BRUSH CREEK – PROJECT NO. 54

MONITORING YEAR 8

2009

Submitted to:

NCDENR Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699

March 2010

Table of Contents

I. Executive Summary/Project Abstract

Brush Creek and its tributary, Little Pine Creek, were restored and/or enhanced in 2001 and 2006. The original goals and objectives stated in the Restoration Plan were as follows:

- To replace 600 feet of altered Little Pine Creek stream channel with a new, 950 foot meandering channel reconnected to the floodplain and designed to maintain stable dimension, pattern, and profile while effectively transporting anticipated streamflow and sediment load.
- To restore a vegetated riparian corridor 30 to 50 feet wide along the new, proposed reach of Little Pine Creek, in order to improve water quality and increase available aquatic and terrestrial habitat resources.
- To restore stable channel dimensions and stable streambank conditions to 340 feet of Brush Creek currently experiencing severe bank collapse, thereby improving downstream water quality through sedimentation reduction and enhancing aquatic habitat.
- To restore/enhance 2,300 feet of degraded Brush Creek riparian corridor, with bioengineering stabilization of unstable streambanks, instream aquatic habitat improvements, and increased riparian buffer vegetation.
- To improve overall terrestrial habitat connectivity through the restoration of riparian corridors along both streams, and improve overall aquatic habitat through the creation of increased habitat complexity.

Survival of planted woody species in MY8 was 469 stems per acre, which meets the success criteria of a minimum of 320 stems acre. Supplemental planting was conducted in April 2009. As a result, the number of planted stems increased in MY8 compared to MY7 (437 per acre). The total number of stems per acre slightly increased from 1205 stems/acre (MY7) to 1246 stems per acre in MY8. After vegetation monitoring was conducted in September 2009, beavers caused damage to existing woody vegetation along approximately 230 feet of Little Pine Creek. Damage included the loss of a few larger, single stem trees that were approximately 7 to 12 cm dbh. Most of the beaver damage included a loss of a few stems on several multiple stem trees that were less than 2 cm dbh.

One of the most significant changes in stream characteristics was a decrease in the number of riffles from 12 to 8. The reduction was largely due to a beaver dam at Station 03+46. Characteristic bed slope was present; however, riffle texture was not present due to sediment accumulation upstream of the dam. Due to the increased depth and lack of texture, these three areas were not functioning riffles. Because adequate bed slope is still present, functioning riffles are expected to return after the removal of the beaver dam. Riffle lengths slightly decreased from MY7. The number of pools remained the same as MY7 and all pools had sufficient depth. Of the engineered structures on Little Pine Creek, one additional structure, a rock vane, was labeled “to be watched” because of rock displacement. The rock vane was still functioning. Three additional structures have failed; these include a digger log, a log vane, and a root wad. New reaches on Brush Creek were assessed in MY8 that were not assessed during AB2, MY6, or MY7. All of the previously assessed structures on Brush Creek were present and functioning. Newly assessed features mainly consisted of logs cabled to the banks approximately 10 years ago. Of the newly assessed structures on Brush Creek, six log vanes and one root wad were no

longer present and labeled “failed”. Banks were stable around these missing structures, with the exception of the right bank along Brush Creek stations 12+00 – 12+50. In MY7, bank scour and slumped banks were common problem areas; banks appear to be more stable in MY8, as no slumped banks were documented and only a few areas of scour were noted. Most of the scour areas were a result of a shifting stream. Bare banks were noted along both banks upstream of the beaver dam. This was a result of beaver damage to woody vegetation and vegetation die off due to inundation from the backwaters of the beaver dam. Cross section data showed a decrease in cross sectional area from MY7 and MY8.

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 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.

II. Methodology

Methods used follow the US Army Corp of Engineers *Stream Mitigation Guidelines* and the Carolina Vegetation Survey, Ecosystem Enhancement Program’s Level 2 *CVS-EEP Protocol for Recording Vegetation Version 4.0* (Lee et al. 2006, http://cvs.bio.unc.edu/methods.htm).

III. References

Fish and Wildlife Associates, Inc. 2008. Brush Creek – Project No. 54, Monitoring Year 7, 2008. Prepared for: NCDENR Ecosystem Enhancement Program, Raleigh, NC.

HDR Engineering, Inc. 2002. Little Pine Creek/Brush Creek Monitoring Methodology Report. Prepared for: Wetlands Restoration Program, NC Department of Environment and Natural Resources, Raleigh, NC.

HDR Engineering, Inc. 2003. Little Pine Creek/Brush Creek 2002 Monitoring Report. Prepared for: Wetlands Restoration Program, NC Department of Environment and Natural Resources, Raleigh, NC.

Lee, Michael T., Robert K. Peet, Steven D. Roberts, and Thomas R. Wentworth. 2006. *CVS-EEP Protocol for Recording Vegetation*: *All Levels of Plot Sampling, Version 4.0*. Available at http://cvs.bio.unc.edu/methods.htm

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NC State University. 2004. Little Pine and Brush Creek: 2004 Monitoring Report. Prepared for: Ecosystem Enhancement Program, NC Department of Environment and Natural Resources, Raleigh, NC.

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

US Army Corp of Engineers. 2003. *Stream Mitigation Guidelines*. US Army Corp of Engineers, US Environmental Protection Agency, NC Wildlife Resources Commission, and NC Department of Natural Resources Division of Water Quality.

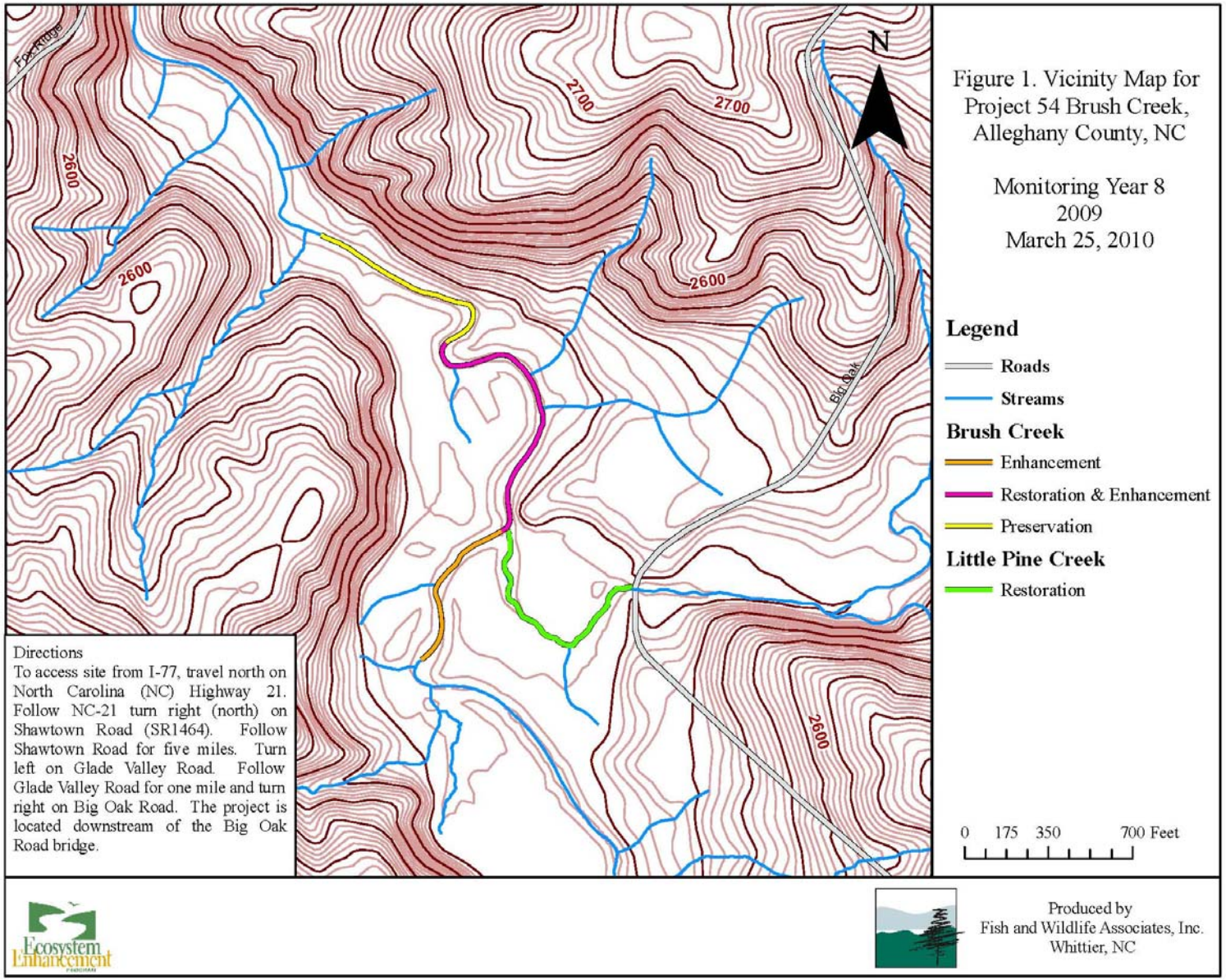
Weakley, Alan S. 2006. *Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas*. UNC Herbarium, North Carolina Botanical Garden, University of North Carolina, Chapel Hill, NC. Available at <http://www.herbarium.unc.edu/FloraArchives/WeakleyFlora_2006-Jan.pdf>

IV. Project Condition and Monitoring Data Appendices

APPENDIX A

GENERAL FIGURES AND PLAN VIEWS

Vicinity Map
Current Condition Plan View


Fox Ridge
2700
2700
2600
2600
2600
2600
N
Big Oak
Figure 1. Vicinity Map for
Project 54 Brush Creek,
Alleghany County, NC
Monitoring Year 8
2009
March 25, 2010
Legend
Roads
Streams
Brush Creek
Enhancement
Restoration & Enhancement
Preservation
Little Pine Creek
Restoration
0 175 350 700 Feet
Directions
To access site from I-77, travel north on North Carolina (NC) Highway 21. Follow NC-21 turn right (north) on Shawtown Road (SR1464). Follow Shawtown Road for five miles. Turn left on Glade Valley Road. Follow Glade Valley Road for one mile and turn right on Big Oak Road. The project is located downstream of the Big Oak Road bridge.
Ecosystem Enhancement
Produced by
Fish and Wildlife Associates, Inc.
Whittier, NC

Current Condition
Plan View

Project 54 Brush Creek
2009 Monitoring Year
Alleghany County, NC
March 25, 2010

Legend

- Centerline Stations
- Thalweg
- Top of Bank
- Waters Edge
- Bankfull

Centerline and stationing for Brush Creek was obtained from recent aerial photography.

Centerline and stationing for for Little Pine Creek came from MY8 survey data.

0 100 200 400 Feet

Monitoring Pin Coordinates:
Location Latitude (N) Longitude (W)

Little Pine Creek
Veg Plots:
054-01-LPV1 36.50591020 81.00769455
054-01-LPV2 36.50580894 81.00908181
054-01-LPV3 36.50628667 81.00924745
054-01-LPV4 36.50554587 81.00827233

Cross Sections:
lp-xs-1-lb 36.50591981 81.00758077
lp-xs-1-bkf 36.50595858 81.00771178
lp-xs-1-rb 36.50602071 81.00791864
lp-xs-2-lb 36.50574429 81.00920903
lp-xs-2-bkf 36.50586082 81.00903444
lp-xs-2-rb 36.50596233 81.00887254
lp-xs-3-lb 36.50617149 81.00944020
lp-xs-3-bkf 36.50616173 81.00919816
lp-xs-3-rb 36.50615447 81.00901317

Longitudinal Profile (As-built data):
begin survey 36.50614744 81.00742900
end survey 36.50671371 81.00917776

Photo Stations:
PS-1 36.50623056 81.00733122
PS-2 36.50617709 81.00756979
PS-3 36.50595799 81.00770895
PS-4 36.50548606 81.00811273
PS-5 36.50554358 81.00858985
PS-6 36.50570996 81.00884450
PS-7 36.50586088 81.00903451
PS-8 36.50595143 81.00914380
PS-9 36.50616173 81.00919818
PS-10 36.50631667 81.00925134

Brush Creek
Veg Plots:
054-01-BCV1 36.50589788 81.00993449

Cross Sections:
bc-xs-4-lb 36.50578678 81.01028959
bc-xs-4-bkf 36.50580545 81.01000965
bc-xs-4-rb 36.50582344 81.00989429

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PS-11 36.50560838 81.01004210
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PS-26 36.50868 81.01022
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PS-29 36.51015 81.01211

Current Condition Plan View

Project 54 Brush Creek
Monitoring Year 8
Alleghany County, NC
March 25, 2010

Repair As-built Data (AB2)
- Photo Stations
- Cross Section
- Centerline stations
- Digger Log
- Log Vane
- Fence Line
- Match Line
- Thalweg
- Top of bank
- Waters edge
- Bankfull
- Rock Sill
- Rock Vane
- Root Wad
- Augmented Riffle
- Rebar Pin Set
- Vegetation Plot

Vegetation Problem Areas
- **Bare Bank**
  - To be watched
- **Invasive Population**
  - To be watched
- **Beaver Damage**
  - To be watched

Stream Problem Areas
- Beaver Dam
- **Engineered Structures Grade**
  - Failed
- **Engineered Structures Other**
  - To be watched
  - Failed
- **Aggradation/Bar Formation**
  - To be watched
- **Bank Scour**
  - To be watched

0 15 30 60 Feet

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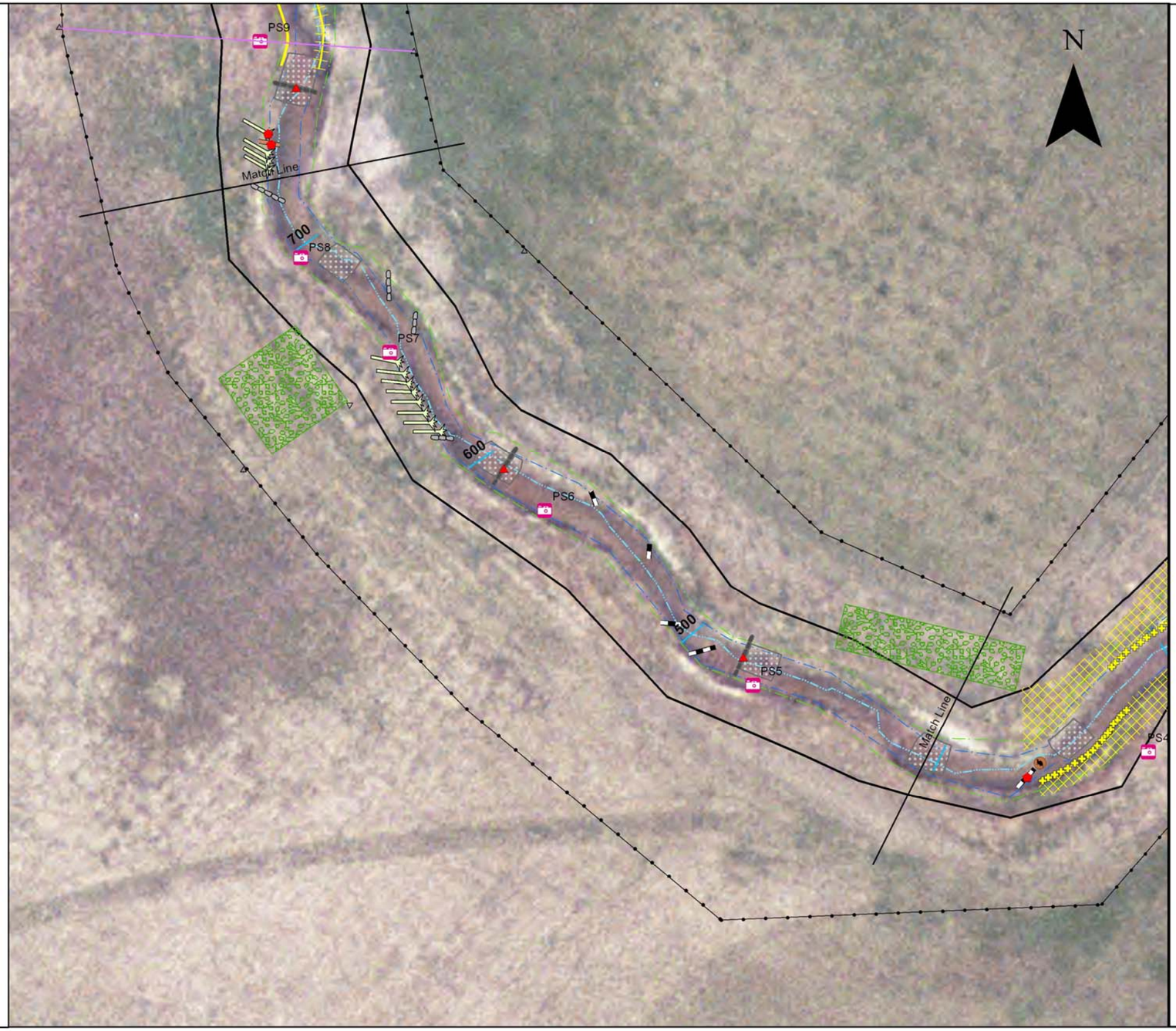

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Project 54 Brush Creek
Monitoring Year 8
Alleghany County, NC
March 25, 2010

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- Photo Stations
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Vegetation Problem Areas
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  - Invasive Population
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  - Beaver Damage

Stream Problem Areas
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- **Beaver Damage**
  - To be watched

