
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5
Submittal Date: December 2010

Prepared by:

JJG

Appendix 4.2 Qualitative Visual Stability Assessment
Main Channel (3,300 lf)
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 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			1	42	99%			
		Degredation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	24	24			100%			
	3. Meander Pool Condition	Depth Sufficient	26	26			100%			
		Lenth Appropriate	26	26			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	25	26			96%			
		Thalweg centering at downstream of meander bend (Glide)	26	26			100%			
2. Bank	**1. Scoured/Eroded**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			11	287	96%	8	213	97%
	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	11	287	96%	8	213	97%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dilodged boulders or logs.	18	18			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	18	18			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	18	18			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	15	15			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	18	18			100%			

Appendix 4.2 Qualitative Visual Stability Assessment
Upstream Tributary (400 lf)
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 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	8	8			100%			
	3. Meander Pool Condition	Depth Sufficient	7	7			100%			
		Lenth Appropriate	7	7			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	7	7			100%			
		Thalweg centering at downstream of meander bend (Glide)	7	7			100%			
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.	8	8			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	8	8			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	8	8			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	8	8			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	8	8			100%			

Appendix 4.2 Qualitative Visual Stability Assessment
Central Tributary (375 lf)
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 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	8	8			100%			
	3. Meander Pool Condition	Depth Sufficient	7	7			100%			
		Lenth Appropriate	7	7			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	7	7			100%			
		Thalweg centering at downstream of meander bend (Glide)	7	7			100%			
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.	8	8			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	8	8			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	8	8			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	8	8			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	8	8			100%			

Appendix 4.3 Verification of Bankfull Events
Back Creek Stream and Wetland Restoration/EEP Project #17
Monitoring Year 5 of 5

Date of Collection	Date of Occurrence	Method	Photo # (if available)
Summer/Fall 2006	9/13/06	Visual Assessment	N/A
10/9/2007	Unknown	Crest Gauge	N/A
8/19/2008	Unknown	Crest Gauge	N/A
7/15/2009	Unknown	Crest Gauge and Visual Assessment	N/A
11/18/2009	11/11/2009-11/12/2009	Crest Gauge and Visual Assessment	N/A
11/19/2010	11/8/2009-11/12/2010	Crest Gauge and Visual Assessment	N/A

Appendix 4.4 Cross-Section Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Main Channel
Monitoring Year 5 of 5

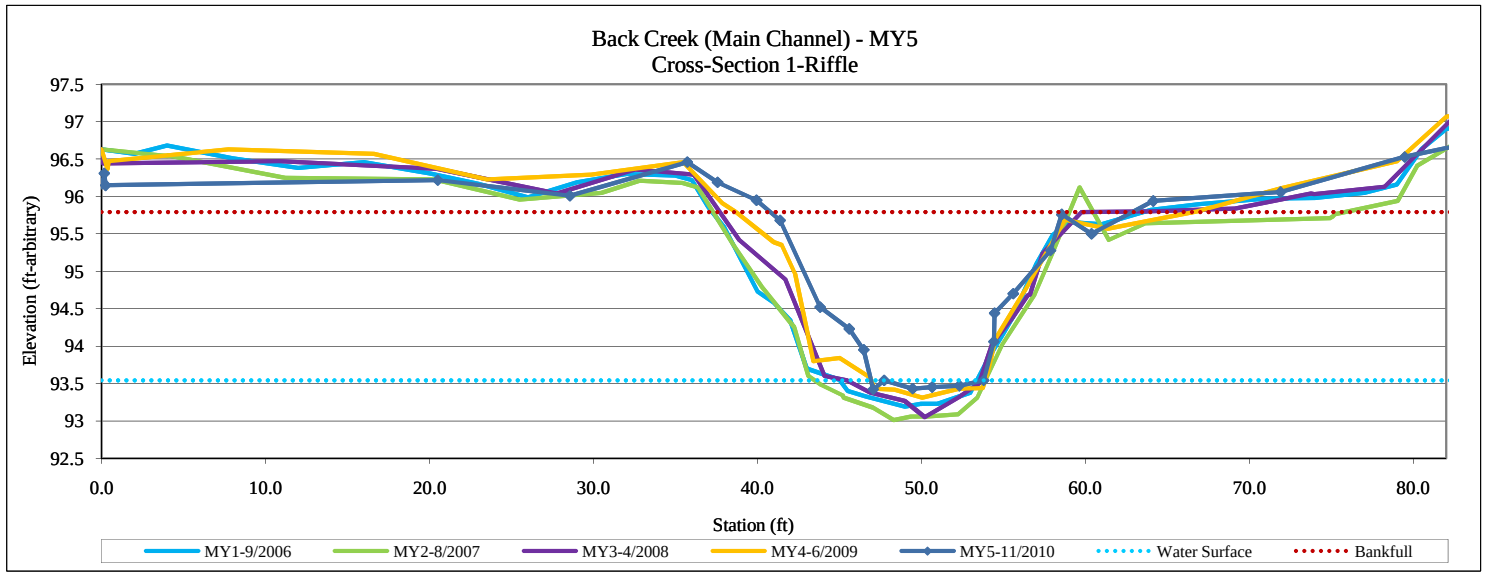
Project Name	**Back Creek**
EEP Project Number	**17**
Cross-Section ID	**XS-1, Riffle, 2+98**
Survey Date	**11/2010**

SUMMARY DATA	
Bankfull Elevation (ft)	95.79
Bankfull Cross-Sectional Area (ft^2)	28.20
Bankfull Width (ft)	17.78
Flood Prone Area Elevation (ft)	98.16
Flood Prone Width (ft)	220.00
Bankfull Mean Depth (ft)	1.53
Bankfull Max Depth (ft)	2.37
W/D Ratio	11.62
Entrenchment Ratio	4.94
Bank Height Ratio	1.00

XS-1: View Upstream

XS-1: View Downstream

Station	Elevation	Notes
-0.03	96.12	x1
0.17	96.31	x1-lpt
0.25	96.15	x1
20.51	96.22	x1
28.57	96.01	x1
35.72	96.46	x1
37.57	96.19	x1
39.95	95.95	x1
41.38	95.68	x1
43.83	94.52	x1
45.6	94.23	x1
46.49	93.95	x1
47.07	93.42	x1
47.73	93.54	x1-lew
49.47	93.43	x1
50.65	93.45	x1
52.32	93.47	x1
53.8	93.54	x1-rew
54.42	94.06	x1
54.46	94.44	x1
55.6	94.7	x1
57.87	95.28	x1
58.56	95.76	x1
60.38	95.5	x1
64.14	95.94	x1
71.9	96.06	x1
79.48	96.53	x1
87.35	96.89	x1-rpt
87.89	96.82	x1



Appendix 4.4 Cross-Section Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Main Channel
Monitoring Year 5 of 5

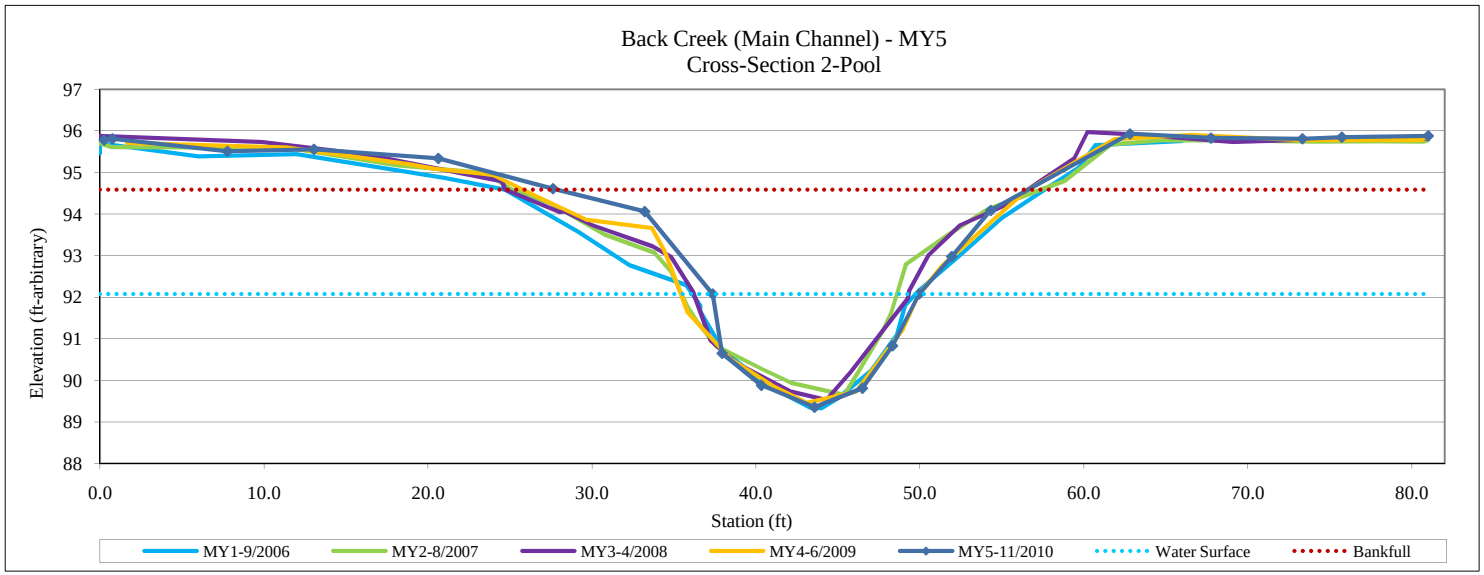
Project Name	**Back Creek**
EEP Project Number	**17**
Cross-Section ID	**XS-2, Pool, 7+56**
Survey Date	**11/2010**

SUMMARY DATA	
Bankfull Elevation (ft)	94.59
Bankfull Cross-Sectional Area (ft^2)	71.37
Bankfull Width (ft)	29.09
Flood Prone Area Elevation (ft)	N/A
Flood Prone Width (ft)	N/A
Bankfull Mean Depth (ft)	2.45
Bankfull Max Depth (ft)	5.26
W/D Ratio	11.87
Entrenchment Ratio	N/A
Bank Height Ratio	1.00

XS-2: View Upstream

XS-2: View Downstream

Station	Elevation	Notes
0.24	95.78	x2
0.75	95.81	x2-lpt
7.77	95.51	x2
13.04	95.56	x2
20.63	95.34	x2
27.63	94.61	x2
33.22	94.06	x2
37.36	92.08	x2-lew
37.94	90.65	x2
40.33	89.88	x2
43.58	89.35	x2
46.50	89.81	x2
48.33	90.83	x2
49.96	92.08	x2-rew
51.94	92.98	x2
54.32	94.09	x2
62.81	95.93	x2
67.76	95.83	x2
73.33	95.81	x2
75.74	95.85	x2
81.01	95.88	x2-rpt



Appendix 4.4 Cross-Section Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Main Channel
Monitoring Year 5 of 5

