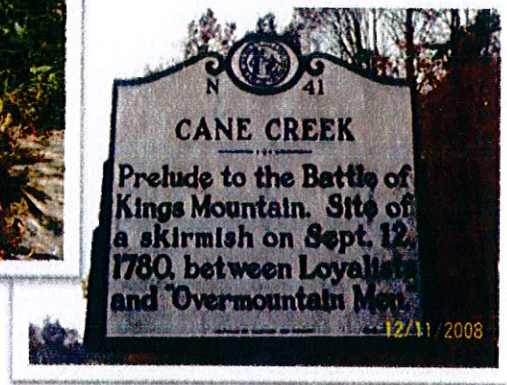
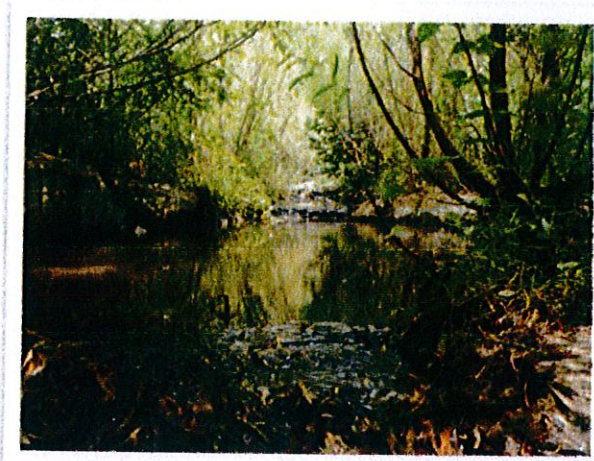


YEAR 4 (2011)
ANNUAL MONITORING REPORT
CANE CREEK RESTORATION SITE
RUTHERFORD COUNTY, NORTH CAROLINA

(CONTRACT D06027-E)
FULL DELIVERY PROJECT
BROAD RIVER BASIN
CATALOGING UNIT 03050105



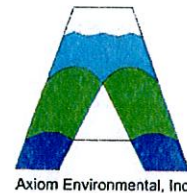
Prepared for:

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
RALEIGH, NORTH CAROLINA

Prepared by:



And



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October 2011

EXECUTIVE SUMMARY

Restoration Systems has completed restoration of streams and wetlands at the Cane Creek Stream and Wetland Restoration Site to assist the North Carolina Ecosystem Enhancement Program in fulfilling stream and wetland mitigation goals. The Site is located in northern Rutherford County less than 0.2 mile south of the Rutherford/McDowell County line along the eastern edge of Highway 64. The Site is located in United States Geological Survey (USGS) Hydrologic Unit 03050105060020 (North Carolina Division of Water Quality Subbasin 03-08-02) of the Broad River Basin and will service the USGS 8-digit Cataloging Unit (CU) 03050105. The Site is not located in a Targeted Local Watershed. This report serves as the Year 4 (2011) annual monitoring report.

Primary activities at the Site included 1) stream restoration, 2) stream enhancement, 3) stream preservation, 4) wetland restoration, 5) soil scarification, and 6) plant community restoration. Project restoration efforts provide a minimum of 6748 Stream Mitigation Units, 4.4 riverine Wetland Mitigation Units, and 5.0 nonriverine Wetland Mitigation Units as outlined in the March 2006 Technical Proposal.

Fifteen vegetation plots (10 meters by 10 meters in size) were established and permanently monumented. These plots were surveyed in June 2011 for the Year 4 (2011) monitoring season. Vegetation sampling across the Site was above the required average density with 645 planted stems per acre surviving.

Twenty cross-sections and longitudinal profiles within five 600-foot reaches (3000 linear feet total) were measured for the Year 4 (2011) monitoring period. As a whole, monitoring measurements indicate that there have been minimal changes in both longitudinal profile and cross-sections as compared to as-built data. The as-built channel geometry compares favorably with the emulated, stable E/C type stream reach as set forth in the detailed mitigation plan and construction plans. Current monitoring has demonstrated dimension, pattern, and profile were stable over the course of the monitoring period. One stream problem area was noted within the Site during the Year 3 (2010) monitoring year. Clearing of land and subsequent erosion upstream of the Site has resulted in sediment input into the upper reaches of Tributary 2. Remedial actions are not recommended at this time; however, close monitoring of Tributary 2 will continue to occur.

One of the five monitored gauges (Gauge 5) within restoration areas was inundated/saturated within 12 inches of the surface for greater than 5 percent of the growing season, which extends from April 4 to November 6 (217 days).

APPENDICES

APPENDIX A. VEGETATION DATA

1. Vegetation Survey Data Tables
2. Vegetation Monitoring Plot Photos

APPENDIX B. GEOMORPHOLOGIC DATA

1. Tables B1-B5. Visual Morphological Stability Assessment
2. Cross-section Plots and Tables
3. Longitudinal Profile Plots
4. Substrate Data
5. Representative Structure Photographs
6. Enhancement Reach Photographs

APPENDIX C. HYDROLOGY DATA

2011 Groundwater Gauge Data

APPENDIX D. MONITORING PLAN VIEW

1.0 PROJECT BACKGROUND

1.1 Location and Setting

Restoration Systems, L.L.C. (Restoration Systems) has completed restoration of streams and wetlands at the Cane Creek Stream and Wetland Restoration Site (hereafter referred to as the "Site") to assist the North Carolina Ecosystem Enhancement Program (EEP) in fulfilling stream and wetland mitigation goals. The Site is located in northern Rutherford County less than 0.2 mile south of the Rutherford/McDowell County line along the eastern edge of Highway 64. The Site is located in United States Geological Survey (USGS) Hydrologic Unit (HU) 03050105060020 (North Carolina Division of Water Quality [NCDWQ] Subbasin 03-08-02) of the Broad River Basin and will service USGS 8-digit Cataloging Unit (CU) 03050105. The Site is not located in a Targeted Local Watershed.

Directions to the Site from Rutherfordton, North Carolina, are as follows:

- Travel northeast on Highway 64 for approximately 15 miles
- The Site is on the right ~ 0.2 miles south of the Rutherford and McDowell County lines.