Stream Problem Areas
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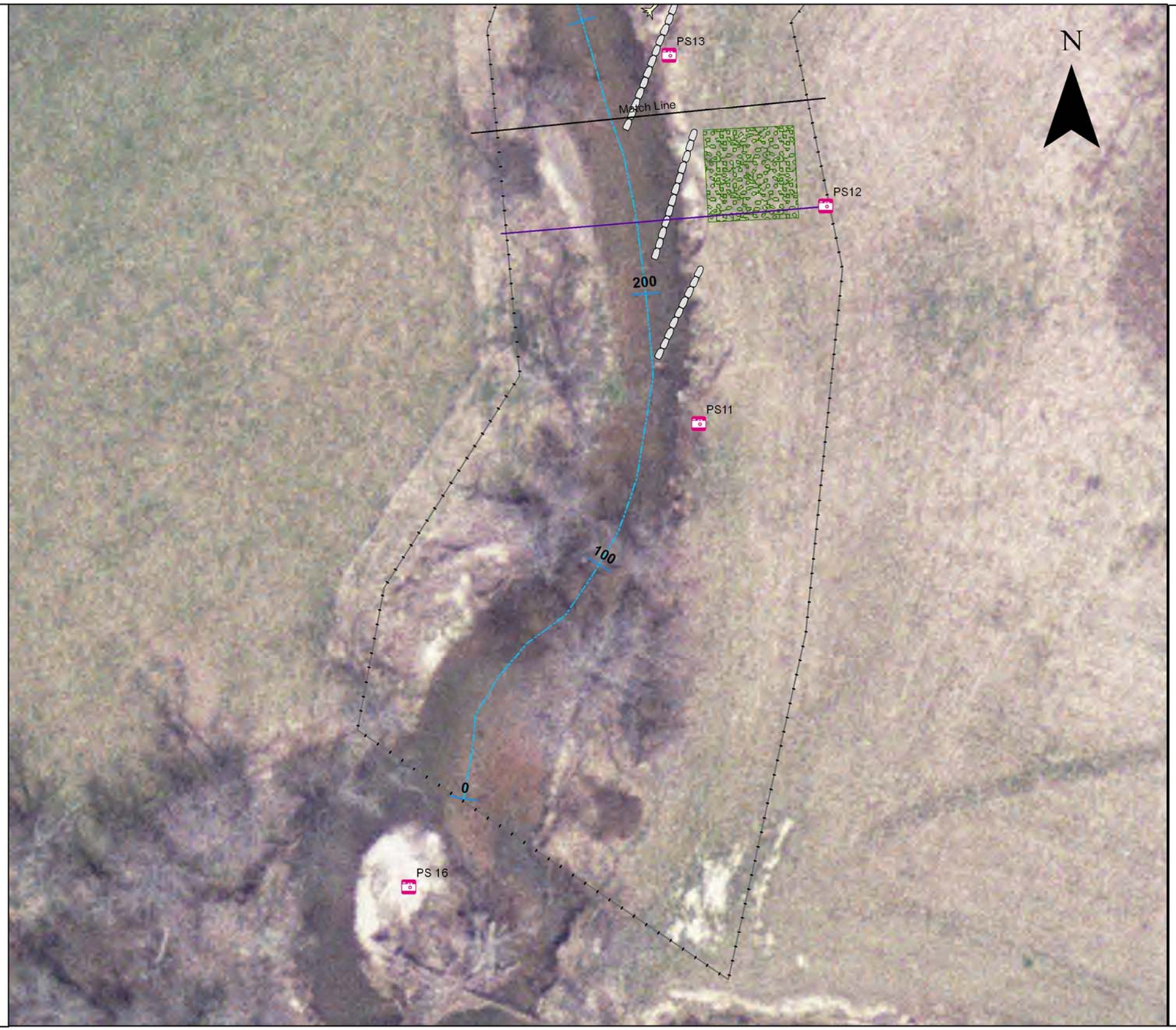

Current Condition Plan View

Project 54 Brush Creek
Monitoring Year 8
Alleghany County, NC
March 25, 2010

Repair As-built Data (AB2)
- Photo stations
- Cross section
- Centerline stations
- Log Vane
- Thalweg
- Match line
- Rock Vane
- Root Wad
- Vegetation Plot
- Conservation Easement

Vegetation Problem Areas
Invasive population
- To be watched

Stream Problem Areas
Engineered structures
- Failed

Aggradation/Bar Formation
- To be watched

Bank Scour
- To Be Watched
- Failed

0 15 30 60 Feet

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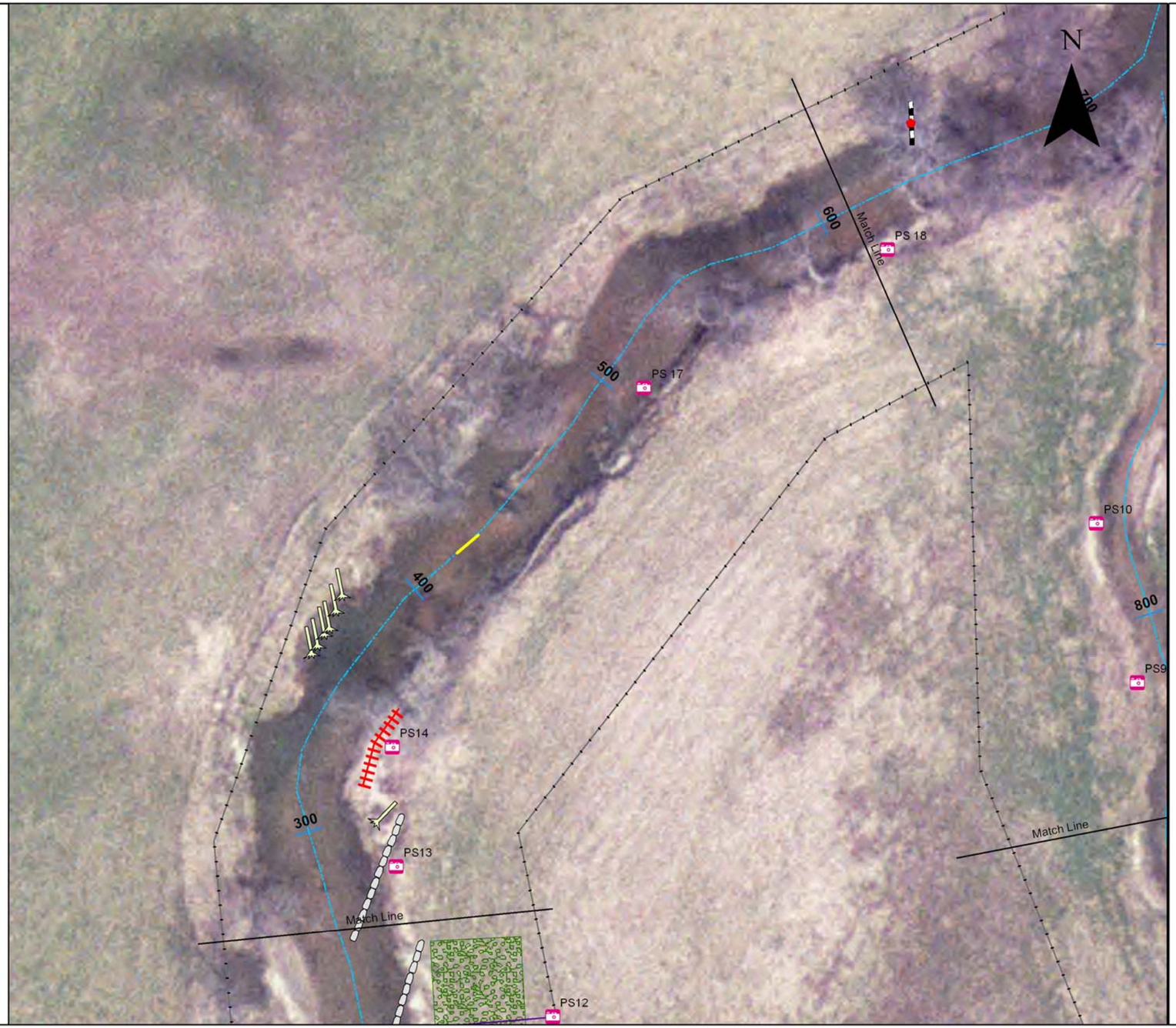

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Stream Problem Areas
Engineered structures
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lp-xs-2-lb 36.50574429 81.00920903
lp-xs-2-bkf 36.50586082 81.00903444
lp-xs-2-rb 36.50596233 81.00887254
lp-xs-3-lb 36.50617149 81.00944020
lp-xs-3-bkf 36.50616173 81.00919816
lp-xs-3-rb 36.50615447 81.00901317

Longitudinal Profile (As-built data):
begin survey 36.50614744 81.00742900
end survey 36.50671371 81.00917776

Photo Stations:
PS-1 36.50623056 81.00733122
PS-2 36.50617709 81.00756979
PS-3 36.50595799 81.00770895
PS-4 36.50548606 81.00811273
PS-5 36.50554358 81.00858985
PS-6 36.50570996 81.00884450
PS-7 36.50586088 81.00903451
PS-8 36.50595143 81.00914380
PS-9 36.50616173 81.00919818
PS-10 36.50631667 81.00925134

Brush Creek
Veg Plots:
054-01-BCV1 36.50589788 81.00993449

Cross Sections:
bc-xs-4-lb 36.50578678 81.01028959
bc-xs-4-bkf 36.50580545 81.01000965
bc-xs-4-rb 36.50582344 81.00989429

Photo Stations:
PS-11 36.50560838 81.01004210
PS-12 36.50682348 81.00989432
PS-13 36.50596754 81.01008668
PS-14 36.50608395 81.01009412
PS-15 36.50716885 81.00925196
PS-16 36.50515 81.01038
PS-17 36.50644 81.00980
PS-18 36.50658 81.00951
PS-19 36.50690 81.00927
PS-20 36.50786 81.00890
PS-21 36.50816 81.00874
PS-22 36.50830 81.00889
PS-23 36.50872 81.00928
PS-24 36.50874 81.00977
PS-25 36.50877 81.01008
PS-26 36.50868 81.01022
PS-27 36.50941 81.01042
PS-28 36.50999 81.01145
PS-29 36.51015 81.01211

Current Condition
Plan View

Project 54 Brush Creek
Monitoring Year 8
Alleghany County, NC
March 25, 2010

Repair As-built Data (AB2)
- Photo stations
- Cross section
- Centerline stations
- Log Vane
- Thalweg
- Match line
- Rock Vane
- Root Wad
- Vegetation Plot
- Conservation Easement

Vegetation Problem Areas
Invasive population
- To be watched

Stream Problem Areas
Engineered structures
- Failed

Aggradation/Bar Formation
- To be watched

Bank Scour
- To Be Watched
- Failed

0 15 30 60 Feet

Monitoring Pin Coordinates:
Location Latitude (N) Longitude (W)

Little Pine Creek
Veg Plots:
054-01-LPV1 36.50591020 81.00769455
054-01-LPV2 36.50580894 81.00908181
054-01-LPV3 36.50628667 81.00924745
054-01-LPV4 36.50554587 81.00827233

Cross Sections:
lp-xs-1-lb 36.50591981 81.00758077
lp-xs-1-bkf 36.50595858 81.00771178
lp-xs-1-rb 36.50602071 81.00791864
lp-xs-2-lb 36.50574429 81.00920903
lp-xs-2-bkf 36.50586082 81.00903444
lp-xs-2-rb 36.50596233 81.00887254
lp-xs-3-lb 36.50617149 81.00944020
lp-xs-3-bkf 36.50616173 81.00919816
lp-xs-3-rb 36.50615447 81.00901317

Longitudinal Profile (As-built data):
begin survey 36.50614744 81.00742900
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Photo Stations:
PS-1 36.50623056 81.00733122
PS-2 36.50617709 81.00756979
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PS-4 36.50548606 81.00811273
PS-5 36.50554358 81.00858985
PS-6 36.50570996 81.00884450
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PS-8 36.50595143 81.00914380
PS-9 36.50616173 81.00919818
PS-10 36.50631667 81.00925134

Brush Creek
Veg Plots:
054-01-BCV1 36.50589788 81.00993449

Cross Sections:
bc-xs-4-lb 36.50578678 81.01028959
bc-xs-4-bkf 36.50580545 81.01000965
bc-xs-4-rb 36.50582344 81.00989429

Photo Stations:
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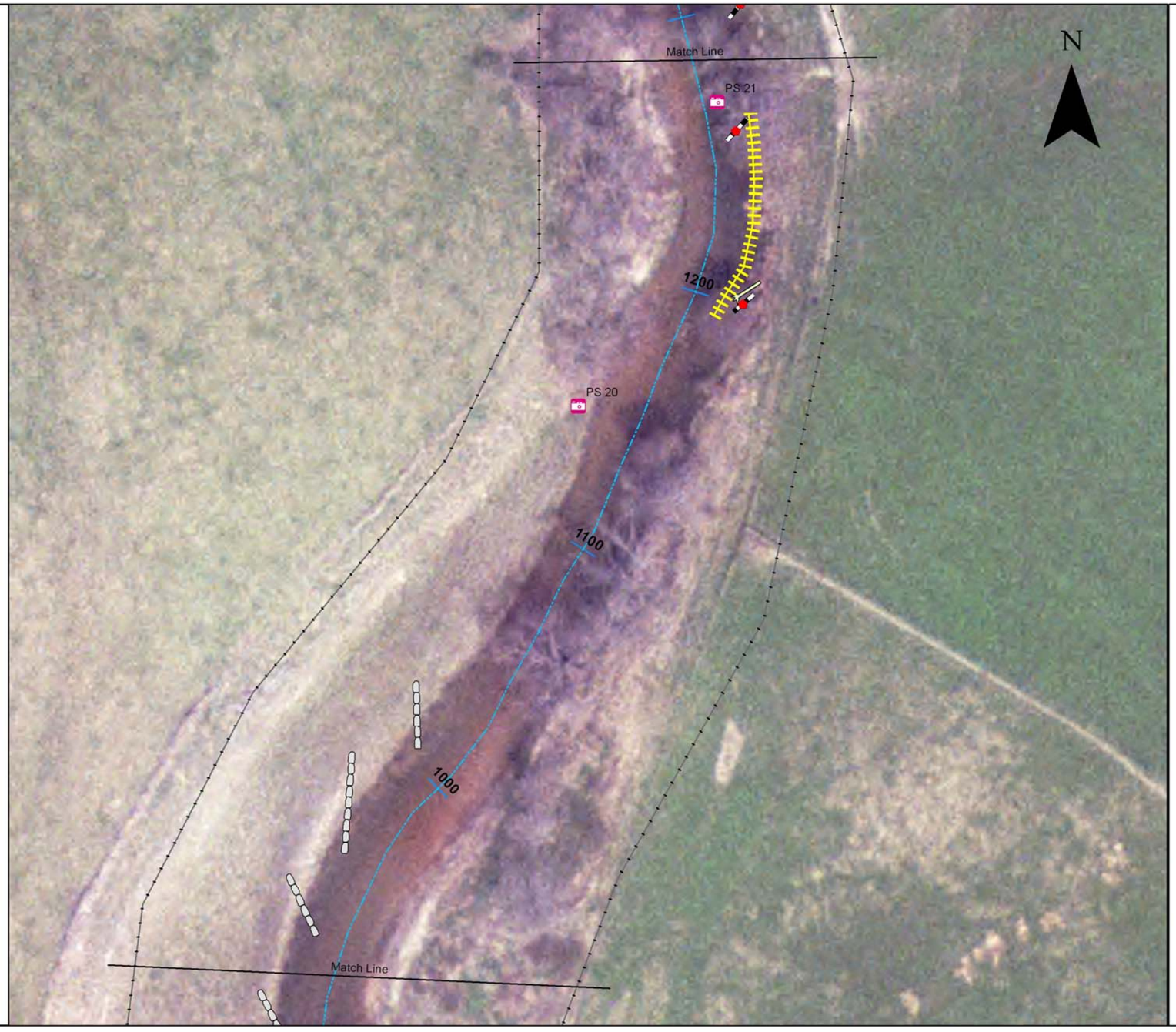
PS-28 36.50999 81.01145
PS-29 36.51015 81.01211



Current Condition Plan View

Project 54 Brush Creek
Monitoring Year 8
Alleghany County, NC
March 25, 2010

Repair As-built Data (AB2)
- Photo stations
- Cross section
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Invasive population
- To be watched

Stream Problem Areas
Engineered structures
- Failed

Aggradation/Bar Formation
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Bank Scour
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0 15 30 60 Feet

Monitoring Pin Coordinates:
Location Latitude (N) Longitude (W)

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Veg Plots:
054-01-LPV1 36.50591020 81.00769455
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054-01-LPV4 36.50554587 81.00827233

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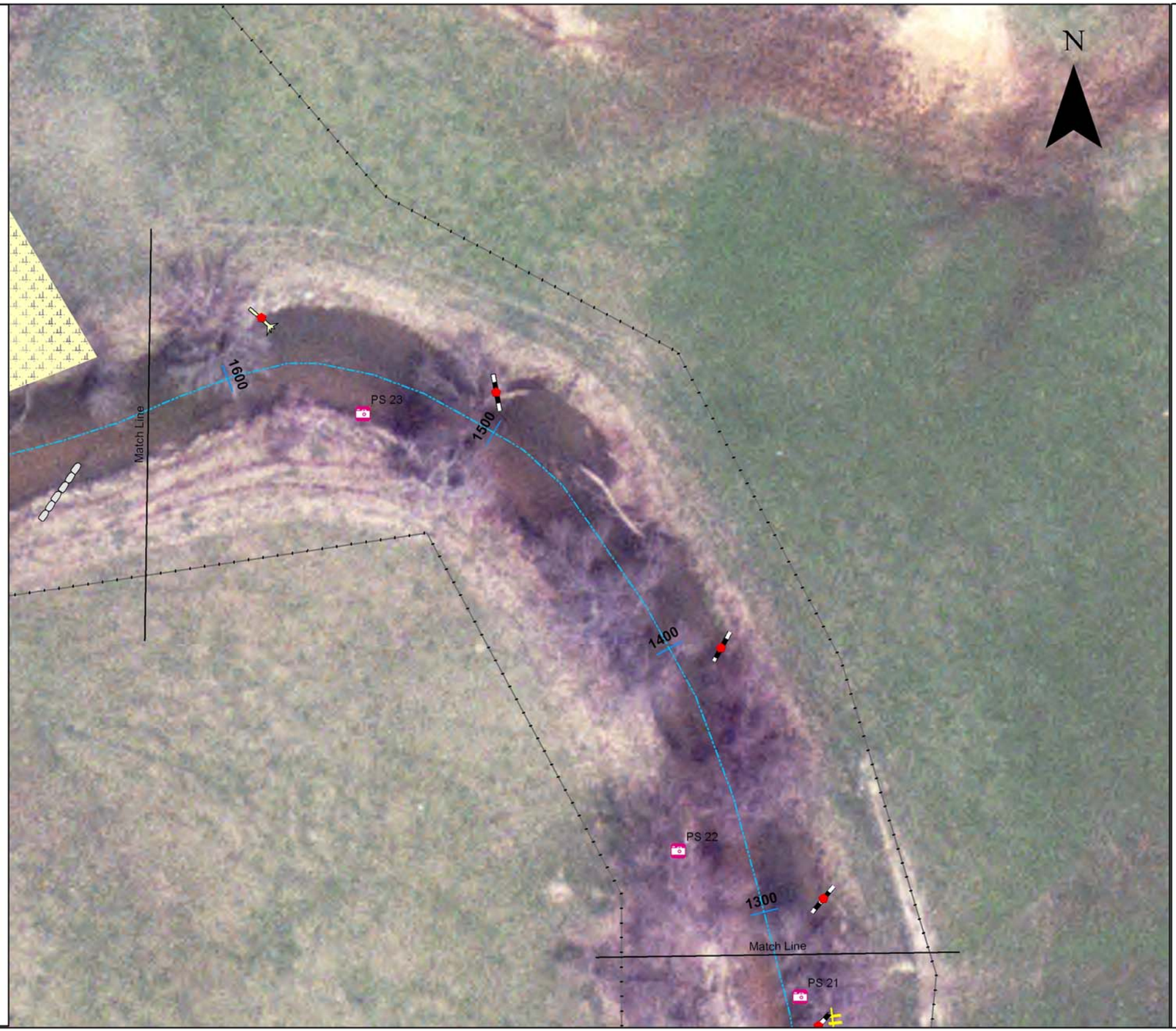

Current Condition Plan View

Project 54 Brush Creek
Monitoring Year 8
Alleghany County, NC
March 25, 2010

Repair As-built Data (AB2)
- Photo stations
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Invasive population
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Stream Problem Areas
Engineered structures
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0 15 30 60 Feet

