Tick Creek Stream Restoration Project – Project # 379
Chatham County, North Carolina

First Annual Monitoring Report - FINAL
February 2006

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TICK CREEK STREAM RESTORATION – Projcet # 379
2006 MONITORING REPORT

CONDUCTED FOR THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

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I. Executive Summary/Project Abstract

The Tick Creek stream restoration and preservation project is located southeast of Siler City, in Chatham County, North Carolina, southeast of the intersection of Rives Chapel Church Road and Jim Moody Road. The project design was completed by the North Carolina Department of Transportation (NCDOT) in 2002, and includes preservation of a 114 foot wide buffer along 3,733 feet of Tick creek (immediately downstream of the Rives Chapel Church Road Bridge), and restoration of 2,597 feet of an unnamed tributary to Tick Creek (UT). The entire project occupies 29 contiguous acres in USGS HUC 03030003070023 (NCDWQ Cape Fear River Subbasin 03-06-12). According to telephone conversations with Jamie Lancaster, PE (construction project manager, NCDOT), construction was completed on the Tick Creek site on 1 September 2005 and bare rootstock planting was completed during the week of 6 February 2006.

As-built qualitative evaluation was conducted by RJG&A during early February 2006. Subsequent qualitative evaluation was conducted during early March, late June, and September 2006. Quantitative as-built geomorphological data were collected by RJG&A during early March 2006. The first annual vegetation monitoring data were collected during September 2006, using EEP's August 2006 monitoring protocol. The first annual geomorphological monitoring data were collected during October 2006.

The restoration/preservation project has met its design goals. No major geomorphologic changes have occurred during the first monitoring year. Aquatic and semi-aquatic organisms have colonized most of the restoration area and the average woody stem density (687 per acre) has exceeded the vegetation restoration goal.

II. Project Background

A. Location and Setting

To get to the Tick Creek restoration site from U.S. 64, turn south on Rives Chapel Church Road (~0.9 mile east of Siler City), travel 4.4 miles, turn left (east) onto Jim Moody Road. The upstream boundary of the unnamed tributary restoration site is 0.3 miles east of the intersection, on the right (south) side of the road. The project's western easement boundary (preservation) begins on the downstream side of the Rives Chapel Church Road Bridge over Tick Creek (south of the Jim Moody Rd. intersection) (Figure 1).

The 2002 Tick Creek Restoration Plan describes the site's pre-restoration land use as cattle pasture that involved agricultural clearing, stream ditching and striating, and unrestricted cattle access to the stream. This land use caused bank instability, which increased sediment load. This caused the direct loss of aquatic habitat and caused the impairment and degradation of aquatic resources along the restoration project's entire reach (from the Jim Moody Road culvert, to the confluence with Tick Creek).

B. Structure and Objectives

A Priority I stream restoration was used along the UT's entire reach to restore pre-agricultural water quality, aquatic habitat function and value, sediment transport

capability, and bank stability. The project involved bedform transformations, channel dimension adjustments, pattern alterations, structure installation (root wads, rock vanes, and woody debris), and riparian buffer restoration (woody vegetation planting and stock exclusion).

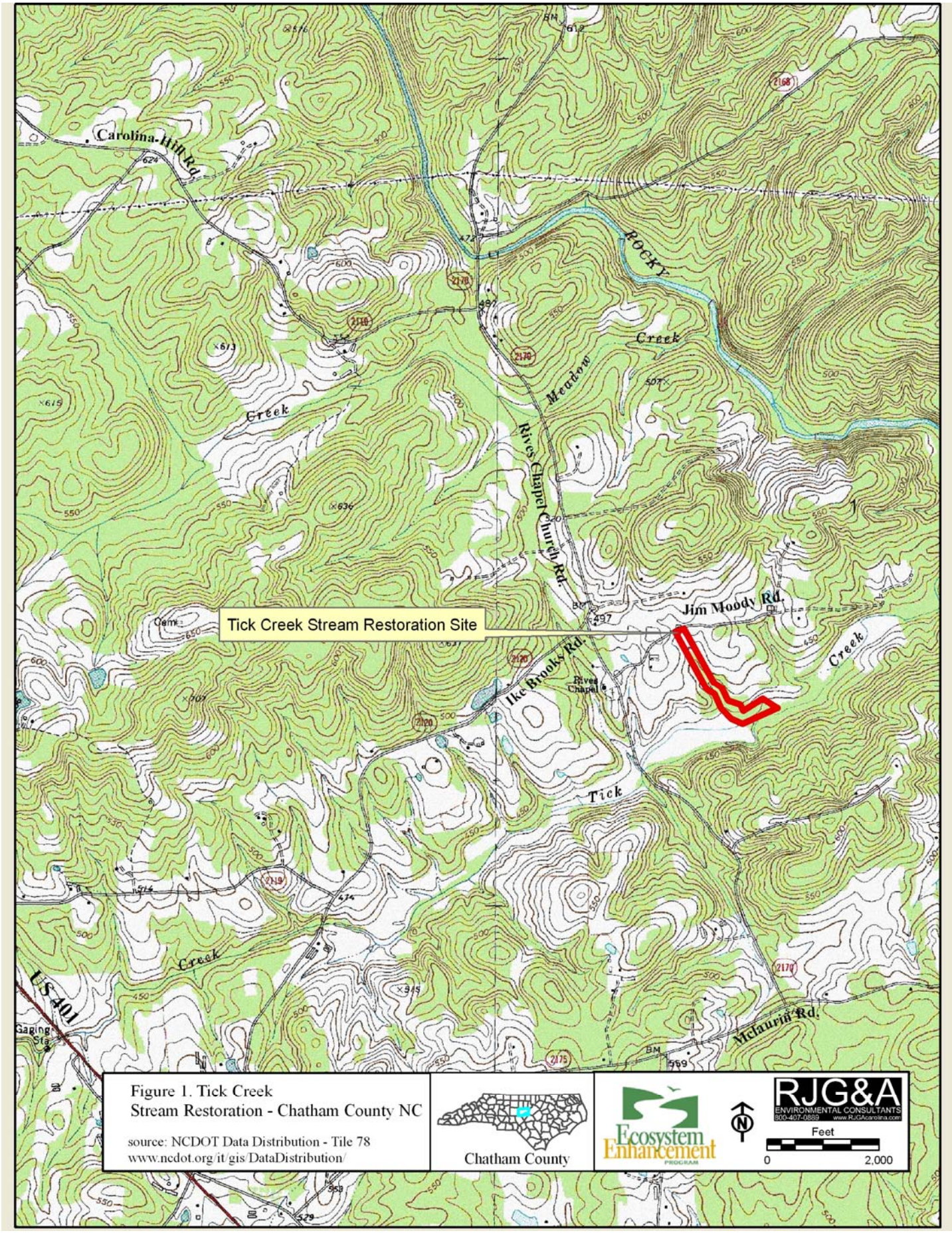

Tick Creek Stream Restoration Site
Carolina Hill Rd
Rocky Creek
Meadow Creek
Rives Chapel Church Rd.
Jim Moody Rd.
Ike Brooks Rd.
Tick Creek
McLaurin Rd.
US 401
Gaging Sta.
Cem.
Rives Chapel
Figure 1. Tick Creek
Stream Restoration - Chatham County NC
source: NCDOT Data Distribution - Tile 78
www.ncdot.org/it/gis/DataDistribution/
Chatham County
Ecosystem Enhancement PROGRAM
RJG&A
ENVIRONMENTAL CONSULTANTS
800-407-0889 www.RJGAcarolina.com
Feet
0
2,000

Exhibit Table I. Mitigation Structure and Objectives (from NCDOT Tick Creek Restoration Plan) Tick Creek Stream Restoration – EEP Project #379						
Reach ID	Mitigation Type	Approach	Linear Feet	Stationing	Mitigation Credits (ratio)	Comment
Tick Creek	Preservation		3,733		1,244 (3:1)	Protection of high quality aquatic habitat (rare mussels)
Reach 1	Restoration	Priority 1	2,946	10+00-14+50	2,946 (1:1)	Shallow pools, small meanders, and steep riffles
Reach 2	Restoration	Priority 1		20+00-35+00		Realigned, widened floodplain
Reach 3	Restoration	Priority 1		40+00-49+00		Realigned, reconnected to floodplain

C. History and Background

Exhibit Table II. Activity and Reporting History Tick Creek Stream Restoration - EEP Project #379		
Activity or Report	**Data Collection**	**Completion**
Restoration Plan	February – May 2002	September 2002
Construction	NA	1 September 2005
Temporary S&E mix applied	NA	NA
Permanent seed mix applied	NA	NA
Bare Root Planting	NA	6 February 2006
Mitigation Plan	NA	NA
As-built	March 2006	
Year 1 Monitoring		November 2006
Vegetation	September 2006	
Geomorphological	October 2006	

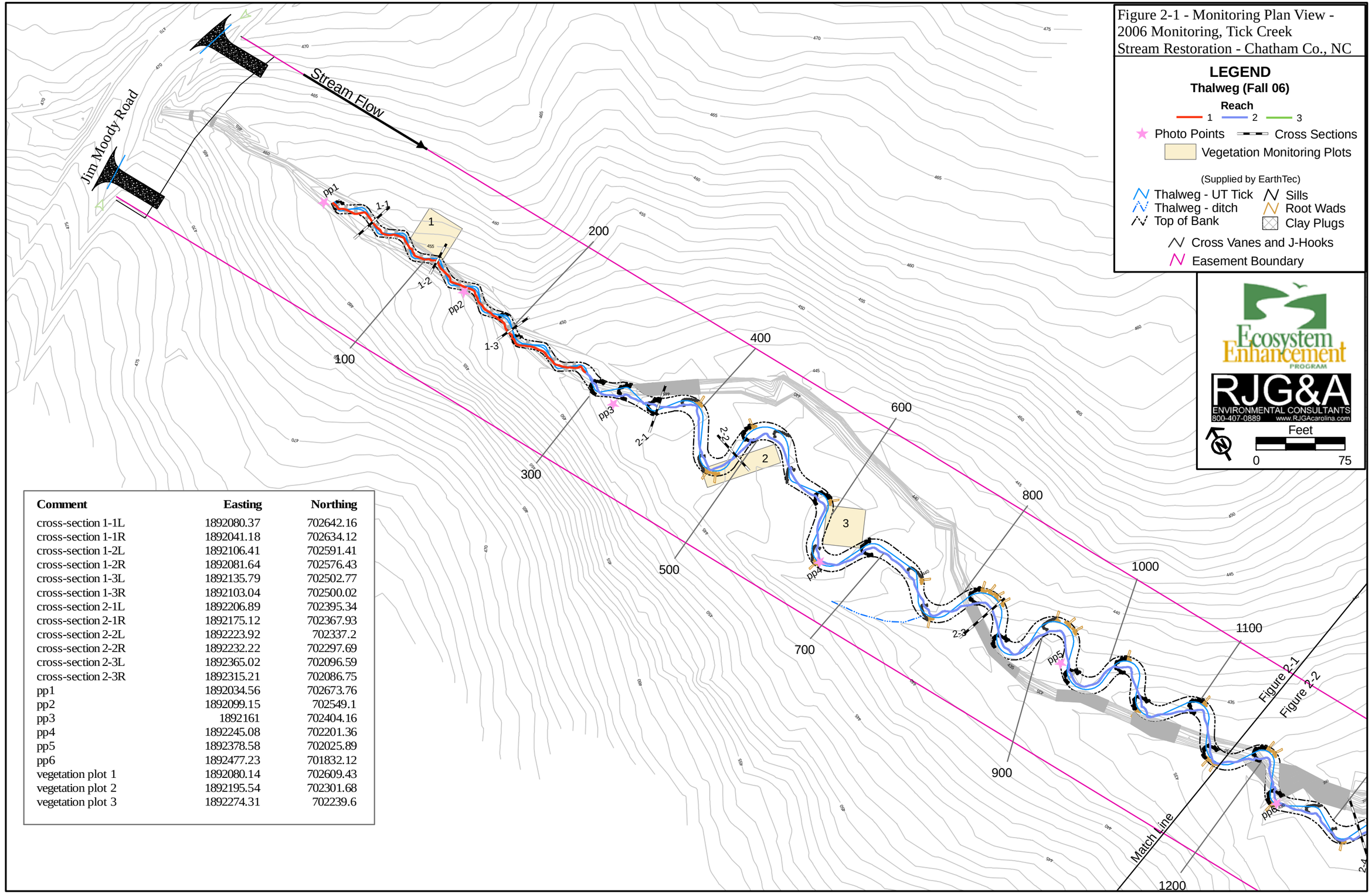
Exhibit Table III. Project Contacts Tick Creek Stream Restoration - EEP Project #379
Design: Earth Tech 701 Corporation Center Drive, Suite 475 Raleigh, NC 27607 Mr. Ron Johnson (919) 854-6210 North Carolina Department of Transportation Natural Environment Unit Natural Environment Engineering Group 1598 Mail Service Center, Raleigh, NC 27699-1598 Mr. Jamie Lancaster, Supervisor (919) 715-1441
Construction Contractor: NA
Monitoring Performers: RJG&A 1221 Corporation Parkway, Suite 100 Raleigh, NC 27616 Mr. Ward Marotti (919) 872-1174

Exhibit Table IV. Project Background - Tick Creek Stream Restoration - EEP Project #379	
County	Chatham
Drainage Area	96 acres (0.15 square miles)
Drainage Impervious Cover Estimate (%)	
Stream Order	First Order
Physiographic Region	Piedmont
Ecoregion	Carolina Slate Belt
Rosgen Classification of As-built	
Reach 1	B6
Reach 2	C5b
Reach 3	E6
Dominant Soil Types	
Reach 1	Georgeville silt loam
Reach 2	Georgeville silt loam
Reach 3	Nanford Badin complex (upper ~1,000 feet), Riverview (lower ~400 feet, to confluence with Tick Creek)
Reference Site ID	Spencer Creek
USGS HUC for Project and Reference	03030003070023, 03040103050090
NCDWQ Sub-basin for Project and Reference	03-06-12, 03-07-09

Exhibit Table IV. Project Background - Tick Creek Stream Restoration - EEP Project #379	
NCDWQ Classification for Project and Reference	C
Any portion of the project segment 303d listed?	No
Any portion of the project segment upstream of a 303d listed segment?	No – not in NCDWQ 30-06-12
Reasons for 303d Listing or Stressor	NA
% of Project Easement Fenced 0%	

Figure 2. Monitoring Plan View

Figure 2-1 - Monitoring Plan View - 2006 Monitoring, Tick Creek Stream Restoration - Chatham Co., NC



LEGEND

Thalweg (Fall 06)

Reach

1 2 3

Photo Points

Cross Sections

Vegetation Monitoring Plots

(Supplied by EarthTec)

Thalweg - UT Tick

Thalweg - ditch

Top of Bank

Sills

Root Wads

Clay Plugs

Cross Vanes and J-Hooks

Easement Boundary

Ecosystem Enhancement Program

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Feet

0 75

Comment	Easting	Northing
cross-section 1-1L	1892080.37	702642.16
cross-section 1-1R	1892041.18	702634.12
cross-section 1-2L	1892106.41	702591.41
cross-section 1-2R	1892081.64	702576.43
cross-section 1-3L	1892135.79	702502.77
cross-section 1-3R	1892103.04	702500.02
cross-section 2-1L	1892206.89	702395.34
cross-section 2-1R	1892175.12	702367.93
cross-section 2-2L	1892223.92	702337.2
cross-section 2-2R	1892232.22	702297.69
cross-section 2-3L	1892365.02	702096.59
cross-section 2-3R	1892315.21	702086.75
pp1	1892034.56	702673.76
pp2	1892099.15	702549.1
pp3	1892161	702404.16
pp4	1892245.08	702201.36
pp5	1892378.58	702025.89
pp6	1892477.23	701832.12
vegetation plot 1	1892080.14	702609.43
vegetation plot 2	1892195.54	702301.68
vegetation plot 3	1892274.31	702239.6

Figure 2-2 - Monitoring Plan View -
2006 Monitoring, Tick Creek
Stream Restoration - Chatham Co., NC

LEGEND

Thalweg (Fall 06)

Reach 1 2 3

Photo Points
Cross Sections
Vegetation Monitoring Plots

(Supplied by EarthTec)

Thalweg - UT Tick
Thalweg - ditch
Top of Bank
Sills
Root Wads
Clay Plugs
Cross Vanes and J-Hooks
Easement Boundary

Ecosystem Enhancement Program

RJG&A ENVIRONMENTAL CONSULTANTS
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Feet
0 100

Match Line
Figure 2-1
Figure 2-2
Stream Flow
Tick Creek
Line 19

Comment	Easting	Northing
cross-section 2-4L	1892532.58	701805.62
cross-section 2-4R	1892518.16	701741.70
cross-section 2-5L	1892679.40	701675.36
cross-section 2-5R	1892659.26	701620.48
cross-section 2-6L	1892763.48	701524.40
cross-section 2-6R	1892730.43	701476.81
cross-section 3-1L	1892896.76	701414.25
cross-section 3-1R	1892932.61	701368.36
cross-section 3-2L	1893050.18	701348.53
cross-section 3-2R	1892990.70	701332.72
cross-section 3-3L	1893054.36	701213.09
cross-section 3-3R	1893067.19	701154.71
cross-section 3-4L	1893161.15	701223.87
cross-section 3-4R	1893178.78	701180.80
cross-section 3-5L	1893242.02	701287.05
cross-section 3-5R	1893271.60	701237.59
cross-section 3-6L	1893291.75	701314.05
cross-section 3-6R	1893324.68	701273.71
pp10	1892986.19	701373.27
pp11	1893011.89	701236.21
pp12	1893163.53	701215.41
pp13	1893262.86	701281.20
pp14	1893330.33	701330.77
pp7	1892648.10	701701.40
pp8	1892734.76	701513.44
pp9	1892810.79	701400.78
vegetation plot 4	1892528.60	701742.96
vegetation plot 5	1892940.30	701393.70
vegetation plot 6	1893080.81	701227.22
vegetation plot 7	1893283.08	701263.81
vegetation plot 8	1893058.97	700909.45

III. Project Conditions and Monitoring Results

The site was initially evaluated in early February 2006 and appeared to be functioning as designed. Subsequent evaluations in March, June, September, and October 2006 also revealed relatively complete design compliance, with a few minor exceptions, detailed below.

A. Vegetation Assessment

1. Soil Data

Exhibit Table V. Preliminary Soil Data – Tick Creek Stream Restoration - EEP Project #379					
Series	Max Depth (in.)	% Clay on Surface	K	T	OM%
Georgeville	80	5-27	0.49	5	0.5-2.0
Nanford-Badin	80	10-27	0.43	4	1.0-3.0
Riverview	80	10-27	0.32	5	0.5-2.0

2. Vegetation Problem Areas

Overall, planted woody vegetation appeared to be successful when evaluated during September 2006, with only a few minor problem areas.

Exhibit Table VI. Vegetation Problem Areas – Tick Creek Stream Restoration - EEP Project #379			
Feature/Issue	**Station/Range**	**Probable Cause**	**Photo #**
No/Limited Planting	00-320	Planting Crew Oversight	VP1
Dense herbaceous invasives	565-1525	Abundant groundwater	VP2
Lower planted woody stem success (relative to Reaches 1 and 2)	2300-2630	Soil Compaction During Construction	VP3

2.1. Reach 1

Woody stem planting in the areas furthest from the stream banks was sporadic, minimal, and absent in some places. Because of the lack of overstory from mature trees, which are present in Reach 2 and most of Reach 3, early successional herbaceous volunteer density and relative cover was high (dog fennal (*Eupatorium capillofolium*), and horseweed (*Conyza canadensis*)). Invasive woody volunteers were not quantitatively observed in Reach 1's monitoring plots, and were relatively sparse outside the plots. This type of early sucessional herbaceous density is common in recently disturbed areas and can be beneficial to the planted stems by prolonging soil moisture in upland areas and reducing early evapotranspiration, provided invasive woody species don't also colonize, and the newly planted *understory* of woody stems remains successful.

2.2. Reach 2

Reach 2 had good success rates for planted individuals, but invasion from autumn olive (*Eleaganus umbellata*), mimosa (*Albizia julibrissin*), and Chinese and Japanese privet (*Ligustrum sinense* and *L. japonicum*, respectively) has begun. In addition to invasive exotic woody species colonization, many native early-successional woody species have began to colonize Reach 2 (e.g. red maple (*Acer rubrum*), sweet gum (*Liquidambar styraciflua*), Southern red cedar (*Juniperus virginiana*), black cherry (*Prunus serotina*), and Virginia creeper (*Parthenocissus quinquefolia*). These aggressive early-successional woody volunteers are common, and in some places quite dense, in the adjacent undisturbed (during restoration) forests. Because of this, successful management of these species within the restoration area may be difficult, without also eliminating them from the adjacent forest understory. Similarly, the invasive herbaceous Chinese lespedeza (*Lespedeza cuneata*) is relatively dense in portions of Reach 2, especially where groundwater is at the surface. The planted woody stem success under these invasive herbaceous stands is relatively high, so continued observation, without remedial action, is appropriate.

2.3. Reach 3

Reach 3 had planted woody stem density well above the targeted 320 stems per acre, and relatively minimal invasive species problems. A number of dead individuals were observed along the inside of Reach 3's final large bend. Invasive individuals were present, but much less dense than in either Reach 1 or Reach 2. A suspected cause of the relatively high mortality inside this large bend is substrate compaction. The Restoration Design Plan View map indicates that a relatively large *staging area* was located here during construction. Because of the adequate live planted stem density in plot 6 no remedial action is recommended at this time. Like in the Reach 1 and Reach 2 problem areas, continued observation is appropriate.

3. Stem Counts

Eight representative vegetation survey plots were selected and installed in reaches 1, 2, and 3 during September 2006, pursuant to the new EEP vegetation monitoring protocol (August, 2006). All plots measure 100 square meters in area and are either 10 meters by 10 meters, or five meters by 20 meters. Level 1 (planted woody stems) and Level 2 (volunteer woody stems) data collection was performed concurrently with plot selection, during September 2006. As a result, the first annual monitoring results should be considered the *as built* during subsequent years' vegetation monitoring and relative success evaluation.

Pursuant to the new guidelines, the four corners of each plot (0,0; 0,10; 10,0; and 10,10 were marked with 18 inch long one half inch diameter galvanized steel conduit. Within each plot, each planted woody stem location (x and y) was recorded and live stem diameter at decimeter height (ddm), and height (cm) were recorded.

The average live, planted woody stem density for all plots was, 24.13 individuals per plot, which translates to 976.34 stems per acre. This exceeds the required 320 stems per acre by 305 percent.

Exhibit Table VII. Stem counts and summary data by species and plot – Tick Creek Stream Restoration - EEP Project #379

										----------Reach----------							
										--1--	----2----			----3----			Tick Creek
SPECIES	**Total Live Stems**	**Total Planted**	**Survival Percent**	**Average (all plots)**	**Average ddh (mm)**	**Relative Abundance**	**Relative # Dead**	**Average # Stems**	**Total Dead**	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**	**Plot 6**	**Plot 7**	**Plot 8**
Betula nigra	10.00	11.00	90.91	1.25	5.53	5.18	0.52	5.00	1	9	1						
Cornus amomum	2.00	5.00	40.00	0.25	NA	1.04	1.55	2.00	3	2							
Fraxinus pennsylvanica	24.00	24.00	100.00	3.00	7.72	12.44	0.00	6.00			9	9		1			5
Liriodendron tulipifera	29.00	32.00	90.63	3.63	7.24	15.03	1.55	7.25	3			8		6	8		7
Platanus occidentalis	34.00	38.00	89.47	4.25	13.96	17.62	2.07	11.33	4				10	10		14	
Quercus alba	30.00	31.00	96.77	3.75	5.00	15.54	0.52	15.00	1						10	20	
Quercus falcata	6.00	9.00	66.67	0.75	5.25	3.11	1.55	2.00	3		2			2			2
Quercus nigra	2.00	2.00	100.00	0.25	4.03	1.04	0.00	2.00			2						
Quercus phellos	7.00	7.00	100.00	0.88	3.69	3.63	0.00	1.75			3		2	1			1
Quercus rubra	10.00	10.00	100.00	1.25	7.50	5.18	0.00	5.00					1				9
Salix nigra	34.00	34.00	100.00	4.25	NA	17.62	0.00	6.80		6	5	7		10		6	
Ulmus alata	4.00	4.00	100.00	0.50	10.25	2.07	0.00	4.00									4
Ulmus americana	1.00	1.00	100.00	0.13	5.86	0.52	0.00	1.00				1					
Total planted woody stems (all plots)	**193**	**208**	**92.79**			**100.00**	**7.77**		**15**	**17**	**22**	**25**	**13**	**30**	**18**	**40**	**28**
Total planted woody stems per acre	**976.34**								**75.88**	**688**	**890**	**1,012**	**526**	**1,214**	**728**	**1,619**	**1,133**
Average all woody stems per acre	**2,600.58**								**75.88**	**688**	**2,671**	**1,295**	**7,406**	**7,568**	**8,134**	**16,471**	**3,642**

4. Vegetation Plot Photos
Vegetation plot photos are in Appendix A.

B. Stream Assessment

RJG&A staff evaluated the Tick Creek Stream Restoration site during February, March, July, September, and October 2006 and took photographs and notes regarding the condition and success of the project. Overall, the site is maintaining its as-built dimension, pattern, and profile, and planted woody stem success is high.

After a detailed preliminary evaluation in February, RJG&A staff selected 15 cross section sites for annual monitoring. The RJG&A staff collected the *as-built* quantitative geomorphological data (15 cross sections and approximately 2,800 linear stream feet) during the first half of March 2006. The first annual monitoring data were collected during October 2006. Photographs were taken at all cross sections, and at the 14 permanent photo locations, which were established by NCDOT during February 2006.

As the quantitative data and qualitative evaluations indicate, after the first growing season the structure and function of the entire restoration project very closely match the as built conditions (i.e. very little change has occurred).

The only potential future structural problems observed were the 18 locations where, during low flow, water flows under, and through the surface rock cross vanes. Water usually *daylights* at or near the surface of downstream pools, above the supporting rock layer. These sites are not considered true *back cuts*, as they only occur between rocks, during extremely low flow conditions. Immediate remedial action is therefore not recommended but on-going observation is appropriate, particularly the downstream-most site (station 27+54), which appears to be growing.

A *wetted perimeter* bed material analysis was performed at each cross section. Silt and clay are by far the dominant bed material throughout the entire restoration site.

No crest gauges are installed on the Tick Creek site and on-site quantitative hydrologic evaluation is not possible. Qualitative evaluation did not indicate any bankfull events during the first growing season. During the September 2006 evaluation, no flowing water was observed. Water was present, along with fish and amphibians, only in pools.

No crest gauges are installed at this site to document bankfull events. Potential occurrence was based on USGS stream gauge discharge data for Tick Creek near Mount Vernon Springs (USGS 02101800). This gauge is located approximately 3 miles upstream on Tick creek from the confluence on the restoration site and has a drainage area of 15.5 square miles. Bankfull discharge at this gauge is 655.3 cubic feet per second (cfs) (Harmen, 1999). Based on USGS data for 2006 (Figure X), there has been one

bankfull event at this gauge (1,390 cfs on November 22) and one event just below bankfull (644 cfs on April 27). The only other high flow event that approached bankfull was 519 cfs on November 16th.

Figure 3. USGS Stream gauge data for Tick Creek upstream of US 421 - Tick Creek Stream Restoration - EEP Project #379

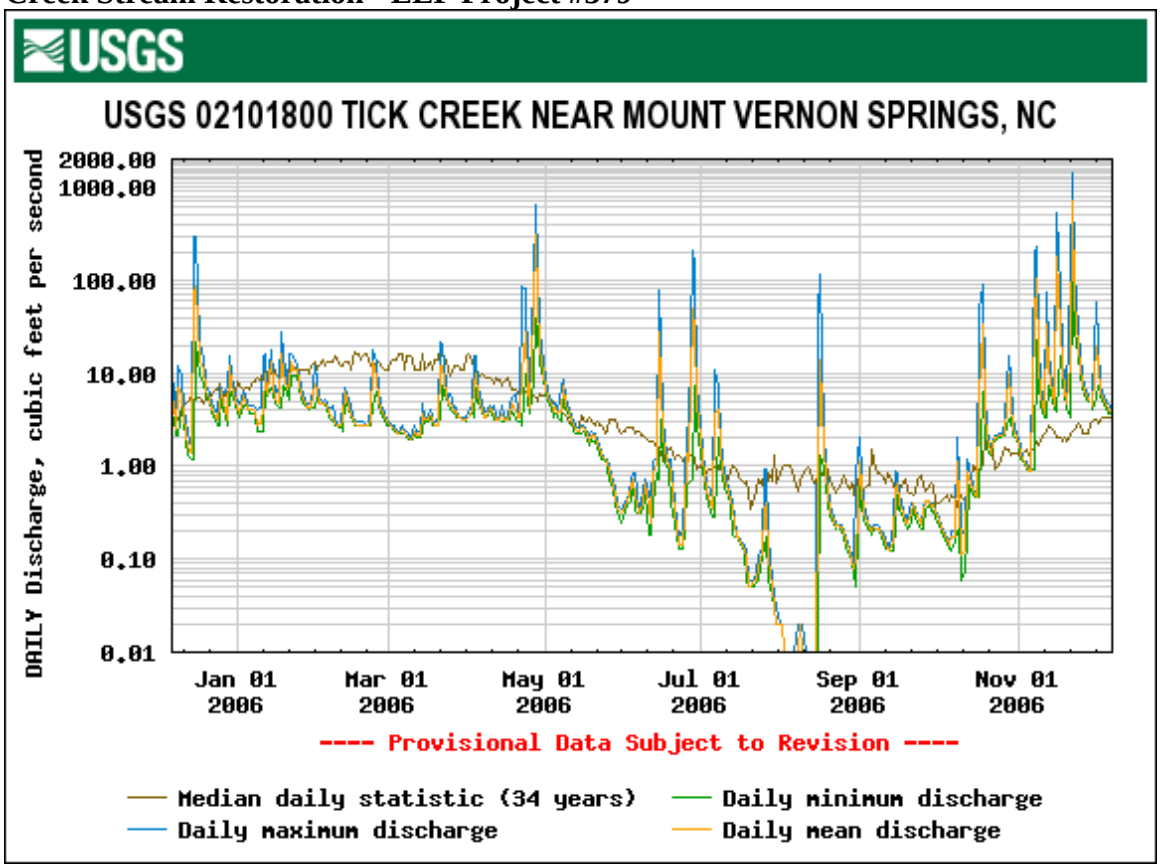


Exhibit Table VIII. Verification of Bankfull Events – Tick Creek Stream Restoration - EEP Project #379			
Date of Data Collection	**Date of Occurrence (mm/dd/yy)**	**Method**	**Photo #**
2006	11/22/06	Proximal USGS gauge resource	NA

Table IX BEHI and Sediment Export Estimates only apply to Monitoring years 3 and 5 and were not performed during 2006 (monitoring year 1).

