MONITORING YEAR 4 ANNUAL REPORT
Final

SCALY BARK CREEK MITIGATION SITE
Stanly County, NC
DENR Contract 002030
NCEEP Project Number 94148

Data Collection Period: May 2014-July 2014
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PREPARED FOR:

NC Department of Environment and Natural Resources
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

PREPARED BY:

Wildlands Engineering, Inc.
1430 South Mint Street, Suite 104
Charlotte, NC 28203

Kirsten Y. Gimbert
kgimbert@wildlandseng.com
Phone: 704.332.7754
Fax: 704.332.3306

EXECUTIVE SUMMARY

Wildlands Engineering (Wildlands) completed a full-delivery project for the North Carolina Ecosystem Enhancement Program (NCEEP) to restore and enhance a total of 8,438 linear feet (LF) and preserve 700 LF of stream in Stanly County, NC. The project streams consist of Scaly Bark Creek, a third order stream, as well as six unnamed first and second order tributaries (UTs) to Scaly Bark Creek (UT1, UT1A, UT1B, UT2, UT3, and UT4). At the downstream limits of the project, the drainage area is 1,619 acres (2.5 square miles).

The Scaly Bark Creek Mitigation Site, hereafter referred to as the site, is approximately 2.6 miles southwest of downtown Albemarle, NC, off of Highway 24/27 in the central portion of Stanly County (see Figure 1). The site is located in the Carolina Slate Belt of the Piedmont Physiographic Province (USGS, 1998). The site is within the Rocky River watershed (North Carolina Division of Water Resources (NCDWR) Subbasin 03-07-13) of the Yadkin River Basin (United States Geological Survey (USGS) Hydrologic Unit 03040105060030). Land use within the watershed is rural and is dominated by forestry, agriculture, and livestock operations with approximately 60% of the watershed forested and 40% used for agriculture. The site is located in an active cattle pasture surrounded by wooded lots, small agricultural operations, and rural residential areas within a 212-acre tract of land owned by Franchot Palmer.

Prior to construction, activities such as livestock trampling on the banks, vegetation maintenance and removal by the landowner, lack of riparian buffer to stabilize banks and filter runoff, and channel maintenance and straightening by the landowner resulted in an unstable stream system. The primary objectives of the project were to decrease nutrient and fecal coliform levels, sediment input, and water temperature; increase dissolved oxygen concentrations; create appropriate in-stream and terrestrial habitat; and decrease channel velocities. These objectives were achieved by restoring 4,860 LF of perennial stream channel, enhancing 3,578 LF of perennial and intermittent stream channel, and preserving 700 LF of intermittent stream channel. Figure 2 and Table 1 present the restoration and enhancement design for the site.

The following project goals were established to address the effects listed above in the executive summary from watershed and project site stressors:

- Remove harmful nutrients from creek flow, including fecal pollution;
- Reduce pollution of the creek by excess sediment;
- Increase dissolved oxygen concentrations;
- Improve stream bank stability;
- Improve in-stream habitat;
- Restore terrestrial habitat; and
- Improve aesthetics of the riparian corridor

Restoration, preservation and enhancement construction efforts were completed in April 2011. A conservation easement is in place on the 26.6 acres of riparian corridor and stream resources to protect them in perpetuity.

Monitoring Year 4 (MY4) monitoring and site visits were completed during May-July 2014 to assess the conditions of the project. Overall, the site has met the required hydrologic, vegetation, and stream success criteria for MY4. The site's overall average stem density of 394 stems/ acre is greater than the 320 stem/ acre density required for MY4. All restored and enhanced streams are stable and functioning as designed, and the site has met the Monitoring Year 4 (MY4) hydrology success criteria.

SCALY BARK CREEK MITIGATION SITE

Monitoring Year 4 Annual Report

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Section 1: PROJECT OVERVIEW

The Scaly Bark Creek Mitigation site is located off of NC Highway 24/27 in the central portion of Stanly County, NC. The project site is approximately 2.6 miles southwest of downtown Albemarle, NC within the Rocky River watershed (NCDWR Subbasin 03-07-13) of the Yadkin River Basin (USGS Hydrologic Unit 03040105060030). The site is located in the Carolina Slate Belt of the Piedmont Physiographic Province (USGS, 1998). Land use within the watershed is rural and is dominated by forestry, agriculture, and livestock operations; with approximately 60% of the watershed forested and 40% used for agriculture. The site is located in an active cattle pasture surrounded by wooded lots, small agricultural operations, and rural residential areas within a 212-acre tract of land owned by Franchot Palmer.

Streams on the site consist of Scaly Bark Creek, a third order stream, as well as six unnamed first and second order UTs to Scaly Bark Creek (UT1, UT1A, UT1B, UT2, UT3, and UT4). At the downstream limits of the project, the drainage area is 1,619 acres (2.5 square miles). Scaly Bark Creek (NCDWQ Index No. 13-17-31-2), which is the main creek on the project site, has been classified as Class C waters. Class C waters are protected for secondary recreation, fishing, wildlife, fish and aquatic life propagation and survival, agriculture, and other uses.

Mitigation work at the site included full restoration on Scaly Bark Creek, the lower portion of UT1, and UT2. The remainder of the onsite streams were enhanced and preserved. All onsite riparian areas were planted with native species. Construction and planting activities were completed in April 2011. A conservation easement is in place on the 26.6 acres of riparian corridor and stream resources to protect them in perpetuity. Directions and a map of the site are provided in Figure 1.

1.1 Project Goals and Objectives

Prior to construction activities, the primary watershed stressor was the high sediment load received from the upstream watershed due to bank erosion and lack of erosion control during agricultural practices. Activities such as livestock trampling on the banks, vegetation maintenance and removal by the landowner, lack of riparian buffer to stabilize banks and filter runoff, and channel maintenance and straightening by the landowner resulted in an unstable stream system. As a result of the aforementioned watershed and land activities, the site had poor water quality due to sediment and fecal pollution, poor habitat due to lack of riparian vegetation and lack of in-stream bed diversity, and unstable geomorphic conditions. Tables in Appendix 1 and 4 present the site's pre-restoration conditions in detail.

The primary objectives of the project were to decrease nutrient and fecal coliform levels, sediment input, and water temperature; increase dissolved oxygen concentrations; create appropriate in-stream and terrestrial habitat, and decrease channel velocities. Restoration of dimension, pattern, and profile was implemented for Scaly Bark Creek, the lower portion of UT1, and UT2; enhancement of profile and dimension, working within the existing channel, was implemented for the remaining portion of UT1, UT1A, UT1B, UT3, and a portion of UT4. The site's riparian areas were also planted to stabilize streambanks, improve habitat, and protect water quality. Figure 2 and Table 1 present the restoration, enhancement and preservation assets for the site.

The following project goals were established and listed in the Mitigation Plan (approved 7/7/2010) to address the effects listed above and in the executive summary from watershed and project site stressors:

- Remove harmful nutrients from creek flow, including fecal pollution;
- Reduce pollution of the creek by excess sediment;
- Increase dissolved oxygen concentrations;
- Improve stream bank stability;
- Improve in-stream habitat;
- Restore terrestrial habitat; and
- Improve aesthetics of the riparian corridor.

The project objectives established in the Mitigation Plan (approved 7/7/2010) to meet these goals were to:

- Fence out cattle from the riparian corridor to remove fecal contamination and eliminate bank trampling;
- Provide a floodplain for excess sediment to settle out while maintaining appropriate sediment transport through the design reach and eliminating sediment contributions from bank erosion in the project reaches;
- Provide aeration points at riffle and drop structures to increase dissolved oxygen;
- Provide riparian vegetation root mass to stabilize banks and to provide terrestrial habitat;
- Construct a geomorphically stable, self-maintaining channel to provide for stable stream form;
- Provide aquatic habitat bedform diversity in the form of riffles and pools, as well as terrestrial habitat with riparian planting; and
- Provide channel shading to reduce water temperatures which will improve habitat quality and help to improve dissolved oxygen concentrations.

1.2 Monitoring Year 4 Data Assessment

Annual monitoring and quarterly site visits were conducted during March, May, June, July and August, 2014 to assess the condition of the project. The stream restoration success criteria for the site follows the approved success criteria presented in the Scaly Bark Mitigation Plan (approved 7/7/2010).

1.2.1 Vegetative Assessment

A total of 29 vegetation plots were established during the baseline monitoring within the project easement area using standard 10 meter by 10 meter vegetation monitoring plots. Plots were randomly established within planted portions of the stream restoration and enhancement areas to capture the heterogeneity of the designed vegetative communities. The plot corners were marked and are recoverable either through field identification or with the use of a GPS unit. Reference photographs at the origin looking diagonally across the plot to the opposite corner were taken to capture the same reference photograph locations as the as-built. The final vegetative success criteria will be the survival of 260 planted stems per acre in the riparian corridor along restored and enhanced reaches at the end of monitoring year five (MY5). The interim measure of vegetative success for the site will be the survival of at least 320 planted stems per acre at the end of monitoring year four (MY4). In monitoring year 1 (MY1), monitoring year 2 (MY2) and monitoring year 3 (MY3), supplemental plantings were completed in response to poor vegetation survival.

The MY4 vegetation survey was completed in July 2014 and resulted in 24 vegetation plots meeting the MY4 success criteria requirement (plots 1, 3, 4, 5, 6, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23,

26, 27, 28, and 29). For MY4, the average stem density resulted in 394 stems per acre which meets the 320 stem/acre success criteria. Of the 5 plots which did not reach the MY4 success criteria (plots 2, 7, 15, 24, 25), only one (plot 7) met the MY5 success criteria of 260 stems per acre. The low survival of plots that did not meet success criteria is presumably due to resource competition with thick herbaceous cover or, in one case (Plot 7), excessively dry/compact soil conditions. Most of the remaining plants in these plots, except plot 7, have strong vigor ratings indicating that they are likely to survive in upcoming monitoring years. Volunteers are not included in the site's stem density results; however, strong recruitment of volunteers was observed in MY4. Please refer to Appendix 3 for vegetation summary tables and raw data tables and Appendix 2 for vegetation plot photographs and the vegetation condition assessment table.

1.2.2 Vegetation Areas of Concern

The MY4 vegetation monitoring and visual assessment revealed several vegetation areas of concern, most carrying over from MY3. The non-native invasive shrub tree of heaven (*Ailanthus altissima)* is continuing to colonize the right floodplain of UT1 Reach 1, and UT1A. During MY3, a herbicidal treatment of the tree of heaven was implemented. The treatment consisted of cutting and applying a diluted concentration of triclophyr directly to the stump. This herbicidal treatment did not kill the Tree of Heaven population and stumps are re-sprouting. The non-native invasive shrub Chinese privet (*Ligustrum sinense)* is forming a dense colony at the upper end of the UT4 enhancement reach, the right floodplain of UT2, and appearing as scattered seedlings around Scaly Bark Reach 1, UT1 Reach 1 and UT1A. The native invasive cattail (*Typha latifolia)* is colonizing within small sections of the active channel in UT1B and in the right floodplain of Scaly Bark Reach 1.

There are distinct areas with characteristically low herbaceous growth and dry soil conditions along UT1 Reach 1 and Scaly Bark Reach 2. Along UT4 and UT1B, there are distinct areas with exceptionally dense herbaceous cover that has affected the survival rate of planted stems during MY2 and MY3. These sections will continue to be monitored closely to maximize survivability of planted stems. The non-native invasive aquatic weed muskgrass (*Chara* sp.*)* was found in pools in Scaly Bark reach 1. Both non-native and native plant species were observed within several riffles in Scaly Bark Reach 1 and Reach 2 and UT2: (rice cut grass (*Leersia oryzoides)*, smartweed (*Polygonum hydropiperoides*), aquatic mint (*Mentha aquatic*), wartremoving herb (*Murdannia keisak*), and Asian dayflower (*Commelina communis*). Please refer to Appendix 2 and Figures 3.0-3.3 for the Current Condition Plan View, which outlines these areas of concern.

Maintenance Plan

Areas with characteristically poor stem survival will be evaluated during Winter 2014/2015 to determine whether or not supplemental plantings will be required. Wildlands will plan to install 1" caliper trees or 1 gallon container saplings if supplemental tree installation is warranted. Herbicidal treatments of tree of heaven, Chinese privet, and cattail are scheduled for November 2014. The treatment will consist of cutting and applying triclophyr directly to cut stumps. The concentration of triclophyr applied to tree of heaven will be increased compared to the concentration used in MY3. Visual assessment will be performed in 2014 to determine if any additional maintenance is necessary to promote survival of the remaining planted stems.

1.2.3 Stream Assessment

Morphological surveys for MY4 were conducted in June 2014. All streams within the site are stable with little to no erosion and have met the success criteria for MY4. Scour areas were observed on Scaly Bark Reach 1 at station 108+30 and on UT2 at station 502+00. These areas are of minor concern and scour has not progressed during the MY4 monitoring season. Please refer to Appendix 2 for the stream visual assessment tables, the CCPV map, and reference photographs. Refer to Appendix 4 for the morphological data and plots.

Riffle cross-sections surveyed along the restoration reaches appear stable and show little to no change in the bankfull area, maximum depth ratio, or width-to-depth ratio. All surveyed riffle cross-section dimensions fell within the parameters defined for channels of the appropriate Rosgen stream type. The surveyed longitudinal profile data for the stream restoration reaches illustrates that the bedform features are maintaining lateral and vertical stability. Profile measurements including riffle slope, riffle length, pool length, and pool-to-pool spacing were based on bed profile. The riffles are remaining steeper and shallower than the pools. The longitudinal profiles show that the bank height ratios remain very near to 1.0 for all of the restoration reaches. In-stream structures used to enhance channel habitat and stability on the outside bank of meander bends, such as root wads and brush toe, are providing stability and habitat as designed. Pattern data will only be completed in MY5 if there are indicators from the profile or dimensions that significant geomorphic adjustments have occurred. No changes were observed that indicated a change in the radius of curvature or channel belt width; therefore, pattern data is not included in the MY4 report.

In general, substrate materials in the restoration reaches indicate maintenance of coarser materials in the riffle features and finer particles in the pool features. In most riffle cross sections, the particle size distribution for MY4 is similar or slightly larger than MY3.

At the end of MY5, two or more bankfull events must occur in separate years within the restored reaches. During MY4 one or more bankfull or greater events were recorded on Scaly Bark Reach 1, UT1 and UT2. Bankfull events were previously recorded for these reaches in MY3, therefore, the success criteria has been met for the five-year monitoring period.

1.3 Monitoring Year 4 Summary

Overall, the site has met the required stream and vegetation mitigation success criteria for MY4 and the hydrology mitigation success criteria for MY5. During MY4, each restored reach experienced at least one bankfull event bringing the total for each reach to two or more bankfull events in separate years. Geomorphically, the stability of each restored and enhanced stream remains in good standing. Visual assessment suggests the channels show little sign of instability within the bed, bank, or engineered structures and the stream survey shows little change in bankfull parameters, profile dimensions, and stream slopes. The MY4 vegetation assessment resulted in five of twenty-nine vegetation plots not meeting the MY4 success criteria and a stem density of 394 stems/ acre, a density that meets the MY4 vegetation success criteria.

Summary information/data related to various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting can be found in the Mitigation Plan (formerly Restoration Plan) documents available on NCEEP's website. All raw data supporting the tables and figures in the appendices is available from NCEEP upon request.

Section 2: METHODOLOGY

Geomorphic data collected followed the standards outlined in *The Stream Channel Reference site: An Illustrated Guide to Field Techniques* (Harrelson et al., 1994) and in the *Stream Restoration: A Natural Channel Design Handbook* (Doll et al., 2003). Longitudinal and cross-sectional data were collected using a total station and were georeferenced to established benchmarks and NC State Plane coordinates. Morphological surveys will be conducted using a total station tied to these geo-referenced (control) points. Reachwide pebble counts were conducted along each restored reach for channel classification. Cross-section substrate analyses conducted in each surveyed riffle followed the 100 count wetted perimeter methodology to characterize pavement. All CCPV mapping was recorded using a Trimble handheld GPS with sub-meter accuracy and processed using was Pathfinder and ArcView. Crest gages were installed during the baseline monitoring period in surveyed riffle cross-sections and are monitored quarterly. Hydrology attainment installation and monitoring methods are in accordance with the USACE (2003) standards. Vegetation monitoring protocols followed the Carolina Vegetation Survey-NCEEP Level 2 Protocol (Lee et al., 2006).

Section 3: REFERENCES

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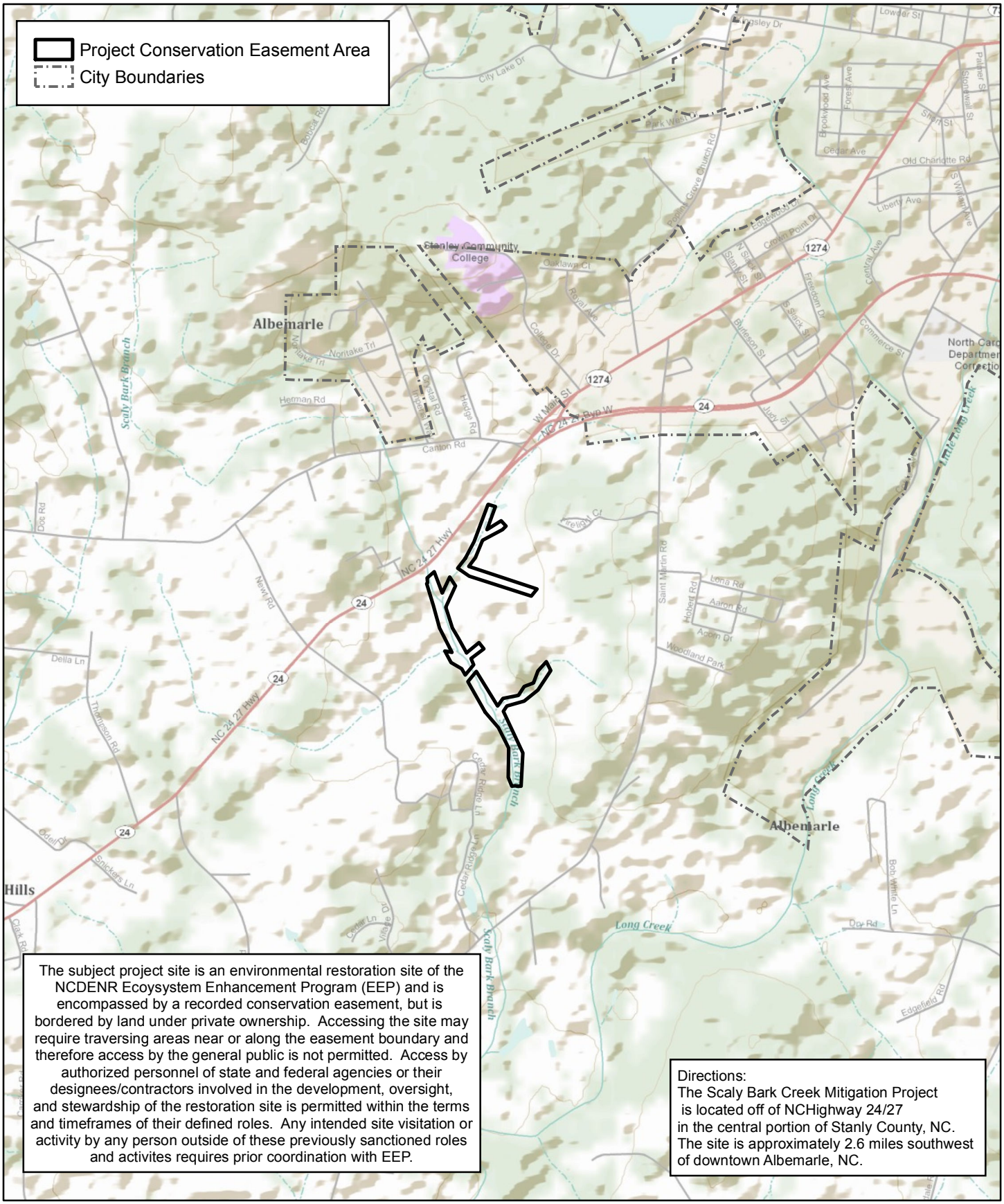
APPENDIX 1. General Tables and Figures



The subject project site is an environmental restoration site of the NCDENR Ecosystem Enhancement Program (EEP) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easement boundary and therefore access by the general public is not permitted. Access by authorized personnel of state and federal agencies or their designees/contractors involved in the development, oversight, and stewardship of the restoration site is permitted within the terms and timeframes of their defined roles. Any intended site visitation or activity by any person outside of these previously sanctioned roles and activites requires prior coordination with EEP.

WILDLANDS ENGINEERING

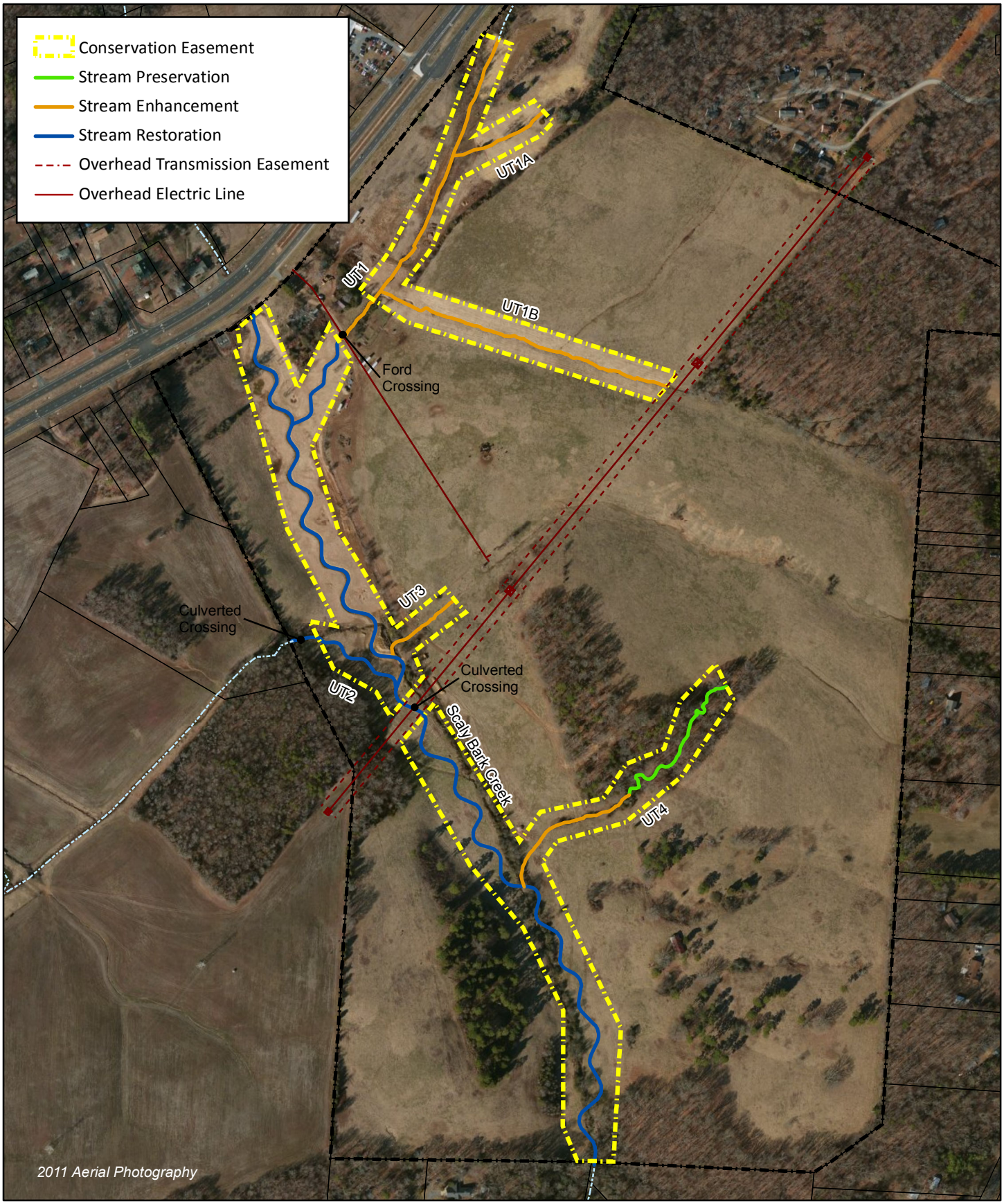
Ecosystem Enhancement PROGRAM

0 1,000 2,000 Feet

N

Figure 1. Project Vicinity Map
Scaly Bark Creek Mitigation Site
EEP Project Number 94148
Monitoring Year 4

Stanly County, NC



WILDLANDS ENGINEERING

Ecosystem Enhancement PROGRAM

0 250 500 Feet

N

Figure 2. Project Component/Asset Map
Scaly Bark Creek Mitigation Site
EEP Project Number 94148
Monitoring Year 4

Stanly County, NC

Table 1. Project Components and Mitigation Credits
Scaly Bark Creek Mitigation Site (EEP Project No.94148)
Monitoring Year 4

Mitigation Credits										
	Stream		Riparian Wetland		Non-Riparian Wetland		Buffer	Nitrogen Nutrient Offet	Phosphorous Nutrient Offset	
Type	R	RE	R	RE	R	RE				
Totals	6,291	140	N/A	N/A	N/A	N/A		N/A	N/A	

Project Components						
Reach ID	Stationing/ Location	Existing Footage (LF)	Approach	Restoration or Restoration Equivalent	Restoration Footage (LF)*	Mitigation Ratio
Scaly Bark Creek Reaches 1 & 2	100+00.00-141+71.79	3,600	Priority 1	Restoration	4,058	1:1
UT1 Reach 1	200+00.00-211+10.37	1,104	spot grading and planting	Enhancement II	1,098	2.5:1
UT1 Reach 2	213+10.37-217+32.36	330	Priority 1	Restoration	402	1:1
UT1a	302+78.00-306+68.00	390	spot grading and planting	Enhancement II	390	2.5:1
UT1b	400+10.00-412+08.00	1,198	spot grading and planting	Enhancement II	1,166	2.5:1
UT2	500+00.00-503+93.00	262	Priority 1	Restoration	400	1:1
UT3	600+00.00-603+26.00	282	spot grading and planting	Enhancement II	341	2.5:1
UT4	707+00.00-712+69.00	516	spot grading and planting	Enhancement II	583	2.5:1
UT4	700+00.00-707+00.00	700	spot grading and planting	Preservation	700	5:1

Component Summation							
Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-Riparian Wetland (acres)		Buffer (square feet)	Upland (acres)
		Riverine	Non-Riverine				
Restoration	4,860	-	-	-	-	-	-
Enhancement		-	-	-	-	-	-
Enhancement I	-						
Enhancement II	3,578						
Creation		-	-	-			
Preservation	700	-	-	-			-
High Quality Preservation	-	-	-	-			-

BMP Elements									
Elements		Location		Purpose/Function		Notes			
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-

BMP Elements

BR = Bioretention Cell; S F= Sand Filter; SW = Stormwater Wetland; WDP = Wet Detention Pond; DDP = Dry Detention Pond; FS = Filter Strip; S = Grassed Swale; LS = Level Spreader; NI = Natural Infiltration Area; FB = Forested Buffer

*Linear footage excludes crossings.