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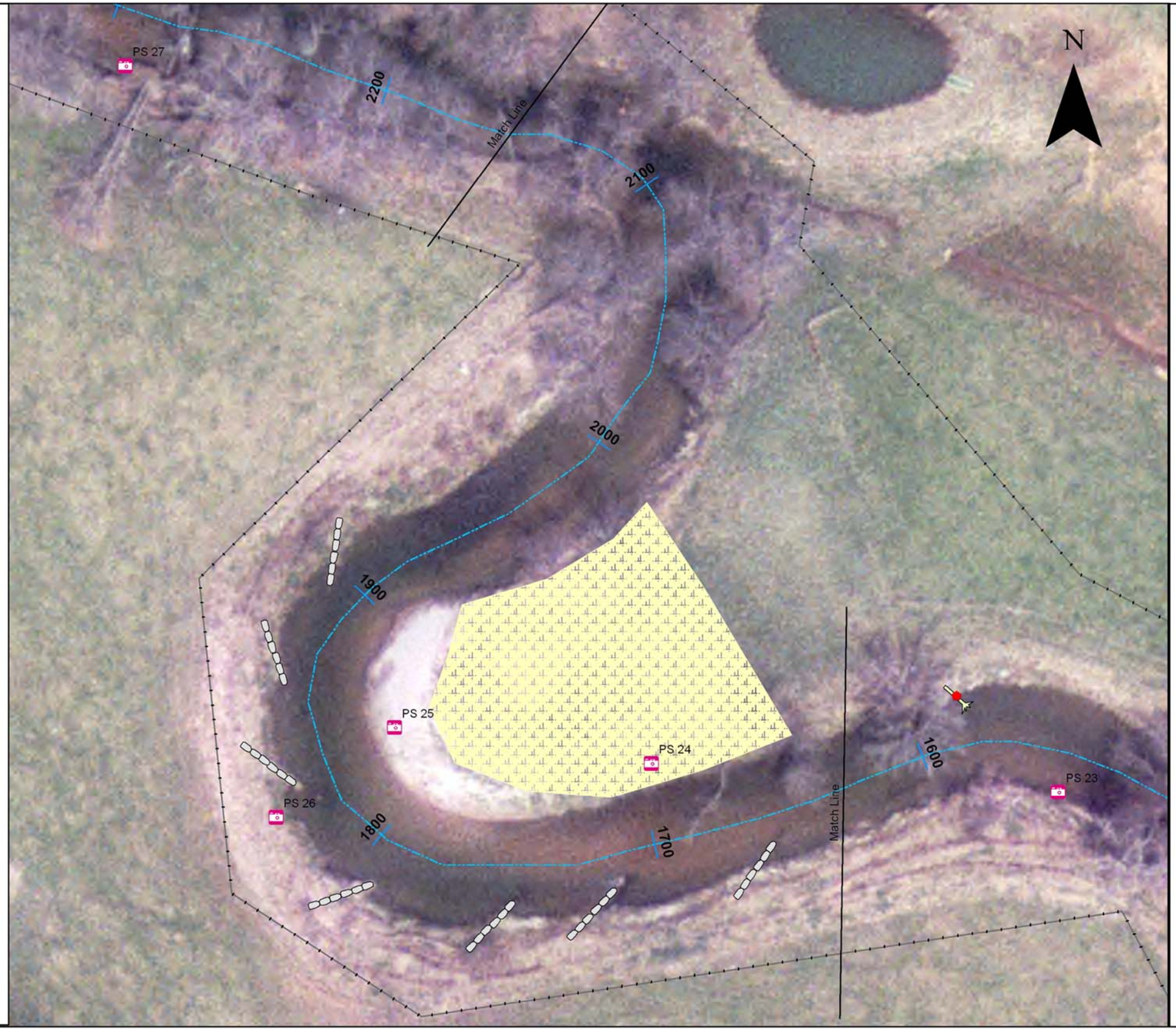

Current Condition Plan View

Project 54 Brush Creek
Monitoring Year 8
Alleghany County, NC
March 25, 2010

Repair As-built Data (AB2)
- Photo stations
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0 15 30 60 Feet

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Cross Sections:
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lp-xs-1-bkf 36.50595858 81.00771178
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Brush Creek
Veg Plots:
054-01-BCV1 36.50589788 81.00993449

Cross Sections:
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Photo Stations:
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Current Condition
Plan View

Project 54 Brush Creek
Monitoring Year 8
Alleghany County, NC
March 25, 2010

Repair As-built Data (AB2)
- Photo stations
- Cross section
- Centerline stations
- Log Vane
- Thalweg
- Match line
- Rock Vane
- Root Wad
- Vegetation Plot
- Conservation Easement

Vegetation Problem Areas
Invasive population
- To be watched

Stream Problem Areas
Engineered structures
- Failed

Aggradation/Bar Formation
- To be watched

Bank Scour
- To Be Watched
- Failed

0 15 30 60 Feet

Monitoring Pin Coordinates:
Location Latitude (N) Longitude (W)

Little Pine Creek
Veg Plots:
054-01-LPV1 36.50591020 81.00769455
054-01-LPV2 36.50580894 81.00908181
054-01-LPV3 36.50628667 81.00924745
054-01-LPV4 36.50554587 81.00827233

Cross Sections:
lp-xs-1-lb 36.50591981 81.00758077
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Brush Creek
Veg Plots:
054-01-BCV1 36.50589788 81.00993449

Cross Sections:
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Current Condition Plan View

Project 54 Brush Creek
Monitoring Year 8
Alleghany County, NC
March 25, 2010

Repair As-built Data (AB2)
- Photo stations
- Cross section
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Vegetation Problem Areas
Invasive population
- To be watched

Stream Problem Areas
Engineered structures
- Failed

Aggradation/Bar Formation
- To be watched

Bank Scour
- To Be Watched
- Failed

0 15 30 60 Feet

APPENDIX B

GENERAL PROJECT TABLES

Table 1. Project Restoration Components
Table 2. Project Activity and Reporting History
Table 3. Project Contacts Table
Table 4. Project Attribute Table

Table 1. Project Restoration Components Brush Creek—Project #54					
Project Segment or Reach ID	**Type**	**Approach**	**Restored Length (Lf)**	**Stationing**	**Comment**
Brush Creek - Reach 1	E	P2	700	0+00 - 07+00	Channel relocation; Rock Sills; Point Bar construction; Re-vegetated
Brush Creek - Reach 2	E and R	E2	1,200	07+00 - 19+00	Log vanes, rock vanes, and root wads
Brush Creek - Reach 3	P		900	19+00 - 28+00	Riparian buffer
Little Pine Creek	R	P2	950	0+00 - 10+00	Relocation of channel; new pattern, profile, dimension, and structures

Table 2. Project Activity and Reporting History Brush Creek - Project #54		
Activity or Report	**Calendar Year of Completion or Planned Completion**	**Actual Completion Date**
Restoration Plan	*	Oct-00
Mitigation Plan/As-built Report	*	Jun-02
Temporary S&E mix applied to entire project area	*	*
Permanent seed mix applied to reach	*	*
Year 1 monitoring	Jan-02	Jun-02
Year 2 Monitoring	Nov-03	Jan-04
Year 3 Monitoring	Nov-04	Dec-04
Year 4 Monitoring	Nov-05	Not completed
Year 5 Monitoring	no monitoring due to assessment and implementation	
Structural maintenance (Bank repair and revegetation)	*	Jan-07
As-Built 2	Dec-06	Jan-07
Year 6 Monitoring	Nov-07	Dec-07
Herbicide Application		Jun-08
Year 7 Monitoring	Nov-08	Nov-08
Additional Plantings and Protection to Woody Vegetation		Apr-09
Year 8 Monitoring	Nov-09	Dec-09
Year 9 Monitoring	Nov-10	
Year 10 Monitoring	Nov-11	

*Historical documents did not provide this data.

Table 3. Project Contact Table Brush Creek - Project # 54	
Designer	HDR Engineering, Inc. of the Carolinas.
	128 South Tryon St, Suite 1400
	Charlotte, North Carolina 28202
Primary project design POC	*
Construction Contractor	A&D Environmental & Industrial Services
Construction contractor POC	*
Planting Contractor	Shamrock Environmental
Planting contractor POC	Mr. Bill Wright (336) 375-1989
Seeding Contractor	*
Planting contractor point of contact	
Seed Mix Sources	*
Nursery Stock Suppliers	*
Repair Designer	HDR Engineering, Inc. of the Carolinas.
	128 South Tryon St, Suite 1400
	Charlotte, North Carolina 28202
Primary project design POC	*
Repair Construction Contractor	North Carolina Wildlife Resources Commission
	Watershed Enhancement Group
	P.O. Box 387
	Elkin, NC 28621
Primary project design POC	*
Monitoring Performers	
MY7-MY10	Fish and Wildlife Associates, Inc.
	P.O. Box 241
	Whittier, NC 28789
	(828)497-6505
Stream Monitoring POC	Barbara Wiggins
Vegetation Monitoring POC	Barbara Wiggins
MY6	MACTEC Engineering and Consulting, Inc.
	3301 Atlantic Avenue
	Raleigh, NC 27604
	(919)876-0416
Stream Monitoring POC	Robert Sain (828)252-8130
Vegetation Monitoring POC	Admin Davis (919)876-0416
MY5	No annual monitoring conducted due to repair assessment and implementation
MY4	EcoLogic Associates

Table 3. Project Contact Table Brush Creek - Project # 54	
	4321 A. South Elm-Eugene Street
	Greensboro, NC 27406
MY2/MY3	Biological and Agricultural Engineering
	Water Resources Research Institute
	North Carolina State University
	Campus Box 7625
	Raleigh, NC 27695
MY1	HDR Engineering, Inc. of the Carolinas
	128 South Tryon Street, Suite 1400
	Charlotte, NC 28202

Table 4. Project Background Table Brush Creek - Project #54	
Project County	Alleghany, North Carolina
Drainage Area	26.3 sq. mi. (Brush Creek)
	4.3 sq.mi. (Little Pine Creek)
Drainage impervious cover estimate (%)	Estimated at <5%
Stream Order	3rd order (Brush Creek)
	2nd order (Little Pine Creek)
Physiographic Region	Mountains
Ecoregion	Southern Crysalline Ridges and Mountains (66d)
Rosgen Classification of As-built	B3 (Brush Creek)
	E4 (Little Pine Creek)
Cowardin Classification	Not applicable
Dominant soil types	Codorus complex, Tate loam, Chester loam, Alluvial
Reference site ID	Mill Creek, Surry County, NC
USGS HUC for Project and Reference	5050001
NCDWQ Sub-basin for Project and Reference	NEW03 10-9-10
NCDWQ classification for Project and Reference	C; Tr
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
% of project easement fenced	91% (Brush Creek)
	100% (Little Pine Creek)

APPENDIX C

VEGETATION ASSESSMENT DATA

Table 5. Vegetation Plot Mitigation Success Summary Table
Vegetation Monitoring Plot Photos
CVS Summary Data Tables
Table 6. Vegetation Metadata Table
Table 7. Stem Count Total and Planted Plot by Species

Table 5. Vegetation Plot Mitigation Success Summary Table Brush Creek - Project # 54		
Vegetation Plot ID	**Total Planted Stems Per Acre**	**Vegetation Survival Threshold Met?***
054-01-BCV1-year:3	769	Yes
054-01-LPV1-year:3	405	Yes
054-01-LPV2-year:3	445	Yes
054-01-LPV3-year:3	445	Yes
054-01-LPV4-year:3	445	Yes

*Survival Threshold is 320 stems/acre

North Carolina Ecosystem Enhancement Program (NC EEP)
Vegetation Monitoring Plot Photos
Brush Creek– Project # 54

Alleghany County, NC
Site: Little Pine Creek Plot ID: 054-01-LPV1
Date: August 26, 2009
Photo No: 64
Photographed by: L. Bilbrey
Description: Taken from plot origin toward diagonally opposite corner.

Alleghany County, NC
Site: Little Pine Creek Plot ID: 054-01-LPV2
Date: August 26, 2009
Photo No: 65
Photographed by: L. Bilbrey
Description: Taken from plot origin toward diagonally opposite corner.

North Carolina Ecosystem Enhancement Program (NC EEP)
Vegetation Monitoring Plot Photos
Brush Creek– Project # 54

Alleghany County, NC
Site: Little Pine Creek Plot ID: 054-01-LPV3
Date: August 26, 2009
Photo No: 66
Photographed by: L. Bilbrey
Description: Taken from plot origin toward diagonally opposite corner.

Alleghany County, NC
Site: Little Pine Creek Plot ID: 054-01-LPV4
Date: August 27, 2009
Photo No: 67
Photographed by: L. Bilbrey
Description: Taken from plot origin toward diagonally opposite corner.

North Carolina Ecosystem Enhancement Program (NC EEP)
Vegetation Monitoring Plot Photos
Brush Creek– Project # 54

Alleghany County, NC
Site: Little Pine Creek Plot ID: 054-01BCV1
Date: August 27, 2008
Photo No: 68
Photographed by: L. Bilbrey
Description: Taken from plot origin toward diagonally opposite corner.

Table 6. Vegetation Metadata Table Brush Creek - Project #54	
Report Prepared By	Leslie Bilbrey
Date Prepared	8/31/2009 16:09
Database name	cvs-eep-entrytool-v2.2.7.mdb
Database location	C:\Documents and Settings\Barbara\Desktop
Computer name	LESLIE-PC
File size	36036608
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY----------	
Project Code	54
Project Name	Brush Creek
Description	Stream repair on Brush and Little Pine Creeks in Alleghany County NC.
River Basin	New River
Length(ft)	1000
Stream-to-edge width (ft)	50
Area (sq m)	9289.36
Required Plots (calculated)	4
Sampled Plots	5

Table 7. Stem Count Total and Planted Plot by Species
Project # 54 - Brush Creek

			Current Plot Data (MY8 2009)															Annual Means											
			054-01-BCV1			054-01-LPV1			054-01-LPV2			054-01-LPV3			054-01-LPV4			MY8 (2009)			MY7 (2008)			MY6 (2007)			AB2 (2007)		
Scientific Name	Common Name	Species Type	P-LS	P-all	T	P-LS	P-all	T	P-LS	P-all	T	P-LS	P-all	T	P-LS	P-all	T	P-LS	P-all	T	P-LS	P-all	T	P-LS	P-all	T	P-LS	P-all	T
Acer rubrum	red maple	Tree		2	3		2	2		1	1								5	6		2	2		2	2		2	2
Alnus serrulata	hazel alder	Shrub Tree																				1	1		1	1		1	1
Asimina triloba	pawpaw	Shrub Tree		1	1			1								1	1		2	3		6	6		9	9		12	12
Betula nigra	river birch	Tree		2	2		2	2						1		1	1		5	6		2	3		6	6		9	9
Carpinus caroliniana	American hornbeam	Shrub Tree		4	4								1	1					5	5		3	5		2	2		8	8
Cornus amomum	silky dogwood	Shrub			2			3			1					1	5		1	11		1	9		1	1		1	1
Diospyros virginiana	common persimmon	Tree																							1	1		2	2
Fraxinus americana	white ash	Tree																			1	1	1	1	1	1			
Fraxinus pennsylvanica	green ash	Tree		2	2					3	3								5	5		4	4		3	3		5	5
Hamamelis virginiana	American witchhazel	Shrub Tree			1		2	2		1	1					3	3		6	7		9	11		10	10		10	10
Ilex opaca	American holly	Shrub Tree					1	1											1	1									
Juglans nigra	black walnut	Tree		1	1								2	2					3	3		2	5		2	2		4	4
Liriodendron tulipifera	tuliptree	Tree					1	1											1	1		1	1		1	1		1	1
Physocarpus opulifolius	common ninebark	Shrub	1	3	3								1	1				1	4	4	1	4	4	1	3	3	1	6	6
Pinus strobus	eastern white pine	Tree														2	2		2	2		2	2		2	2		2	2
Platanus occidentalis	American sycamore	Tree								1	1		1	1					2	2									
Prunus serotina	black cherry	Shrub Tree			1			1		3	4		4	4		1	2		8	12		9	18		8	8		12	12
Quercus alba	white oak	Tree					1	1		2	2								3	3		3	3		3	3		4	4
Quercus rubra	northern red oak	Tree		1	1		1	1											2	2									
Rhododendron calendulaceum	flame azalea	Shrub																				1	1		1	1		3	3
Rhododendron viscosum	swamp azalea	Shrub																										1	1
Salix nigra	black willow	Tree	2	3	4												2	2	3	6	5	5	7	3	4	4	3	3	3
Sambucus canadensis	Common Elderberry	Shrub Tree										1	2	28		1	46	1	3	74	2	7	65	3	6	6	3	13	13
Tsuga canadensis	eastern hemlock	Tree																							1	1		1	1
Uknown																1	1		1	1			1	2	2	2		12	12
		Stem count	3	19	25	0	10	15	0	11	13	1	11	38	0	11	63	4	62	154	9	63	149	10	69	69	7	112	112
		size (ares)		1			1			1			1			1			5			5			5			5	
		size (ACRES)		0.02			0.02			0.02			0.02			0.02			0.12			0.12			0.12			0.12	
		Species count	2	9	12	0	7	10	0	6	7	1	6	7	0	8	9	3	19	19	4	18	19	5	21	21	3	21	21
		Stems per ACRE	121	769	1012	0	405	607	0	445	526	40.5	445	1538	0	445	2550	32.4	502	1246	72.8	510	1206	80.9	558	558	56.7	906	906

*Shaded boxes indicate a difference in the number of planted stems and total stems. The difference is due to the presence of natural stems.

APPENDIX D

STREAM ASSESSMENT DATA

Stream Station Photos
Table 8 - Visual Morphological Stability Assessment
Table 9 - Verification of Bankfull Events
Annual Overlays of Cross Section Plots
Annual Overlays of Longitudinal Plots
Annual Overlays of Pebble Count Frequency Distribution Plots

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Little Pine Creek
Project No: 54
Photo Station: 1
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 100 degrees from north.

Site: Little Pine Creek
Project No: 54
Photo Station: 1
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 225 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Little Pine Creek
Project No: 54
Photo Station: 2
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 70 degrees from north, facing upstream. Midbar forming under bridge (station 00+10-00+22).

Site: Little Pine Creek
Project No: 54
Photo Station: 2
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 200 degrees from north. Facing downstream towards riffle cross section 1.

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Little Pine Creek
Project No: 54
Photo Station: 3
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 25 degrees from north

Site: Little Pine Creek
Project No: 54
Photo Station: 3
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 228 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Little Pine Creek
Project No: 54
Photo Station: 4
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 45 degrees from north

Site: Little Pine Creek
Project No: 54
Photo Station: 4
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 270 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Little Pine Creek
Project No: 54
Photo Station: 5
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 90 degrees from north

Site: Little Pine Creek
Project No: 54
Photo Station: 5
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 300 degrees from north, facing downstream towards breached rock sill.