Exhibit Table X. Stream Problem Areas - Tick Creek Stream Restoration - EEP Project #379			
Feature/Issue	**Station**	**Probable Cause**	**Photo #**
Cross Vane Piping/backcutting	290	No coarse backfill	SP1 & 2
Cross Vane Piping/backcutting	545	No coarse backfill	
Cross Vane Piping/backcutting	625	No coarse backfill	

Exhibit Table X. Stream Problem Areas - Tick Creek Stream Restoration - EEP Project #379			
Cross Vane Piping/backcutting	680	No coarse backfill	
Cross Vane Piping/backcutting	760	No coarse backfill	
Cross Vane Piping/backcutting	1001	No coarse backfill	
Cross Vane Piping/backcutting	1418	No coarse backfill	SP1 & 2
Cross Vane Piping/backcutting	1495	No coarse backfill	
Cross Vane Piping/backcutting	2050	No coarse backfill	
Cross Vane Piping/backcutting	2145	No coarse backfill	
Cross Vane Piping/backcutting	2242	No coarse backfill	
Cross Vane Piping/backcutting	2365	No coarse backfill	
Cross Vane Piping/backcutting	2533	No coarse backfill	
Cross Vane Piping/backcutting	2568	No coarse backfill	
Cross Vane Piping/backcutting	2665	No coarse backfill	
Cross Vane Piping/backcutting	2754	No coarse backfill	
Exposed Matting	808	Not trimmed after construction	SP3
Pool Filling/Deposition	2180	unknown	SP4

Exhibit Table XI. Categorical Stream Feature Visual Stability Assessment Tick Creek Stream Restoration - EEP Project #379				
Reach 1(286 feet)				
Feature	Initial	MY-01	MY-02	MY-03
A. Riffles	100%	100%		
B. Pools	100%	100%		
C. Thalweg	100%	100%		
D. Meanders	100%	100%		
E. Bed General	100%	100%		
F. Vanes/J Hooks, etc.	100%	100%		
G. Wads and Boulders	NA	NA		
Reach 2 (1,521 feet)				
A. Riffles	100%	100%		
B. Pools	100%	100%		
C. Thalweg	100%	100%		
D. Meanders	100%	100%		
E. Bed General	100%	100%		
F. Vanes/J Hooks, etc.	100%	93%		
G. Wads and Boulders	100%	100%		
Reach 3 (974 feet)				
A. Riffles	100%	100%		
B. Pools	100%	99%		
C. Thalweg	100%	100%		
D. Meanders	100%	100%		
E. Bed General	100%	100%		
F. Vanes/J Hooks, etc.	100%	92%		
G. Wads and Boulders	100%	100%		

Exhibit Table XII. Baseline Morphology and Hydraulic Summary - Tick Creek Stream Restoration - EEP Project #379

Parameters			**Pre-existing condition**		
Dimension	**USGS Data**	**Regional Curve Interval**	**Reach 1**	**Reach 2**	**Reach 3**
Floodprone Elevation (ft)			NA	NA	NA
Bankfull Elevation (ft)			NA	NA	NA
Floodprone Width (ft)			33.00	11-50.	50.00
Bankfull Width (ft)		7.33	7.30	7-8.6	5.6-7.9
Entrenchment Ratio			4.50	4.10	7.40
Mean Depth (ft)		0.95	0.90	0.9-1.3	1.2-1.7
Maximum Depth (ft)			1.50	1.5-1.9	1.9-2.1
Width/Depth Ratio			8.50	5.5-7.0	3.30
Bankfull Area (sq ft)		6.17	6.30	7.9-9.7	9.3-9.5
Wetted Perimeter (ft)			NA	NA	NA
Hydraulic Radius (ft)			NA	NA	NA
Substrate					
d50 (mm)			NA	NA	NA
d84 (mm)			NA	NA	NA
Pattern					
Channel Beltwidth (ft)			0	0-22	26
Radius of Curvature (ft)			0	7-10.	8.0-9.0
Meander Wavelength			0	25-31	-
Meander Width ratio			0	1.3-2.8	3.8
Profile					
Riffle length (ft)			NA	NA	NA
Riffle slope (ft/ft)			0.022-0.20	0.0072-0.078	0.0006-0.053
Pool length (ft)			NA	NA	NA
Pool spacing (ft)			8.5-68	11-72.	18-50
Additional Reach Parameters					
Valley Length (ft)			NA	NA	NA
Channel Length (ft)			NA	NA	NA
Sinuosity			1.00	1.00	1.00
Water Surface Slope (ft/ft)			NA	NA	NA
BF slope (ft/ft)			NA	NA	NA
Rosgen Classification			E4b	E4-G4	E4
Habitat Index			NA	NA	NA
Macrobenthos			NA	NA	NA

Exhibit Table XII. Baseline Morphology and Hydraulic Summary - Tick Creek Stream Restoration - EEP Project #379

Parameters	Reference Reaches		Design		
Dimension	UT Cane Creek (south fork)	Spencer's Creek	Reach 1	Reach 2	Reach 3
Floodprone Elevation (ft)	NA	NA	NA	NA	NA
Bankfull Elevation (ft)	NA	NA	NA	NA	NA
Floodprone Width (ft)	26-36	229.00	>19	>19	>19
Bankfull Width (ft)	13.0-13.1	8.7-12.3	6.90	12.00	9.50
Entrenchment Ratio	2.40	22.40	>2.6	>1.6	>2.0
Mean Depth (ft)	0.90	0.9-1.2	0.87	0.75	0.95
Maximum Depth (ft)	1.40	1.8-1.9	1.40	1.20	1.50
Width/Depth Ratio	14-14.5	7.2-14	8.00	16.00	10.00
Bankfull Area (sq ft)	11.6-12.2	10.3-10.8	6.00	9.00	9.00
Wetted Perimeter (ft)	NA	NA	NA	NA	NA
Hydraulic Radius (ft)	NA	NA	NA	NA	NA
Substrate					
d50 (mm)	NA	NA	NA	NA	NA
d84 (mm)	NA	NA	NA	NA	NA
Pattern					
Channel Beltwidth (ft)	14-30	24-52	8.0-17.0	13-29	10.0-23.0
Radius of Curvature (ft)	16-25	5.4-22.1	9.5-17	16-29	13-23
Meander Wavelength	32-58	54-196	17-39	29-68	23-54
Meander Width ratio	1.2-2.3	4.2-13.3	1.1-2.4	1.1-2.4	1.1-2.4
Profile					
Riffle length (ft)	NA	NA	NA	NA	NA
Riffle slope (ft/ft)	0.0043-0.041	0.01-0.067	0.040-0.053	0.02-0.029	0.010-0.019
Pool length (ft)	NA	NA	NA	NA	NA
Pool spacing (ft)	37-81	13-47	13-22	36-61	19-38
Additional Reach Parameters					
Valley Length (ft)	NA	NA	NA	NA	NA
Channel Length (ft)	NA	NA	NA	NA	NA
Sinuosity	1.20	1.10	1.10	1.30	1.40
Water Surface Slope (ft/ft)	NA	NA	NA	NA	NA
BF slope (ft/ft)	NA	NA	NA	NA	NA
Rosgen Classification	C4	E4	E4b	C4	E4
Habitat Index	NA	NA	NA	NA	NA
Macrobenthos	NA	NA	NA	NA	NA

Exhibit Table XII. Baseline Morphology and Hydraulic Summary - Tick Creek Stream Restoration - EEP Project #379

As-built

Parameters	**Reach 1**			**Reach 2**			**Reach 3**		
Dimension	min	max	average	min	max	average	min	max	average
Floodprone Elevation (ft)	451.52	457.27	454.60	428.78	448.29	437.69	414.53	421.49	418.05
Bankfull Elevation (ft)	450.32	456.05	453.24	424.98	445.92	435.24	412.49	419.87	415.86
Floodprone Width (ft)	5.95	30.63	21.86	40.40	70.00	53.32	2.41	64.80	37.17
Bankfull Width (ft)	10.38	14.61	11.80	17.92	34.17	21.50	17.01	27.06	22.17
Entrenchment Ratio	0.57	2.95	1.84	1.69	3.90	2.59	0.09	3.45	1.74
Mean Depth (ft)	0.61	0.90	0.71	0.79	1.66	1.16	0.54	1.19	0.86
Maximum Depth (ft)	1.22	1.65	1.37	1.58	3.80	2.45	1.47	2.99	2.18
Width/Depth Ratio	11.52	23.93	17.44	14.68	22.70	18.64	20.20	49.71	27.68
Bankfull Area (sq ft)	6.40	9.91	8.56	14.15	56.89	26.26	11.15	29.22	19.22
Wetted Perimeter (ft)	10.91	14.85	12.28	18.37	35.44	22.49	18.09	27.41	22.93
Hydraulic Radius (ft)	0.59	0.84	0.68	0.77	1.61	1.11	0.54	1.15	0.82
Substrate									
d50 (mm)									
d84 (mm)									
Pattern	min	max	average	min	max	average	min	max	average
Channel Beltwidth (ft)	5.03	10.44	7.65	9.59	55.69	25.99	8.77	28.65	16.67
Radius of Curvature (ft)	5.98	17.01	9.85	24.51	42.96	16.58	6.32	23.07	12.91
Meander Wavelength	32.13	49.67	38.69	41.26	130.14	70.17	35.83	84.30	51.31
Meander Width ratio	0.48	0.71	0.65	0.53	1.63	1.21	0.52	1.06	0.75
Profile									
Riffle length (ft)	7.00	40.00	19.86	4.80	38.00	22.64	6.50	17.50	10.96
Riffle slope (ft/ft)	0.019	0.082	0.042	0.002	0.070	0.024	0.002	0.055	0.028
Pool length (ft)	7.00	20.00	14.04	6.00	48.70	20.86	6.00	46.00	27.16
Pool spacing (ft)	1.00	45.00	16.13	0.5	17.5	6.1	0.5	17.5	6.1
Additional Reach Parameters									
Valley Length (ft)			255			1,150			635
Channel Length (ft)			286			1,535			963
Sinuosity			1.12			1.33			1.52
Water Surface Slope (ft/ft)			0.029			0.018			0.011
BF slope (ft/ft)			0.028			0.015			0.010
Rosgen Classification			B6			C5b			E6
Habitat Index									
Macrobenthos									

Exhibit Table XIII. Morphology and Hydraulic Monitoring Summary - Tick Creek Stream Restoration - EEP Project #379

	XS 1-1		XS 1-2		XS 1-3		XS 2-1		XS 2-2	
Dimension	As-built	Mon 01	As-built	Mon 01	As-built	Mon 01	As-built	Mon 01	As-built	Mon 01
Floodprone Elevation (ft)	457.27	457.15	455.01	454.79	451.52	451.71	448.29	448.32	445.54	445.56
Bankfull Elevation (ft)	456.05	455.98	453.36	453.31	450.32	450.35	445.92	445.95	443.96	443.97
Floodprone Width (ft)	29.01	27.49	5.95	24.74	30.63	33.05	42.00	42.00	40.40	40.50
Bankfull Width (ft)	14.61	13.51	10.38	10.04	10.40	11.09	18.22	18.77	17.92	18.02
Entrenchment Ratio	1.99	2.03	0.57	2.47	2.95	2.98	2.30	2.24	2.25	2.25
Mean Depth (ft)	0.61	0.57	0.90	0.81	0.62	0.64	1.24	1.25	0.79	0.81
Maximum Depth (ft)	1.22	1.17	1.65	1.48	1.25	1.36	2.37	2.37	1.58	1.59
Width/Depth Ratio	23.93	23.64	11.52	12.39	16.88	17.34	14.68	14.98	22.70	22.35
Bankfull Area (sq ft)	9.91	7.72	9.36	8.14	6.40	7.10	22.61	23.53	14.15	14.53
Wetted Perimeter (ft)	14.85	13.73	11.07	10.67	10.91	11.63	19.17	19.60	18.37	18.46
Hydraulic Radius (ft)	0.60	0.56	0.84	0.76	0.59	0.61	1.18	1.20	0.77	0.79
Substrate										
d50 (mm)		0.04		0.04		0.05		0.04		0.04
d84 (mm)		8.00		0.06		16		0.06		0.62

	Reach 1			Reach 2			Reach 3			
Pattern	min	max	average	min	max	average	min	max	average	
Channel Beltwidth (ft)	3.24	8.10	6.17	9.15	54.638	25.81	10.48	29.55	16.44	
Radius of Curvature (ft)	6.04	10.25	8.04	14.40	36.44	24.74	10.13	23.27	16.62	
Meander Wavelength	11.18	38.59	23.34	39.21	121.14	70.53	34.30	83.33	53.97	
Meander Width ratio	0.32	0.60	0.53	0.51	1.66	1.19	0.26	0.46	0.30	
Profile	min	max	average	min	max	average	min	max	average	
Riffle length (ft)	2.24	29.91	12.45	1.88	43.56	23.02	8.21	21.79	16.17	
Riffle slope (ft/ft)	0.034	0.285	0.086	0.001	0.075	0.031	0.012	0.075	0.023	
Pool length (ft)	4.33	22.69	10.21	5.73	31.66	15.61	7.732	38.274	24.6194	
Pool spacing (ft)	8.08	27.86	18.59	2.52	37.78	22.86	0.19	22.47	7.137733	

Additional Reach Parameters			
Valley Length (ft)	255	1,150	635
Channel Length (ft)	285	1,521	974
Sinuosity	1.12	1.32	1.53
Water Surface Slope (ft/ft)	0.037	0.022	0.016
BF slope (ft/ft)	0.038	0.022	0.014
Rosgen Classification	B6	C5b	E6
Habitat Index	NA	NA	NA
Macrobenthos	NA	NA	NA

Exhibit Table XIII. Morphology and Hydraulic Monitoring Summary - Tick Creek Stream Restoration - EEP Project #379										
	XS 2-3		**XS 2-4**		**XS 2-5**		**XS 2-6**		**XS 3-1**	
Dimension	As-built	Mon 01	As-built	Mon 01	As-built	Mon 01	As-built	Mon 01	As-built	Mon 01
Floodprone Elevation (ft)	441.07	441.10	432.71	432.89	429.73	429.66	428.78	429.90	421.49	421.67
Bankfull Elevation (ft)	438.29	438.33	430.74	430.74	427.55	427.50	424.98	424.90	419.87	419.95
Floodprone Width (ft)	51.00	51.00	70.00	70.00	58.90	58.90	57.60	57.70	2.41	61.00
Bankfull Width (ft)	20.96	18.35	17.96	19.42	19.77	19.49	34.17	33.00	27.06	34.84
Entrenchment Ratio	2.43	2.78	3.90	3.60	2.98	3.02	1.69	1.75	0.09	1.75
Mean Depth (ft)	1.11	1.29	1.03	1.15	1.12	1.08	1.66	1.69	0.54	0.51
Maximum Depth (ft)	2.78	2.77	1.97	2.15	2.18	2.16	3.80	4.00	1.62	1.72
Width/Depth Ratio	18.87	14.28	17.36	16.92	17.72	17.97	20.52	19.51	49.71	67.70
Bankfull Area (sq ft)	23.28	23.58	18.59	22.29	22.04	21.14	56.89	55.83	14.73	17.93
Wetted Perimeter (ft)	22.90	20.58	18.56	20.11	20.48	20.18	35.44	35.25	27.41	35.21
Hydraulic Radius (ft)	1.02	1.15	1.00	1.11	1.08	1.05	1.61	1.58	0.54	0.51
Substrate										
d50 (mm)		0.03		3.50		0.09		0.03		0.03
d84 (mm)		0.05		16.00		0.48		0.05		0.05
	XS 3-2		**XS 3-3**		**XS 3-4**		**XS 3-5**		**XS 3-6**	
Dimension	As-built	Mon 01	As-built	Mon 01	As-built	Mon 01	As-built	Mon 01	As-built	Mon 01
Floodprone Elevation (ft)	419.80	419.69	417.42	417.65	418.32	418.26	416.71	416.61	414.53	414.56
Bankfull Elevation (ft)	417.54	417.59	415.95	416.05	415.33	415.36	413.99	413.90	412.49	412.51
Floodprone Width (ft)	64.80	64.80	12.81	54.08	45.50	46.50	57.90	57.60	39.57	39.68
Bankfull Width (ft)	18.80	19.46	17.01	17.13	26.00	26.65	24.51	22.84	19.65	17.00
Entrenchment Ratio	3.45	3.33	0.75	3.16	1.75	1.74	2.36	2.52	2.01	2.33
Mean Depth (ft)	0.93	0.83	0.66	0.74	1.04	1.13	1.19	1.17	0.79	0.87
Maximum Depth (ft)	2.26	2.10	1.47	1.60	2.99	2.90	2.72	2.71	2.04	2.05
Width/Depth Ratio	20.20	23.34	25.95	23.30	24.95	23.63	20.55	19.57	24.72	19.55
Bankfull Area (sq ft)	17.49	16.22	11.15	12.60	27.09	30.06	29.22	26.64	15.62	14.79
Wetted Perimeter (ft)	20.11	20.59	18.09	17.61	27.31	28.22	24.43	24.03	20.22	17.79
Hydraulic Radius (ft)	0.87	0.79	0.62	0.72	0.99	1.06	1.15	1.11	0.77	0.83
Substrate										
d50 (mm)		0.03		0.03		0.03		0.04		0.04
d84 (mm)		0.05		0.05		0.05		5.70		0.06

C. Wetland Assessment

No wetland restoration was included in this project.

Tick Creek Stream Restoration – Chatham County, NC
Appendix A Vegetation Raw Data

A-1 Vegetation Problem Area Plan View
A-2 Vegetation Problem Area Photo
A-3 Vegetation Survey Summary Data
A-4 Vegetation Monitoring Plot Photos
A-5 Vegetation Raw Data

Figure A1 - Vegetation Problem Areas, Project #379
Plan View - 2006 Monitoring, Tick Creek
Stream Restoration - Chatham Co., NC

LEGEND

Thalweg (Fall 06)

Reach

1 2 3

Vegetation Problem Areas

Invasive Herbaceous

Lower Success

Sparce/No Planting

Design Drawings
(Supplied by EarthTec)

Thalwag - UT Tick
Thalwag - ditch
Top of Bank
Sills
Root Wads
Clay Plugs
Cross Vanes and J-Hooks
Easement Boundary

Ecosystem Enhancement Program

RJG&A
ENVIRONMENTAL CONSULTANTS
800-407-0889 www.RJGAcarolina.com

Feet
0 75

Jim Moody Road

100
200
300
400
500
600
700
800
900
1000
1100
1200
1300

Figure A1

Figure A2

Match Line

Figure A2 - Vegetation Problem Areas, Plan View - 2006 Monitoring, Tick Creek Stream Restoration - Chatham Co., NC

LEGEND

Thalweg (Fall 06)

Reach

1 2 3

Vegetation Problem Areas

Dense Invasives (herbaceous and woody)

Lower Success

Sparce/No Planting

Design Drawings
(Supplied by EarthTec)

Thalwag - UT Tick

Thalwag - ditch

Top of Bank

Sills

Root Wads

Clay Plugs

Cross Vanes and J-Hooks

Easement Boundary

Ecosystem Enhancement Program

RJG&A ENVIRONMENTAL CONSULTANTS 800-407-0889 www.RJGAcarolina.com

Feet

0 100

900 1000 1100 1200 1300 1400 1500 1600 1700 1800 1900 2000 2100 2200 2300 2400 2500 2600 2700 2780

Figure A1

Figure A2

Match Line

4 5 6 7 8

Tick Creek

Appendix A2. Representative Vegetation Problem Area Photos - 2006 - Tick Creek Stream Restoration - Project 379

VP1. Sparse Woody Stem Planting

VP2. Exotic Herbaceous and Woody Invasion

VP3. Relatively Low Planting Success

A3. Vegetation Monitoring Summary Data - Tick Creek Stream Restoration. - Project 379

PLANTED WOODY STEMS										----------Reach----------							
										--1--	----2----			----3----			Tick Creek
SPECIES	**Total Live Stems**	**Total Planted**	**Survival Percent**	**Average (all plots)**	**Average ddh (mm)**	**Relative Abundance**	**Relative # Dead**	**Average # Stems**	**Total Dead**	**Plot 1**	**Plot 2**	**Plot 3**	**Plot 4**	**Plot 5**	**Plot 6**	**Plot 7**	**Plot 8**
Betula nigra	10.00	11.00	90.91	1.25	5.53	5.18	0.52	5.00	1	9	1						
Cornus amomum	2.00	5.00	40.00	0.25	NA	1.04	1.55	2.00	3	2							
Fraxinus pennsylvanica	24.00	24.00	100.00	3.00	7.72	12.44	0.00	6.00			9	9		1			5
Liriodendron tulipifera	29.00	32.00	90.63	3.63	7.24	15.03	1.55	7.25	3			8		6	8		7
Platanus occidentalis	34.00	38.00	89.47	4.25	13.96	17.62	2.07	11.33	4				10	10		14	
Quercus alba	30.00	31.00	96.77	3.75	5.00	15.54	0.52	15.00	1						10	20	
Quercus falcata	6.00	9.00	66.67	0.75	5.25	3.11	1.55	2.00	3		2			2			2
Quercus nigra	2.00	2.00	100.00	0.25	4.03	1.04	0.00	2.00			2						
Quercus phellos	7.00	7.00	100.00	0.88	3.69	3.63	0.00	1.75			3		2	1			1
Quercus rubra	10.00	10.00	100.00	1.25	7.50	5.18	0.00	5.00					1				9
Salix nigra	34.00	34.00	100.00	4.25	NA	17.62	0.00	6.80		6	5	7		10		6	
Ulmus alata	4.00	4.00	100.00	0.50	10.25	2.07	0.00	4.00									4
Ulmus americana	1.00	1.00	100.00	0.13	5.86	0.52	0.00	1.00				1					

Total planted woody stems (all plots)	**193**	**208**	**92.79**			**100.00**	**7.77**		**15**	**17**	**22**	**25**	**13**	**30**	**18**	**40**	**28**
Total planted woody stems per acre	**976.34**								**75.88**	**688**	**890**	**1,012**	**526**	**1,214**	**728**	**1,619**	**1,133**
Average all woody stems per acre	**2,600.58**								**75.88**	**688**	**2,671**	**1,295**	**7,406**	**7,568**	**8,134**	**16,471**	**3,642**

SPECIES	Total Live Stems	Total Planted	Survival Percent	Average (all plots)	Average ddh (mm)	Relative Abundance	Relative # Dead	Average # Stems	Total Dead	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8
VOLUNTEER WOODY STEMS																	
Acer negundo	16.00					1.62									2.00	14.00	
Acer rubrum	75.00					7.58					42.00		33.00				
Albizia julibrissin	1.00					0.10										1.00	
Carya ovata	6.00					0.61								6.00			
Elaeagnus umbellata	2.00					0.20								1.00		1.00	
Fagus americum	1.00					0.10								1.00			
Fraxinus pennsylvanica	70.00					7.07								1.00		69.00	
Ilex	1.00					0.10										1.00	
Juniperus virginiana	1.00					0.10								1.00			
Ligustrum japonicum	52.00					5.25								1.00			51.00
Ligustrum sinense	8.00					0.81					1.00	4.00			1.00	2.00	
Liquidambar styraciflua	735.00					74.24						1.00	136.00	145.00	180.00	273.00	
Liriodendron tulipifera	3.00					0.30							1.00	1.00		1.00	
Nyssa sylvatica	2.00					0.20						2.00					
Parthenocissus quinquefolia	1.00					0.10										1.00	
Platanus occidentalis	4.00					0.40										4.00	
Prunus serotina	1.00					0.10					1.00						
Quercus acutissima	0.00					0.00											
Quercus	0.00					0.00											
Rosa multiflora	10.00					1.01											10.00
Viburnum prunifolium	1.00					0.10											1.00
Total volunteer woody stems	**990.00**					**100.00**				**0.00**	**44.00**	**7.00**	**170.00**	**157.00**	**183.00**	**367.00**	**62.00**
Average density	**123.75**																
Total volunteer woody stems per acre	**5,008.16**								**0**	**0**	**1,781**	**283**	**6,880**	**6,354**	**7,406**	**14,852**	**2,509**

Appendix A4. Vegetation Monitoring Plot Photographs - 2006 - Tick Creek Stream Restoration - Project 379

Plot #1

Plot #2

Plot #3

Plot #4

Appendix A4. Vegetation Monitoring Plot Photographs - 2006 - Tick Creek Stream Restoration - Project 379

Plot #5

Plot #6

Plot #7

Plot #8

A5. Planted Woody Stems, Plot 1 - Tick Creek Stream Restoration. - Project 379									
SCIENTIFIC NAME	**Unknown Species**	**Stem Source**	**Stem X**	**Stem Y**	**Diameter at girth height (dgh)**	**Height**	**Diameter at breast height (dbh)**	**Resprout**	**Stem Health**
Betula nigra		R	0.05	2.55	6.1	40.54		FALSE	3
Betula nigra		R	3.8	2.2	5.1	74.37		FALSE	3
Betula nigra		R	6.42	2.1	6.8	46.33		FALSE	3
Betula nigra		R	8.5	1.73	4.6	45.72		FALSE	2
Betula nigra		R	9.2	1.39	6.2	51.82		FALSE	2
Betula nigra		R	9.13	4.2	6.8	59.13		FALSE	3
Betula nigra		R	7.5	4.22	4.9	41.23		FALSE	3
Betula nigra		R	0.9	7.45				FALSE	0
Betula nigra		R	6.5	6.6	5.3	53.95		FALSE	3
Betula nigra		R	7.6	6.6	4	85.95		FALSE	3
Cornus amomum		L	7.02	0.7		32.92		FALSE	3
Cornus amomum		L	8.3	0.4		31.39		FALSE	3
Salix nigra		L	0.8	1.35		89.31		FALSE	3
Salix nigra		L	0.05	2.55	6.1	40.54		FALSE	3
Salix nigra		L	3.37	0.78		48.46		FALSE	3
Salix nigra		L	4.33	0.66		99.06		FALSE	3
Salix nigra		L	6.63	1.6		95.4		FALSE	3
Salix nigra		L	9.1	0.98		52.73		FALSE	3

A5. Volunteer Woody Stems, Plot 1 - Tick Creek Stream Restoration. - Project 379

SCIENTIFIC NAME	Total	plot ID	CHt 0-50	CHt 50-100	CHt 100-137	C0 1	C1 2	C2 Plus	C5 Plus	C10Plus	C15Plus	C20 Plus	C25 Plus	C30 Plus	C35 Plus
		1													
Total live stems	**0**														

A5. Planted Woody Stems, Plot 2 - Tick Creek Stream Restoration. - Project 379

SCIENTIFIC NAME	Un-known Species	Stem Source	Stem X	Stem Y	Diameter at girth height (dgh)	Height	Diameter at breast height (dbh)	Resprout	Stem Health
Betula nigra		R	10.2	3.5	5.5	67.06		FALSE	1
Fraxinus pennsylvanica		R	6.6	2.6	11.33	95.71		FALSE	3
Fraxinus pennsylvanica		R	0.66	4.25	6.16	57.91		FALSE	2
Fraxinus pennsylvanica		R	4.61	4.98	5.05	64.01		FALSE	3
Fraxinus pennsylvanica		R	6.37	4.05	8.08	60.96		FALSE	3
Fraxinus pennsylvanica		R	6.98	1.18	6.11	61.57		FALSE	2
Fraxinus pennsylvanica		R	7.35	4.31	8.21	71.32		FALSE	3
Fraxinus pennsylvanica		R	9.44	2.96	6.94	80.47		FALSE	2
Fraxinus pennsylvanica		R	9.9	3.62	11.6	63.4		FALSE	1
Fraxinus pennsylvanica		R	9.3	2	6.79	81.69		FALSE	3
Quercus	sp.	R	8.7	3.33	0	0		FALSE	0
Quercus	sp.	R	11.2	4.4		0		FALSE	0
Quercus falcata		R	2	1.58	2.58	24.99		FALSE	2
Quercus falcata		R	3.5	0.98	2.17	11.58		FALSE	2
Quercus falcata		R	2.11	4.17		0		FALSE	0
Quercus falcata		R	2.74	4.49		0		FALSE	0
Quercus falcata		R	6.07	2.46	0	0		FALSE	0
Quercus nigra		R	5.28	3.6	6.34	100.58		FALSE	3
Quercus nigra		R	18.3	2.85	1.71	27.43		FALSE	3
Quercus phellos		R	1.33	2.7	1.91	26.21		FALSE	2
Quercus phellos		R	18.29	3.81	4.39	84.12		FALSE	3
Quercus phellos		R	18.4	3.81	3.38	88.39		FALSE	3
Salix nigra		L	19.9	4.8		82.3		FALSE	3
Salix nigra		L	19.86	3.5		28.96		FALSE	3
Salix nigra		L	19.8	2.65		54.86		FALSE	3
Salix nigra		L	19.9	1.5		57.91		FALSE	3
Salix nigra		L	19.95	0.5		45.72		FALSE	3

A5. Volunteer Woody Stems, Plot 2 - Tick Creek Stream Restoration. - Project 379

SCIENTIFIC NAME	Total	plotID	CHt_0_50	CHt_50_100	CHt_100_137	C1_2	C5Plus	C10Plus	C15Plus	C20Plus	C25Plus	C30Plus	C35Plus	BigStem1
Acer rubrum	42	2	0	0	0	0	0	0	0	0	0	0	0	42
Juniperus virginiana	0	2	1	0	0	0	0	0	0	0	0	0	0	
Ligustrum sinense	1	2	0	1	0	0	0	0	0	0	0	0	0	
Prunus serotina	1	2	1	0	0	0	0	0	0	0	0	0	0	
Ulmus americana	0	2	1	0	0	0	0	0	0	0	0	0	0	
Total live stems	**44**													

A5. Planted Woody Stems, Plot 3 - Tick Creek Stream Restoration. - Project 379

SCIENTIFIC NAME	Un-known Species	Stem Source	Stem X	Stem Y	Diameter at girth height (dgh)	Height	Diameter at breast height (dbh)	Resprout	Stem Health
Fraxinus pennsylvanica		R	0.4	3.38	7.91	22.25		FALSE	2
Fraxinus pennsylvanica		R	0.97	4.72	5.6	70.71		FALSE	3
Fraxinus pennsylvanica		R	1.96	4.76	6.64	75.59		FALSE	3
Fraxinus pennsylvanica		R	9.5	2.5	7.75	89.31		FALSE	3
Fraxinus pennsylvanica		R	8.47	2.33	8.62	95.4		FALSE	3
Fraxinus pennsylvanica		R	6.5	2.91	8.76	120.7		FALSE	3
Fraxinus pennsylvanica		R	5.56	6.84	6.32	57.3		FALSE	3
Fraxinus pennsylvanica		R	6.8	6.78	8.22	81.69		FALSE	3
Fraxinus pennsylvanica		R	4.31	4.22	5.9	62.79		FALSE	3
Liriodendron tulipifera		R	0.51	6.68		0		FALSE	0
Liriodendron tulipifera		R	1.47	6.72	7.69	22.25		FALSE	3
Liriodendron tulipifera		R	1.3	7.45	5.62	49.38		FALSE	3
Liriodendron tulipifera		R	0.3	9.03		0		FALSE	0
Liriodendron tulipifera		R	1.43	8.8	9.83	68.58		FALSE	3
Liriodendron tulipifera		R	2.27	7.05	9.62	55.78		FALSE	3
Liriodendron tulipifera		R	3.25	4.35	9.6	112.78		FALSE	3
Liriodendron tulipifera		R	3.93	1.48	8.69	87.17		FALSE	3
Liriodendron tulipifera		R	6.9	7.7	10.17	73.15		FALSE	3
Liriodendron tulipifera		R	2.55	9.18		0		FALSE	0
Liriodendron tulipifera		R	4.2	9.13	7.58	15.54		FALSE	2
Salix nigra		L	0.23	0.45		55.78		FALSE	3
Salix nigra		L	1.14	0.3		94.49		FALSE	3
Salix nigra		L	2.16	0.26		173.13	0.367	FALSE	4
Salix nigra		L	5.67	0.32		138.07		FALSE	4
Salix nigra		L	6.95	0.34		48.16		FALSE	3
Salix nigra		L	8.38	0.44		177.09	0.308	FALSE	4
Salix nigra		L	9.75	0.14		144.48	0.163	FALSE	4
Ulmus americana		R	0.48	7.89	5.86	52.43		FALSE	3

A5. Volunteer Woody Stems, Plot 3 - Tick Creek Stream Restoration. - Project 379

SCIENTIFIC NAME	Total	plotID	CHt_0_50	CHt_50_100	CHt_100_137	C0_1	C1_2	C2Plus	C5Plus	C10Plus	C15Plus	C20Plus	C25Plus	C30Plus	C35Plus
Ligustrum sinense	4	3	0	4	0	0	0	0	0	0	0	0	0	0	0
Liquidambar styraciflua	1	3	0	0	0	0	0	0	0	0	0	1	0	0	0
Nyssa sylvatica	2	3	1	0	0	0	0	0	0	0	0	0	0	0	1
Total live stems	**7**														

A5. Planted Woody Stems, Plot 4 - Tick Creek Stream Restoration. - Project 379

SCIENTIFIC NAME	Un-known Species	Stem Source	Stem X	Stem Y	Diameter at girth height (dgh)	Height	Diameter at breast height (dbh)	Resprout	Stem Health
Platanus occidentalis		R	0.67	0.01	10.29	88.39		FALSE	3
Platanus occidentalis		R	4.22	0.78	15.13	101.19		FALSE	3
Platanus occidentalis		R	3.75	0.29	8.83	96.93		FALSE	3
Platanus occidentalis		R	7.67	1.15	11.18	71.93		FALSE	3
Platanus occidentalis		R	9.6	1.82	9.84	104.85		FALSE	3
Platanus occidentalis		R	11.58	2.38	17.48	125.27		FALSE	4
Platanus occidentalis		R	13.43	2.82	12.81	129.84		FALSE	4
Platanus occidentalis		R	14.65	3.62	13.24	112.78		FALSE	3
Platanus occidentalis		R	17.28	4.34	11.5	98.15		FALSE	3
Platanus occidentalis		R	19.24	4.71	17.53	129.84		FALSE	4
Quercus	sp.	R	5.13	4.13		0		FALSE	0
Quercus	sp.	R	7.3	4.37		0		FALSE	0
Quercus	sp.	R	8.86	4.51		0		FALSE	0
Quercus acutissima		R	2.41	2.72		0		FALSE	0
Quercus phellos		R	0.43	2.85	2.4	9.14		FALSE	2
Quercus phellos		R	10.52	4.99	2.07	15.24		FALSE	3
Quercus rubra		R	0.73	0.99	2.4	21.64		FALSE	2