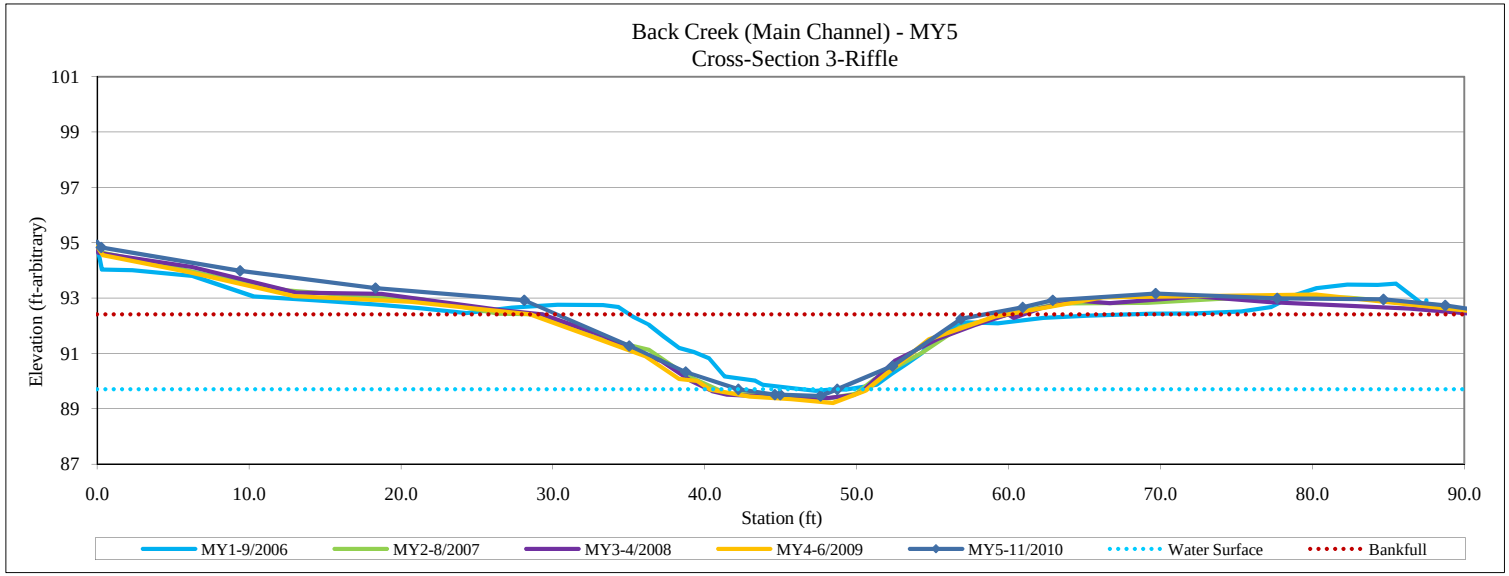
Project Name	**Back Creek**
EEP Project Number	**17**
Cross-Section ID	**XS-3, Riffle, 12+23**
Survey Date	**11/2010**

SUMMARY DATA	
Bankfull Elevation (ft)	92.41
Bankfull Cross-Sectional Area (ft^2)	48.85
Bankfull Width (ft)	30.08
Flood Prone Area Elevation (ft)	95.36
Flood Prone Width (ft)	200.00
Bankfull Mean Depth (ft)	1.62
Bankfull Max Depth (ft)	2.95
W/D Ratio	18.57
Entrenchment Ratio	6.65
Bank Height Ratio	1.00

XS-3: View Upstream

XS-3: View Downstream

Station	Elevation	Notes
-0.01	95.04	x3-lpt
0.26	94.83	x3
9.41	93.98	x3
18.32	93.36	x3
28.11	92.92	x3
35.02	91.27	x3
38.74	90.33	x3
42.21	89.70	x3-lew
44.60	89.51	x3
44.97	89.51	x3
47.61	89.46	x3
48.72	89.70	x3-rew
52.35	90.54	x3
56.87	92.25	x3
60.92	92.66	x3
62.90	92.92	x3
69.67	93.16	x3
77.67	92.99	x3
84.67	92.95	x3
88.74	92.73	x3
93.15	92.37	x3
94.54	92.23	x3-rpt



Appendix 4.4 Cross-Section Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Main Channel
Monitoring Year 5 of 5

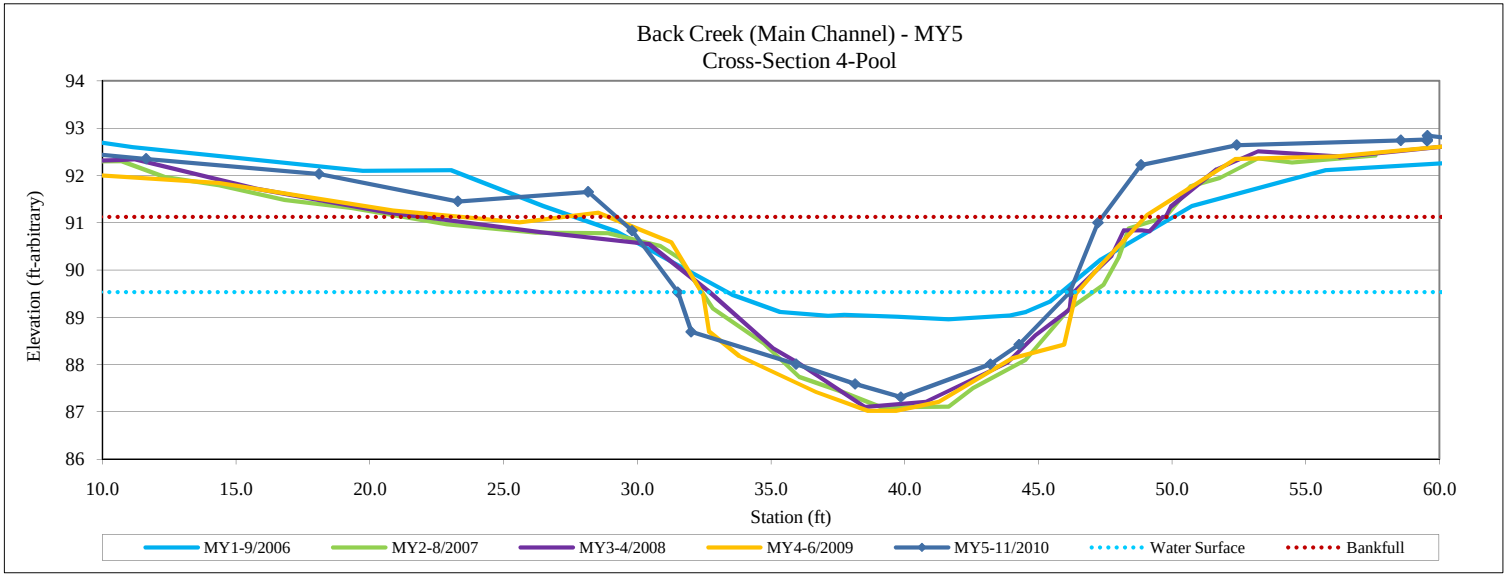
Project Name	**Back Creek**
EEP Project Number	**17**
Cross-Section ID	**XS-4, Pool, 15+60**
Survey Date	**11/2010**

SUMMARY DATA	
Bankfull Elevation (ft)	91.12
Bankfull Cross-Sectional Area (ft^2)	46.85
Bankfull Width (ft)	18.16
Flood Prone Area Elevation (ft)	N/A
Flood Prone Width (ft)	N/A
Bankfull Mean Depth (ft)	2.58
Bankfull Max Depth (ft)	3.81
W/D Ratio	7.04
Entrenchment Ratio	N/A
Bank Height Ratio	1.00

XS-4: View Upstream

XS-4: View Downstream

Station	Elevation	Notes
-1.58	92.12	x4-lpt
0.65	92.45	x4
6.58	92.62	x4
11.64	92.35	x4
18.11	92.03	x4
23.30	91.45	x4
28.17	91.65	x4
29.81	90.83	x4
31.52	89.53	x4-lew
32.02	88.69	x4
35.94	88.01	x4
38.15	87.59	x4
39.86	87.31	x4
43.21	88.01	x4
44.28	88.42	x4
46.18	89.53	x4-rew
47.23	91.00	x4
48.84	92.22	x4
52.42	92.64	x4
58.55	92.74	x4
59.54	92.76	x4
59.54	92.73	x4
59.55	92.84	x4
60.16	92.8	x4



Appendix 4.4 Cross-Section Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Main Channel
Monitoring Year 5 of 5

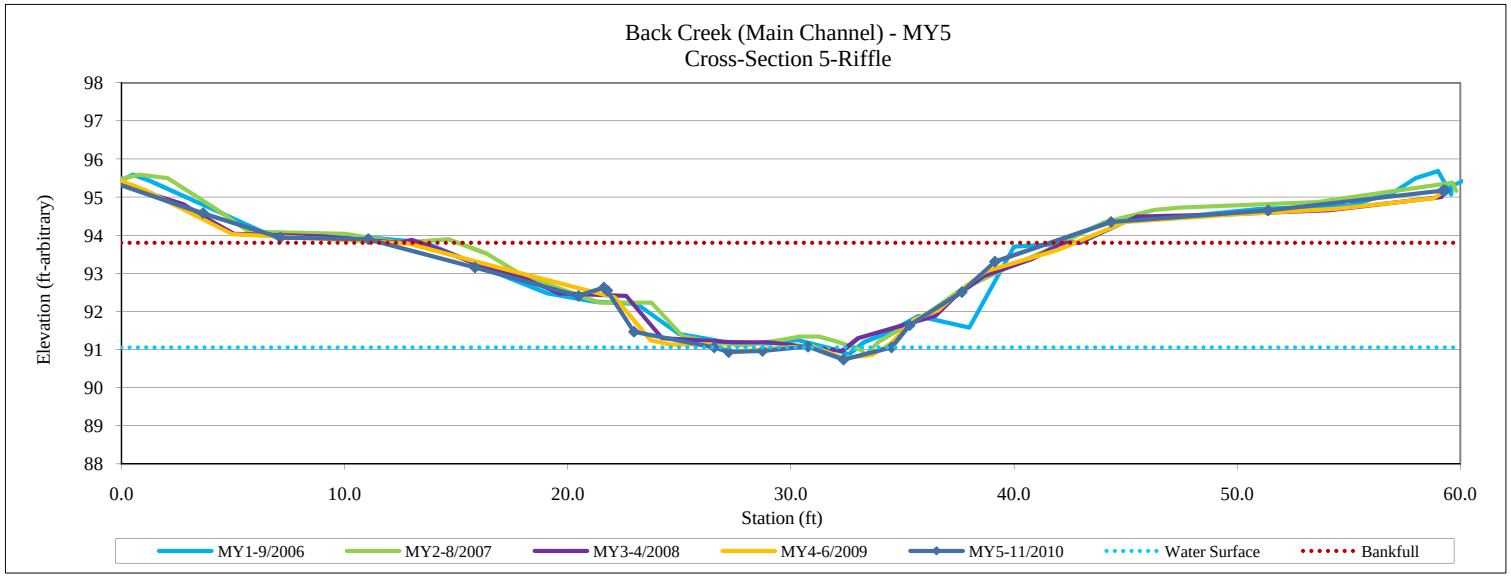
Project Name	**Back Creek**
EEP Project Number	**17**
Cross-Section ID	**XS-5, Riffle, 19+73**
Survey Date	**11/2010**

SUMMARY DATA	
Bankfull Elevation (ft)	93.80
Bankfull Cross-Sectional Area (ft^2)	49.50
Bankfull Width (ft)	29.89
Flood Prone Area Elevation (ft)	96.86
Flood Prone Width (ft)	190.00
Bankfull Mean Depth (ft)	1.66
Bankfull Max Depth (ft)	3.06
W/D Ratio	18.01
Entrenchment Ratio	6.36
Bank Height Ratio	1.00

XS-5: View Upstream

XS-5: View Downstream

Station	Elevation	Notes
-0.21	95.50	x5-lpt
-0.09	95.33	x5
3.66	94.58	x5
7.12	93.94	x5
11.06	93.90	x5
15.84	93.16	x5
20.48	92.41	x5
21.62	92.63	x5
21.77	92.55	x5
22.97	91.47	x5
26.56	91.06	x5-lew
27.21	90.94	x5
28.73	90.97	x5
30.77	91.08	x5
32.36	90.74	x5
34.51	91.06	x5-rew
35.32	91.64	x5
37.66	92.51	x5
39.14	93.31	x5
44.35	94.35	x5
51.39	94.65	x5
59.21	95.17	x5
59.27	95.18	x5
59.32	95.17	x5

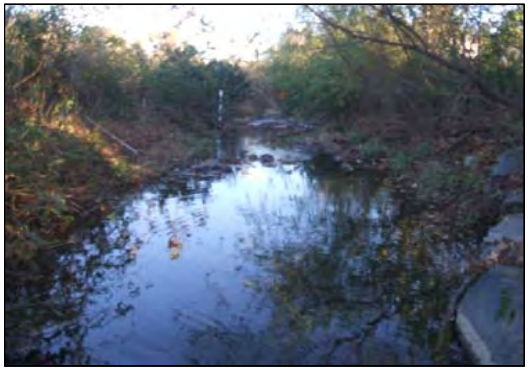


Appendix 4.4 Cross-Section Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Main Channel
Monitoring Year 5 of 5