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Little Pine Creek
Project No: 54
Photo Station: 6
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 115 degrees from north

Site: Little Pine Creek
Project No: 54
Photo Station: 6
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 332 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Little Pine Creek
Project No: 54
Photo Station: 7
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 115 degrees from north

Site: Little Pine Creek
Project No: 54
Photo Station: 7
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 352 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Little Pine Creek
Project No: 54
Photo Station: 8
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 100 degrees from north

Site: Little Pine Creek
Project No: 54
Photo Station: 8
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 350 degrees from north, muskrat holes along the left descending bank.

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Little Pine Creek
Project No: 54
Photo Station: 9
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 20 degrees from north

Site: Little Pine Creek
Project No: 54
Photo Station: 9
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 170 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Little Pine Creek
Project No: 54
Photo Station: 10
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 20 degrees from north, water flowing under root wads along left descending bank.

Site: Little Pine Creek
Project No: 54
Photo Station: 10
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 160 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 11
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 226 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 11
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 350 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 12
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 224 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 12
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 270 degrees from north, showing a portion of the Brush Creek Vegetation Plot.

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 13
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 195 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 13
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 345 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 14
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 190 degrees from north, facing upstream, bank scour is visible along the right descending bank.

Site: Brush Creek
Project No: 54
Photo Station: 14
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 330 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 15
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 35 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 15
Date: May 12, 2009
Photographed by: C. Lawson
Description: Taken 160 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 16
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 28 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 17
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 235degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 17
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 275 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 18
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 300 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 18
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 43 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 19
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 160 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 19
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 120 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 20
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 60 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 20
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 176 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 21
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 8 degrees from north

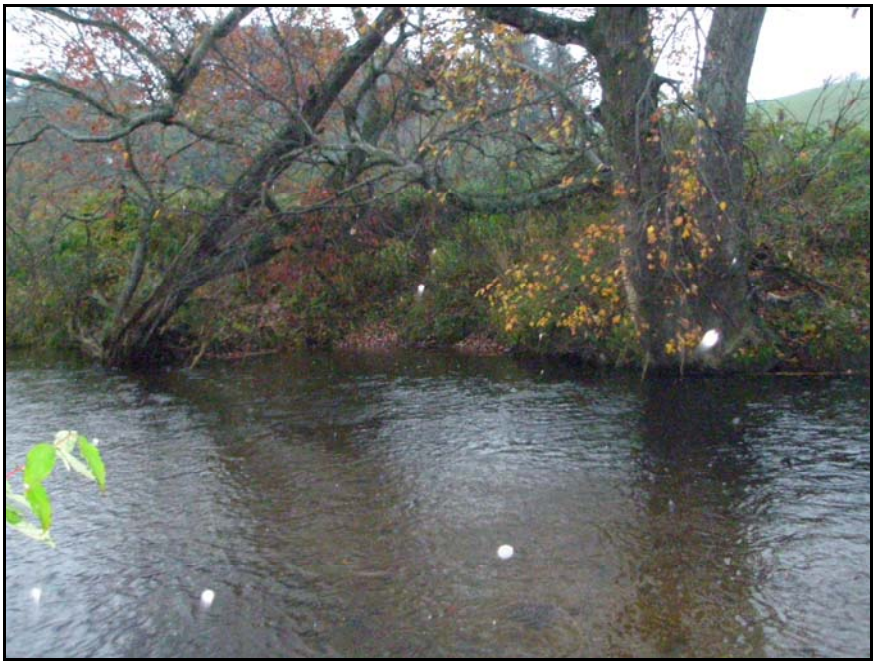
North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 21
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 122 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 22
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 150 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 22
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 115 degrees from north



Site: Brush Creek
Project No: 54
Photo Station: 22
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 55 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 22
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 5 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 23
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 118 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 23
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 90 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 23
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 335 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 24
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 140 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 24
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 180 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 24
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 220 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 25
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 42 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 25
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 230 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 25
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 270 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 25
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 310 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 25
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 340 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 26
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 10 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 26
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 85 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 26
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 120 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 27
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 83 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 27
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 316 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 28
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 144 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)
Stream Fixed Station Photos
Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 28
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 293 degrees from north

Site: Brush Creek
Project No: 54
Photo Station: 29
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 108 degrees from north

North Carolina Ecosystem Enhancement Program (NC EEP)

Stream Fixed Station Photos

Brush Creek – Project # 54

Site: Brush Creek
Project No: 54
Photo Station: 29
Date: October 14, 2009
Photographed by: L. Bilbrey
Description: Taken 326 degrees from north

Table 8. Visual Morphological Stability Assessment Brush Creek - Project # 54 Segment/Reach: Little Pine Creek (1000 ft)						
Feature Category	**Metric (per As-built and reference baselines)**	**(# Stable) Number Performing as Intended**	**Total number per As-built**	**Total Number / feet in unstable state**	**% Perform in Stable Condition**	**Feature Perform. Mean or Total**
A. Riffles	1. Present?	8	11	NA	73	
	2. Armor stable (e.g. no displacement)?	7	11	NA	64	
	3. Facet grade appears stable?	7	11	NA	64	
	4. Minimal evidence of embedding/ fining?	8	11	NA	73	
	5. Length Appropriate?	6	11	NA	55	**65**
B. Pools	1. Present? (e.g not subject to severe aggradation or migration?)	10	13	NA	77	
	2. Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	10	13	NA	77	
	3. Length Appropriate?	9	13	NA	69	**74**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	12	13	NA	92	
	2. Downstream of meander (glide/inflection) centering?	12	13	NA	92	**92**
D. Meanders	1. Outer bend in state of limited/controlled erosion?	13	15	NA	87	
	2. Of those eroding, # w/concomitant point bar formation?	1	NA	NA	NA	
	3. Apparent Rc within spec?	14	15	NA	93	
	4. Sufficient floodplain access and relief?	14	15	NA	93	**91**
E. Bed General	1. General channel bed aggradation areas (bar formation)	NA	NA	1/15	98	
	2. Channel bed degradation – areas of increasing down-cutting or head cutting?	NA	NA	NA	100	**99**
F. Banks	1. Actively eroding, wasting, or slumping bank	NA	NA	6/185	83	**83**
G. Vanes	1. Free of back or arm scour?	13	16	NA	81	
	2. Height appropriate?	13	16	NA	81	
	3. Angle and geometry appear appropriate?	13	16	NA	81	
	4. Free of piping or other structural failures?	12	16	NA	75	**80**
H. Wads/ Boulders	1. Free of scour?	4	4	NA	100	
	2. Footing stable?	2	4	NA	50	**75**

Table 8. Visual Morphological Stability Assessment Brush Creek - Project # 54 Segment/Reach: Brush Creek (2800 ft)						
Feature Category	**Metric (per As-built and reference baselines)**	**(# Stable) Number Performing as Intended**	**Total number per As-built**	**Total Number / feet in unstable state**	**% Perform in Stable Condition**	**Feature Perform. Mean or Total**
A. Riffles	1. Present?	*	*	*	*	
	2. Armor stable (e.g. no displacement)?	*	*	*	*	
	3. Facet grade appears stable?	*	*	*	*	
	4. Minimal evidence of embedding/ fining?	*	*	*	*	
	5. Length Appropriate?	*	*	*	*	*
B. Pools	1. Present? (e.g not subject to severe aggradation or migration?)	*	*	*	*	
	2. Sufficiently deep (Max Pool D:Mean Bkf >1.6?)	*	*	*	*	
	3. Length Appropriate?	*	*	*	*	*
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	7	7	NA	100	
	2. Downstream of meander (glide/inflection) centering?	7	7	NA	100	**100**
D. Meanders	1. Outer bend in state of limited/controlled erosion?	7	7	NA	100	
	2. Of those eroding, # w/concomitant point bar formation?	NA	NA	NA	NA	
	3. Apparent Rc within spec?	7	7	NA	100	
	4. Sufficient floodplain access and relief?	7	7	NA	100	**100**
E. Bed General	1. General channel bed aggradation areas (bar formation)	NA	NA	1/25	99	
	2. Channel bed degradation – areas of increasing down-cutting or head cutting?	NA	NA	NA	100	**100**
F. Banks	1. Actively eroding, wasting, or slumping bank	NA	NA	3/150	95	**95**
G. Vanes	1. Free of back or arm scour?	15	21	NA	71	
	2. Height appropriate?	15	21	NA	71	
	3. Angle and geometry appear appropriate?	15	21	NA	71	
	4. Free of piping or other structural failures?	15	21	NA	71	**71**
H. Wads/ Boulders	1. Free of scour?	3	4	NA	75	
	2. Footing stable?	3	4	NA	75	**75**

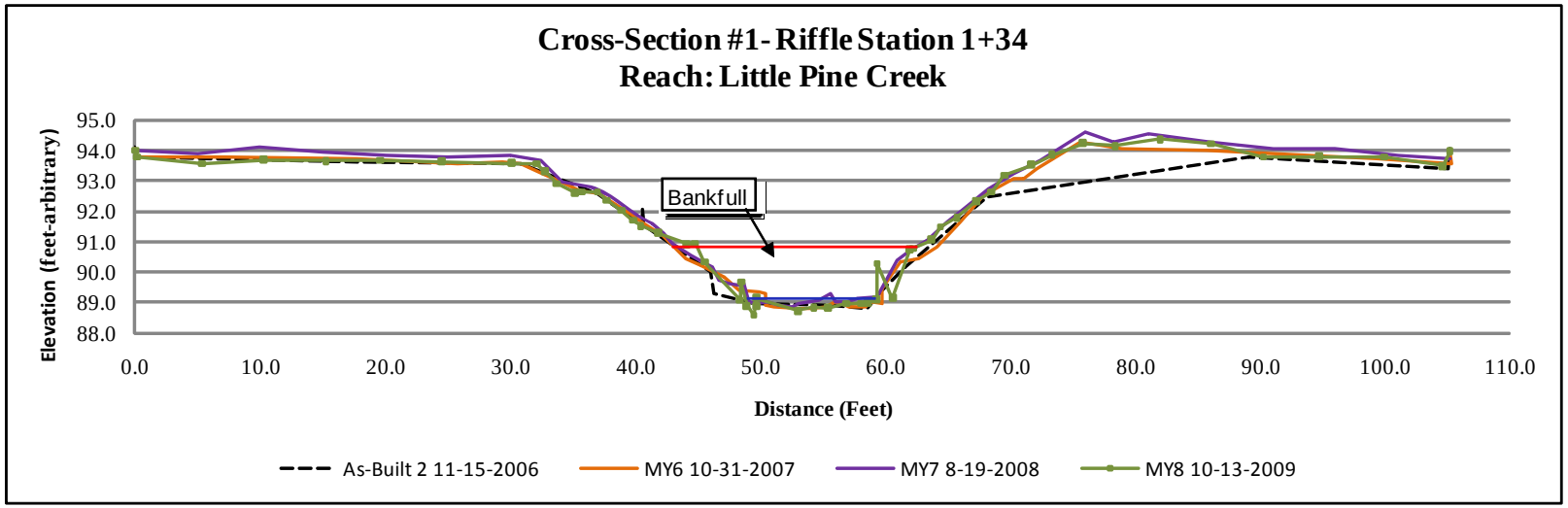
*A longitudinal survey was not conducted; therefore, this data is not available**.**

Table 9. Verification of Bankfull Events Brush Creek - Project 54			
Date of Data Collection	**Date of Occurrence**	**Method**	**Photograph Number (if available)**
11/13/2009	11/10/09-11/11/09	Approximately 4 inches of rain in a 24-hour period (data collected from National Oceanic and Atmospheric Administration)	N/A
5/12/2009	unknown	Visual and photographic documentation of sandy, sediment deposits indicating bankfull event.	3, 20, 22
8/26/08 10/16/2008	8/25/08-8/27/08	Visual documentation of over bank event, Land Manager, Bobby Irwin; rain gauge for Ennice, NC equaled 3.46 inches of rain; visual documentation of sediment deposits, debris deposits, and wrack lines.	Not included in MY8 report
11/01/07	10/23/07	On-site observation and high water indicators observed.	Not available
12/08/06	12/08/06	On-site observation and high water indicators observed.	Not Available

Project Name	Brush Creek Project 54
Cross Section	Little Pine Creek 1 of 3
Feature	Riffle
Date Surveyed	10/13/2009
Crew	Bilbrey, L., Lawson, C.

Bankfull Area				
	AB2	MY6	MY7	MY8
Area	45.3	44.4	47.9	31.3
Width	24.9	25.4	25.4	20.4
Mean Depth	1.8	1.7	1.9	1.5
Max Depth	2.8	2.8	3.0	2.5
w/d ratio	13.7	14.5	13.5	13.4
FPW	105.1	>100	171.0	39.6
ER	4.2	3.9	6.7	1.9

Facing downstream x-section #1



Project Name	Brush Creek Project 54
Cross Section	Little Pine Creek 1 of 3
Feature	Riffle
Date Surveyed	10/13/09
Crew	Bilbrey, L., Lawson, C.

10/13/09 MY8 Survey			10/13/09 MY8 Survey (cont'd)			MY9 Survey			MY10 Survey		
Station	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**
0	94	x1lp	58.64	89	x1						
0.17	93.78	x1	59.31	89.1	x1we						
5.35	93.56	x1	59.35	90.29	x1						
10.25	93.7	x1	60.59	89.15	x1ws						
15.25	93.66	x1	61.97	90.75	x1						
19.55	93.67	x1	62.2	90.77	x1						
24.53	93.64	x1	63.67	91.06	x1bf						
30.07	93.59	x1	64.39	91.48	x1						
32.07	93.57	x1	65.73	91.8	x1						
32.81	93.31	x1	67.28	92.35	x1						
33.75	92.9	x1	68.49	92.64	x1						
35.17	92.61	x1	69.51	93.18	x1						
35.7	92.64	x1	71.68	93.52	x1						
36.97	92.64	x1	73.34	93.86	x1						
37.74	92.36	x1	75.82	94.24	x1tob						
38.87	92.04	x1	78.37	94.14	x1						
39.83	91.71	x1	81.98	94.36	x1						
40.42	91.53	x1bfpin	86.08	94.22	x1						
41.86	91.28	x1	90.24	93.79	x1						
44.12	90.92	x1bf	94.71	93.8	x1						
44.79	90.93	x1	99.93	93.78	x1						
45.52	90.33	x1	104.59	93.49	x1						
48.37	89.07	x1we	105.15	93.96	x1rp						
48.46	89.68	x1									
48.92	88.9	x1									
49.47	88.58	x1									
49.65	88.89	x1									
49.66	89.15	x1ws									
52.99	88.73	x1									
54.28	88.85	x1									
55.38	88.82	x1									
56.87	88.97	x1									
58.09	88.97	x1									

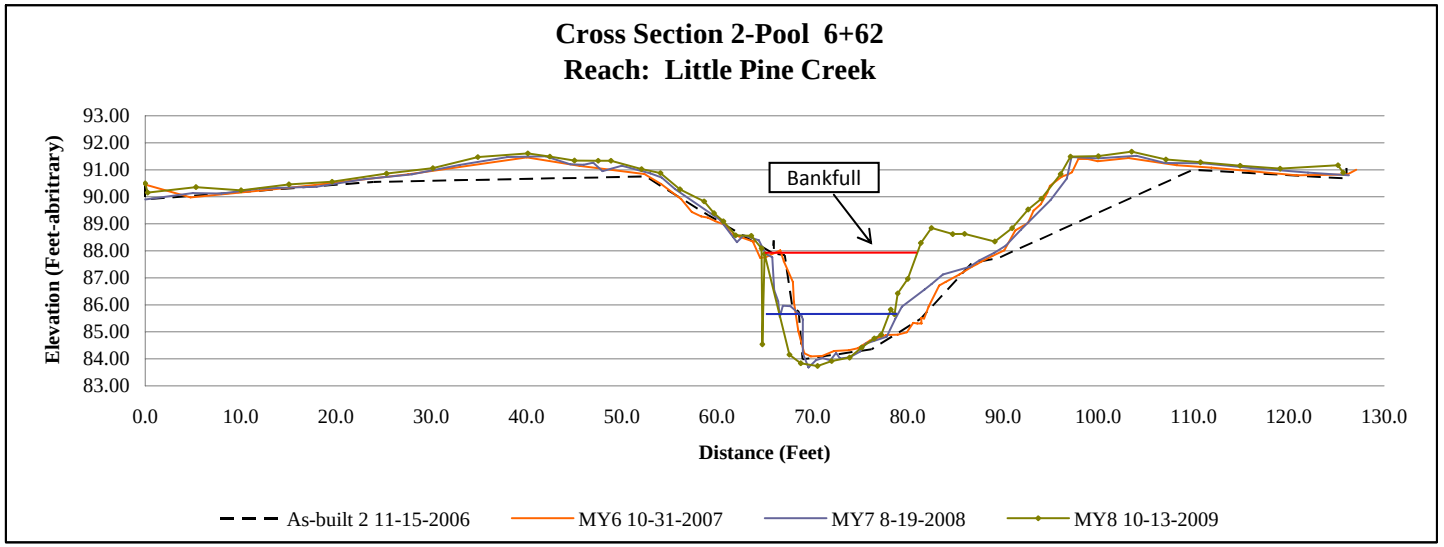
Project Name	Brush Creek Project 54
Cross Section	Little Pine Creek 1 of 3
Feature	Riffle
Date Surveyed	10/13/09
Crew	Bilbrey, L., Lawson, C.

11/15/06 As-Built #2 Survey			10/31/07 MY6 Survey			10/31/07 MY6 Survey (cont.)			8/20/08 MY7 Survey			8/20/08 MY7 Survey (cont.)		
Station	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**
0.0	94.1	IPS	0.0	94.0	tolp	61.2	90.3		0	94	L pin	57	89.04	
0.1	93.8	GS	0.0	93.8		62.6	90.4		5	93.87		57.8	89.15	
18.0	93.6		7.1	93.8		64.2	90.8		10	94.12		59.3	89.2	we
30.8	93.6	LB	17.7	93.7		66.1	91.6		15	93.96		60.9	90.4	
36.9	92.6		25.8	93.6		67.9	92.5		20	93.83		62	90.73	
40.5	91.6	BKF	29.4	93.6		70.2	93.1		25	93.8		63.4	91.05	rbkfl
40.6	92.1	IPSBKF	30.8	93.6		71.1	93.1		30	93.82		64.9	91.64	
40.6	91.6		32.6	93.2		72.1	93.4		32.4	93.65		66.1	92.03	
46.1	90.0	TS	33.5	93.1		75.6	94.3		34.2	92.97		68.3	92.74	
46.3	89.3	LEW	35.5	92.7		79.0	94.1		36.4	92.8		70.2	93.26	
49.5	89.0		37.2	92.6		85.7	94.0		37.9	92.5		72.4	93.65	
55.5	88.9		39.8	91.8		99.3	93.7		38.9	92.27		76	94.58	
58.6	88.8		40.7	91.6		105.2	93.6		40.2	91.88	bkf pin	78.3	94.26	
59.8	89.4	REW	42.1	91.2	bkf	105.1	93.9	torp	41.3	91.61		81	94.55	
61.6	90.2	TS	44.0	90.5					42.3	91.26		86	94.26	
68.1	92.5		45.2	90.2					43	90.94		91	94.08	
89.1	93.8		47.1	89.8					44.4	90.58		96	94.04	
105.0	93.4	GS	48.3	89.4					45.6	90.29		101	93.86	
105.1	94.1	IPS	49.8	89.3					46.2	90.16		105.1	93.75	
			50.4	89.3	ws				46.7	89.74				
			50.5	88.9	lew				47.5	89.65				
			51.1	88.8					48.3	89.57				
			53.1	88.8					48.7	89.61				
			54.1	88.8					49.1	89.04	we			
			55.3	88.8					49.7	88.95				
			56.0	89.0					50.5	89.05				
			56.5	89.0					51.5	88.92				
			57.1	88.9					52.5	88.88				
			58.4	88.9					53.1	88.95				
			59.0	89.0					53.9	89				
			59.7	88.9	rew				54.7	89.06				
			59.8	89.3	ws				55.6	89.29				
			59.8	89.4					56	89.04				

Project Name	Brush Creek Project 54
Cross Section	Little Pine Creek 2 of 3
Feature	Pool
Date Surveyed	10/13/2009
Crew	Bilbrey, L., Lawson, C.