A5. Volunteer Woody Stems, Plot 4 - Tick Creek Stream Restoration. - Project 379

SCIENTIFIC NAME	Total	plotID	CHt_0_50	CHt_50_100	CHt_100_137	C0_1	C1_2	C2Plus	C5Plus	C10Plus	C15Plus	C20Plus	C25Plus	C30Plus	C35Plus
Acer rubrum	33	4	33	0	0	0	0	0	0	0	0	0	0	0	0
Liquidambar styraciflua	136	4	136	0	0	0	0	0	0	0	0	0	0	0	0
Liriodendron tulipifera	1	4	1	0	0	0	0	0	0	0	0	0	0	0	0
Total live stems	**170**														

A5. Planted Woody Stems, Plot 5 - Tick Creek Stream Restoration. - Project 379									
SCIENTIFIC NAME	**Un-known Species**	**Stem Source**	**Stem X**	**Stem Y**	**Diameter at girth height (dgh)**	**Height**	**Diameter at breast height (dbh)**	**Resprout**	**Stem Health**
Cornus amomum		L	8.45	3.34		0		FALSE	0
Cornus amomum		L	7.8	3.88		0		FALSE	0
Cornus amomum		L	9.62	3.28		0		FALSE	0
Fraxinus pennsylvanica		R	3.2	0.88	6.6	53.64		FALSE	3
Liriodendron tulipifera		R	6.9	3.45	6.4	76.2		FALSE	3
Liriodendron tulipifera		R	8.85	2.67	6.2	49.99		FALSE	3
Liriodendron tulipifera		R	4.62	4.85	4.2	40.23		FALSE	3
Liriodendron tulipifera		R	10.5	2.5	8.7	71.02		FALSE	3
Liriodendron tulipifera		R	12.9	1.9	7	48.46		FALSE	3
Liriodendron tulipifera		R	15.48	2.1	6.7	60.96		FALSE	2
Platanus occidentalis		R	6	4.95	13.1	123.44		FALSE	4
Platanus occidentalis		R	8.05	4	13.9	161.54	4.5	FALSE	4
Platanus occidentalis		R	9.7	3.7	13.6	146.3		FALSE	2
Platanus occidentalis		R	11.8	3.35	21.4	147.22		FALSE	4
Platanus occidentalis		R	13.72	3.46		207.26	6	FALSE	4
Platanus occidentalis		R	15.3	3.64		204.22	6.1	FALSE	4
Platanus occidentalis		R	16.9	3.4		207.26		FALSE	4
Platanus occidentalis		R	18	3.15		198.12	5.2	FALSE	4
Platanus occidentalis		R	18.23	0.01	18	131.67		FALSE	3
Platanus occidentalis		R	18.5	1.7	17.7	147.22		FALSE	3
Quercus falcata		R	5.6	0.01	7.1	53.95		FALSE	3
Quercus falcata		R	3.66	2.78	7.5	76.2		FALSE	2
Quercus phellos		R	0.6	0.8	2.3	18.29		FALSE	3
Salix nigra		L	8.52	4.15		73.76		FALSE	2
Salix nigra		L	9.93	4.3		24.38		FALSE	3
Salix nigra		L	10.8	3.65		26.82		FALSE	3
Salix nigra		L	11.38	4.24		23.77		FALSE	3
Salix nigra		L	13.95	4.7		50.29		FALSE	4
Salix nigra		L	14.97	3.95		39.01		FALSE	2
Salix nigra		L	15.15	4.97		67.06		FALSE	4
Salix nigra		L	15.76	4.5		57.91		FALSE	3
Salix nigra		L	17.3	4.99		91.44		FALSE	4
Salix nigra		L	18.7	3.7		70.1		FALSE	4
Salix nigra		L	19.2	2.8		60.96		FALSE	
Salix nigra		L	19.6	4		91.44		FALSE	
Salix nigra		L	19.5	1.5		80.77		FALSE	
Salix nigra		L	19.6	0.31		51.82		FALSE	

A5. Volunteer Woody Stems, Plot 5 - Tick Creek Stream Restoration. - Project 379

SCIENTIFIC NAME	Total	plotID	CHt_0_50	CHt_50_100	CHt_100_137	C0_1	C1_2	C2Plus	C5Plus	C10Plus	C15Plus	C20Plus	C25Plus	C30Plus	C35Plus
Carya ovata	6	5	4	1	0	0	0	0	0	1	0	0	0	0	0
Elaeagnus	1	5	0	1	0	0	0	0	0	0	0	0	0	0	0
Fagus	1	5	0	0	0	0	0	0	0	0	0	0	0	1	0
Fraxinus pennsylvanica	1	5	1	0	0	0	0	0	0	0	0	0	0	0	0
Juniperus virginiana	1	5	0	0	0	0	0	0	1	0	0	0	0	0	0
Ligustrum japonicum	1	5	1	0	0	0	0	0	0	0	0	0	0	0	0
Liquidambar styraciflua	145	5	145	0	0	0	0	0	0	0	0	0	0	0	0
Liriodendron tulipifera	1	5	1	0	0	0	0	0	0	0	0	0	0	0	0
Ulmus americana	2	5	0	0	0	0	0	0	0	0	1	1	0	0	
Total live stems	**159**														

A5. Planted Woody Stems, Plot 6 - Tick Creek Stream Restoration. - Project 379									
SCIENTIFIC NAME	**Un-known Species**	**Stem Source**	**Stem X**	**Stem Y**	**Diameter at girth height (dgh)**	**Height**	**Diameter at breast height (dbh)**	**Resprout**	**Stem Health**
Liriodendron tulipifera		R	0.35	1.2	5.94	61.87		FALSE	2
Liriodendron tulipifera		R	6.72	7.37	4.06	7.01		FALSE	2
Liriodendron tulipifera		R	9.78	1.73	7.9	65.53		FALSE	2
Liriodendron tulipifera		R	8.5	0.6	8.14	4.57		FALSE	2
Liriodendron tulipifera		R	5.31	4.9	4.31	22.25		FALSE	2
Liriodendron tulipifera		R	8.9	7.7	6.23	57.91		FALSE	2
Liriodendron tulipifera		R	3.5	3.49	8.85	38.1		FALSE	1
Liriodendron tulipifera		R	2	1.63	3.57	16.76		FALSE	2
Platanus occidentalis		R	7.22	1		0		FALSE	0
Platanus occidentalis		R	3.92	9.05		0		FALSE	0
Quercus alba		R	1.28	4.1	5.51	26.82		FALSE	2
Quercus alba		R	5.15	2.59	5.35	22.25		FALSE	2
Quercus alba		R	3.73	5.78	4.68	30.78		FALSE	2
Quercus alba		R	4.7	6.6	4.66	27.43		FALSE	2
Quercus alba		R	9.12	8.19		0		FALSE	0
Quercus alba		R	9.83	5.23	5.5	31.09		FALSE	3
Quercus alba		R	6.82	8.14	2.64	16.76		FALSE	2
Quercus alba		R	9.65	9.92	4.26	18.92		FALSE	2
Quercus alba		R	2.82	5.02	7.77	36.58		FALSE	2
Quercus alba		R	6.31	2.87	6.88	27.74		FALSE	2
Quercus alba		R	3.25	2.07	2.95	21.03		FALSE	2

A5. Volunteer Woody Stems, Plot 6 - Tick Creek Stream Restoration. - Project 379

SCIENTIFIC NAME	Total	plotID	CHt_0_50	CHt_50_100	CHt_100_137	C0_1	C1_2	C2Plus	C5Plus	C10Plus	C15Plus	C20Plus	C25Plus	C30Plus	C35Plus
Acer negundo	2	6	2	0	0	0	0	0	0	0	0	0	0	0	0
Ligustrum sinense	1	6	1	0	0	0	0	0	0	0	0	0	0	0	0
Liquidambar styraciflua	180	6	180	0	0	0	0	0	0	0	0	0	0	0	0
Ulmus alata	6	6	6	0	0	0	0	0	0	0	0	0	0	0	0
Total live stems	**189**														

A5. Planted Woody Stems, Plot 7 - Tick Creek Stream Restoration. - Project 379									
SCIENTIFIC NAME	**Un-known Species**	**Stem Source**	**Stem X**	**Stem Y**	**Diameter at girth height (dgh)**	**Height**	**Diameter at breast height (dbh)**	**Resprout**	**Stem Health**
Platanus occidentalis		R	1.5	2.22		0		FALSE	0
Platanus occidentalis		R	1.41	4.23		0		FALSE	0
Platanus occidentalis		R	3.98	4.11	4.86	61.5		FALSE	3
Platanus occidentalis		R	4	2.54	7.91	76		FALSE	3
Platanus occidentalis		R	3.9	0.71	17.07	175		FALSE	4
Platanus occidentalis		R	6.08	0.7	14.75	151		FALSE	4
Platanus occidentalis		R	6.7	2.56	22.95	194		FALSE	4
Platanus occidentalis		R	8.23	0.55	15.12	134		FALSE	4
Platanus occidentalis		R	8.4	2.39	16.97	131		FALSE	4
Platanus occidentalis		R	10.6	1.57	10.9	115		FALSE	3
Platanus occidentalis		R	14.5	3.1	10.04	93		FALSE	3
Platanus occidentalis		R	15.13	0.27	13.28	142.5		FALSE	4
Platanus occidentalis		R	16.35	2.5	8.45	92		FALSE	3
Platanus occidentalis		R	18.2	0.87	18.24	176		FALSE	4
Platanus occidentalis		R	16.8	3.27	8.68	108		FALSE	4
Platanus occidentalis		R	19.2	3.99	24.02	235		FALSE	4
Quercus alba		R	0.55	1.35	3.68	34.5		FALSE	3
Quercus alba		R	2.2	1.48	4.66	43		FALSE	3
Quercus alba		R	1.9	4	4.58	45		FALSE	2
Quercus alba		R	4.2	4.36	3.84	35		FALSE	3
Quercus alba		R	5.3	4.19	4.13	25.5		FALSE	3
Quercus alba		R	4.98	0.68	4.83	40.5		FALSE	2
Quercus alba		R	6.7	3.9	2.46	21.5		FALSE	2
Quercus alba		R	7.82	3.31	6.64	38.5		FALSE	3
Quercus alba		R	9.65	1.5	5.87	16		FALSE	2
Quercus alba		R	10.32	1.11	8.87	31		FALSE	3
Quercus alba		R	11.59	0.5	4.57	37		FALSE	3
Quercus alba		R	12.9	1.18	4.86	42		FALSE	3
Quercus alba		R	14	2.1	5.29	51		FALSE	3
Quercus alba		R	15.75	0.42	6.64	27		FALSE	3
Quercus alba		R	15.45	2.29	9.72	51.5		FALSE	3
Quercus alba		R	17.3	0.86	2.89	26		FALSE	3
Quercus alba		R	17.8	3.13	4.16	25		FALSE	2
Quercus alba		R	18.6	2.52	2.11	16		FALSE	2
Quercus alba		R	19.32	3.66	2.84	24		FALSE	3
Quercus alba		R	16.7	3.06	7.22	35		FALSE	3
Salix nigra		L	3.33	4.9		58		FALSE	3
Salix nigra		L	4.52	4.7		71		FALSE	3
Salix nigra		L	5.92	4.64		33		FALSE	3
Salix nigra		L	8.05	4.5		41		FALSE	2
Salix nigra		L	7.5	3.86		51		FALSE	2
Salix nigra		L	13.13	4.4		43		FALSE	3

A5. Volunteer Woody Stems, Plot 7 - Tick Creek Stream Restoration. - Project 379

SCIENTIFIC NAME	Total	plotID	CHt_0_50	CHt_50_100	CHt_100_137	C0_1	C1_2	C2Plus	C5Plus	C10Plus	C15Plus	C20Plus	C25Plus	C30Plus	C35Plus
Acer negundo	14	7	14	0	0	0	0	0	0	0	0	0	0	0	0
Albizia julibrissin	1	7	1	0	0	0	0	0	0	0	0	0	0	0	0
Elaeagnus	1	7	1	0	0	0	0	0	0	0	0	0	0	0	0
Fraxinus pennsylvanica	69	7	69		0	0	0	0	0	0	0	0	0	0	0
Ilex	1	7	1	0	0	0	0	0	0	0	0	0	0	0	0
Ligustrum sinense	2	7	2	0	0	0	0	0	0	0	0	0	0	0	0
Liquidambar styraciflua	273	7	273	0	0	0	0	0	0	0	0	0	0	0	0
Liriodendron tulipifera	1	7	1	0	0	0	0	0	0	0	0	0	0	0	0
Parthenocissus quinquefolia	1	7	1	0	0	0	0	0	0	0	0	0	0	0	
Platanus occidentalis	4	7	4	0	0	0	0	0	0	0	0	0	0	0	0
Ulmus alata	1	7	1	0	0	0	0	0	0	0	0	0	0	0	0
Total live stems	**368**														

A5. Planted Woody Stems, Plot 8 - Tick Creek Stream Restoration. - Project 379									
SCIENTIFIC NAME	**Un-known Species**	**Stem Source**	**Stem X**	**Stem Y**	**Diameter at girth height (dgh)**	**Height**	**Diameter at breast height (dbh)**	**Resprout**	**Stem Health**
Fraxinus pennsylvanica		R	1.4	2	8.6	42.67		FALSE	3
Fraxinus pennsylvanica		R	3.4	9.6	6	47.24		FALSE	3
Fraxinus pennsylvanica		R	1.85	9.78	8.4	70.1		FALSE	3
Fraxinus pennsylvanica		R	8.1	8.5	11.2	73.15		FALSE	3
Fraxinus pennsylvanica		R	6.4	8.23	8.5	77.72		FALSE	3
Liriodendron tulipifera		R	0.08	0.12	4.2	47.85		FALSE	3
Liriodendron tulipifera		R	1.5	0.56	14	67.06		FALSE	3
Liriodendron tulipifera		R	2.7	0.9	9.85	67.06		FALSE	2
Liriodendron tulipifera		R	5.7	1	9.7	70.1		FALSE	3
Liriodendron tulipifera		R	7	1.2	5.6	50.95		FALSE	3
Liriodendron tulipifera		R	9	0.1	9.6	76.2		FALSE	3
Liriodendron tulipifera		R	9.95	0.4	7.1	72.85		FALSE	3
Quercus falcata		R	8.2	2.12	10.4	68.28		FALSE	3
Quercus falcata		R	7.91	6.55	9.6	71.02		FALSE	3
Quercus phellos		R	4.2	0.85	9.4	44.5		FALSE	3
Quercus rubra		R	8.5	4.09	6.75	60.96		FALSE	3
Quercus rubra		R	6.21	5	9	56.69		FALSE	3
Quercus rubra		R	1	7.48	8.5	60.96		FALSE	4
Quercus rubra		R	2.6	5.22	9.2	80.47		FALSE	3
Quercus rubra		R	3.15	9.7	8.7	56.39		FALSE	3
Quercus rubra		R	6.5	6.7	7.4	70.1		FALSE	3
Quercus rubra		R	5	7.06	7.7	65.53		FALSE	3
Quercus rubra		R	6.3	5.5	7.4	78.33		FALSE	3
Quercus rubra		R	8.95	6.7	7.9	70.1		FALSE	3
Ulmus alata		R	0.35	0.81	3.7	49.69		FALSE	3
Ulmus alata		R	2	0.95	9.4	43.89		FALSE	3
Ulmus alata		R	5	9.2	8.4	76.2		FALSE	3
Ulmus alata		R	7.3	6.67	19.5	91.44		FALSE	3

A5. Volunteer Woody Stems, Plot 8 - Tick Creek Stream Restoration. - Project 379

SCIENTIFIC NAME	Total	plotID	CHt_0_50	CHt_50_100	CHt_100_137	C0_1	C1_2	C2Plus	C5Plus	C10Plus	C15Plus	C20Plus	C25Plus	C30Plus	C35Plus
Ligustrum japonicum	51	8	43	8	0	0	0	0	0	0	0	0	0	0	0
Rosa multiflora	10	8	2	8	0	0	0	0	0	0	0	0	0	0	0
Ulmus alata	2	8	2	0	0	0	0	0	0	0	0	0	0	0	0
Viburnum prunifolium	1	8	0	1	0	0	0	0	0	0	0	0	0	0	0
Total live stems	**64**														

Tick Creek Stream Restoration – Chatham County, NC
Appendix B Geomorphologic Raw Data

B-1 Exhibit – Problem Areas Plan View
B-2 Representative Stream Problem Area Photos
B-3 Stream Photo-station Photos
B-4 Table B.1 Qualitative Visual Stability Assessment
B-5 Cross section Plots and Raw Data Tables
B-6 Longitudinal Plots and Raw Data Tables
B-7 Pebble Counts

Figure B1 - Stream Problem Areas,
Plan View - 2006 Monitoring, Tick Creek
Stream Restoration - Chatham Co., NC

LEGEND

Thalweg (Fall 06)

Reach

1 2 3

Problem Areas (all low priority)

piping/backcutting

exposed mat

pool fill

(Supplied by EarthTec)

Thalwag - UT Tick
Thalwag - ditch
Top of Bank
Sills
Root Wads
Clay Plugs
Cross Vanes and J-Hooks
Easement Boundary

Ecosystem Enhancement PROGRAM

RJG&A ENVIRONMENTAL CONSULTANTS
800-407-0889 www.RJGAcarolina.com

Feet
0 75

Jim Moody Road

100
200
300
400
500
600
700
800
900
1000
1100
1200
1300

Figure B1
Figure B2
Match Line

Figure B1.2 - Stream Problem Areas, Plan View - 2006 Monitoring, Tick Creek Stream Restoration - Chatham Co., NC

LEGEND

Thalweg (Fall 06)

Reach

1 2 3

Problem Areas (all low priority)

piping/backcutting

exposed mat

pool fill

(Supplied by EarthTec)

Thalwag - UT Tick

Thalwag - ditch

Top of Bank

Sills

Root Wads

Clay Plugs

Cross Vanes and J-Hooks

Easement Boundary

Ecosystem Enhancement Program

RJG&A ENVIRONMENTAL CONSULTANTS 800-407-0889 www.RJGAcarolina.com

Feet

0 75

Figure B1

Figure B1.2

Match Line

1200

1300

1400

1500

1600

1700

1800

1900

2000

2100

2200

2300

2400

2500

2600

2700

2780

Tick Creek

Appendix B2. Representative Stream Problem Area Photographs - 2006 - Tick Creek Stream Restoration - Project #379

SP1. Piping and minor backcutting (hook/vane)

SP2. Piping and minor backcutting (hook/vane)

SP1. Pool Deposition

SP4. Exposed Matting

Appendix B3. Permanent Photopoint Photographs - 2006 - Tick Creek Stream Restoratio- Project #379

PP#1 Looking Upstream (11/21/06)

PP#2 Looking Upstream (11/21/06)

PP#3 Looking Upstream (11/21/06)

PP#4 Looking Downstream (11/21/06)

Appendix B3. Permanent Photopoint Photographs - 2006 - Tick Creek Stream Restoratioo- Project #379

PP#5 Looking Upstream (11/14/06)

PP#6 Looking Downstream (11/14/06)

PP#7 Looking Downstream (11/14/06)

PP#8 Looking Upstream (11/14/06)

Appendix B3. Permanent Photopoint Photographs - 2006 - Tick Creek Stream RestorationoProject #379

PP#9 Looking Downstream (11/14/06)

PP#10 Looking Downstream (11/14/06)

PP#11Looking Downstream (11/14/06)

PP#12 Looking Downstream (11/13/06)

Appendix B3. Permanent Photopoint Photographs - 2006 - Tick Creek Stream Restoration -Project #379

PP#13 Looking Downstream (11/13/06)

PP#14 Looking Downstream (11/13/06)

Table B1. Visual Morphological Assessment Tick Creek Stream Restoration - Project 379 - Reach 1

Feature Category	Metric (per As-built and reference baselines)	(# Stable) Number Performing as Intended	Total Number per As-built	Total Number/ feet in Unstable State	Percent Performing in Stable Condition	Feature Performing Mean (%)
A. Riffles	1. Present	12	12	0/0	100	
	2. Armor stable	12	12	0/0	100	
	3. Facet grade appears stable	12	12	0/0	100	
	4. Minimal evidence of embedding/fining	12	12	0/0	100	
	5. Length appropriate	12	12	0/0	100	**100**
B. Pools	1. Present	13	13	0/0	100	
	2. Sufficiently deep	13	13	0/0	100	
	3. Length appropriate	13	13	0/0	100	**100**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering	6	6	0/0	100	
	2. Downstream of meander (glide/inflection) centering	7	7	0/0	100	**100**
D. Meanders	1. Outer bend in state of limited/controlled erosion	12	12	0/0	100	
	2. Of those eroding, # w/concomitant point bar formation	NA	NA	NA	NA	
	3. Apparent Rc within spec	12	12	0/0	100	
	4. Sufficient floodplain access and relief	12	12	0/0	100	**100**
E. Bed (General)	1. General channel bed aggradation areas (bar formation)	NA	NA	0/0	100	
	2. Channel bed degradation – areas of increasing downcutting or head cutting	NA	NA	0/0	100	**100**
F. Vanes	1. Free of back or arm scour	27	27	0/0	100	
	2. Height appropriate	27	27	0/0	100	
	3. Angle and geometry appear appropriate	27	27	0/0	100	
	4. Free of piping or other structural failures	27	27	0/0	100	**100**
G. Wads/Bould	1. Free of scour	NA	0	NA	NA	
	2. Footing stable	NA	0	NA	NA	**NA**

Table B1. Visual Morphological Assessment Tick Creek Stream Restoration - Project 379 - Reach 2

Feature Category	Metric (per As-built and reference baselines)	(# Stable) Number Performing as Intended	Total Number per As-built	Total Number/ feet in Unstable State	Percent Performing in Stable Condition	Feature Performing Mean (%)
A. Riffles	1. Present	39	39	0/0	100	
	2. Armor stable	39	39	0/0	100	
	3. Facet grade appears stable	39	39	0/0	100	
	4. Minimal evidence of embedding/fining	39	39	0/0	100	
	5. Length appropriate	39	39	0/0	100	**100**
B. Pools	1. Present	44	44	0/0	100	
	2. Sufficiently deep	44	44	0/0	100	
	3. Length appropriate	44	44	0/0	100	**100**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering	16	16	0/0	100	
	2. Downstream of meander (glide/inflection) centering	15	15	0/0	100	**100**
D. Meanders	1. Outer bend in state of limited/controlled erosion	32	32	0/0	100	
	2. Of those eroding, # w/concomitant point bar formation	NA	NA	0/0	NA	
	3. Apparent Rc within spec	32	32	0/0	100	
	4. Sufficient floodplain access and relief	32	32	0/0	100	**100**
E. Bed (General)	1. General channel bed aggradation areas (bar formation)	NA	NA	0/0	100	
	2. Channel bed degradation – areas of increasing downcutting or head cutting	NA	NA	0/0	100	**100**
F. Vanes	1. Free of back or arm scour	32	32	0/0	100	
	2. Height appropriate	32	32	0/0	100	
	3. Angle and geometry appear appropriate	32	32	0/0	100	
	4. Free of piping or other structural failures	23	32	8/25	72	**93**
G. Wads/Bould	1. Free of scour	34	34	0/0	100	
	2. Footing stable	34	34	0/0	100	**100**

Table B1. Visual Morphological Assessment Tick Creek Stream Restoration - Project 379- Reach 3

Feature Category	Metric (per As-built and reference baselines)	(# Stable) Number Performing as Intended	Total Number per As-built	Total Number/ feet in Unstable State	Percent Performing in Stable Condition	Feature Performing Mean (%)
A. Riffles	1. Present	31	31	0/0	100	
	2. Armor stable	31	31	0/0	100	
	3. Facet grade appears stable	31	31	0/0	100	
	4. Minimal evidence of embedding/fining	31	31	0/0	100	
	5. Length appropriate	31	31	0/0	100	**100**
B. Pools	1. Present	32	32	0/0	100	
	2. Sufficiently deep	31	32	1/6	97	
	3. Length appropriate	32	32	0/0	100	**99**
C. Thalweg	1. Upstream of meander bend (run/inflection) centering	16	16	0/0	100	
	2. Downstream of meander (glide/inflection) centering	15	15	0/0	100	**100**
D. Meanders	1. Outer bend in state of limited/controlled erosion	28	28	0/0	100	
	2. Of those eroding, # w/concomitant point bar formation	0	0	0/0	NA	
	3. Apparent Rc within spec	28	28	0/0	100	
	4. Sufficient floodplain access and relief	28	28	0/0	100	**100**
E. Bed (General)	1. General channel bed aggradation areas (bar formation)	NA	NA	0/0	100	
	2. Channel bed degradation – areas of increasing downcutting or head cutting	NA	NA	0/0	100	**100**
F. Vanes	1. Free of back or arm scour	31	31	0/0	100	
	2. Height appropriate	31	31	0/0	100	
	3. Angle and geometry appear appropriate	29	31	2/8	94	
	4. Free of piping or other structural failures	23	31	8/26	74	**92**
G. Wads/Bould	1. Free of scour	34	34	0/0	100	
	2. Footing stable	34	34	0/0	100	**100**

B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

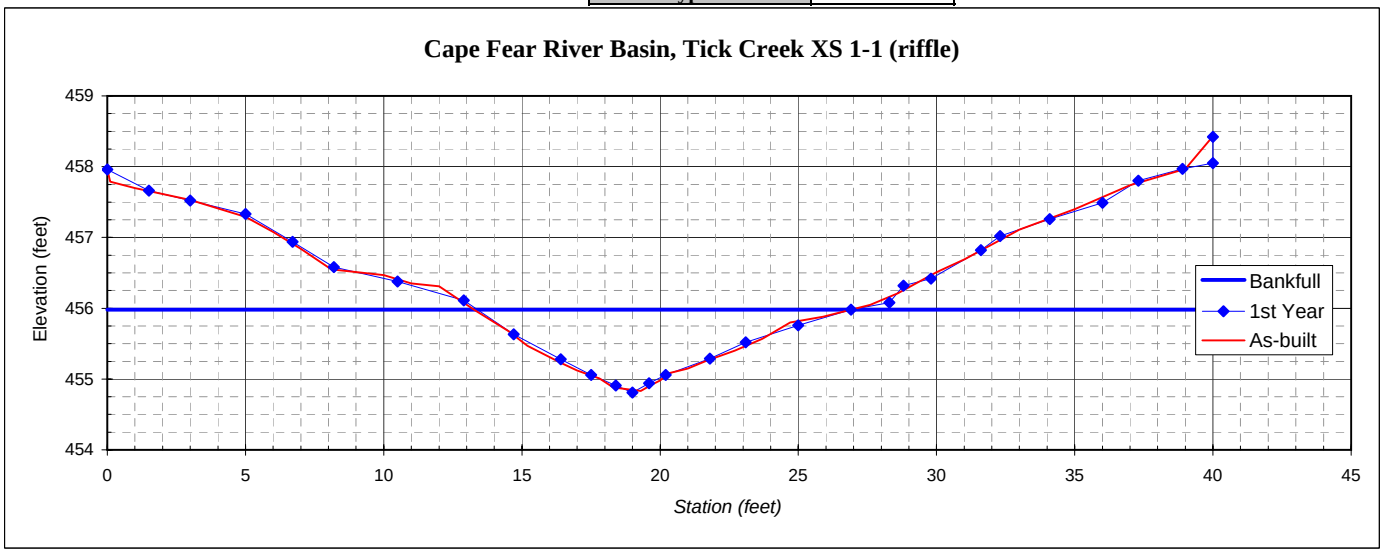
River Basin:	Cape Fear
Watershed:	Tick Creek
XS ID	XS 1-1 (riffle)
Reach:	1
Date:	11/1/2006
Field Crew:	J. O'Neal and S. Doig

Station	Rod Ht.	Elevation
0	2.54	457.96
1.5	2.84	457.66
3	2.98	457.52
5	3.17	457.33
6.7	3.56	456.94
8.2	3.92	456.58
10.5	4.12	456.38
12.9	4.39	456.11
14.7	4.87	455.63
16.4	5.22	455.28
17.5	5.44	455.06
18.4	5.59	454.91
19	5.69	454.81
19.6	5.56	454.94
20.2	5.44	455.06
21.8	5.21	455.29
23.1	4.98	455.52
25	4.74	455.76
26.9	4.52	455.98
28.3	4.42	456.08
28.8	4.18	456.32
29.8	4.08	456.42
31.6	3.68	456.82
32.3	3.48	457.02
34.1	3.24	457.26
36	3.01	457.49
37.3	2.70	457.80
38.9	2.53	457.97
40	2.45	458.05
40	2.08	458.42

SUMMARY DATA	
Floodprone Elevation (ft)	457.15
Bankfull Elevation (ft)	455.98
Floodprone Width (ft)	42.00
Bankfull Width (ft)	13.51
Entrenchment Ratio	3.11
Mean Depth (ft)	0.57
Maximum Depth (ft)	1.17
Width/Depth Ratio	23.64
Bankfull Area (sq ft)	7.72
Wetted Perimeter (ft)	13.73
Hydraulic Radius (ft)	0.56

View of cross-section 1-1 looking upstream

Stream Type:	B6a



B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

As Built 1-1

Station	Rod Ht.	Elevation
0	3.44	457.96
0.1	3.61	457.79
1	3.7	457.70
3	3.87	457.53
5	4.11	457.29
6	4.32	457.08
7	4.56	456.84
8.1	4.85	456.55
10	4.93	456.47
11	5.05	456.35
12	5.09	456.31
13.3	5.43	455.97
14.5	5.72	455.68
15.2	5.93	455.47
16.4	6.17	455.23
17	6.28	455.12
17.8	6.39	455.01
18.3	6.52	454.88
19.3	6.57	454.83
19.7	6.48	454.92
20	6.42	454.98
20.3	6.32	455.08
21	6.25	455.15
21.7	6.14	455.26
22.7	6	455.40
23.7	5.83	455.57
24.7	5.6	455.80
25.9	5.52	455.88
27.6	5.35	456.05
28.6	5.19	456.21
30	4.89	456.51
31	4.71	456.69
33	4.29	457.11
35	4	457.40
37	3.66	457.74
39	3.43	457.97
40	2.97	458.43

B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

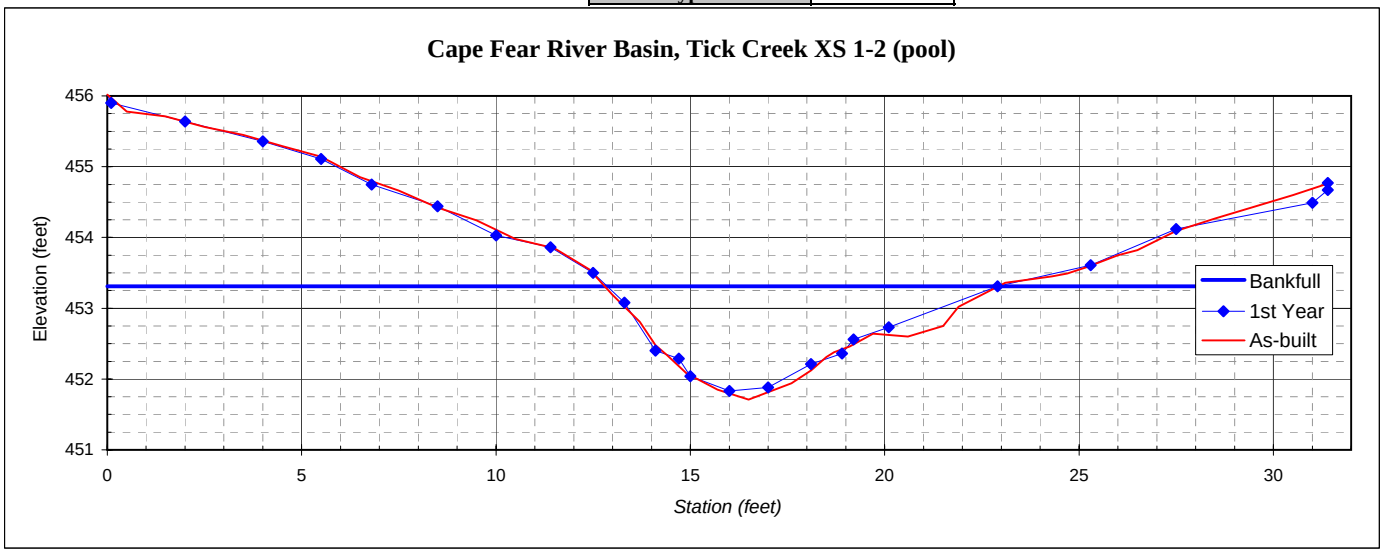
River Basin:	Cape Fear
Watershed:	Tick Creek
XS ID	XS 1-2 (pool)
Reach:	1
Date:	11/1/2006
Field Crew:	J. O'Neal and S. Doig