1.2 Project Objectives

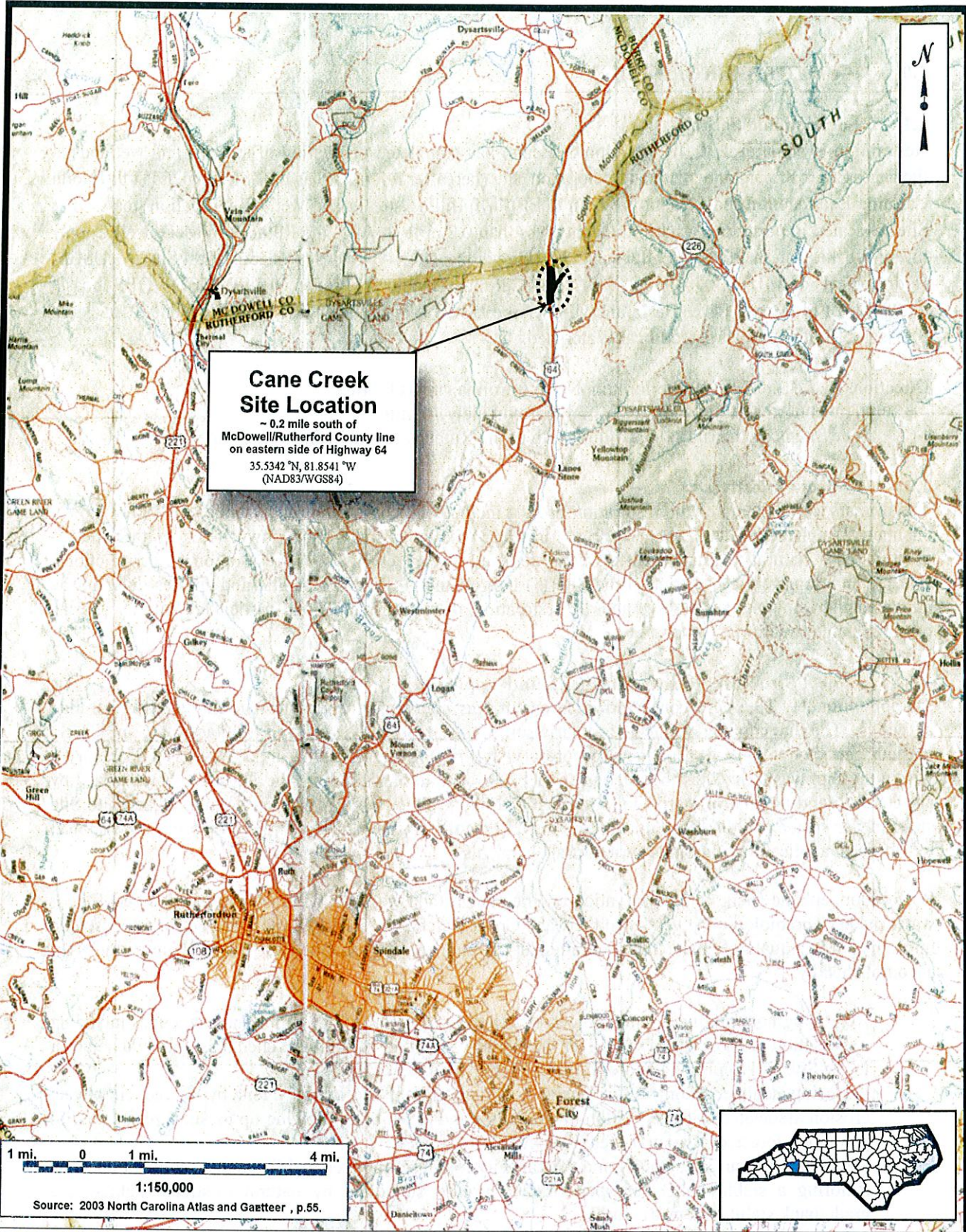
The primary components of the restoration project included 1) construction of a stable, riffle-pool stream channel; 2) enhancement of water quality functions within, upstream, and downstream of the Site; 3) creation of a natural vegetated buffer along restored stream channels; 4) restoration of jurisdictional riverine and nonriverine wetlands in the Site; 5) improvement of aquatic habitat and species diversity by enhancing stream bed variability; and 6) restoration of wildlife functions associated with a riparian corridor/stable stream.

1.3 Project Structure, Restoration Type, and Approach

An approximately 43.5-acre conservation easement was placed on the Site to incorporate all restoration activities. The Site contains 9.4 acres of hydric soil, Cane Creek, three unnamed tributaries to Cane Creek, and adjacent floodplains. An undisturbed preservation reach located on the upper extents of Tributary 1 within the Site was utilized as the reference reach. Prior to implementation, the Site was characterized by agricultural land utilized primarily for row crop and hay production. Riparian vegetation adjacent to Site streams was sparse and disturbed due to plowing and regular maintenance, and row crop areas were subject to broadcast application of various agricultural chemicals.

Restoration, enhancement, and preservation of Site streams and wetlands will result in positive benefits for water quality and biological diversity in the Cane Creek watershed. Targeted mitigation efforts focused on improving water quality, enhancing flood attenuation, and restoring aquatic and riparian habitat and were accomplished by:

1. Removing nonpoint and point sources of pollution associated with agricultural practices including a) cessation of broadcasting fertilizer, pesticides, and other agricultural chemicals into and adjacent to the Site and b) provide a forested riparian buffer to treat surface runoff.
2. Reducing sedimentation within onsite and downstream receiving waters by a) reducing bank erosion associated with vegetation maintenance and agricultural plowing up to Site streams, and b) planting a forested riparian buffer adjacent to Site streams.
3. Reestablishing stream stability and the capacity to transport watershed flows and sediment loads by restoring a stable dimension, pattern, and profile supported by natural in-stream habitat and grade/bank stabilization structures.



SITE LOCATION
CANE CREEK RESTORATION SITE
Rutherford County, North Carolina

Dwn. by: CLF
 Date: April 2007
 Project: 06-022

FIGURE
 1

4. Promoting floodwater attenuation by a) reconnecting bankfull stream flows to the abandoned floodplain terrace; b) restoring secondary, dredged, straightened, and entrenched tributaries, thereby reducing floodwater velocities within smaller catchment basins; and c) revegetating Site floodplains to increase frictional resistance on floodwaters.
5. Restoring onsite wetlands, thereby promoting flood storage, nutrient cycling, and aquatic wildlife habitat.
6. Improving aquatic habitat with bed variability and the use of in-stream structures.
7. Providing a terrestrial wildlife corridor and refuge in an area that is developed for agricultural and timber production.
8. Providing connectivity to a State Nature Preserve northeast of the Site.

Table 1 describes the Site restoration structures and objectives, which have provided a minimum of 6748 Stream Mitigation Units, 4.4 riverine Wetland Mitigation Units, and 5.0 nonriverine Wetland Mitigation Units as outlined in the March 2006 Technical Proposal as follows.

- Restoration of 4600 linear feet of stream within three UTs to Cane Creek by constructing meandering channels.
- Enhancement of (level II) 5708 linear feet of Cane Creek.
- Preservation of 1506 linear feet of the upper reaches of an unnamed tributary to Cane Creek.
- Restore 4.4 acres of jurisdictional riverine wetland by reestablishing historic water table elevations.
- Restore 5.0 acres of jurisdictional nonriverine wetland by filling ditches.
- Reforest approximately 30 acres of the Site with native forest species.