Bankfull Area				
	AB2	MY6	MY7	MY8
Area	54.4	51.9	40.2	50.8
Width	24.7	26.4	20.6	16.5
Mean Depth	2.2	2.0	1.9	3.1
Max Depth	3.9	3.8	3.7	4.4
w/d ratio	11.2	13.4	n/a	n/a
FPW	126.1	>100	n/a	n/a
ER	5.1	3.8	n/a	n/a

Facing down stream x-section #2



Project Name	Brush Creek Project 54
Cross Section	Little Pine Creek 2 of 3
Feature	Pool
Date Surveyed	10/13/2009
Crew	Bilbrey, L., Lawson, C.

10/13/2009 MY8 Survey			10/13/2009 MY8 Survey (cont'd)			MY9 Survey			MY10 Survey			
Station	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	
0	90.5	x2lp	78.22	85.82	x2ws							
0.26	90.16	x2	78.62	85.65	x2we							
5.34	90.36	x2	78.95	86.42	x2							
10.07	90.24	x2	80.01	86.96	x2							
15.08	90.46	x2	81.39	88.29	x2							
19.61	90.56	x2	82.5	88.85	x2							
25.34	90.86	x2	84.73	88.62	x2							
30.2	91.06	x2	85.96	88.63	x2							
34.89	91.47	x2	89.16	88.35	x2							
40.15	91.61	x2	90.97	88.84	x2							
42.45	91.49	x2	92.63	89.53	x2							
45.03	91.34	x2	94.04	89.93	x2							
47.53	91.33	x2	96.06	90.84	x2							
48.88	91.33	x2tob	97.08	91.49	x2							
52.07	91.02	x2	100.02	91.51	x2							
54.08	90.88	x2	103.5	91.67	x2							
56.11	90.28	x2	107.11	91.38	x2							
58.66	89.83	x2	110.73	91.28	x2							
59.68	89.39	x2	114.88	91.15	x2							
60.66	89.09	x2	119.08	91.04	x2							
61.97	88.57	x2	125.17	91.17	x2rp							
63.59	88.56	x2	125.7	90.9	x2							
64.67	88.09	x2bf										
64.76	84.54	x2we										
64.98	87.88	x2										
67.59	84.16	x2										
68.8	83.84	x2										
70.55	83.74	x2										
72.03	83.92	x2										
73.92	84.05	x2										
75.19	84.42	x2										
76.49	84.76	x2										
77.23	84.89	x2										

* bankfull pin missing .

Project Name	Brush Creek Project 54
Cross Section	Little Pine Creek 2 of 3
Feature	Pool
Date Surveyed	10/13/2009
Crew	Bilbrey, L., Lawson, C.

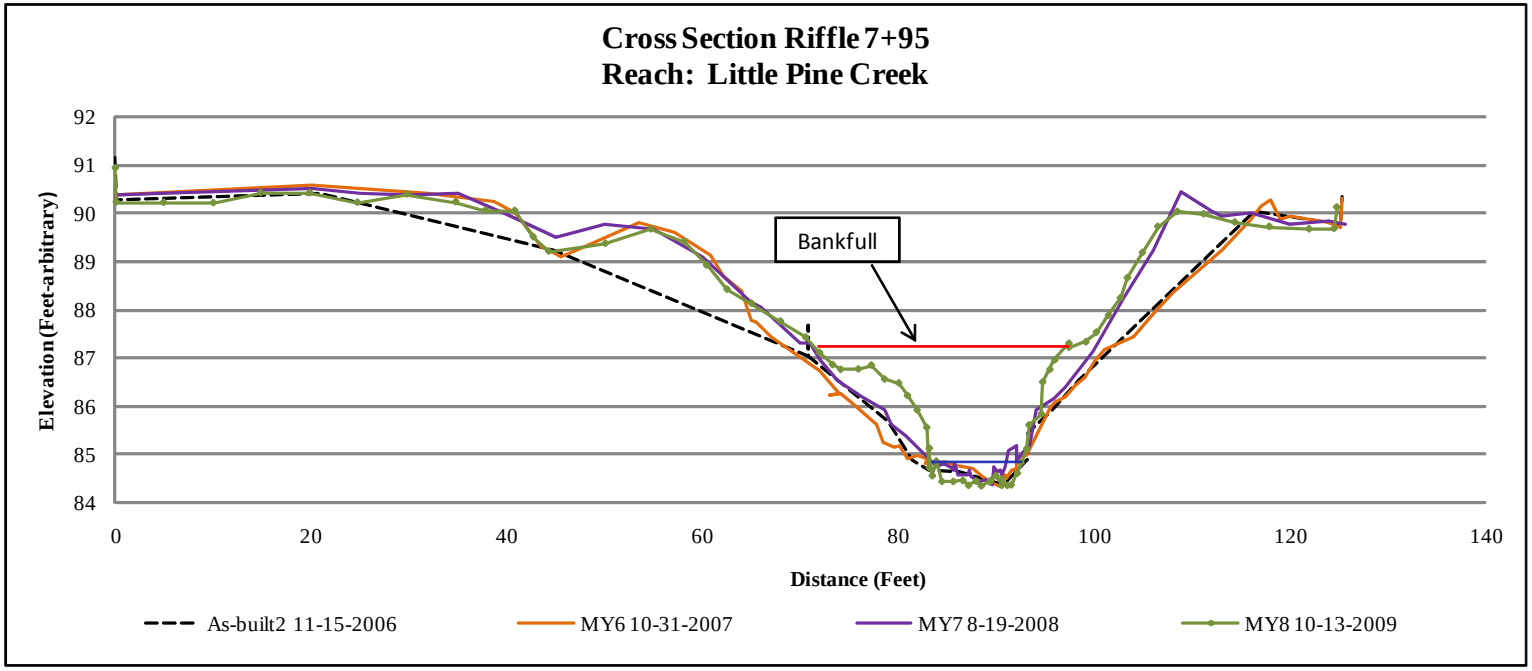
11/15/2006 As-Built #2 Survey			10/31/2007 MY6 Survey			10/31/2007 MY6 Survey (cont.)			8/20/2008 MY7 Survey			8/20/2008 MY7 Survey (cont.)		
Station	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**
0.0	90.50	IPS	0.0	90.45	xs 2 tlp	79.9	84.98		0.0	89.9	lpin	69.6	83.68	twg
0.0	89.90	GS	4.8	89.98		80.6	85.33		5.0	90.14		70.4	83.96	
24.0	90.55		16.1	90.37		81.0	85.31		8.0	90.12		71.1	84.03	
52.5	90.75	LB	27.6	90.83		81.5	85.32	rew	12.0	90.3		71.9	83.95	
59.1	89.32		40.0	91.46		81.4	85.51	ws	18.0	90.38		72.5	84.22	
65.9	87.91	BKF	45.6	91.15		81.7	85.50		23.0	90.65		72.9	84.01	
65.9	88.38	IPS BKF	52.4	90.84		82.2	85.93		28.0	90.83		73.9	84.06	
66.0	87.91		54.1	90.47		83.3	86.72		33.0	91.18		75.0	84.27	
67.1	87.84		56.2	89.91		84.0	86.85		38.0	91.47		75.6	84.57	
67.9	85.92		57.3	89.44		85.4	87.12		42.0	91.5	tob	77.8	84.82	
68.6	85.74	LEW	58.3	89.27		86.7	87.40		44.6	91.21		78.7	85.47	we
69.0	83.98		59.0	89.23		87.3	87.51		46.0	91.19		79.4	85.93	
76.2	84.36		59.8	89.10		87.8	87.60	bkf	47.0	91.26		81.8	86.57	
81.4	85.49	REW	60.8	88.95		88.9	87.81		48.0	90.95		82.5	86.77	
86.8	87.55		61.5	88.63		90.1	88.01		50.0	91.15		83.7	87.13	
89.5	87.73		63.8	88.34		91.3	88.75		53.0	90.87		86.5	87.41	
109.9	91.00		63.8	88.34		92.6	89.02		54.2	90.71		87.5	87.64	rbkf
126.1	90.68	GS	64.5	87.75	bkf	93.2	89.48		55.6	90.29		89.1	87.93	
126.0	91.07	IPS	65.1	87.75		94.0	89.72		60.3	89.15		90.3	88.19	
			66.6	88.02		94.7	90.15		61.7	88.5		91.9	88.78	
			67.0	87.61		94.9	90.41		62.1	88.32		93.6	89.38	
			68.0	86.84		96.2	90.75		62.8	88.57		95.0	89.88	
			68.1	86.12		96.8	90.83		64.4	88.39		96.7	90.68	
			68.5	85.02	llew	97.2	90.90		65.1	87.89		97.2	91.47	
			69.1	84.21		97.9	91.40		65.8	87.76	lbkf pin	100.0	91.42	tob
			69.9	84.10		98.9	91.40		66.0	86.54		104.0	91.52	
			71.0	84.11		99.9	91.31		66.4	86.13		107.0	91.25	
			72.3	84.29		103.2	91.44		66.6	85.55		111.0	91.24	
			73.9	84.32		108.2	91.17		66.9	85.97		116.0	91.07	
			74.8	84.39		111.9	91.08		67.7	85.95		122.0	90.90	
			76.0	84.68	rew	120.8	90.80		68.9	85.58		126.3	90.80	rpin
			77.8	84.88	ws	126.1	90.82		69.0	85.46	we			
			79.0	84.90		127.1	91.01	top rpin	69.0	84.2				

* bankfull pin missing .

Project Name	Brush Creek Project 54
Cross Section	Little Pine Creek 3 of 3
Feature	Riffle
Date Surveyed	10/13/2009
Crew	Bilbrey, L., Lawson, C.

Bankfull Area				
	AB2	MY6	MY7	MY8
Area	45.1	45.97	48.3	37.8
Width	30.3	34.0	30.3	26.0
Mean Depth	1.8	1.4	1.6	1.5
Max Depth	2.8	2.8	3.0	2.9
w/d ratio	20.3	25.1	19.1	17.9
FPW	110.0	>100	73.9	79.2
ER	2.7	2.9	2.4	3.0

Facing down stream x-section #3



Project Name	Brush Creek Project 54
Cross Section	Little Pine Creek 3 of 3
Feature	Riffle
Date Surveyed	10/13/2009
Crew	Bilbrey, L., Lawson, C.

10/13/2009 MY8 Survey			10/13/2009 MY8 Survey (cont'd)			MY9 Survey			MY10 Survey		
Station	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**
0	90.93	x3lp	85.58	84.44	x3						
0.1	90.23	x3	86.55	84.46	x3						
4.93	90.22	x3	87.14	84.36	x3						
10.01	90.21	x3	87.91	84.45	x3						
14.84	90.42	x3	88.45	84.35	x3						
19.84	90.42	x3	89.29	84.43	x3						
24.72	90.22	x3	89.41	84.46	x3						
29.77	90.39	x3	89.95	84.56	x3						
34.77	90.23	x3	90.53	84.36	x3						
37.82	90.06	x3	90.55	84.49	x3						
40.78	90.05	x3	91.09	84.36	x3						
42.67	89.51	x3	91.49	84.37	x3						
44.25	89.21	x3	92.13	84.61	x3we						
50.05	89.37	x3	92.5	84.83	x3ws						
54.7	89.67	x3	93.09	85.12	x3						
58.09	89.41	x3tob	93.32	85.61	x3						
60.38	88.92	x3	94.57	85.84	x3						
62.47	88.42	x3	94.71	86.5	x3						
64.96	88.13	x3	95.45	86.76	x3						
67.92	87.76	x3	95.96	86.96	x3						
70.49	87.43	x3	97.39	87.3	x3						
71.93	87.11	x3	97.41	87.22	x3bf						
73.25	86.86	x3	99.12	87.33	x3						
74.08	86.76	x3bf	100.2	87.5	x3						
75.88	86.77	x3	101.4	87.9	x3						
77.21	86.85	x3	102.7	88.2	x3						
78.56	86.56	x3	103.4	88.7	x3						
80.01	86.48	x3	104.9	89.2	x3						
80.9	86.22	x3	106.5	89.7	x3						
81.89	85.92	x3	108.5	90.0	x3tob						
82.87	85.56	x3	111.1	90.0	x3						
83.12	84.73	x3ws	114.3	89.8	x3						
83.14	85.13	x3	117.9	89.7	x3						
83.45	84.56	x3we	121.9	89.7	x3						
83.84	84.86	x3	124.5	89.7	x3						
84.41	84.44	x3	124.7	90.1	x3rp						

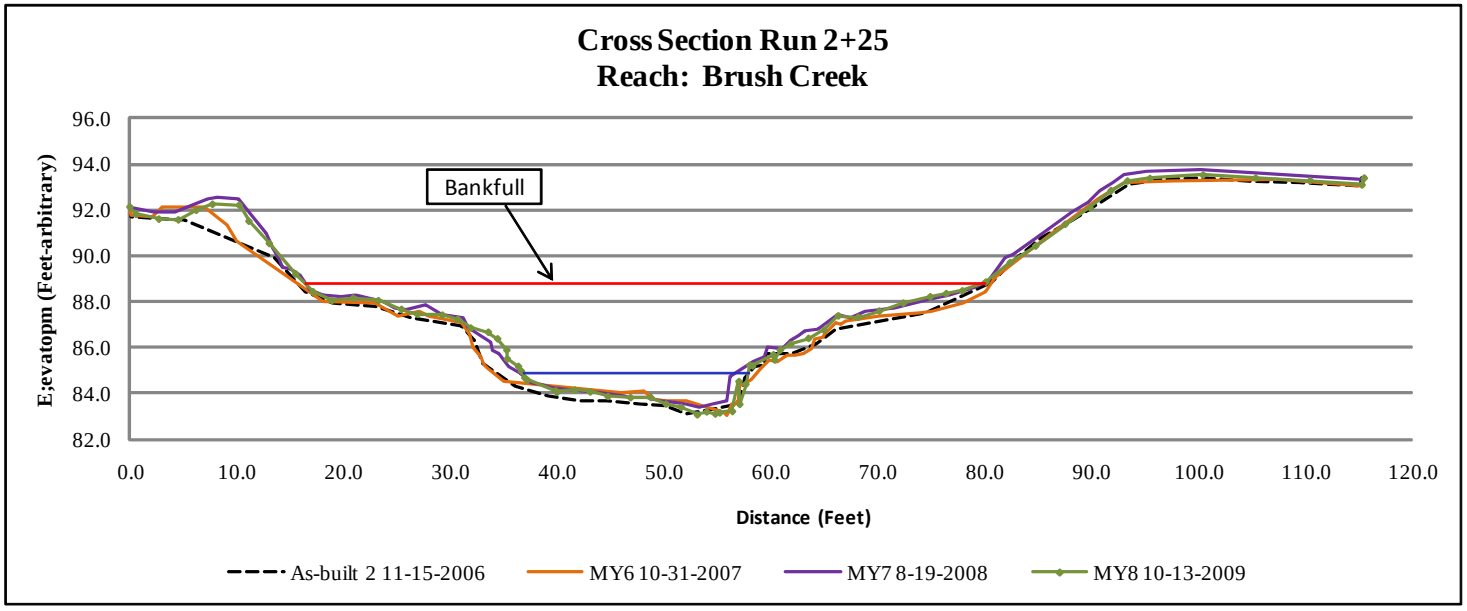
Project Name	Brush Creek Project 54
Cross Section	Little Pine Creek 3 of 3
Feature	Riffle
Date Surveyed	10/13/09
Crew	Bilbrey, L., Lawson, C.

11/15/06 As-Built #2 Survey			10/31/07 MY6 Survey			10/31/07 MY6 Survey (cont)			8/20/08 MY7 Survey			8/20/08 MY7 Survey (cont)		
Station	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**
0	91.16	IPS	0.0	90.9	xs3 tlp	86.7	84.8		0.0	90.4	L Pin	87.4	84.6	
0.05	90.27		0.0	90.4		87.6	84.7		5.0	90.4		88.3	84.4	twg
20.83	90.4		20.0	90.6		88.6	84.6		10.0	90.4		88.9	84.5	
44.79	89.23		31.9	90.4		89.5	84.4		15.0	90.5		89.6	84.4	
70.69	87.05	BKF	38.6	90.2		90.4	84.3		20.0	90.5	tob	89.8	84.7	rock
70.7	87.69	IPS BKF	40.9	90.0		90.5	84.5		25.0	90.4		90.1	84.65	rock
70.72	87.05		42.6	89.6		90.7	84.5		30.0	90.4		90.4	84.67	rock
78.88	85.69		43.5	89.3		90.9	84.6		35.0	90.4		90.6	84.58	rock
81.43	84.87	LEW	43.7	89.3		91.1	84.5		40.0	90.0		90.9	84.75	we
83.12	84.67		45.5	89.1		91.3	84.6		45.0	89.5		91.3	85.09	
86.21	84.64		47.8	89.3		91.5	84.7		50.0	89.8		92.0	85.17	
90.73	84.36		53.5	89.8		91.7	84.7		55.0	89.7		92.1	84.88	
93.15	84.91	REW	57.1	89.6		92.0	84.7	xs3 rew	60.0	89.1		92.8	85.06	
93.24	85.47		60.8	89.1		92.1	84.9	xs3 ws	65.0	88.1		93.4	85.19	
95.72	85.92		62.1	88.7		92.5	85.0		66.0	88.1		94.1	85.94	
98.34	86.53		63.9	88.4		93.0	85.0		70.0	87.3	lbkf	95.8	86.15	
116.32	90.05		65.0	87.8		95.5	86.0		71.0	87.3	bkf pin	97.0	86.39	
125.16	89.76		65.5	87.7		96.0	86.1		71.9	87.0		99.8	87.13	
125.23	90.34	IPS	67.0	87.5	xs3-bkf	97.0	86.2		73.7	86.6		103.0	88.26	
			72.0	86.7		98.0	86.4		76.3	86.2		106.1	89.23	
			74.0	86.3		99.0	86.6		78.6	85.9		108.9	90.45	
			73.0	86.2		100.0	86.9		79.2	85.6		112.0	90.06	
			74.0	86.3		101.0	87.2	bkf	80.7	85.4		113.0	89.96	
			74.1	86.3		104.0	87.5		82.0	85.1		116.0	90.01	
			75.1	86.1		106.0	87.9		83.9	84.7	we	120.0	89.76	
			77.7	85.6		108.0	88.4		84.5	84.8		124.0	89.83	
			78.4	85.3		113.0	89.2		85.9	84.7		125.7	89.78	r pin
			79.6	85.2		116.0	89.9		85.6	84.7				
			80.0	85.2		117.0	90.1		85.8	84.8				
			80.9	84.9		118.0	90.3		86.1	84.6				
			81.9	85.0		119.0	89.9		87.1	84.6				
			82.9	84.9		120.0	89.9		87.2	84.7				
			82.8	84.8	xs3 ws	124.0	89.8							
			84.8	84.8		125.2	89.7							
			85.7	84.8		125.3	90.3	xs3 top rp						

Project Name	Brush Creek Project 54
Cross Section	Brush Creek 1 of 1
Feature	Run
Date Surveyed	10/13/2009
Crew	Bilbrey, L., Lawson, C.