Station	Rod Ht.	Elevation
0	4.48	456.02
0.1	4.60	455.90
2	4.86	455.64
4	5.14	455.36
5.5	5.39	455.11
6.8	5.75	454.75
8.5	6.06	454.44
10	6.47	454.03
11.4	6.64	453.86
12.5	7.00	453.50
13.3	7.42	453.08
14.1	8.10	452.40
14.7	8.21	452.29
15	8.46	452.04
16	8.67	451.83
17	8.62	451.88
18.1	8.29	452.21
18.9	8.14	452.36
19.2	7.94	452.56
20.1	7.77	452.73
22.9	7.19	453.31
25.3	6.89	453.61
27.5	6.38	454.12
31	6.01	454.49
31.4	5.83	454.67
31.4	5.73	454.77

SUMMARY DATA	
Floodprone Elevation (ft)	454.79
Bankfull Elevation (ft)	453.31
Floodprone Width (ft)	44.00
Bankfull Width (ft)	10.04
Entrenchment Ratio	4.38
Mean Depth (ft)	0.81
Maximum Depth (ft)	1.48
Width/Depth Ratio	12.39
Bankfull Area (sq ft)	8.14
Wetted Perimeter (ft)	10.67
Hydraulic Radius (ft)	0.76

View of cross-section 1-2 looking upstream

Stream Type:	B



B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

As Built 1-2

Station	Rod Ht.	Elevation
0	5.37	456.02
0.5	5.61	455.78
1.5	5.68	455.71
2.5	5.83	455.56
3.5	5.94	455.45
4.5	6.1	455.29
5.5	6.25	455.14
6.5	6.54	454.85
7.5	6.73	454.66
8.5	6.97	454.42
9.5	7.15	454.24
10.5	7.41	453.98
11.5	7.54	453.85
12.4	7.84	453.55
13	8.2	453.19
13.7	8.58	452.81
14.1	8.91	452.48
14.4	9.05	452.34
14.9	9.31	452.08
15.7	9.54	451.85
16.5	9.68	451.71
17.6	9.45	451.94
18.1	9.27	452.12
18.5	9.08	452.31
18.7	9.01	452.38
19.1	8.93	452.46
19.7	8.75	452.64
20.6	8.79	452.60
21.5	8.64	452.75
21.9	8.37	453.02
23.1	8.03	453.36
24.3	7.94	453.45
24.7	7.9	453.49
25.2	7.81	453.58
26	7.64	453.75
26.5	7.57	453.82
27.5	7.3	454.09
28.5	7.12	454.27
30.5	6.79	454.60
31.5	6.61	454.78

B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

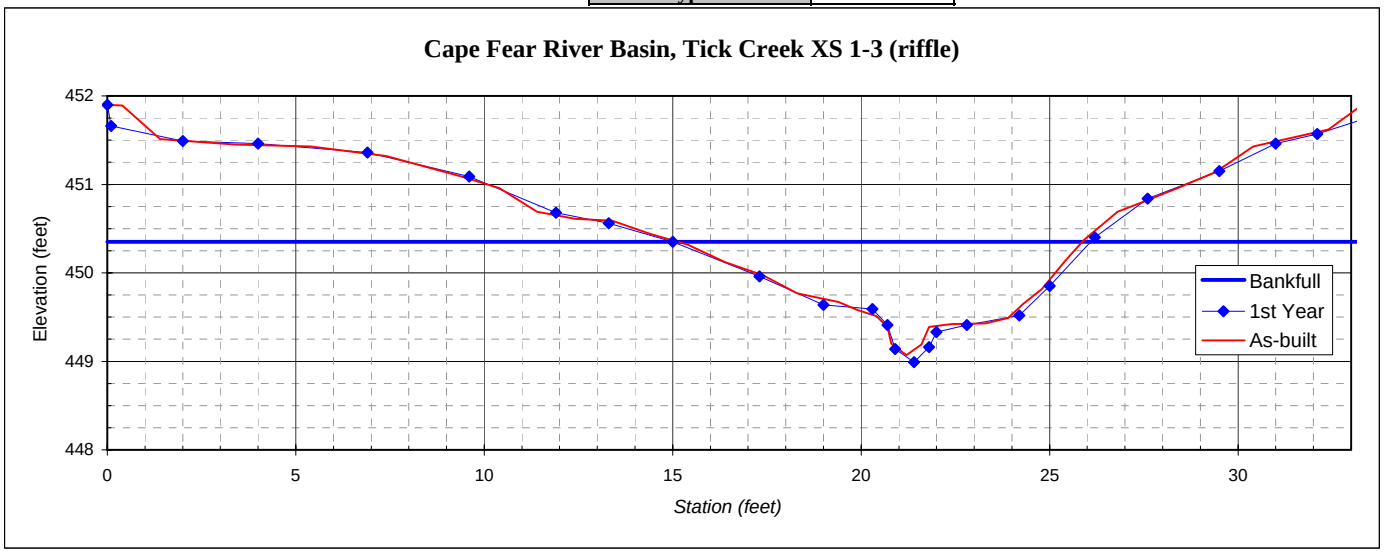
River Basin:	Cape Fear
Watershed:	Tick Creek
XS ID	XS 1-3 (riffle)
Reach:	1
Date:	11/1/2006
Field Crew:	J. O'Neal and S. Doig

Station	Rod Ht.	Elevation
0	5.44	451.90
0.1	5.68	451.66
2	5.85	451.49
4	5.88	451.46
6.9	5.98	451.36
9.6	6.25	451.09
11.9	6.66	450.68
13.3	6.78	450.56
15	6.99	450.35
17.3	7.38	449.96
19	7.70	449.64
20.3	7.75	449.59
20.7	7.93	449.41
20.9	8.20	449.14
21.4	8.35	448.99
21.8	8.18	449.16
22	8.01	449.33
22.8	7.93	449.41
24.2	7.82	449.52
25	7.49	449.85
26.2	6.94	450.40
27.6	6.50	450.84
29.5	6.19	451.15
31	5.88	451.46
32.1	5.77	451.57
33.5	5.58	451.76

SUMMARY DATA	
Floodprone Elevation (ft)	451.71
Bankfull Elevation (ft)	450.35
Floodprone Width (ft)	56.00
Bankfull Width (ft)	11.09
Entrenchment Ratio	5.05
Mean Depth (ft)	0.64
Maximum Depth (ft)	1.36
Width/Depth Ratio	17.34
Bankfull Area (sq ft)	7.10
Wetted Perimeter (ft)	11.63
Hydraulic Radius (ft)	0.61

View of cross-section 1-3 looking upstream

Stream Type:	C5b



B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

As Built 1-3

Station	Rod Ht.	Elevation
0	9.68	451.90
0.4	9.69	451.89
1.4	10.07	451.51
3.4	10.13	451.45
5.4	10.15	451.43
7.4	10.26	451.32
9.4	10.49	451.09
10.4	10.62	450.96
11.4	10.89	450.69
12.4	10.97	450.61
13.4	10.99	450.59
14.4	11.14	450.44
15.4	11.26	450.32
16.4	11.46	450.12
17.4	11.61	449.97
18.3	11.81	449.77
19.4	11.91	449.67
19.9	12	449.58
20.4	12.07	449.51
20.7	12.19	449.39
20.8	12.38	449.20
21.2	12.51	449.07
21.6	12.39	449.19
21.8	12.19	449.39
22.4	12.16	449.42
23.3	12.15	449.43
23.9	12.09	449.49
24.3	11.93	449.65
24.8	11.76	449.82
25.4	11.45	450.13
25.9	11.21	450.37
26.8	10.89	450.69
27.4	10.79	450.79
28.4	10.62	450.96
29.4	10.44	451.14
30.4	10.15	451.43
32.4	9.96	451.62
33.4	9.65	451.93

B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

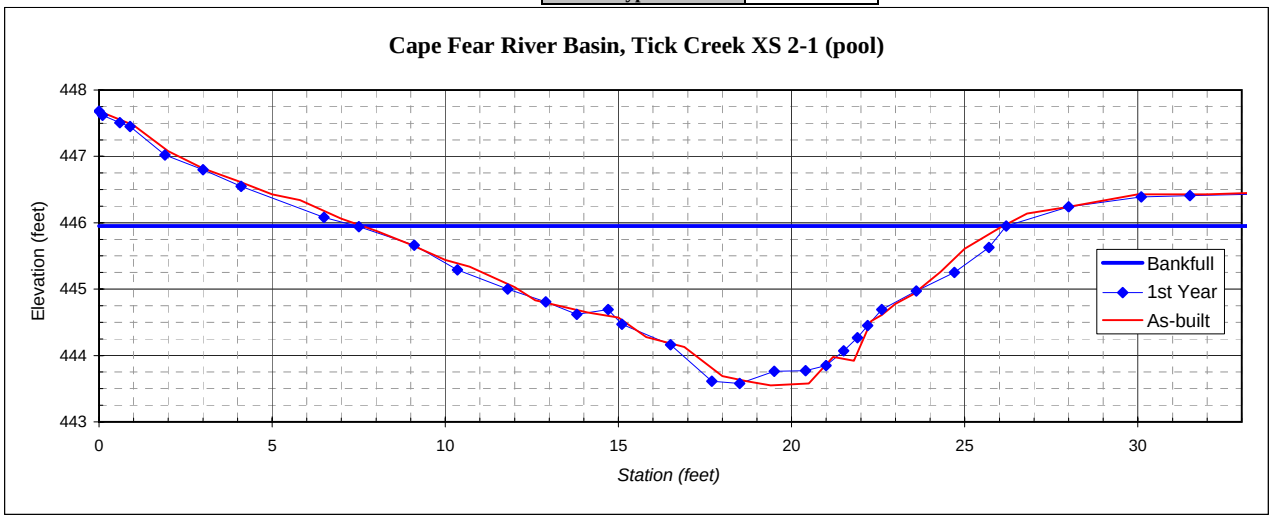
River Basin:	Cape Fear
Watershed:	Tick Creek
XS ID	XS 2-1 (pool)
Reach:	2
Date:	11/1/2006
Field Crew:	J. O'Neal and S. Doig

Station	Rod Ht.	Elevation
0	3.95	447.68
0.1	4.01	447.62
0.6	4.12	447.51
0.9	4.18	447.45
1.9	4.61	447.02
3	4.83	446.80
4.1	5.08	446.55
6.5	5.55	446.08
7.5	5.69	445.94
9.1	5.97	445.66
10.35	6.34	445.29
11.8	6.63	445.00
12.9	6.82	444.81
13.8	7.01	444.62
14.7	6.94	444.69
15.1	7.16	444.47
16.5	7.47	444.16
17.7	8.02	443.61
18.5	8.05	443.58
19.5	7.87	443.76
20.4	7.86	443.77
21	7.78	443.85
21.5	7.56	444.07
21.9	7.36	444.27
22.2	7.18	444.45
22.6	6.94	444.69
23.6	6.66	444.97
24.7	6.38	445.25
25.7	6.00	445.63
26.2	5.68	445.95
28	5.39	446.24
30.1	5.24	446.39
31.5	5.22	446.41
34	5.19	446.44
35.5	5.24	446.39
37	5.28	446.35
38.2	5.23	446.4
39	5.2	446.43
	5.14	446.49
40.9	5.11	446.52
41.7	5.02	446.61
42	4.91	446.72
42	4.84	446.79

SUMMARY DATA	
Floodprone Elevation (ft)	448.32
Bankfull Elevation (ft)	445.95
Floodprone Width (ft)	105.00
Bankfull Width (ft)	18.77
Entrenchment Ratio	5.59
Mean Depth (ft)	1.25
Maximum Depth (ft)	2.37
Width/Depth Ratio	14.98
Bankfull Area (sq ft)	23.53
Wetted Perimeter (ft)	19.60
Hydraulic Radius (ft)	1.20

View of cross-section 2-1 looking downstream

Stream Type:	C5b



B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

As Built 2-1		
Station	**Rod Ht.**	**Elevation**
0	2.54	447.68
1	2.75	447.47
2	3.14	447.08
3	3.4	446.82
4	3.59	446.63
5	3.79	446.43
5.8	3.88	446.34
7	4.16	446.06
8	4.34	445.88
9	4.55	445.67
10	4.78	445.44
10.7	4.88	445.34
12	5.19	445.03
12.6	5.39	444.83
14.1	5.57	444.65
15	5.65	444.57
15.8	5.94	444.28
16.9	6.09	444.13
18	6.53	443.69
18.7	6.61	443.61
19.4	6.67	443.55
20.5	6.64	443.58
21.2	6.24	443.98
21.8	6.3	443.92
22.3	5.7	444.52
22.6	5.61	444.61
23	5.44	444.78
23.5	5.3	444.92
24.3	4.96	445.26
25	4.61	445.61
26	4.3	445.92
26.8	4.08	446.14
28	3.98	446.24
30	3.79	446.43
32	3.79	446.43
34	3.76	446.46
36	3.85	446.37
38	3.83	446.39
40	3.72	446.50
42	3.43	446.79

B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

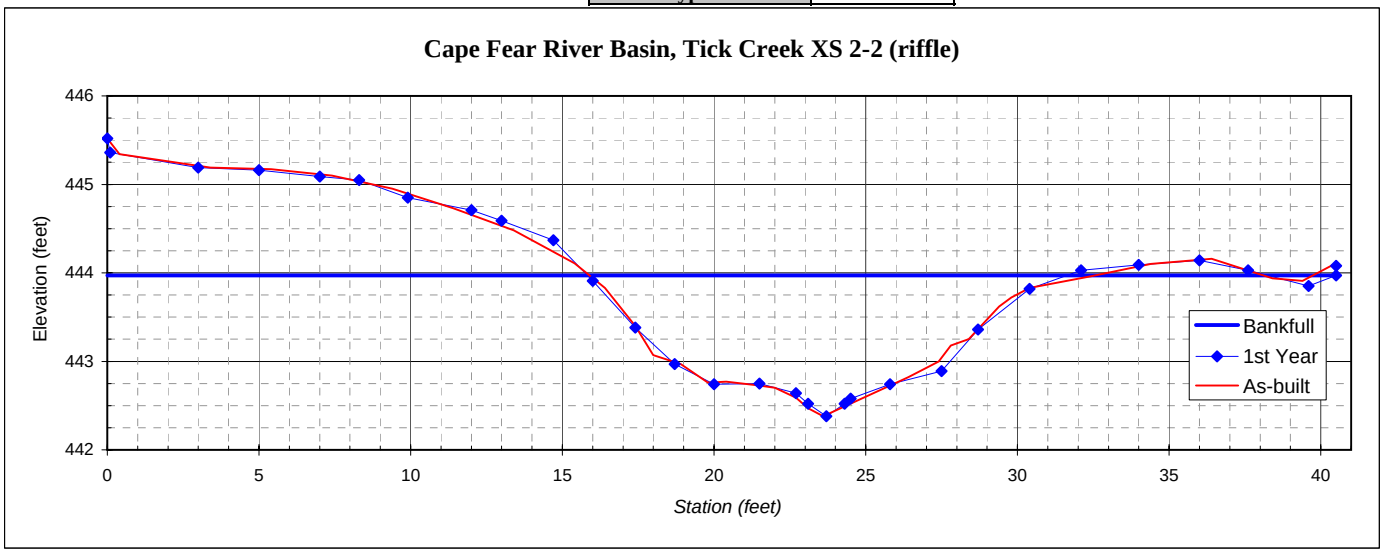
River Basin:	Cape Fear
Watershed:	Tick Creek
XS ID	XS 2-2 (riffle)
Reach:	2
Date:	11/1/2006
Field Crew:	J. O'Neal and S. Doig

Station	Rod Ht.	Elevation
0	6.11	445.52
0.1	6.27	445.36
3	6.44	445.19
5	6.47	445.16
7	6.54	445.09
8.3	6.58	445.05
9.9	6.78	444.85
12	6.92	444.71
13	7.04	444.59
14.7	7.26	444.37
16	7.72	443.91
17.4	8.25	443.38
18.7	8.66	442.97
20	8.89	442.74
21.5	8.88	442.75
22.7	8.99	442.64
23.1	9.11	442.52
23.7	9.25	442.38
24.3	9.11	442.52
24.5	9.05	442.58
25.8	8.89	442.74
27.5	8.74	442.89
28.7	8.27	443.36
30.4	7.81	443.82
32.1	7.60	444.03
34	7.54	444.09
36	7.49	444.14
37.6	7.60	444.03
39.6	7.78	443.85
40.5	7.66	443.97
40.5	7.55	444.08

SUMMARY DATA	
Floodprone Elevation (ft)	445.56
Bankfull Elevation (ft)	443.97
Floodprone Width (ft)	210.00
Bankfull Width (ft)	18.02
Entrenchment Ratio	11.66
Mean Depth (ft)	0.81
Maximum Depth (ft)	1.59
Width/Depth Ratio	22.35
Bankfull Area (sq ft)	14.53
Wetted Perimeter (ft)	18.46
Hydraulic Radius (ft)	0.79

View of cross-section 2-2 looking downstream

Stream Type:	C5b



B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

As Built 2-2

Station	Rod Ht.	Elevation
0	4.71	445.52
0.4	4.89	445.34
3.4	5.04	445.19
5.4	5.06	445.17
7.4	5.13	445.10
9.4	5.28	444.95
11.4	5.5	444.73
13.4	5.75	444.48
15.4	6.12	444.11
16.4	6.4	443.83
17.4	6.83	443.40
18	7.16	443.07
18.9	7.26	442.97
19.8	7.47	442.76
20.4	7.46	442.77
21.4	7.5	442.73
22	7.53	442.70
22.7	7.64	442.59
23.1	7.76	442.47
23.6	7.85	442.38
24.1	7.77	442.46
26.4	7.41	442.82
27.4	7.23	443.00
27.8	7.05	443.18
28.4	6.98	443.25
29.4	6.61	443.62
29.8	6.51	443.72
30.4	6.4	443.83
32.4	6.27	443.96
34.4	6.13	444.10
36.4	6.07	444.16
38.4	6.29	443.94
39.4	6.32	443.91
40.4	6.14	444.09

B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

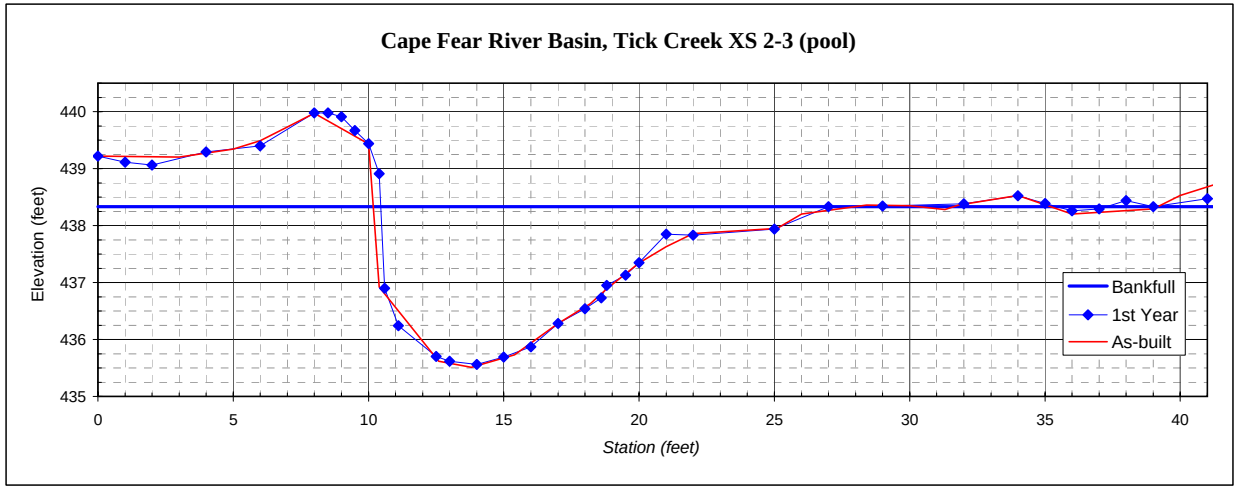
River Basin:	Cape Fear
Watershed:	Tick Creek
XS ID	XS 2-3 (pool)
Reach:	2
Date:	11/1/2006
Field Crew:	J. O'Neal and S. Doig

Station	Rod Ht.	Elevation
0	4.82	439.22
1	4.93	439.11
2	4.98	439.06
4	4.75	439.29
6	4.64	439.40
8	4.06	439.98
8.5	4.06	439.98
9	4.13	439.91
9.5	4.37	439.67
10	4.60	439.44
10.4	5.13	438.91
10.6	7.14	436.90
11.1	7.80	436.24
12.5	8.34	435.70
13	8.42	435.62
14	8.48	435.56
15	8.35	435.69
16	8.17	435.87
17	7.76	436.28
18	7.50	436.54
18.6	7.31	436.73
18.8	7.09	436.95
19.5	6.91	437.13
20	6.69	437.35
21	6.19	437.85
22	6.21	437.83
25	6.10	437.94
27	5.71	438.33
29	5.70	438.34
32	5.66	438.38
34	5.52	438.52
35	5.65	438.39
36	5.78	438.26
37	5.75	438.29
38	5.60	438.44
39	5.71	438.33
41	5.57	438.47
43	5.58	438.46
	5.39	438.65
46	5.53	438.51
47	5.52	438.52
49	5.41	438.63
50	5.5	438.54
50.9	5.49	438.55
51	5.35	438.69

SUMMARY DATA	
Floodprone Elevation (ft)	441.10
Bankfull Elevation (ft)	438.33
Floodprone Width (ft)	125.00
Bankfull Width (ft)	18.35
Entrenchment Ratio	6.81
Mean Depth (ft)	1.29
Maximum Depth (ft)	2.77
Width/Depth Ratio	14.28
Bankfull Area (sq ft)	23.58
Wetted Perimeter (ft)	20.58
Hydraulic Radius (ft)	1.15

View of cross-section 2-3 looking upstream.

Stream Type:	C5b



B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

As Built 2-3

Station	Rod Ht.	Elevation
0	4.59	439.22
3	4.61	439.20
5	4.47	439.34
6	4.32	439.49
7	4.08	439.73
8	3.84	439.97
10	4.38	439.43
10.4	6.89	436.92
12.6	8.19	435.62
13.8	8.3	435.51
15.4	8.08	435.73
17	7.53	436.28
18.2	7.18	436.63
18.8	6.92	436.89
20	6.47	437.34
21	6.18	437.63
22	5.95	437.86
25.1	5.86	437.95
26	5.61	438.20
28.4	5.45	438.36
30	5.46	438.35
31.3	5.53	438.28
31.8	5.45	438.36
34	5.28	438.53
36	5.61	438.20
39	5.52	438.29
40	5.28	438.53
41.6	5.04	438.77
42.5	5.38	438.43
43.6	5.16	438.65
46	5.22	438.59
47	5.39	438.42
48	5.28	438.53
51	5.13	438.68

B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

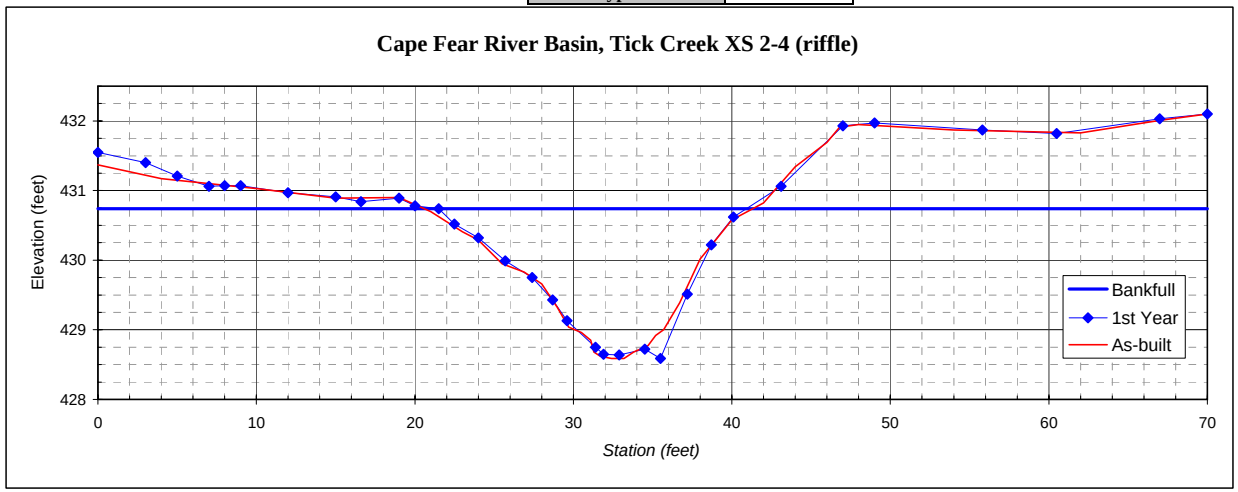
River Basin:	Cape Fear
Watershed:	Tick Creek
XS ID	XS 2-4 (riffle)
Reach:	2
Date:	11/3/2006
Field Crew:	W. Marotti and N. Allen

Station	Rod Ht.	Elevation
0	7.02	431.55
3	7.17	431.40
5	7.36	431.21
7	7.51	431.06
8	7.50	431.07
9	7.50	431.07
12	7.60	430.97
15	7.66	430.91
16.6	7.73	430.84
19	7.68	430.89
20	7.79	430.78
21.5	7.83	430.74
22.5	8.05	430.52
24	8.25	430.32
25.7	8.58	429.99
27.4	8.82	429.75
28.7	9.14	429.43
29.6	9.44	429.13
31.4	9.82	428.75
31.9	9.92	428.65
32.9	9.93	428.64
34.5	9.85	428.72
35.5	9.98	428.59
37.2	9.06	429.51
38.7	8.35	430.22
40.1	7.95	430.62
43.1	7.51	431.06
47	6.64	431.93
49	6.60	431.97
55.8	6.70	431.87
60.5	6.75	431.82
67	6.54	432.03
70	6.47	432.10

SUMMARY DATA	
Floodprone Elevation (ft)	432.89
Bankfull Elevation (ft)	430.74
Floodprone Width (ft)	120.00
Bankfull Width (ft)	19.42
Entrenchment Ratio	6.18
Mean Depth (ft)	1.15
Maximum Depth (ft)	2.15
Width/Depth Ratio	16.92
Bankfull Area (sq ft)	22.29
Wetted Perimeter (ft)	20.11
Hydraulic Radius (ft)	1.11

View of cross-section 2-4 looking upstream

Stream Type:	C5b



B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

As Built 2-4

Station	Rod Ht.	Elevation
0	8.4	431.37
4	8.6	431.17
10	8.74	431.03
15	8.88	430.89
19	8.87	430.90
21	9.07	430.70
23	9.36	430.41
24	9.48	430.29
25.5	9.82	429.95
26.9	9.94	429.83
28	10.11	429.66
29	10.45	429.32
29.7	10.73	429.04
30.5	10.81	428.96
31.1	10.92	428.85
31.3	11.09	428.68
31.7	11.15	428.62
32.4	11.18	428.59
33.2	11.18	428.59
33.8	11.09	428.68
34.7	11	428.77
35.2	10.85	428.92
35.7	10.77	429.00
36.7	10.38	429.39
38	9.75	430.02
39	9.47	430.30
40	9.19	430.58
42	8.95	430.82
44	8.43	431.34
46	8.08	431.69
46.8	7.86	431.91
48	7.82	431.95
54	7.9	431.87
62	7.94	431.83
67	7.76	432.01
70	7.67	432.10

B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

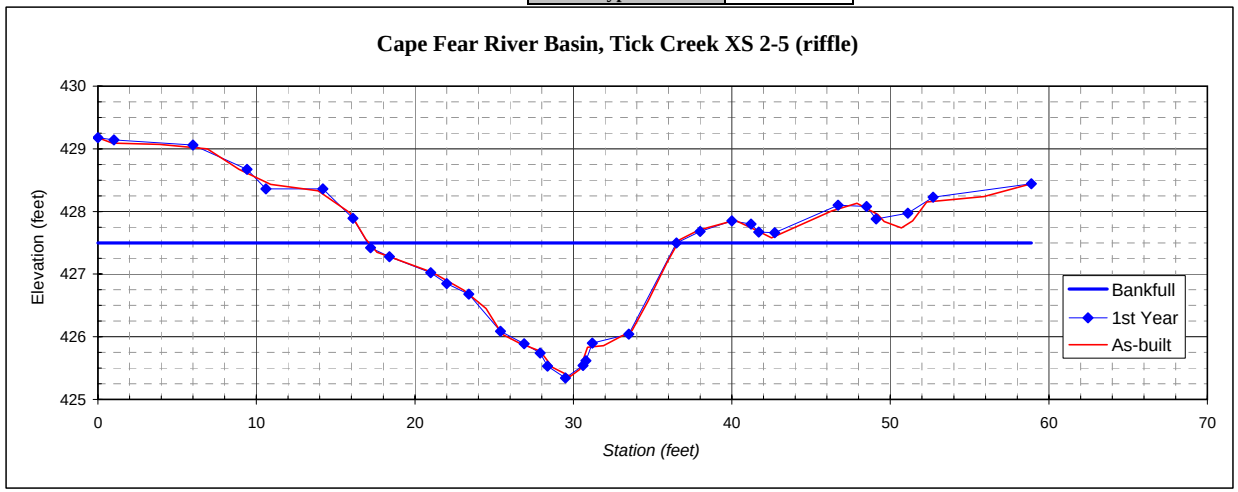
River Basin:	Cape Fear
Watershed:	Tick Creek
XS ID	XS 2-5 (riffle)
Reach:	2
Date:	11/3/2006
Field Crew:	J. O'Neal and S. Doig

Station	Rod Ht.	Elevation
0	3.11	429.18
1	3.14	429.14
6	3.22	429.06
9.4	3.61	428.67
10.6	3.92	428.36
14.2	3.92	428.36
16.1	4.39	427.89
17.2	4.86	427.42
18.4	5.00	427.28
21	5.26	427.02
22	5.43	426.85
23.4	5.61	426.68
25.4	6.19	426.09
26.9	6.39	425.89
27.9	6.54	425.74
28.37	6.75	425.53
29.5	6.95	425.34
30.6	6.74	425.54
30.8	6.66	425.62
31.2	6.39	425.90
33.5	6.24	426.04
36.5	4.78	427.50
38	4.60	427.68
40	4.43	427.85
41.2	4.48	427.80
41.7	4.61	427.67
42.7	4.63	427.66
46.7	4.19	428.10
48.5	4.21	428.08
49.1	4.41	427.88
51.1	4.32	427.97
52.7	4.05	428.23
58.9	3.85	428.44

SUMMARY DATA	
Floodprone Elevation (ft)	429.66
Bankfull Elevation (ft)	427.50
Floodprone Width (ft)	90.00
Bankfull Width (ft)	19.49
Entrenchment Ratio	4.62
Mean Depth (ft)	1.08
Maximum Depth (ft)	2.16
Width/Depth Ratio	17.97
Bankfull Area (sq ft)	21.14
Wetted Perimeter (ft)	20.18
Hydraulic Radius (ft)	1.05

View of cross-section 2-5 looking upstream

Stream Type:	C5b



B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

As Built 2-5

Station	Rod Ht.	Elevation
0	1.25	429.18
0.9	1.34	429.09
3.9	1.36	429.07
6.9	1.43	429
8.9	1.76	428.67
10.9	2	428.43
13.9	2.1	428.33
15.9	2.45	427.98
16.9	2.87	427.56
17.6	3.08	427.35
18.9	3.2	427.23
21.1	3.4	427.03
23.1	3.69	426.74
24.5	3.98	426.45
25.5	4.39	426.04
26.6	4.53	425.90
27.9	4.66	425.77
28.7	4.92	425.51
29.8	5.06	425.37
30.4	4.95	425.48
30.9	4.6	425.83
31.9	4.57	425.86
33.7	4.33	426.10
34.7	3.86	426.57
35.9	3.25	427.18
36.7	2.88	427.55
37.9	2.73	427.70
40.2	2.57	427.86
41.7	2.75	427.68
42.5	2.85	427.58
46.3	2.42	428.01
47.9	2.3	428.13
49.2	2.48	427.95
49.6	2.59	427.84
50.7	2.69	427.74
51.4	2.58	427.85
52.3	2.28	428.15
55.9	2.19	428.24
58.9	1.99	428.44