Project Name	**Back Creek**
EEP Project Number	**17**
Cross-Section ID	**XS-6, Pool, 24+50**
Survey Date	**11/2010**

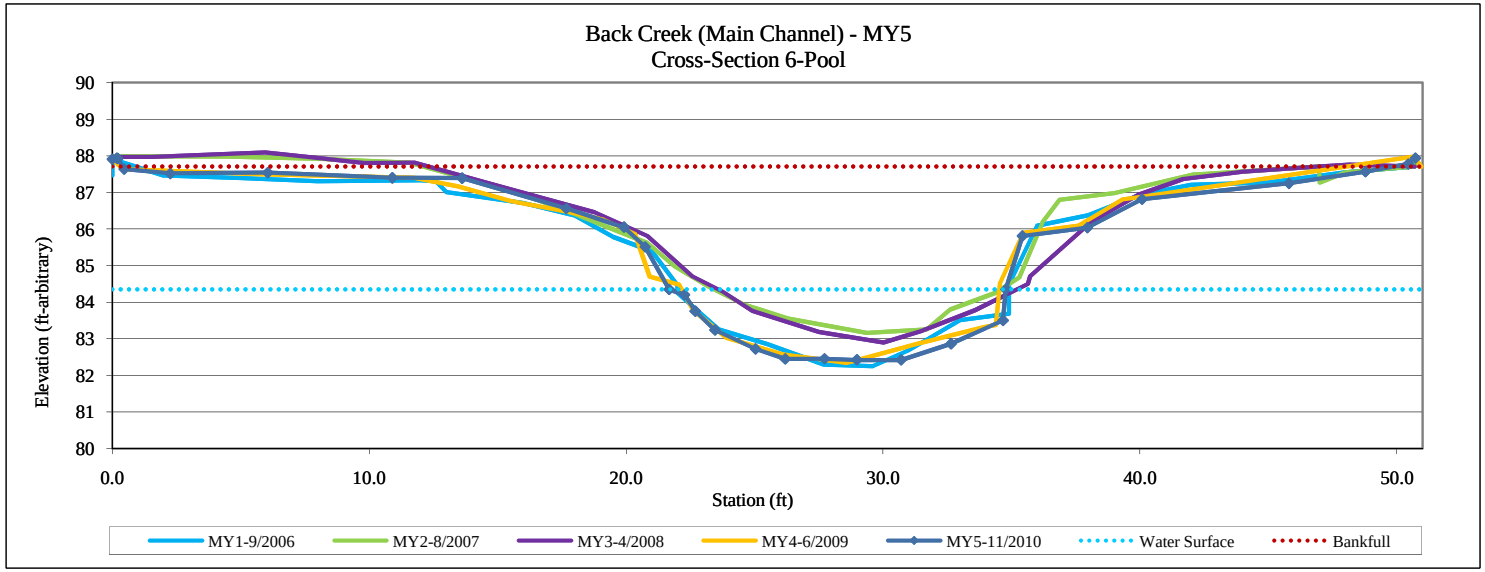
SUMMARY DATA	
Bankfull Elevation (ft)	87.71
Bankfull Cross-Sectional Area (ft^2)	90.45
Bankfull Width (ft)	49.48
Flood Prone Area Elevation (ft)	N/A
Flood Prone Width (ft)	N/A
Bankfull Mean Depth (ft)	1.83
Bankfull Max Depth (ft)	5.29
W/D Ratio	27.04
Entrenchment Ratio	N/A
Bank Height Ratio	1.00

XS-6: View Upstream



XS-6: View Downstream

Station	Elevation	Notes
0	87.91	x6-lpt
0.18	87.94	x6
0.21	87.93	x6
0.46	87.64	x6
2.26	87.52	x6
6.05	87.54	x6
10.9	87.4	x6
13.62	87.39	x6
17.67	86.56	x6
19.92	86.05	x6
20.74	85.51	x6
21.67	84.35	x6-lew
22.27	84.2	x6
22.69	83.75	x6
23.46	83.24	x6
25.04	82.72	x6
26.19	82.45	x6
27.72	82.45	x6
28.98	82.42	x6
30.7	82.42	x6
32.65	82.86	x6
34.67	83.5	x6
34.78	84.35	x6-rew
35.42	85.81	x6
37.95	86.04	x6
40.08	86.82	x6
45.8	87.25	x6
48.77	87.57	x6
50.44	87.78	x6
50.72	87.94	x6-rpt



Appendix 4.4 Cross-Section Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Main Channel
Monitoring Year 5 of 5

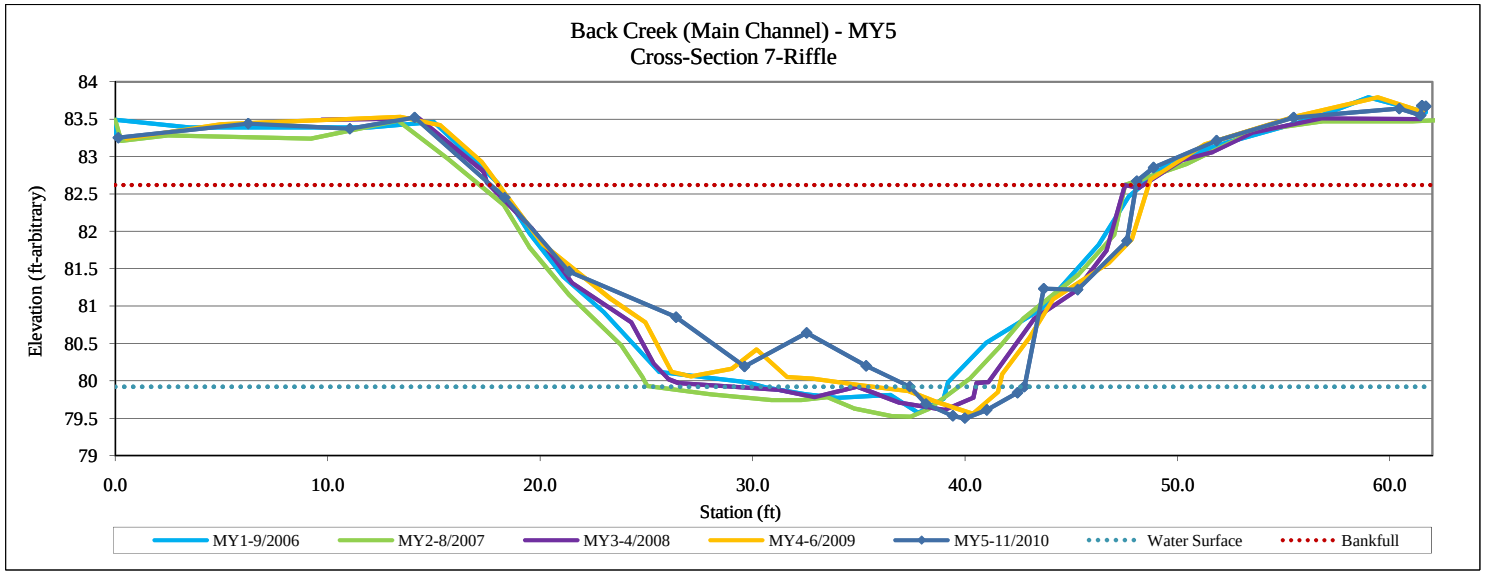
Project Name	**Back Creek**
EEP Project Number	**17**
Cross-Section ID	**XS-7, Riffle, 30+37**
Survey Date	**11/2010**

SUMMARY DATA	
Bankfull Elevation (ft)	82.62
Bankfull Cross-Sectional Area (ft^2)	56.77
Bankfull Width (ft)	30.39
Flood Prone Area Elevation (ft)	85.74
Flood Prone Width (ft)	232.00
Bankfull Mean Depth (ft)	1.87
Bankfull Max Depth (ft)	3.12
W/D Ratio	16.25
Entrenchment Ratio	7.63
Bank Height Ratio	1.00

XS-7: View Upstream

XS-7: View Downstream

Station	Elevation	Notes
0.15	83.25	x7
6.27	83.44	x7
11.05	83.37	x7
14.1	83.52	x7
18.34	82.45	x7
21.38	81.46	x7
26.41	80.85	x7
29.63	80.19	x7
32.55	80.64	x7
35.35	80.2	x7
37.4	79.92	x7-lew
38.17	79.69	x7
39.43	79.53	x7
40	79.5	x7
41.03	79.61	x7
42.48	79.84	x7
42.8	79.92	x7-rew
43.71	81.23	x7
45.31	81.22	x7
47.63	81.87	x7
48.09	82.67	x7
48.88	82.85	x7
51.85	83.21	x7
55.47	83.52	x7
60.45	83.64	x7
61.45	83.55	x7
61.51	83.68	x7
61.7	83.67	x7-rpt



Appendix 4.4 Cross-Section Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Cnetral Tributary
Monitoring Year 5 of 5

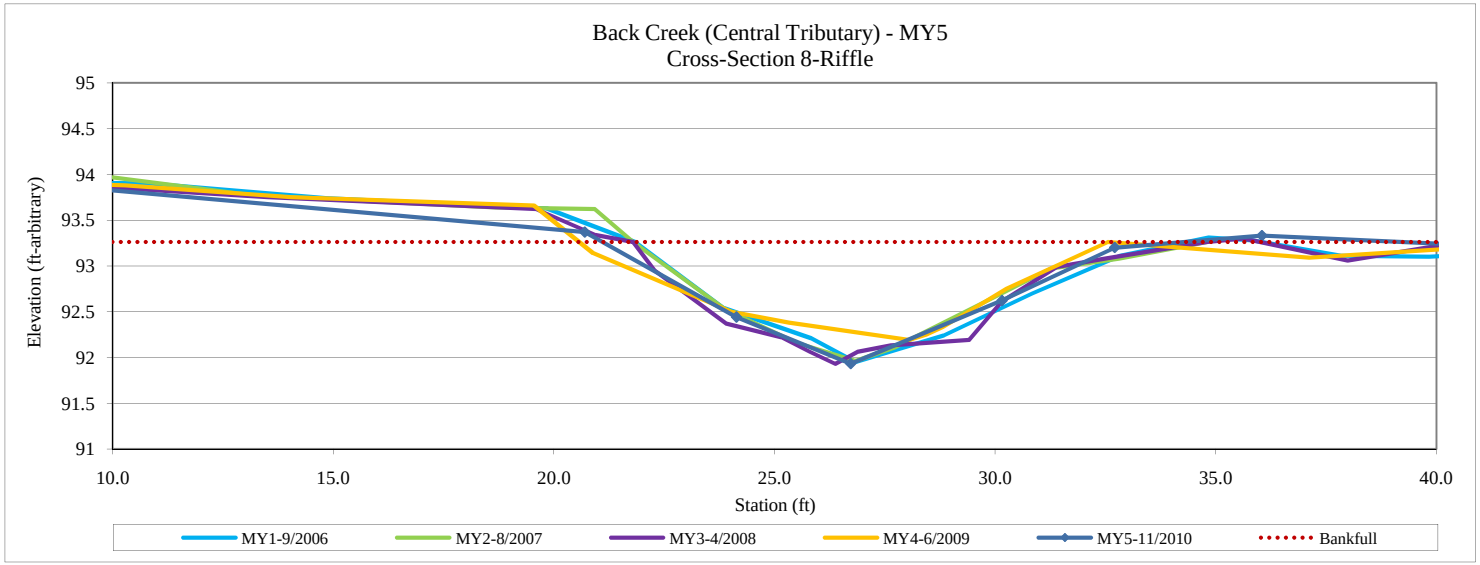
Project Name	**Back Creek**
EEP Project Number	**17**
Cross-Section ID	**XS-8, Riffle**
Survey Date	**11/2010**

SUMMARY DATA	
Bankfull Elevation (ft)	93.26
Bankfull Cross-Sectional Area (ft^2)	8.35
Bankfull Width (ft)	13.14
Flood Prone Area Elevation (ft)	94.59
Flood Prone Width (ft)	200.00
Bankfull Mean Depth (ft)	0.63
Bankfull Max Depth (ft)	1.33
W/D Ratio	20.86
Entrenchment Ratio	15.22
Bank Height Ratio	1.00