Table 1. Site Restoration Structures and Objectives

Restoration Segment/ Reach ID	Station Range	Restoration Type/Approach*	Designed Linear Footage/Acreage	SMU/WMUs
Tributary 1	10+00 – 19+25	Restoration/PI	925	925
Tributary 2	10+00 – 28+71	Restoration/PI	1871	1871
Tributary 3	10+00 – 17+96	Restoration/PI	1804	1804
Cane Creek	--	Enhancement II	5708	2283
Tributary 1	--	Preservation	1506	301
Riverine Wetlands	--	Restoration	4.4	4.4
Nonriverine Wetlands	--	Restoration	5.0	5.0
Mitigation Unit Summations				
Stream	Riverine Wetland	Nonriverine Wetland		
7184 SMU	4.4 WMU	5.0 WMU		

*PI=Priority I

1.4 Project History and Background

Completed project activities, reporting history, completion dates, project contacts, and background information are summarized in Tables 2-4.

Table 2. Project Activity and Reporting History

Activity or Report	Data Collection Completion	Actual Completion or Delivery
Restoration Plan	April 2007	May 2007
Construction Completion	NA	April 2008
Site Planting	NA	April 2008
Mitigation Plan/As-builts	May 2008	July 2008
Year 1 Monitoring (2008)	November 2008	November 2008
Year 2 Monitoring (2009)	November 2009	October 2009
Year 3 Monitoring (2010)	November 2010	September 2010
Year 4 Monitoring (2011)	November 2011	October 2011

Table 3. Project Contacts Table

Full Delivery Provider	Restoration Systems 1101 Haynes Street, Suite 211 Raleigh, North Carolina 27604 George Howard and John Preyer (919) 755-9490
Construction Contractor	Backwater Environmental PO Box 1654 Pittsboro, North Carolina 27312 Wes Newell (919) 523-4375
Planting Contractor	Carolina Silvics 908 Indian Trail Road Edenton, North Carolina 27932 Dwight McKinney (252) 482-8491
Designer and Monitoring Performer	Axiom Environmental, Inc. 218 Snow Avenue Raleigh, North Carolina 27603 Grant Lewis (919) 215-1693

Table 4. Project Background Table

Project County	Rutherford County, North Carolina
Drainage Area	Cane Creek: 8.7 square miles Tributaries: 0.1-0.4 square mile
Drainage impervious cover estimate (%)	< 1
Stream Order	Cane Creek: Fourth Tributaries: First and Second
Physiographic Region	Mountains
Ecoregion	Eastern Blue Ridge Foothills
Rosgen Classification of As-built	E-/C-type
Dominant Soil Types	Chewacla, Wehadkee, Fannin, Skyuka
Reference Site ID	Tributary 1 Preservation Reach
USGS HUC	03050105
NCDWQ Subbasin	03-08-02
NCDWQ Classification	WS-V (Stream Index # 9-41-12-(0.3))
Any portion of any project segment 303d listed?	No
Any portion of any project segment upstream of a 303d listed segment?	No
Reasons for 303d listing or stressor	Not Applicable
% of project easement fenced	0%

1.5 Monitoring Plan View

Monitoring activities for the Site, including relevant structures and utilities, project features, specific project structures, and monitoring features are detailed in the monitoring plan view in Appendix D. Site features including vegetation, stream dimension (cross-sections), stream profile and pattern, wetland hydrology, and photographic documentation were monitored in Year 4 (2011).

2.0 PROJECT CONDITION AND MONITORING RESULTS

2.1 Vegetation Assessment

Following Site construction, fifteen plots (10 meters by 10 meters in size) were established and monumented with metal fence posts at all plot corners and PVC at each plot origin. Sampling was conducted as outlined in the *CVS-EEP Protocol for Recording Vegetation, Version 4.0* (Lee et al. 2006) (<http://cvs.bio.unc.edu/methods.htm>); results are included in Appendix A. The taxonomic standard for vegetation used for this document was *Flora of the Carolinas, Virginia, Georgia, and Surrounding Areas* (Weakley 2007). The locations of vegetation monitoring plots were placed to accurately represent the entire Site and are depicted on the monitoring plan view in Appendix D.

2.1.1 Vegetation Success Criteria

Success criteria have been established to verify that the vegetation component supports community elements necessary for forest development. Success criteria are dependent upon the density and growth of characteristic forest species. Additional success criteria are dependent upon density and growth of "Characteristic Tree Species." Characteristic Tree Species include planted species, species identified through inventory of a reference (relatively undisturbed) forest community used to orient the planting plan, and appropriate Schafale and Weakley (1990) community descriptions. All canopy tree species planted and identified in the reference forest will be utilized to define "Characteristic Tree Species" as termed in the success criteria. Table 5 below outlines planted and reference forest species.

Table 5. Planted Species and Reference Forest Ecosystem

Planted Species	Reference Species
Pawpaw (<i>Asimina triloba</i>)	Red maple (<i>Acer rubrum</i>)
Mockernut hickory (<i>Carya alba/tomentosa</i>)	Ironwood (<i>Carpinus caroliniana</i>)
Hackberry (<i>Celtis laevigata</i>)	Mockernut hickory (<i>Carya alba/tomentosa</i>)
Buttonbush (<i>Cephalanthus occidentalis</i>)	Hickory (<i>Carya</i> sp.)
Silky dogwood (<i>Cornus amomum</i>)	Dogwood (<i>Cornus florida</i>)
Persimmon (<i>Diospyros virginiana</i>)	Persimmon (<i>Diospyros virginiana</i>)
Green ash (<i>Fraxinus pennsylvanica</i>)	American beech (<i>Fagus grandifolia</i>)
Sycamore (<i>Platanus occidentalis</i>)	Eastern red cedar (<i>Juniperus virginiana</i>)
Black cherry (<i>Prunus serotina</i>)	Mountain laurel (<i>Kalmia latifolia</i>)
White oak (<i>Quercus alba</i>)	Doghobble (<i>Leucothoe fontanesiana</i>)
Swamp chestnut oak (<i>Quercus michauxii</i>)	Sycamore (<i>Platanus occidentalis</i>)
Cherrybark oak (<i>Quercus pagoda</i>)	Black cherry (<i>Prunus serotina</i>)
Northern red oak (<i>Quercus rubra</i>)	White oak (<i>Quercus alba</i>)
Elderberry (<i>Sambucus canadensis</i>)	Northern red oak (<i>Quercus rubra</i>)
American elm (<i>Ulmus americana</i>)	

Success criteria dictate that an average density of 320 stems per acre of Character Tree Species must be surviving in the first three monitoring years. Subsequently, 290 Character Tree Species per acre must be surviving in Year 4 and 260 Character Tree Species per acre in Year 5.