Bankfull Area				
	AB2	MY6	MY7	MY8
Area	177.5	146.00	128.8	170.8
Width	63.5	65.0	56.6	63.8
Mean Depth	2.8	2.2	2.3	2.7
Max Depth	5.5	3.3	4.8	5.8
w/d ratio	22.8	28.9	24.9	23.8
FPW	181.8	>100	225.0	225.0
ER	2.9	2.9	4.0	3.5

Facing down stream x-section #1



Project Name	Brush Creek Project 54
Cross Section	Brush Creek 1 of 1
Feature	Run
Date Surveyed	10/13/09
Crew	Bilbrey, L., Lawson, C.

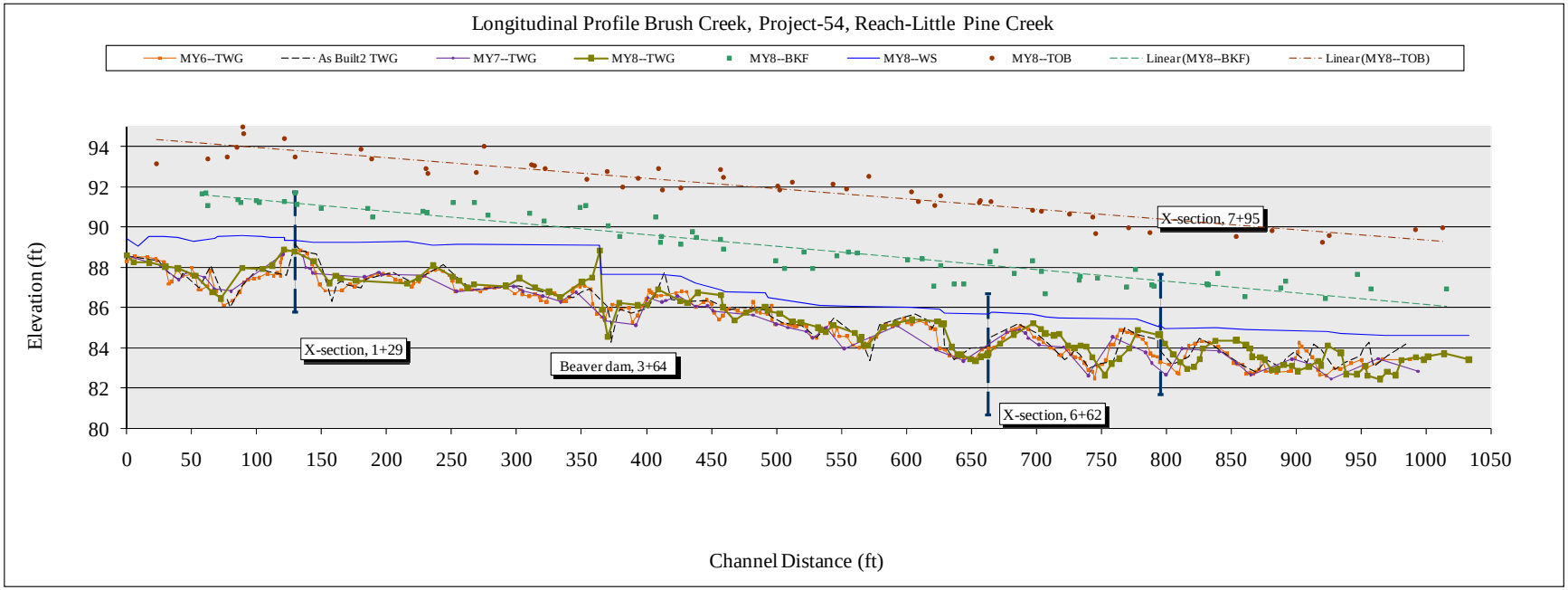
10/13/09 MY8 Survey			10/13/09 MY8 Survey (cont'd)			MY9 Survey			MY10 Survey		
Station	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**
0	92.13	x4lp	53.07	83.08	x4						
0.57	91.81	x4	53.95	83.21	x4						
2.72	91.6	x4	54.75	83.12	x4						
4.54	91.57	x4	55.17	83.17	x4						
6.21	91.99	x4	56.35	83.23	x4						
7.73	92.25	x4	56.96	84.53	x4						
10.23	92.21	x4tob	57.04	83.54	x4						
11.13	91.51	x4	57.6	84.41	x4						
13.03	90.54	x4	57.98	85.24	x4						
15.51	89.21	x4	58.24	85.21	x4we						
17.12	88.44	x4	60.18	85.69	x4						
18.89	88.06	x4	60.31	85.47	x4						
20.88	88.16	x4	60.82	85.9	x4						
23.24	88.05	x4	61.8	86.15	x4						
25.4	87.67	x4	63.47	86.41	x4						
26.9	87.46	x4bf	64.92	86.77	x4						
29.24	87.42	x4	66.25	87.39	x4						
30.67	87.24	x4	68.12	87.33	x4						
31.89	86.86	x4	70.09	87.6	x4						
33.52	86.68	x4	72.32	87.94	x4						
34.39	86.39	x4	74.85	88.22	x4						
35.25	85.9	x4	76.35	88.36	x4						
35.3	85.52	x4	77.86	88.48	x4						
36.34	85.19	x4ws	80.05	88.9	x4bf						
36.61	84.98	x4we	82.33	89.7	x4						
36.93	84.69	x4	84.71	90.4	x4						
37.18	84.59	x4	87.47	91.4	x4						
39.81	84.12	x4	89.79	92.1	x4						
39.97	84.07	x4	91.75	92.8	x4						
41.62	84.16	x4	93.29	93.3	x4tob						
43.06	84.08	x4	95.39	93.4	x4						
44.71	83.88	x4	100.37	93.5	x4						
46.82	83.83	x4	105.28	93.4	x4						
48.71	83.84	x4	110.38	93.3	x4						
50.15	83.55	x4	115.23	93.1	x4						
51.56	83.41	x4	115.44	93.4	x4rp						

Project Name	Brush Creek Project 54
Cross Section	Brush Creek 1 of 1
Feature	Run
Date Surveyed	10/13/09
Crew	Bilbrey, L., Lawson, C.

8/20/08 MY7 Survey			8/20/08 MY7 Survey (cont.)			8/20/08 MY7 Survey (cont.)		
Station	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**
0.0	92.1	L pin	43.9	84.0		92.0	93.2	
2.2	91.9		46.3	83.9		93.0	93.5	
4.2	91.9		46.7	83.9		95.2	93.7	tob
7.2	92.5		48.3	83.8		100.2	93.7	
8.2	92.6		49.6	83.7		105.2	93.6	
10.2	92.5		50.9	83.6		110.2	93.5	
11.3	91.8		52.1	83.6		115.2	93.4	r pin
12.8	91.0		53.2	83.4	twg			
13.4	90.4		54.4	83.5				
14.0	89.8		55.8	83.7				
14.3	89.5		56.1	84.7				
15.0	89.4		58.3	85.4				
15.9	89.1		59.3	85.6				
16.9	88.5		59.7	86.0				
18.1	88.3	l bkf	61.0	85.9				
19.7	88.3		61.8	86.3				
21.1	88.3		62.6	86.5				
23.7	88.0		63.1	86.7				
24.7	87.7		64.4	86.8				
25.9	87.7		66.2	87.5				
27.6	87.9		67.4	87.3				
29.2	87.5		68.8	87.6				
31.1	87.3		71.5	87.7				
31.6	86.9		74.6	88.1				
33.8	86.3		76.7	88.3				
33.9	85.9		79.1	88.6				
34.5	85.7		80.3	88.9	bkfl			
35.5	85.2		81.9	89.9				
36.5	84.9	we	82.7	90.1				
37.6	84.5		84.8	90.8				
38.4	84.4		86.4	91.4				
39.6	84.3		88.2	91.9				
40.9	84.2		89.7	92.4				
42.4	84.1		90.8	92.8				

Project Name	Brush Creek Project 54
Cross Section	Brush Creek 1 of 1
Feature	Run
Date Surveyed	10/13/09
Crew	Bilbrey, L., Lawson, C.

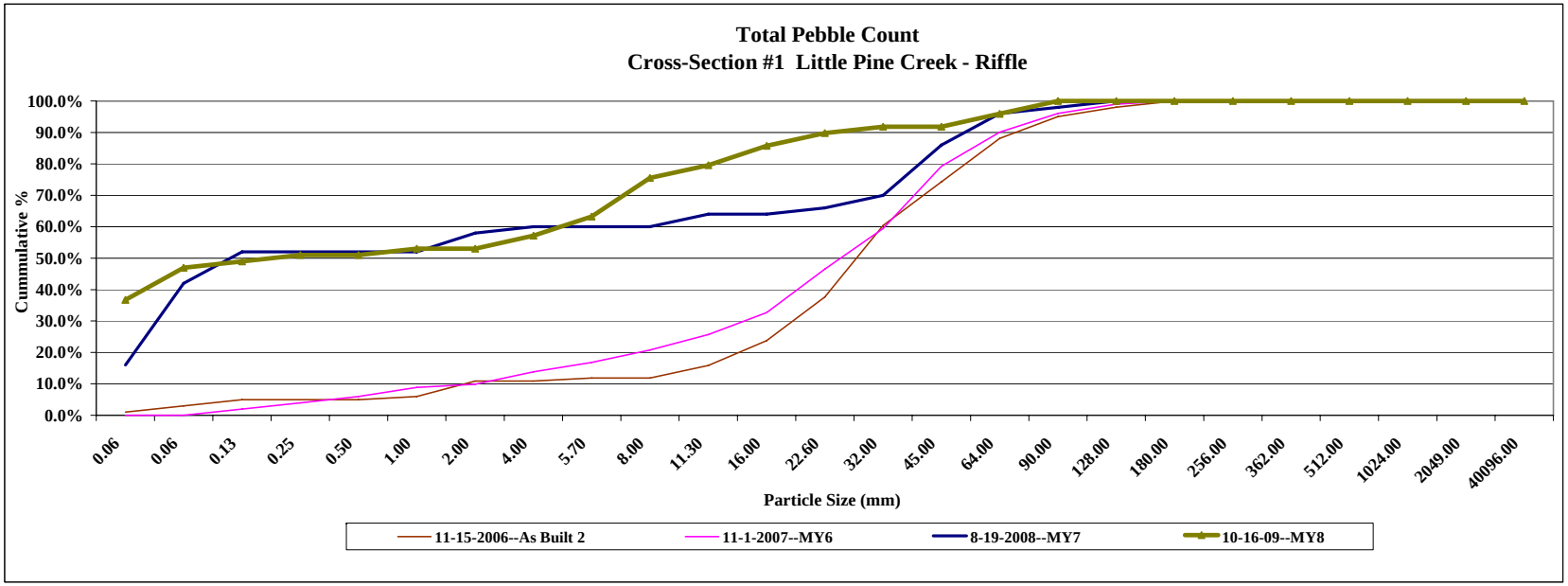
11/15/06 As-Built #2 Survey			11/15/06 As-Built #2 Survey cont.			10/31/07 MY6 Survey			10/31/07 MY6 Survey (cont.)		
Station	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**	**Station**	**Elev**	**Notes**
0.0	92.2	IPS	93.4	93.1	RB	0.0	92.1	top	58.2	84.6	
0.1	91.7		96.5	93.3		0.1	91.8		59.0	85.1	rew-ws
5.1	91.6		100.5	93.4		2.0	91.7		59.8	85.4	bcxs 1
13.4	89.9		104.4	93.2		3.0	92.1		60.6	85.4	
16.4	88.4	BKF	109.5	93.2		7.0	92.1		61.4	85.7	
19.0	87.9		115.2	93.0		9.0	91.3		62.2	85.6	
23.0	87.8		115.3	93.4	IPS	10.0	90.7		63.0	85.8	
26.4	87.3		115.3	93.02		15.0	89.0		63.8	86.0	
31.0	86.9					18.0	88.0	bkf	64.0	86.4	
32.2	86.3					23.0	87.9		64.8	86.5	
33.0	85.3	LEW				25.0	87.4		65.0	86.6	
36.1	84.3					27.0	87.6		65.6	86.9	
39.0	83.9					28.0	87.3		66.0	87.1	
42.1	83.7					31.0	87.1		66.5	87.0	
44.6	83.7					31.8	86.6		67.0	87.1	
47.7	83.6					32.0	86.0		68.0	87.2	
50.1	83.5					32.8	85.6		70.0	87.4	
52.0	83.1	TW				33.0	85.4		74.0	87.5	
54.7	83.4					33.2	85.3		75.0	87.6	
56.9	83.5					33.5	85.1	ws-lew	78.0	88.0	
57.5	84.7					35.0	84.5		80.0	88.4	bkf
58.4	85.2					46.0	84.0		80.9	89.1	
59.4	85.2	REW				48.0	84.1		86.5	91.0	
59.5	85.8					49.0	83.8		90.5	92.5	
61.9	85.7					50.0	83.7		93.0	93.2	
64.2	86.2					52.0	83.7		97.5	93.3	
66.1	86.8					54.0	83.4		107.5	93.3	
74.4	87.5					55.5	83.2		115.3	93.1	
80.4	88.8	BKF				55.9	83.1		115.5	93.4	torp
80.5	89.0	IPSBKF				56.0	83.2				
80.5	88.8					56.3	83.5				
82.6	89.8					56.5	83.5				
85.2	90.8					56.9	83.7				
88.4	91.6					57.0	84.4				
						57.4	84.4				


Longitudinal Profile Brush Creek, Project-54, Reach-Little Pine Creek
MY6--TWG
As Built2 TWG
MY7--TWG
MY8--TWG
MY8--BKF
MY8--WS
MY8--TOB
Linear (MY8--BKF)
Linear (MY8--TOB)
Elevation (ft)
94
92
90
88
86
84
82
80
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
1050
X-section, 1+29
Beaver dam, 3+64
X-section, 6+62
X-section, 7+95
Channel Distance (ft)

Project Name	Brush Creek Poject 54
Cross Section	#1
Feature	Riffle
Date	10/16/09
Crew	Bilbrey, L., Lawson, C.
Notes	Pebble count data from As Built 2 to MY8

	d16	d35	d50	d84	d95
As Built	*	*	*	*	*
MY1	*	*	*	*	*
MY2	*	*	*	*	*
MY3	*	*	*	*	*
As Built 2	13.76	25.79	33.39	70.31	108.77
MY6	6.29	20.64	30.32	64.40	103.40
MY7	0.06	0.08	0.17	52.50	74.75
MY8	--	0.061	0.281	17.72	71.94

* Data collected prior to As-Built 2, not applicable because in different location



Project Name	Brush Creek Poject 54
Cross Section	#1
Feature	Riffle
Date	10/16/09
Crew	Bilbrey, L., Lawson, C.
Notes	Pebble count data from As Built 2 to MY8

		2008--MY7												2009--MY8										
Description	**Material**	**Size (mm)**	**Riffle - Bed**	**Riffle - Bank**	**%**	**Cum %**	**d16**	**d35**	**d50**	**d84**	**d95**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Bank**	**%**	**Cum %**	**d16**	**d35**	**d50**	**d84**	**d95**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	8		16.0%	16.0%	0.062					16.0%	16.0%	36		36.7%	36.7%						36.7%	36.7%
	very fine sand	0.062	13		26.0%	42.0%		0.085				26.0%	42.0%	10		10.2%	46.9%						10.2%	46.9%
	fine sand	0.125	5		10.0%	52.0%			0.169			10.0%	52.0%	2		2.0%	49.0%						2.0%	49.0%
Sand	medium sand	0.25			0.0%	52.0%						0.0%	52.0%	2		2.0%	51.0%			0.281			2.0%	51.0%
	course sand	0.50			0.0%	52.0%						0.0%	52.0%	0		0.0%	51.0%						0.0%	51.0%
	very course sand	1.0			0.0%	52.0%						0.0%	52.0%	2		2.0%	53.1%						2.0%	53.1%
	very fine gravel	2.0	3		6.0%	58.0%						6.0%	58.0%	0		0.0%	53.1%						0.0%	53.1%
	fine gravel	4.0	1		2.0%	60.0%						2.0%	60.0%	4		4.1%	57.1%						4.1%	57.1%
G	fine gravel	5.7			0.0%	60.0%						0.0%	60.0%	6		6.1%	63.3%						6.1%	63.3%
r	medium gravel	8.0			0.0%	60.0%						0.0%	60.0%	12		12.2%	75.5%						12.2%	75.5%
a	medium gravel	11.3	2		4.0%	64.0%						4.0%	64.0%	4		4.1%	79.6%						4.1%	79.6%
v	course gravel	16.0			0.0%	64.0%						0.0%	64.0%	6		6.1%	85.7%				17.72		6.1%	85.7%
e	course gravel	22.6	1		2.0%	66.0%						2.0%	66.0%	4		4.1%	89.8%						4.1%	89.8%
l	very course gravel	32	2		4.0%	70.0%						4.0%	70.0%	2		2.0%	91.8%						2.0%	91.8%
	very course gravel	45	8		16.0%	86.0%				52.50		16.0%	86.0%	0		0.0%	91.8%						0.0%	91.8%
	small cobble	64	5		10.0%	96.0%					74.75	10.0%	96.0%	4		4.1%	95.9%					71.94	4.1%	95.9%
Cobble	medium cobble	90	1		2.0%	98.0%						2.0%	98.0%	4		4.1%	100.0%						4.1%	100.0%
	large cobble	128	1		2.0%	100.0%						2.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
	very large cobble	180			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
	small boulder	256			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
	small boulder	362			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
Boulder	medium boulder	512			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
	large boulder	1024			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
	very large boulder	2049			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
Bedrock	bedrock	40096			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
TOTAL / %of whole count			50	0	100.0%		0.06	0.08	0.17	52.50	74.75	100.0%		98	0	100.0%		0.00	0.00	0.28	17.72	71.94	100.0%	