XS-8: View Upstream

XS-8: View Downstream

Station	Elevation	Notes
7.80	93.92	x8-lpt
20.70	93.37	x8
24.14	92.44	x8
26.73	91.93	x8
30.16	92.62	x8
32.71	93.20	x8
36.05	93.33	x8
41.12	93.22	x8
41.40	93.32	x8-rpt



Appendix 4.4 Cross-Section Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Central Tributary
Monitoring Year 5 of 5

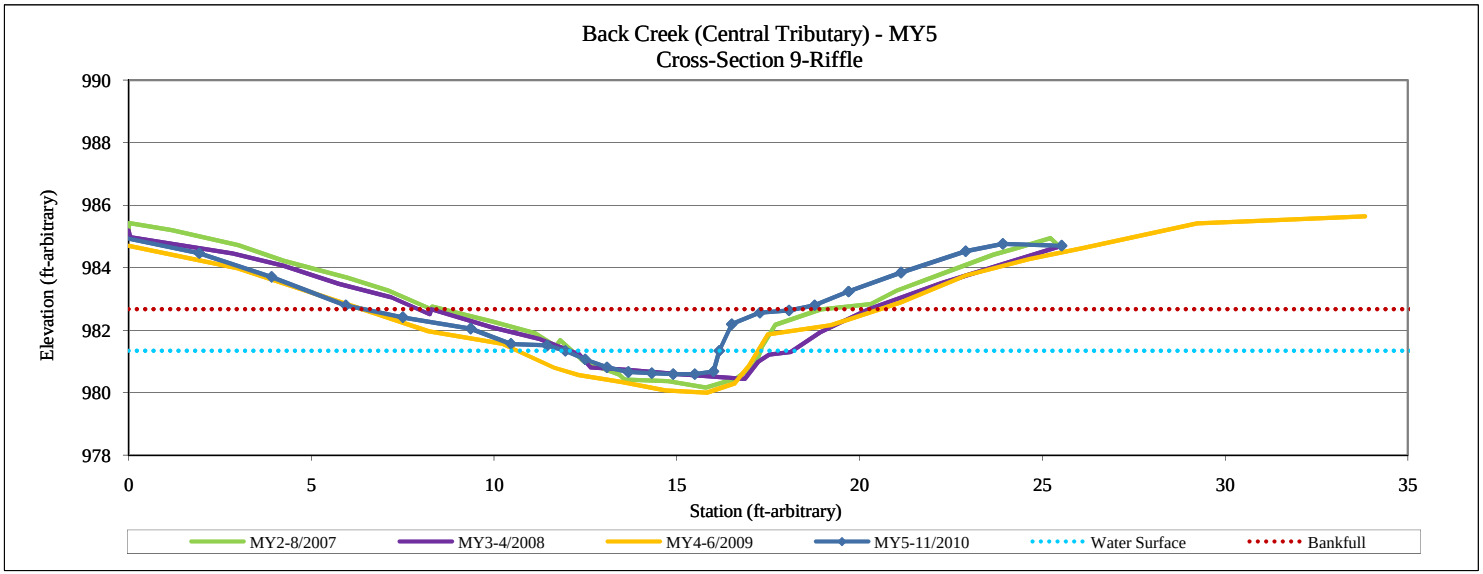
Project Name	**Back Creek MY5**
EEP Project Number	**17**
Cross-Section ID	**XS-9, Riffle**
Survey Date	**11/2010**

SUMMARY DATA	
Bankfull Elevation (ft)	982.67
Bankfull Cross-Sectional Area (ft^2)	12.26
Bankfull Width (ft)	11.81
Flood Prone Area Elevation (ft)	984.75
Flood Prone Width (ft)	110.00
Bankfull Mean Depth (ft)	1.04
Bankfull Max Depth (ft)	2.08
W/D Ratio	11.36
Entrenchment Ratio	9.31
Bank Height Ratio	1.00

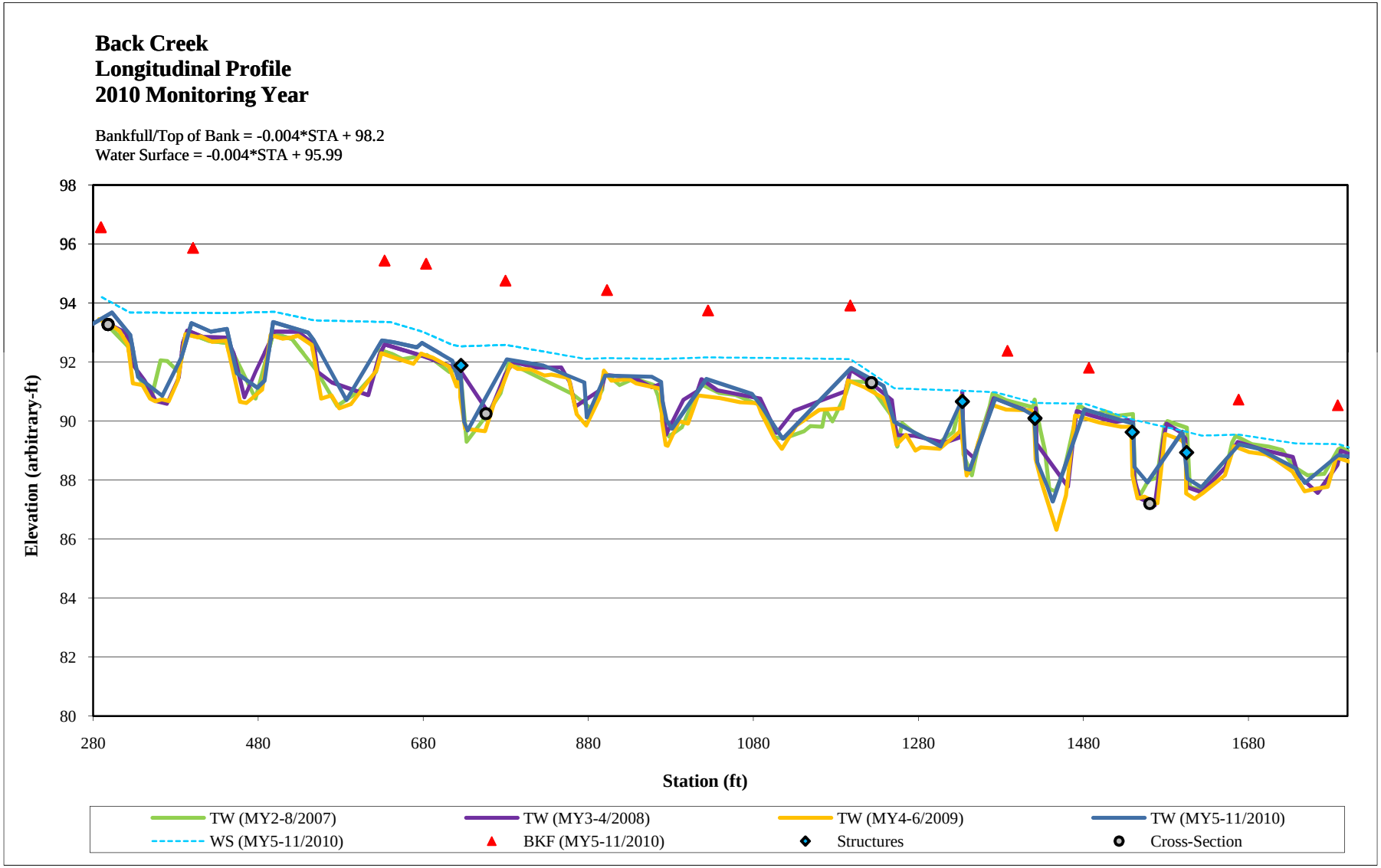
XS-9: View Upstream

XS-9: View Downstream

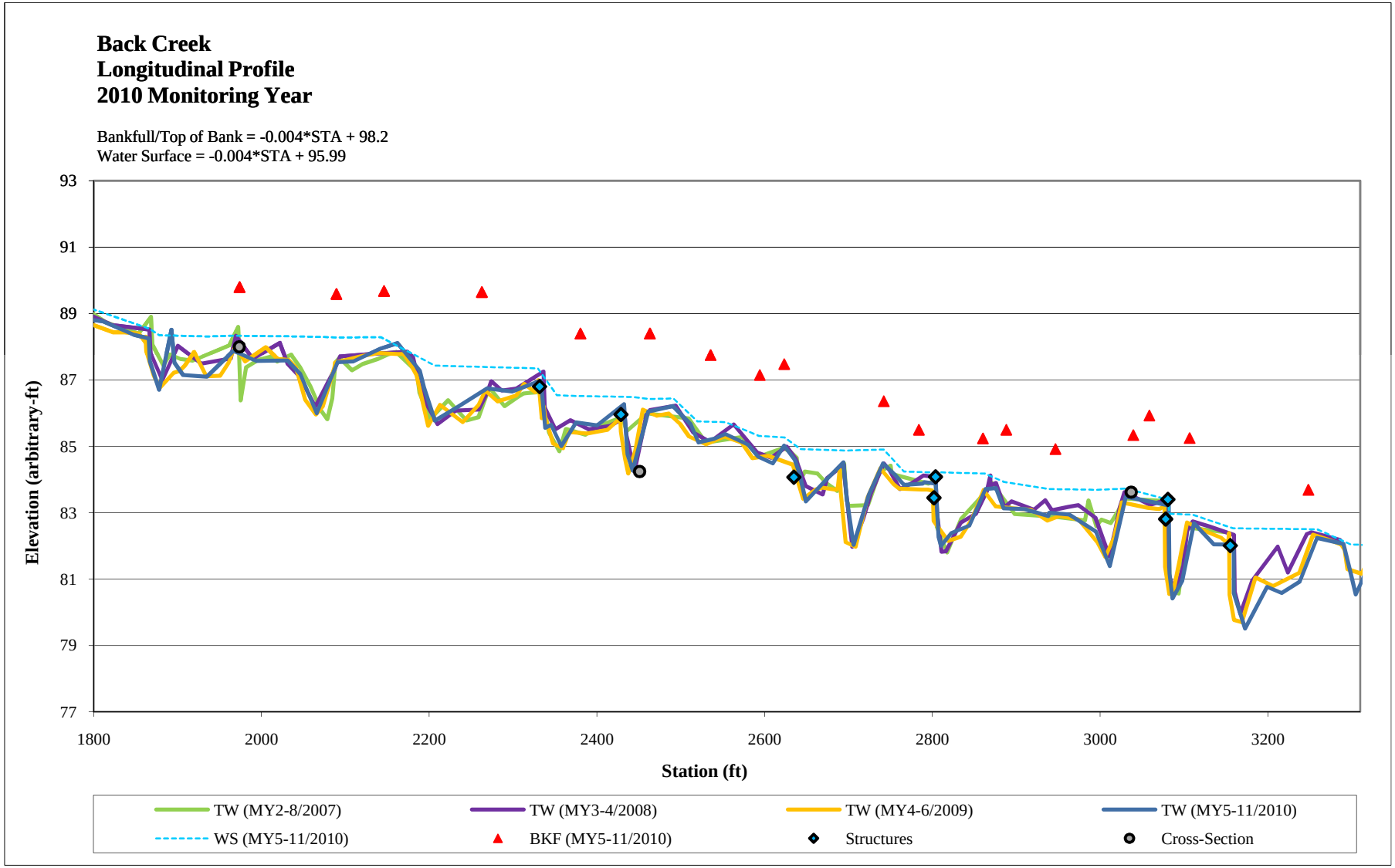
Station	Elevation	Notes
-1.65	985.38	x9-lpt
-1.64	985.14	x9
-0.15	984.96	x9
1.93	984.46	x9
3.91	983.7	x9
5.94	982.79	x9
7.5	982.41	x9
9.36	982.05	x9
10.46	981.56	x9
11.45	981.51	x9
11.95	981.34	x9-lew
12.49	981.06	x9
13.09	980.81	x9
13.67	980.66	x9
14.31	980.62	x9
14.9	980.59	x9
15.49	980.59	x9
16	980.68	x9
16.16	981.34	x9-rew
16.5	982.19	x9
17.27	982.56	x9
18.07	982.63	x9
18.77	982.79	x9
19.7	983.23	x9
21.13	983.84	x9
22.9	984.52	x9
23.92	984.76	x9
25.53	984.7	x9-rpt