B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

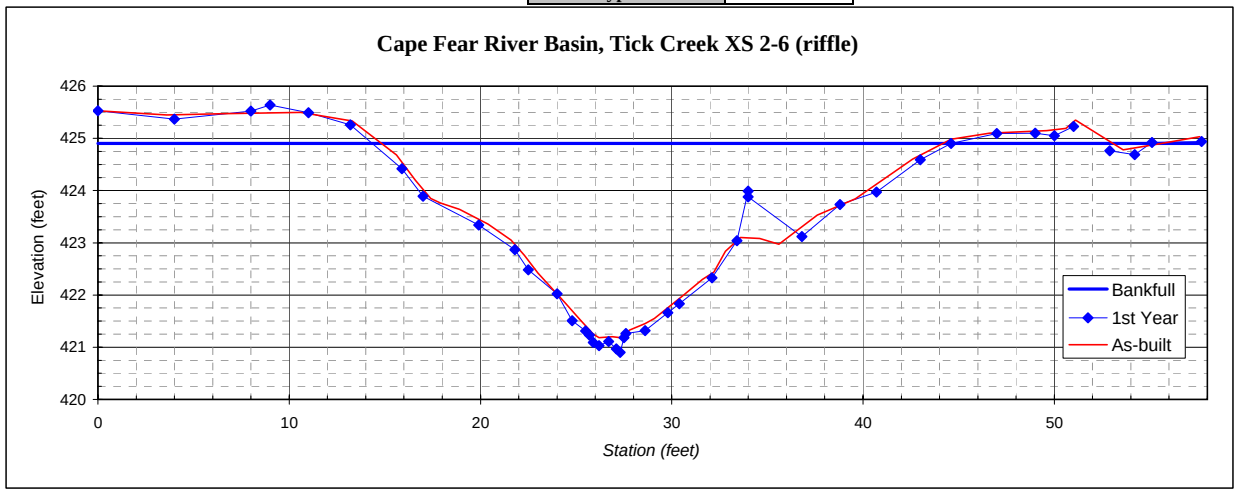
River Basin:	Cape Fear
Watershed:	Tick Creek
XS ID	XS 2-6 (riffle)
Reach:	2
Date:	11/3/2006
Field Crew:	J. O'Neal and S. Doig

Station	Rod Ht.	Elevation
0	3.90	425.53
4	4.06	425.37
8	3.91	425.52
9	3.79	425.64
11	3.94	425.49
13.2	4.17	425.26
15.9	5.01	424.42
17	5.54	423.89
19.9	6.10	423.34
21.8	6.56	422.87
22.5	6.95	422.48
24	7.41	422.02
24.8	7.92	421.51
25.5	8.12	421.31
25.7	8.20	421.23
25.9	8.35	421.09
26.2	8.40	421.03
26.7	8.33	421.11
27.1	8.47	420.97
27.3	8.53	420.90
27.5	8.25	421.18
27.6	8.17	421.26
28.6	8.11	421.32
29.8	7.77	421.66
30.4	7.61	421.83
32.1	7.10	422.33
33.4	6.39	423.04
34	5.45	423.99
34	5.55	423.88
36.8	6.31	423.12
38.8	5.70	423.73
40.7	5.47	423.97
43	4.84	424.59
44.6	4.53	424.90
47	4.35	425.09
49	4.34	425.10
50	4.38	425.05
51	4.20	425.23
	4.35	425.09
52.9	4.67	424.76
54.2	4.74	424.69
55.1	4.52	424.92
57.7	4.50	424.94

SUMMARY DATA	
Floodprone Elevation (ft)	429.90
Bankfull Elevation (ft)	424.90
Floodprone Width (ft)	63.00
Bankfull Width (ft)	33.00
Entrenchment Ratio	1.91
Mean Depth (ft)	1.69
Maximum Depth (ft)	4.00
Width/Depth Ratio	19.51
Bankfull Area (sq ft)	55.83
Wetted Perimeter (ft)	35.25
Hydraulic Radius (ft)	1.58

View of cross-section 2-6 looking downstream

Stream Type:	B6



B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

As Built 2-6

Station	Rod Ht.	Elevation
0	4.9	425.53
3.6	4.98	425.45
6.6	4.96	425.47
10.6	4.93	425.5
13.3	5.1	425.33
15.6	5.75	424.68
16.6	6.23	424.2
17.4	6.58	423.85
17.9	6.67	423.76
18.9	6.79	423.64
20.4	7.07	423.36
21.6	7.38	423.05
22.3	7.67	422.76
23	8.01	422.42
24.4	8.57	421.86
25.2	8.9	421.53
25.9	9.18	421.25
26.2	9.25	421.18
26.9	9.23	421.20
27.3	9.25	421.18
27.8	9.1	421.33
28.6	8.98	421.45
29.1	8.88	421.55
30.6	8.44	421.99
31.6	8.13	422.30
32.2	7.99	422.44
32.8	7.59	422.84
33.6	7.33	423.10
34.6	7.35	423.08
35.6	7.46	422.97
37.6	6.9	423.53
39.6	6.59	423.84
41.6	6.08	424.35
42.6	5.83	424.60
44.6	5.45	424.98
46.6	5.33	425.10
49.6	5.28	425.15
50.6	5.24	425.19
51.1	5.08	425.35
53.6	5.65	424.78
55.6	5.53	424.90
57.6	5.4	425.03

B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

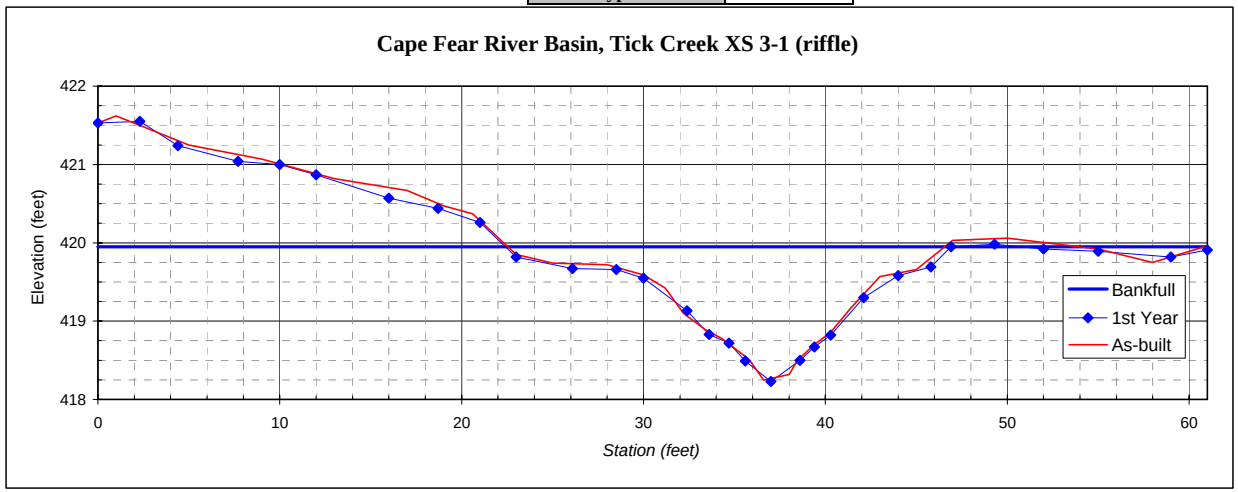
River Basin:	Cape Fear
Watershed:	Tick Creek
XS ID	XS 3-1(rifle)
Reach:	3
Date:	11/3/2006
Field Crew:	J. O'Neal and S. Doig

Station	Rod Ht.	Elevation
0	2.89	421.53
2.3	2.87	421.55
4.4	3.18	421.24
7.7	3.39	421.04
10	3.42	421.00
12	3.56	420.87
16	3.85	420.57
18.7	3.98	420.44
21	4.17	420.26
23	4.61	419.82
26.1	4.75	419.67
28.5	4.77	419.66
30	4.87	419.55
32.4	5.29	419.13
33.6	5.59	418.83
34.7	5.70	418.72
35.6	5.93	418.49
37	6.19	418.23
38.6	5.93	418.50
39.4	5.75	418.67
40.3	5.60	418.82
42.1	5.12	419.30
44	4.85	419.58
45.8	4.73	419.69
46.9	4.47	419.95
49.3	4.45	419.98
52	4.50	419.92
55	4.53	419.89
59	4.61	419.82
61	4.51	419.91

SUMMARY DATA	
Floodprone Elevation (ft)	421.67
Bankfull Elevation (ft)	419.95
Floodprone Width (ft)	265.00
Bankfull Width (ft)	34.84
Entrenchment Ratio	7.61
Mean Depth (ft)	0.51
Maximum Depth (ft)	1.72
Width/Depth Ratio	67.70
Bankfull Area (sq ft)	17.93
Wetted Perimeter (ft)	35.21
Hydraulic Radius (ft)	0.51

View of cross-section 3-1 looking downstream

Stream Type:	B6



B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

As Built 3-1

Station	Rod Ht.	Elevation
0	2.79	421.53
1	2.7	421.62
5	3.07	421.25
9	3.25	421.07
13	3.5	420.82
17	3.65	420.67
19	3.85	420.47
20.6	3.95	420.37
23	4.47	419.85
25	4.58	419.74
28	4.6	419.72
30	4.73	419.59
31.2	4.9	419.42
32.2	5.22	419.10
33.4	5.43	418.89
34.3	5.54	418.78
35.8	5.81	418.51
36.6	6.07	418.25
37.3	6.04	418.28
38	6	418.32
38.5	5.81	418.51
39.5	5.6	418.72
40.3	5.46	418.86
41.4	5.15	419.17
43	4.75	419.57
45	4.66	419.66
47	4.29	420.03
50	4.26	420.06
55	4.4	419.92
58	4.57	419.75
61	4.36	419.96

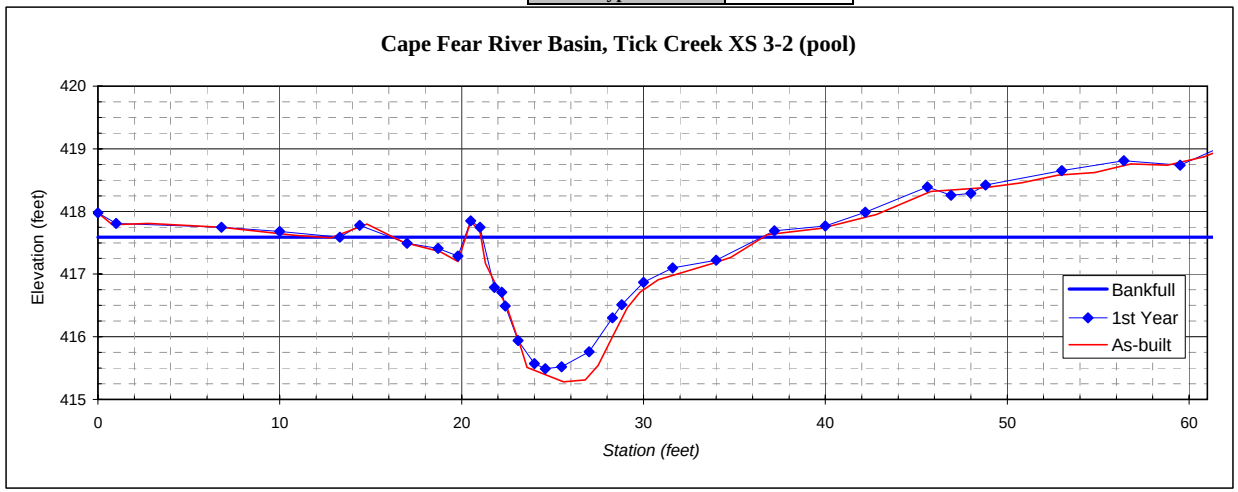
River Basin:	Cape Fear
Watershed:	Tick Creek
XS ID	XS 3-2(pool)
Reach:	3
Date:	11/3/2006
Field Crew:	J. O'Neal and S. Doig

Station	Rod Ht.	Elevation
0	5.09	417.98
1	5.27	417.81
6.8	5.33	417.75
10	5.39	417.68
13.3	5.48	417.59
14.4	5.30	417.78
17	5.59	417.49
18.7	5.66	417.41
19.8	5.79	417.29
20.5	5.22	417.85
21	5.33	417.75
21.8	6.29	416.79
22.2	6.37	416.71
22.4	6.58	416.49
23.1	7.13	415.94
24	7.51	415.57
24.6	7.59	415.49
25.5	7.55	415.52
27	7.31	415.76
28.3	6.77	416.30
28.8	6.57	416.51
30	6.20	416.87
31.6	5.97	417.10
34	5.85	417.22
37.2	5.38	417.69
40	5.30	417.77
42.2	5.09	417.99
45.6	4.68	418.39
46.9	4.81	418.26
48	4.78	418.29
48.8	4.65	418.42
53	4.42	418.65
56.4	4.26	418.81
59.5	4.33	418.74
62	4.01	419.06
62.8	4.09	418.98
64.8	3.92	419.15

SUMMARY DATA	
Floodprone Elevation (ft)	419.69
Bankfull Elevation (ft)	417.59
Floodprone Width (ft)	270.00
Bankfull Width (ft)	19.46
Entrenchment Ratio	13.88
Mean Depth (ft)	0.83
Maximum Depth (ft)	2.10
Width/Depth Ratio	23.34
Bankfull Area (sq ft)	16.22
Wetted Perimeter (ft)	20.59
Hydraulic Radius (ft)	0.79

View of cross-section 3-2 looking upstream

Stream Type:	C6b



B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

As Built 3-2

Station	Rod Ht.	Elevation
0	6.28	417.98
0.8	6.47	417.79
2.8	6.45	417.81
6.8	6.51	417.75
10.8	6.64	417.62
12.8	6.68	417.58
14.8	6.46	417.80
16.8	6.75	417.51
18.8	6.9	417.36
19.8	7.06	417.20
20.5	6.42	417.84
21	6.58	417.68
21.3	7.09	417.17
22.5	7.8	416.46
23.3	8.47	415.79
23.6	8.75	415.51
25.6	8.98	415.28
26.8	8.95	415.31
27.5	8.72	415.54
28.2	8.31	415.95
29.1	7.8	416.46
29.8	7.55	416.71
30.8	7.35	416.91
33.8	7.09	417.17
34.8	6.99	417.27
36.8	6.635	417.63
39.8	6.53	417.73
42.8	6.31	417.95
45.8	5.94	418.32
48.8	5.88	418.38
50.8	5.8	418.46
52.8	5.685	418.58
54.8	5.645	418.62
56.8	5.5	418.76
58.8	5.52	418.74
60.8	5.39	418.87
62.8	5.16	419.10
64.8	5.1	419.16

B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

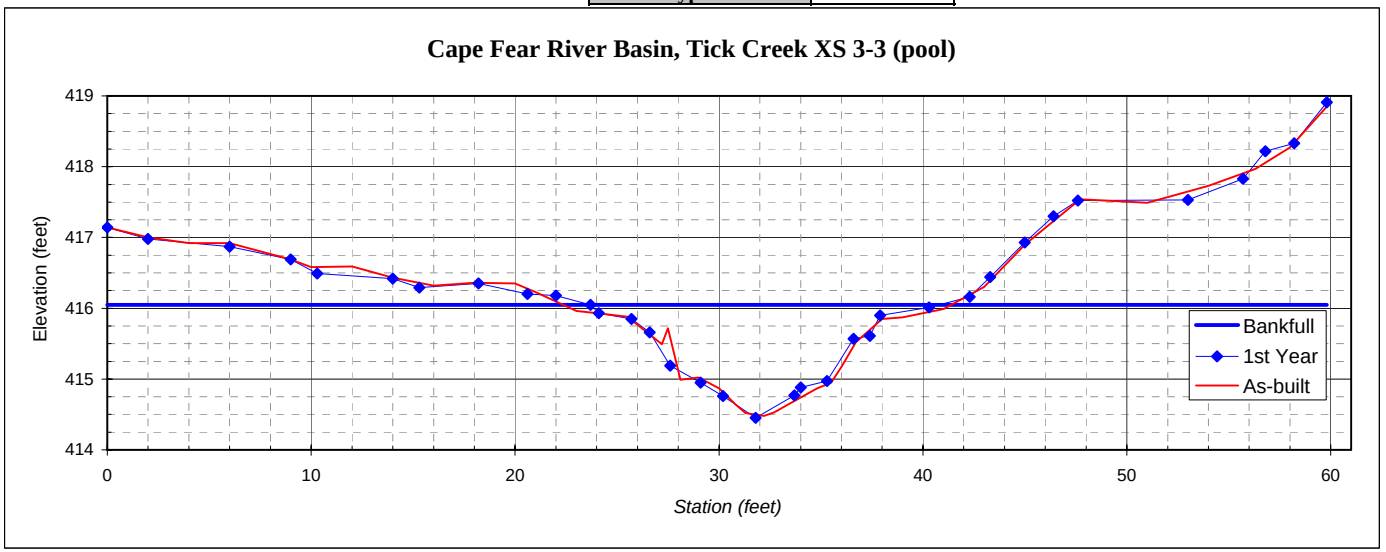
River Basin:	Cape Fear
Watershed:	Tick Creek
XS ID	XS 3-3 (pool)
Reach:	3
Date:	11/3/2006
Field Crew:	J. O'Neal and S. Doig

Station	Rod Ht.	Elevation
0	4.59	417.14
2	4.76	416.98
6	4.87	416.87
9	5.05	416.69
10.3	5.24	416.49
14	5.31	416.42
15.3	5.44	416.29
18.2	5.38	416.35
20.6	5.53	416.20
22	5.55	416.18
23.7	5.69	416.05
24.1	5.81	415.93
25.7	5.88	415.85
26.6	6.08	415.66
27.6	6.54	415.19
29.1	6.79	414.95
30.2	6.97	414.76
31.8	7.29	414.45
33.7	6.96	414.77
34	6.85	414.88
35.3	6.76	414.97
36.6	6.16	415.57
37.4	6.13	415.61
37.9	5.83	415.90
40.3	5.72	416.01
42.3	5.57	416.16
43.3	5.29	416.44
45	4.80	416.93
46.4	4.43	417.30
47.6	4.21	417.52
53	4.21	417.53
55.7	3.90	417.83
56.8	3.51	418.22
58.2	3.40	418.33
59.8	2.82	418.91

SUMMARY DATA	
Floodprone Elevation (ft)	417.65
Bankfull Elevation (ft)	416.05
Floodprone Width (ft)	250.00
Bankfull Width (ft)	17.13
Entrenchment Ratio	14.59
Mean Depth (ft)	0.74
Maximum Depth (ft)	1.60
Width/Depth Ratio	23.30
Bankfull Area (sq ft)	12.60
Wetted Perimeter (ft)	17.61
Hydraulic Radius (ft)	0.72

View of cross-section 3-3 looking upstream

Stream Type:	C6b



As Built 3-3

Station	Rod Ht.	Elevation
0	7.18	417.14
2	7.32	417
4	7.4	416.92
6	7.4	416.92
9	7.63	416.69
10	7.74	416.58
12	7.73	416.59
14	7.89	416.43
16	8	416.32
18	7.96	416.36
20	7.97	416.35
21	8.09	416.23
23	8.36	415.96
24.3	8.4	415.92
25.5	8.44	415.88
27.2	8.83	415.49
27.5	8.6	415.72
28.1	9.33	414.99
29	9.3	415.02
30	9.45	414.87
30.8	9.68	414.64
31.3	9.8	414.52
32.2	9.84	414.48
32.7	9.79	414.53
33.4	9.68	414.64
34.8	9.45	414.87
35.5	9.37	414.95
36	9.15	415.17
36.7	8.8	415.52
38	8.47	415.85
39	8.45	415.87
41	8.33	415.99
43	8.02	416.30
45	7.42	416.90
47.7	6.78	417.54
51	6.83	417.49
54	6.59	417.73
56.3	6.35	417.97
58	6.05	418.27
60	5.41	418.91

B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

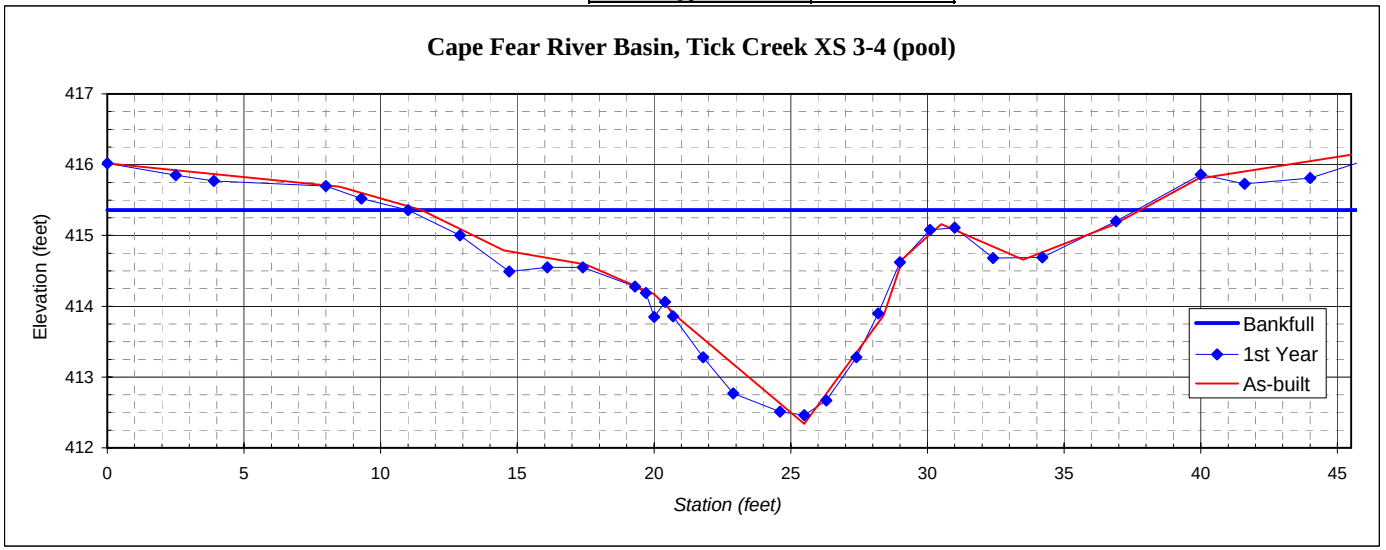
River Basin:	Cape Fear
Watershed:	Tick Creek
XS ID	XS 3-4 (pool)
Reach:	3
Date:	11/3/2006
Field Crew:	J. O'Neal and S. Doig

Station	Rod Ht.	Elevation
0	4.68	416.02
2.5	4.85	415.85
3.9	4.93	415.77
8	5.01	415.70
9.3	5.19	415.52
11	5.35	415.36
12.9	5.70	415.00
14.7	6.22	414.49
16.1	6.15	414.55
17.4	6.15	414.55
19.3	6.43	414.28
19.7	6.51	414.19
20	6.86	413.85
20.4	6.65	414.06
20.7	6.84	413.86
21.8	7.43	413.28
22.9	7.93	412.77
24.6	8.19	412.51
25.5	8.24	412.46
26.3	8.03	412.67
27.4	7.42	413.28
28.2	6.80	413.90
29	6.08	414.62
30.1	5.62	415.08
31	5.60	415.11
32.4	6.02	414.68
34.2	6.01	414.69
36.9	5.51	415.20
40	4.84	415.86
41.6	4.97	415.73
44	4.89	415.81
46.5	4.59	416.12

SUMMARY DATA	
Floodprone Elevation (ft)	418.26
Bankfull Elevation (ft)	415.36
Floodprone Width (ft)	300.00
Bankfull Width (ft)	26.65
Entrenchment Ratio	11.26
Mean Depth (ft)	1.13
Maximum Depth (ft)	2.90
Width/Depth Ratio	23.63
Bankfull Area (sq ft)	30.06
Wetted Perimeter (ft)	28.22
Hydraulic Radius (ft)	1.06

View of cross-section 3-4 looking downstream

Stream Type:	C6



B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

As Built 3-4

Station	Rod Ht.	Elevation
0	5.22	416.02
8.5	5.55	415.69
11.5	5.885	415.36
14.5	6.45	414.79
17.5	6.655	414.59
20	7.07	414.17
21	7.445	413.80
25.5	8.905	412.34
28.4	7.37	413.87
29.1	6.575	414.67
30.5	6.085	415.16
33.5	6.58	414.66
36.8	6.09	415.15
39.9	5.44	415.80
45.5	5.105	416.14

B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

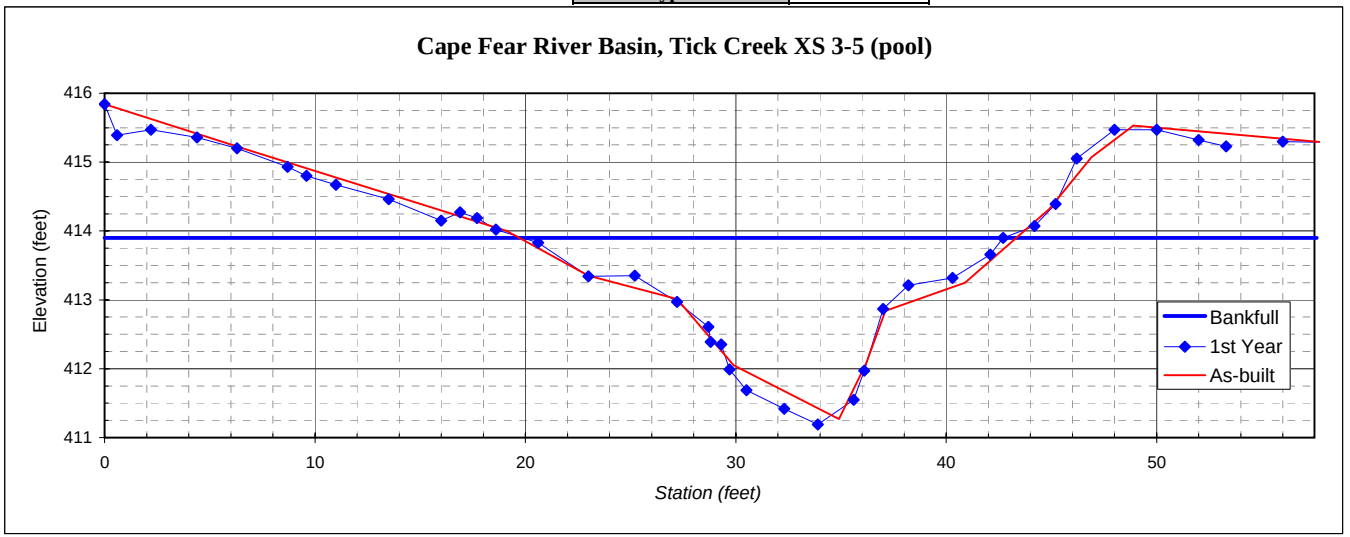
River Basin:	Cape Fear
Watershed:	Tick Creek
XS ID	XS 3-5 (pool)
Reach:	3
Date:	11/3/2006
Field Crew:	J. O'Neal and S. Doig

Station	Rod Ht.	Elevation
0	2.31	415.84
0.6	2.76	415.39
2.2	2.68	415.47
4.4	2.79	415.36
6.3	2.96	415.20
8.7	3.23	414.93
9.6	3.35	414.80
11	3.49	414.67
13.5	3.69	414.46
16	4.00	414.15
16.9	3.88	414.27
17.7	3.96	414.19
18.6	4.13	414.02
20.6	4.33	413.83
23	4.81	413.34
25.2	4.80	413.35
27.2	5.18	412.97
28.7	5.54	412.61
28.8	5.77	412.39
29.3	5.80	412.35
29.7	6.16	411.99
30.5	6.46	411.69
32.3	6.74	411.42
33.9	6.96	411.19
35.6	6.60	411.55
36.1	6.18	411.97
37	5.29	412.87
38.2	4.94	413.21
40.3	4.83	413.32
42.1	4.49	413.66
42.7	4.26	413.90
44.2	4.08	414.07
45.2	3.76	414.39
46.2	3.10	415.05
48	2.69	415.47
50	2.68	415.47
52	2.83	415.32
53.3	2.92	415.23
	2.95	415.20
56	2.86	415.30
57.6	2.87	415.29

SUMMARY DATA	
Floodprone Elevation (ft)	416.61
Bankfull Elevation (ft)	413.90
Floodprone Width (ft)	220.00
Bankfull Width (ft)	22.84
Entrenchment Ratio	9.63
Mean Depth (ft)	1.17
Maximum Depth (ft)	2.71
Width/Depth Ratio	19.57
Bankfull Area (sq ft)	26.64
Wetted Perimeter (ft)	24.03
Hydraulic Radius (ft)	1.11

View of cross-section 3-5 looking downstream

Stream Type:	C6



B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

As Built 3-5

Station	Rod Ht.	Elevation
0	5.07	415.84
6.9	5.74	415.17
19.1	6.91	414.00
23	7.56	413.35
27.2	7.9	413.01
29.9	8.86	412.05
34.9	9.64	411.27
36.2	8.83	412.08
37.1	8.07	412.84
40.9	7.66	413.25
44.9	6.59	414.32
46.9	5.84	415.07
48.9	5.38	415.53
57.9	5.62	415.29

B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

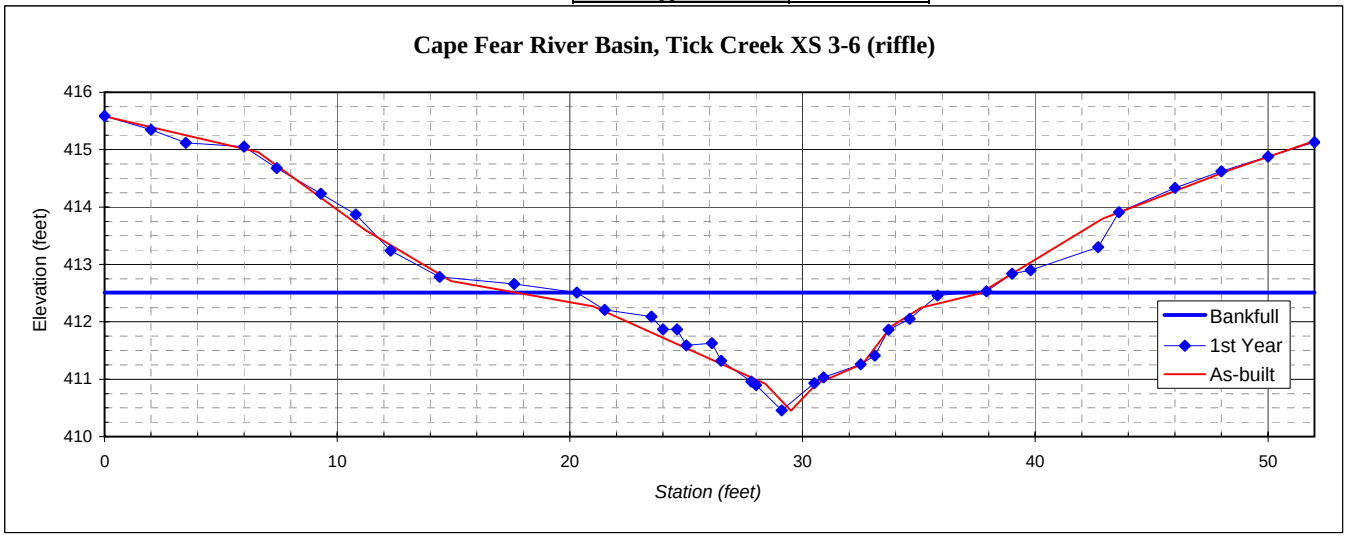
River Basin:	Cape Fear
Watershed:	Tick Creek
XS ID	XS 3-6 (riffle)
Reach:	3
Date:	11/3/2006
Field Crew:	J. O'Neal and S. Doig