Table 2. Project Activity and Reporting History
Scaly Bark Creek Mitigation Site (EEP Project No.94148)
Monitoring Year 3

Activity or Report	Date Collection Complete	Completion or Delivery
Mitigation Plan	May 2010	May 2010
Final Design - Construction Plans	December 2010	December 2010
Construction	April 2011	April 2011
Temporary S&E mix applied to entire project area*	April 2011	April 2011
Permanent seed mix applied to reach/segments	April 2011	April 2011
Containerized and B&B plantings for reach/segments	April 2011	April 2011
Baseline Monitoring Document (Year 0 Monitoring - baseline)	March 2011/April 2011	June 2011
Year 1 Monitoring	November 2011	November 2011
Year 2 Monitoring	September 2012	November 2012
Year 3 Monitoring	August/September 2013	November 2013
Year 4 Monitoring	2014	December 2014
Year 5 Monitoring		

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

Table 3. Project Contacts Table
Scaly Bark Creek Mitigation Site (EEP Project No.94148)
Monitoring Year 3

Designer	**Wildlands Engineering, Inc.**
	1430 South Mint Street, Suite 104
	Charlotte, NC 28203
Shawn Wilkerson	704.332.7754
Construction Contractor	**North State Environmental, Inc.**
	2889 Lowery Street
	Winston-Salem, NC 27101
Darrell Westmoreland	336.725.2010
Planting Contractor	**North State Environmental, Inc.**
	2889 Lowery Street
	Winston-Salem, NC 27101
Stephen Joyce	336.725.2010
Seeding Contractor	**North State Environmental, Inc.**
	2889 Lowery Street
	Winston-Salem, NC 27101
Stephen Joyce	336.725.2010
Seed Mix Sources	**Green Resource**
Nursery Stock Suppliers	
Bare Roots	**Dykes and Son Nursery**
Plugs	**Pinelands Nursery**
Live Stakes/Brush Mattress	**North State Environmental, Inc.**
Monitoring Performers	**Wildlands Engineering, Inc.**
Stream Monitoring, POC	Kirsten Y. Gimbert
Vegetation Monitoring, POC	704.332.7754, ext. 110

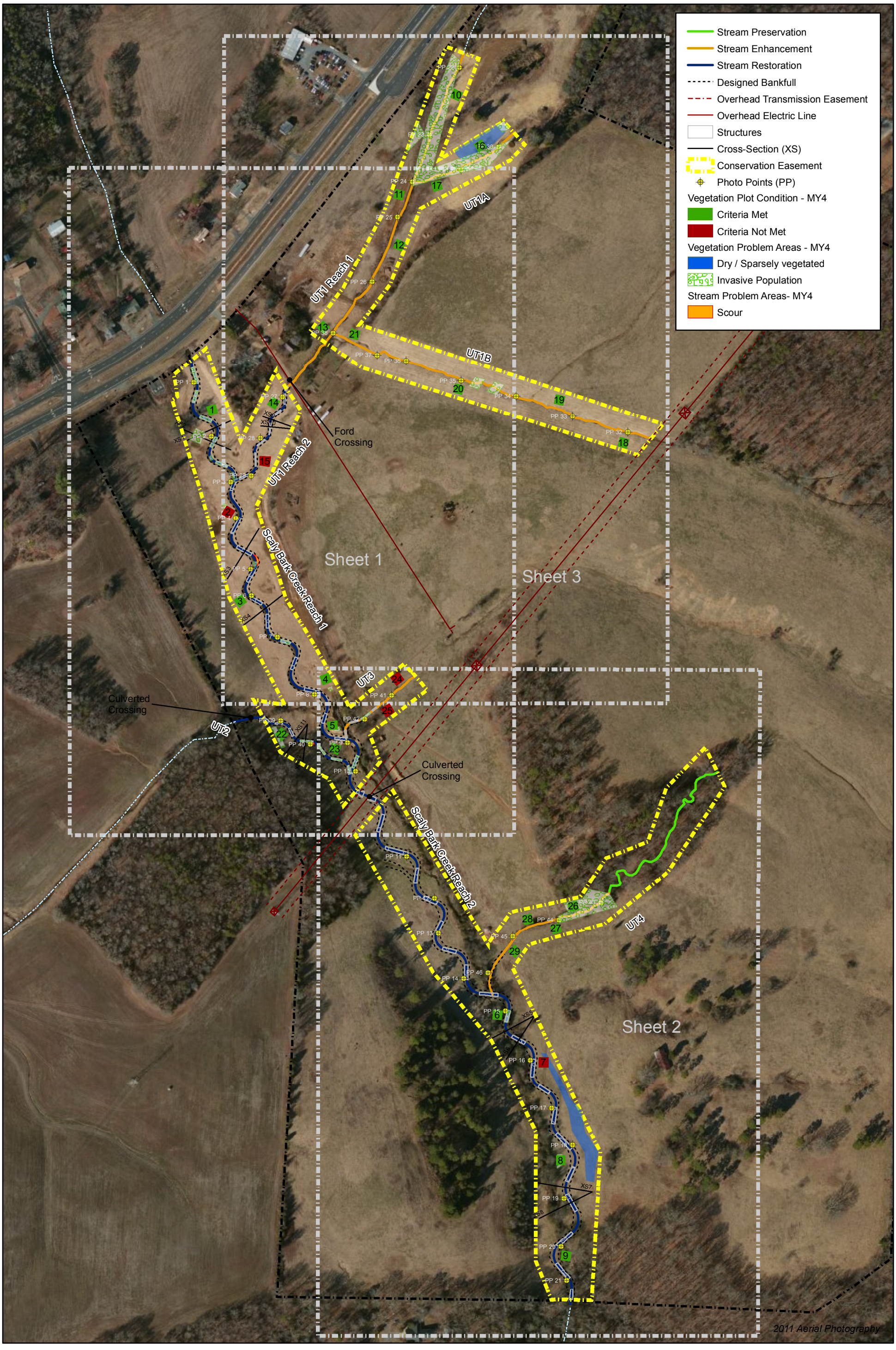
Table 4. Project Baseline Information and Attributes
Scaly Bark Creek Mitigation Site (EEP Project No.94148)
Monitoring Year 4

Project Information (Pre-Restoration)							
Project Name	Scaly Bark Creek Mitigation Site						
County	Stanly						
Project Area (acres)	26.6						
Project Coordinates (latitude and longitude)	35° 19' 38.338" N, 80° 14' 19.315"W						
Project Watershed Summary Information							
Physiographic Province	Piedmont						
River Basin	Yadkin						
USGS Hydrologic Unit 8-digit 03040105	USGS Hydrologic Unit 14-digit 03040105060030						
DWQ Sub-basin	Rocky River (03-07-13)						
Project Drainiage Area (acres)	1,619						
Project Drainage Area Percentage of Impervious Area	<10%						
CGIA Land Use Classification	U						
Reach Summary Information							
Parameters	**Scaly Bark**	**UT1**	**UT1a**	**UT1b**	**UT2**	**UT3**	**UT4**
Length of reach (linear feet) - Post-Restoration	4,058	1,500	390	1,166	400	341	583
Valley classification	VIII						
Drainage area (acres)	1,619	173	46	83	436	36	25
NCDWQ stream identification score	43.5	31	21.5	26.5	37.5	19.5	24
NCDWQ Water Quality Classification	C	-	-	-	-	-	-
Morphological Desription (stream type)	C4	Reach1: E4 Reach 2: C4	E4	C4b	C4	C4	Reach 1: B4 Reach 2: C4
Evolutionary trend (Simon's Model) - Pre- Restoration	Reach 1: Stage 2 Reach 2: Stage 3, 4 & 5	Reach 2: Stage 2 & 4	n/a	n/a	Stage 4	n/a	n/a
Underlying mapped soils	*BaB, BaD,BbB & BbD*		*GoC, GoF*		*KkB*	*MhB*	*Oa*
Drainage class	well drained		well-drained to excessively drained		moderately well-drained	moderate to moderately rapid	moderately well-drained
Soil Hydric status	No		No		No	No	Yes (inclusions)
Slope	gently sloping to steep uplands		gently sloping to strongly sloping		lower slopes	nearly level to gently sloping	nearly level
FEMA classification	Zone AE (downstream end of Scaly Bark only); all other areas were not mapped						
Native vegetation community	Piedmont Bottomland Forest						
Percent composition of exotic invasive vegetation - Post-Restoration	0%						

Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the United States - Section 404	Yes	Yes	USACE Nationwide Permit No.27 and
Waters of the United States - Section 401	Yes	Yes	DWQ 401 Water Quality Certification
Endangered Species Act	Yes	Yes	Scaly Bark Mitigation Plan; studies found suitable habitat not present for
Historic Preservation Act	Yes	Yes	No historic resources were found to be impacted (letter from SHPO)
Coastal Zone Management Act (CZMA)/Coastal Area Management Act (CAMA)	No	n/a	n/a
FEMA Floodplain Compliance	Yes	Yes	LOMR approved
Essential Fisheries Habitat	Yes	Yes	No adverse impacts to aquatic resources were found (letter from NCWRC)

U= Unknown

APPENDIX 2. Visual Assessment Data



WILDLANDS ENGINEERING

Ecosystem Enhancement PROGRAM

0 150 300 Feet

Figure 3.0 Integrated Current Condition Plan View (Key)
Scaly Bark Creek Mitigation Site
EEP Project Number 94148
Monitoring Year 4

Stanly County, NC

Rice Cutgrass, Smartweed, Murdannia
Cattails
Rice Cutgrass, Smartweed, Murdannia
Muskgrass (aquatic)
Muskgrass (aquatic)
Smartweed
Culverted Crossing
Cattails
Ford Crossing
Cattails
Smartweed
Chinese privet
Aquatic mint, Murdannia Smartweed Rice cutgrass
Culverted Crossing
UT1A
UT1 Reach 1
UT1B
UT1 Reach 2
Scaly Bark Creek Reach 1
UT3
UT2
Stream Preservation
Stream Enhancement
Stream Restoration
Designed Bankfull
Conservation Easement
Overhead Transmission Easement
Overhead Electric Line
Structures
Cross-Section (XS)
Photo Points (PP)
Vegetation Plot Condition - MY4
Criteria Met
Criteria Not Met
Vegetation Problem Areas - MY4
Dry / Sparsely vegetated
Invasive Population
Stream Problem Areas- MY4
Scour
2011 Aerial Photography
WILDLANDS ENGINEERING
Ecosystem Enhancement PROGRAM
0 75 150 Feet
N

Figure 3.1 Integrated Current Condition Plan View (Sheet 1 of 3)
Scaly Bark Creek Mitigation Site
EEP Project Number 94148
Monitoring Year 4

Stanly County, NC

Rice cutgrass
aquatic mint
smartweed

Culverted
Crossing

Scaly Bark Creek Reach 2

UT3

UT4

Chinese privet

Johnson Grass

Rice cutgrass
and smartweed

Stream Preservation
Stream Enhancement
Stream Restoration
Designed Bankfull
Conservation Easement
Overhead Transmission Easement
Overhead Electric Line
Structures
Cross-Section (XS)
Photo Points (PP)
Vegetation Plot Condition-MY4
Criteria Met
Criteria Not Met
Vegetation Problem Areas - MY4
Dry / Sparsely vegetated
Invasive Population
Stream Problem Areas- MY4
Scour

2011 Aerial Photography

WILDLANDS ENGINEERING

Ecosystem Enhancement PROGRAM

0 75 150 Feet

N

Figure 3.2 Integrated Current Condition Plan View (Sheet 2 of 3)
Scaly Bark Creek Mitigation Site
EEP Project Number 94148
Monitoring Year 4

Stanly County, NC

WILDLANDS ENGINEERING

Ecosystem Enhancement PROGRAM

0 75 150 Feet

N

Figure 3.3 Integrated Current Condition Plan View (Sheet 3 of 3)
Scaly Bark Creek Mitigation Site
EEP Project Number 94148
Monitoring Year 4

Stanly County, NC

Table 5a. Visual Stream Morphology Stability Assessment Table
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Scaly Bark Reaches 1 and 2 (4,058 LF)
Monitoring Year 4

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degredation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	37	37			100%			
	3. Meander Pool Condition	Depth Sufficient	37	37			100%			
		Lenth Appropriate	37	37			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	37	37			100%			
		Thalweg centering at downstream of meander bend (Glide)	37	37			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			1	30	99%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	1	30	100%	0	0	100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dilodged boulders or logs.	13	13			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	13	13			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	13	13			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	13	13			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	13	13			100%			

Table 5b. Visual Stream Morphology Stability Assessment Table
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
UT1 Reach 2 (402 LF)
Monitoring Year 4

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability (Riffle and Run units)**	Aggradation			0	0	100%			
		Degredation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	6	6			100%			
	3. Meander Pool Condition	Depth Sufficient	6	6			100%			
		Lenth Appropriate	6	6			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	6	6			100%			
		Thalweg centering at downstream of meander bend (Glide)	6	6			100%			
2. Bank	**1. Scoured/Eroded**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0		0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dilodged boulders or logs.								
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill								
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.								
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	n/a				n/a			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.								

n/a: Constructed riffles were built; no engineered structures were built on UT1

Table 5c. Visual Stream Morphology Stability Assessment Table
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
UT2 (400 LF)
Monitoring Year 4

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-Built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjust % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	Aggradation			0	0	100%			
		Degredation			0	0	100%			
	2. Riffle Condition	Texture/Substrate	7	7			100%			
	3. Meander Pool Condition	Depth Sufficient	7	7			100%			
		Lenth Appropriate	7	7			100%			
	4. Thalweg Position	Thalweg centering at upstream of meander bend (Run)	7	7			100%			
		Thalweg centering at downstream of meander bend (Glide)	7	7			100%			
2. Bank	1. Scoured/Eroded	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dilodged boulders or logs.	1	1			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	1	1			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	1	1			100%			
	4. Habitat	Pool forming structures maintaining ~Max Pool Depth : Bankfull Depth ≥ 1.6 Rootwads/logs providing some cover at baseflow.	1	1			100%			

Table 6. Vegetation Condition Assessment Table
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Monitoring Year 4

Planted Acreage **25.4**

Vegetation Category	Definitions	Mapping Threshold (acres)	Number of Polygons	Combined Acreage	% of Planted Acreage*
Bare Areas	Very limited cover of both woody and herbaceous material	0.1	2	3.3	12%
Low Stem Density Areas^	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1	5	0.12	0%
		Total	**7**	**3.4**	**13%**
Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0	0	0	0%
		Cumulative Total	**7**	**3.4**	**13%**

Easement Acreage **26.6**

Vegetation Category	Definitions	Mapping Threshold (SF)	Number of Polygons	Combined Acreage	% of Planted Acreage
Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	1000	28	1.4	5%
Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	none	0	0	0%

^Acreage calculated from vegetation plots monitored for site.

Stream Photographs

	
Photo Point 1 – looking upstream (06/11/2014)	Photo Point 1 – looking downstream (06/11/2014)
	
Photo Point 2 – looking upstream (06/11/2014)	Photo Point 2 – looking downstream (06/11/2014)
	
Photo Point 3 – looking upstream (06/11/2014)	Photo Point 3 – looking downstream (06/11/2014)

	
Photo Point 4 – looking upstream (06/11/2014)	Photo Point 4 – looking downstream (06/11/2014)
	
Photo Point 5 – looking upstream (06/11/2014)	Photo Point 5 – looking downstream (06/11/2014)
	
Photo Point 6 – looking upstream (06/11/2014)	Photo Point 6 – looking downstream (06/11/2014)

	
Photo Point 7 – looking upstream (06/11/2014)	Photo Point 7 – looking downstream (06/11/2014)
	
Photo Point 8 – looking upstream (06/11/2014)	Photo Point 8 – looking downstream (06/11/2014)
	
Photo Point 9 – looking upstream (06/11/2014)	Photo Point 9 – looking downstream (06/11/2014)

	
Photo Point 10 – looking upstream (06/11/2014)	Photo Point 10 – looking downstream (06/11/2014)
	
Photo Point 11 – looking upstream (06/05/2014)	Photo Point 11 – looking downstream (06/05/2014)
	
Photo Point 12 – looking upstream (06/05/2014)	Photo Point 12 – looking downstream (06/05/2014)

	
Photo Point 13 – looking upstream (06/05/2014)	Photo Point 13 – looking downstream (06/05/2014)
	
Photo Point 14 – looking upstream (06/05/2014)	Photo Point 14 – looking downstream (06/05/2014)
	
Photo Point 15 – looking upstream (06/05/2014)	Photo Point 15 – looking downstream (06/05/2014)

	
Photo Point 16 – looking upstream (06/05/2014)	Photo Point 16 – looking downstream (06/05/2014)
	
Photo Point 17 – looking upstream (06/05/2014)	Photo Point 17 – looking downstream (06/05/2014)
	
Photo Point 18 – looking upstream (06/05/2014)	Photo Point 18 – looking downstream (06/05/2014)

	
Photo Point 19 – looking upstream (06/05/2014)	Photo Point 19 – looking downstream (06/05/2014)
	
Photo Point 20 – looking upstream (06/05/2014)	Photo Point 20 – looking downstream (06/05/2014)
	
Photo Point 21 – looking upstream (06/05/2014)	Photo Point 21 – looking downstream (06/05/2014)

	
Photo Point 22 – looking upstream (06/11/2014)	Photo Point 22 – looking downstream (06/11/2014)
	
Photo Point 23 – looking upstream (06/11/2014)	Photo Point 23 – looking downstream (06/11/2014)
	
Photo Point 24 – looking upstream (06/11/2014)	Photo Point 24 – looking downstream (06/11/2014)

	
Photo Point 25 – looking upstream (06/11/2014)	Photo Point 25 – looking downstream (06/11/2014)
	
Photo Point 26 – looking upstream (06/11/2014)	Photo Point 26 – looking downstream (06/11/2014)
	
Photo Point 27 – looking upstream (06/11/2014)	Photo Point 27 – looking downstream (06/11/2014)

	
Photo Point 28 – looking upstream (06/11/2014)	Photo Point 28 – looking downstream (06/11/2014)
	
Photo Point 29 – looking upstream (06/11/2014)	Photo Point 29 – looking downstream (06/11/2014)
	
Photo Point 30 – looking upstream (06/11/2014)	Photo Point 30 – looking downstream (06/11/2014)

	
Photo Point 31 – looking upstream (06/11/2014)	Photo Point 31 – looking downstream (06/11/2014)
	
Photo Point 32 – looking upstream (06/11/2014)	Photo Point 32 – looking downstream (06/11/2014)
	
Photo Point 33 – looking upstream (06/11/2014)	Photo Point 33 – looking downstream (06/11/2014)

	
Photo Point 34 – looking upstream (06/11/2014)	Photo Point 34 – looking downstream (06/11/2014)
	
Photo Point 35 – looking upstream (06/11/2014)	Photo Point 35 – looking downstream (06/11/2014)
	
Photo Point 36 – looking upstream (06/11/2014)	Photo Point 36 – looking downstream (06/11/2014)

	
Photo Point 37 – looking upstream (06/11/2014)	Photo Point 37 – looking downstream (06/11/2014)
	
Photo Point 38 – looking upstream (06/11/2014)	Photo Point 38 – looking downstream (06/11/2014)
	
Photo Point 39 – looking upstream (06/11/2014)	Photo Point 39 – looking downstream (06/11/2014)

	
Photo Point 40 – looking upstream (06/11/2014)	Photo Point 40 – looking downstream (06/11/2014)
	
Photo Point 41 – looking upstream (06/11/2014)	Photo Point 41 – looking downstream (06/11/2014)
	
Photo Point 42 – looking upstream (06/11/2014)	Photo Point 42 – looking downstream (06/11/2014)

	
Photo Point 43 – looking upstream (06/05/2014)	Photo Point 43 – looking downstream (06/05/2014)
	
Photo Point 44 – looking upstream (06/05/2014)	Photo Point 44 – looking downstream (06/05/2014)
	
Photo Point 45 – looking upstream (06/05/2014)	Photo Point 45 – looking downstream (06/05/2014)

	
Photo Point 46 – looking upstream (06/05/2014)	Photo Point 46 – looking downstream (06/05/2014)

Vegetation Photographs

	
Vegetation Plot 1 (7/8/2014)	Vegetation Plot 2 (7/8/2014)
	
Vegetation Plot 3 (7/8/2014)	Vegetation Plot 4 (7/8/2014)
	
Vegetation Plot 5 (7/8/2014)	Vegetation Plot 6 (7/9/2014)

	
Vegetation Plot 7 (7/9/2014)	Vegetation Plot 8 (7/9/2014)
	
Vegetation Plot 9 (7/9/2014)	Vegetation Plot 10 (7/10/2014)
	
Vegetation Plot 11 (7/10/2014)	Vegetation Plot 12 (7/10/2014)

	
Vegetation Plot 13 (7/10/2014)	Vegetation Plot 14 (7/8/2014)
	
Vegetation Plot 15 (7/8/2014)	Vegetation Plot 16 (7/10/2014)
	
Vegetation Plot 17 (7/10/2014)	Vegetation Plot 18 (7/9/2014)

	
Vegetation Plot 19 (7/9/2014)	Vegetation Plot 20 (7/9/2014)
	
Vegetation Plot 21 (7/10/2014)	Vegetation Plot 22 (7/8/2014)
	
Vegetation Plot 23 (7/8/2014)	Vegetation Plot 24 (7/8/2014)

Vegetation Plot 25 (7/8/2014)

Vegetation Plot 26 (7/9/2014)

Vegetation Plot 27 (7/9/2014)

Vegetation Plot 28 (7/9/2014)

Vegetation Plot 29 (7/9/2014)

APPENDIX 3. Vegetation Plot Data

Table 7. Vegetation Plot Criteria Attainment
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Monitoring Year 4

Plot	MY3 Success Criteria Met (Y/N)	Tract Mean
1	Y	
2	N	
3	Y	
4	Y	
5	Y	
6	Y	
7	N	
8	Y	
9	Y	
10	Y	
11	Y	
12	Y	
13	Y	
14	Y	
15	N	83%
16	Y	
17	Y	
18	Y	
19	Y	
20	Y	
21	Y	
22	Y	
23	Y	
24	N	
25	N	
26	Y	
27	Y	
28	Y	
29	Y	

Table 8. CVS Vegetation Plot Metadata
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Monitoring Year 4

Report Prepared By	Kenton Beal
Date Prepared	7/21/2014 13:42
database name	*Scaly Bark MY4 cvs-eep-entrytool-v2.3.1.mdb*
database location	*Q:\ActiveProjects\005-02122 Scaly Bark Creek Mitigation Project\Monitoring\Monitoring Year 4/Vegetation Assessment*
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	*This worksheet, which is a summary of the project and the project data.*
Plots	*List of plots surveyed.*
Stem Count by Plot and Spp	*Unknown*
PROJECT SUMMARY----------	
Project Code	94148
project Name	Scaly Bark Creek
Description	Scaly Bark Creek Mitigation Site
length (ft)	
stream-to-edge width (ft)	
area (sq m)	
Required Plots (calculated)	
Sampled Plots	29

Table 9. Planted and Total Stem Counts
Scaly Bark Creek (NCEEP Project No. 94148)
Monitoring Year 4