Appendix 4.5 Longitudinal Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5



Appendix 4.5 Longitudinal Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5

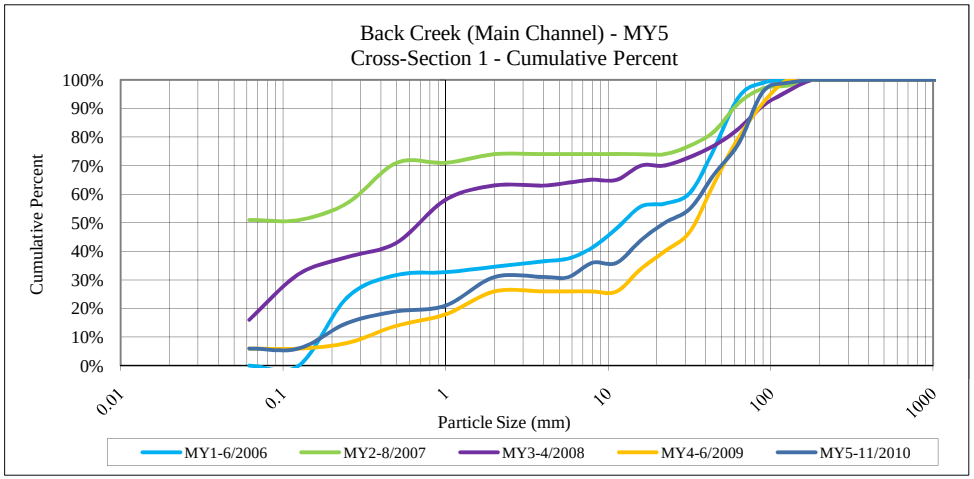


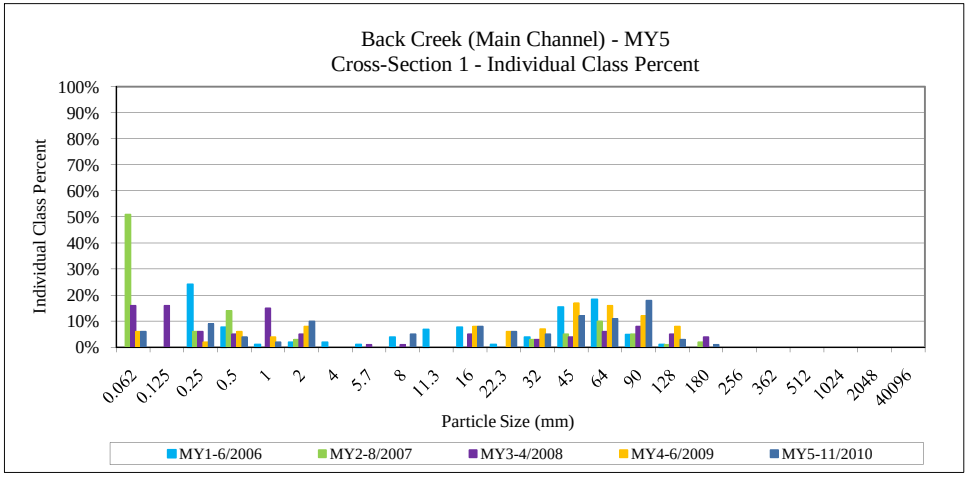
Appendix 4.6 Pebble Count Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Main Channel
Monitoring Year 5 of 5

Project Name	**Back Creek**
EEP Project Number	**17**
Cross-Section ID	**XS-1, Riffle, 2+98**
Survey Date	**11/2010**

Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	6	6%	6%
Sand	very fine sand	0.125	0	0%	0%
	fine sand	0.250	9	9%	9%
	medium sand	0.50	4	4%	4%
	coarse sand	1.00	2	2%	2%
	very coarse sand	2.0	10	10%	10%
Gravel	very fine gravel	4.0	0	0%	0%
	fine gravel	5.7	0	0%	0%
	fine gravel	8.0	5	5%	5%
	medium gravel	11.3	0	0%	0%
	medium gravel	16.0	8	8%	8%
	course gravel	22.3	6	6%	6%
	course gravel	32.0	5	5%	5%
	very coarse gravel	45	12	12%	12%
	very coarse gravel	64	11	11%	11%
Cobble	small cobble	90	18	18%	18%
	medium cobble	128	3	3%	3%
	large cobble	180	1	1%	1%
	very large cobble	256	0	0%	0%
Boulder	small boulder	362	0	0%	0%
	small boulder	512	0	0%	0%
	medium boulder	1024	0	0%	0%
	large boulder	2048	0	0%	0%
Bedrock	bedrock	40096	0	0%	0%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	22.6
D84	72.67
D95	88.56



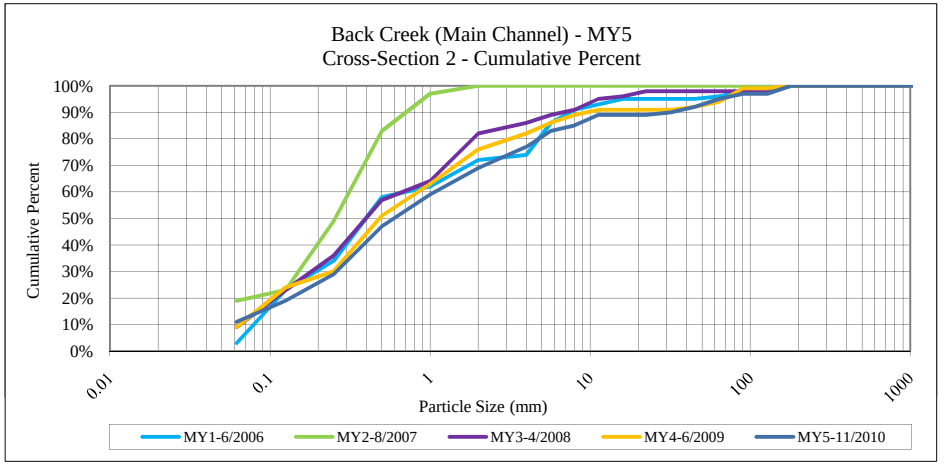


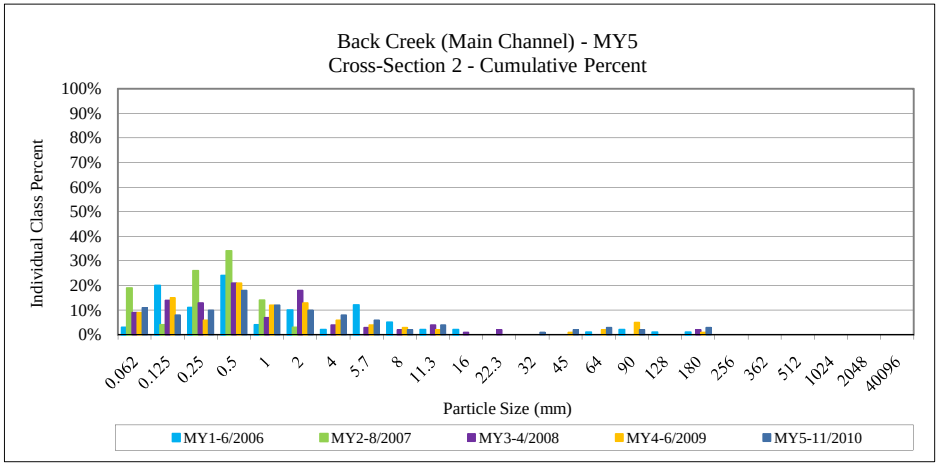
Appendix 4.6 Pebble Count Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Main Channel
Monitoring Year 5 of 5

Project Name	**Back Creek**
EEP Project Number	**17**
Cross-Section ID	**XS-2, Pool, 7+56**
Survey Date	**11/2010**

Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	11	11%	11%
Sand	very fine sand	0.125	8	8%	8%
	fine sand	0.250	10	10%	10%
	medium sand	0.50	18	18%	18%
	coarse sand	1.00	12	12%	12%
	very coarse sand	2.0	10	10%	10%
Gravel	very fine gravel	4.0	8	8%	8%
	fine gravel	5.7	6	6%	6%
	fine gravel	8.0	2	2%	2%
	medium gravel	11.3	4	4%	4%
	medium gravel	16.0	0	0%	0%
	course gravel	22.3	0	0%	0%
	course gravel	32.0	1	1%	1%
	very coarse gravel	45	2	2%	2%
	very coarse gravel	64	3	3%	3%
Cobble	small cobble	90	2	2%	2%
	medium cobble	128	0	0%	0%
	large cobble	180	3	3%	3%
	very large cobble	256	0	0%	0%
Boulder	small boulder	362	0	0%	0%
	small boulder	512	0	0%	0%
	medium boulder	1024	0	0%	0%
	large boulder	2048	0	0%	0%
Bedrock	bedrock	40096	0	0%	0%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	0.63
D84	6.85
D95	64



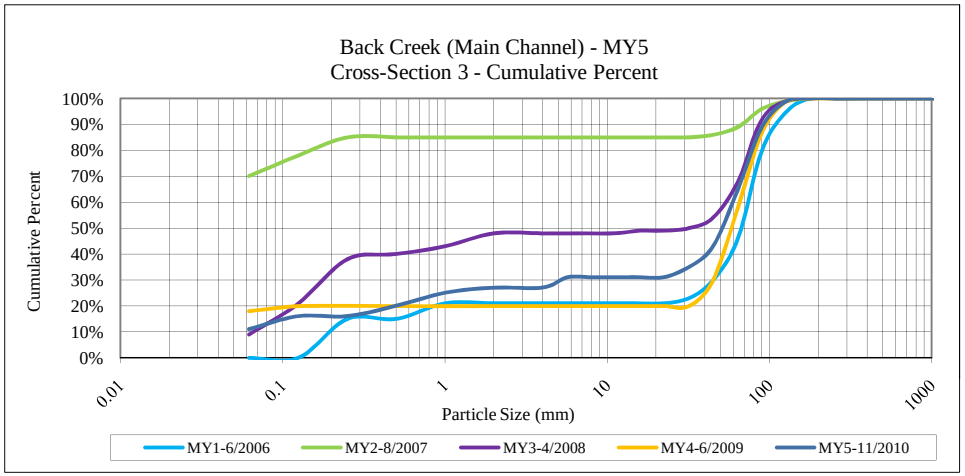


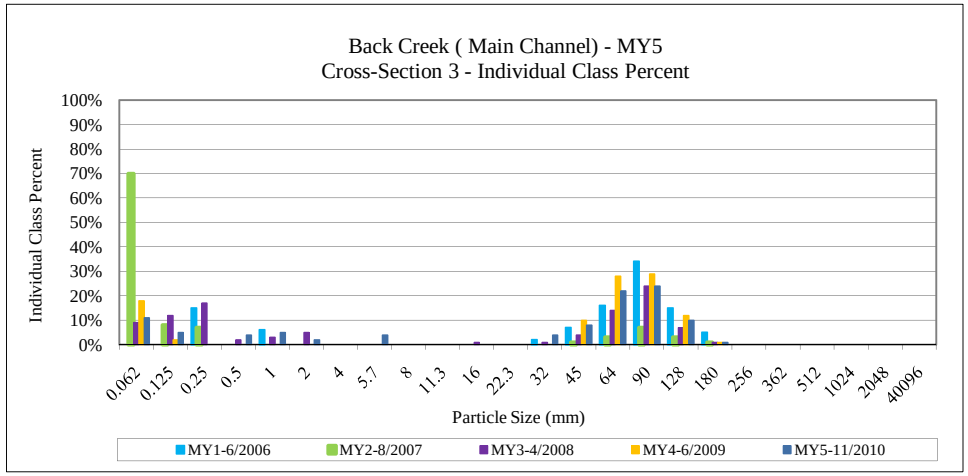
Appendix 4.6 Pebble Count Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Main Channel
Monitoring Year 5 of 5