2.1.2 Vegetative Problem Areas

Vegetation sampling across the Site was above the required average density with 645 planted stems per acre surviving. Thirteen of the fifteen plots are meeting success criteria based on planted stems alone. When including natural recruits of appropriate species such as box elder (*Acer negundo*), green ash (*Fraxinus pennsylvanica*), sycamore (*Platanus occidentalis*), tulip tree (*Liriodendron tulipifera*), black cherry (*Prunus serotina*), and black walnut (*Juglans nigra*), all plots are meeting success criteria.

Active measures to control kudzu (*Pueraria montana*) in the northern portion of the Site and a few stems of multiflora rose (*Rosa multiflora*) and privet (*Ligustrum sinense*) in the southern portion of the Site, including spraying and manual removal to control invasive species, will continue as necessary. All three invasive species were previously treated with the herbicide Milestone VM (aminopyralid) at a rate of seven ounces per acre.

2.2 Stream Assessment

Twenty permanent cross-sections within five 600-foot reaches were established after construction was completed. Measurements of each cross-section include points at all breaks in slope including top of bank, bankfull, and thalweg. Riffle cross-sections are classified using the Rosgen stream classification system. Longitudinal profile measurements of five 600-foot reaches include thalweg, water surface, and bankfull; with each measurement taken at the head of facets (i.e. riffle, run, pool, and glide) in addition to the maximum pool depth.

2.2.1 Stream Success Criteria

Success criteria for stream restoration will include 1) successful classification of the reach as a functioning stream system (Rosgen 1996) and 2) channel variables indicative of a stable stream system. Annual monitoring will continue until success criteria are met and no less than two bankfull events have occurred, as determined by in situ crest gauge, otherwise monitoring will continue until the second bankfull event has occurred.

Visual assessment of in-stream structures will be conducted to determine if failure has occurred. Failure of a structure may be indicated by collapse of the structure, undermining of the structure, abandonment of the channel around the structure, and/or stream flow beneath the structure.

2.2.2 Bankfull Events

One bankfull events were documented during the Year 4 (2011) monitoring period for a total of six bankfull events.

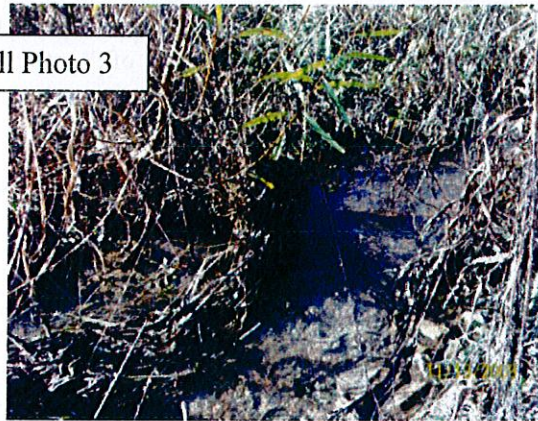
Table 6. Verification of Bankfull Events

Date of Data Collection	Date of Occurrence	Method	Photo
March 12, 2009	March 2, 2009	A total of 3.65 inches of rain were documented to fall at the Site by an onsite rain gauge from February 27-March 2, 2009. In addition, wrack was observed adjacent to restored channels.	1-2
November 30, 2009	November 11, 2009	A total of 2.3 inches of rain were documented to fall at the Site November 10-11, 2009*. In addition, wrack was observed adjacent to restored channels.	3
May 13, 2010	January 24, 2010	A total of 3.19 inches of rain were documented to fall at the Site January 24, 2010*. In addition, wrack was observed adjacent to restored channels.	4-5
September 28, 2010	August 19, 2010	A total of 4.63 inches of rain were documented to fall at the Site from August 13- 21, 2010*.	--
September 28, 2010	September 27, 2010	A total of 2.12 inches of rain were documented to fall at the Site from September 26-27, 2010*.	--
October 18, 2011	September 23, 2011	A total of 3.11 inches of rain were documented to fall by an onsite rain gauge from September 21-23, 2011.	--

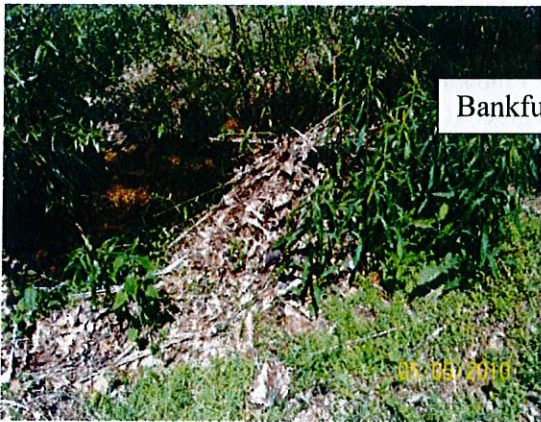
*Weatherunderground 2010



Bankfull Photos 1-2



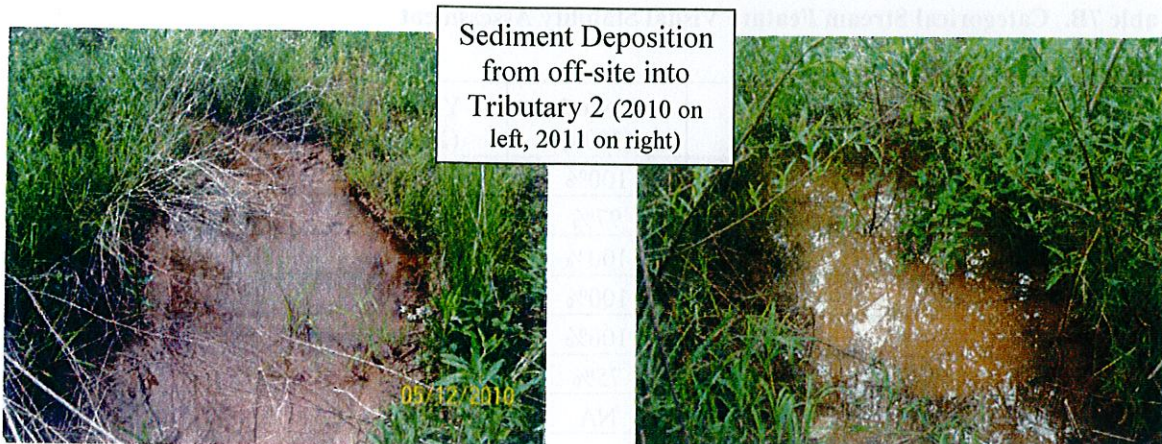
Bankfull Photo 3



Bankfull Photos 4-5

2.2.3 Stream Problem Areas

One stream problem area was noted within the Site during the Year 3 (2010) monitoring year. Clearing of land and subsequent erosion upstream of the Site has resulted in sediment input into the upper reaches of Tributary 2. Remedial actions are not recommended at this time; however, close monitoring of Tributary 2 will continue to occur.