Station	Rod Ht.	Elevation
0	2.57	415.59
2	2.81	415.35
3.5	3.03	415.12
6	3.11	415.05
7.4	3.47	414.68
9.3	3.92	414.23
10.8	4.28	413.87
12.3	4.91	413.24
14.4	5.37	412.78
17.6	5.49	412.66
20.3	5.65	412.51
21.5	5.95	412.21
23.5	6.06	412.09
24	6.28	411.87
24.6	6.28	411.87
25	6.56	411.59
26.1	6.53	411.63
26.5	6.83	411.32
27.8	7.19	410.96
28	7.25	410.90
29.1	7.69	410.46
30.5	7.22	410.93
30.9	7.12	411.03
32.5	6.89	411.26
33.1	6.74	411.41
33.7	6.29	411.86
34.6	6.10	412.05
35.8	5.70	412.46
37.9	5.63	412.53
39	5.31	412.84
39.8	5.25	412.90
42.7	4.85	413.30
43.6	4.24	413.91
46	3.82	414.33
48	3.53	414.62
50	3.27	414.88
52	3.02	415.13

SUMMARY DATA	
Floodprone Elevation (ft)	414.56
Bankfull Elevation (ft)	412.51
Floodprone Width (ft)	62.00
Bankfull Width (ft)	17.00
Entrenchment Ratio	3.65
Mean Depth (ft)	0.87
Maximum Depth (ft)	2.05
Width/Depth Ratio	19.55
Bankfull Area (sq ft)	14.79
Wetted Perimeter (ft)	17.79
Hydraulic Radius (ft)	0.83

View of cross-section 3-6 looking downstream

Stream Type:	C6



B5. Cross Section Plots, Photos, and Raw Data Tables - Tick Creek Stream Restoration - Project #379 - Chatham County, NC

As Built 3-6

Station	Rod Ht.	Elevation
0	5.33	415.58
6.6	5.95	414.96
11.2	7.31	413.60
14.9	8.2	412.71
21	8.64	412.27
28.4	9.995	410.92
29.5	10.46	410.45
30.6	9.99	410.92
32.6	9.64	411.27
33.8	8.99	411.92
35.1	8.665	412.25
37.6	8.42	412.49
42.9	7.11	413.80
48.4	6.265	414.65
52	5.765	415.15

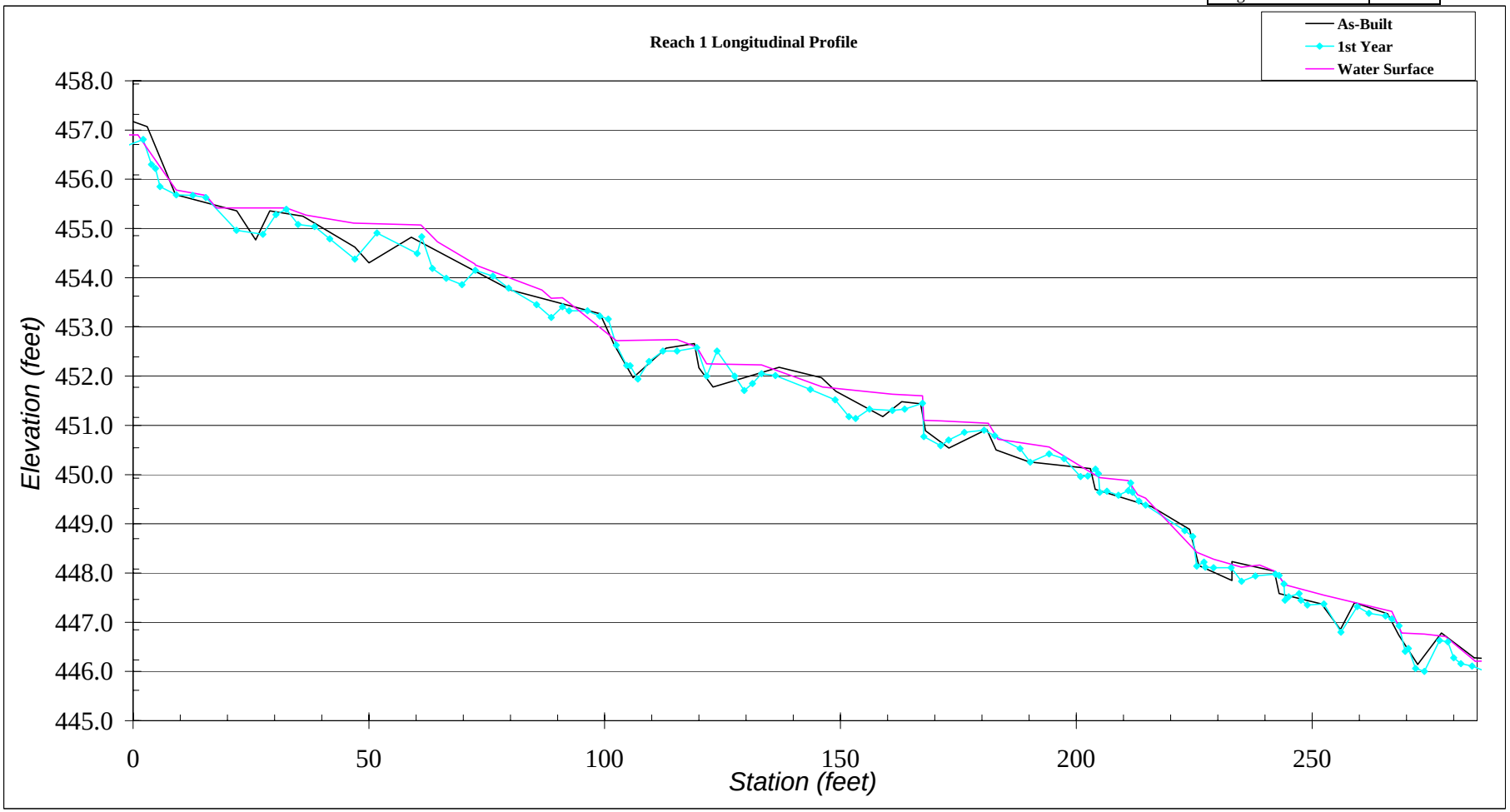
B5. Longitudinal Plots and Raw Data Tables - Tick Creek Stream Restoration - EEP Project #379

River Basin:	Cape Fear
Watershed:	Tick Creek
Reach:	Upstream
Profile ID:	Profile 1
Date:	1-Nov-06
Field Crew:	W. Marotti, J'Oneal, and S. Doig

Pattern	min	max	average
Channel Beltwidth (ft)	3.24	8.10	6.17
Radius of Curvature (ft)	6.04	10.25	8.04
Meander Wavelength	11.18	38.59	23.34
Meander Width ratio	0.32	0.60	0.53

Profile	min	max	average
Riffle length (ft	2.24	29.91	12.45
Riffle slope (ft/	0.034	0.285	0.086
Pool length (ft)	4.33	22.69	10.21
Pool spacing (ft	8.08	27.86	18.59

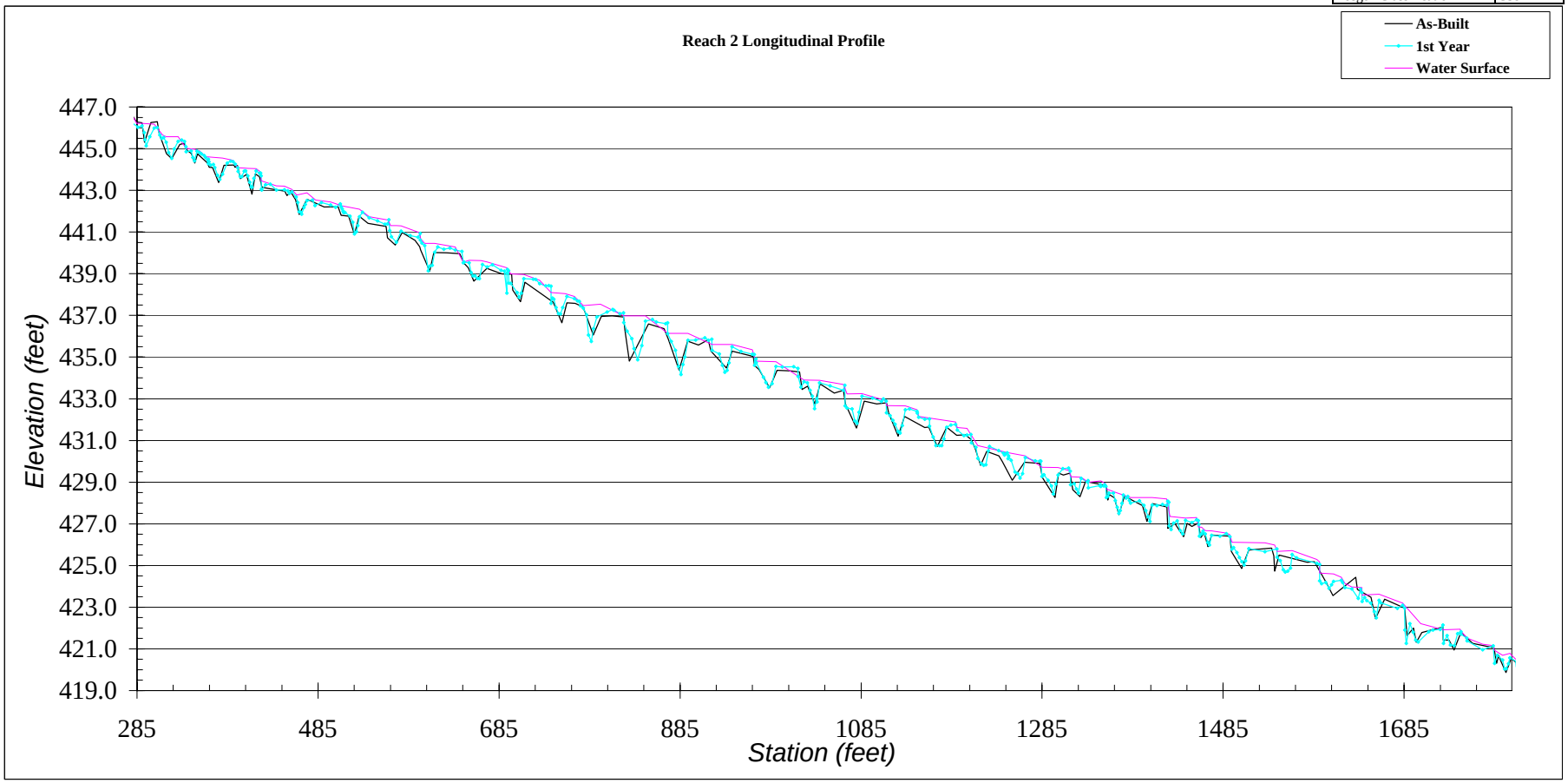
Additional Reach Parameters	
Valley Length (ft)	255
Channel Length (ft)	285
Sinuosity	1.12
Water Surface Slope (ft	0.037
BF slope (ft/ft)	0.038
Rosgen Classification	B6



B5. Longitudinal Plots and Raw Data Tables - Tick Creek Stream Restoration - EEP Project #379

River Basin:	Cape Fear
Watershed:	Tick Creek
Reach:	Middle
Profile ID:	Profile 2
Date:	1-Nov-06
Field Crew:	J'Oneal, and S. Doig

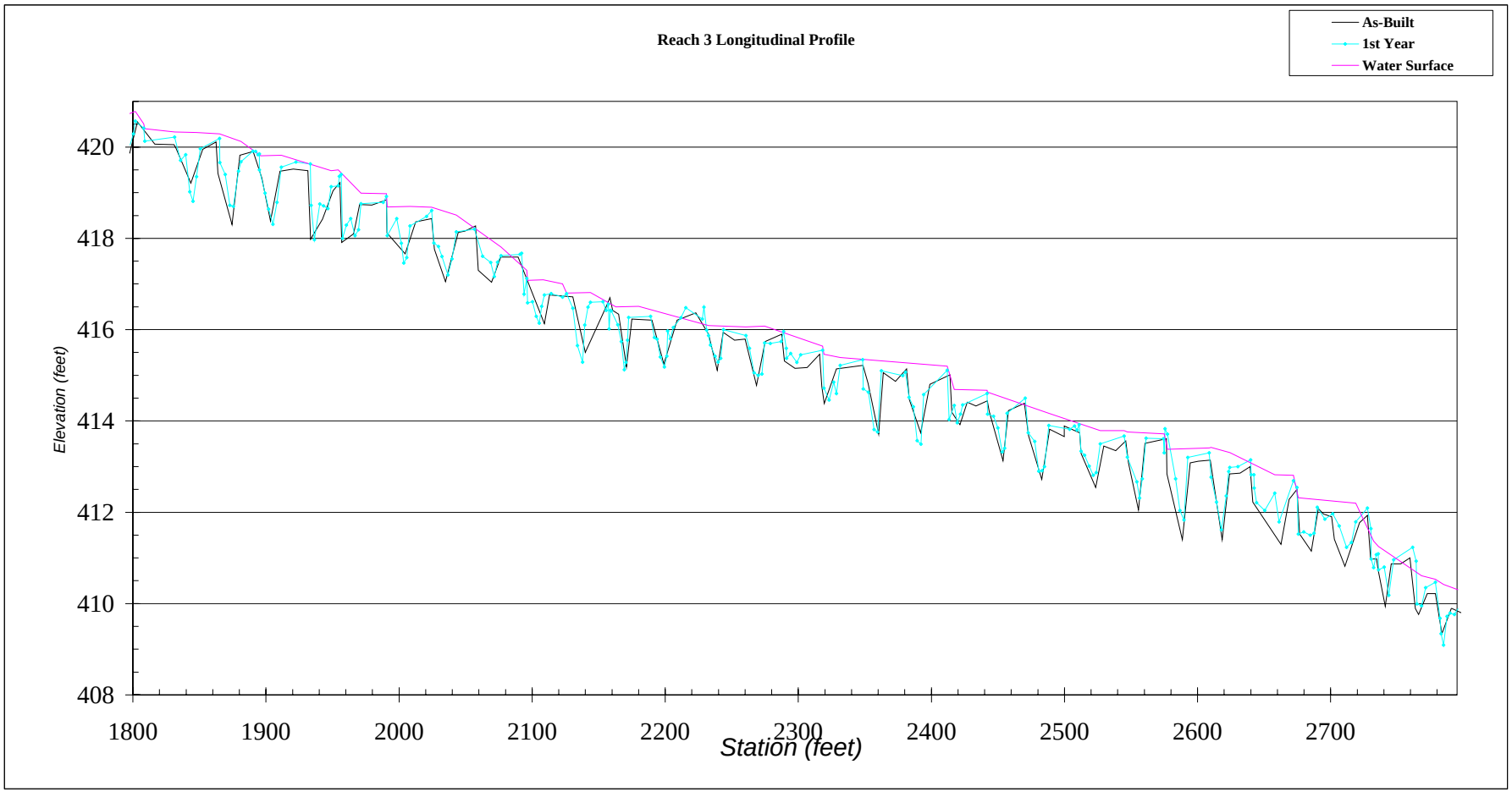
Pattern	min	max	average	**Profile**	min	max	average	**Additional Reach Parameters**	
Channel Beltwidth (ft)	9.149	54.638	25.812	Riffle length (ft)	1.876	43.562	23.017308	Valley Length (ft)	1150
Radius of Curvature (ft)	14.4	36.44	24.74	Riffle slope (ft/ft)	0.0006258	0.0746269	0.0305511	Channel Length (ft)	1521
Meander Wavelength	39.209	121.135	70.527	Pool length (ft)	5.73	31.661	15.609523	Sinuosity	1.3226087
Meander Width ratio	0.507713651	1.655697	1.1919099	Pool spacing (ft)	2.521	37.776	22.857405	Water Surface Slope (ft/ft)	0.022
								BF slope (ft/ft)	0.022
								Rosgen Classification	C5b



B5. Longitudinal Plots and Raw Data Tables - Tick Creek Stream Restoration - EEP Project #379

River Basin:	Cape Fear
Watershed:	Tick Creek
Reach:	Downstream
Profile ID:	Profile 3
Date:	1-Nov-06
Field Crew:	J'Oneal, and S. Doig

Pattern	min	max	average	**Profile**	min	max	average	**Additional Reach Parameters**	
Channel Beltwidth (ft)	10.48	29.554	16.43707143	Riffle length (ft)	8.208	21.79	16.174556	Valley Length (ft)	635
Radius of Curvature (ft)	10.13	23.27	16.62	Riffle slope (ft/ft)	0.0120752	0.0746269	0.0230761	Channel Length (ft)	974
Meander Wavelength	34.304	83.325	53.96607407	Pool length (ft)	7.732	38.274	24.6194	Sinuosity	1.5338583
Meander Width ratio	0.264113	0.45608	0.304709969	Pool spacing (ft)	0.19	22.47	7.1377333	Water Surface Slope (ft/ft)	0.016
								BF slope (ft/ft)	0.014
								Rosgen Classification	E6



B5. Longitudinal Plots and Raw Data Tables - Tick Creek Stream Restoration - EEP Project #379

Year 1

STATION	ELEV	STATION	ELEV	STATION	ELEV	STATION	ELEV
2.159	456.81	161.028	451.3	271.934	446.06	400.683	443.65
3.912	456.3	163.636	451.33	273.796	446	403.386	443.92
4.751	456.22	167.416	451.45	277.049	446.63	405.001	443.93
5.698	455.85	167.685	450.77	278.769	446.6	407.522	443.7
9.15	455.68	171.214	450.59	280.035	446.28	409.449	443.39
12.634	455.67	172.92	450.7	281.578	446.16	410.948	443.16
15.412	455.63	176.24	450.86	283.942	446.11	411.93	443.15
21.936	454.96	180.47	450.9	286.058	446.03	414.075	443.58
27.5	454.88	182.71	450.79	290.496	446.09	416.575	443.94
30.3	455.28	188.102	450.53	292.876	445.77	420.538	443.82
32.5	455.39	190.205	450.25	293.843	445.43	421.595	443.83
34.967	455.08	194.255	450.42	295.223	445.14	422.042	443.7
38.513	455.04	197.404	450.32	298.962	445.57	422.527	443.06
41.694	454.79	200.91	449.96	303.884	445.99	422.657	443.02
47.042	454.38	202.433	449.97	307.457	446.01	427.123	443.27
51.696	454.91	204.07	450.11	310.023	445.66	432.277	443.29
60.256	454.49	204.684	450.02	312.315	445.49	439.141	443.01
61.2	454.83	204.992	449.64	314.453	445.54	448.047	443.03
63.443	454.19	206.494	449.66	317.354	445.31	451.511	442.97
66.389	453.99	208.959	449.58	319.891	444.81	453.303	442.86
69.754	453.86	211.024	449.67	323.242	444.53	456.214	442.94
72.545	454.15	211.508	449.83	326.162	444.99	460.932	442.68
76.3	454.03	211.925	449.64	330.372	445.35	462.524	442.41
79.62	453.79	213.296	449.46	334.296	445.41	464.199	441.97
85.572	453.45	214.669	449.38	337.341	445.35	465.996	441.95
88.656	453.19	222.999	448.86	338.858	445.1	467.056	441.85
91.023	453.41	224.685	448.74	339.26	444.86	469.415	442.17
92.463	453.33	225.568	448.14	344.893	444.89	471.045	442.32
96.343	453.33	227.073	448.22	346.538	444.57	472.708	442.51
98.963	453.22	227.358	448.12	348.473	444.41	478.987	442.53
100.752	453.16	229.124	448.11	351.364	444.88	481.651	442.27
102.462	452.63	232.847	448.11	354.042	444.82	488.569	442.41
104.662	452.22	235.052	447.83	356.239	444.75	498.813	442.29
105.387	452.21	238.002	447.94	359.182	444.67	504.465	442.19
107.029	451.94	242.221	447.98	360.792	444.58	509.471	442.35
109.403	452.3	243.007	447.95	363.83	444.28	510.616	442.22
112.349	452.51	244.013	447.78	363.952	444.5	511.68	442.11
115.36	452.51	244.246	447.45	364.614	444.38	512.6	442
119.501	452.58	245.066	447.52	366.43	444.21	513.377	441.93
121.595	452	247.223	447.58	369.316	444.24	514.718	441.94
123.828	452.51	247.658	447.45	370.955	444.09	520.219	441.76
127.578	452	249.016	447.35	374.04	443.72	523.313	441.47
129.564	451.71	252.505	447.37	376.346	443.52	525.256	440.91
131.313	451.85	256.115	446.8	379.366	443.78	527.32	441.02
133.257	452.05	259.561	447.32	384.793	444.31	528.958	441.31
136.181	452.01	262.055	447.18	388.357	444.4	530.641	441.73
143.587	451.73	265.575	447.13	391.074	444.37	534.067	441.95
148.878	451.52	266.891	447.07	393.658	444.26	541.46	441.68
151.776	451.18	268.441	446.93	396.344	444.08	550.602	441.53
153.182	451.14	269.748	446.41	396.778	443.91	558.866	441.38
156.124	451.33	270.393	446.47	399.212	443.66	561.671	441.39

B5. Longitudinal Plots and Raw Data Tables - Tick Creek Stream Restoration - EEP Project #379

Year 1

STATION	ELEV	STATION	ELEV	STATION	ELEV	STATION	ELEV
563.405	441.59	745.556	437.78	952.198	435.27	1160.6	432.04
564.121	441.07	747.847	437.38	964.868	435.14	1160.77	431.69
566.124	440.77	750.711	437.09	967.109	435.12	1164.574	431.17
571.683	440.51	752.863	437.07	967.195	434.6	1167.712	430.76
576.897	441.04	755.352	437.38	968.984	434.91	1171.59	430.76
586.796	440.83	759.924	437.91	969.111	434.74	1174.052	430.76
595.531	440.75	768.211	437.81	977.058	434.03	1176.704	431.07
597.847	440.93	771.59	437.7	979.827	433.78	1179.799	431.64
597.959	440.61	773.801	437.67	982.789	433.55	1184.357	431.74
599.909	440.47	774.999	437.46	986.556	433.73	1189.452	431.77
602.919	440.35	778.13	437.35	990.933	434.55	1191.346	431.5
606.777	439.14	781.682	437.03	997.948	434.52	1198.568	431.24
608.378	439.36	783.977	436.06	1010.603	434.54	1202.151	431.26
611.06	439.41	786.814	435.75	1015.084	434.46	1206.475	431.29
614.03	440.03	789.529	436.36	1015.517	434.07	1207.039	430.89
617.135	440.28	793.027	436.92	1018.577	433.55	1211.721	430.68
623.917	440.18	804.493	437.16	1021.974	433.82	1214.087	430.14
630.656	440.23	810.482	437.29	1025.606	433.76	1217.954	429.89
636.498	440.14	812.011	437.25	1028.831	433.41	1220.512	429.81
644.008	440.07	818.44	437.09	1031.137	433.12	1222.88	429.83
645.417	439.52	822.646	437.13	1033.509	432.53	1225.534	430.5
646.271	439.56	822.766	436.66	1035.91	433.01	1226.817	430.72
651.969	439.52	826.511	436.24	1036.397	432.85	1236.892	430.51
653.955	439.06	831.594	435.88	1039.056	433.77	1242.382	430.39
656.215	438.9	834.057	435.41	1050.729	433.62	1243.594	430.3
658.483	438.9	838.291	434.87	1065.542	433.41	1244.397	430.35
661.04	438.78	842.701	435.55	1067.193	433.64	1246.547	430.41
663.359	438.76	846.904	436.72	1067.441	432.66	1247.502	430.13
666.616	439.45	854.427	436.8	1069.618	432.56	1248.155	430.26
672.032	439.33	858.696	436.68	1074.958	432.52	1250.85	430.05
677.795	439.43	869.196	436.61	1077.959	431.94	1255.017	429.49
687.239	439.17	871.31	436.64	1080.406	431.82	1258.128	429.41
690.963	439.12	871.459	436.12	1082.789	432.36	1260.781	429.2
693.637	438.07	875.343	435.75	1086.083	433.12	1263.437	429.41
693.793	439.02	879.955	435.32	1097.624	433.03	1266.405	430.18
694.381	439.21	883.248	434.55	1107.58	432.87	1277.521	430.02
695.592	439.15	885.995	434.16	1109.749	432.99	1282.302	430.01
695.906	438.55	888.132	434.64	1112.892	432.89	1283.75	430.01
698.074	438.54	890.357	435	1112.999	432.33	1285.013	429.28
704.944	438.1	893.604	435.8	1117.159	432.19	1287.083	429.36
707.231	437.87	902.314	435.82	1120.024	431.97	1291.716	429.09
709.585	438.07	912.384	435.93	1122.536	431.78	1295.263	428.82
712.423	438.76	916.518	435.8	1125.98	431.43	1297.546	428.43
722.93	438.74	920.231	435.86	1128.25	431.35	1300.279	428.91
725.452	438.72	920.493	435.33	1130.419	431.71	1302.597	429.34
729.864	438.53	928.411	435.15	1134.086	432.48	1307.906	429.65
736.542	438.42	931.81	434.6	1138.449	432.52	1314.398	429.67
739.959	438.43	934.663	434.27	1146.84	432.39	1316.274	429.53
742.385	438.4	936.913	434.36	1147.174	432.31	1316.397	428.87
742.582	437.58	939.123	434.73	1148.584	432.11	1320.426	428.93
743.949	437.83	942.486	435.5	1155.434	432.02	1322.794	428.67

B5. Longitudinal Plots and Raw Data Tables - Tick Creek Stream Restoration - EEP Project #379

Year 1

STATION	ELEV	STATION	ELEV	STATION	ELEV	STATION	ELEV
1324.958	428.48	1468.009	426.11	1687.466	421.26	1908.288	418.79
1328.141	429.18	1469.805	425.99	1691.26	422.21	1911.451	419.56
1335.067	429.01	1472.241	426.45	1695.132	421.8	1922.518	419.67
1335.936	429.08	1481.489	426.41	1697.92	421.43	1933.241	419.63
1336.148	428.73	1488.686	426.53	1700.666	421.33	1933.921	418.72
1348.692	428.83	1492.461	426.38	1712.358	421.82	1936.48	417.97
1349.459	428.87	1494.674	425.78	1717	421.91	1940.54	418.75
1349.872	428.79	1496.438	425.86	1724.773	421.93	1943.3	418.71
1353.119	428.82	1500.321	425.63	1727.788	422.14	1946.61	418.65
1354.273	428.87	1503.115	425.39	1728.525	421.26	1948.947	419.13
1355.572	428.8	1505.681	425.19	1732.569	421.64	1954.305	419.15
1355.997	428.26	1508.131	425.02	1736.158	421.19	1955.012	419.36
1358.008	428.33	1509.92	425.22	1740.542	421.16	1956.506	419.4
1358.693	428.48	1513.39	425.81	1744.044	421.73	1957.52	418
1363.828	428.47	1531.28	425.66	1747.75	421.82	1960.372	418.29
1365.917	428.12	1544.594	425.8	1747.984	421.7	1963.609	418.43
1367.938	427.79	1544.824	425.4	1754.179	421.52	1966.927	418.06
1369.962	427.5	1548.194	425.24	1754.507	421.39	1969.546	418.19
1371.445	427.64	1551.572	424.8	1771.749	420.96	1971.373	418.76
1373.137	427.98	1553.77	424.69	1783.555	421.14	1988.17	418.79
1374.716	428.38	1556.469	424.73	1784.956	420.3	1990.628	418.92
1377.806	428.24	1559.434	424.88	1788.11	420.69	1991.114	418.06
1379.718	428.31	1561.456	425.53	1793.869	420.46	1998.36	418.43
1381.591	428.11	1566.185	425.37	1795.917	420.04	2001.825	417.89
1382.814	427.99	1588.746	425.11	1797.927	420.05	2003.484	417.46
1392.683	428.1	1591.604	425.05	1800.414	420.29	2005.8	417.58
1397.531	427.89	1591.756	424.26	1801.916	420.57	2008.268	418.27
1399.681	427.64	1593.86	424.13	1808.181	420.41	2020.587	418.48
1402.081	427.34	1598.472	424.19	1808.953	420.13	2024.58	418.61
1404.318	427.12	1602.037	423.9	1831.357	420.22	2026.171	417.9
1406.708	427.9	1604.81	424.08	1835.914	419.71	2029.542	417.82
1411.927	427.88	1607.071	424.24	1839.646	419.83	2032.313	417.6
1418.159	427.93	1615.697	424.29	1842.788	419.02	2036.65	417.2
1422.687	427.89	1617.233	424.18	1845.201	418.81	2039.719	417.55
1423.87	428.09	1619.484	423.94	1847.761	419.35	2042.995	418.14
1425.064	428.03	1627.299	423.88	1850.761	419.96	2056.786	418.2
1425.51	426.9	1634.39	423.43	1865.075	420.19	2062.877	417.61
1427.568	426.73	1636.908	423.87	1865.295	419.66	2068.895	417.47
1430.314	427.04	1638.38	423.71	1869.383	419.4	2071.525	417.16
1434.315	427.14	1638.716	423.28	1872.821	418.72	2073.89	417.48
1437.794	426.67	1641.31	423.46	1875.526	418.7	2076.679	417.62
1440.373	426.52	1643.995	423.32	1879.304	419.47	2090.955	417.65
1443.641	427.17	1648.214	423.2	1881.295	419.68	2092.042	417.67
1450.546	427.06	1652.057	422.78	1890.128	419.91	2093.854	416.78
1455.656	427.2	1654.194	422.49	1892.179	419.9	2095.881	417.12
1457.614	427.16	1657.404	423.33	1894.094	419.83	2096.662	416.59
1458.355	426.97	1659.238	423.21	1895.035	419.85	2100.25	416.61
1458.829	426.41	1677.453	422.94	1895.155	419.5	2103.077	416.29
1461.313	426.51	1683.383	423.09	1899.308	418.99	2105.291	416.14
1462.875	426.65	1685.53	422.96	1901.962	418.64	2107.232	416.51
1465.159	426.52	1685.741	421.91	1905.148	418.31	2109.199	416.76

B5. Longitudinal Plots and Raw Data Tables - Tick Creek Stream Restoration - EEP Project #379

Year 1

STATION	ELEV	STATION	ELEV	STATION	ELEV	STATION	ELEV
2114.386	416.79	2291.137	415.37	2523.923	412.87	2736.004	410.74
2122.945	416.71	2294.213	415.48	2526.834	413.5	2740.313	410.8
2125.857	416.79	2299.008	415.28	2544.866	413.67	2743.804	410.18
2130.502	416.47	2301.72	415.45	2547.217	413.21	2747.421	410.96
2134.113	415.65	2318.208	415.55	2554.294	412.67	2761.647	411.23
2137.857	415.29	2319.319	414.72	2556.513	412.31	2764.163	410.93
2139.502	416.1	2323.11	414.46	2558.429	412.73	2764.908	409.99
2141.961	416.49	2326.564	414.85	2561.261	413.62	2768.314	409.95
2143.88	416.6	2328.677	414.6	2574.425	413.61	2771.348	410.35
2153.247	416.61	2331.402	415.22	2575	413.3	2778.8	410.47
2155.561	416.42	2348.428	415.34	2575.598	413.83	2782.163	409.68
2157.33	416.56	2348.808	414.7	2577.334	413.71	2782.899	409.34
2157.83	416.02	2352.727	414.63	2583.502	412.73	2784.841	409.09
2158.64	416.42	2357.013	413.81	2586.795	412.04	2787.42	409.72
2159.432	416.41	2359.581	413.76	2589.828	411.83	2789.649	409.79
2164.464	416.11	2362.361	415.1	2592.564	413.2	2792.884	409.76
2167.065	415.74	2378.585	414.99	2608.8	413.3	2795.819	409.89
2169.237	415.12	2380.635	415.07	2610.252	412.77		
2170.54	415.28	2383.106	414.52	2614.251	412.22		
2171.779	415.77	2386.446	414.31	2617.927	411.62		
2172.419	416.27	2389.271	413.57	2621.491	412.36		
2188.983	416.29	2392.117	413.49	2623.432	412.89		
2191.887	415.83	2394.119	414.58	2624.135	412.98		
2193.835	415.79	2411.867	415.11	2630.293	413		
2196.375	415.4	2413.249	414.03	2639.791	413.15		
2199.443	415.18	2417.094	414.34	2640.251	412.82		
2201.173	415.42	2419.504	413.96	2642.334	412.82		
2201.848	415.97	2421.822	414.15	2642.59	412.53		
2203.882	415.8	2423.543	414.35	2644.465	412.21		
2206.1	416.05	2441.74	414.6	2650.419	412.04		
2211.71	416.26	2442.17	414.15	2657.997	412.42		
2215.455	416.48	2446.805	414.1	2661.306	411.79		
2227.923	416.23	2449.944	413.85	2672.071	412.69		
2229.197	416.49	2453.162	413.32	2674.702	412.54		
2231.164	415.99	2455.072	413.4	2675.809	411.52		
2232.6	415.87	2456.969	414.17	2679.854	411.57		
2234.067	415.66	2470.435	414.5	2684.684	411.5		
2237.521	415.42	2472.853	413.74	2687.613	411.54		
2239.629	415.29	2477.624	413.55	2689.906	412.11		
2241.725	415.37	2480.727	412.9	2695.737	411.85		
2243.73	416	2483.178	412.91	2701.5	411.97		
2260.725	415.87	2485.039	413	2706.544	411.7		
2263.289	415.59	2488.196	413.9	2711.889	411.23		
2266.787	415.06	2503.97	413.82	2715.581	411.34		
2269.781	415	2507.623	413.89	2718.923	411.79		
2272.751	415.03	2509.334	413.8	2727.61	412.09		
2274.792	415.71	2511.127	413.92	2730.305	411.64		
2279	415.7	2512.496	413.34	2730.519	410.98		
2287.193	415.74	2515.035	413.25	2732.364	410.79		
2289.002	415.96	2518.52	413.01	2734.314	411.07		
2290.947	415.59	2521.58	412.81	2735.804	411.09		