Project Name	**Back Creek**
EEP Project Number	**17**
Cross-Section ID	**XS-3, Riffle, 12+23**
Survey Date	**11/2010**

Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	11	11%	11%
Sand	very fine sand	0.125	5	5%	5%
	fine sand	0.250	0	0%	0%
	medium sand	0.50	4	4%	4%
	coarse sand	1.00	5	5%	5%
	very coarse sand	2.0	2	2%	2%
Gravel	very fine gravel	4.0	0	0%	0%
	fine gravel	5.7	4	4%	4%
	fine gravel	8.0	0	0%	0%
	medium gravel	11.3	0	0%	0%
	medium gravel	16.0	0	0%	0%
	course gravel	22.3	0	0%	0%
	course gravel	32.0	4	4%	4%
	very coarse gravel	45	8	8%	8%
	very coarse gravel	64	22	22%	22%
Cobble	small cobble	90	24	24%	24%
	medium cobble	128	10	10%	10%
	large cobble	180	1	1%	1%
	very large cobble	256	0	0%	0%
Boulder	small boulder	362	0	0%	0%
	small boulder	512	0	0%	0%
	medium boulder	1024	0	0%	0%
	large boulder	2048	0	0%	0%
Bedrock	bedrock	40096	0	0%	0%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	51.05
D84	84.58
D95	112.8



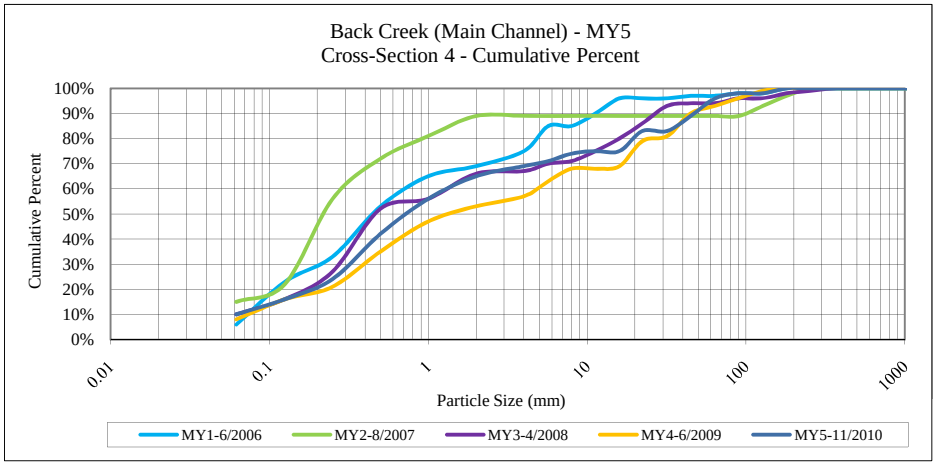


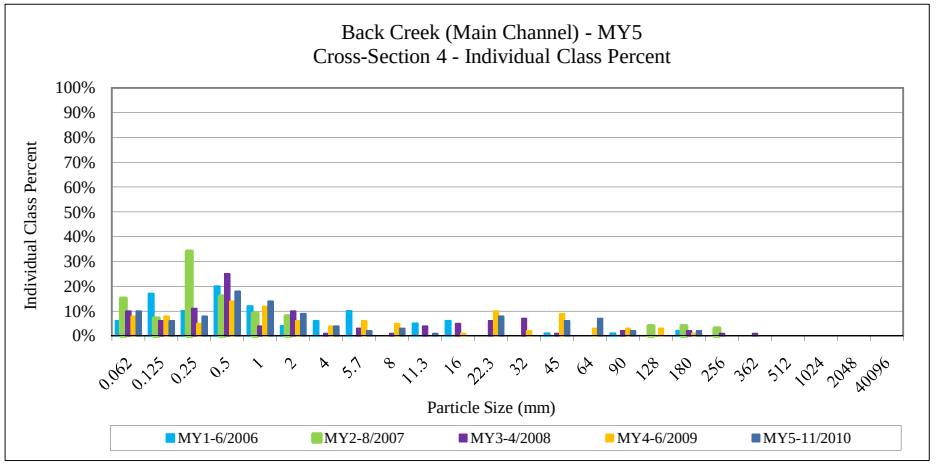
Appendix 4.6 Pebble Count Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Main Channel
Monitoring Year 5 of 5

Project Name	**Back Creek**
EEP Project Number	**17**
Cross-Section ID	**XS-4, Pool, 15+60**
Survey Date	**11/2010**

Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	10	10%	10%
Sand	very fine sand	0.125	6	6%	6%
	fine sand	0.250	8	8%	8%
	medium sand	0.50	18	18%	18%
	coarse sand	1.00	14	14%	14%
	very coarse sand	2.0	9	9%	9%
Gravel	very fine gravel	4.0	4	4%	4%
	fine gravel	5.7	2	2%	2%
	fine gravel	8.0	3	3%	3%
	medium gravel	11.3	1	1%	1%
	medium gravel	16.0	0	0%	0%
	course gravel	22.3	8	8%	8%
	course gravel	32.0	0	0%	0%
	very coarse gravel	45	6	6%	6%
	very coarse gravel	64	7	7%	7%
Cobble	small cobble	90	2	2%	2%
	medium cobble	128	0	0%	0%
	large cobble	180	2	2%	2%
	very large cobble	256	0	0%	0%
Boulder	small boulder	362	0	0%	0%
	small boulder	512	0	0%	0%
	medium boulder	1024	0	0%	0%
	large boulder	2048	0	0%	0%
Bedrock	bedrock	40096	0	0%	0%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	0.79
D84	34.17
D95	61.29



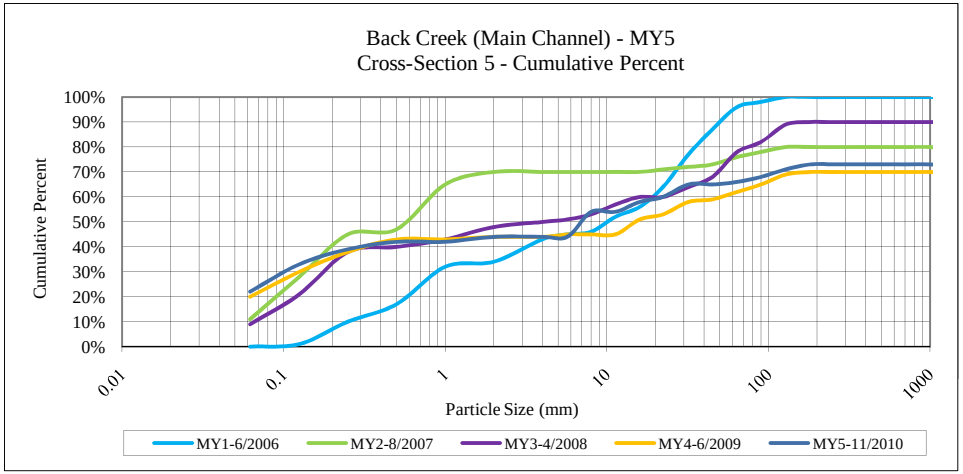


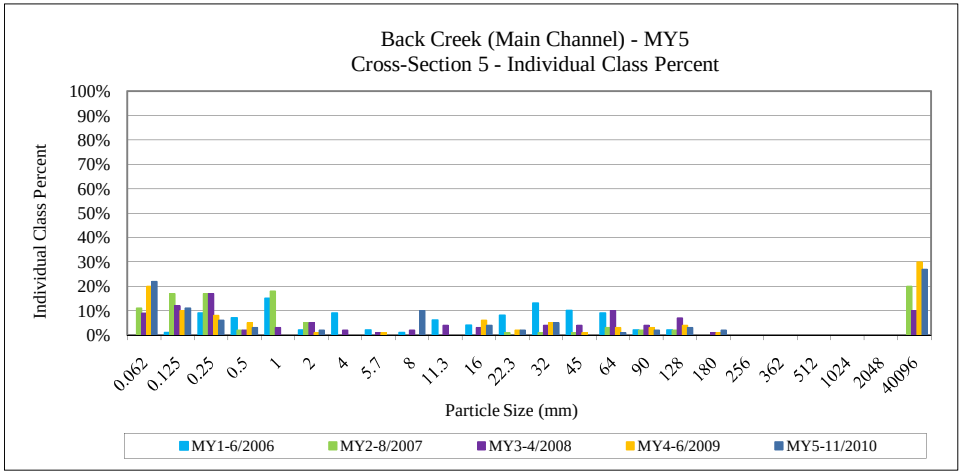
Appendix 4.6 Pebble Count Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Main Channel
Monitoring Year 5 of 5

Project Name	**Back Creek**
EEP Project Number	**17**
Cross-Section ID	**XS-5, Riffle, 19+73**
Survey Date	**11/2010**

Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	22	22%	22%
Sand	very fine sand	0.125	11	11%	11%
	fine sand	0.250	6	6%	6%
	medium sand	0.50	3	3%	3%
	coarse sand	1.00	0	0%	0%
	very coarse sand	2.0	2	2%	2%
Gravel	very fine gravel	4.0	0	0%	0%
	fine gravel	5.7	0	0%	0%
	fine gravel	8.0	10	10%	10%
	medium gravel	11.3	0	0%	0%
	medium gravel	16.0	4	4%	4%
	course gravel	22.3	2	2%	2%
	course gravel	32.0	5	5%	5%
	very coarse gravel	45	0	0%	0%
	very coarse gravel	64	1	1%	1%
Cobble	small cobble	90	2	2%	2%
	medium cobble	128	3	3%	3%
	large cobble	180	2	2%	2%
	very large cobble	256	0	0%	0%
Boulder	small boulder	362	0	0%	0%
	small boulder	512	0	0%	0%
	medium boulder	1024	0	0%	0%
	large boulder	2048	0	0%	0%
Bedrock	bedrock	40096	27	27%	27%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	7.08
D84	Bedrock
D95	Bedrock



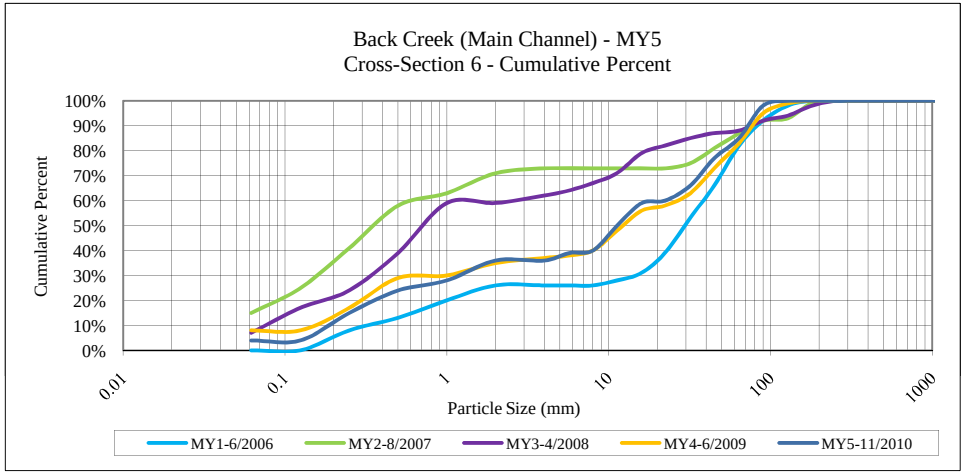


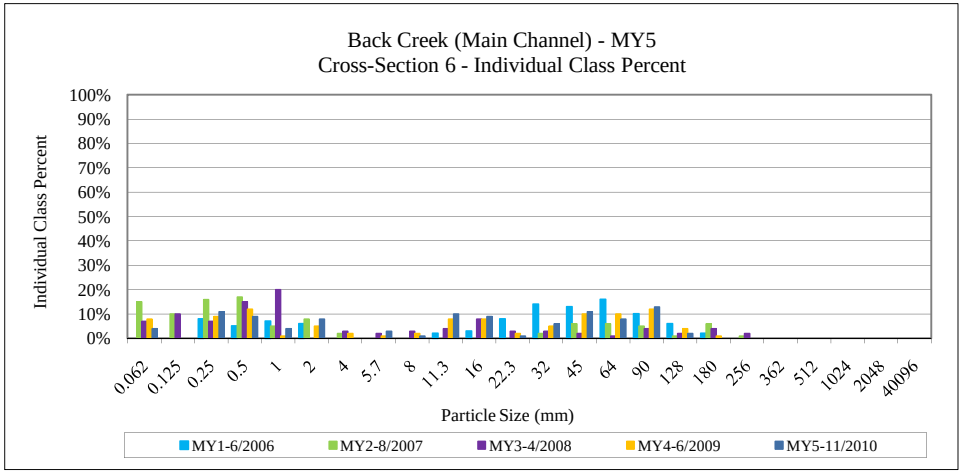
Appendix 4.6 Pebble Count Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Main Channel
Monitoring Year 5 of 5