2.2.4 Categorical Stream Feature Visual Stability Assessment

Each stream reach was visually inspected during the Year 4 (2011) monitoring period using eight feature categories and various metrics within each category. Assessment features included riffles, pools, thalweg, meanders, channel bed, structures, and root wads/boulders. Tables for semi-quantitative assessments of each reach are included in Appendix B (Tables B1-B5). The mean percentages of performance for features in each reach are summarized in the tables below. Issues within the Site are minimal and are not causing any stream problems at this time.

Table 7A. Categorical Stream Feature Visual Stability Assessment

Cane Creek (Reach 1)

Feature	Year 1 (2008)	Year 2 (2009)	Year 3 (2010)	Year 4 (2011)	Year 5 (2012)
A. Riffles	100%	100%	100%	100%	
B. Pools	100%	100%	95%	95%	
C. Thalweg	100%	100%	100%	100%	
D. Meanders	100%	100%	98%	98%	
E. Bed General	100%	100%	96%	96%	
F. Vanes / J. Hooks, Etc.	75%	75%	100%	100%	
G. Wads and Boulders	NA	NA	NA	NA	

Table 7B. Categorical Stream Feature Visual Stability Assessment

Cane Creek (Reach 2)

Feature	Year 1 (2008)	Year 2 (2009)	Year 3 (2010)	Year 4 (2011)	Year 5 (2012)
A. Riffles	100%	100%	92%	92%	
B. Pools	97%	97%	94%	94%	
C. Thalweg	100%	100%	100%	100%	
D. Meanders	100%	100%	100%	100%	
E. Bed General	100%	100%	79%	79%	
F. Vanes / J. Hooks, Etc.	75%	75%	75%	75%	
G. Wads and Boulders	NA	NA	NA	NA	

Table 7C. Categorical Stream Feature Visual Stability Assessment

Cane Creek (Reach 3)

Feature	Year 1 (2008)	Year 2 (2009)	Year 3 (2010)	Year 4 (2011)	Year 5 (2012)
A. Riffles	100%	100%	100%	100%	
B. Pools	100%	100%	100%	100%	
C. Thalweg	100%	100%	100%	100%	
D. Meanders	100%	100%	100%	100%	
E. Bed General	100%	100%	100%	100%	
F. Vanes / J. Hooks, Etc.	75%	75%	100%	100%	
G. Wads and Boulders	NA	NA	NA	NA	

Table 7D. Categorical Stream Feature Visual Stability Assessment

Cane Creek (Reach 4)

Feature	Year 1 (2008)	Year 2 (2009)	Year 3 (2010)	Year 4 (2011)	Year 5 (2012)
A. Riffles	100%	100%	100%	100%	
B. Pools	100%	100%	100%	100%	
C. Thalweg	100%	100%	100%	100%	
D. Meanders	100%	100%	100%	100%	
E. Bed General	100%	100%	100%	100%	
F. Vanes / J. Hooks, Etc.	100%	100%	100%	100%	
G. Wads and Boulders	NA	NA	NA	NA	

Table 7E. Categorical Stream Feature Visual Stability Assessment

Cane Creek (Reach 5)

Feature	Year 1 (2008)	Year 2 (2009)	Year 3 (2010)	Year 4 (2011)	Year 5 (2012)
A. Riffles	100%	100%	100%	100%	
B. Pools	100%	100%	100%	100%	
C. Thalweg	100%	100%	100%	100%	
D. Meanders	100%	100%	100%	100%	
E. Bed General	100%	100%	100%	100%	
F. Vanes / J. Hooks, Etc.	100%	100%	100%	100%	
G. Wads and Boulders	NA	NA	NA	NA	

2.2.5 Quantitative Stream Measurements

During the Year 4 (2011) monitoring period 20 cross-sections and longitudinal profiles within five 600-foot reaches were measured. Permanent cross-sections and longitudinal profiles are included in Appendix B; each is graphically depicted for as-built through Year 4 (2011) for analysis. As a whole, monitoring measurements indicate minimal changes in both the longitudinal profile and cross-sections as compared to as-built data. The channel geometry compares favorably with the emulated, stable E/C type stream reach as set forth in the detailed mitigation plan and as constructed. Current monitoring has demonstrated dimension, pattern, and profile were stable over the course of the monitoring period. Tables for quantitative assessments are included below; these tables include data from previous years. In addition, visual assessments of the enhancement of Cane Creek were completed; photographs are included in Appendix B.

2.3 Wetland Assessment

Five groundwater monitoring gauges and one reference groundwater gauge were maintained and monitored throughout the Year 4 (2011) growing season. Graphs of groundwater hydrology and precipitation from an onsite rain gauge for the growing season are included in Appendix C.

2.3.1 Wetland Success Criteria

Target hydrological characteristics include saturation or inundation for 5 to 12.5 percent of the growing season, during average climatic conditions. During growing seasons with atypical climatic conditions, groundwater gauges in reference wetlands may dictate threshold hydrology success criteria (75 percent of reference). These areas are expected to support hydrophytic vegetation. If wetland parameters are marginal as indicated by vegetation and/or hydrology monitoring, a jurisdictional determination will be performed.

2.3.2 Wetland Criteria Attainment

One of the five monitored gauges (Gauge 5) within restoration areas was inundated/saturated within 12 inches of the surface for greater than 5 percent of the growing season, which extends from April 4 to November 6 (217 days) (Table 10). Hydrographs containing groundwater and precipitation data for each gauge can be found in Appendix B.

Table 10. Wetland Criteria Attainment for Year 4 (2011)

Gauge ID	Hydrology Threshold Met?	Hydrophytic Vegetation Criteria Met?	Site Mean	Vegetation Plot ID	Vegetation Survival Threshold Met?	Site Mean
1	No	Yes	20 %	1	Yes	100 %
2	No	Yes		2	Yes	
3	No	Yes		3	Yes	
4	No	Yes		4	Yes	
5	Yes	Yes		5	Yes	
				6	Yes	
				7	Yes	
				8	Yes	
				9	Yes	
				10	Yes	
				11	Yes	
				12	Yes	
				13	Yes	
				14	Yes	
				15	Yes	