B5. Longitudinal Plots and Raw Data Tables - Tick Creek Stream Restoration - EEP Project #379

As-built

STATION	ELEV	STATION	ELEV	STATION	ELEV	STATION
0	457.17	309.4	445.72	657.03	438.65	1155.48
3	457.07	317.4	444.76	671.53	439.26	1159.68
9	455.69	323.4	444.52	688.03	438.99	1169.28
22	455.36	332.4	445.2	698.73	438.98	1179.78
26	454.77	337.1	445.26	700.13	438.22	1190.78
29	455.36	340.2	444.92	708.83	437.66	1200.28
36	455.25	345	444.76	713.63	438.59	1207.08
47	454.62	348.9	444.31	745.03	437.63	1211.18
50	454.3	352	444.75	754.33	436.64	1216.98
59	454.82	362.6	444.32	759.83	437.6	1223.68
80	453.75	364.9	444.11	769.13	437.58	1237.48
99	453.27	368.5	444.09	777.53	437.42	1241.08
102	452.64	375.2	443.38	780.23	437.14	1251.98
106	451.97	380.9	444.2	789.13	436.06	1265.68
113	452.57	392.2	444.21	798.03	436.95	1282.38
119	452.66	393.4	444.11	810.03	436.98	1285.38
120	452.17	396.2	444.19	822.63	436.92	1299.18
123	451.78	399	443.56	824.03	436.3	1303.38
137	452.18	405.93	443.76	829.03	434.8	1308.38
146	451.97	411.93	442.82	850.13	436.59	1315.98
149	451.69	415.63	443.79	867.28	436.37	1318.98
159	451.18	420.43	443.66	871.78	435.87	1326.78
163	451.48	423.13	443.15	883.88	434.38	1332.98
167	451.44	432.93	443.07	893.48	435.76	1355.98
168	450.89	448.13	442.96	905.48	435.58	1357.48
173	450.54	450.63	442.75	915.98	435.83	1358.98
181	450.92	454.73	442.93	919.08	435.29	1364.98
183	450.5	460.13	442.55	936.48	434.47	1369.98
190	450.26	464.23	441.84	942.48	435.29	1375.98
203	450.12	472.73	442.57	965.78	435.03	1395.98
204	449.7	491.73	442.2	967.48	434.59	1400.98
216	449.35	507.03	442.21	972.18	434.4	1406.98
224	448.89	510.53	441.8	983.98	433.52	1422.98
226	448.15	518.93	441.76	992.28	434.36	1423.98
233	447.85	525.23	440.88	1006.48	434.34	1431.98
233	448.23	530.43	441.76	1017.08	434.29	1441.48
242	448.04	540.33	441.42	1019.68	433.44	1445.48
243	447.58	560.23	441.27	1025.98	433.61	1450.48
252	447.37	561.83	440.72	1033.78	432.75	1457.48
256	446.85	570.33	440.37	1039.78	433.71	1460.48
259	447.4	578.03	440.97	1055.48	433.27	1463.98
266	447.17	592.13	440.6	1065.48	433.41	1468.48
268.4	446.74	597.43	440.3	1067.78	432.75	1472.48
272.4	446.14	598.23	440.15	1079.88	431.6	1492.48
277.4	446.78	608.23	439.13	1088.48	432.89	1493.98
284.4	446.28	613.03	440.02	1102.48	432.75	1505.48
290.4	446.24	627.03	440	1112.98	432.81	1513.48
293.4	445.31	641.53	439.96	1115.48	432.32	1538.48
300.4	446.25	646.63	439.48	1125.98	431.21	1540.98
307.4	446.3	651.03	439.29	1133.08	432.16	1541.98

B5. Longitudinal Plots and Raw Data Tables - Tick Creek Stream Restoration - EEP Project #379

As-built

ELEV	STATION	ELEV	STATION	ELEV	STATION	ELEV
431.62	1546.98	425.51	1990.48	418.84	2383.43	414.47
431.65	1577.98	425.16	1990.98	418.12	2391.93	413.74
430.71	1585.98	425.18	2004.48	417.66	2398.93	414.8
431.64	1598.48	424.22	2012.48	418.36	2413.93	415.01
431.25	1606.48	423.56	2024.48	418.43	2415.43	414.19
431.28	1631.48	424.44	2026.48	417.76	2421.43	413.92
431.03	1633.48	423.85	2034.98	417.05	2426.93	414.41
430.59	1648.48	423.48	2044.48	418.13	2433.43	414.33
429.81	1653.48	422.45	2049.48	418.16	2441.93	414.44
430.48	1663.48	423.39	2057.48	418.27	2443.43	414.21
430.26	1685.48	422.96	2059.48	417.3	2453.93	413.13
430	1688.48	421.64	2069.48	417.04	2457.93	414.23
429.09	1695.48	422	2076.48	417.59	2469.93	414.39
429.96	1698.48	421.32	2081.98	417.59	2472.93	413.68
429.9	1704.48	421.78	2089.48	417.59	2482.93	412.72
429.21	1727.78	422.05	2109.28	416.13	2488.93	413.82
428.26	1728.28	421.43	2112.98	416.76	2499.93	413.66
429.44	1734.78	421.43	2130.48	416.72	2499.93	413.89
429.34	1740.28	420.94	2139.98	415.5	2511.53	413.74
429.43	1747.78	421.8	2155.98	416.53	2512.53	413.29
428.63	1760.78	421.26	2158.48	416.7	2523.53	412.54
428.3	1784.28	421.05	2160.48	416.42	2529.53	413.45
429.04	1786.98	420.3	2164.98	416.34	2538.53	413.35
428.83	1789.48	420.68	2170.98	415.19	2546.03	413.56
428.14	1791.48	420.46	2174.98	416.23	2548.03	413.08
428.41	1797.48	419.86	2189.98	416.21	2555.53	412.05
428.25	1803.48	420.55	2198.98	415.25	2560.53	413.51
427.44	1816.48	420.06	2208.98	416.21	2576.53	413.61
428.33	1830.98	420.05	2222.98	416.37	2577.03	412.84
427.88	1832.48	419.96	2232.58	415.9	2588.53	411.4
427.11	1843.48	419.21	2239.08	415.11	2594.53	413.08
427.97	1852.48	419.95	2243.58	415.94	2600.53	413.12
427.81	1862.48	420.11	2252.08	415.77	2609.53	413.14
426.78	1863.98	419.42	2260.08	415.79	2618.53	411.4
427.01	1874.48	418.3	2268.58	414.78	2624.03	412.84
426.38	1880.48	419.82	2275.08	415.74	2632.03	412.86
427.02	1890.48	419.9	2287.58	415.9	2639.53	413
426.87	1896.98	419.32	2289.58	415.31	2641.53	412.22
427.04	1903.48	418.38	2297.58	415.15	2662.73	411.3
426.34	1910.48	419.47	2306.58	415.17	2668.73	412.28
426.57	1920.48	419.52	2316.08	415.46	2674.73	412.5
425.9	1931.48	419.48	2317.58	414.76	2676.73	411.52
426.46	1933.48	417.98	2319.58	414.38	2685.43	411.15
426.41	1942.48	418.42	2328.58	415.14	2690.73	412.08
425.68	1950.48	419.04	2348.58	415.22	2694.73	411.96
424.87	1955.48	419.22	2352.43	414.82	2700.73	411.9
425.75	1956.98	417.91	2360.43	413.71	2702.73	411.41
425.84	1965.98	418.1	2363.93	415.06	2710.73	410.82
425.46	1970.48	418.74	2372.93	414.87	2721.63	411.77
424.73	1979.48	418.73	2381.43	415.14	2727.63	411.93

B5. Longitudinal Plots and Raw Data Tables - Tick Creek Stream Restoration - EEP Project #379

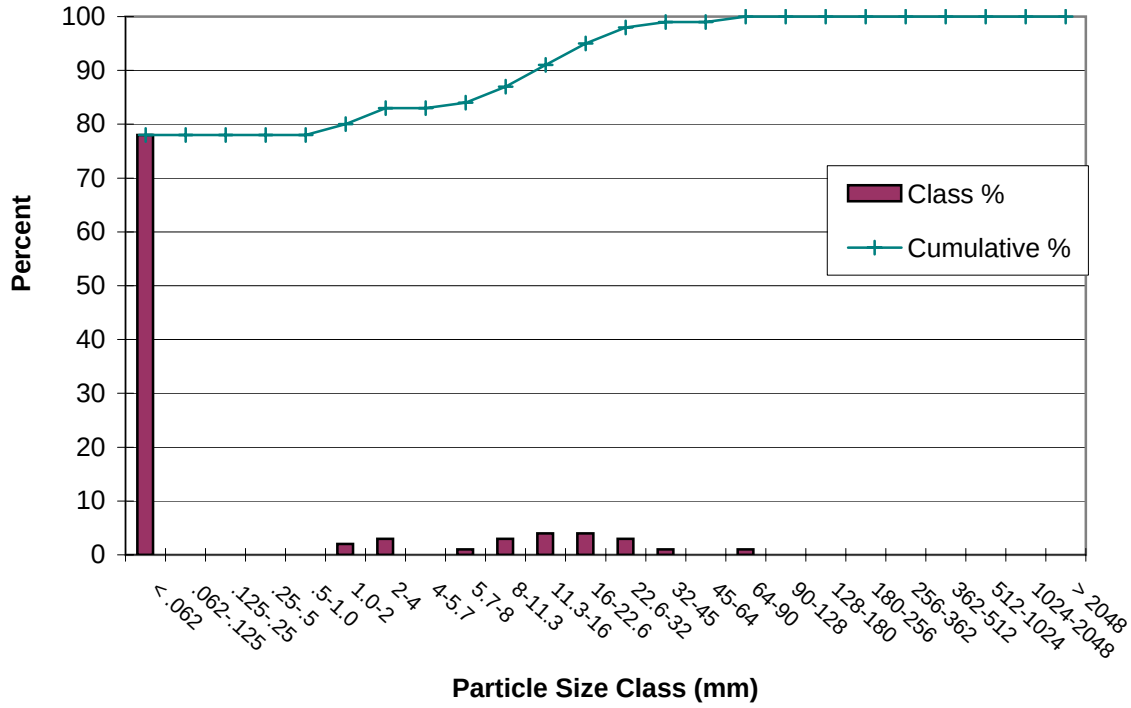
As-built	
STATION	**ELEV**
2730.13	410.98
2734.63	410.98
2735.63	410.76
2741.13	409.94
2745.63	410.87
2752.63	410.87
2759.63	411
2763.63	409.89
2766.13	409.76
2772.63	410.22
2778.63	410.22
2783.63	409.34
2790.63	409.9
2803.13	409.73

B7. Pebble Count - Tick Creek Stream Restoration - First year Monitoring 11/1/2006 - Project #379

Cross Section 1-1

	Particle	Size Range (mm)	Total #	Class %	Cumulative %
S/C	Silt/Clay	< .062	78	78	78
Sand	Very Fine Sand	.062-.125		0	78
	Fine Sand	.125-.25		0	78
	Medium Sand	.25-.5		0	78
	Coarse Sand	.5-1.0		0	78
	Very Course Sand	1.0-2	2	2	80
Gravel	Very Fine Gravel	2-4	3	3	83
	Fine Gravel	4-5.7		0	83
	Fine Gravel	5.7-8	1	1	84
	Medium Gravel	8-11.3	3	3	87
	Medium Gravel	11.3-16	4	4	91
	Coarse Gravel	16-22.6	4	4	95
	Coarse Gravel	22.6-32	3	3	98
	Very Course Gravel	32-45	1	1	99
	Very Course Gravel	45-64		0	99
Cobble	Small Cobble	64-90	1	1	100
	Small Cobble	90-128		0	100
	Medium Cobble	128-180		0	100
	Large Cobble	180-256		0	100
Boulder	Small Boulders	256-362		0	100
	Small Boulders	362-512		0	100
	Medium Boulders	512-1024		0	100
	Large Boulders	1024-2048		0	100
	Bedrock	> 2048		0	100
	Total		100		

d_{50} = 0.04mm

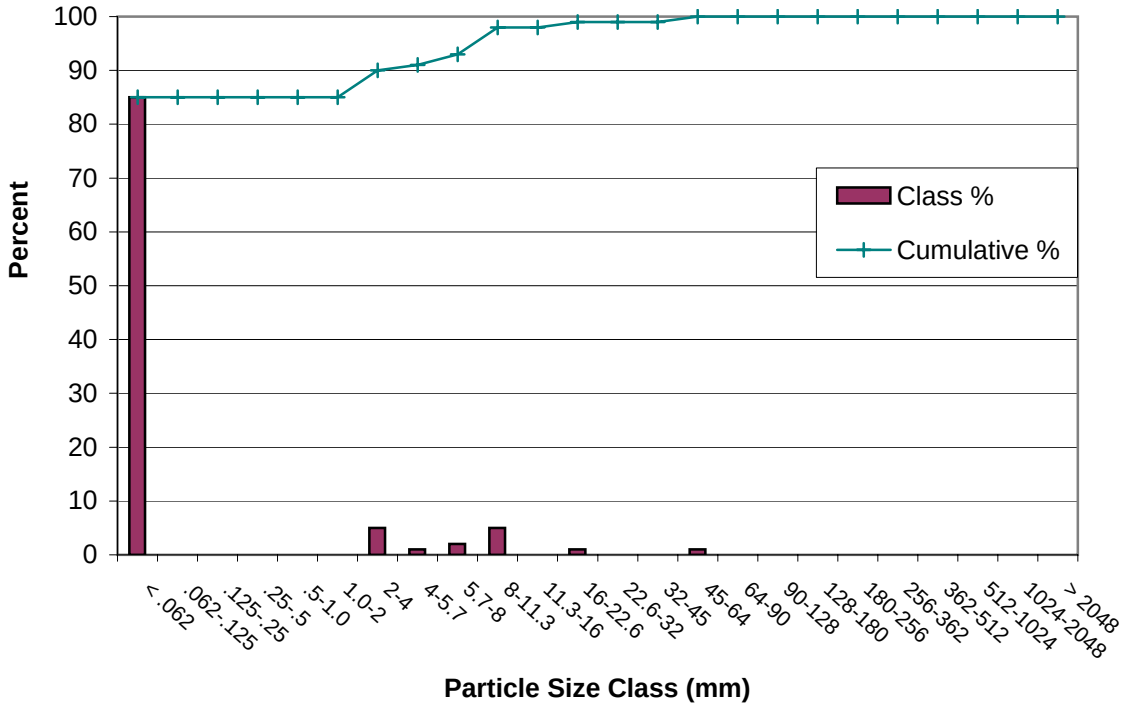


B7. Pebble Count - Tick Creek Stream Restoration - First year Monitoring 11/1/2006 - Project #379

Cross Section 1-2

	Particle	Size Range (mm)	Total #	Class %	Cumulative %
S/C	Silt/Clay	< .062	85	85	85
Sand	Very Fine Sand	.062-.125		0	85
	Fine Sand	.125-.25		0	85
	Medium Sand	.25-.5		0	85
	Coarse Sand	.5-1.0		0	85
	Very Course Sand	1.0-2		0	85
Gravel	Very Fine Gravel	2-4	5	5	90
	Fine Gravel	4-5.7	1	1	91
	Fine Gravel	5.7-8	2	2	93
	Medium Gravel	8-11.3	5	5	98
	Medium Gravel	11.3-16		0	98
	Coarse Gravel	16-22.6	1	1	99
	Coarse Gravel	22.6-32		0	99
	Very Course Gravel	32-45		0	99
	Very Course Gravel	45-64	1	1	100
Cobble	Small Cobble	64-90		0	100
	Small Cobble	90-128		0	100
	Medium Cobble	128-180		0	100
	Large Cobble	180-256		0	100
Boulder	Small Boulders	256-362		0	100
	Small Boulders	362-512		0	100
	Medium Boulders	512-1024		0	100
	Large Boulders	1024-2048		0	100
	Bedrock	> 2048		0	100
	Total		100		

d_{50} = 0.04mm

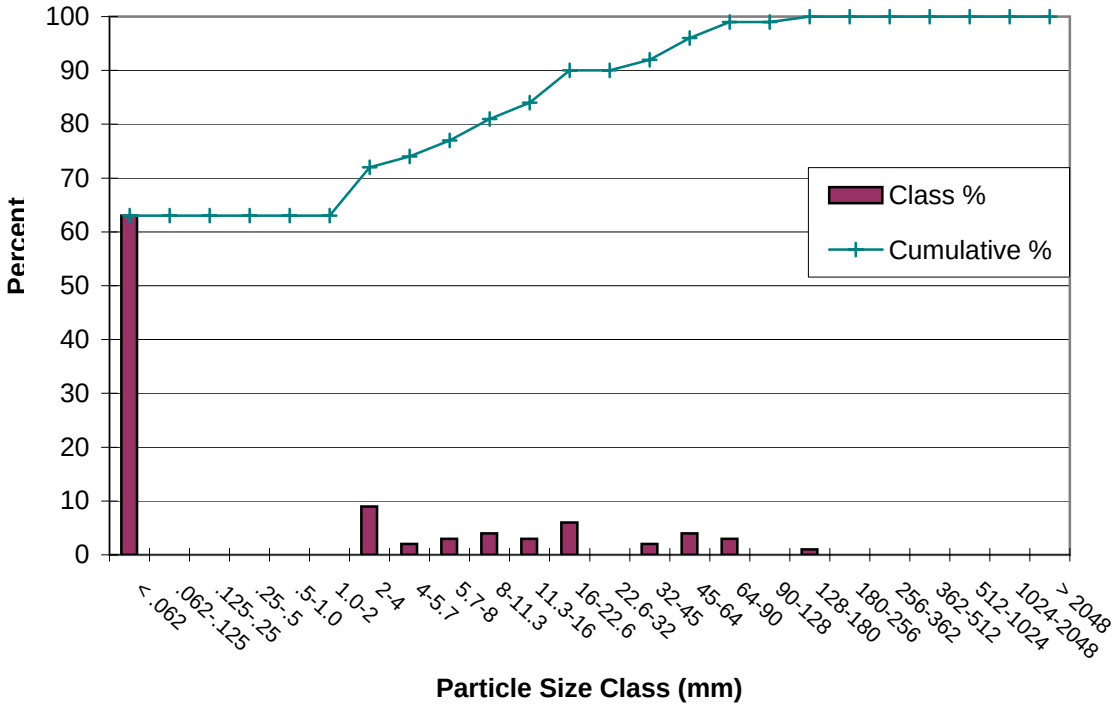


B7. Pebble Count - Tick Creek Stream Restoration - First year Monitoring 11/1/2006 - Project #379

Cross Section 1-3

	Particle	Size Range (mm)	Total #	Class %	Cumulative %
S/C	Silt/Clay	< .062	63	63	63
Sand	Very Fine Sand	.062-.125		0	63
	Fine Sand	.125-.25		0	63
	Medium Sand	.25-.5		0	63
	Coarse Sand	.5-1.0		0	63
	Very Course Sand	1.0-2		0	63
Gravel	Very Fine Gravel	2-4	9	9	72
	Fine Gravel	4-5.7	2	2	74
	Fine Gravel	5.7-8	3	3	77
	Medium Gravel	8-11.3	4	4	81
	Medium Gravel	11.3-16	3	3	84
	Coarse Gravel	16-22.6	6	6	90
	Coarse Gravel	22.6-32		0	90
	Very Course Gravel	32-45	2	2	92
	Very Course Gravel	45-64	4	4	96
Cobble	Small Cobble	64-90	3	3	99
	Small Cobble	90-128		0	99
	Medium Cobble	128-180	1	1	100
	Large Cobble	180-256		0	100
Boulder	Small Boulders	256-362		0	100
	Small Boulders	362-512		0	100
	Medium Boulders	512-1024		0	100
	Large Boulders	1024-2048		0	100
	Bedrock	> 2048		0	100
	Total		100		

d_{50} = 0.05mm

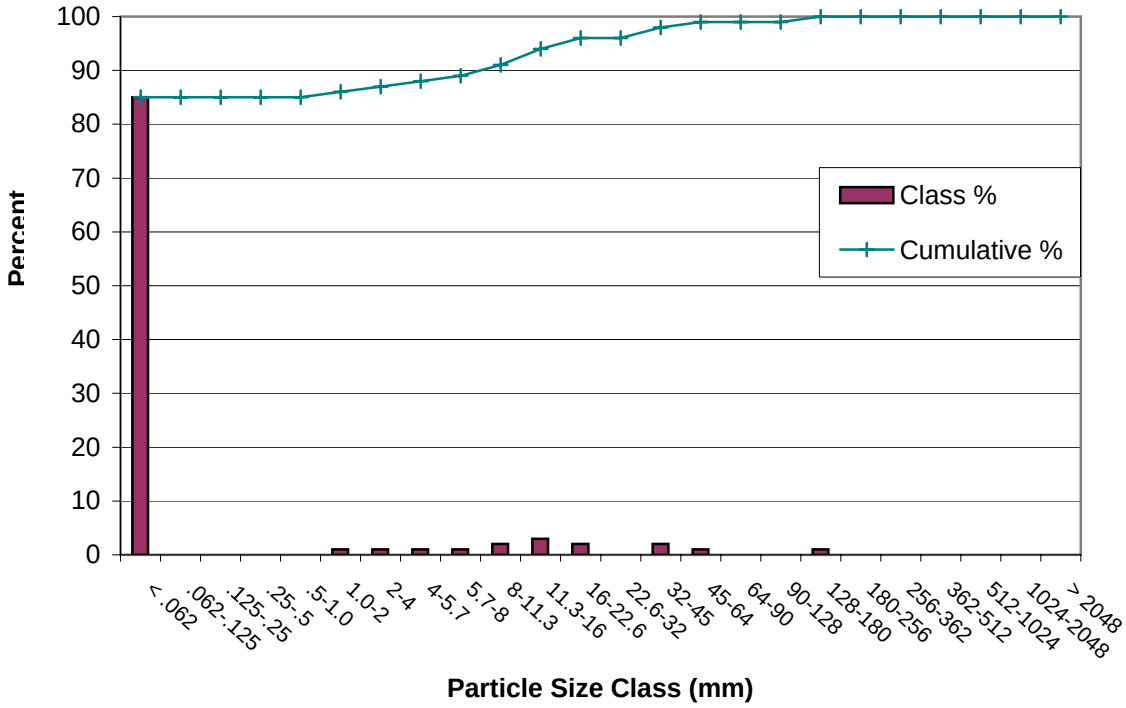


B7. Pebble Count - Tick Creek Stream Restoration - First year Monitoring 11/1/2006 - Project #379

Cross Section 2-1

	Particle	Size Range (mm)	Total #	Class %	Cumulative %
S/C	Silt/Clay	< .062	85	85	85
Sand	Very Fine Sand	.062-.125		0	85
	Fine Sand	.125-.25		0	85
	Medium Sand	.25-.5		0	85
	Coarse Sand	.5-1.0		0	85
	Very Course Sand	1.0-2	1	1	86
Gravel	Very Fine Gravel	2-4	1	1	87
	Fine Gravel	4-5.7	1	1	88
	Fine Gravel	5.7-8	1	1	89
	Medium Gravel	8-11.3	2	2	91
	Medium Gravel	11.3-16	3	3	94
	Coarse Gravel	16-22.6	2	2	96
	Coarse Gravel	22.6-32		0	96
	Very Course Gravel	32-45	2	2	98
	Very Course Gravel	45-64	1	1	99
Cobble	Small Cobble	64-90		0	99
	Small Cobble	90-128		0	99
	Medium Cobble	128-180	1	1	100
	Large Cobble	180-256		0	100
Boulder	Small Boulders	256-362		0	100
	Small Boulders	362-512		0	100
	Medium Boulders	512-1024		0	100
	Large Boulders	1024-2048		0	100
	Bedrock	> 2048		0	100
	Total		100		

d_{50} = 0.04mm

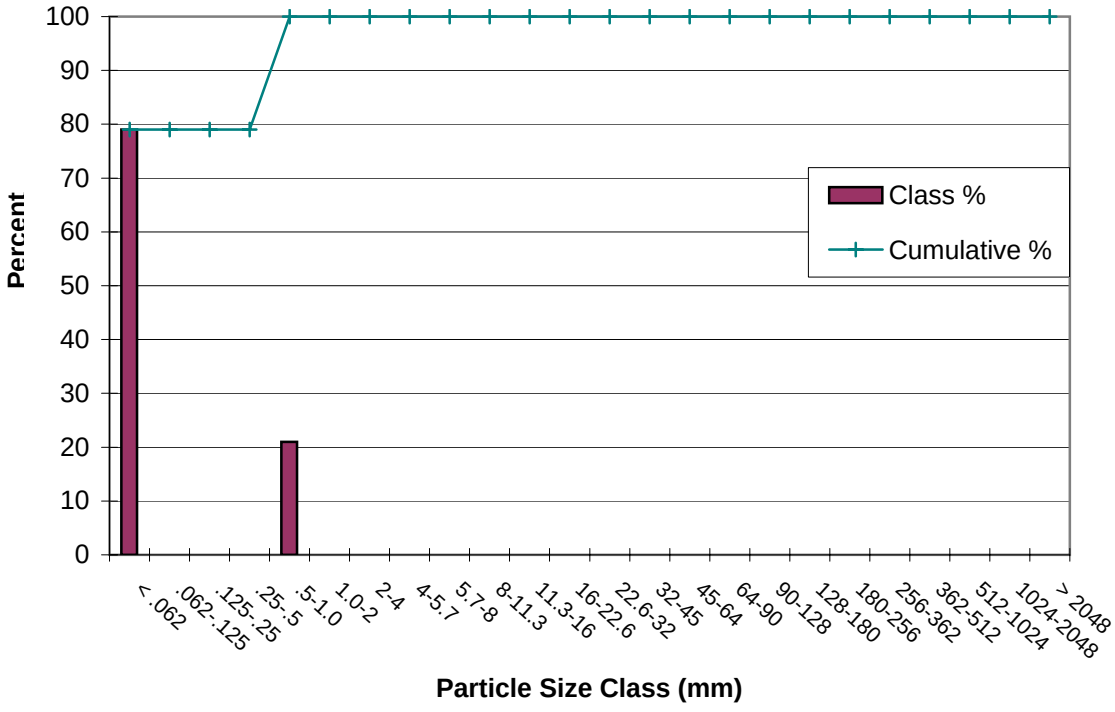


B7. Pebble Count - Tick Creek Stream Restoration - First year Monitoring 11/1/2006 - Project #379

Cross Section 2-2

	Particle	Size Range (mm)	Total #	Class %	Cumulative %
S/C	Silt/Clay	< .062	79	79	79
Sand	Very Fine Sand	.062-.125		0	79
	Fine Sand	.125-.25		0	79
	Medium Sand	.25-.5		0	79
	Coarse Sand	.5-1.0	21	21	100
	Very Course Sand	1.0-2		0	100
Gravel	Very Fine Gravel	2-4		0	100
	Fine Gravel	4-5.7		0	100
	Fine Gravel	5.7-8		0	100
	Medium Gravel	8-11.3		0	100
	Medium Gravel	11.3-16		0	100
	Coarse Gravel	16-22.6		0	100
	Coarse Gravel	22.6-32		0	100
	Very Course Gravel	32-45		0	100
	Very Course Gravel	45-64		0	100
Cobble	Small Cobble	64-90		0	100
	Small Cobble	90-128		0	100
	Medium Cobble	128-180		0	100
	Large Cobble	180-256		0	100
Boulder	Small Boulders	256-362		0	100
	Small Boulders	362-512		0	100
	Medium Boulders	512-1024		0	100
	Large Boulders	1024-2048		0	100
	Bedrock	> 2048		0	100
	Total		100		

d_{50} = 0.04mm

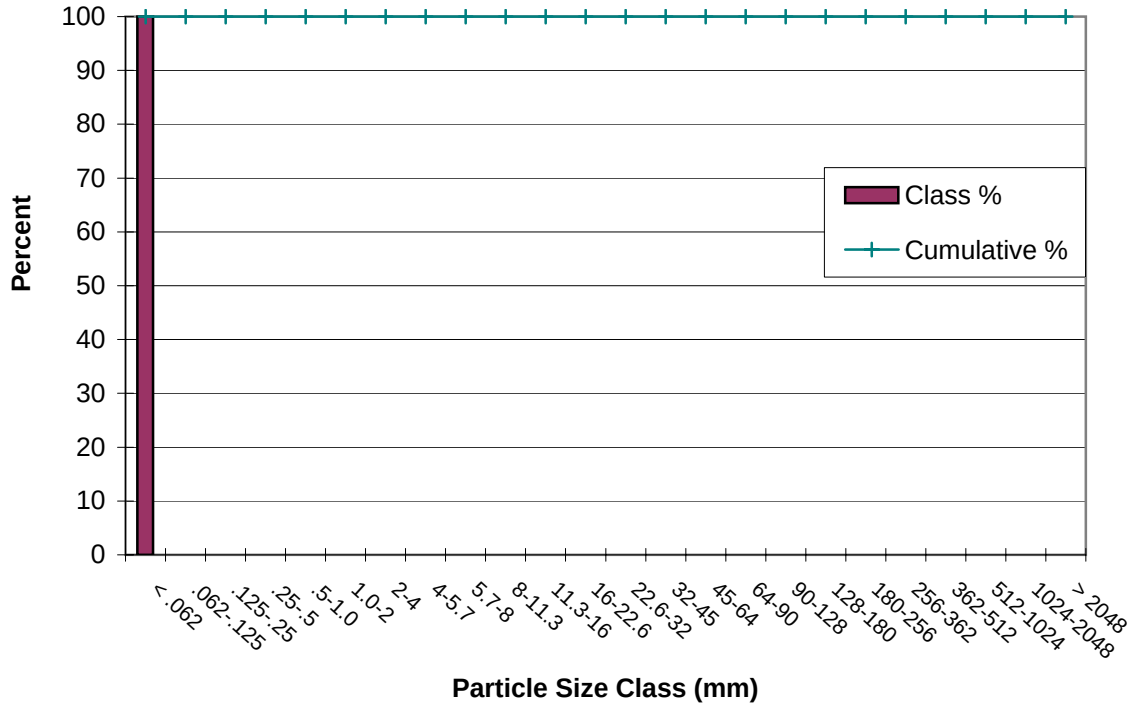


B7. Pebble Count - Tick Creek Stream Restoration - First year Monitoring 11/1/2006 - Project #379