Project Name	**Back Creek**
EEP Project Number	**17**
Cross-Section ID	**XS-6, Pool, 24+50**
Survey Date	**11/2010**

Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	4	4%	4%
Sand	very fine sand	0.125	0	0%	0%
	fine sand	0.250	11	11%	11%
	medium sand	0.50	9	9%	9%
	coarse sand	1.00	4	4%	4%
	very coarse sand	2.0	8	8%	8%
Gravel	very fine gravel	4.0	0	0%	0%
	fine gravel	5.7	3	3%	3%
	fine gravel	8.0	1	1%	1%
	medium gravel	11.3	10	10%	10%
	medium gravel	16.0	9	9%	9%
	course gravel	22.3	1	1%	1%
	course gravel	32.0	6	6%	6%
	very coarse gravel	45	11	11%	11%
	very coarse gravel	64	8	8%	8%
Cobble	small cobble	90	13	13%	13%
	medium cobble	128	2	2%	2%
	large cobble	180	0	0%	0%
	very large cobble	256	0	0%	0%
Boulder	small boulder	362	0	0%	0%
	small boulder	512	0	0%	0%
	medium boulder	1024	0	0%	0%
	large boulder	2048	0	0%	0%
Bedrock	bedrock	40096	0	0%	0%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	11.56
D84	63.62
D95	84.33



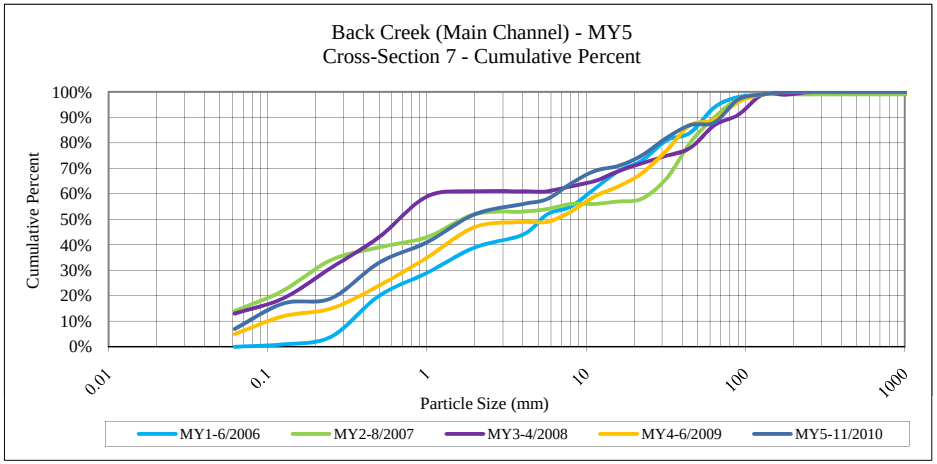


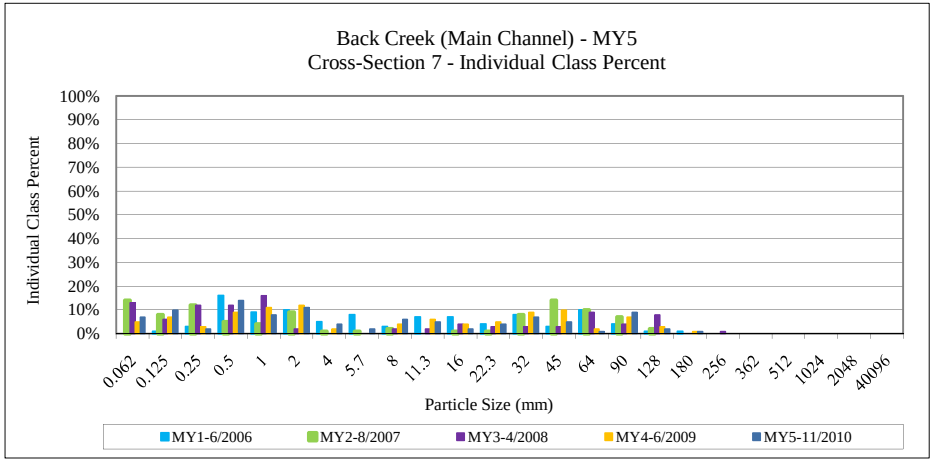
Appendix 4.6 Pebble Count Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Main Channel
Monitoring Year 5 of 5

Project Name	**Back Creek**
EEP Project Number	**17**
Cross-Section ID	**XS-7, Riffle, 30+37**
Survey Date	**11/2010**

Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	7	7%	7%
Sand	very fine sand	0.125	10	10%	10%
	fine sand	0.250	2	2%	2%
	medium sand	0.50	14	14%	14%
	coarse sand	1.00	8	8%	8%
	very coarse sand	2.0	11	11%	11%
Gravel	very fine gravel	4.0	4	4%	4%
	fine gravel	5.7	2	2%	2%
	fine gravel	8.0	6	6%	6%
	medium gravel	11.3	5	5%	5%
	medium gravel	16.0	2	2%	2%
	course gravel	22.3	4	4%	4%
	course gravel	32.0	7	7%	7%
	very coarse gravel	45	5	5%	5%
	very coarse gravel	64	1	1%	1%
Cobble	small cobble	90	9	9%	9%
	medium cobble	128	2	2%	2%
	large cobble	180	1	1%	1%
	very large cobble	256	0	0%	0%
Boulder	small boulder	362	0	0%	0%
	small boulder	512	0	0%	0%
	medium boulder	1024	0	0%	0%
	large boulder	2048	0	0%	0%
Bedrock	bedrock	40096	0	0%	0%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	1.82
D84	37.2
D95	84.22



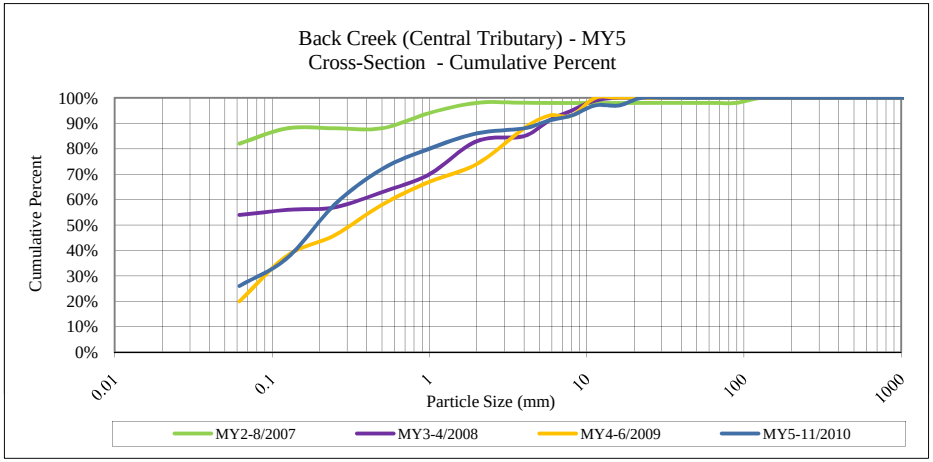


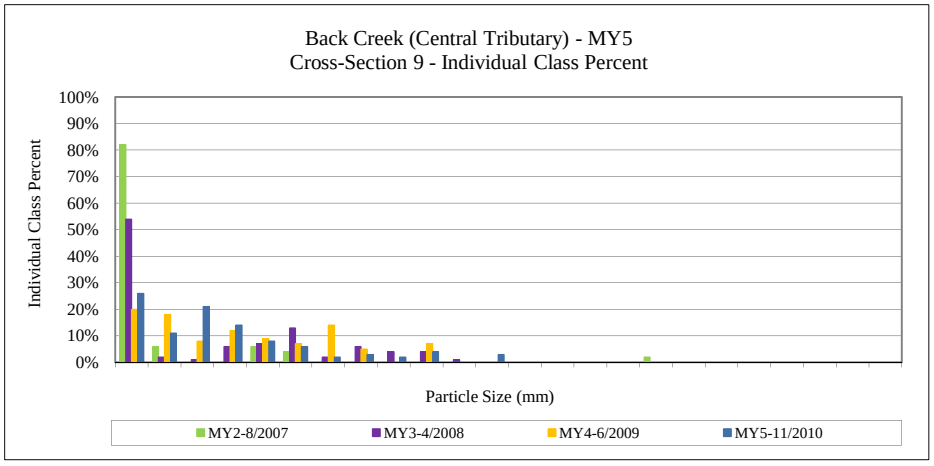
Appendix 4.6 Pebble Count Plots and Raw Data Tables
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Central Tributary
Monitoring Year 5 of 5

Project Name	**Back Creek MY5**
EEP Project Number	**17**
Cross-Section ID	**XS-9, Riffle**
Survey Date	**11/2010**

Description	Material	Size (mm)	Total #	Item %	Cum %
Silt/Clay	silt/clay	0.062	22	22%	22%
Sand	very fine sand	0.125	15	15%	15%
	fine sand	0.250	11	11%	11%
	medium sand	0.50	10	10%	10%
	coarse sand	1.00	8	8%	8%
	very coarse sand	2.0	10	10%	10%
Gravel	very fine gravel	4.0	12	12%	12%
	fine gravel	5.7	3	3%	3%
	fine gravel	8.0	2	2%	2%
	medium gravel	11.3	4	4%	4%
	medium gravel	16.0	0	0%	0%
	course gravel	22.3	3	3%	3%
	course gravel	32.0	0	0%	0%
	very coarse gravel	45	0	0%	0%
	very coarse gravel	64	0	0%	0%
Cobble	small cobble	90	0	0%	0%
	medium cobble	128	0	0%	0%
	large cobble	180	0	0%	0%
	very large cobble	256	0	0%	0%
Boulder	small boulder	362	0	0%	0%
	small boulder	512	0	0%	0%
	medium boulder	1024	0	0%	0%
	large boulder	2048	0	0%	0%
Bedrock	bedrock	40096	0	0%	0%
TOTAL % of whole count			100	100%	100%