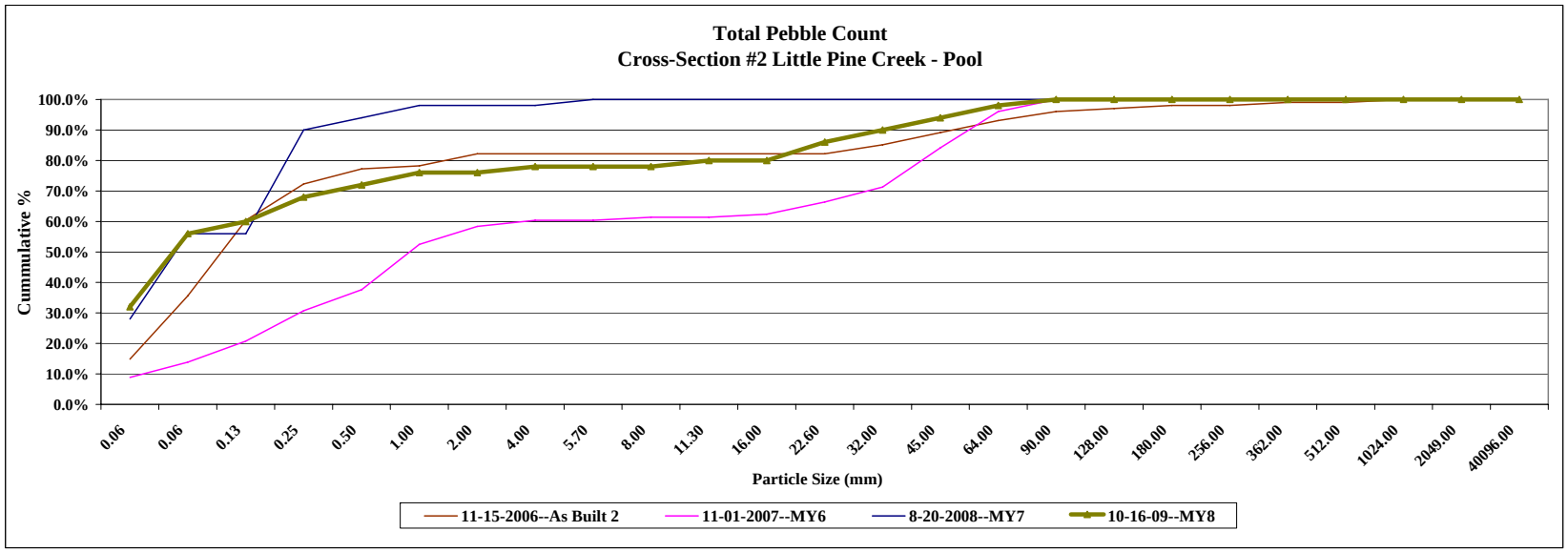
Project Name	Brush Creek Poject 54
Cross Section	#1
Feature	Riffle
Date	10/16/09
Crew	Bilbrey, L., Lawson, C.
Notes	Pebble count data from As Built 2 to MY8

		2006--As Built 2												2007--MY6										
Description	**Material**	**Size (mm)**	**Riffle - Bed**	**Riffle - Bank**	**%**	**Cum %**	**d16**	**d35**	**d50**	**d84**	**d95**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Bank**	**%**	**Cum %**	**d16**	**d35**	**d50**	**d84**	**d95**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	1		1.0%	1.0%						1.0%	1.0%			0.0%	0.0%						0.0%	0.0%
Sand	very fine sand	0.062	2		2.0%	3.0%						2.0%	3.0%			0.0%	0.0%						0.0%	0.0%
	fine sand	0.125	2		2.0%	5.0%						2.0%	5.0%	2		2.0%	2.0%						2.0%	2.0%
	medium sand	0.25			0.0%	5.0%						0.0%	5.0%	2		2.0%	4.0%						2.0%	4.0%
	course sand	0.50			0.0%	5.0%						0.0%	5.0%	2		2.0%	5.9%						2.0%	5.9%
	very course sand	1.0	1		1.0%	5.9%						1.0%	5.9%	3		3.0%	8.9%						3.0%	8.9%
G r a v e l	very fine gravel	2.0	5		5.0%	10.9%						5.0%	10.9%	1		1.0%	9.9%						1.0%	9.9%
	fine gravel	4.0			0.0%	10.9%						0.0%	10.9%	4		4.0%	13.9%						4.0%	13.9%
	fine gravel	5.7	1		1.0%	11.9%						1.0%	11.9%	3		3.0%	16.8%	6.29					3.0%	16.8%
	medium gravel	8.0			0.0%	11.9%						0.0%	11.9%	4		4.0%	20.8%						4.0%	20.8%
	medium gravel	11.3	4		4.0%	15.8%						4.0%	15.8%	5		5.0%	25.7%						5.0%	25.7%
	course gravel	16.0	8		7.9%	23.8%	13.76					7.9%	23.8%	7		6.9%	32.7%						6.9%	32.7%
	course gravel	22.6	14		13.9%	37.6%		25.79				13.9%	37.6%	14		13.9%	46.5%		20.64				13.9%	46.5%
	very course gravel	32	23		22.8%	60.4%			33.39			22.8%	60.4%	13		12.9%	59.4%			30.32			12.9%	59.4%
	very course gravel	45	14		13.9%	74.3%						13.9%	74.3%	20		19.8%	79.2%						19.8%	79.2%
Cobble	small cobble	64	14		13.9%	88.1%				70.31		13.9%	88.1%	11		10.9%	90.1%				64.40		10.9%	90.1%
	medium cobble	90	7		6.9%	95.0%					108.77	6.9%	95.0%	6		5.9%	96.0%					103.40	5.9%	96.0%
	large cobble	128	3		3.0%	98.0%						3.0%	98.0%	3		3.0%	99.0%						3.0%	99.0%
	very large cobble	180	2		2.0%	100.0%						2.0%	100.0%	1		1.0%	100.0%						1.0%	100.0%
Boulder	small boulder	256			0.0%	100.0%						0.0%	100.0%			0.0%	100.0%						0.0%	100.0%
	small boulder	362			0.0%	100.0%						0.0%	100.0%			0.0%	100.0%						0.0%	100.0%
	medium boulder	512			0.0%	100.0%						0.0%	100.0%			0.0%	100.0%						0.0%	100.0%
	large boulder	1024			0.0%	100.0%						0.0%	100.0%			0.0%	100.0%						0.0%	100.0%
	very large boulder	2049			0.0%	100.0%						0.0%	100.0%			0.0%	100.0%						0.0%	100.0%
Bedrock	bedrock	40096			0.0%	100.0%						0.0%	100.0%			0.0%	100.0%						0.0%	100.0%
TOTAL / %of whole count			101	0	100.0%		13.76	25.79	33.39	70.31	108.77	100.0%		101	0	100.0%		6.29	20.64	30.32	64.40	103.40	100.0%	

Project Name	Brush Creek Poject 54
Cross Section	#2
Feature	Pool
Date	10/16/09
Crew	Bilbrey, L., Lawson, C.
Notes	Pebble count data from As Built 2 to MY8

	d16	d35	d50	d84	d95
As Built	*	*	*	*	*
MY1	*	*	*	*	*
MY2	*	*	*	*	*
MY3	*	*	*	*	*
As Built 2	0.06	0.09	0.15	34.17	97.80
MY6	0.12	0.61	1.38	54.30	75.03
MY7	--	0.07	0.09	0.34	0.94
MY8	--	0.07	0.09	24.63	60.12

* Data collected prior to As-Built 2, not applicable because in different location



Project Name	Brush Creek Poject 54
Cross Section	#2
Feature	Pool
Date	10/16/09
Crew	Bilbrey, L., Lawson, C.
Notes	Pebble count data from As Built 2 to MY8

		2006--As Built 2											2007--MY6										
Description	**Material**	**Size (mm)**	**Pool - Bed**	**Pool - Bank**	**%**	**Cum %**	**d16**	**d35**	**d50**	**d84**	**d95**	**%**	**Cum %**	**Pool - Bed**	**Pool - Bank**	**%**	**Cum %**	**d16**	**d35**	**d50**	**d84**	**d95**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	15		14.9%	14.9%						14.9%	14.9%	9		8.9%	8.9%						8.9%	8.9%
Sand	very fine sand	0.062	21		20.8%	35.6%	0.06	0.09				20.8%	35.6%	5		5.0%	13.9%						5.0%	13.9%
	fine sand	0.125	25		24.8%	60.4%			0.15			24.8%	60.4%	7		6.9%	20.8%	0.12					6.9%	20.8%
	medium sand	0.25	12		11.9%	72.3%						11.9%	72.3%	10		9.9%	30.7%						9.9%	30.7%
	course sand	0.50	5		5.0%	77.2%						5.0%	77.2%	7		6.9%	37.6%		0.61				6.9%	37.6%
	very course sand	1.0	1		1.0%	78.2%						1.0%	78.2%	15		14.9%	52.5%			1.38			14.9%	52.5%
G r a v e l	very fine gravel	2.0	4		4.0%	82.2%						4.0%	82.2%	6		5.9%	58.4%						5.9%	58.4%
	fine gravel	4.0			0.0%	82.2%						0.0%	82.2%	2		2.0%	60.4%						2.0%	60.4%
	fine gravel	5.7			0.0%	82.2%						0.0%	82.2%			0.0%	60.4%						0.0%	60.4%
	medium gravel	8.0			0.0%	82.2%						0.0%	82.2%	1		1.0%	61.4%						1.0%	61.4%
	medium gravel	11.3			0.0%	82.2%						0.0%	82.2%			0.0%	61.4%						0.0%	61.4%
	course gravel	16.0			0.0%	82.2%						0.0%	82.2%	1		1.0%	62.4%						1.0%	62.4%
	course gravel	22.6			0.0%	82.2%						0.0%	82.2%	4		4.0%	66.3%						4.0%	66.3%
	very course gravel	32	3		3.0%	85.1%				34.17		3.0%	85.1%	5		5.0%	71.3%						5.0%	71.3%
	very course gravel	45	4		4.0%	89.1%						4.0%	89.1%	13		12.9%	84.2%				54.30		12.9%	84.2%
Cobble	small cobble	64	4		4.0%	93.1%						4.0%	93.1%	12		11.9%	96.0%					75.03	11.9%	96.0%
	medium cobble	90	3		3.0%	96.0%					97.80	3.0%	96.0%	4		4.0%	100.0%						4.0%	100.0%
	large cobble	128	1		1.0%	97.0%						1.0%	97.0%			0.0%	100.0%						0.0%	100.0%
	very large cobble	180	1		1.0%	98.0%						1.0%	98.0%			0.0%	100.0%						0.0%	100.0%
Boulder	small boulder	256			0.0%	98.0%						0.0%	98.0%			0.0%	100.0%						0.0%	100.0%
	small boulder	362	1		1.0%	99.0%						1.0%	99.0%			0.0%	100.0%						0.0%	100.0%
	medium boulder	512			0.0%	99.0%						0.0%	99.0%			0.0%	100.0%						0.0%	100.0%
	large boulder	1024	1		1.0%	100.0%						1.0%	100.0%			0.0%	100.0%						0.0%	100.0%
	very large boulder	2049			0.0%	100.0%						0.0%	100.0%			0.0%	100.0%						0.0%	100.0%
Bedrock	bedrock	40096			0.0%	100.0%						0.0%	100.0%			0.0%	100.0%						0.0%	100.0%
	TOTAL / %of whole count		101	0	100.0%		0.06	0.09	0.15	34.17	97.80	100.0%		101	0	100.0%		0.12	0.61	1.38	54.30	75.03	100.0%	

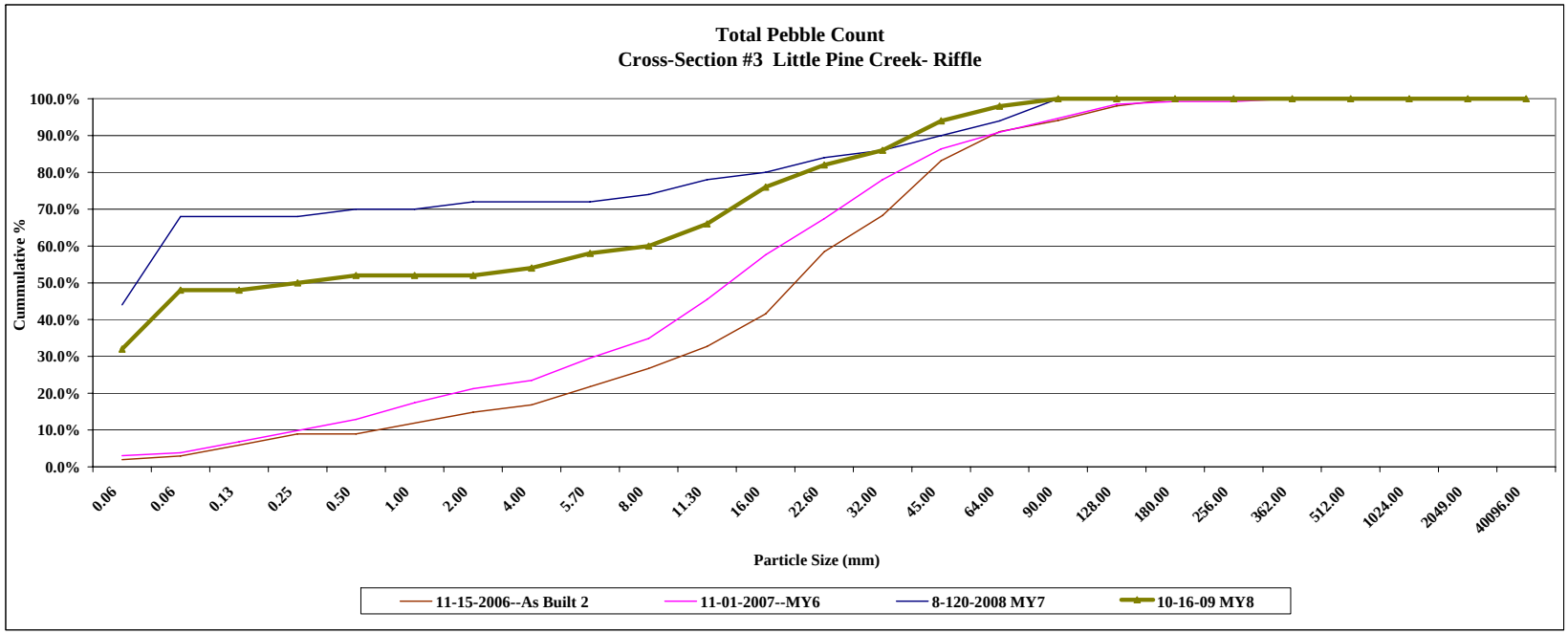
Project Name	Brush Creek Poject 54
Cross Section	#2
Feature	Pool
Date	10/16/09
Crew	Bilbrey, L., Lawson, C.
Notes	Pebble count data from As Built 2 to MY8

		2008--MY7											2009--MY8											
Description	**Material**	**Size (mm)**	**Pool - Bed**	**Pool - Bank**	**%**	**Cum %**	**d16**	**d35**	**d50**	**d84**	**d95**	**%**	**Cum %**	**Pool - Bed**	**Pool - Bank**	**%**	**Cum %**	**d16**	**d35**	**d50**	**d84**	**d95**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	14		28.0%	28.0%						28.0%	28.0%	32		32.0%	32.0%						32.0%	32.0%
Sand	very fine sand	0.062	14		28.0%	56.0%		0.07	0.09			28.0%	56.0%	24		24.0%	56.0%		0.07	0.09			24.0%	56.0%
	fine sand	0.125			0.0%	56.0%						0.0%	56.0%	4		4.0%	60.0%						4.0%	60.0%
	medium sand	0.25	17		34.0%	90.0%				0.34		34.0%	90.0%	8		8.0%	68.0%						8.0%	68.0%
	course sand	0.50	2		4.0%	94.0%						4.0%	94.0%	4		4.0%	72.0%						4.0%	72.0%
	very course sand	1.0	2		4.0%	98.0%					0.94	4.0%	98.0%	4		4.0%	76.0%						4.0%	76.0%
G r a v e l	very fine gravel	2.0			0.0%	98.0%						0.0%	98.0%	0		0.0%	76.0%						0.0%	76.0%
	fine gravel	4.0			0.0%	98.0%						0.0%	98.0%	2		2.0%	78.0%						2.0%	78.0%
	fine gravel	5.7	1		2.0%	100.0%						2.0%	100.0%	0		0.0%	78.0%						0.0%	78.0%
	medium gravel	8.0			0.0%	100.0%						0.0%	100.0%	0		0.0%	78.0%						0.0%	78.0%
	medium gravel	11.3			0.0%	100.0%						0.0%	100.0%	2		2.0%	80.0%						2.0%	80.0%
	course gravel	16.0			0.0%	100.0%						0.0%	100.0%	0		0.0%	80.0%						0.0%	80.0%
	course gravel	22.6			0.0%	100.0%						0.0%	100.0%	6		6.0%	86.0%				24.63		6.0%	86.0%
	very course gravel	32			0.0%	100.0%						0.0%	100.0%	4		4.0%	90.0%						4.0%	90.0%
	very course gravel	45			0.0%	100.0%						0.0%	100.0%	4		4.0%	94.0%						4.0%	94.0%
Cobble	small cobble	64			0.0%	100.0%						0.0%	100.0%	4		4.0%	98.0%					60.12	4.0%	98.0%
	medium cobble	90			0.0%	100.0%						0.0%	100.0%	2		2.0%	100.0%						2.0%	100.0%
	large cobble	128			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
	very large cobble	180			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
Boulder	small boulder	256			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
	small boulder	362			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
	medium boulder	512			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
	large boulder	1024			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
	very large boulder	2049			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
Bedrock	bedrock	40096			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
	TOTAL / %of whole count		50	0	100.0%		0.00	0.07	0.09	0.34	0.94	100.0%		100	0	100.0%		0.00	0.07	0.09	24.63	60.12	100.0%	

Project Name	Brush Creek Poject 54
Cross Section	#3
Feature	Riffle
Date	10/16/09
Crew	Bilbrey, L., Lawson, C.
Notes	Pebble count data from As Built 2 to MY8

	d16	d35	d50	d84	d95
As Built	*	*	*	*	*
MY1	*	*	*	*	*
MY2	*	*	*	*	*
MY3	*	*	*	*	*
As Built 2	4.07	15.13	23.30	56.86	119.69
MY6	1.27	9.71	15.77	49.96	112.60
MY7	--	--	0.07	27.30	82.33
MY8	--	0.068	0.375	32.9	60.12

* Data collected prior to As-Built 2, not applicable because in different location



Project Name	Brush Creek Poject 54
Cross Section	#3
Feature	Riffle
Date	10/16/09
Crew	Bilbrey, L., Lawson, C.
Notes	Pebble count data from As Built 2 to MY8