			Current Plot Data (MY4 2014)																				
			94148-WE-0001			94148-WE-0002			94148-WE-0003			94148-WE-0004			94148-WE-0005			94148-WE-0006			94148-WE-0007		
Scientific Name	**Common Name**	**Species Type**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**
Acer floridanum	Southern Sugar Maple	Tree	1	1	1				2	2	2	2	2	2	1	1	1				1	1	1
Acer rubrum	red maple	Tree																					
Alnus serrulata	hazel alder	Shrub																					
Baccharis	baccharis	Shrub																					
Betula nigra	river birch	Tree	1	1	1	1	1	1				1	1	1				1	1	1			
Carpinus caroliniana	American hornbeam	Tree				1	1	1				1	1	1									
Carya	hickory	Tree																					
Carya cordiformis	bitternut hickory	Tree																					
Carya ovata	shagbark hickory	Tree																			1	1	1
Celtis	hackberry	Tree																					
Celtis laevigata	sugarberry	Tree																					
Celtis occidentalis	common hackberry	Tree																					
Cornus	dogwood	Shrub or Tree																					
Cornus amomum	silky dogwood	Shrub				1	1	1	2	2	2				1	1	1	1	1	1	1	1	1
Cornus florida	flowering dogwood	Tree	1	1	1										1	1	1						
Diospyros virginiana	common persimmon	Tree																					
Fraxinus pennsylvanica	green ash	Tree				1	1	1				1	1	1				2	2	2			
Ilex opaca	American holly	Tree																					
Liquidambar	sweetgum	Tree																					
Liquidambar styraciflua	sweetgum	Tree																			1	1	1
Liriodendron tulipifera	tuliptree	Tree	1	1	1	1	1	1	2	2	2				2	2	2	1	1	1			
Platanus occidentalis	American sycamore	Tree	3	3	3				1	1	1	2	2	2	3	3	3	3	3	4			
Quercus	oak	Tree																					
Quercus falcata	southern red oak	Tree																					
Quercus laurifolia	laurel oak	Tree																					
Quercus lyrata	overcup oak	Tree																					
Quercus michauxii	swamp chestnut oak	Tree				1	1	1													1	1	1
Quercus nigra	water oak	Tree										2	2	2	2	2	2						
Quercus pagoda	cherrybark oak	Tree																2	2	2			
Quercus phellos	willow oak	Tree			4				1	1	1				3	3	3			1	2	2	2
Quercus rubra	northern red oak	Tree	2	2	2																		
Salix	willow	Shrub or Tree																					
Salix nigra	black willow	Tree																					
Sambucus canadensis	Common Elderberry	Shrub																					
Uknown																							
Ulmus alata	winged elm	Tree																					
Stem count			9	9	13	6	6	6	8	8	8	9	9	9	13	13	13	10	10	12	7	7	7
size (ares)			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			6	6	7	6	6	6	5	5	5	6	6	6	7	7	7	6	6	7	6	6	6
Stems per ACRE			364.2	364.2	526.1	242.8	242.8	242.8	323.7	323.7	323.7	364.2	364.2	364.2	526.1	526.1	526.1	404.7	404.7	485.6	283.3	283.3	283.3

Color Coding for Table

Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes
P-all: Number of planted stems including live stakes
T: Total Stems

Table 9. Planted and Total Stem Counts
Scaly Bark Creek (NCEEP Project No. 94148)
Monitoring Year 4

			Current Plot Data (MY4 2014)																				
			94148-WE-0008			94148-WE-0009			94148-WE-0010			94148-WE-0011			94148-WE-0012			94148-WE-0013			94148-WE-0014		
Scientific Name	**Common Name**	**Species Type**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**
Acer floridanum	Southern Sugar Maple	Tree	2	2	2	4	4	4	1	1	1	2	2	2	1	1	1	1	1	1			
Acer rubrum	red maple	Tree				5	5	6															
Alnus serrulata	hazel alder	Shrub																					
Baccharis	baccharis	Shrub																					
Betula nigra	river birch	Tree	1	1	1				1	1	1	1	1	1									
Carpinus caroliniana	American hornbeam	Tree																					
Carya	hickory	Tree	1	1	1																		
Carya cordiformis	bitternut hickory	Tree																					
Carya ovata	shagbark hickory	Tree																1	1	1	2	2	2
Celtis	hackberry	Tree																1	1	1			
Celtis laevigata	sugarberry	Tree																			3	3	3
Celtis occidentalis	common hackberry	Tree																1	1	1			
Cornus	dogwood	Shrub or Tree																					
Cornus amomum	silky dogwood	Shrub				1	1	1															
Cornus florida	flowering dogwood	Tree				1	1	1	2	2	2	2	2	2	2	2	2	2	2	2			
Diospyros virginiana	common persimmon	Tree	2	2	2	1	1	1															
Fraxinus pennsylvanica	green ash	Tree													2	2	2				1	1	1
Ilex opaca	American holly	Tree				1	1	1															
Liquidambar	sweetgum	Tree																					
Liquidambar styraciflua	sweetgum	Tree				1	1	1															
Liriodendron tulipifera	tuliptree	Tree	1	1	1							1	1	1	1	1	1	2	2	2	2	2	2
Platanus occidentalis	American sycamore	Tree	1	1	1	6	6	6				2	2	2	5	5	5	2	2	2	2	2	2
Quercus	oak	Tree																					
Quercus falcata	southern red oak	Tree																			1	1	1
Quercus laurifolia	laurel oak	Tree	1	1	1																		
Quercus lyrata	overcup oak	Tree	1	1	1				1	1	1												
Quercus michauxii	swamp chestnut oak	Tree																					
Quercus nigra	water oak	Tree	1	1	1				1	1	1	1	1	1	1	1	1	1	1	1			
Quercus pagoda	cherrybark oak	Tree																					
Quercus phellos	willow oak	Tree						2	2	2	2	1	1	1	1	1	1						
Quercus rubra	northern red oak	Tree	1	1	1				1	1	1												
Salix	willow	Shrub or Tree																					
Salix nigra	black willow	Tree																					
Sambucus canadensis	Common Elderberry	Shrub																					
Uknown																							
Ulmus alata	winged elm	Tree																					
		Stem count	12	12	12	20	20	23	9	9	9	10	10	10	13	13	13	11	11	11	11	11	11
		size (ares)	1			1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	10	10	10	8	8	9	7	7	7	7	7	7	7	7	7	8	8	8	6	6	6
		Stems per ACRE	485.6	485.6	485.6	809.4	809.4	930.8	364.2	364.2	364.2	404.7	404.7	404.7	526.1	526.1	526.1	445.2	445.2	445.2	445.2	445.2	445.2

Color Coding for Table

Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes
P-all: Number of planted stems including live stakes
T: Total Stems

Table 9. Planted and Total Stem Counts
Scaly Bark Creek (NCEEP Project No. 94148)
Monitoring Year 4

			Current Plot Data (MY4 2014)																				
			94148-WE-0015			94148-WE-0016			94148-WE-0017			94148-WE-0018			94148-WE-0019			94148-WE-0020			94148-WE-0021		
Scientific Name	**Common Name**	**Species Type**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**
Acer floridanum	Southern Sugar Maple	Tree							1	1	1	4	4	4	1	1	1	6	6	6			
Acer rubrum	red maple	Tree																					
Alnus serrulata	hazel alder	Shrub																					
Baccharis	baccharis	Shrub			1																		
Betula nigra	river birch	Tree	1	1	2	2	2	2	1	1	1	2	2	2	1	1	1						
Carpinus caroliniana	American hornbeam	Tree	1	1	1																		
Carya	hickory	Tree																					
Carya cordiformis	bitternut hickory	Tree																					
Carya ovata	shagbark hickory	Tree																1	1	1	2	2	2
Celtis	hackberry	Tree				4	4	4															
Celtis laevigata	sugarberry	Tree	1	1	1																		
Celtis occidentalis	common hackberry	Tree																					
Cornus	dogwood	Shrub or Tree																					
Cornus amomum	silky dogwood	Shrub																					
Cornus florida	flowering dogwood	Tree	1	1	1				4	4	4												
Diospyros virginiana	common persimmon	Tree										2	2	2									
Fraxinus pennsylvanica	green ash	Tree				1	1	1							2	2	2				5	5	5
Ilex opaca	American holly	Tree	1	1	1																		
Liquidambar	sweetgum	Tree																					
Liquidambar styraciflua	sweetgum	Tree																					
Liriodendron tulipifera	tuliptree	Tree				1	1	1	2	2	2				2	2	2	1	1	1			
Platanus occidentalis	American sycamore	Tree				1	1	1							3	3	3				2	2	2
Quercus	oak	Tree																					
Quercus falcata	southern red oak	Tree																					
Quercus laurifolia	laurel oak	Tree										1	1	1									
Quercus lyrata	overcup oak	Tree													1	1	1						
Quercus michauxii	swamp chestnut oak	Tree																					
Quercus nigra	water oak	Tree	1	1	1	1	1	1				1	1	1	1	1	1						
Quercus pagoda	cherrybark oak	Tree																					
Quercus phellos	willow oak	Tree																1	1	1			
Quercus rubra	northern red oak	Tree																					
Salix	willow	Shrub or Tree																					
Salix nigra	black willow	Tree																					
Sambucus canadensis	Common Elderberry	Shrub																					
Uknown																							
Ulmus alata	winged elm	Tree																					
Stem count			6	6	8	10	10	10	8	8	8	10	10	10	11	11	11	9	9	9	9	9	9
size (ares)			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			6	6	7	6	6	6	4	4	4	5	5	5	7	7	7	4	4	4	3	3	3
Stems per ACRE			242.8	242.8	323.7	404.7	404.7	404.7	323.7	323.7	323.7	404.7	404.7	404.7	445.2	445.2	445.2	364.2	364.2	364.2	364.2	364.2	364.2

Color Coding for Table

Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes
P-all: Number of planted stems including live stakes
T: Total Stems

Table 9. Planted and Total Stem Counts
Scaly Bark Creek (NCEEP Project No. 94148)
Monitoring Year 4

			Current Plot Data (MY4 2014)																				
			94148-WE-0022			94148-WE-0023			94148-WE-0024			94148-WE-0025			94148-WE-0026			94148-WE-0027			94148-WE-0028		
Scientific Name	**Common Name**	**Species Type**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**
Acer floridanum	Southern Sugar Maple	Tree	2	2	2				1	1	1				2	2	2						
Acer rubrum	red maple	Tree			12																		
Alnus serrulata	hazel alder	Shrub																					
Baccharis	baccharis	Shrub																					
Betula nigra	river birch	Tree																1	1	1			
Carpinus caroliniana	American hornbeam	Tree																					
Carya	hickory	Tree																					
Carya cordiformis	bitternut hickory	Tree																					
Carya ovata	shagbark hickory	Tree				1	1	1	1	1	1												
Celtis	hackberry	Tree									1												
Celtis laevigata	sugarberry	Tree							1	1	1	1	1	1	2	2	2	1	1	1			
Celtis occidentalis	common hackberry	Tree													1	1	1						
Cornus	dogwood	Shrub or Tree																					
Cornus amomum	silky dogwood	Shrub	2	2	2																		
Cornus florida	flowering dogwood	Tree	1	1	1				2	2	2										1	1	1
Diospyros virginiana	common persimmon	Tree										1	1	1							1	1	1
Fraxinus pennsylvanica	green ash	Tree							1	1	1				1	1	1						
Ilex opaca	American holly	Tree																					
Liquidambar	sweetgum	Tree			5																		
Liquidambar styraciflua	sweetgum	Tree																			1	1	1
Liriodendron tulipifera	tuliptree	Tree	1	1	1	3	3	3							1	1	1	2	2	2	2	2	2
Platanus occidentalis	American sycamore	Tree				4	4	4													3	3	3
Quercus	oak	Tree																					
Quercus falcata	southern red oak	Tree																					
Quercus laurifolia	laurel oak	Tree													2	2	2	2	2	2	1	1	1
Quercus lyrata	overcup oak	Tree																					
Quercus michauxii	swamp chestnut oak	Tree																					
Quercus nigra	water oak	Tree	2	2	2			2				2	2	2				1	1	1			
Quercus pagoda	cherrybark oak	Tree																			2	2	2
Quercus phellos	willow oak	Tree	1	1	1							1	1	1	1	1	1	1	1	1			
Quercus rubra	northern red oak	Tree	1	1	1										1	1	1	2	2	2			
Salix	willow	Shrub or Tree																					
Salix nigra	black willow	Tree																					
Sambucus canadensis	Common Elderberry	Shrub																					
Uknown																							
Ulmus alata	winged elm	Tree			2																		
		Stem count	10	10	29	8	8	10	6	6	7	5	5	5	11	11	11	10	10	10	11	11	11
		size (ares)	1			1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	7	7	10	3	3	4	5	5	6	4	4	4	8	8	8	7	7	7	7	7	7
		Stems per ACRE	404.7	404.7	1174	323.7	323.7	404.7	242.8	242.8	283.3	202.3	202.3	202.3	445.2	445.2	445.2	404.7	404.7	404.7	445.2	445.2	445.2

Color Coding for Table

Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%
Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes
P-all: Number of planted stems including live stakes
T: Total Stems

Table 9. Planted and Total Stem Counts
Scaly Bark Creek (NCEEP Project No. 94148)
Monitoring Year 4

			Current Plot Data			Annual Means														
			94148-WE-0029			MY4 (2014)			MY3 (2013)			MY2 (2012)			MY1 (2011)			MY0 (2011)		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer floridanum	Southern Sugar Maple	Tree				35	35	35	37	37	37	46	46	46	57	57	57	104	104	104
Acer rubrum	red maple	Tree				5	5	18	6	6	11									
Alnus serrulata	hazel alder	Shrub													3	3	3	5	5	5
Baccharis	baccharis	Shrub						1			1									
Betula nigra	river birch	Tree				15	15	16	5	5	5	5	5	5	12	12	12	32	32	32
Carpinus caroliniana	American hornbeam	Tree				3	3	3	3	3	3	4	4	4						
Carya	hickory	Tree				1	1	1	1	1	1				1	1	1	3	3	3
Carya cordiformis	bitternut hickory	Tree										4	4	4	15	15	15	25	25	25
Carya ovata	shagbark hickory	Tree				9	9	9	8	8	8	21	21	21	5	5	5	12	12	12
Celtis	hackberry	Tree	1	1	1	6	6	7	7	7	7									
Celtis laevigata	sugarberry	Tree				9	9	9	12	12	12	17	17	17						
Celtis occidentalis	common hackberry	Tree				2	2	2	2	2	2	3	3	3	4	4	4	12	12	12
Cornus	dogwood	Shrub or Tree							1	1	1				2	2	2	2	2	2
Cornus amomum	silky dogwood	Shrub				9	9	9	9	9	9	9	9	9	11	11	11	11	11	11
Cornus florida	flowering dogwood	Tree				20	20	20	26	26	26	37	37	37	66	66	66	120	120	120
Diospyros virginiana	common persimmon	Tree	1	1	1	8	8	8	1	1	1									
Fraxinus pennsylvanica	green ash	Tree				17	17	17	17	17	18									
Ilex opaca	American holly	Tree				2	2	2	2	2	2	4	4	4	30	30	30	91	91	91
Liquidambar	sweetgum	Tree						5												
Liquidambar styraciflua	sweetgum	Tree				3	3	3	3	3	5	2	2	2	1	1	1	2	2	2
Liriodendron tulipifera	tuliptree	Tree	2	2	2	31	31	31	26	26	26	26	26	26	16	16	16	107	107	107
Platanus occidentalis	American sycamore	Tree	2	2	2	45	45	46	37	37	38	37	37	37	5	5	5	7	7	7
Quercus	oak	Tree										2	2	2	2	2	2			
Quercus falcata	southern red oak	Tree				1	1	1				1	1	1						
Quercus laurifolia	laurel oak	Tree				7	7	7												
Quercus lyrata	overcup oak	Tree				3	3	3												
Quercus michauxii	swamp chestnut oak	Tree				2	2	2	4	4	4	3	3	3	19	19	19	34	34	34
Quercus nigra	water oak	Tree	1	1	1	19	19	21	15	15	15	14	14	14						
Quercus pagoda	cherrybark oak	Tree	2	2	2	6	6	6												
Quercus phellos	willow oak	Tree				15	15	22	13	13	13	17	17	17						
Quercus rubra	northern red oak	Tree	1	1	1	9	9	9	10	10	10	10	10	10						
Salix	willow	Shrub or Tree									12									
Salix nigra	black willow	Tree									4									
Sambucus canadensis	Common Elderberry	Shrub									23									
Uknown												1	1	1	10	10	10	13	13	13
Ulmus alata	winged elm	Tree						2												
Stem count			10	10	10	282	282	315	245	245	294	263	263	263	259	259	259	580	580	580
size (ares)			1			29			29			29			29			29		
size (ACRES)			0.02			0.72			0.72			0.72			0.72			0.72		
Species count			7	7	7	25	25	28	22	22	26	20	20	20	17	17	17	16	16	16
Stems per ACRE			404.7	404.7	404.7	393.5	393.5	439.6	341.9	341.9	410.3	367	367	367	361.4	361.4	361.4	809.4	809.4	809.4

Color Coding for Table

- Exceeds requirements by 10%
- Exceeds requirements, but by less than 10%
- Fails to meet requirements, by less than 10%
- Fails to meet requirements by more than 10%
- Volunteer species included in total

PnoLS: Number of Planted stems excluding live stakes
P-all: Number of planted stems including live stakes
T: Total Stems

APPENDIX 4. Morphological Summary Data and Plots

Table 10a. Baseline Stream Data Summary
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Scaly Bark Creek Reaches 1 and 2
Monitoring Year 4

Parameter	Gauge	Regional Curve						Pre-Restoration Condition				Reference Reach Data						Design				As-Built/Baseline					
		Reach 1			Reach 2			Reach 1		Reach 2		UT to Rocky Creek		Spencer Creek 1		Spencer Creek 2		Reach 1		Reach 2		Reach 1			Reach 2		
		LL	UL	Eq.	LL	UL	Eq.	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Med	Max	Min	Med	Max
Dimension and Substrate - Riffle																											
Bankfull Width (ft)	n/a							27.6		17.0	23.9	12.2		8.7		10.7	11.2	17.0		20.0		0.0	17.1	17.4	21.2	21.3	21.4
Floodprone Width (ft)								87.0		111.0	112.0	72.0		229.0		60.0	114+	37+		44+		0	0	0	200+	200+	200+
Bankfull Mean Depth								1.0		1.6	2.0	1.3		1.2		1.6	1.8	1.6		1.8		1.4	1.4	1.4	1.6	1.7	1.7
Bankfull Max Depth								2.6		2.8	3.0	1.8		1.9		2.1	2.6	2.3		2.5		0.0	2.2	2.3	2.3	2.4	2.6
Bankfull Cross-sectional Area (ft^2)								26.3		33.2	39.0	16.3		10.6		17.8	19.7	27.1		36.3		24.6	25.2	25.8	34.3	35.6	36.8
Width/Depth Ratio								29.0		10.6	12.0	9.1		7.3		5.8	7.1	10.7		11.0		13.0	13.0	13.0	12.2	12.8	13.3
Entrenchment Ratio								3.1		4.7	6.5	6.0		26.3		5.5	10.2	2.2+		2.2+		0	0	0	0	0	0
Bank Height Ratio								1.0		1.0	1.0	1.0		1.0		1.0		1.0		1.0		0.0	1.0	1.0	0.0	1.0	1.0
D50 (mm)								57.8		56.9	53.7	22.6		8.6		8.8											
Profile																											
Riffle Length (ft)	n/a							7 (min) - 22 (max)				N/P		N/P		N/P		20	52	10	63	17	35	55	30	49	69
Riffle Slope (ft/ft)								0.0180	0.0260	0.0033	0.0490	0.0606	0.0892	0.0100	0.0670	0.0130		0.0087	0.0204	0.0069	0.0203	0.0050	0.0136	0.0283	0.0023	0.0075	0.0188
Pool Length (ft)								31 (min) - 184 (max)				N/P		N/P		N/P		30	84	42	81	37	62	98	45	67	96
Pool Max Depth (ft)								2.26	2.85	2.22	3.31	2.2		2.5		3.3		3.5	4.5	4.0	5.5	3.4	4.3	6.1	3.6	4.6	5.5
Pool Spacing (ft)*								31	62	45	117	26	81	13	47	71		38	114	45	132	71	104	165	92	119	147
Pool Volume (ft^3)												-		-		-		-		-							
Pattern																											
Channel Beltwidth (ft)	n/a							52		54	69	n/a		24	52	38	41	60	120	80	140	60	-	120	80	-	140
Radius of Curvature (ft)								43	93	15	146			5	22	11	15	35	50	40	60	35	-	50	40	-	60
Rc:Bankfull Width (ft/ft)								1.6	3.4	0.9	6.1			0.6	2.5	1.3	1.4	2.1	2.9	2.0	3.0	2.1	-	2.9	2.0	-	3.0
Meander Wave Length (ft)								81	163	60	190			54	196	46	48	125	160	160	200	125	-	160	160	-	200
Meander Width Ratio								1.9		2.9	3.2			2.8	6	3.4	3.6	3.5	7.1	4.0	7.0	3.5	-	7.1	4.0	-	7.0
Substrate, Bed and Transport Parameters																											
Ri%/Ru%/P%/G%/S%	n/a																										
SC%/Sa%/G%/C%/B%/Be%																											
d16/d35/d50/d84/d95/d100								0.9/13.7/35.9/101.2/172.5/>2048				<0.063/2.4/22.6/120/256		0.1/3/8.6/77/180		<0.062/3/8.8/42/90						SC/SC/5.78/71.7/137/362			SC/7.6/21.5/83.2/151.8/362		
Reach Shear Stress (Competency) lb/ft^2								0.47		0.50-0.55								0.56		0.59		0.50	-	0.51	0.43	-	0.45
Max part size (mm) mobilized at bankfull								30-40		30-40								30	40	40	50	27	-	28	23	-	25
Stream Power (Capacity) W/m^2																											
Additional Reach Parameters																											
Drainage Area (SM)	n/a							1.09	1.65	2.38	2.53	1.10		0.50		0.96											
Impervious Cover Estimate (%)								27%				N/P		N/P		N/P											
Rosgen Classification								C4		C4		E4b		E3/C4		E4		C4		C4		C4			C4		
Bankfull Velocity (fps)		-	-	-	-	-	-	3.8		3.8	4.5							3.7		4.1		3.7			4.1		
Bankfull Discharge (cfs)		95	128	-	167	174	-					85		-		97		100		150							
Q-NFF regression								192		259																	
Q-USGS extrapolation								87	162	123	221																
Q-Mannings								80		85	96																
Valley Length (ft)								1480		2003		N/P		N/P		N/P		1480		2003							
Channel Thalweg Length (ft)								3600				N/P		N/P		N/P		4060				4058					
Sinuosity (ft)								1.1		1.0		N/P		N/P		N/P		1.2		1.2		2.7			0.0		
Water Surface Slope (ft/ft)								0.0087		0.0025	0.0051	N/P		N/P		N/P		0.0067		0.0053		0.0067			0.0049		
Bankfull Slope (ft/ft)								0.00568 (min) - 0.00944 (max)				N/P		N/P		N/P		0.0064		0.0056		0.0067			0.0050		

N/P: Data was not provided
*Design P:P spacing reported in the Restoration Plan included in-line pools, which are considered a habitat quality rather than a stability parameter, for evaluating for a channels profile stability. Subsequent monitoring years will evaluate pool Dmax for spacing

Table 10b. Baseline Stream Data Summary
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
UT1 Reach 2 and UT2
Monitoring Year 4