**Table 8A. Baseline Morphology and Hydraulic Summary
Cane Creek (Reach 1)**

Parameter	USGS Gage Data			Pre-Existing Condition			Project Reference Stream			Design			As-built		
	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med
Dimension															
BF Width (ft)				6.9	12	9.8	8.1	8.7	8.4	9.6	11.1	8.4	10.4	12.2	11.3
Floodprone Width (ft)				9	18	14.9	25	150	87.5	80	200	150			150
BF Cross Sectional Area (ft ²)						0.3			8.5			10.3	9.3	11.3	10.3
BF Mean Depth (ft)				0.9	1.5	1.1	0.9	1.2	1.1	0.9	1.1	1	0.6	0.7	0.9
BF Max Depth (ft)				1.3	2.1	1.8	1.3	1.4	1.4	1.3	1.9	1.5	1.4	1.5	1.4
Width/Depth Ratio				4.6	14	9.6	7.1	9.7	8.4	10	16	14	11.7	13.2	12.5
Entrenchment Ratio				1.3	1.6	1.5	2.9	18.5	10.7	7.8	18.9	14.2	12.3	14.4	13.4
Bank Height Ratio				2.9	4.6	3.8			1			1			1
Wetted Perimeter (ft)						===			===			===			===
Hydraulic radius (ft)						===			===			===			===
Pattern															
Channel Beltwidth (ft)							19	60	37	21	74	42	21	74	42
Radius of Curvature (ft)							7	29	12.9	21	42	23	21	42	23
Meander Wavelength (ft)							36.5	87.9	58.9	53	117	74	53	117	74
Meander Width ratio							2.3	7.1	4.4	2	7	4	2	7	4
Profile															
Riffle length (ft)									===			===	8	36	16
Riffle slope (ft/ft)							1.48%	4.92%	2.84%	1.13%	3.39%	1.81%	0.80%	5.60%	2.40%
Pool length (ft)									===			===	8	58	33
Pool spacing (ft)							23.2	89.3	42.3	31	106	53	31	106	53
Substrate															
d50 (mm)									===			===			===
d84 (mm)									===			===			===
Additional Reach Parameters															
Valley Length (ft)									===			712			712
Channel Length (ft)									===			925			925
Sinuosity						1			1.5			1.3			1.3
Water Surface Slope (ft/ft)						1.12%			1.61%			1.13%			0.92%
BF slope (ft/ft)						===			===			===			===
Rosgen Classification						34			E4			C/E4			C/E4

Table 9A. Morphology and Hydraulic Monitoring Summary
Cane Creek

Reach 1 (Tributary 1 - Sta. 17+50 to 10+60)

Parameter	Cross Section 1 Pool					Cross Section 2 Rifle					Cross Section 3 Rifle					Cross Section 4 Pool									
	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	
Dimension	150.0																								
Floodprone Width (ft) (approx)	10.1	10.2	10.7	10.6			10.4	9.3	11.0	9.9			12.2	13.8	13.0	13.3			13.9	13.9	13.8	13.3			
BF Width (ft)	10.9	11.1	10.6	11.1			9.3	7.8	7.9	7.9			11.3	12.5	11.9	11.7			16.3	16.6	13.5	15.8			
BF Cross Sectional Area (ft ²)	1.1	1.1	1.0	1.0			0.9	0.8	0.7	0.8			0.9	0.9	0.9	0.9			1.2	1.2	1.0	1.2			
BF Mean Depth (ft)	2.3	2.3	1.8	2.1			1.4	1.3	1.3	1.3			1.5	1.6	1.7	1.6			2.6	2.7	1.8	2.5			
BF Max Depth (ft)	NA	NA	NA	NA			11.7	11.1	15.2	12.3			13.2	15.1	14.1	15.2			NA	NA	NA	NA			
Width/Depth Ratio	NA	NA	NA	NA			14.4	16.1	13.6	15.2			12.3	10.9	11.6	11.2			NA	NA	NA	NA			
Entrenchment Ratio	NA	NA	NA	NA			1.0	1.0	1.0	1.0			1.0	1.0	1.0	1.0			NA	NA	NA	NA			
Bank Height Ratio	11.4	11.5	11.8	12.0			10.9	9.9	11.6	10.6			12.7	14.2	13.6	13.9			15.0	15.0	14.6	14.4			
Wetted Perimeter (ft)	1.0	1.0	0.9	0.9			0.8	0.8	0.7	0.7			0.9	0.9	0.9	0.8			1.1	1.1	0.9	1.1			
Hydraulic radius (ft)	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	
d50 (mm)	0.1	0.6	0.2	0.2			66	87	71	170			66	87	71	170			66	87	71	170			
d84 (mm)	1	1.0	1.0	1.0			107	158	158	170			107	158	158	170			107	158	158	170			
Substrate	MY-01 (2008)																								
Parameter	MY-01 (2008)					MY-02 (2009)					MY-03 (2010)					MY-04 (2011)					MY-05 (2012)				
Pattern	Min	Max	Med	Min	Med	Max	Min	Max	Med	Min	Med	Max	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	
Channel Belwidth (ft)	21	74	42	21	74	42	21	74	42	21	74	42	21	74	42	21	74	42	21	74	42	21	74	42	
Radius of Curvature (ft)	21	42	23	21	42	23	21	42	23	21	42	23	21	42	23	21	42	23	21	42	23	21	42	23	
Meander Wavelength (ft)	53	117	74	53	117	74	53	117	74	53	117	74	53	117	74	53	117	74	53	117	74	53	117	74	
Meander Width ratio	2.0	7.0	4.0	2.0	7.0	4.0	2.0	7.0	4.0	2.0	7.0	4.0	2.0	7.0	4.0	2.0	7.0	4.0	2.0	7.0	4.0	2.0	7.0	4.0	
Profile	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	
Riffle length (ft)	8	36	16	8	38	20	9	34	18	3	45	19													
Riffle slope (ft/ft)	0.8%	5.6%	2.4%	0.8%	5.8%	2.2%	0.9%	3.8%	2.1%	0.5%	4.1%	2.0%													
Pool length (ft)	8	58	33	13	48	24	11	42	27	13	41	26													
Pool spacing (ft)	31	106	53	31	106	53	31	106	53	31	106	53													
Additional Reach Parameters	MY-01 (2008)					MY-02 (2009)					MY-03 (2010)					MY-04 (2011)					MY-05 (2012)				
Valley Length (ft)	551					551					551					588					588				
Channel Length (ft)	716					716					716					739					739				
Sinuosity	1.3					1.3					1.3					1.3					1.3				
Water Surface Slope (ft/ft)	0.92%					0.92%					0.91%					0.89%					0.89%				
BF slope (ft/ft)	---					---					---					---					---				
Rosgen Classification	C/E type					C/E type					C/E type					C/E type					C/E type				
Number of Bankfull Events	0					2					3					1					1				

Table 9B. Morphology and Hydraulic Monitoring Summary
Cane Creek
Reach 2 (Tributary 2 - Sta. 14+10 to 19+50)