Summary Data	
D50	0.2
D84	1.67
D95	9.65





APPENDIX 5
WETLAND DATA ASSESSMENT

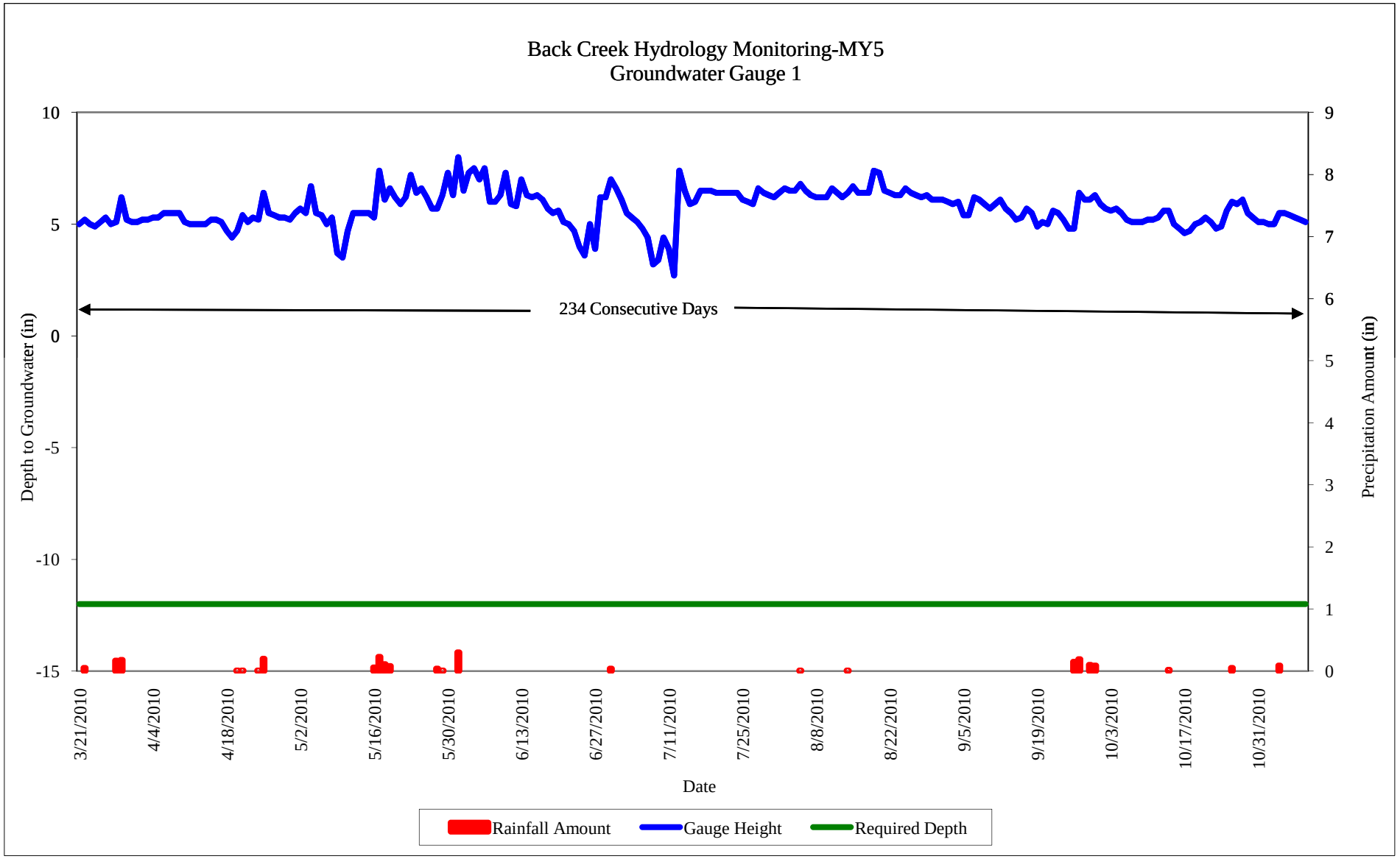
5.1 Precipitation – Water Level Plots for Gauges*

5.2 Wetland Criteria Attainment

*Raw data tables have been provided electronically.

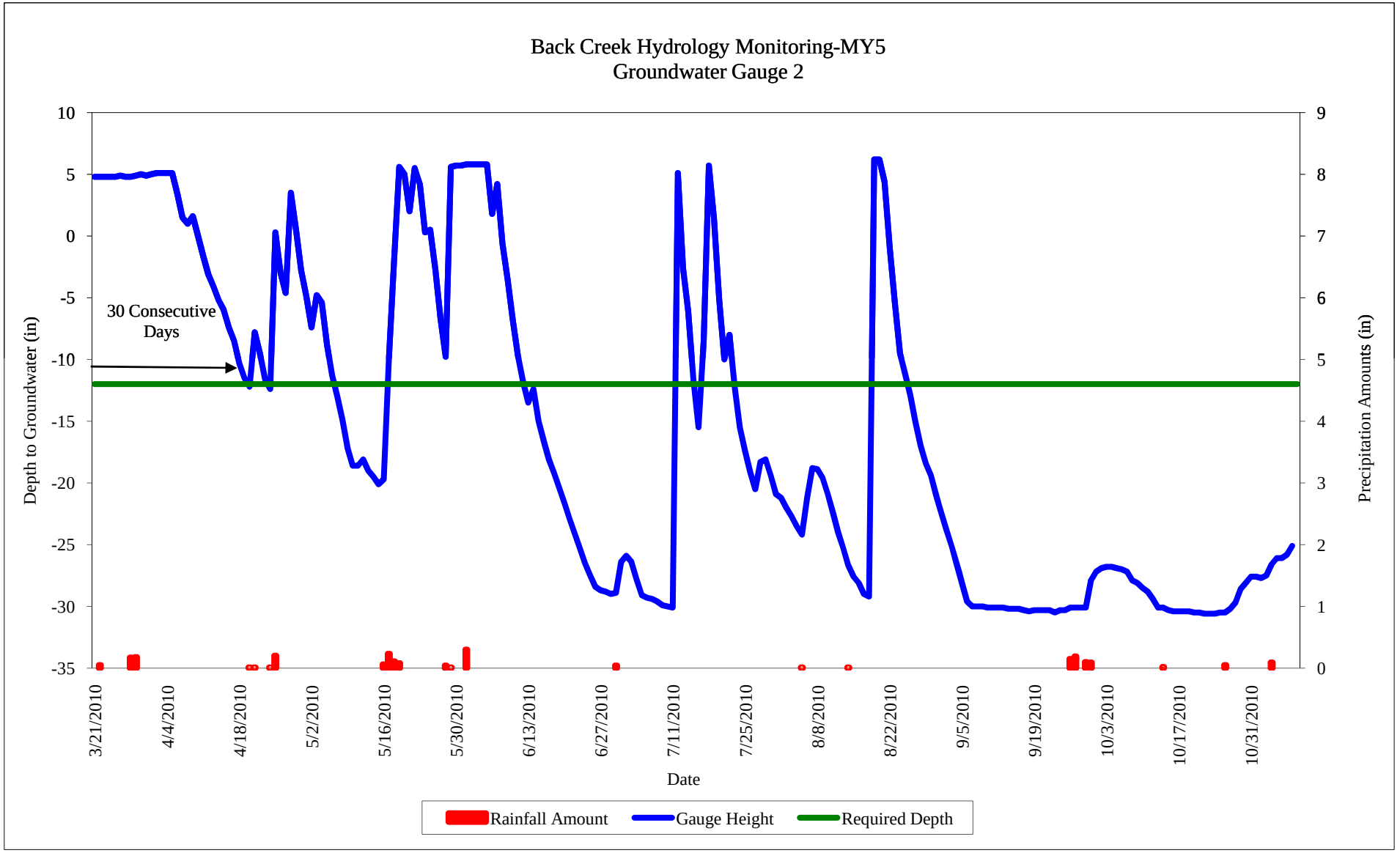
Appendix 5.1 Precipitation - Water Level Plots for Gauges
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5

Growing Season: March 21-November 16



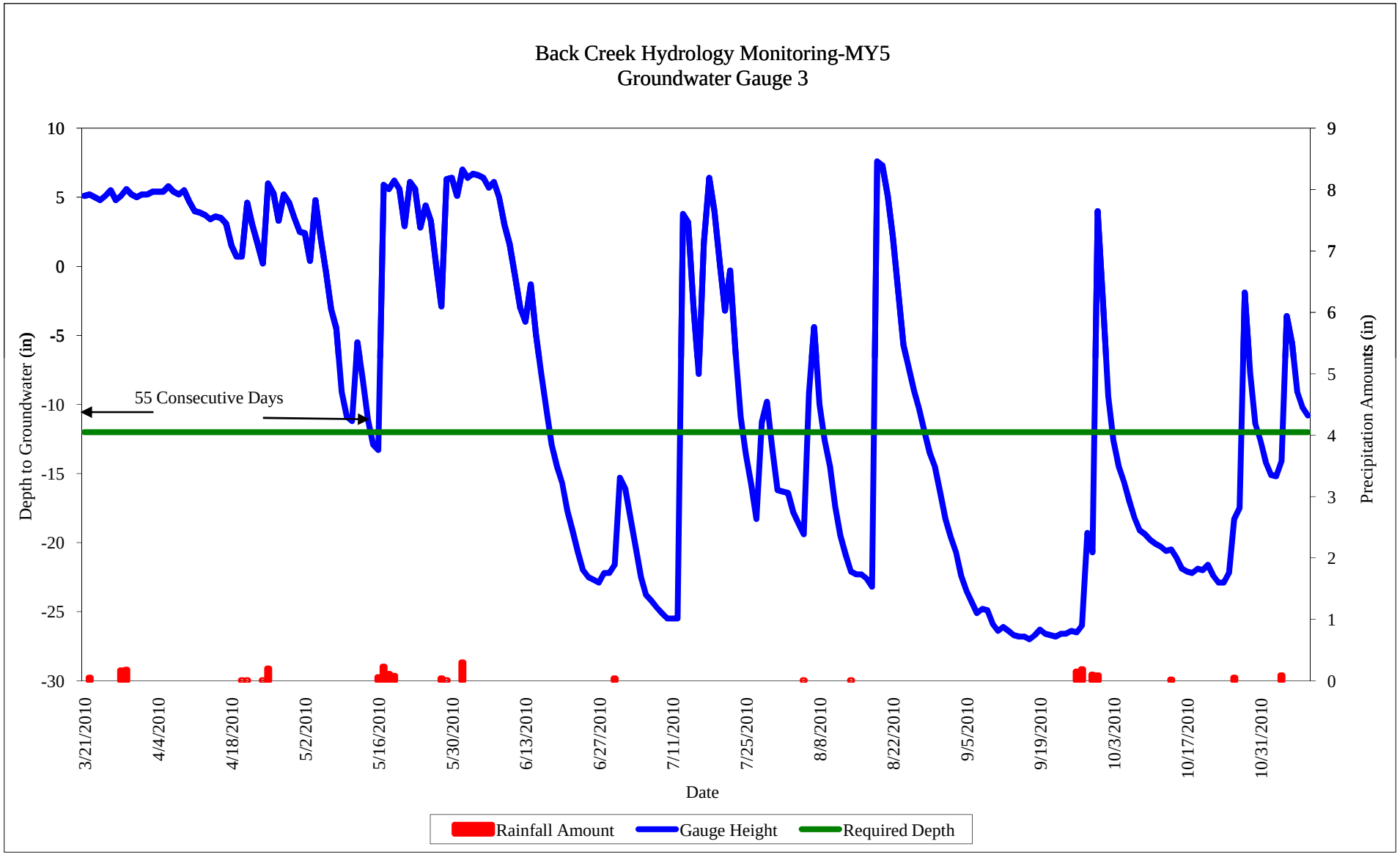
Appendix 5.1 Precipitation - Water Level Plots for Gauges
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5

Growing Season: March 21-November 16



Appendix 5.1 Precipitation - Water Level Plots for Gauges
Back Creek Stream and Wetland Restoration/EEP Project No. 17
Monitoring Year 5 of 5

Growing Season: March 21-November 16



Appendix 5.2 Wetland Criteria Attainment
Back Creek Stream and Wetland Restoration/EEP Project No.17
Monitoring Year 5 of 5

Summary of Groundwater Gauge Results for Years 1 through 5					
	Success Criteria Achieved/Max Consecutive Days During Growing Season (Percentage %)				
Gauge	**Year 1 (2006)**	**Year 2 (2007)**	**Year 3 (2008)**	**Year 4 (2009)**	**Year 5 (2010)**
GW1	Yes/241 Days (100%)	Yes/142 Days (59%)	Yes/241 Days (100%)	Yes/241 Days (100%)	Yes/234 Days (100%)
GW2	Yes/40 Days (17%)	Yes/58 Days (24%)	Yes/67 Days (28%)	Yes/96 Days (40%)	Yes/30 Days (38%)
GW3	Yes/103 Days (43%)	Yes/64 Days (27%)	Yes/83 Days (34%)	Yes/100 Days (42%)	Yes/55 Days (53%)