Parameter	Gauge	Regional Curve						Pre-Restoration Condition				Reference Reach Data						Design				As-Built/Baseline					
		UT1 Reach 2			UT2			UT1 Reach 2		UT2		UT to Rocky Creek		Spencer Creek 1		Spencer Creek 2		UT1 Reach 2		UT2		UT1 Reach 2			UT2		
		LL	UL	Eq.	LL	UL	Eq.	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Med	Max	Min	Med	Max
Dimension and Substrate - Riffle																											
Bankfull Width (ft)	n/a							10.6		13.3		12.2		8.7		10.7	11.2	11.0		12.0		12.1			13.0		
Floodprone Width (ft)								78.0		94.0		72.0		229.0		60.0	114+	24+		26+		200+			200+		
Bankfull Mean Depth								1.1		1.0		1.3		1.2		1.6	1.8	1.1		1.1		1.0			0.9		
Bankfull Max Depth								1.6		1.8		1.8		1.9		2.1	2.6	1.5		1.5		1.7			1.5		
Bankfull Cross-sectional Area (ft^2)								12.0		13.0		16.3		10.6		17.8	19.7	12.0		13.5		12.4			11.4		
Width/Depth Ratio								9.4		13.6		9.1		7.3		5.8	7.1	10.1		10.7		11.9			14.8		
Entrenchment Ratio								7.3		7.1		6.0		26.3		5.5	10.2	2.2+		2.2+		2.2+			2.2+		
Bank Height Ratio								1.3		1.2		1.0		1.0		1.0		1.0		1.0		1.0			1.0		
D50 (mm)								27.3		55.6		22.6		8.6		8.8											
Profile																											
Riffle Length (ft)	n/a							5	32	6	23	N/P		N/P		N/P		29	42	23	37	11	30	41	21	29	41
Riffle Slope (ft/ft)								0.0050	0.0250	0.0137	0.0740	0.0606	0.0892	0.0100	0.0670	0.0130		0.0153	0.0245	0.0162	0.0281	0.0150	0.0187	0.0233	0.0215	0.0230	0.0272
Pool Length (ft)								37	61	26	40	N/P		N/P		N/P		14	39	20	44	21	30	43	27	31	37
Pool Max Depth (ft)								1.36	1.87	1.71	2.07	2.20		2.50		3.30		2.3	3.5	2.2	3.5	2.5	3.3	4.0	2.9	3.1	3.5
Pool Spacing (ft)*								75	88	48	90	26	81	13	47	71		17	55	18	60	55	59	77	55	59	70
Pool Volume (ft^3)																											
Pattern																											
Channel Beltwidth (ft)	n/a							20		28				24	52	38	41	50	80	50	80	50	-	80	50	-	80
Radius of Curvature (ft)								22	83	23	89			5	22	11	15	25	33	25	34	25	-	33	25	-	34
Rc:Bankfull Width (ft/ft)								2.1	7.8	1.7	6.7			0.6	2.5	1.3	1.4	2.3	3.0	2.1	2.8	2.3	-	3.0	2.1	-	2.8
Meander Wave Length (ft)								45	93	39	113			54	196	46	48	80	100	90	120	80	-	100	90	-	120
Meander Width Ratio								1.9		2.1				2.8	6.0	3.4	3.6	4.5	7.3	4.2	6.7	4.5	-	7.3	4.2	-	6.7
Substrate, Bed and Transport Parameters																											
Ri%/Ru%/P%/G%/S%	n/a																										
SC%/Sa%/G%/C%/B%/Be%																											
d16/d35/d50/d84/d95/d100								SC/0.9/27.3/94.6/158.4/>2048		16.0/30/55.6/128/164.4/>2048		<0.063/2.4/22.6/120/256		0.1/3/8.6/77/180		<0.062/3/8.8/42/90						0.025/16/37.24/104.7/157.1/362			SC/8.8/16.9/75.9/152/512		
Reach Shear Stress (Competency) lb/ft^2								0.7		0.52								0.61		0.67		0.55			0.68		
Max part size (mm) mobilized at bankfull								50-60		30-40								40	50	50	60	31			39		
Stream Power (Capacity) W/m^2																											
Additional Reach Parameters																											
Drainage Area (SM)	n/a							0.47		0.68		1.10		0.50		0.96											
Impervious Cover Estimate (%)								33%		4%		N/P		N/P		N/P											
Rosgen Classification								E4		C4		E4b		E3/C4		E4		C4		C4		C4			C4		
Bankfull Velocity (fps)		-	-	-	-	-	-	4.2		3.8								4.2		3.7		4.2			3.7		
Bankfull Discharge (cfs)		52			67			50		50		85		-		97		50		50							
Q-NFF regression								79		103																	
Q-USGS extrapolation								42	85	31	65																
Q-Mannings								47		52																	
Valley Length (ft)								358		356		N/P		N/P		N/P		358		356							
Channel Thalweg Length (ft)								330		262		N/P		N/P		N/P		422		393		402			400		
Sinuosity (ft)								1.0		1.1		N/P		N/P		N/P		1.1		1.1		1.1			1.1		
Water Surface Slope (ft/ft)								0.0130		0.0189		N/P		N/P		N/P		0.0107		0.0113		0.0101			0.0121		
Bankfull Slope (ft/ft)								0.0119		0.0177		N/P		N/P		N/P		0.0097		0.0116		0.0094			0.0130		

N/P: Data was not provided

*Design P:P spacing reported in the Restoration Plan included in-line pools, which are considered a habitat quality rather than a stability parameter, for evaluating for a channels profile stability. Subsequent monitoring years will evaluate pool Dmax for spacing

Table 11. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters - Cross-Section)
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Scaly Bark Creek Reaches 1 and 2, UT1 Reach 2, and UT2
Monitoring Year 4

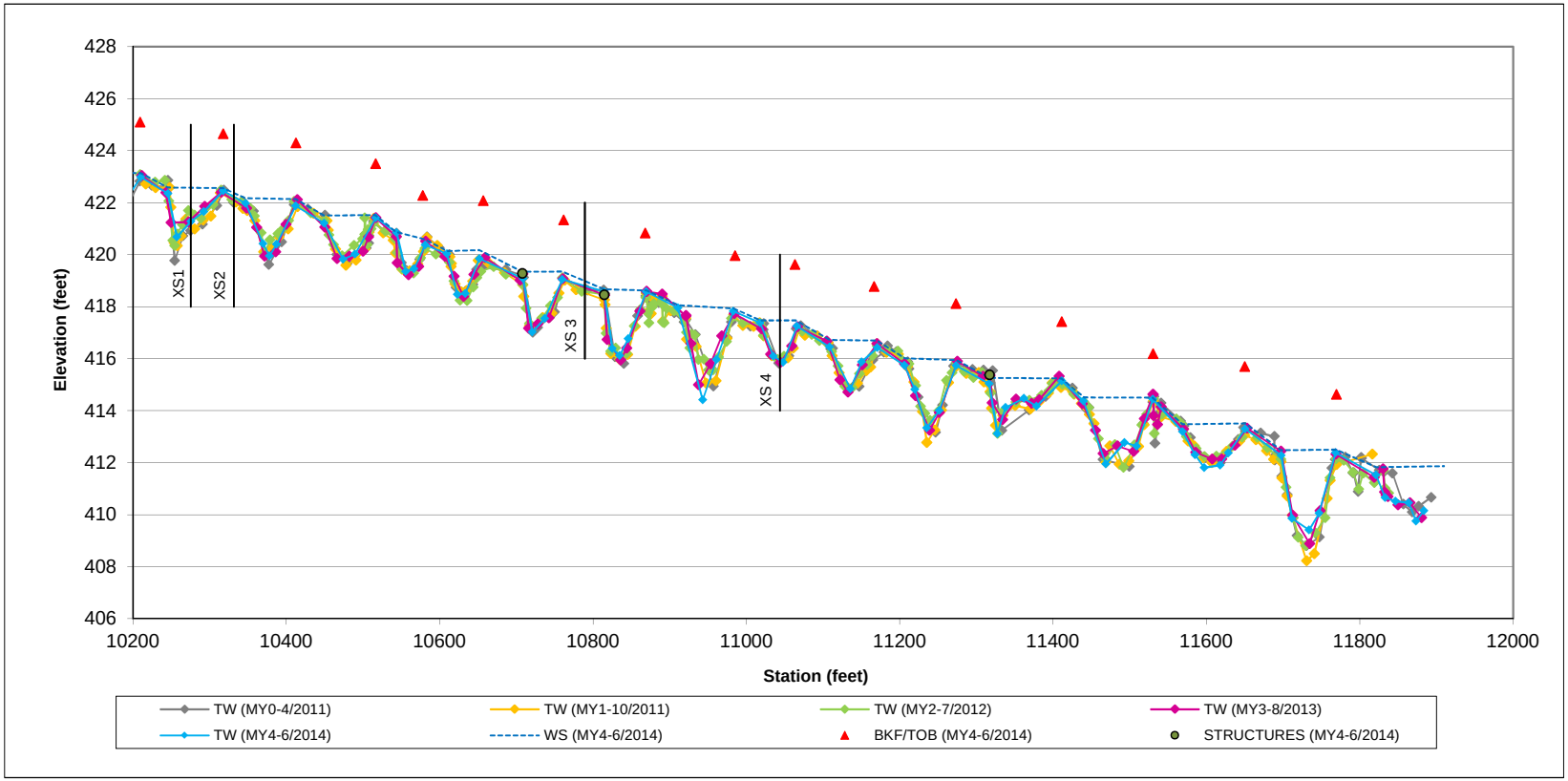
	Scaly Bark Reach 1																							
	Cross-Section 1 (Pool)						Cross-Section 2 (Riffle)						Cross-Section 3 (Riffle)						Cross-Section 4 (Pool)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
based on fixed bankfull elevation																								
Bankfull Width (ft)	21.13	19.61	19.37	20.34	19.50		17.86	17.70	24.65	18.60	17.67		18.29	18.29	19.09	19.14	17.10		24.12	25.80	23.52	27.50	25.15	
Floodprone Width (ft)	n/a	n/a	n/a	n/a	n/a		200+	200+	200+	200+	200+		200+	200+	200+	200+	200+		n/a	n/a	n/a	n/a	n/a	
Bankfull Mean Depth (ft)	1.83	1.78	1.69	1.68	1.74		1.38	1.3	1.09	1.25	1.45		1.41	1.37	1.31	1.26	1.4		1.87	1.69	1.87	1.61	1.6	
Bankfull Max Depth (ft)	3.48	3.37	2.84	2.95	3.13		2.20	2.04	2.26	2.49	2.38		2.20	2.26	2.22	2.42	2.24		3.67	3.36	3.38	3.54	3.63	
Bankfull Cross-Sectional Area (ft^2)	38.63	34.95	32.79	34.09	33.82		24.64	23.07	26.83	23.19	25.63		25.82	24.15	24.96	24.04	23.13		45.17	43.63	43.9	44.43	40.28	
Bankfull Width/Depth Ratio	11.55	11	11.45	12.14	11.23		12.95	13.57	22.66	14.93	12.18		12.95	13.31	14.6	15.25	12.61		12.88	15.26	12.59	17.11	15.71	
Bankfull Entrenchment Ratio	n/a	n/a	n/a	n/a	n/a		2.2+	2.2+	2.2+	2.2+	2.2+		2.2+	2.2+	2.2+	2.2+	2.2+		n/a	n/a	n/a	n/a	n/a	
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1	
d50 (mm)							27	42	22	76	47		30	30	45	48	34							
	Scaly Bark Reach 2																							
	Cross-Section 5 (Pool)						Cross-Section 6 (Riffle)						Cross-Section 7 (Pool)						Cross-Section 8 (Riffle)					
based on fixed bankfull elevation	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
Bankfull Width (ft)	26.64	27.41	30.69	27.28	30.45		21.35	26.65	23.60	23.00	20.78		24.73	24.54	25.02	23.75	23.79		21.20	21.37	22.50	21.11	20.22	
Floodprone Width (ft)	n/a	n/a	n/a	n/a	n/a		200+	200+	200+	200+	200+		n/a	n/a	n/a	n/a	n/a		200+	200+	200+	200+	200+	
Bankfull Mean Depth (ft)	1.96	1.97	1.8	1.98	1.94		1.61	1.27	1.5	1.45	1.55		1.95	1.89	1.8	1.9	1.9		1.74	1.65	1.59	1.74	1.63	
Bankfull Max Depth (ft)	4.63	4.40	4.46	4.52	4.57		2.27	2.25	2.38	2.34	2.33		3.9	3.66	3.61	3.91	3.79		2.6	2.60	2.68	2.69	2.64	
Bankfull Cross-Sectional Area (ft^2)	52.24	53.92	55.28	54.05	54.94		34.33	33.76	35.45	33.41	32.13		48.29	46.34	45.09	45.16	45.27		36.79	35.25	35.80	36.74	32.87	
Bankfull Width/Depth Ratio	13.58	13.93	17.04	13.77	15.69		13.28	21.04	15.71	15.84	13.44		12.67	12.99	13.88	12.49	12.5		12.22	12.96	14.14	12.13	12.44	
Bankfull Entrenchment Ratio	n/a	n/a	n/a	n/a	n/a		2.2+	2.2+	2.2+	2.2+	2.2+		n/a	n/a	n/a	n/a	n/a		2.2+	2.2+	2.2+	2.2+	2.2+	
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
d50 (mm)							45	57	38	35	24								23	49	33	58	45	
	UT1 Reach 2												UT2											
	Cross-Section 9 (Pool)						Cross-Section 10 (Riffle)						Cross-Section 11 (Pool)						Cross-Section 12 (Riffle)					
Dimension and Substrate	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
based on fixed bankfull elevation																								
Bankfull Width (ft)	18.21	26.61	17.60	16.89	16.90		12.14	11.85	12.20	10.17	13.50		15.38	14.82	16.98	15.24	15.40		12.99	13.03	13.00	11.97	13.5	
Floodprone Width (ft)	n/a	n/a	n/a	n/a	n/a		200+	200+	200+	200+	200+		n/a	n/a	n/a	n/a	n/a		200+	200+	200+	200+	200+	
Bankfull Mean Depth (ft)	1.53	1.23	1.33	1.31	1.37		1.02	0.96	0.97	0.86	0.84		1.51	1.40	1.4	1.43	1.49		0.88	0.90	0.99	0.95	0.9	
Bankfull Max Depth (ft)	3.26	2.98	2.73	3.02	2.88		1.73	1.64	1.73	1.61	1.68		2.90	2.62	2.87	3.01	2.95		1.46	1.53	1.71	1.57	1.7	
Bankfull Cross-Sectional Area (ft^2)	27.95	26.61	23.47	22.1	23.11		12.39	11.40	11.8	10.17	11.34		23.28	20.79	23.82	21.87	22.88		11.40	11.73	12.89	11.43	12.1	
Bankfull Width/Depth Ratio	11.87	17.62	13.2	12.91	12.36		11.89	12.32	12.61	13.64	16.06		10.16	10.57	12.11	10.62	10.36		14.82	14.47	13.11	12.54	15.1	
Bankfull Entrenchment Ratio	n/a	n/a	n/a	n/a	n/a		2.2+	2.2+	2.2+	2.2+	2.2+		n/a	n/a	n/a	n/a	n/a		2.2+	2.2+	2.2+	2.2+	2.2+	
Bankfull Bank Height Ratio	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	
d50 (mm)							48	39	12	56	68								35	15	41	27	27	

Table 12a. Monitoring Data - Stream Reach Data Summary
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Scaly Bark Creek Reach 1
Monitoring Year 4

Parameter	As-Built/Baseline			MY-1			MY-2			MY-3			MY-4			MY-5		
	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max
Dimension and Substrate - Riffle																		
Bankfull Width (ft)	17.86	18.08	18.29	17.70	18.00	18.29	19.09	21.87	24.65	18.60	18.87	19.14	17.1	17.4	17.7			
Floodprone Width (ft)	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+			
Bankfull Mean Depth	1.4	1.4	1.4	1.3	1.3	1.4	1.1	1.2	1.3	1.3	1.3	1.3	1.4	1.4	1.5			
Bankfull Max Depth	2.2	2.2	2.2	2.0	2.2	2.3	2.2	2.2	2.3	2.4	2.5	2.5	2.2	2.3	2.4			
Bankfull Cross-sectional Area (ft^2)	24.6	25.2	25.8	23.1	23.6	24.2	25.0	25.9	26.8	23.2	23.6	24.0	23.1	24.4	25.6			
Width/Depth Ratio	13.0	13.0	13.0	13.3	13.4	13.6	14.6	18.6	22.7	14.9	15.1	15.3	12.2	12.4	12.6			
Entrenchment Ratio	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+			
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
D50 (mm)																		
Profile																		
Riffle Length (ft)	17	35	55	22	34	52	16	30	67	25	36	54	27	38	57			
Riffle Slope (ft/ft)	0.0050	0.0136	0.0283	0.0052	0.0149	0.0332	0.0055	0.0133	0.0372	0.0087	0.0190	0.0323	0.0029	0.0173	0.0322			
Pool Length (ft)	37	62	98	39	63	89	32	56	82	38	65	99	38	65	95			
Pool Max Depth (ft)	3.4	4.3	6.1	3.4	3.9	6.8	3.2	4.1	6.6	3.6	4.4	6.6	3.0	3.9	5.7			
Pool Spacing (ft)	71	104	165	67	103	160	72	100	165	71	106	170	67	99	143			
Pool Volume (ft^3)																		
Pattern																		
Channel Beltwidth (ft)	60	-	120															
Radius of Curvature (ft)	35	-	50															
Rc:Bankfull Width (ft/ft)	2.1	-	2.9															
Meander Wave Length (ft)	125	-	160															
Meander Width Ratio	3.5	-	7.1															
Additional Reach Parameters																		
Rosgen Classification	C4			C4			C4			C4			C4					
Channel Thalweg Length (ft)	1886			1886			1886			1886			1886					
Sinuosity (ft)	1.3			1.3			1.3			1.3			1.3					
Water Surface Slope (ft/ft)	0.0067			0.0069			n/a[1]			0.0072			0.0066					
Bankfull Slope (ft/ft)	0.0067			0.0069			0.0071			0.0070			0.0066					
Ri%/Ru%/P%/G%/S%																		
SC%/Sa%/G%/C%/B%/Be%																		
d16/d35/d50/d84/d95/d100	SC/SC/6/72/137/362			SC/SC/22/101/165/512			SC/SC/23/97/170/256			6/12/23/114/164/362			5/16/25/105/161/512					
% of Reach with Eroding Banks				0%			0%			0%			2%					

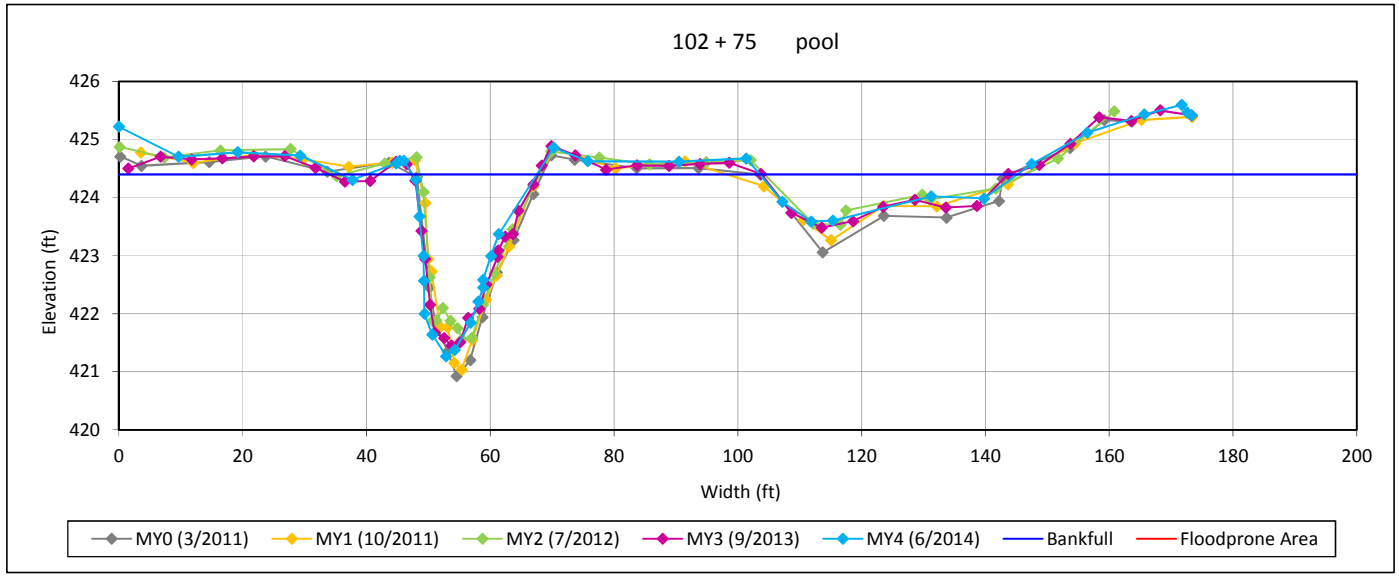
[1] Water surface slope wasn't calculated because there was little to no baseflow during Year 2 Monitoring.

Longitudinal Profile Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Scaly Bark Creek Reach 1
Monitoring Year 4



Cross-Section Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Monitoring Year 4

Cross Section 1-Scaly Bark Reach 1



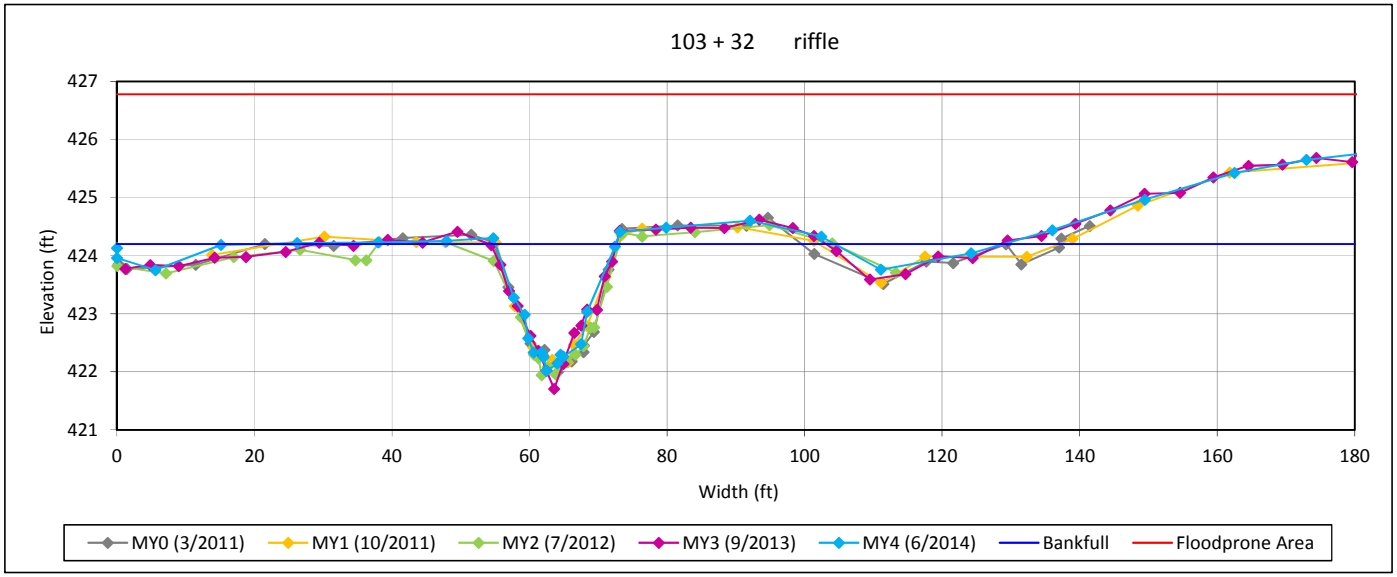
Bankfull Dimensions	
33.82	x-section area (ft.sq.)
19.5	width (ft)
1.74	mean depth (ft)
3.13	max depth (ft)
21.45	wetted parimeter (ft)
1.58	hyd radi (ft)
11.23	width-depth ratio

Survey Date: Jun-14
Field Crew: KB, AT

View Downstream (06/2014)

Cross-Section Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Monitoring Year 4

Cross Section 2-Scaly Bark Reach 1



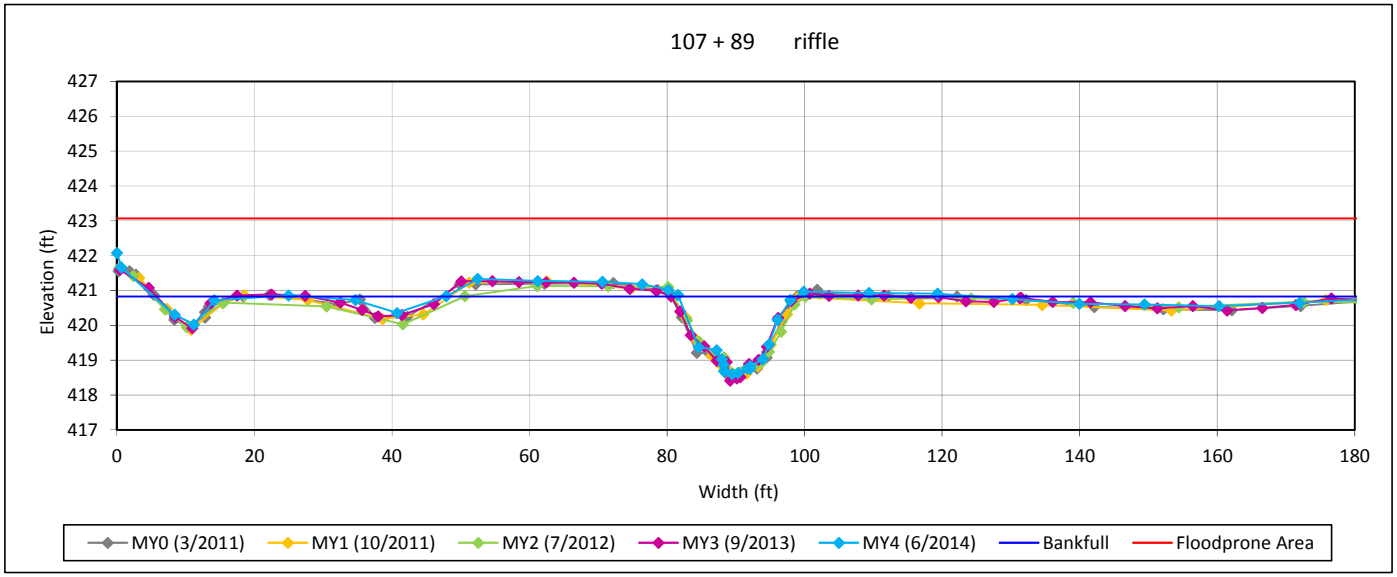
Bankfull Dimensions	
25.63	x-section area (ft.sq.)
17.67	width (ft)
1.45	mean depth (ft)
2.38	max depth (ft)
18.47	wetted parimeter (ft)
1.39	hyd radi (ft)
12.18	width-depth ratio