			2006--As Built 2											2007--MY6									
Description	**Material**	**Size (mm)**	**Riffle - Bed**	**Riffle - Bank**	**%**	**Cum %**	**d16**	**d35**	**d50**	**d84**	**d95**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Bank**	**%**	**Cum %**	**d16**	**d35**	**d50**	**d84**	**d95**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	2		2.0%	2.0%						2.0%	2.0%	4		3.0%	3.0%						3.0%	3.0%
	very fine sand	0.062	1		1.0%	3.0%						1.0%	3.0%	1		0.8%	3.8%						0.8%	3.8%
Sand	fine sand	0.125	3		3.0%	5.9%						3.0%	5.9%	4		3.0%	6.8%						3.0%	6.8%
	medium sand	0.25	3		3.0%	8.9%						3.0%	8.9%	4		3.0%	9.8%						3.0%	9.8%
	course sand	0.50			0.0%	8.9%						0.0%	8.9%	4		3.0%	12.9%						3.0%	12.9%
	very course sand	1.0	3		3.0%	11.9%						3.0%	11.9%	6		4.5%	17.4%	1.27					4.5%	17.4%
	very fine gravel	2.0	3		3.0%	14.9%						3.0%	14.9%	5		3.8%	21.2%						3.8%	21.2%
	fine gravel	4.0	2		2.0%	16.8%	4.07					2.0%	16.8%	3		2.3%	23.5%						2.3%	23.5%
G	fine gravel	5.7	5		5.0%	21.8%						5.0%	21.8%	8		6.1%	29.5%						6.1%	29.5%
r	medium gravel	8.0	5		5.0%	26.7%						5.0%	26.7%	7		5.3%	34.8%						5.3%	34.8%
a	medium gravel	11.3	6		5.9%	32.7%						5.9%	32.7%	14		10.6%	45.5%		9.71				10.6%	45.5%
v	course gravel	16.0	9		8.9%	41.6%		15.13				8.9%	41.6%	16		12.1%	57.6%			15.77			12.1%	57.6%
e	course gravel	22.6	17		16.8%	58.4%			23.30			16.8%	58.4%	13		9.8%	67.4%						9.8%	67.4%
l	very course gravel	32	10		9.9%	68.3%						9.9%	68.3%	14		10.6%	78.0%						10.6%	78.0%
	very course gravel	45	15		14.9%	83.2%						14.9%	83.2%	11		8.3%	86.4%				49.96		8.3%	86.4%
	small cobble	64	8		7.9%	91.1%				56.86		7.9%	91.1%	6		4.5%	90.9%						4.5%	90.9%
Cobble	medium cobble	90	3		3.0%	94.1%						3.0%	94.1%	5		3.8%	94.7%						3.8%	94.7%
	large cobble	128	4		4.0%	98.0%					119.69	4.0%	98.0%	5		3.8%	98.5%					112.60	3.8%	98.5%
	very large cobble	180	2		2.0%	100.0%						2.0%	100.0%	1		0.8%	99.2%						0.8%	99.2%
	small boulder	256			0.0%	100.0%						0.0%	100.0%			0.0%	99.2%						0.0%	99.2%
	small boulder	362			0.0%	100.0%						0.0%	100.0%	1		0.8%	100.0%						0.8%	100.0%
Boulder	medium boulder	512			0.0%	100.0%						0.0%	100.0%			0.0%	100.0%						0.0%	100.0%
	large boulder	1024			0.0%	100.0%						0.0%	100.0%			0.0%	100.0%						0.0%	100.0%
	very large boulder	2049			0.0%	100.0%						0.0%	100.0%			0.0%	100.0%						0.0%	100.0%
Bedrock	bedrock	40096			0.0%	100.0%						0.0%	100.0%			0.0%	100.0%						0.0%	100.0%
TOTAL / %of whole count			101	0	100.0%		4.1	15.1	23.3	56.9	119.7	100.0%		132.0	0.0	100.0%		1.3	9.7	15.8	50.0	112.6	100.0%	

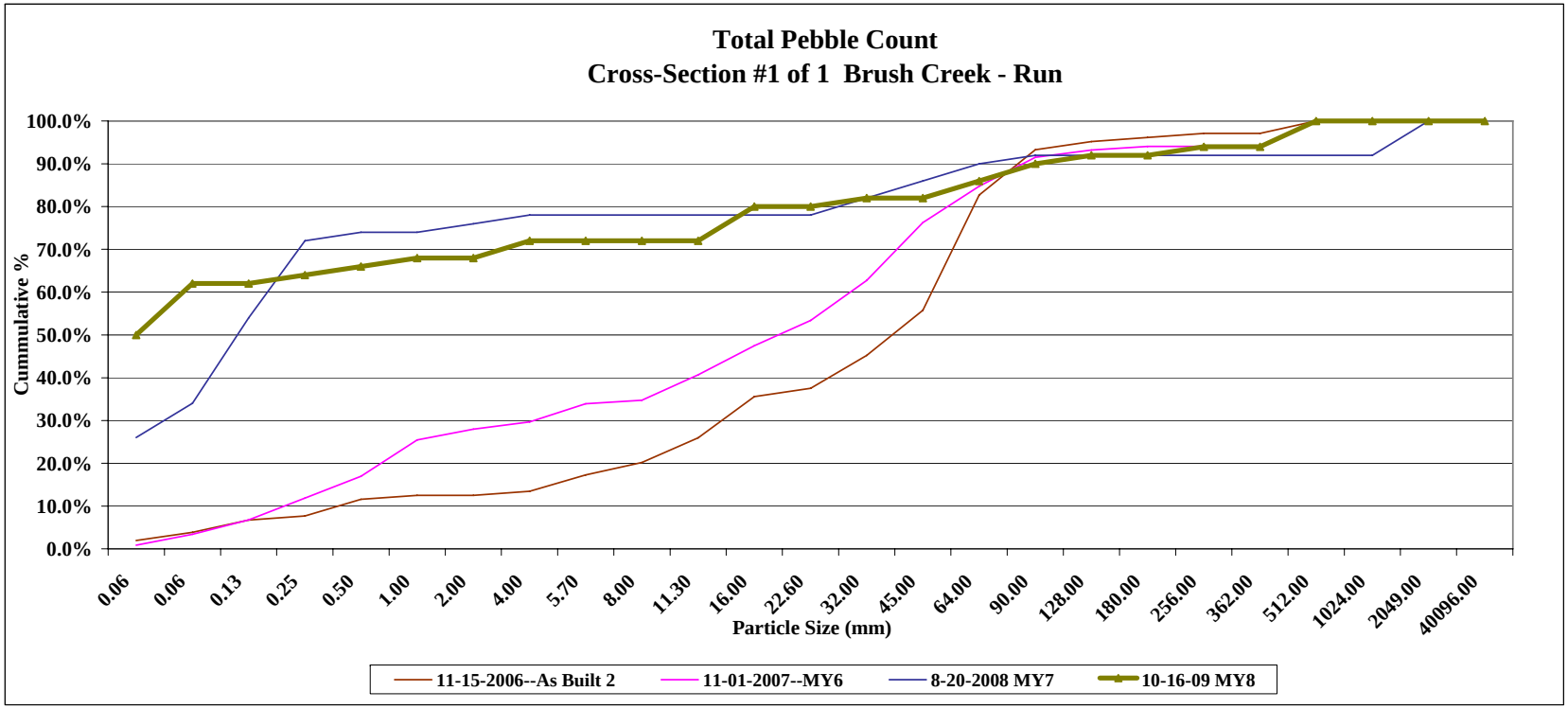
Project Name	Brush Creek Poject 54
Cross Section	#3
Feature	Riffle
Date	10/16/09
Crew	Bilbrey, L., Lawson, C.
Notes	Pebble count data from As Built 2 to MY8

		2008--MY7											2009--MY8										
Description	**Material**	**Size (mm)**	**Riffle - Bed**	**Riffle - Bank**	**%**	**Cum %**	**d16**	**d35**	**d50**	**d84**	**d95**	**%**	**Cum %**	**Riffle - Bed**	**Riffle - Bank**	**%**	**Cum %**	**d16**	**d35**	**d50**	**d84**	**d95**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	22		44.0%	44.0%						44.0%	44.0%	32		32.0%	32.0%						32.0%	32.0%
	very fine sand	0.062	12		24.0%	68.0%			0.070			24.0%	68.0%	16		16.0%	48.0%		0.068				16.0%	48.0%
	fine sand	0.125			0.0%	68.0%						0.0%	68.0%	0		0.0%	48.0%						0.0%	48.0%
Sand	medium sand	0.25			0.0%	68.0%						0.0%	68.0%	2		2.0%	50.0%			0.375			2.0%	50.0%
	course sand	0.50	1		2.0%	70.0%						2.0%	70.0%	2		2.0%	52.0%						2.0%	52.0%
	very course sand	1.0			0.0%	70.0%						0.0%	70.0%	0		0.0%	52.0%						0.0%	52.0%
	very fine gravel	2.0	1		2.0%	72.0%						2.0%	72.0%	0		0.0%	52.0%						0.0%	52.0%
	fine gravel	4.0			0.0%	72.0%						0.0%	72.0%	2		2.0%	54.0%						2.0%	54.0%
G	fine gravel	5.7			0.0%	72.0%						0.0%	72.0%	4		4.0%	58.0%						4.0%	58.0%
r	medium gravel	8.0	1		2.0%	74.0%						2.0%	74.0%	2		2.0%	60.0%						2.0%	60.0%
a	medium gravel	11.3	2		4.0%	78.0%						4.0%	78.0%	6		6.0%	66.0%						6.0%	66.0%
v	course gravel	16.0	1		2.0%	80.0%						2.0%	80.0%	10		10.0%	76.0%						10.0%	76.0%
e	course gravel	22.6	2		4.0%	84.0%				27.30		4.0%	84.0%	6		6.0%	82.0%						6.0%	82.0%
l	very course gravel	32	1		2.0%	86.0%						2.0%	86.0%	4		4.0%	86.0%				32.90		4.0%	86.0%
	very course gravel	45	2		4.0%	90.0%						4.0%	90.0%	8		8.0%	94.0%						8.0%	94.0%
	small cobble	64	2		4.0%	94.0%						4.0%	94.0%	4		4.0%	98.0%					60.12	4.0%	98.0%
Cobble	medium cobble	90	3		6.0%	100.0%					82.33	6.0%	100.0%	2		2.0%	100.0%						2.0%	100.0%
	large cobble	128			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
	very large cobble	180			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
	small boulder	256			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
	small boulder	362			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
Boulder	medium boulder	512			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
	large boulder	1024			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
	very large boulder	2049			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
Bedrock	bedrock	40096			0.0%	100.0%						0.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
TOTAL / %of whole count			50.0	0.0	100.0%		0.0	0.0	0.1	27.3	82.3	100.0%		100.0	0.0	100.0%		0.0	0.1	0.4	32.9	60.1	100.0%	

Project Name	Brush Creek Poject 54
Cross Section	#1 of 1
Feature	Run
Date	10/16/09
Crew	Bilbrey, L., Lawson, C.
Notes	Pebble count data from As Built 2 to MY8

	d16	d35	d50	d84	d95
As Built	*	*	*	*	*
MY1	*	*	*	*	*
MY2	*	*	*	*	*
MY3	*	*	*	*	*
As Built 2	6.17	18.96	45.77	80.96	149.50
MY6	0.68	9.82	22.73	75.02	489.01
MY7	--	0.10	0.17	46.50	8862.50
MY8	--	--	0.061	65.75	492.17

* Data collected prior to As-Built 2, not available. This is a new cross-section



Project Name	Brush Creek Poject 54
Cross Section	#1 of 1
Feature	Run
Date	10/16/09
Crew	Bilbrey, L., Lawson, C.
Notes	Pebble count data from As Built 2 to MY8

		2006--As Built 2													2007--MY6									
Description	**Material**	**Size (mm)**	**Run - Bed**	**Run - Bank**	**%**	**Cum %**	**d16**	**d35**	**d50**	**d84**	**d95**	**%**	**Cum %**	**Run - Bed**	**Run - Bank**	**%**	**Cum %**	**d16**	**d35**	**d50**	**d84**	**d95**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	2		1.9%	1.9%						1.9%	1.9%	1		0.8%	0.8%						0.8%	0.8%
Sand	very fine sand	0.062	2		1.9%	3.8%						1.9%	3.8%	3		2.5%	3.4%						2.5%	3.4%
	fine sand	0.125	3		2.9%	6.7%						2.9%	6.7%	4		3.4%	6.8%						3.4%	6.8%
	medium sand	0.25	1		1.0%	7.7%						1.0%	7.7%	6		5.1%	11.9%						5.1%	11.9%
	course sand	0.50	4		3.8%	11.5%						3.8%	11.5%	6		5.1%	16.9%	0.68					5.1%	16.9%
	very course sand	1.0	1		1.0%	12.5%						1.0%	12.5%	10		8.5%	25.4%						8.5%	25.4%
G r a v e l	very fine gravel	2.0			0.0%	12.5%						0.0%	12.5%	3		2.5%	28.0%						2.5%	28.0%
	fine gravel	4.0	1		1.0%	13.5%						1.0%	13.5%	2		1.7%	29.7%						1.7%	29.7%
	fine gravel	5.7	4		3.8%	17.3%	6.17					3.8%	17.3%	5		4.2%	33.9%						4.2%	33.9%
	medium gravel	8.0	3		2.9%	20.2%						2.9%	20.2%	1		0.8%	34.7%						0.8%	34.7%
	medium gravel	11.3	6		5.8%	26.0%						5.8%	26.0%	7		5.9%	40.7%		9.82				5.9%	40.7%
	course gravel	16.0	10		9.6%	35.6%		18.96				9.6%	35.6%	8		6.8%	47.5%						6.8%	47.5%
	course gravel	22.6	2		1.9%	37.5%						1.9%	37.5%	7		5.9%	53.4%			22.73			5.9%	53.4%
	very course gravel	32	8		7.7%	45.2%						7.7%	45.2%	11		9.3%	62.7%						9.3%	62.7%
	very course gravel	45	11		10.6%	55.8%			45.77			10.6%	55.8%	16		13.6%	76.3%						13.6%	76.3%
Cobble	small cobble	64	28		26.9%	82.7%						26.9%	82.7%	10		8.5%	84.7%				75.02		8.5%	84.7%
	medium cobble	90	11		10.6%	93.3%				80.96		10.6%	93.3%	8		6.8%	91.5%						6.8%	91.5%
	large cobble	128	2		1.9%	95.2%					149.50	1.9%	95.2%	2		1.7%	93.2%						1.7%	93.2%
	very large cobble	180	1		1.0%	96.2%						1.0%	96.2%	1		0.8%	94.1%						0.8%	94.1%
Boulder	small boulder	256	1		1.0%	97.1%						1.0%	97.1%			0.0%	94.1%						0.0%	94.1%
	small boulder	362			0.0%	97.1%						0.0%	97.1%			0.0%	94.1%						0.0%	94.1%
	medium boulder	512	3		2.9%	100.0%						2.9%	100.0%	7		5.9%	100.0%					489.01	5.9%	100.0%
	large boulder	1024			0.0%	100.0%						0.0%	100.0%			0.0%	100.0%						0.0%	100.0%
	very large boulder	2049			0.0%	100.0%						0.0%	100.0%			0.0%	100.0%						0.0%	100.0%
Bedrock	bedrock	40096			0.0%	100.0%						0.0%	100.0%			0.0%	100.0%						0.0%	100.0%
TOTAL / %of whole count			104	0	100.0%		6.17	18.96	45.77	80.96	149.50	100.0%		118	0	100.0%		0.68	9.82	22.73	75.02	489.01	100.0%	

Project Name	Brush Creek Poject 54
Cross Section	#1 of 1
Feature	Run
Date	10/16/09
Crew	Bilbrey, L., Lawson, C.
Notes	Pebble count data from As Built 2 to MY8

		2008--MY7												2009--MY8										
Description	**Material**	**Size (mm)**	**Run - Bed**	**Run - Bank**	**%**	**Cum %**	**d16**	**d35**	**d50**	**d84**	**d95**	**%**	**Cum %**	**Run - Bed**	**Run - Bank**	**%**	**Cum %**	**d16**	**d35**	**d50**	**d84**	**d95**	**%**	**Cum %**
Silt/Clay	silt/clay	0.061	13		26.0%	26.0%						26.0%	26.0%	50		50.0%	50.0%						50.0%	50.0%
Sand	very fine sand	0.062	4		8.0%	34.0%						8.0%	34.0%	12		12.0%	62.0%						12.0%	62.0%
	fine sand	0.125	10		20.0%	54.0%		0.10	0.17			20.0%	54.0%	0		0.0%	62.0%						0.0%	62.0%
	medium sand	0.25	9		18.0%	72.0%						18.0%	72.0%	2		2.0%	64.0%						2.0%	64.0%
	course sand	0.50	1		2.0%	74.0%						2.0%	74.0%	2		2.0%	66.0%						2.0%	66.0%
	very course sand	1.0			0.0%	74.0%						0.0%	74.0%	2		2.0%	68.0%						2.0%	68.0%
G r a v e l	very fine gravel	2.0	1		2.0%	76.0%						2.0%	76.0%	0		0.0%	68.0%						0.0%	68.0%
	fine gravel	4.0	1		2.0%	78.0%						2.0%	78.0%	4		4.0%	72.0%						4.0%	72.0%
	fine gravel	5.7			0.0%	78.0%						0.0%	78.0%	0		0.0%	72.0%						0.0%	72.0%
	medium gravel	8.0			0.0%	78.0%						0.0%	78.0%	0		0.0%	72.0%						0.0%	72.0%
	medium gravel	11.3			0.0%	78.0%						0.0%	78.0%	0		0.0%	72.0%						0.0%	72.0%
	course gravel	16.0			0.0%	78.0%						0.0%	78.0%	8		8.0%	80.0%						8.0%	80.0%
	course gravel	22.6			0.0%	78.0%						0.0%	78.0%	0		0.0%	80.0%						0.0%	80.0%
	very course gravel	32	2		4.0%	82.0%						4.0%	82.0%	2		2.0%	82.0%						2.0%	82.0%
	very course gravel	45	2		4.0%	86.0%				46.50		4.0%	86.0%	0		0.0%	82.0%						0.0%	82.0%
Cobble	small cobble	64	2		4.0%	90.0%						4.0%	90.0%	4		4.0%	86.0%				65.75		4.0%	86.0%
	medium cobble	90	1		2.0%	92.0%						2.0%	92.0%	4		4.0%	90.0%						4.0%	90.0%
	large cobble	128			0.0%	92.0%						0.0%	92.0%	2		2.0%	92.0%						2.0%	92.0%
	very large cobble	180			0.0%	92.0%						0.0%	92.0%	0		0.0%	92.0%						0.0%	92.0%
Boulder	small boulder	256			0.0%	92.0%						0.0%	92.0%	2		2.0%	94.0%						2.0%	94.0%
	small boulder	362			0.0%	92.0%						0.0%	92.0%	0		0.0%	94.0%						0.0%	94.0%
	medium boulder	512			0.0%	92.0%						0.0%	92.0%	6		6.0%	100.0%					492.17	6.0%	100.0%
	large boulder	1024			0.0%	92.0%						0.0%	92.0%			0.0%	100.0%						0.0%	100.0%
	very large boulder	2049	4		8.0%	100.0%					8862.50	8.0%	100.0%	0		0.0%	100.0%						0.0%	100.0%
Bedrock	bedrock	40096			0.0%	100.0%						0.0%	100.0%			0.0%	100.0%						0.0%	100.0%
TOTAL / %of whole count			50	0	100.0%		0.00	0.10	0.17	46.50	8862.50	100.0%		100	0	100.0%		0.00	0.00	0.00	65.75	492.17	100.0%	