Parameter	Cross Section 1 Pool						Cross Section 2 Riffle						Cross Section 3 Pool						Cross Section 4 Riffle											
	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+						
Dimension	13.0	13.6	5.6	6.6			9.3	13.3	7.7	9.1			11.2	10.5	9.6	9.4			10.5	10.3	7.9	9.8								
Flood prone Width (ft) (approx)	150.0																													
BF Cross Sectional Area (ft ²)	8.6	6.7	3.8	2.6			6.3	5.9	4.1	4.8			9.8	9.8	8.1	8.0			5.0	5.0	3.8	5.0								
BF Mean Depth (ft)	0.7	0.5	0.7	0.4			0.7	0.4	0.5	0.5			0.9	0.9	0.8	0.9			0.5	0.5	0.5	0.5								
BF Max Depth (ft)	1.4	1.3	1.3	1.4			1.5	1.2	1.0	1.1			2.0	2.0	1.8	1.7			0.9	0.9	0.8	0.9								
Width/Depth Ratio	NA	NA	NA	NA			13.7	29.9	14.5	17.1			NA	NA	NA	NA			21.9	21.2	16.2	19.4								
Entrenchment Ratio	NA	NA	NA	NA			16.2	11.2	19.5	16.6			NA	NA	NA	NA			14.3	14.6	19.0	15.2								
Bank Height Ratio	NA	NA	NA	NA			1.0	1.0	1.0	1.0			NA	NA	NA	NA			1.0	1.0	1.0	1.0								
Wetted Perimeter (ft)	13.4	14.0	6.3	7.0			9.8	13.7	8.1	9.4			12.0	11.5	10.4	10.2			10.7	10.6	8.1	10.1								
Hydraulic radius (ft)	0.6	0.5	0.6	0.4			0.6	0.4	0.5	0.5			0.8	0.9	0.8	0.8			0.5	0.5	0.5	0.5								
Substrate	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+						
d50 (mm)	NA	NA	NA	NA			60	60	51	90			NA	NA	NA	NA			60	60	51	90								
d84 (mm)	NA	NA	NA	NA			98	98	128	191			NA	NA	NA	NA			98	98	128	191								
Parameter	MY-01 (2008)						MY-02 (2009)						MY-03 (2010)						MY-04 (2011)						MY-05 (2012)					
Pattern	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med						
Channel Beltwidth (ft)	10	35	20	10	35	20	10	35	20	10	35	20	10	35	20	10	35	20	10	35	20	10	35	20						
Radius of Curvature (ft)	10	20	11	10	20	11	10	20	11	10	20	11	10	20	11	10	20	11	10	20	11	10	20	11						
Meander Wavelength (ft)	25	55	35	25	55	35	25	55	35	25	55	35	25	55	35	25	55	35	25	55	35	25	55	35						
Meander Width ratio	2.0	7.0	4.0	2.0	7.0	4.0	2.0	7.0	4.0	2.0	7.0	4.0	2.0	7.0	4.0	2.0	7.0	4.0	2.0	7.0	4.0	2.0	7.0	4.0						
Profile	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med						
Riffle length (ft)	8	26	15	6	35	13	6	45	10	7	49	12																		
Riffle slope (ft/ft)	NA*	NA*	NA*	NA*	NA*	NA*	0.0%	1.9%	0.4%	0.0%	2.4%	0.3%																		
Pool length (ft)	15	23	18	6	40	11	11	33	19	11	21	14																		
Pool spacing (ft)	15	50	25	15	50	25	15	50	25	15	50	25																		
Additional Reach Parameters	MY-01 (2008)						MY-02 (2009)						MY-03 (2010)						MY-04 (2011)						MY-05 (2012)					
Valley Length (ft)	415																													
Channel Length (ft)	540																													
Sinuosity	1.3																													
Water Surface Slope (ft/ft)	NA*																													
BF slope (ft/ft)	---																													
Rosgen Classification	C type																													
Number of Bankfull Events	0						2						3						1											

Table 9C. Morphology and Hydraulic Monitoring Summary
Cane Creek

Reach 3 (Tributary 2 - Sta.19+84 to 26+10)

Parameter	Cross Section 5 Pool					Cross Section 6 Riffle					Cross Section 7 Riffle					Cross Section 8 Pool									
	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5					
Dimension	150.0																								
Floodprone Width (ft) (approx)	7.8	8.1	7.7	8.1		4.8	5.0	5.7	5.7		7.4	8.8	6.6	7.6		11.8	9.8	10.7	11.2						
BF Cross Sectional Area (ft ²)	5.8	5.8	5.8	5.9		2.1	2.2	2.6	2.1		3.5	3.4	3.2	3.0		11.2	9.2	9.8	9.7						
BF Mean Depth (ft)	0.7	0.7	0.8	0.7		0.4	0.4	0.5	0.4		0.5	0.4	0.5	0.4		0.9	0.9	0.9	0.9						
BF Max Depth (ft)	1.3	1.4	1.4	1.4		0.8	0.8	0.9	0.7		0.9	0.9	0.9	0.8		1.7	1.9	1.6	1.6						
Width/Depth Ratio	NA	NA	NA	NA		11.0	11.1	12.4	14.9		15.6	22.9	13.8	19.5		NA	NA	NA	NA						
Entrenchment Ratio	NA	NA	NA	NA		31.2	30.1	26.1	26.5		20.1	17.1	22.7	19.8		NA	NA	NA	NA						
Bank Height Ratio	NA	NA	NA	NA		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		NA	NA	NA	NA						
Wetted Perimeter (ft)	8.5	8.7	8.3	8.6		5.1	5.3	6.1	6.0		7.7	9.0	7.0	7.9		12.3	10.5	11.3	11.7						
Hydraulic radius (ft)	0.7	0.7	0.7	0.7		0.8	0.4	0.4	0.4		0.4	0.4	0.5	0.4		0.9	0.9	0.9	0.8						
Substrate	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5					
d50 (mm)	NA	NA	NA	NA		48	59	83			48	59	83			NA	NA	NA	NA						
d84 (mm)	NA	NA	NA	NA		98	124	174			98	124	174			NA	NA	NA	NA						
Parameter	MY-01 (2008)					MY-03 (2010)					MY-04 (2011)					MY-05 (2012)									
Pattern	Min	Max	Med	Min	Max	Min	Max	Med	Min	Max	Min	Max	Med	Min	Max	Min	Max	Med	Min	Max					
Channel Beltwidth (ft)	10	35	20	10	35	10	35	20	10	35	10	35	20	10	35										
Radius of Curvature (ft)	10	20	11	10	20	10	20	11	10	20	10	20	11	10	20										
Meander Wavelength (ft)	25	55	35	25	55	25	55	35	25	55	25	55	35	25	55										
Meander Width ratio	2.0	7.0	4.0	2.0	7.0	2.0	7.0	4.0	2.0	7.0	2.0	7.0	4.0	2.0	7.0										
Profile	Min	Max	Med	Min	Max	Min	Max	Med	Min	Max	Min	Max	Med	Min	Max	Min	Max	Med	Min	Max					
Riffle length (ft)	12	27	15	5	16	5	20	9	4	21	4	21	10												
Riffle slope (ft/ft)	NA*	NA*	NA*	NA*	NA*	0.0%	3.6%	1.1%	0.0%	2.3%	0.7%														
Pool length (ft)	18	33	21	12	30	8	30	18	8	28	16														
Pool spacing (ft)	15	50	25	15	50	25	50	25	15	50	25	15	50	25	15										
Additional Reach Parameters	MY-01 (2008)					MY-02 (2009)					MY-03 (2010)					MY-04 (2011)					MY-05 (2012)				
Valley Length (ft)	482					485					481					492									
Channel Length (ft)	626					631					625					639									
Sinuosity	1.3					1.3					1.3					1.3									
Water Surface Slope (ft/ft)	NA*					NA*					0.44%					0.44%									
BF slope (ft/ft)	---					---					---					---									
Rosgen Classification	C/E type					C/E type					C/E type					C/E type									
Number of Bankfull Events	0					2					3					1									