Survey Date: Jun-14
Field Crew: KB, AT

View Downstream (6/2014)

Cross-Section Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Monitoring Year 4

Cross Section 3-Scaly Bark Reach 1



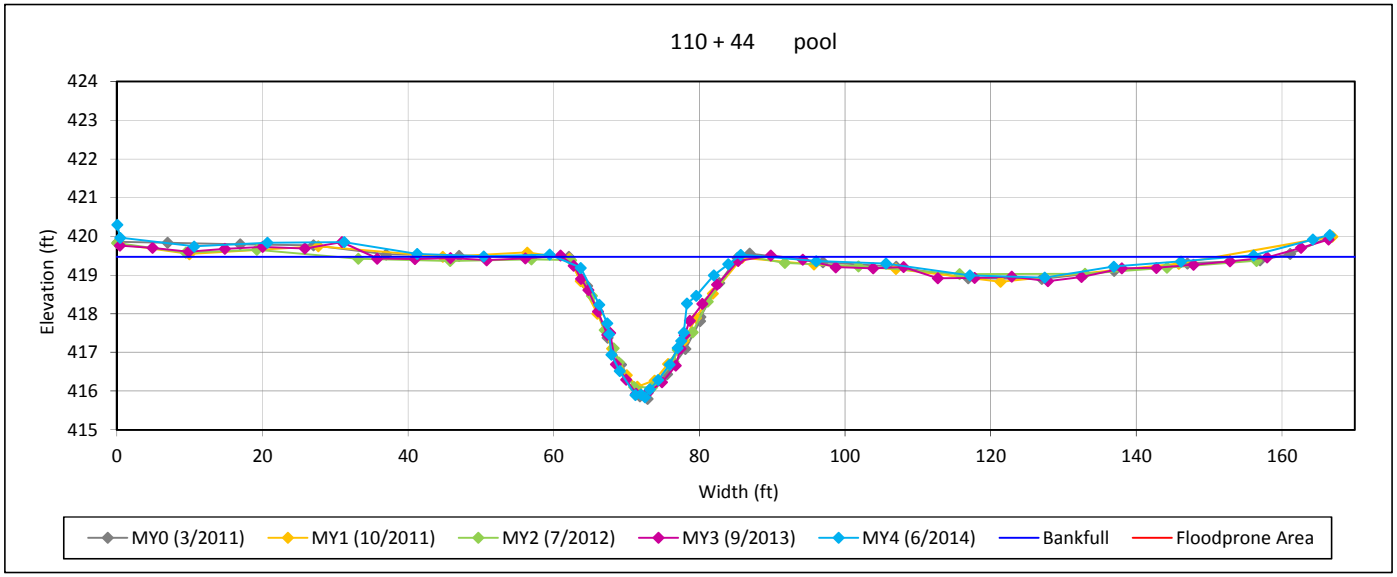
Bankfull Dimensions	
23.13	x-section area (ft.sq.)
17.08	width (ft)
1.35	mean depth (ft)
2.24	max depth (ft)
18.09	wetted parimeter (ft)
1.28	hyd radi (ft)
12.61	width-depth ratio

Survey Date: Jun-14
Field Crew: KB, AT

View Downstream (6/2014)

Cross-Section Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Monitoring Year 4

Cross Section 4-Scaly Bark Reach 1



Bankfull Dimensions	
40.28	x-section area (ft.sq.)
25.15	width (ft)
1.60	mean depth (ft)
3.63	max depth (ft)
26.86	wetted parimeter (ft)
1.50	hyd radi (ft)
15.71	width-depth ratio

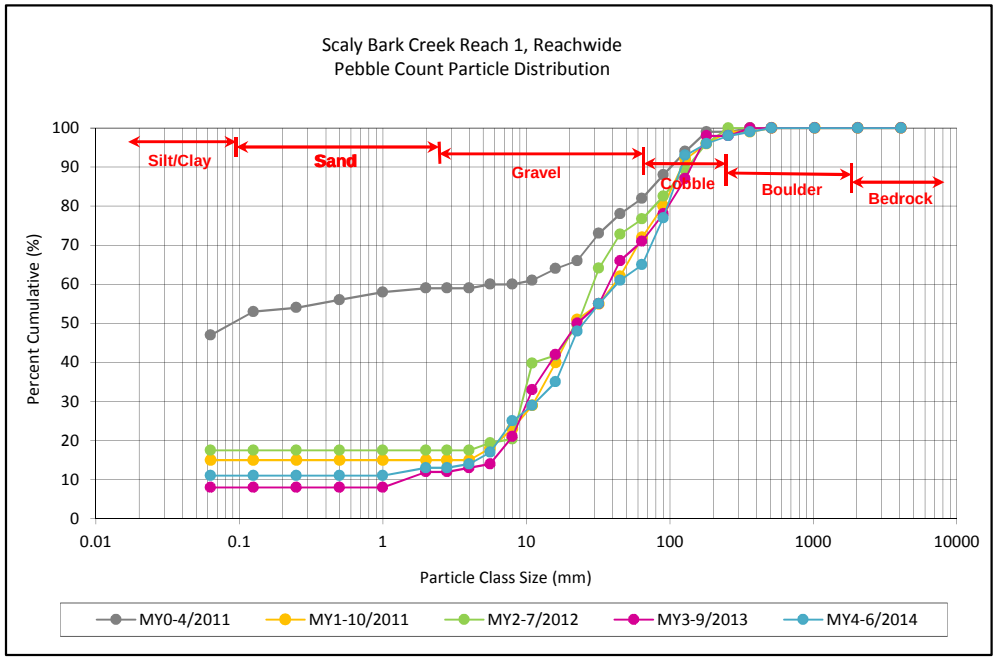
Survey Date: Jun-14
Field Crew: KB, AT

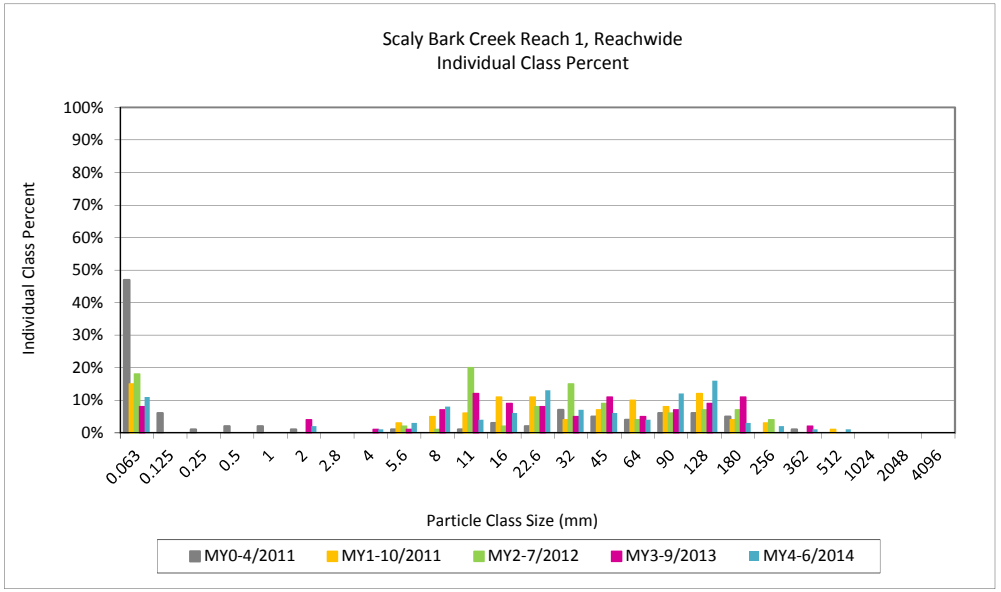
View Downstream (6/2014)

Reachwide and Cross-Section Pebble Count Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Scaly Bark Creek Reach 1, Reachwide
Monitoring Year 4

Particle Class		Diameter (mm)		Particle Count			Scaly Bark Reach 1 Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062		11	11	11%	11
SAND	Very fine	0.062	0.125					11
	Fine	0.125	0.250					11
	Medium	0.250	0.500					11
	Coarse	0.5	1.0					11
	Very Coarse	1.0	2.0		2	2	2%	13
GRAVEL	Very Fine	2.0	2.8					13
	Very Fine	2.8	4.0	1		1	1%	14
	Fine	4.0	5.7	1	2	3	3%	17
	Fine	5.7	8.0	3	5	8	8%	25
	Medium	8.0	11.3		4	4	4%	29
	Medium	11.3	16.0		6	6	6%	35
	Coarse	16.0	22.6	3	10	13	13%	48
	Coarse	22.6	32	3	4	7	7%	55
	Very Coarse	32	45	3	3	6	6%	61
	Very Coarse	45	64	4		4	4%	65
COBBLE	Small	64	90	12		12	12%	77
	Small	90	128	14	2	16	16%	93
	Large	128	180	3		3	3%	96
	Large	180	256	2		2	2%	98
BOULDER	Small	256	362	1		1	1%	99
	Small	362	512		1	1	1%	100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100%**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	5.01
D_{35} =	16.00
D_{50} =	24.96
D_{84} =	104.99
D_{95} =	160.66
D_{100} =	512.00

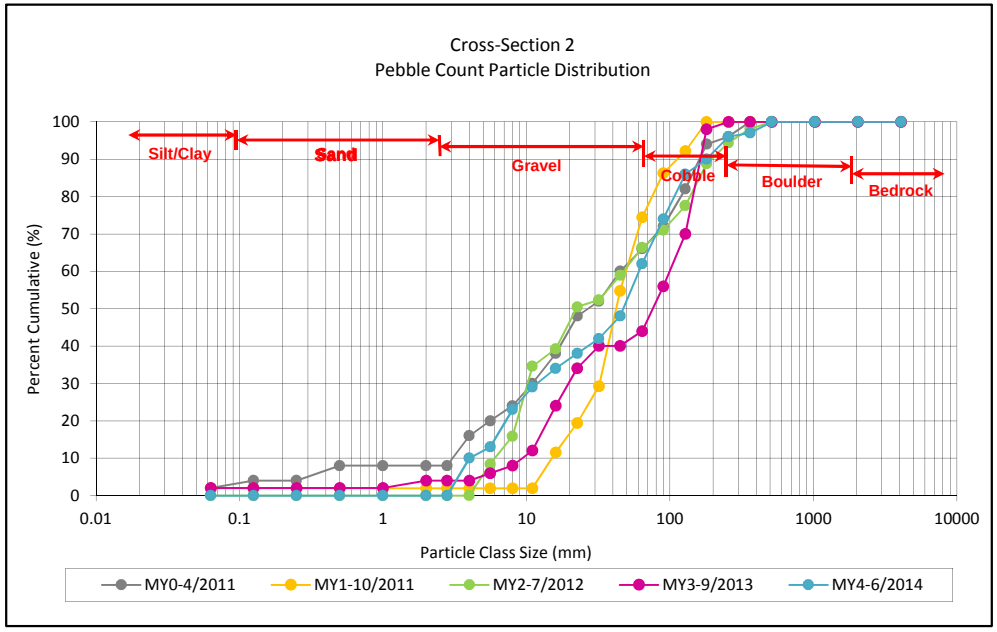


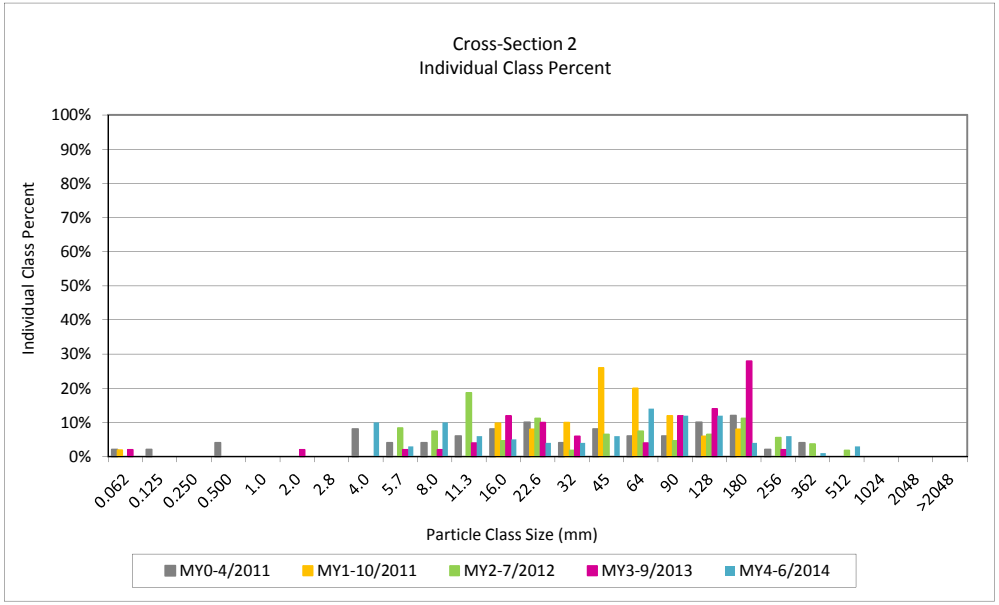


Reachwide and Cross-Section Substrate Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Scaly Bark Creek Reach 1, Cross-Section 2 (Riffle)
Monitoring Year 4

Particle Class		Diameter (mm)		Particle Count	Cross-Section 2 Summary	
		min	max	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062			0
SAND	Very fine	0.062	0.125			0
	Fine	0.125	0.250			0
	Medium	0.250	0.500			0
	Coarse	0.5	1.0			0
	Very Coarse	1.0	2.0			0
GRAVEL	Very Fine	2.0	2.8			0
	Very Fine	2.8	4.0	10	10%	10
	Fine	4.0	5.7	3	3%	13
	Fine	5.7	8.0	10	10%	23
	Medium	8.0	11.3	6	6%	29
	Medium	11.3	16.0	5	5%	34
	Coarse	16.0	22.6	4	4%	38
	Coarse	22.6	32	4	4%	42
	Very Coarse	32	45	6	6%	48
	Very Coarse	45	64	14	14%	62
COBBLE	Small	64	90	12	12%	74
	Small	90	128	12	12%	86
	Large	128	180	4	4%	90
	Large	180	256	6	6%	96
BOULDER	Small	256	362	1	1%	97
	Small	362	512	3	3%	100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100%**	**100**

Cross-Section 2	
Channel materials (mm)	
D_{16} =	6.23
D_{35} =	17.44
D_{50} =	47.32
D_{84} =	120.70
D_{95} =	241.40
D_{100} =	512.00

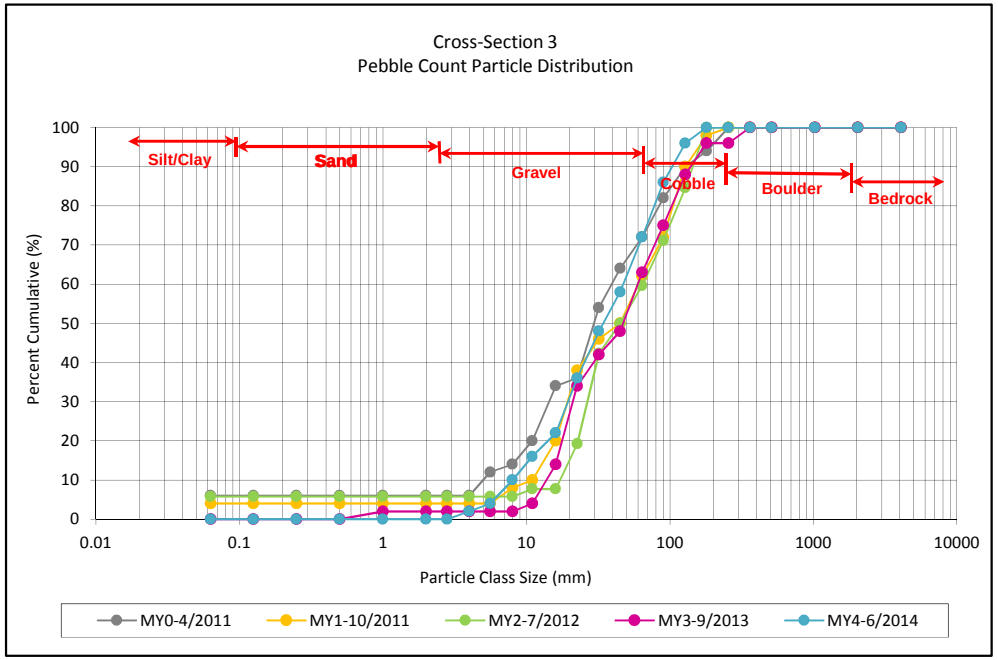




Reachwide and Cross-Section Substrate Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Scaly Bark Creek Reach 1, Cross-Section 3 (Riffle)
Monitoring Year 4

Particle Class		Diameter (mm)		Particle Count	Cross-Section 3 Summary	
		min	max	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062			0
SAND	Very fine	0.062	0.125			0
	Fine	0.125	0.250			0
	Medium	0.250	0.500			0
	Coarse	0.5	1.0			0
	Very Coarse	1.0	2.0			0
GRAVEL	Very Fine	2.0	2.8			0
	Very Fine	2.8	4.0	2	2%	2
	Fine	4.0	5.7	2	2%	4
	Fine	5.7	8.0	6	6%	10
	Medium	8.0	11.3	6	6%	16
	Medium	11.3	16.0	6	6%	22
	Coarse	16.0	22.6	14	14%	36
	Coarse	22.6	32	12	12%	48
	Very Coarse	32	45	10	10%	58
	Very Coarse	45	64	14	14%	72
COBBLE	Small	64	90	14	14%	86
	Small	90	128	10	10%	96
	Large	128	180	4	4%	100
	Large	180	256			100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**98%**	**100**

Cross-Section 3	
Channel materials (mm)	
D_{16} =	11.00
D_{35} =	22.05
D_{50} =	34.26
D_{84} =	85.72
D_{95} =	123.57
D_{100} =	180.00



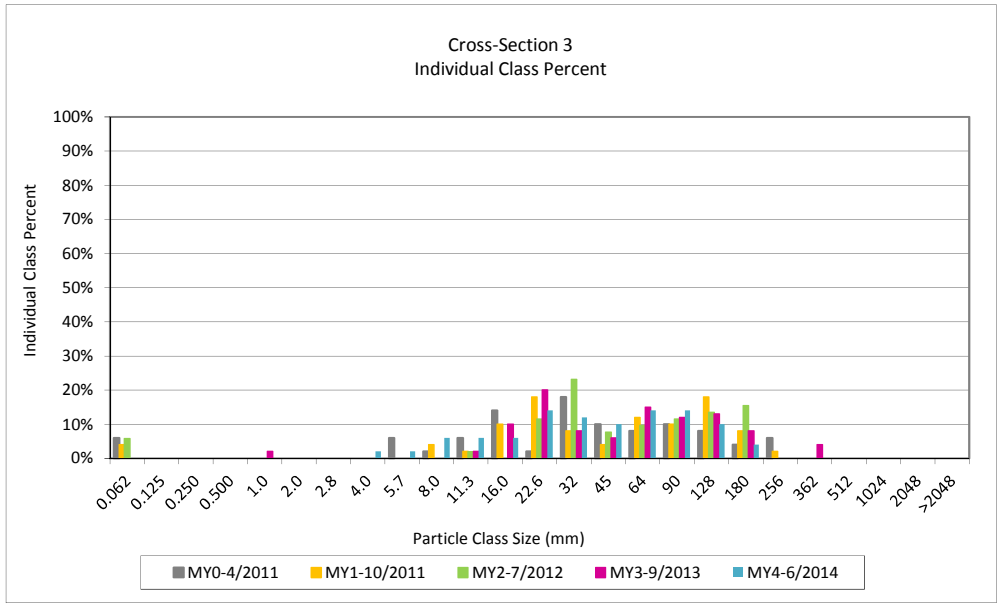
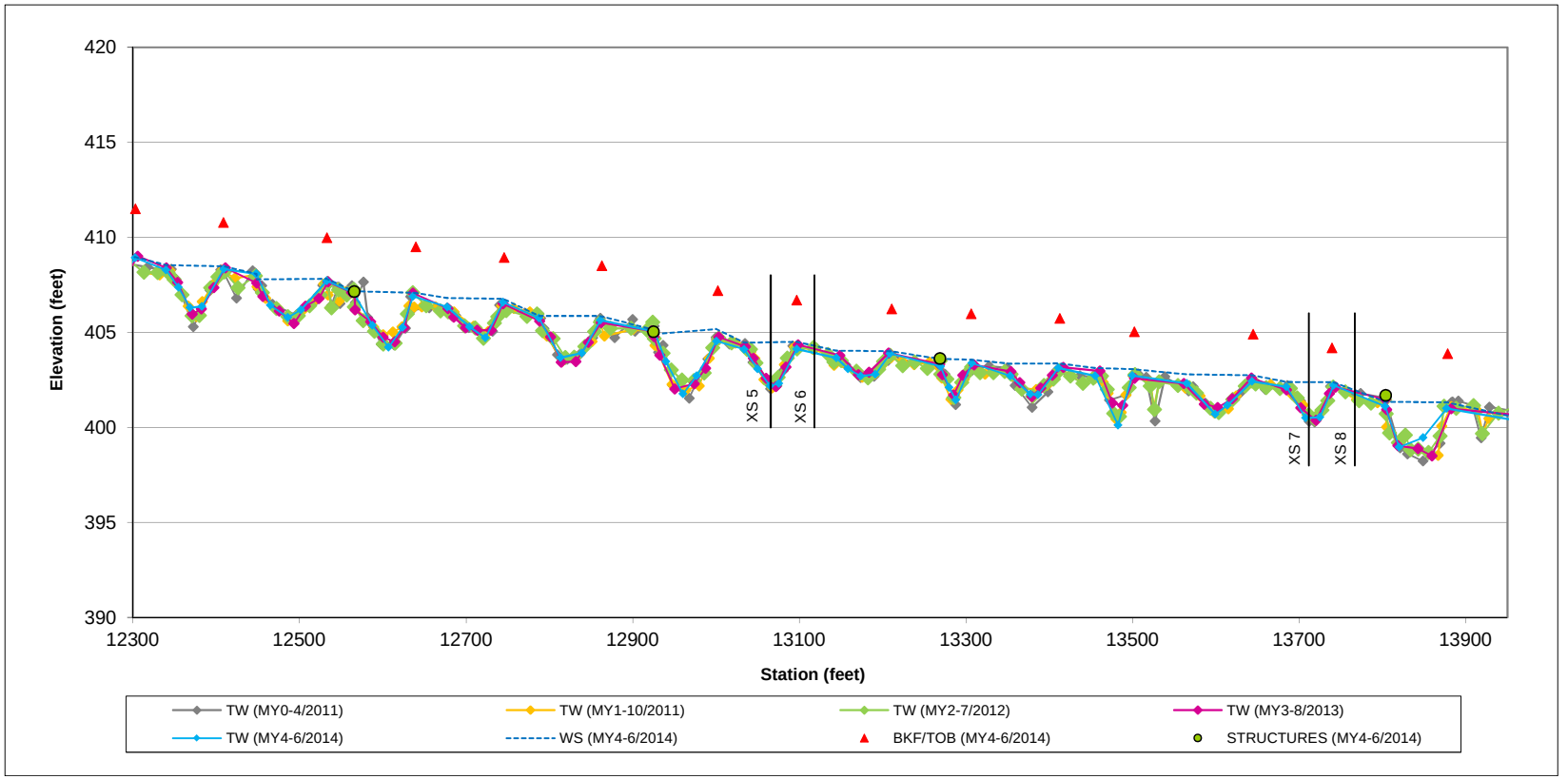


Table 12b. Monitoring Data - Stream Reach Data Summary
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Scaly Bark Creek Reach 2
Monitoring Year 4