Cross Section 2-3

	Particle	Size Range (mm)	Total #	Class %	Cumulative %
S/C	Silt/Clay	< .062	100	100	100
Sand	Very Fine Sand	.062-.125		0	100
	Fine Sand	.125-.25		0	100
	Medium Sand	.25-.5		0	100
	Coarse Sand	.5-1.0		0	100
	Very Course Sand	1.0-2		0	100
Gravel	Very Fine Gravel	2-4		0	100
	Fine Gravel	4-5.7		0	100
	Fine Gravel	5.7-8		0	100
	Medium Gravel	8-11.3		0	100
	Medium Gravel	11.3-16		0	100
	Coarse Gravel	16-22.6		0	100
	Coarse Gravel	22.6-32		0	100
	Very Course Gravel	32-45		0	100
	Very Course Gravel	45-64		0	100
Cobble	Small Cobble	64-90		0	100
	Small Cobble	90-128		0	100
	Medium Cobble	128-180		0	100
	Large Cobble	180-256		0	100
Boulder	Small Boulders	256-362		0	100
	Small Boulders	362-512		0	100
	Medium Boulders	512-1024		0	100
	Large Boulders	1024-2048		0	100
	Bedrock	> 2048		0	100
	Total		100		

d_{50} = 0.03mm

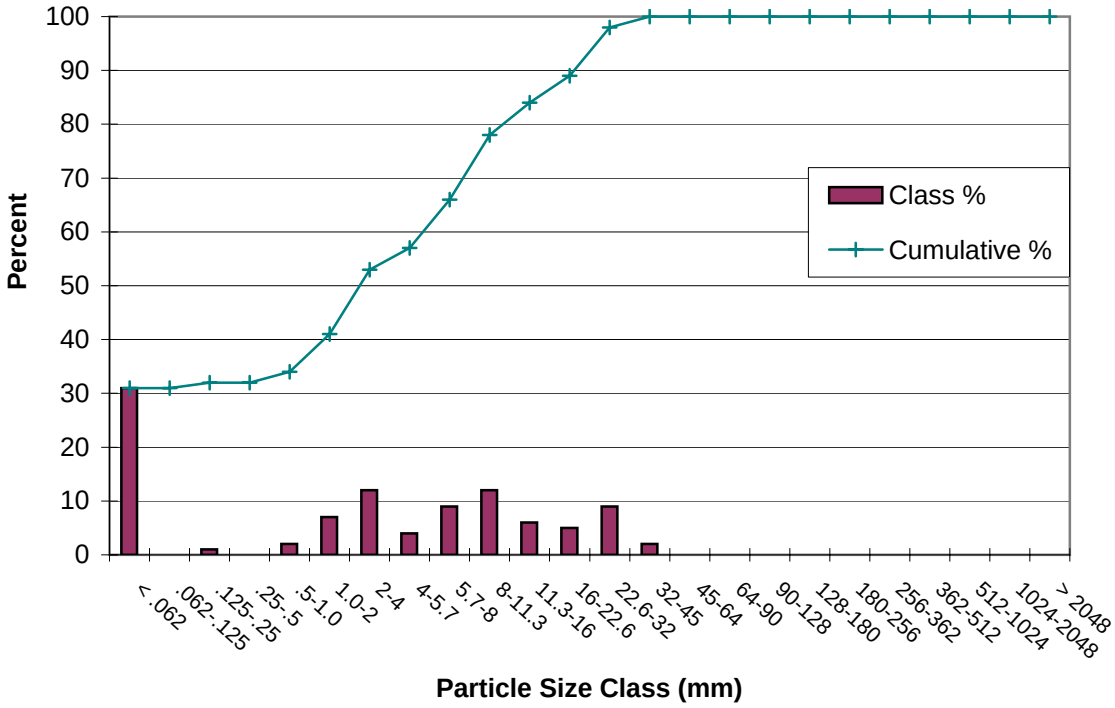


B7. Pebble Count - Tick Creek Stream Restoration - First year Monitoring 11/1/2006 - Project #379

Cross Section 2-4

	Particle	Size Range (mm)	Total #	Class %	Cumulative %
S/C	Silt/Clay	< .062	31	31	31
Sand	Very Fine Sand	.062-.125		0	31
	Fine Sand	.125-.25	1	1	32
	Medium Sand	.25-.5		0	32
	Coarse Sand	.5-1.0	2	2	34
	Very Course Sand	1.0-2	7	7	41
Gravel	Very Fine Gravel	2-4	12	12	53
	Fine Gravel	4-5.7	4	4	57
	Fine Gravel	5.7-8	9	9	66
	Medium Gravel	8-11.3	12	12	78
	Medium Gravel	11.3-16	6	6	84
	Coarse Gravel	16-22.6	5	5	89
	Coarse Gravel	22.6-32	9	9	98
	Very Course Gravel	32-45	2	2	100
	Very Course Gravel	45-64		0	100
Cobble	Small Cobble	64-90		0	100
	Small Cobble	90-128		0	100
	Medium Cobble	128-180		0	100
	Large Cobble	180-256		0	100
Boulder	Small Boulders	256-362		0	100
	Small Boulders	362-512		0	100
	Medium Boulders	512-1024		0	100
	Large Boulders	1024-2048		0	100
	Bedrock	> 2048		0	100
	Total		100		

d_{50} = 3.5mm

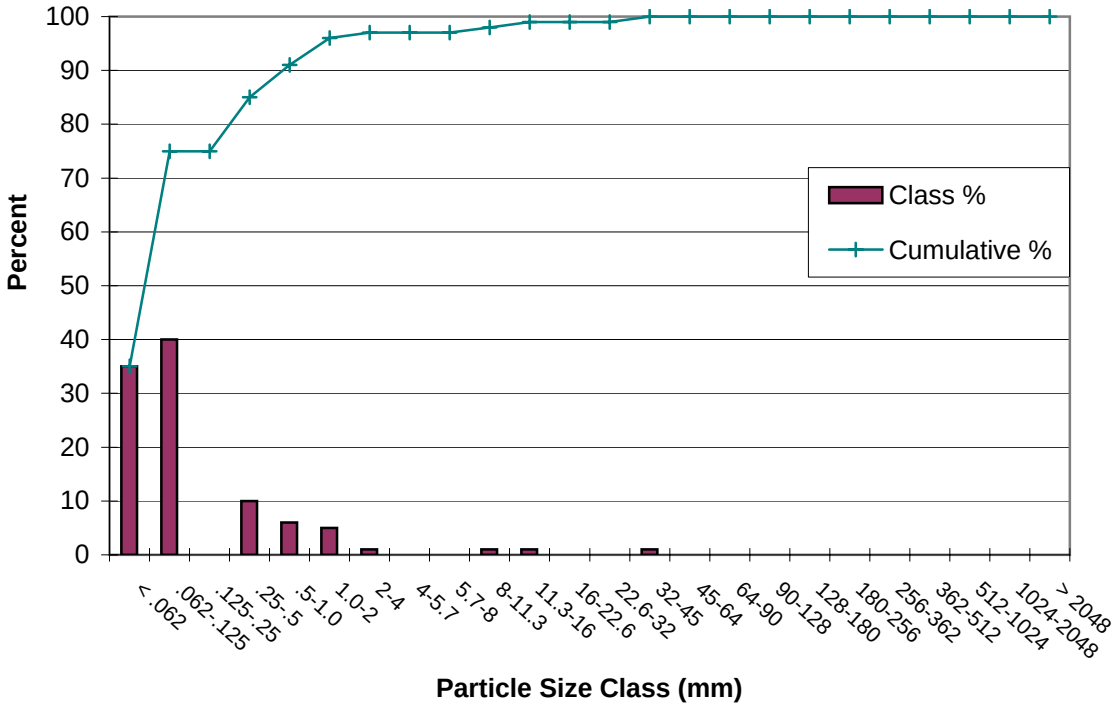


B7. Pebble Count - Tick Creek Stream Restoration - First year Monitoring 11/1/2006 - Project #379

Cross Section 2-5

	Particle	Size Range (mm)	Total #	Class %	Cumulative %
S/C	Silt/Clay	< .062	35	35	35
Sand	Very Fine Sand	.062-.125	40	40	75
	Fine Sand	.125-.25		0	75
	Medium Sand	.25-.5	10	10	85
	Coarse Sand	.5-1.0	6	6	91
	Very Course Sand	1.0-2	5	5	96
Gravel	Very Fine Gravel	2-4	1	1	97
	Fine Gravel	4-5.7		0	97
	Fine Gravel	5.7-8		0	97
	Medium Gravel	8-11.3	1	1	98
	Medium Gravel	11.3-16	1	1	99
	Coarse Gravel	16-22.6		0	99
	Coarse Gravel	22.6-32		0	99
	Very Course Gravel	32-45	1	1	100
	Very Course Gravel	45-64		0	100
Cobble	Small Cobble	64-90		0	100
	Small Cobble	90-128		0	100
	Medium Cobble	128-180		0	100
	Large Cobble	180-256		0	100
Boulder	Small Boulders	256-362		0	100
	Small Boulders	362-512		0	100
	Medium Boulders	512-1024		0	100
	Large Boulders	1024-2048		0	100
	Bedrock	> 2048		0	100
	Total		100		

d_{50} = 0.09mm

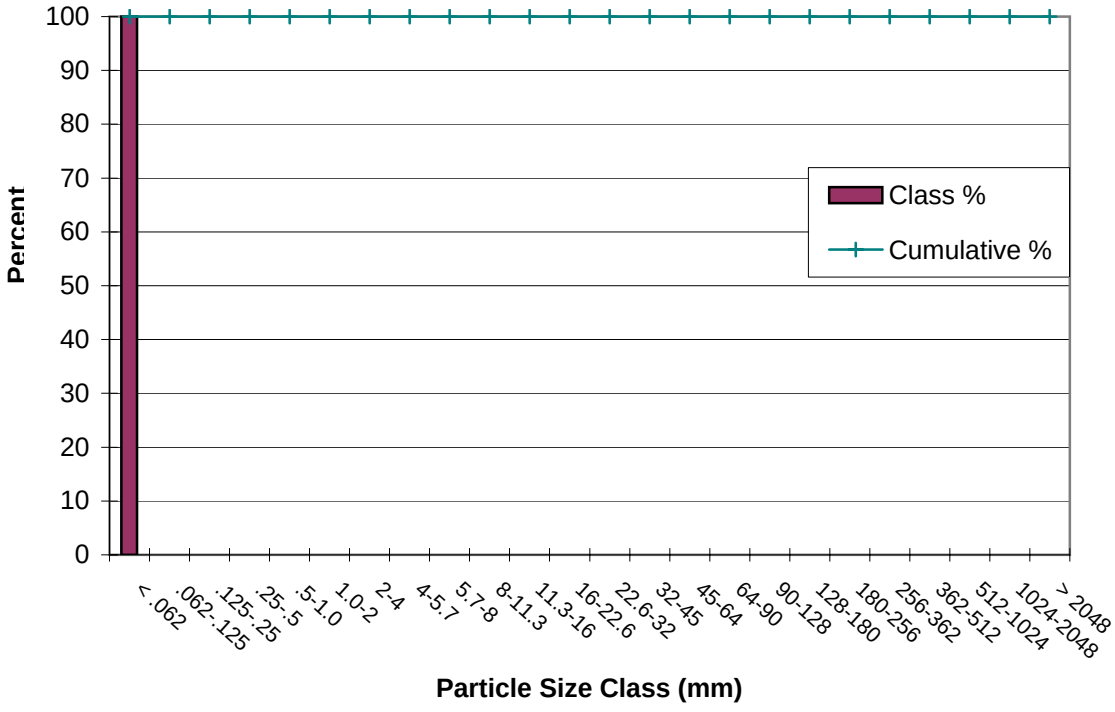


B7. Pebble Count - Tick Creek Stream Restoration - First year Monitoring 11/1/2006 - Project #379

Cross Section 2-6

	Particle	Size Range (mm)	Total #	Class %	Cumulative %
S/C	Silt/Clay	< .062	100	100	100
Sand	Very Fine Sand	.062-.125		0	100
	Fine Sand	.125-.25		0	100
	Medium Sand	.25-.5		0	100
	Coarse Sand	.5-1.0		0	100
	Very Course Sand	1.0-2		0	100
Gravel	Very Fine Gravel	2-4		0	100
	Fine Gravel	4-5.7		0	100
	Fine Gravel	5.7-8		0	100
	Medium Gravel	8-11.3		0	100
	Medium Gravel	11.3-16		0	100
	Coarse Gravel	16-22.6		0	100
	Coarse Gravel	22.6-32		0	100
	Very Course Gravel	32-45		0	100
	Very Course Gravel	45-64		0	100
Cobble	Small Cobble	64-90		0	100
	Small Cobble	90-128		0	100
	Medium Cobble	128-180		0	100
	Large Cobble	180-256		0	100
Boulder	Small Boulders	256-362		0	100
	Small Boulders	362-512		0	100
	Medium Boulders	512-1024		0	100
	Large Boulders	1024-2048		0	100
	Bedrock	> 2048		0	100
	Total		100		

d_{50} = 0.03mm

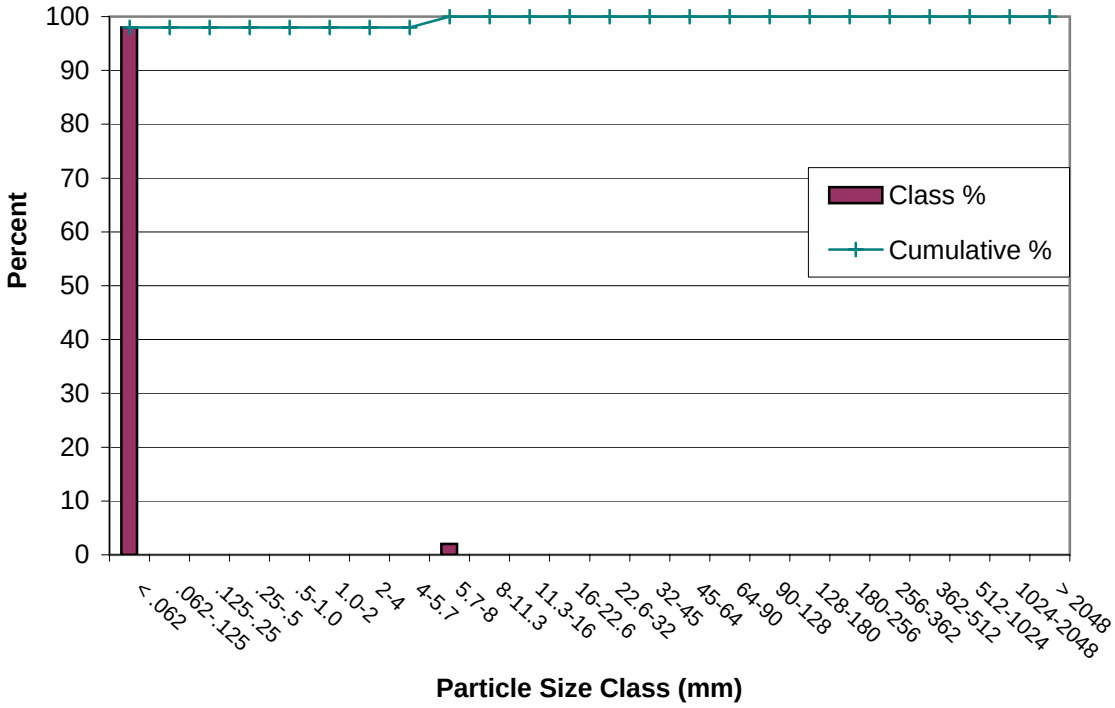


B7. Pebble Count - Tick Creek Stream Restoration - First year Monitoring 11/1/2006 - Project #379

Cross Section 3-1

	Particle	Size Range (mm)	Total #	Class %	Cumulative %
S/C	Silt/Clay	< .062	98	98	98
Sand	Very Fine Sand	.062-.125		0	98
	Fine Sand	.125-.25		0	98
	Medium Sand	.25-.5		0	98
	Coarse Sand	.5-1.0		0	98
	Very Course Sand	1.0-2		0	98
Gravel	Very Fine Gravel	2-4		0	98
	Fine Gravel	4-5.7		0	98
	Fine Gravel	5.7-8	2	2	100
	Medium Gravel	8-11.3		0	100
	Medium Gravel	11.3-16		0	100
	Coarse Gravel	16-22.6		0	100
	Coarse Gravel	22.6-32		0	100
	Very Course Gravel	32-45		0	100
	Very Course Gravel	45-64		0	100
Cobble	Small Cobble	64-90		0	100
	Small Cobble	90-128		0	100
	Medium Cobble	128-180		0	100
	Large Cobble	180-256		0	100
Boulder	Small Boulders	256-362		0	100
	Small Boulders	362-512		0	100
	Medium Boulders	512-1024		0	100
	Large Boulders	1024-2048		0	100
	Bedrock	> 2048		0	100
	Total		100		

d_{50} = 0.03mm

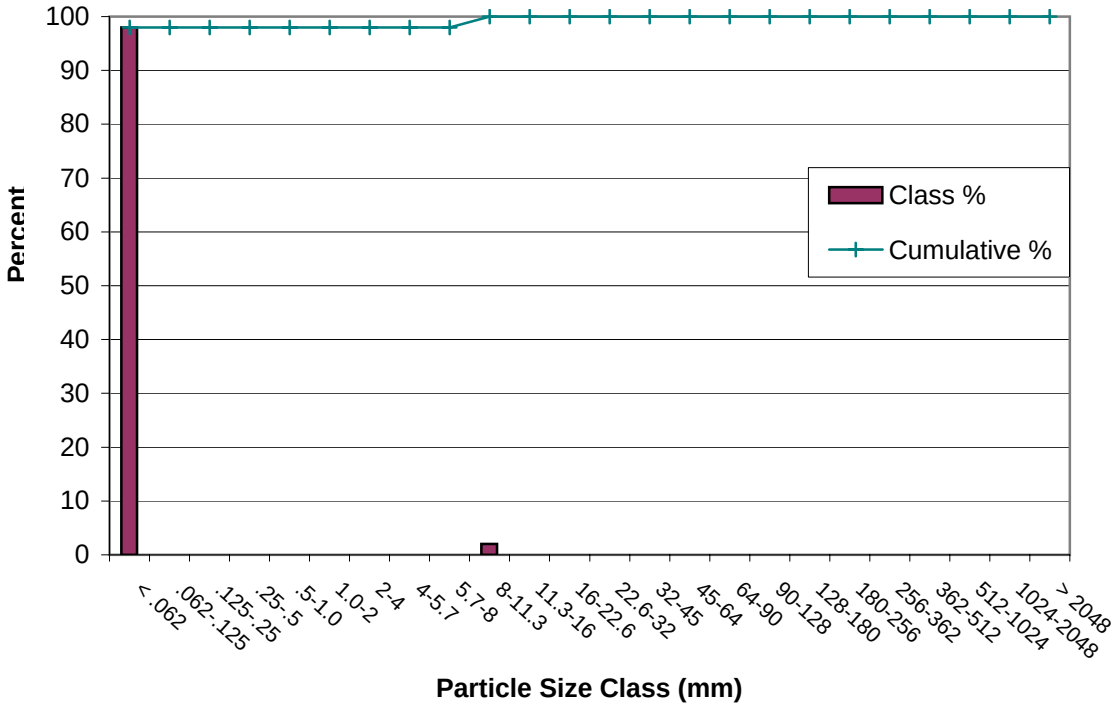


B7. Pebble Count - Tick Creek Stream Restoration - First year Monitoring 11/1/2006 - Project #379

Cross Section 3-2

	Particle	Size Range (mm)	Total #	Class %	Cumulative %
S/C	Silt/Clay	< .062	98	98	98
Sand	Very Fine Sand	.062-.125		0	98
	Fine Sand	.125-.25		0	98
	Medium Sand	.25-.5		0	98
	Coarse Sand	.5-1.0		0	98
	Very Course Sand	1.0-2		0	98
Gravel	Very Fine Gravel	2-4		0	98
	Fine Gravel	4-5.7		0	98
	Fine Gravel	5.7-8		0	98
	Medium Gravel	8-11.3	2	2	100
	Medium Gravel	11.3-16		0	100
	Coarse Gravel	16-22.6		0	100
	Coarse Gravel	22.6-32		0	100
	Very Course Gravel	32-45		0	100
	Very Course Gravel	45-64		0	100
Cobble	Small Cobble	64-90		0	100
	Small Cobble	90-128		0	100
	Medium Cobble	128-180		0	100
	Large Cobble	180-256		0	100
Boulder	Small Boulders	256-362		0	100
	Small Boulders	362-512		0	100
	Medium Boulders	512-1024		0	100
	Large Boulders	1024-2048		0	100
	Bedrock	> 2048		0	100
	Total		100		

d_{50} = 0.03mm

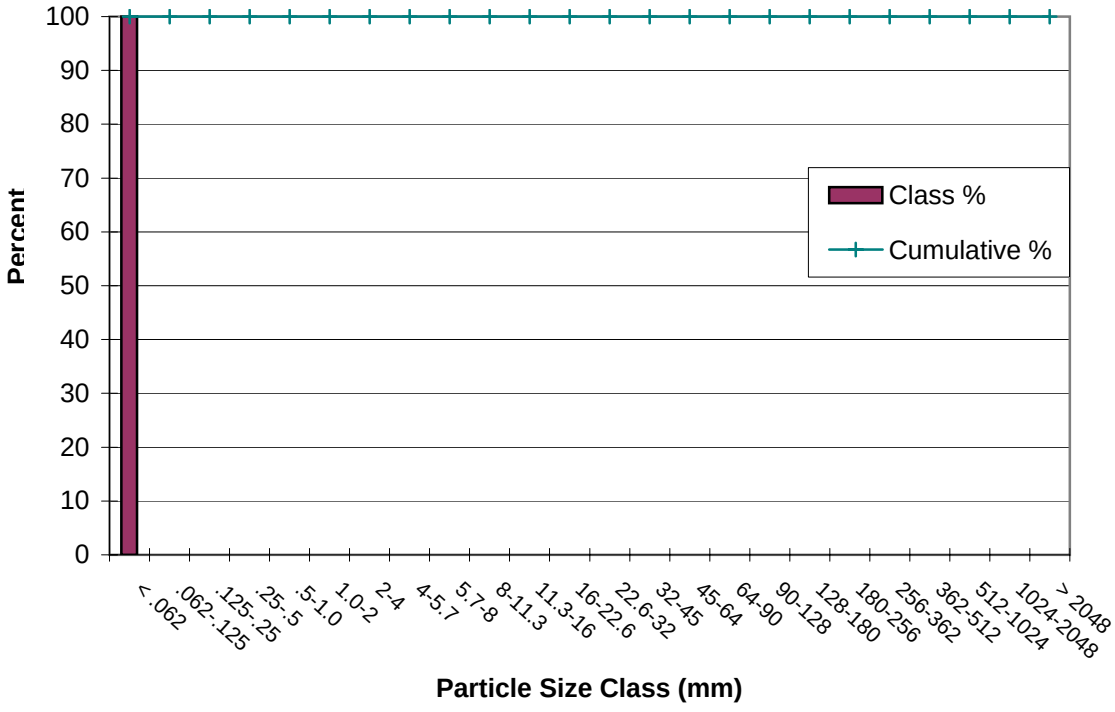


B7. Pebble Count - Tick Creek Stream Restoration - First year Monitoring 11/1/2006 - Project #379

Cross Section

	Particle	Size Range (mm)	Total #	Class %	Cumulative %
S/C	Silt/Clay	< .062	100	100	100
Sand	Very Fine Sand	.062-.125		0	100
	Fine Sand	.125-.25		0	100
	Medium Sand	.25-.5		0	100
	Coarse Sand	.5-1.0		0	100
	Very Course Sand	1.0-2		0	100
Gravel	Very Fine Gravel	2-4		0	100
	Fine Gravel	4-5.7		0	100
	Fine Gravel	5.7-8		0	100
	Medium Gravel	8-11.3		0	100
	Medium Gravel	11.3-16		0	100
	Coarse Gravel	16-22.6		0	100
	Coarse Gravel	22.6-32		0	100
	Very Course Gravel	32-45		0	100
	Very Course Gravel	45-64		0	100
Cobble	Small Cobble	64-90		0	100
	Small Cobble	90-128		0	100
	Medium Cobble	128-180		0	100
	Large Cobble	180-256		0	100
Boulder	Small Boulders	256-362		0	100
	Small Boulders	362-512		0	100
	Medium Boulders	512-1024		0	100
	Large Boulders	1024-2048		0	100
	Bedrock	> 2048		0	100
	Total		100		

d_{50} = 0.03mm

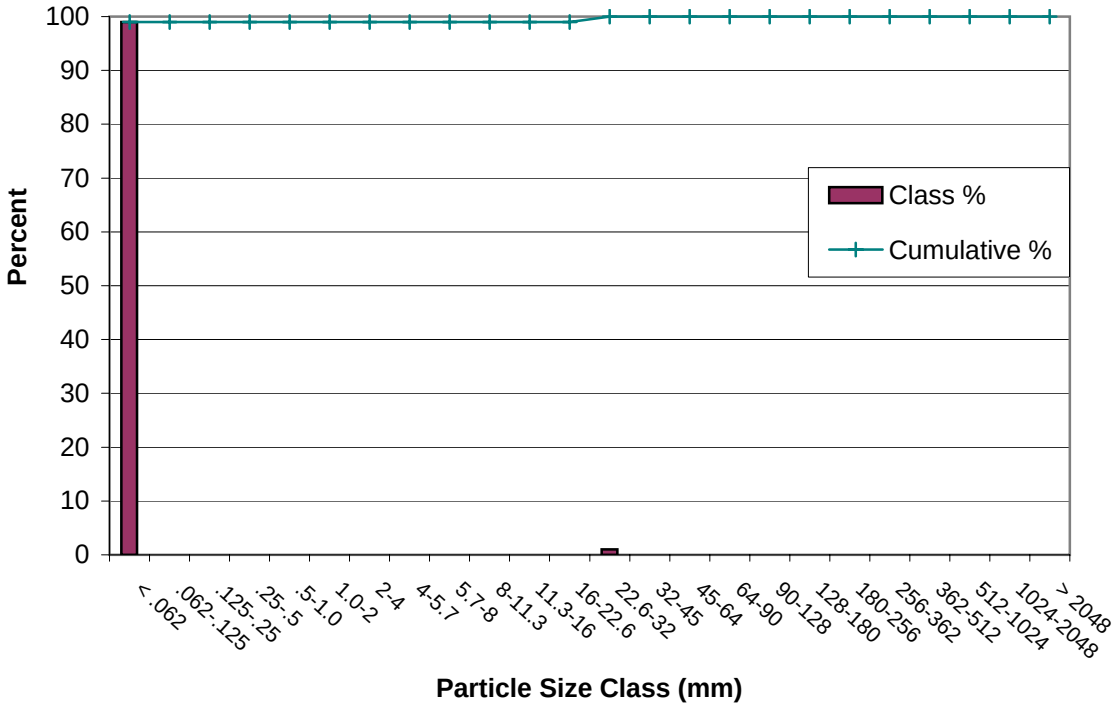


B7. Pebble Count - Tick Creek Stream Restoration - First year Monitoring 11/1/2006 - Project #379

Cross Section 3-4

	Particle	Size Range (mm)	Total #	Class %	Cumulative %
S/C	Silt/Clay	< .062	99	99	99
Sand	Very Fine Sand	.062-.125		0	99
	Fine Sand	.125-.25		0	99
	Medium Sand	.25-.5		0	99
	Coarse Sand	.5-1.0		0	99
	Very Course Sand	1.0-2		0	99
Gravel	Very Fine Gravel	2-4		0	99
	Fine Gravel	4-5.7		0	99
	Fine Gravel	5.7-8		0	99
	Medium Gravel	8-11.3		0	99
	Medium Gravel	11.3-16		0	99
	Coarse Gravel	16-22.6		0	99
	Coarse Gravel	22.6-32	1	1	100
	Very Course Gravel	32-45		0	100
	Very Course Gravel	45-64		0	100
Cobble	Small Cobble	64-90		0	100
	Small Cobble	90-128		0	100
	Medium Cobble	128-180		0	100
	Large Cobble	180-256		0	100
Boulder	Small Boulders	256-362		0	100
	Small Boulders	362-512		0	100
	Medium Boulders	512-1024		0	100
	Large Boulders	1024-2048		0	100
	Bedrock	> 2048		0	100
	Total		100		

d_{50} = 0.03mm

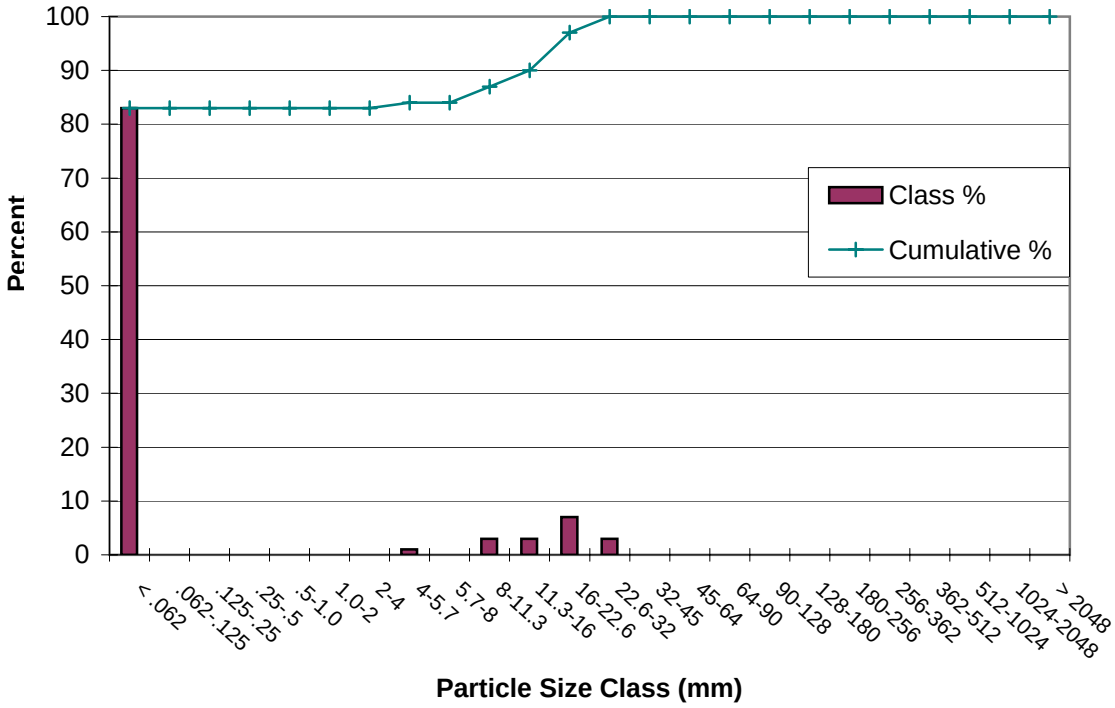


B7. Pebble Count - Tick Creek Stream Restoration - First year Monitoring 11/1/2006 - Project #379

Cross Section 3-5

	Particle	Size Range (mm)	Total #	Class %	Cumulative %
S/C	Silt/Clay	< .062	83	83	83
Sand	Very Fine Sand	.062-.125		0	83
	Fine Sand	.125-.25		0	83
	Medium Sand	.25-.5		0	83
	Coarse Sand	.5-1.0		0	83
	Very Course Sand	1.0-2		0	83
Gravel	Very Fine Gravel	2-4		0	83
	Fine Gravel	4-5.7	1	1	84
	Fine Gravel	5.7-8		0	84
	Medium Gravel	8-11.3	3	3	87
	Medium Gravel	11.3-16	3	3	90
	Coarse Gravel	16-22.6	7	7	97
	Coarse Gravel	22.6-32	3	3	100
	Very Course Gravel	32-45		0	100
	Very Course Gravel	45-64		0	100
Cobble	Small Cobble	64-90		0	100
	Small Cobble	90-128		0	100
	Medium Cobble	128-180		0	100
	Large Cobble	180-256		0	100
Boulder	Small Boulders	256-362		0	100
	Small Boulders	362-512		0	100
	Medium Boulders	512-1024		0	100
	Large Boulders	1024-2048		0	100
	Bedrock	> 2048		0	100
	Total		100		

d_{50} = 0.04mm



B7. Pebble Count - Tick Creek Stream Restoration - First year Monitoring 11/1/2006 - Project #379

Cross Section 3-6

	Particle	Size Range (mm)	Total #	Class %	Cumulative %
S/C	Silt/Clay	< .062	87	87	87
Sand	Very Fine Sand	.062-.125		0	87
	Fine Sand	.125-.25		0	87
	Medium Sand	.25-.5		0	87
	Coarse Sand	.5-1.0		0	87
	Very Course Sand	1.0-2		0	87
Gravel	Very Fine Gravel	2-4	2	2	89
	Fine Gravel	4-5.7	3	3	92
	Fine Gravel	5.7-8	1	1	93
	Medium Gravel	8-11.3	2	2	95
	Medium Gravel	11.3-16	4	4	99
	Coarse Gravel	16-22.6	1	1	100
	Coarse Gravel	22.6-32		0	100
	Very Course Gravel	32-45		0	100
	Very Course Gravel	45-64		0	100
Cobble	Small Cobble	64-90		0	100
	Small Cobble	90-128		0	100
	Medium Cobble	128-180		0	100
	Large Cobble	180-256		0	100
Boulder	Small Boulders	256-362		0	100
	Small Boulders	362-512		0	100
	Medium Boulders	512-1024		0	100
	Large Boulders	1024-2048		0	100
	Bedrock	> 2048		0	100
	Total		100		

d_{50} = 0.04mm