Parameter	As-Built/Baseline			MY-1			MY-2			MY-3			MY-4			MY-5		
	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max
Dimension and Substrate - Riffle																		
Bankfull Width (ft)	21.20	21.28	21.35	21.37	24.01	26.65	22.50	23.05	23.60	21.1	22.1	23.0	20.2	20.5	20.8			
Floodprone Width (ft)	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+	200+			
Bankfull Mean Depth	1.6	1.7	1.7	1.3	1.5	1.7	1.5	1.5	1.6	1.5	1.6	1.7	1.6	1.6	1.6			
Bankfull Max Depth	2.3	2.4	2.6	2.3	2.4	2.6	2.4	2.5	2.7	2.3	2.5	2.7	2.3	2.5	2.6			
Bankfull Cross-sectional Area (ft^2)	34.3	35.6	36.8	33.8	34.5	35.3	35.5	35.6	35.8	33.4	35.1	36.7	32.1	32.5	32.9			
Width/Depth Ratio	12.2	12.8	13.3	13.0	17.0	21.0	14.1	14.9	15.7	12.1	14.0	15.8	12.4	12.9	13.4			
Entrenchment Ratio	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+	2.2+			
Bank Height Ratio	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0			
D50 (mm)																		
Profile																		
Riffle Length (ft)	30	49	69	24	41	66	25	42	67	28	44	69	32	47	78			
Riffle Slope (ft/ft)	0.0023	0.0075	0.0188	0.0041	0.0091	0.0168	0.0051	0.0107	0.0265	0.0043	0.0115	0.0214	0.0065	0.0121	0.0195			
Pool Length (ft)	45	67	96	43	65	82	24	51	72	41	69	86	38	67	84			
Pool Max Depth (ft)	3.6	4.6	5.5	3.5	4.4	5.2	3.6	4.5	5.4	4.0	4.8	6.1	3.6	5.0	6.4			
Pool Spacing (ft)	92	119	147	91	109	154	93	113	140	85	115	137	90	115	154			
Pool Volume (ft^3)																		
Pattern																		
Channel Beltwidth (ft)	80	-	140															
Radius of Curvature (ft)	40	-	60															
Rc:Bankfull Width (ft/ft)	2.0	-	3.0															
Meander Wave Length (ft)	160	-	200															
Meander Width Ratio	4.0	-	7.0															
Additional Reach Parameters																		
Rosgen Classification	C4			C4			C4			C4			C4					
Channel Thalweg Length (ft)	2220			2220			2220			2200			220					
Sinuosity (ft)	1.1			1.1			1.1			1.1			1.1					
Water Surface Slope (ft/ft)	0.0049			0.0046			n/a[1]			0.0050			0.0052					
Bankfull Slope (ft/ft)	0.0050			0.0048			0.0049			0.0048			0.0055					
Ri%/Ru%/P%/G%/S%																		
SC%/Sa%/G%/C%/B%/Be%																		
d16/d35/d50/d84/d95/d100	SC/8/22/83/152/362			SC/SC/21/101/165/512			SC/SC/28/108/200/512			18/41/58/215/431/1024			8/19/30/193/1024/2048					
% of Reach with Eroding Banks				0%			0%			0%			0%					

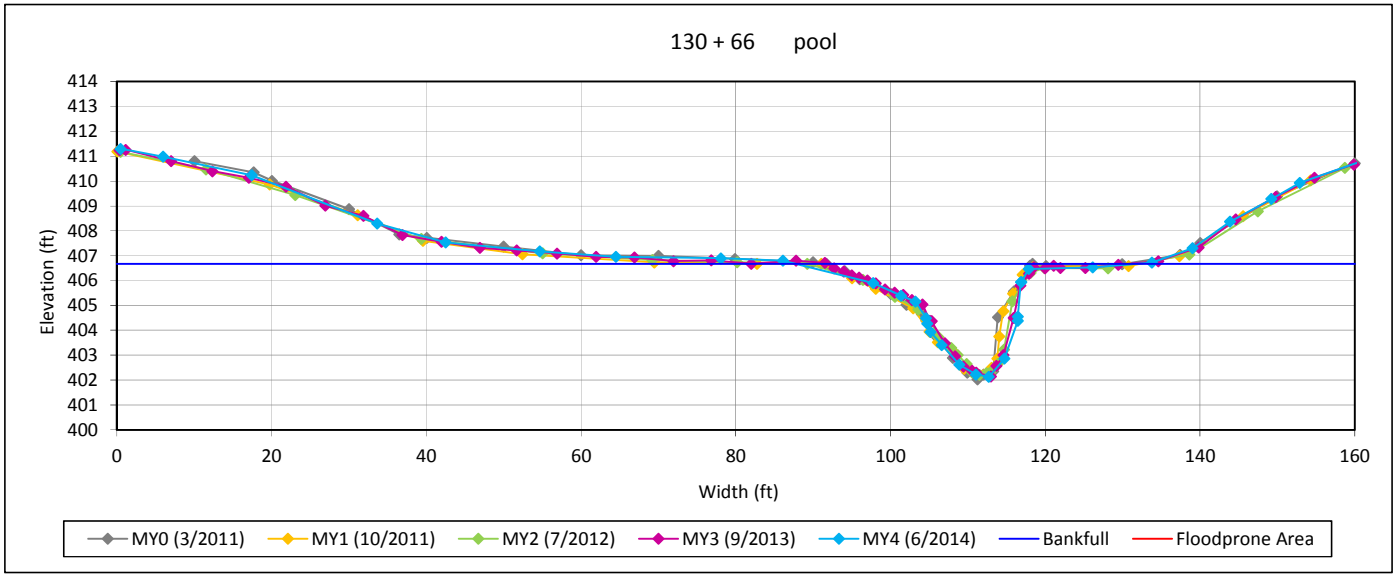
[1] Water surface slope wasn't calculated because there was little to no baseflow during Year 2 Monitoring.

Longitudinal Profile Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Scaly Bark Reach 2
Monitoring Year 4



Cross-Section Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Monitoring Year 4

Cross Section 5-Scaly Bark Creek Reach 2



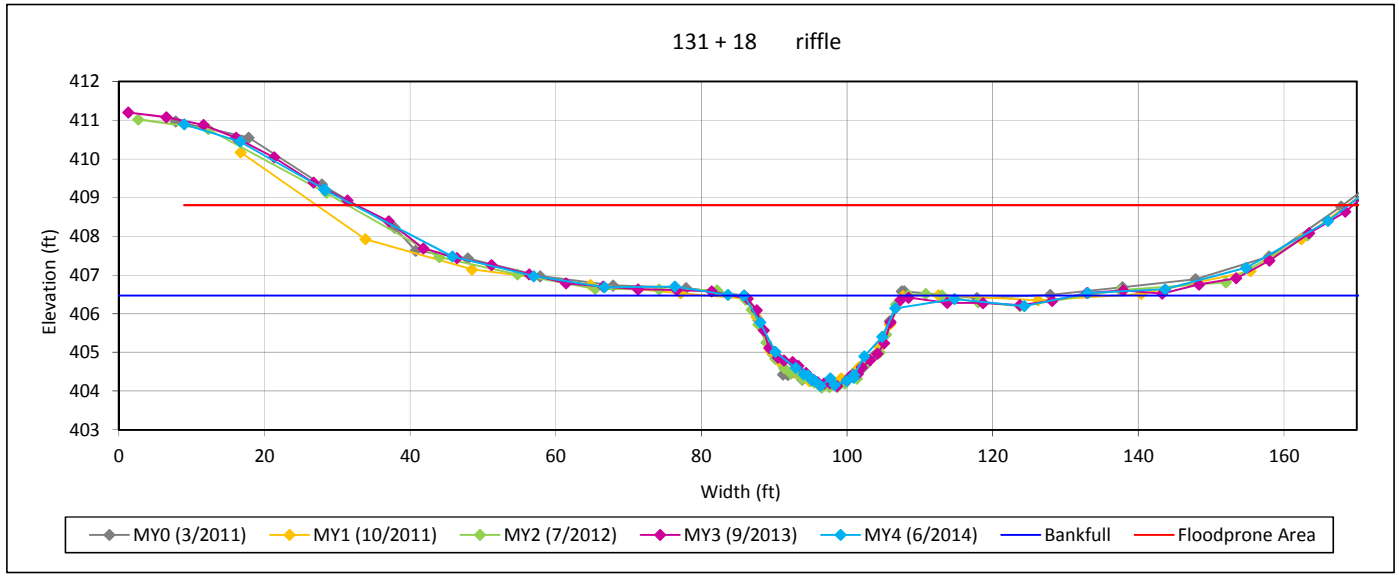
Bankfull Dimensions	
59.10	x-section area (ft.sq.)
30.45	width (ft)
1.94	mean depth (ft)
4.57	max depth (ft)
33.23	wetted parimeter (ft)
1.78	hyd radi (ft)
15.69	width-depth ratio

Survey Date: Jun-14
Field Crew: KB, AT

View Downstream (6/2014)

Cross-Section Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Monitoring Year 4

Cross Section 6-Scaly Bark Creek Reach 2



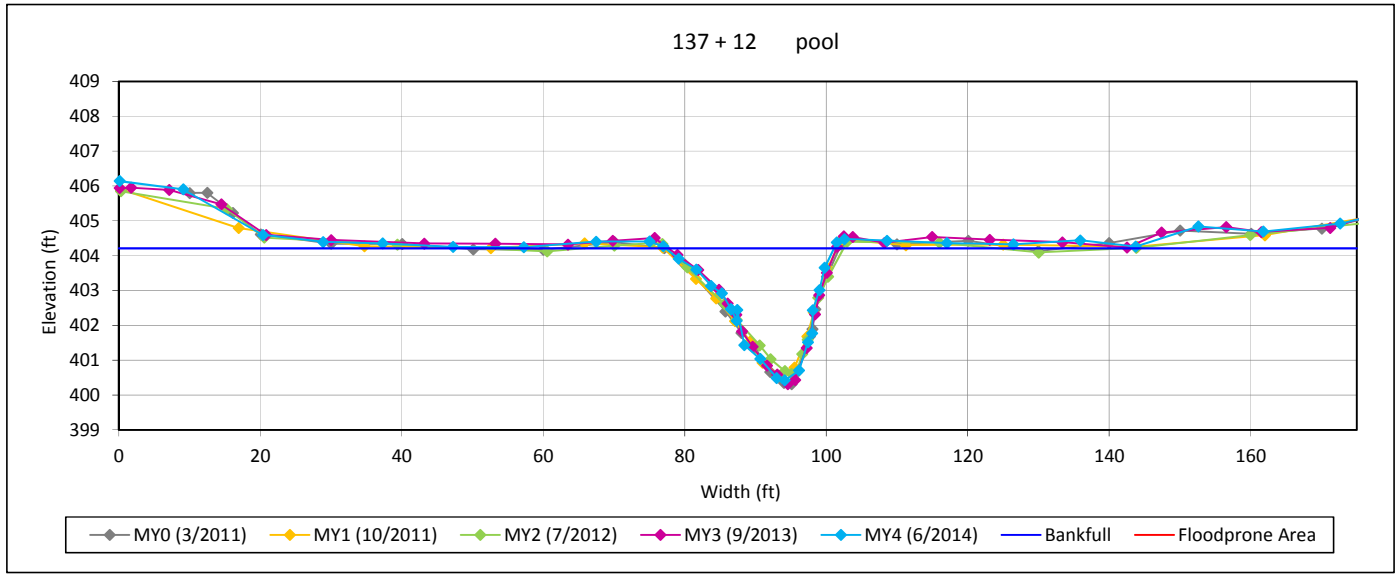
Bankfull Dimensions	
32.13	x-section area (ft.sq.)
20.78	width (ft)
1.55	mean depth (ft)
2.33	max depth (ft)
21.47	wetted parimeter (ft)
1.50	hyd radi (ft)
13.44	width-depth ratio

Survey Date: Jun-14
Field Crew: KB, AT

View Downstream (6/2014)

Cross-Section Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Monitoring Year 4

Cross Section 7-Scaly Bark Creek Reach 2



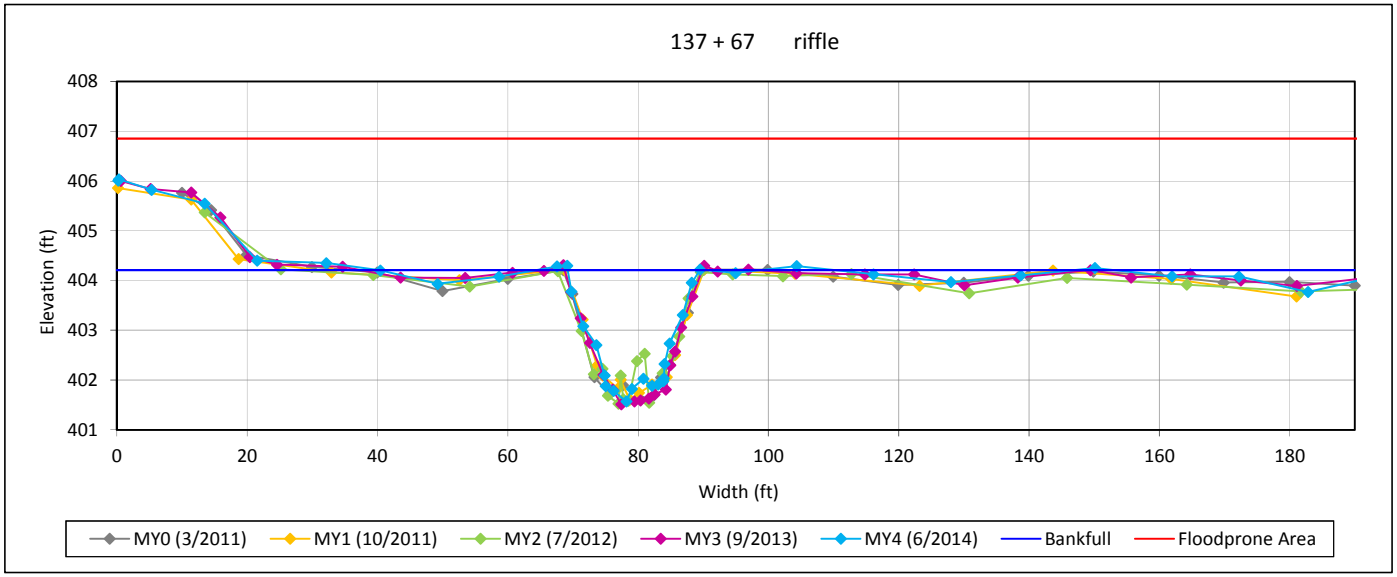
Bankfull Dimensions	
45.27	x-section area (ft.sq.)
23.79	width (ft)
1.90	mean depth (ft)
3.79	max depth (ft)
26.21	wetted parimeter (ft)
1.73	hyd radi (ft)
12.50	width-depth ratio

Survey Date: Jun-14
Field Crew: KB, AT

View Downstream (6/2014)

Cross-Section Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Monitoring Year 4

Cross Section 8-Scaly Bark Creek Reach 2



Bankfull Dimensions	
32.87	x-section area (ft.sq.)
20.22	width (ft)
1.63	mean depth (ft)
2.64	max depth (ft)
21.43	wetted parimeter (ft)
1.53	hyd radi (ft)
12.44	width-depth ratio

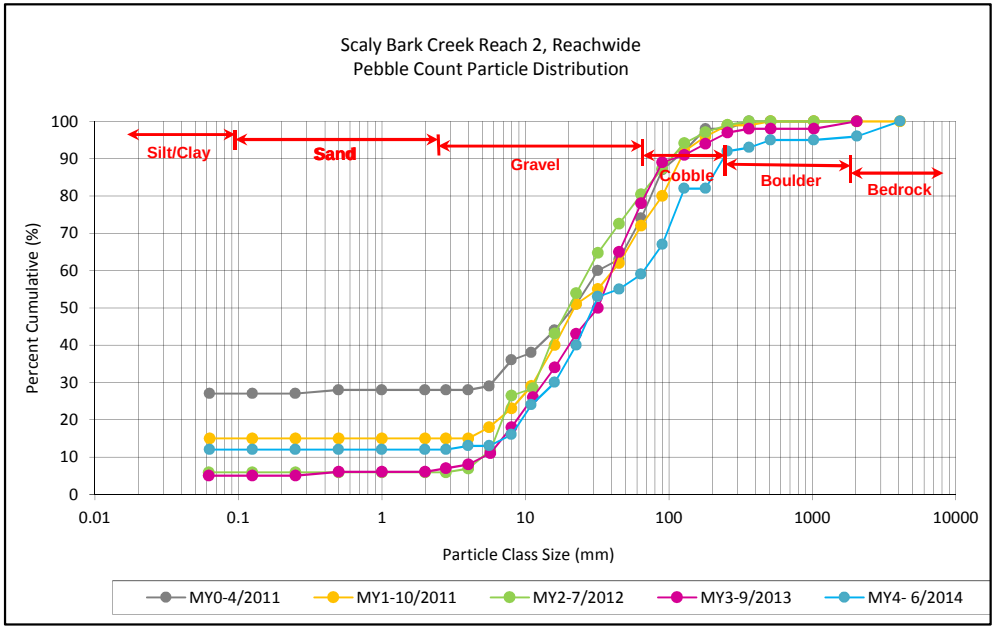
Survey Date: Jun-14
Field Crew: KB, AT

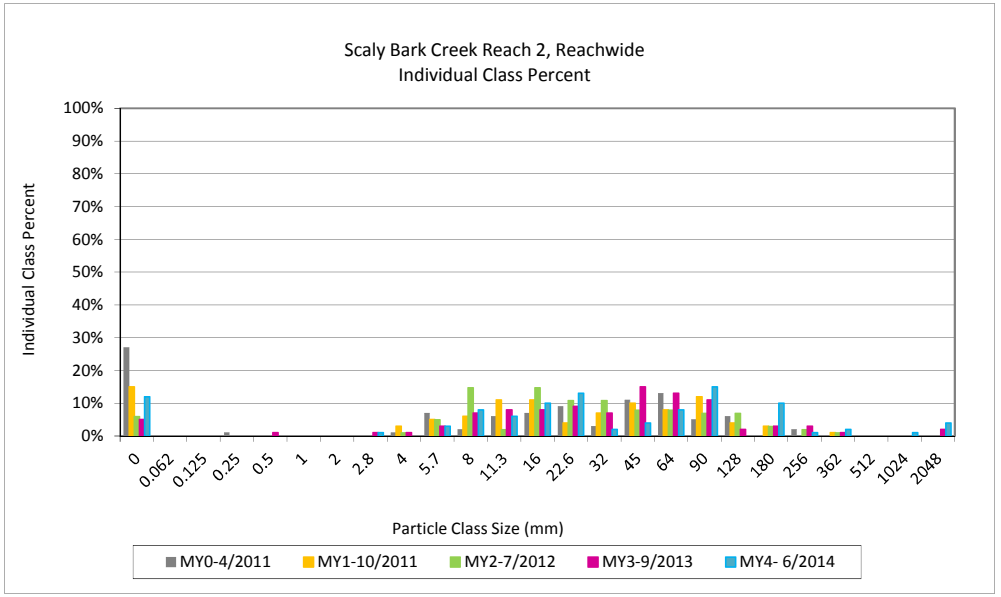
View Downstream (6/2014)

Reachwide and Cross-Section Substrate Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Scaly Bark Creek Reach 2, Reachwide
Monitoring Year 4

Particle Class		Diameter (mm)		Particle Count			Scaly Bark Reach 2 Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	2	10	12	12%	12
SAND	Very fine	0.062	0.125					12
	Fine	0.125	0.250					12
	Medium	0.250	0.500					12
	Coarse	0.5	1.0					12
	Very Coarse	1.0	2.0					12
GRAVEL	Very Fine	2.0	2.8					12
	Very Fine	2.8	4.0	1		1	1%	13
	Fine	4.0	5.7					13
	Fine	5.7	8.0		3	3	3%	16
	Medium	8.0	11.3	1	7	8	8%	24
	Medium	11.3	16.0	1	5	6	6%	30
	Coarse	16.0	22.6	7	3	10	10%	40
	Coarse	22.6	32	6	7	13	13%	53
	Very Coarse	32	45	1	1	2	2%	55
	Very Coarse	45	64	3	1	4	4%	59
COBBLE	Small	64	90	7	1	8	8%	67
	Small	90	128	8	7	15	15%	82
	Large	128	180					82
	Large	180	256	7	3	10	10%	92
BOULDER	Small	256	362	1		1	1%	93
	Small	362	512	2		2	2%	95
	Medium	512	1024					95
	Large/Very Large	1024	2048	1		1	1%	96
BEDROCK	Bedrock	2048	>2048	2	2	4	4%	100
			Total	**50**	**50**	**100**	**100%**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	8.00
D_{35} =	19.02
D_{50} =	29.53
D_{84} =	193.14
D_{95} =	1024.00
D_{100} =	>2048

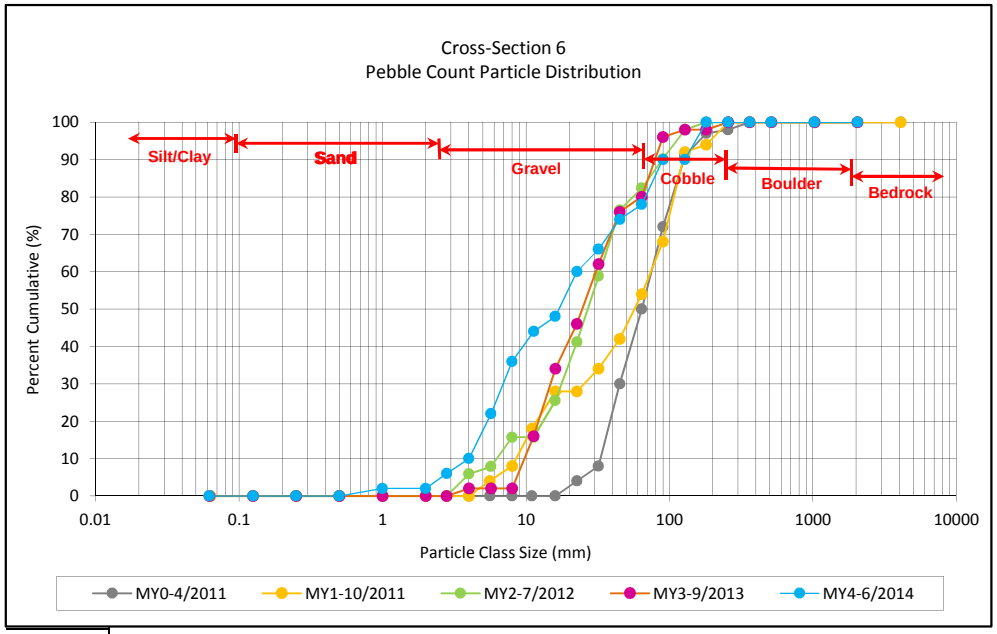


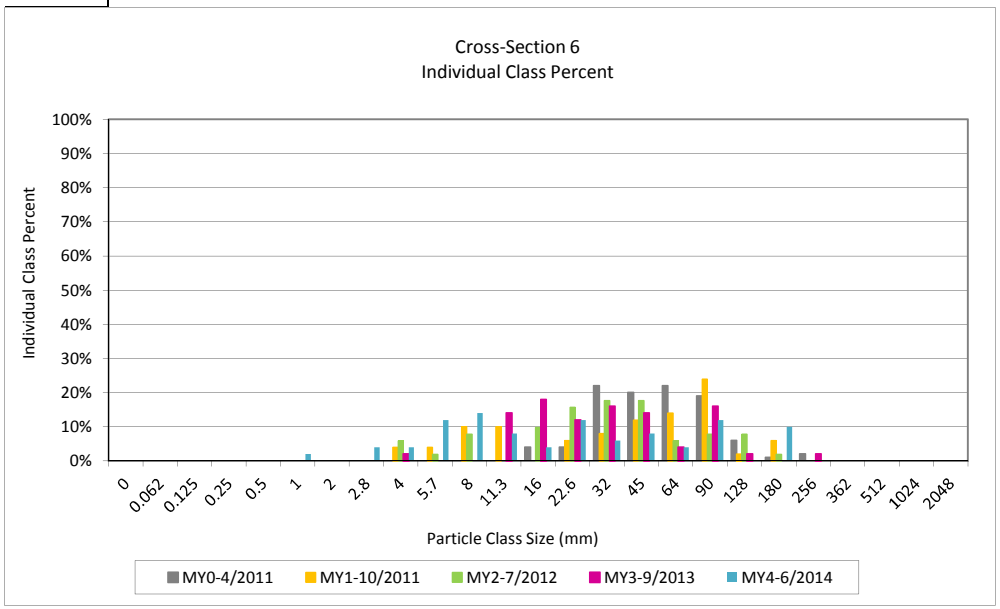


Reachwide and Cross-Section Substrate Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Scaly Bark Reach 2, Cross-Section 6 (Riffle)
Monitoring Year 4

Particle Class		Diameter (mm)		Particle Count	Cross-Section 6 Summary	
		min	max	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062			0
SAND	Very fine	0.062	0.125			0
	Fine	0.125	0.250			0
	Medium	0.250	0.500			0
	Coarse	0.5	1.0			0
	Very Coarse	1.0	2.0	2	2%	2
GRAVEL	Very Fine	2.0	2.8			2
	Very Fine	2.8	4.0	4	4%	6
	Fine	4.0	5.7	4	4%	10
	Fine	5.7	8.0	12	12%	22
	Medium	8.0	11.3	14	14%	36
	Medium	11.3	16.0	8	8%	44
	Coarse	16.0	22.6	4	4%	48
	Coarse	22.6	32	12	12%	60
	Very Coarse	32	45	6	6%	66
	Very Coarse	45	64	8	8%	74
COBBLE	Small	64	90	4	4%	78
	Small	90	128	12	12%	90
	Large	128	180			90
	Large	180	256	10	10%	100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100%**	**100**

Cross-Section 6	
Channel materials (mm)	
D_{16} =	6.69
D_{35} =	10.75
D_{50} =	23.95
D_{84} =	107.33
D_{95} =	214.66
D_{100} =	256.00

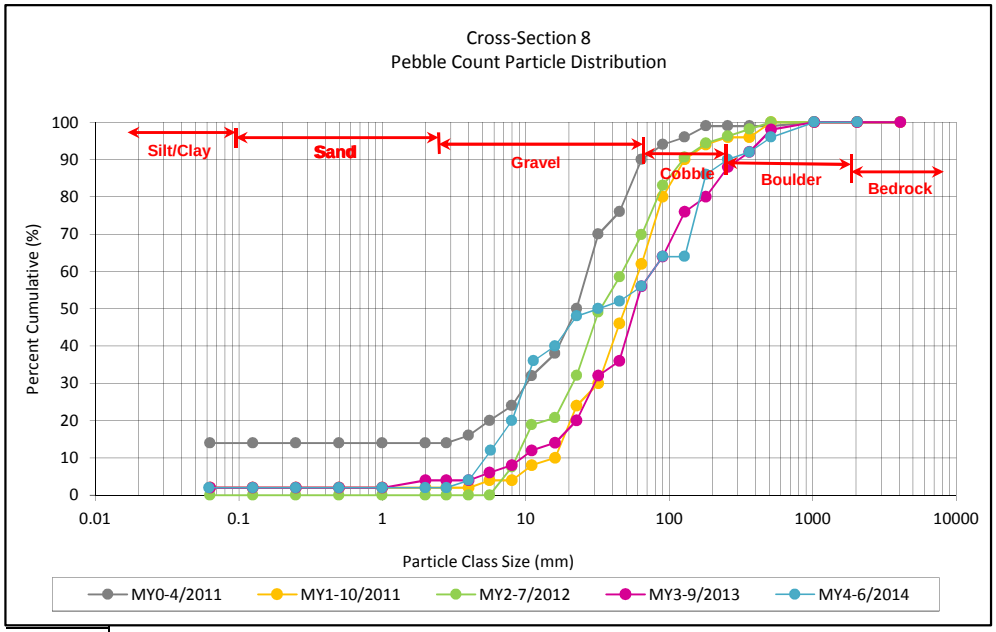




Reachwide and Cross-Section Substrate Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Scaly Bark Reach 2, Cross-Section 8 (Riffle)
Monitoring Year 4

Particle Class		Diameter (mm)		Particle Count	Cross-Section 8 Summary	
		min	max	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	2	2%	2
SAND	Very fine	0.062	0.125			2
	Fine	0.125	0.250			2
	Medium	0.250	0.500			2
	Coarse	0.5	1.0			2
	Very Coarse	1.0	2.0			2
GRAVEL	Very Fine	2.0	2.8			2
	Very Fine	2.8	4.0			2
	Fine	4.0	5.7	2	2%	4
	Fine	5.7	8.0	8	8%	12
	Medium	8.0	11.3	8	8%	20
	Medium	11.3	16.0	16	16%	36
	Coarse	16.0	22.6	4	4%	40
	Coarse	22.6	32	8	8%	48
	Very Coarse	32	45	2	2%	50
	Very Coarse	45	64	2	2%	52
COBBLE	Small	64	90	4	4%	56
	Small	90	128	8	8%	64
	Large	128	180			64
	Large	180	256	22	22%	86
BOULDER	Small	256	362	4	4%	90
	Small	362	512	2	2%	92
	Medium	512	1024	4	4%	96
	Large/Very Large	1024	2048	4	4%	100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100%**	**100**

Cross-Section 8	
Channel materials (mm)	
D_{16} =	9.38
D_{35} =	15.63
D_{50} =	45.00
D_{84} =	247.93
D_{95} =	861.08
D_{100} =	2048.00



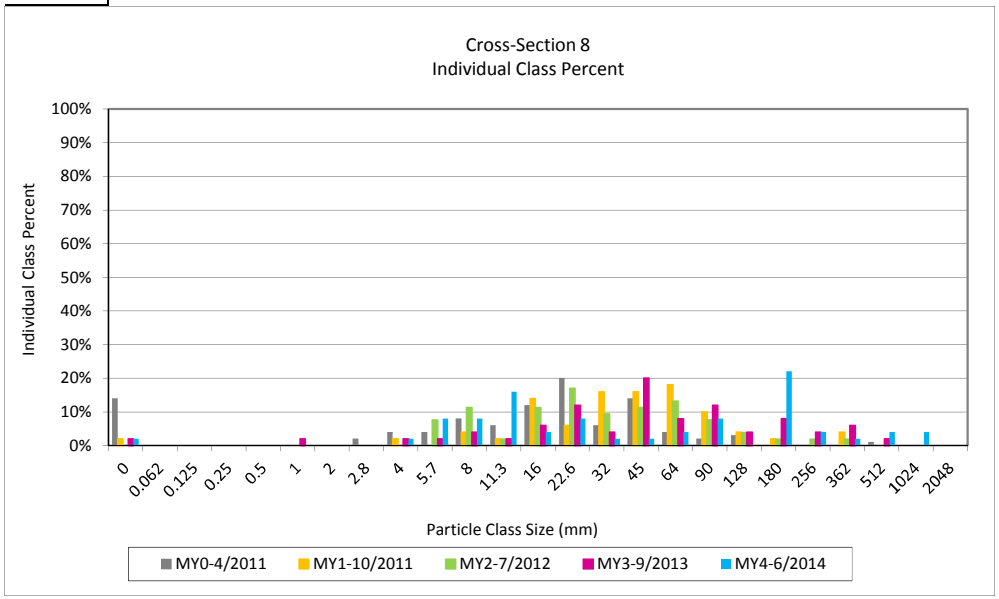
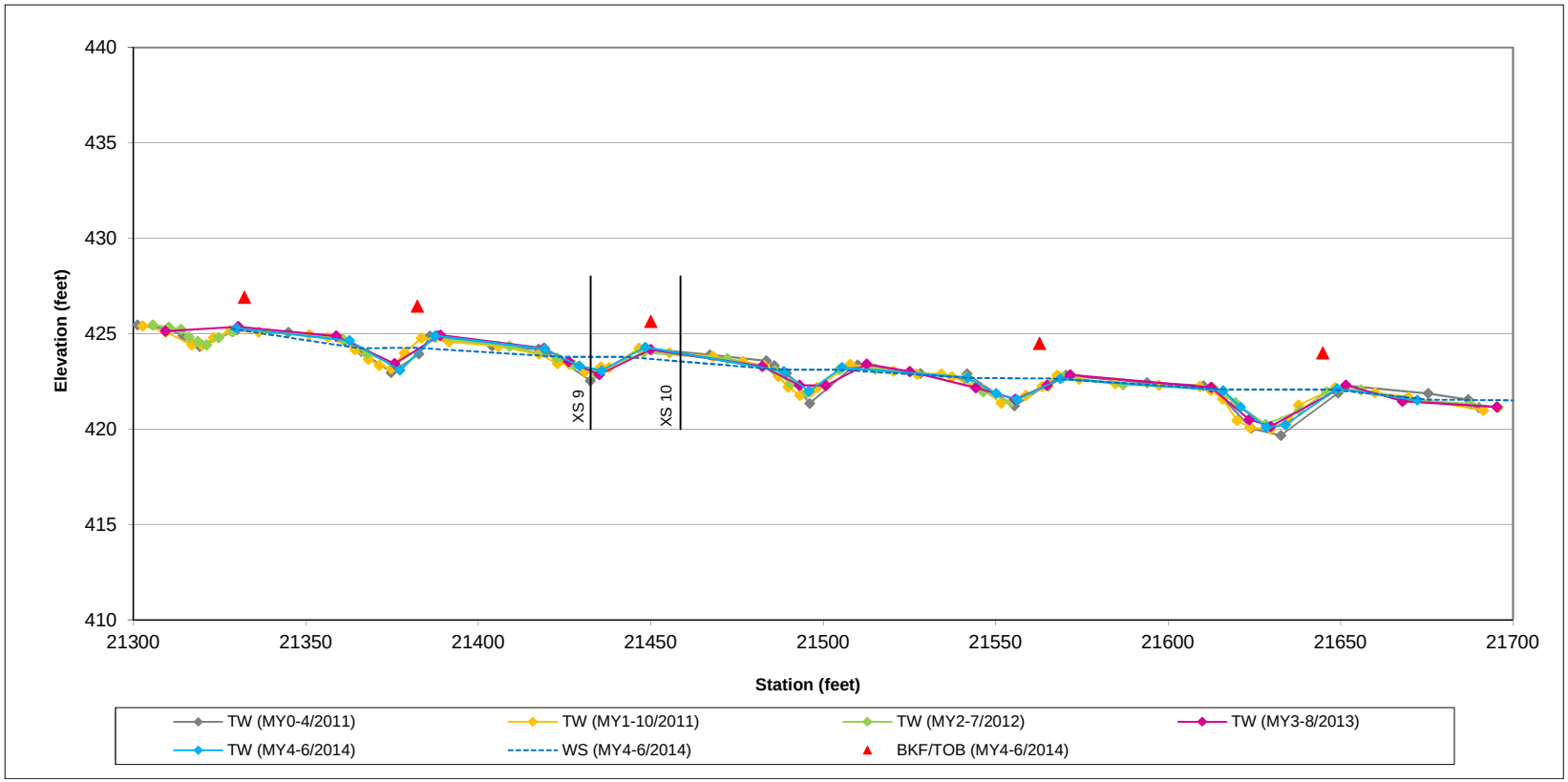


Table 12c. Monitoring Data - Stream Reach Data Summary
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
UT1 Reach 2
Monitoring Year 4

Parameter	As-Built/Baseline			MY-1			MY-2			MY-3			MY-4			MY-5		
	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max
Dimension and Substrate - Riffle																		
Bankfull Width (ft)		12.1			11.9			12.2			10.2			13.5				
Floodprone Width (ft)		200+			200+			200+			200+			200+				
Bankfull Mean Depth		1.0			1.0			1.0			0.9			0.8				
Bankfull Max Depth		1.7			1.6			1.7			1.6			1.4				
Bankfull Cross-sectional Area (ft^2)		12.4			11.4			11.8			10.2			11.3				
Width/Depth Ratio		11.9			12.3			12.6			13.6			16.1				
Entrenchment Ratio		2.2+			2.2+			2.2+			2.2+			2.2+				
Bank Height Ratio		1.0			1.0			1.0			1.0			1.0				
D50 (mm)																		
Profile																		
Riffle Length (ft)	11	30	41	6	31	44	8	24	44	13	31	44	23	35	47			
Riffle Slope (ft/ft)	0.0150	0.0187	0.0233	0.0132	0.0161	0.0272	0.0104	0.0172	0.0280	0.0159	0.0246	0.0306	0.0132	0.0205	0.0314			
Pool Length (ft)	21	30	43	19	27	40	15	27	31	22	31	46	17	27	33			
Pool Max Depth (ft)	2.5	3.3	4.0	2.3	2.9	3.8	2.2	2.7	3.4	2.6	2.9	3.1	2.8	3.2	3.8			
Pool Spacing (ft)	55	59	77	55	59	79	49	59	73	58	64	75	58	60	72			
Pool Volume (ft^3)																		
Pattern																		
Channel Beltwidth (ft)	50	-	80															
Radius of Curvature (ft)	25	-	33															
Rc:Bankfull Width (ft/ft)	2.3	-	3.0															
Meander Wave Length (ft)	80	-	100															
Meander Width Ratio	4.5	-	7.3															
Additional Reach Parameters																		
Rosgen Classification		C4			C4			C4			C4			C4				
Channel Thalweg Length (ft)		399			399			399			399			399				
Sinuosity (ft)		1.1			1.1			1.1			1.1			1.1				
Water Surface Slope (ft/ft)		0.0101			0.0100			n/a[1]			0.0100			0.0103				
Bankfull Slope (ft/ft)		0.0094			0.0092			0.0096			0.0101			0.0101				
Ri%/Ru%/P%/G%/S%																		
SC%/Sa%/G%/C%/B%/Be%																		
d16/d35/d50/d84/d95/d100		SC/16/37/105/157/362			SC/26/38/94/191/256			SC/4/9/96/152/362			SC/1/11/102/156/512			SC/52/68/119/163/256				
% of Reach with Eroding Banks					0%			0%			0%			0%				

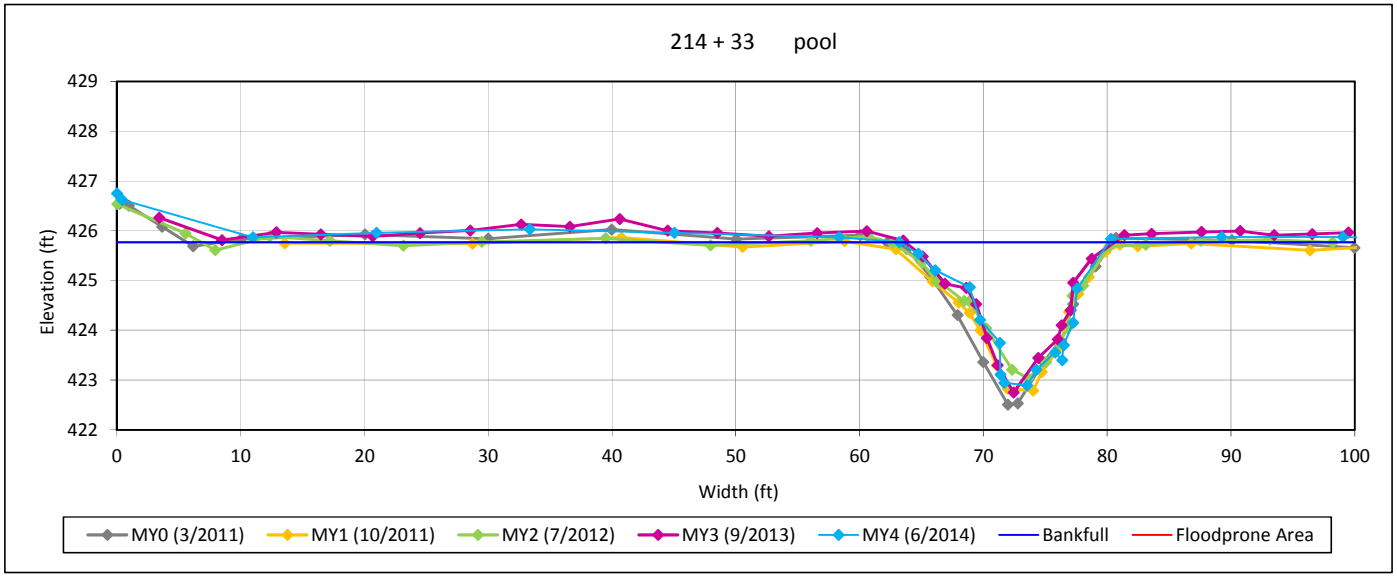
[1] Water surface slope wasn't calculated because there was little to no baseflow during Year 2 Monitoring.

Longitudinal Profile Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
UT1 Reach 2
Monitoring Year 4



Cross-Section Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Monitoring Year 4

Cross Section 9-UT1 Reach 2



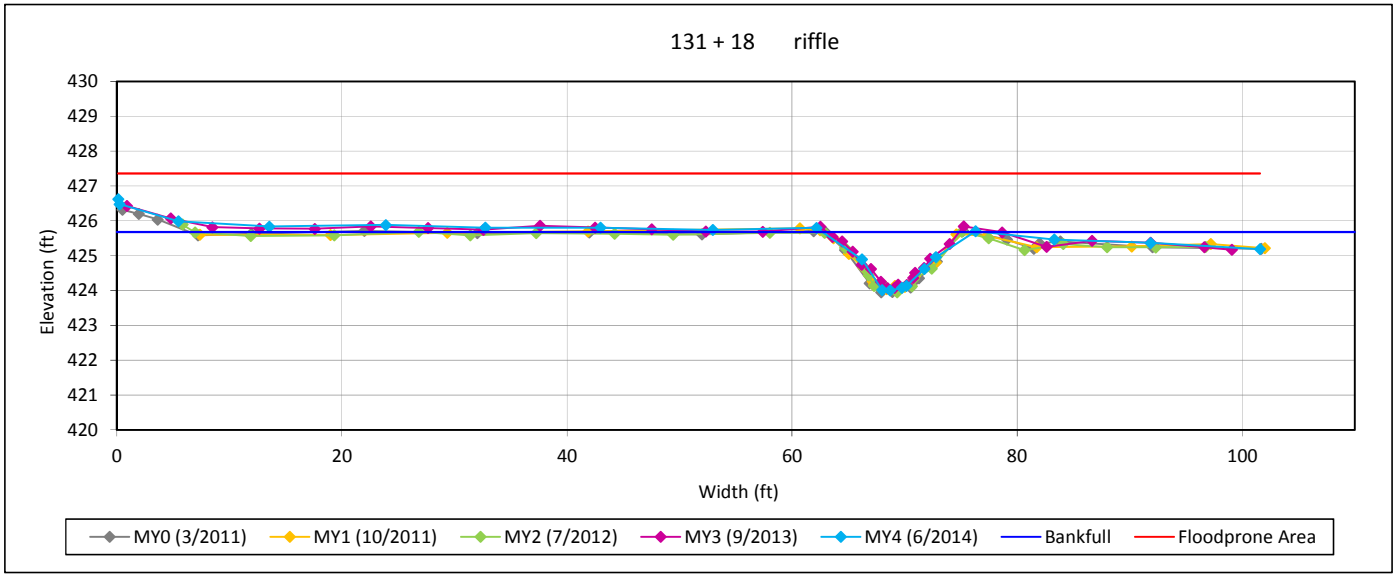
Bankfull Dimensions	
23.11	x-section area (ft.sq.)
16.90	width (ft)
1.37	mean depth (ft)
2.88	max depth (ft)
18.97	wetted parimeter (ft)
1.22	hyd radi (ft)
12.36	width-depth ratio

Survey Date: Jun-14
Field Crew: KB, AT

View Downstream (6/2014)

Cross-Section Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Monitoring Year 4

Cross Section 10-UT1 Reach 2



Bankfull Dimensions	
11.34	x-section area (ft.sq.)
13.50	width (ft)
0.84	mean depth (ft)
1.68	max depth (ft)
14.00	wetted parimeter (ft)
0.81	hyd radi (ft)
16.06	width-depth ratio

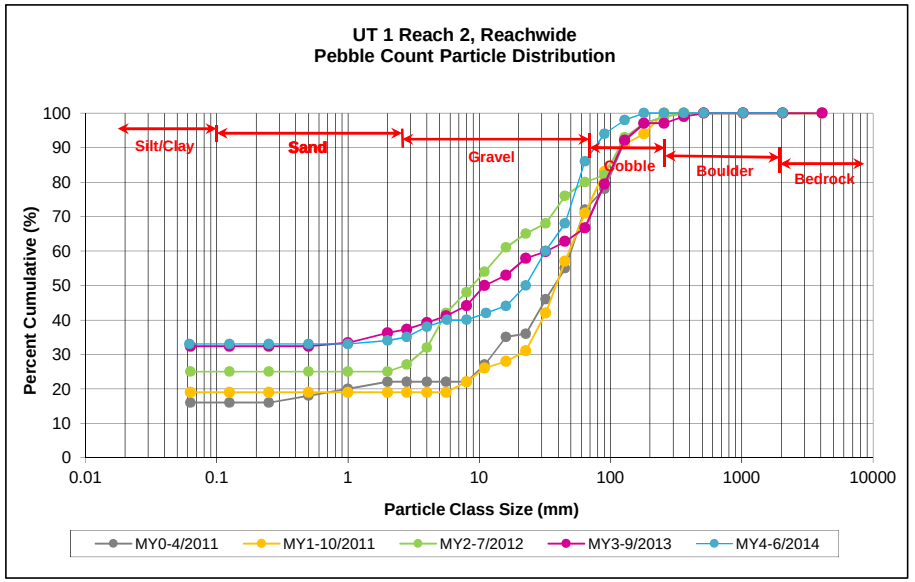
Survey Date: Jun-14
Field Crew: KB, AT

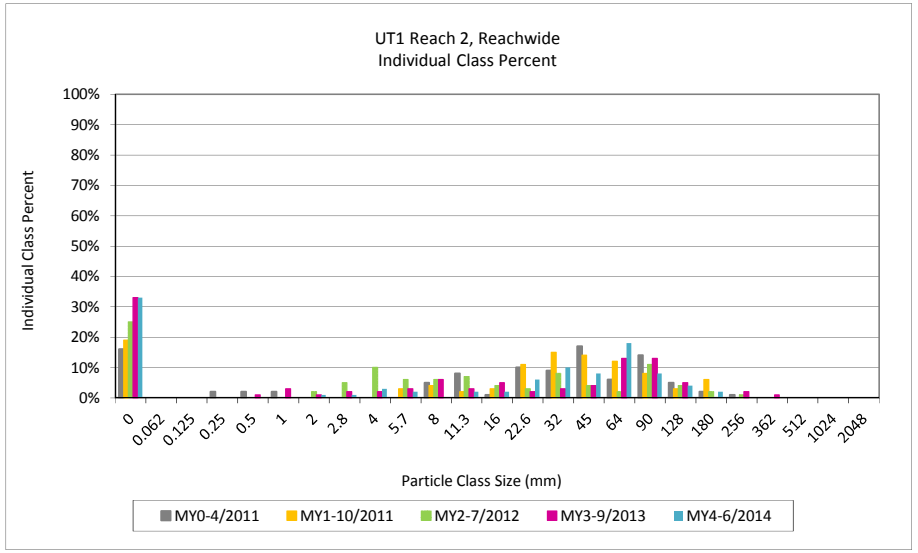
View Downstream (6/2014)

Reachwide and Cross-Section Pebble Count Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
UT1 Reach 2, Reachwide
Monitoring Year 4

Particle Class		Diameter (mm)		Particle Count			UT1 Reach 2 Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	16	17	33	33%	33
SAND	Very fine	0.062	0.125			0	0%	33
	Fine	0.125	0.250			0	0%	33
	Medium	0.250	0.500			0	0%	33
	Coarse	0.5	1.0			0	0%	33
	Very Coarse	1.0	2.0			0	0%	33
GRAVEL	Very Fine	2.0	2.8		1	1	1%	34
	Very Fine	2.8	4.0		1	1	1%	35
	Fine	4.0	5.7		3	3	3%	38
	Fine	5.7	8.0		2	2	2%	40
	Medium	8.0	11.3			0	0%	40
	Medium	11.3	16.0		2	2	2%	42
	Coarse	16.0	22.6	2		2	2%	44
	Coarse	22.6	32	6		6	6%	50
	Very Coarse	32	45	8	2	10	10%	60
	Very Coarse	45	64	2	6	8	8%	68
COBBLE	Small	64	90	16	2	18	18%	86
	Small	90	128	4	4	8	8%	94
	Large	128	180	4		4	4%	98
	Large	180	256	2		2	2%	100
BOULDER	Small	256	362			0	0%	100
	Small	362	512			0	0%	100
	Medium	512	1024			0	0%	100
	Large/Very Large	1024	2048			0	0%	100
BEDROCK	Bedrock	2048	>2048			0	0%	100
			Total	**60**	**40**	**100**	**100%**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	4.00
D_{50} =	32.00
D_{84} =	86.65
D_{95} =	139.39
D_{100} =	>2048

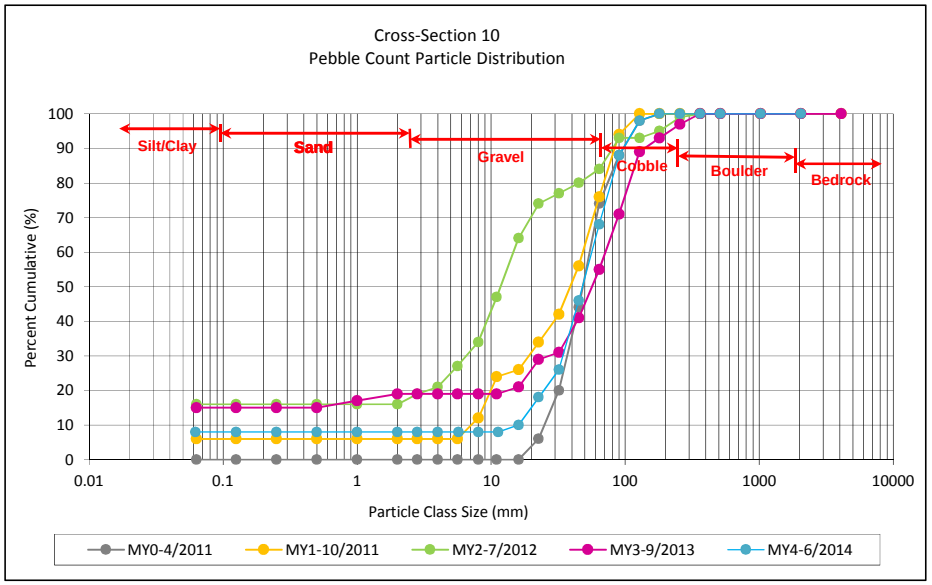




Reachwide and Cross-Section Pebble Count Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
UT1 Reach 2, Cross-Section 10 (Riffle)
Monitoring Year 4

Particle Class		Diameter (mm)		Particle Count	Cross-Section 6 Summary	
		min	max	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	8	8%	8
SAND	Very fine	0.062	0.125			8
	Fine	0.125	0.250			8
	Medium	0.250	0.500			8
	Coarse	0.5	1.0			8
	Very Coarse	1.0	2.0			8
GRAVEL	Very Fine	2.0	2.8			8
	Very Fine	2.8	4.0			8
	Fine	4.0	5.7			8
	Fine	5.7	8.0			8
	Medium	8.0	11.3			8
	Medium	11.3	16.0			8
	Coarse	16.0	22.6	2	2%	10
	Coarse	22.6	32	8	8%	18
	Very Coarse	32	45	8	8%	26
	Very Coarse	45	64	20	20%	46
COBBLE	Small	64	90	22	22%	68
	Small	90	128	20	20%	88
	Large	128	180	10	10%	98
	Large	180	256	2	2%	100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100%**	**100**

Cross-Section 10	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	52.73
D_{50} =	68.09
D_{84} =	119.29
D_{95} =	162.50
D_{100} =	256.00



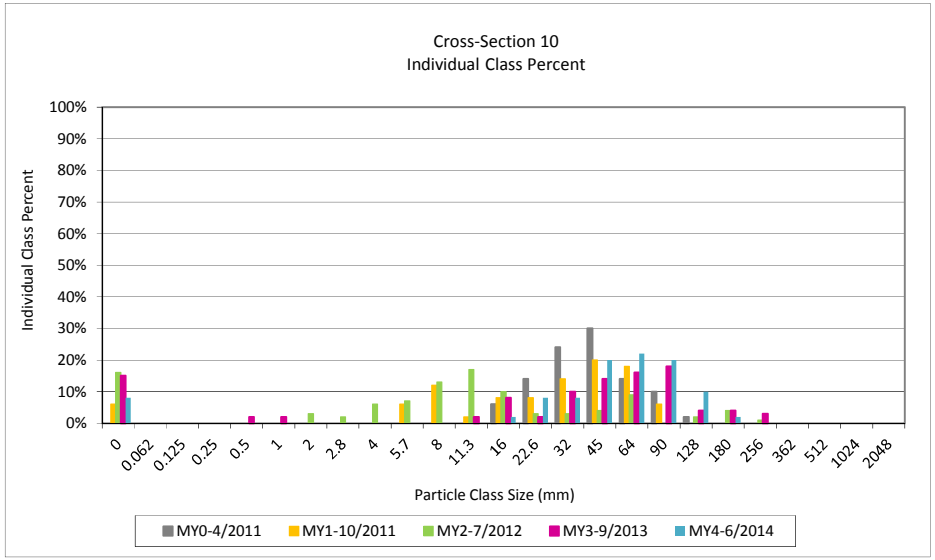
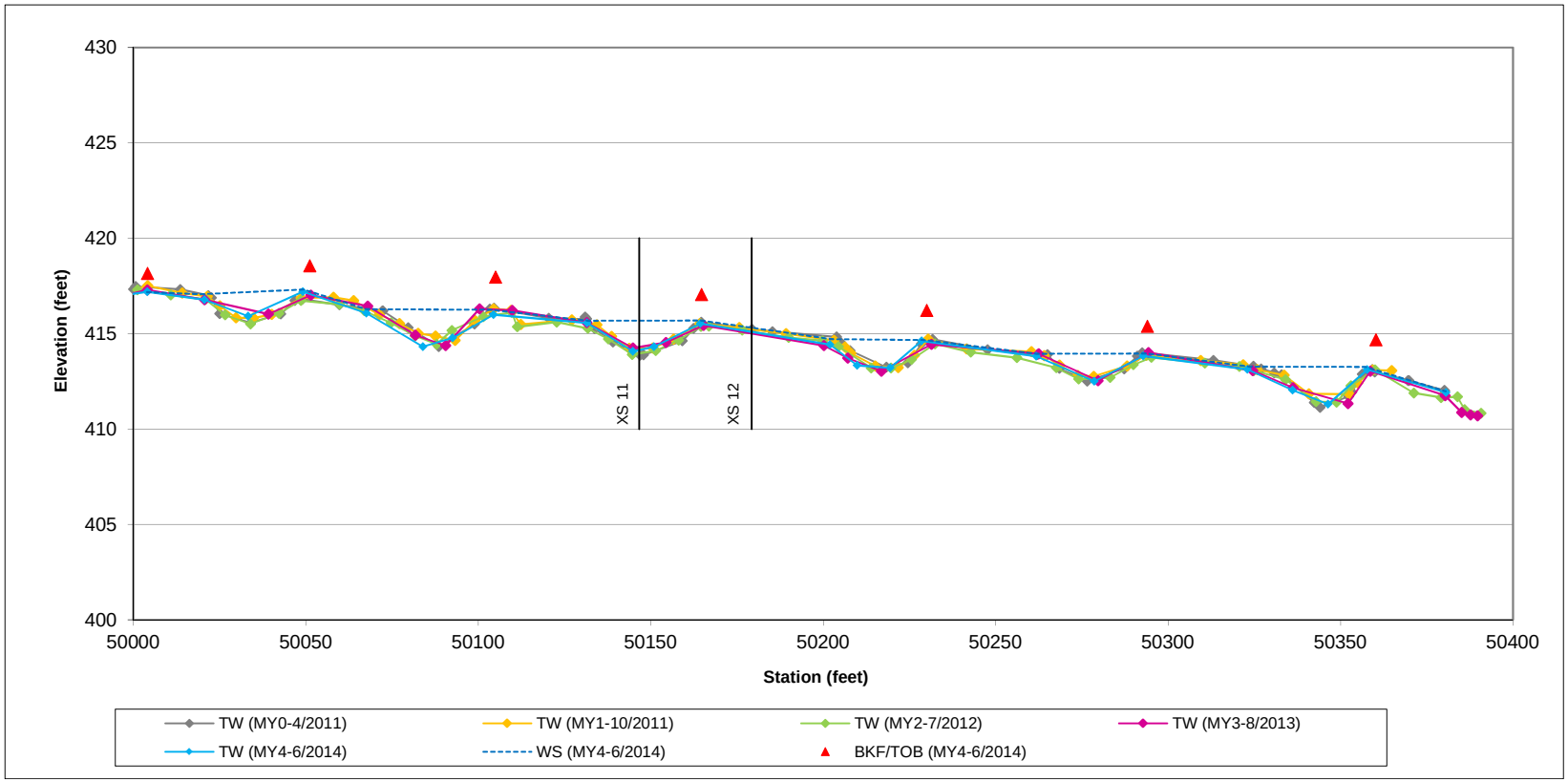


Table 12d. Monitoring Data - Stream Reach Data Summary
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
UT2
Monitoring Year 4

Parameter	As-Built/Baseline			MY-1			MY-2			MY-3			MY-4			MY-5		
	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max	Min	Med	Max
Dimension and Substrate - Riffle																		
Bankfull Width (ft)		13.0			13.0			13.0			12.0			13.5				
Floodprone Width (ft)		200+			200+			200+			200+			200+				
Bankfull Mean Depth		0.9			0.9			1.0			1.0			0.9				
Bankfull Max Depth		1.5			1.5			1.7			1.6			1.7				
Bankfull Cross-sectional Area (ft^2)		11.4			11.7			12.9			11.4			12.1				
Width/Depth Ratio		14.8			14.5			13.1			12.5			15.1				
Entrenchment Ratio		2.2+			2.2+			2.2+			2.2+			2.2+				
Bank Height Ratio		1.0			1.0			1.0			1.0			1.0				
D50 (mm)																		
Profile																		
Riffle Length (ft)	21	29	41	16	26	38	18	23	33	17	30	35	18	29	38			
Riffle Slope (ft/ft)	0.0215	0.0230	0.0272	0.0187	0.0264	0.0543	0.0190	0.0267	0.0369	0.0157	0.0306	0.0349	0.0160	0.0269	0.0606			
Pool Length (ft)	27	31	37	28	31	37	27	33	39	31	32	34	27	33	37			
Pool Max Depth (ft)	2.9	3.1	3.5	2.5	3.0	3.3	3.0	3.2	3.4	2.2	2.7	3.2	2.9	3.3	3.8			
Pool Spacing (ft)	55	59	70	51	58	78	54	57	75	50	64	77	51	60	75			
Pool Volume (ft^3)																		
Pattern																		
Channel Beltwidth (ft)	50	-	80															
Radius of Curvature (ft)	25	-	34															
Rc:Bankfull Width (ft/ft)	2.1	-	2.8															
Meander Wave Length (ft)	90	-	120															
Meander Width Ratio	4.2	-	6.7															
Additional Reach Parameters																		
Rosgen Classification		C4			C4			C4			C4			C4				
Channel Thalweg Length (ft)		380			380			380			380			380				
Sinuosity (ft)		1.1			1.1			1.1			1.1			1.1				
Water Surface Slope (ft/ft)		0.0121			0.0121			n/a[1]			0.0123			0.0126				
Bankfull Slope (ft/ft)		0.0130			0.0130			0.0127			0.0133			0.0161				
Ri%/Ru%/P%/G%/S%																		
SC%/Sa%/G%/C%/B%/Be%																		
d16/d35/d50/d84/d95/d100		SC/9/17/76/152/512			SC/6/14/77/157/362			SC/13/25/94/163/362			SC/14/27/109/171/362			SC/14/27/104/158/362				
% of Reach with Eroding Banks					0%			0%			0%			0%				

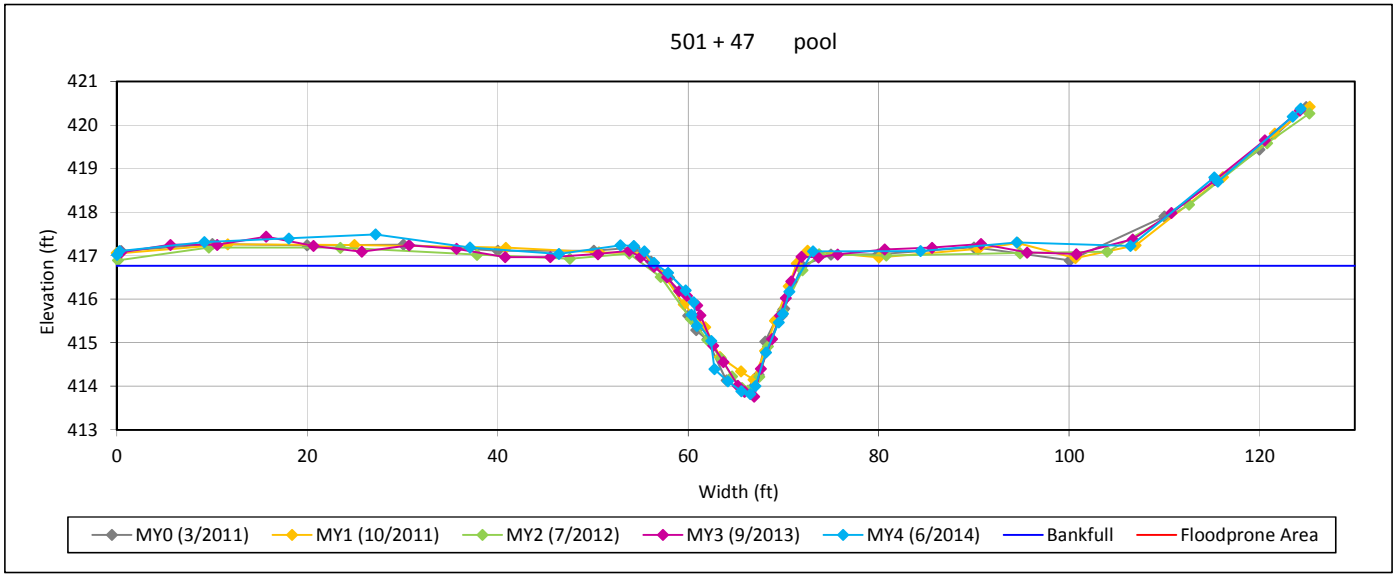
[1] Water surface slope wasn't calculated because there was little to no baseflow during Year 2 Monitoring.

Longitudinal Profile Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
UT2
Monitoring Year 4



Cross-Section Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Monitoring Year 4

Cross Section 11-UT2



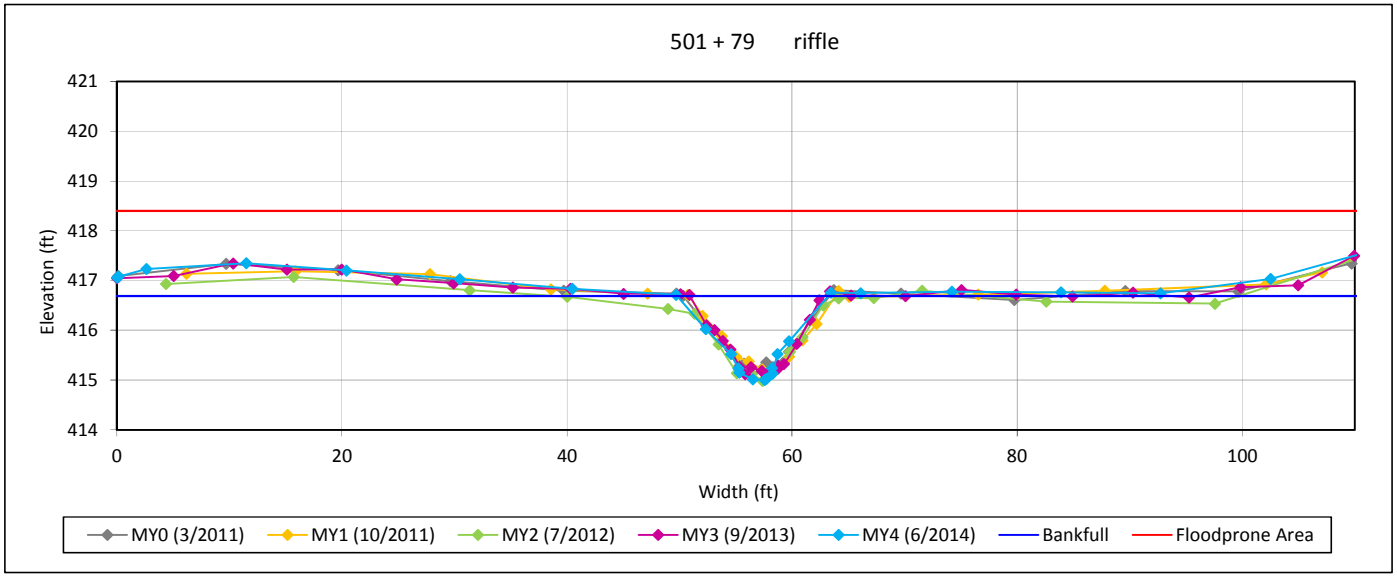
Bankfull Dimensions	
22.88	x-section area (ft.sq.)
15.40	width (ft)
1.49	mean depth (ft)
2.95	max depth (ft)
18.25	wetted parimeter (ft)
1.25	hyd radi (ft)
10.36	width-depth ratio

Survey Date: Jun-14
Field Crew: KB, AT

View Downstream (6/2014)

Cross-Section Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Monitoring Year 4

Cross Section 12-UT2



Bankfull Dimensions	
12.1	x-section area (ft.sq.)
13.5	width (ft)
0.9	mean depth (ft)
1.7	max depth (ft)
14.2	wetted parimeter (ft)
0.9	hyd radi (ft)
15.1	width-depth ratio

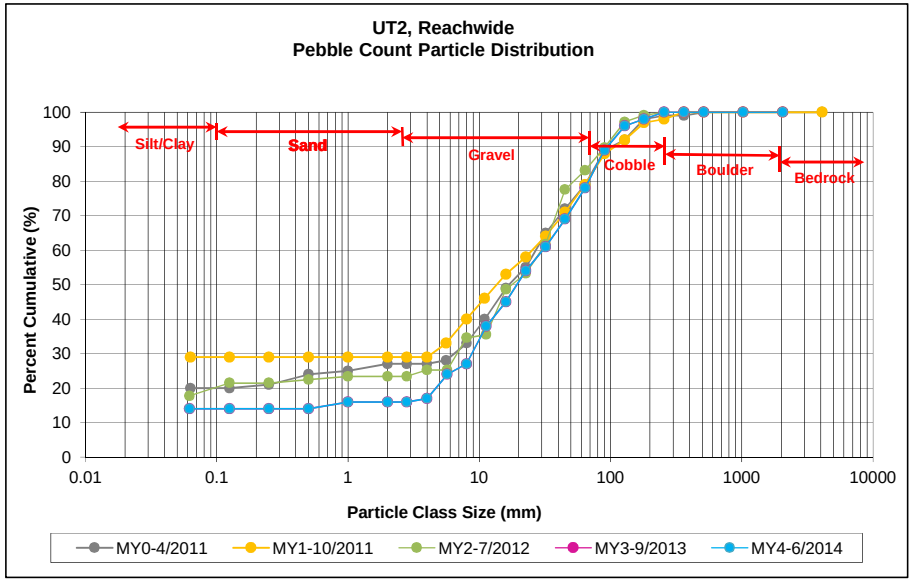
Survey Date: Jun-14
Field Crew: KB, AT

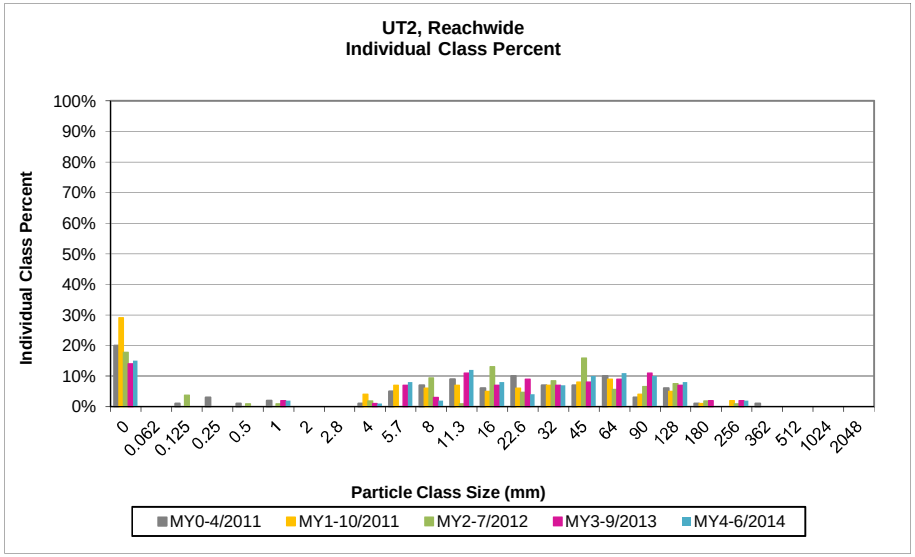
View Downstream (6/2014)

Reachwide and Cross-Section Pebble Count Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
UT2, Reachwide
Monitoring Year 4

Particle Class		Diameter (mm)		Particle Count			UT2 Summary	
		min	max	Riffle	Pool	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	3	12	15	15%	15
SAND	Very fine	0.062	0.125					15
	Fine	0.125	0.250					15
	Medium	0.250	0.500					15
	Coarse	0.5	1.0					15
	Very Coarse	1.0	2.0	1	1	2	2%	17
GRAVEL	Very Fine	2.0	2.8					17
	Very Fine	2.8	4.0					17
	Fine	4.0	5.7		1	1	1%	18
	Fine	5.7	8.0	1	7	8	8%	26
	Medium	8.0	11.3	1	1	2	2%	28
	Medium	11.3	16.0	4	8	12	12%	40
	Coarse	16.0	22.6	1	7	8	8%	48
	Coarse	22.6	32	1	3	4	4%	52
	Very Coarse	32	45	5	2	7	7%	59
	Very Coarse	45	64	10		10	10%	69
COBBLE	Small	64	90	7	4	11	11%	80
	Small	90	128	9	1	10	10%	90
	Large	128	180	5	3	8	8%	98
	Large	180	256					98
BOULDER	Small	256	362	2		2	2%	100
	Small	362	512					100
	Medium	512	1024					100
	Large/Very Large	1024	2048					100
BEDROCK	Bedrock	2048	>2048					100
			Total	**50**	**50**	**100**	**100%**	**100**

Reachwide	
Channel materials (mm)	
D_{16} =	Silt/Clay
D_{35} =	13.69
D_{50} =	26.89
D_{84} =	103.62
D_{95} =	158.40
D_{100} =	362

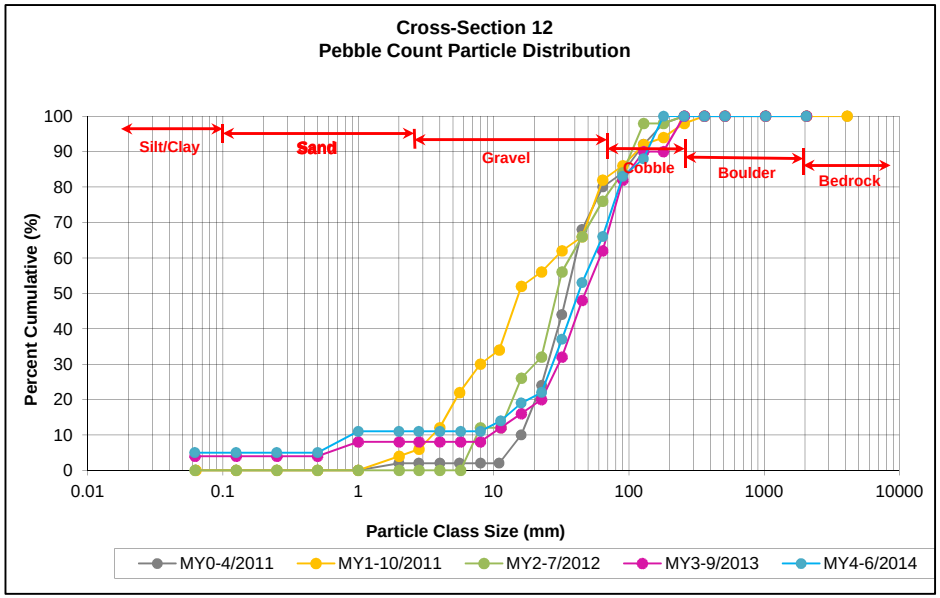


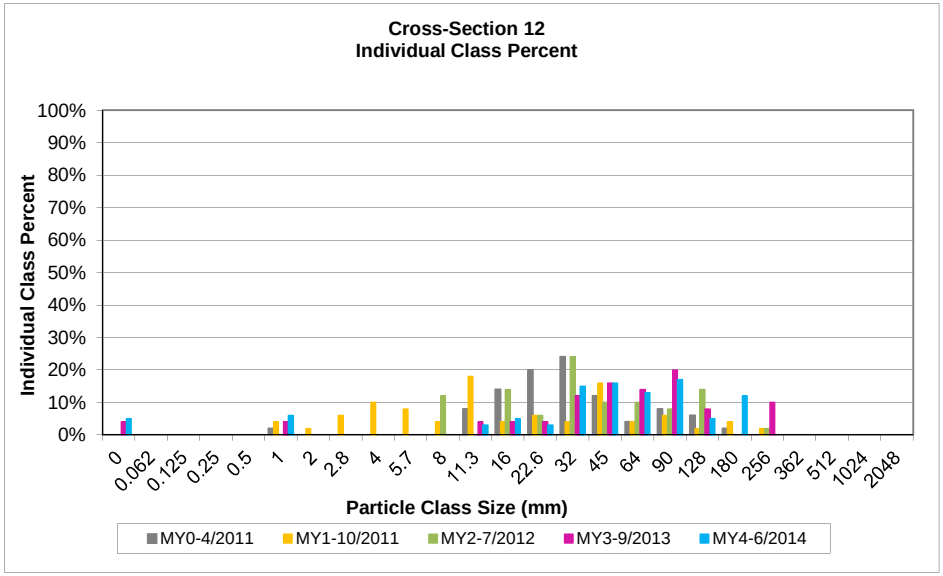


Reachwide and Cross-Section Substrate Plots
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
UT2, Cross-Section 12 (Riffle)
Monitoring Year 3

Particle Class		Diameter (mm)		Particle Count	Cross-Section 12 Summary	
		min	max	Total	Class Percentage	Percent Cumulative
SILT/CLAY	Silt/Clay	0.000	0.062	5	5	5
SAND	Very fine	0.062	0.125			5
	Fine	0.125	0.250			5
	Medium	0.250	0.500			5
	Coarse	0.5	1.0			5
	Very Coarse	1.0	2.0	6	6	11
GRAVEL	Very Fine	2.0	2.8			11
	Very Fine	2.8	4.0			11
	Fine	4.0	5.7			11
	Fine	5.7	8.0			11
	Medium	8.0	11.3			11
	Medium	11.3	16.0	3	3	14
	Coarse	16.0	22.6	5	5	19
	Coarse	22.6	32	3	3	22
	Very Coarse	32	45	15	15	37
	Very Coarse	45	64	16	16	53
COBBLE	Small	64	90	13	13	66
	Small	90	128	17	17	83
	Large	128	180	5	5	88
	Large	180	256	12	12	100
BOULDER	Small	256	362			100
	Small	362	512			100
	Medium	512	1024			100
	Large/Very Large	1024	2048			100
BEDROCK	Bedrock	2048	>2048			100
			Total	**100**	**100**	**100**

Cross-Section 12	
Channel materials (mm)	
D_{16} =	18.37
D_{35} =	43.00
D_{50} =	59.91
D_{84} =	137.03
D_{95} =	221.06
D_{100} =	256.00





APPENDIX 5. Hydrology Data

Table 13. Hydrology Summary Data
Scaly Bark Creek Mitigation Site (EEP Project No. 94148)
Monitoring Year 4

Reach	Date Recorded	Approximate Date of Occurrence	Gage Reading (ft)	Bankfull Event Met
Scaly Bark				
	1/21/2014	u	1.9	Y
	6/10/2014	u	2.65	Y
UT1				
UT2				
	1/21/2014	u	0.85	Y