Table 9D. Morphology and Hydraulic Monitoring Summary
Cane Creek
Reach 4 (Tributary 3 - Sta. 14+45 to 20+40)

Parameter	Cross Section 1 Riffle					Cross Section 2 Riffle					Cross Section 3 Pool					Cross Section 4 Pool				
	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5
Dimension	150.0																			
BF Width (ft)	9.1	9.0	9.9	9.5		7.5	10.5	7.2	7.5		11.8	10.7	10.6	11.3		9.1	9.8	10.4	10.0	
Floodprone Width (ft) (approx)	150.0																			
BF Cross Sectional Area (ft ²)	5.2	5.2	5.6	5.7		3.1	4.7	3.0	3.4		10.3	9.7	9.4	10.1		8.3	8.7	9.0	9.3	
BF Mean Depth (ft)	0.6	0.6	0.6	0.6		0.4	0.4	0.4	0.4		0.9	0.9	0.9	0.9		0.9	0.9	0.9	0.9	
BF Max Depth (ft)	1.1	1.1	1.1	1.1		0.6	0.8	0.6	0.7		1.7	1.7	1.7	1.6		1.8	1.8	1.9	1.8	
Width/Depth Ratio	16.1	15.4	17.3	16.0		18.5	23.3	17.6	16.7		NA	NA	NA	NA		NA	NA	NA	NA	
Entrenchment Ratio	16.5	16.8	15.2	15.8		19.9	14.3	20.7	20.0		NA	NA	NA	NA		NA	NA	NA	NA	
Bank Height Ratio	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		NA	NA	NA	NA		NA	NA	NA	NA	
Bank Height Ratio	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		NA	NA	NA	NA		NA	NA	NA	NA	
Wetted Perimeter (ft)	9.4	9.2	10.2	9.9		7.7	10.7	7.4	7.7		12.4	11.3	11.2	11.9		9.8	10.6	11.2	10.8	
Hydraulic radius (ft)	0.5	0.5	0.5	0.6		0.4	0.4	0.4	0.4		0.8	0.9	0.8	0.9		0.8	0.8	0.8	0.9	
Substrate	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5	MY1	MY2	MY3	MY4	MY5
d50 (mm)		57	73	102			90	138	156											
d84 (mm)		90	138	156			90	138	156											
Parameter	MY-01 (2008)					MY-03 (2010)					MY-04 (2011)					MY-05 (2012)				
Pattern	Min	Max	Med	Med	Max	Min	Max	Med	Med	Max	Min	Max	Med	Med	Max	Min	Max	Med	Med	Max
Channel Beltwidth (ft)	10	35	20	10	35	10	35	20	10	35	10	35	20	10	35					
Radius of Curvature (ft)	10	20	35	10	20	10	20	35	10	20	10	20	35	10	20					
Meander Wavelength (ft)	25	55	35	25	55	25	55	35	25	55	25	55	35	25	55					
Meander Width ratio	2.0	7.0	4.0	2.0	7.0	2.0	7.0	4.0	2.0	7.0	2.0	7.0	4.0	2.0	7.0					
Profile	Min	Max	Med	Med	Max	Min	Max	Med	Med	Max	Min	Max	Med	Med	Max	Min	Max	Med	Med	Max
Riffle length (ft)	5	17	11	6	19	5	18	10	5	18	5	18	11							
Riffle slope (ft/ft)	NA*	NA*	NA*	NA*	NA*	0.0%	1.2%	0.2%	0.0%	2.3%	0.0%	2.3%	0.3%							
Pool length (ft)	9	33	21	8	33	11	35	17	8	32	16									
Pool spacing (ft)	15	50	25	15	50	15	50	25	15	50	25									
Additional Reach Parameters	MY-01 (2008)					MY-03 (2010)					MY-04 (2011)					MY-05 (2012)				
Valley Length (ft)	457					472					457									
Channel Length (ft)	594					614					594									
Sinuosity	1.3					1.3					1.3									
Water Surface Slope (ft/ft)	NA*					0.19%					0.17%									
BF slope (ft/ft)	---					---					---									
Rosgen Classification	C type					C type					C type									
Number of Bankfull Events	0					2					1									

* No water in channel due to drought conditions.

Table 9E. Morphology and Hydraulic Monitoring Summary
Cane Creek

Reach 5 (Tributary 3 - Sta. 20+68 to 26+60)

Parameter	Cross Section 5 Riffle					Cross Section 6 Pool					Cross Section 7 Pool					Cross Section 8 Riffle									
	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4	MY5	MY+	
Dimension	150.0																								
BF Width (ft)	8.6	9.3	9.6	9.1			12.1	11.6	10.8	10.5			12.5	13.2	11.4	11.6			6.8	7.6	7.6	7.2			
Floodprone Width (ft) (approx)	150.0																								
BF Cross Sectional Area (ft ²)	5.5	5.9	6.4	5.9			10.9	10.2	9.5	9.6			11.2	12.5	10.9	11.0			3.6	3.8	3.8	3.9			
BF Mean Depth (ft)	0.6	0.6	0.7	0.7			0.9	0.9	0.9	0.9			0.9	1.0	1.0	1.0			0.5	0.5	0.5	0.5			
BF Max Depth (ft)	1.1	1.1	1.2	1.2			1.8	1.8	1.8	1.7			1.9	2.0	1.8	1.8			0.8	0.8	0.8	0.9			
Width/Depth Ratio	13.4	14.5	14.5	13.9			NA	NA	NA	NA			NA	NA	NA	NA			13.1	15.2	14.9	13.3			
Entrenchment Ratio	17.4	16.2	15.6	16.6			NA	NA	NA	NA			NA	NA	NA	NA			21.9	19.8	19.8	20.8			
Bank Height Ratio	1.0	1.0	1.0	1.0			NA	NA	NA	NA			NA	NA	NA	NA			1.0	1.0	1.0	1.0			
Wetted Perimeter (ft)	8.9	9.6	10.0	9.4			12.7	12.2	11.5	11.2			13.3	13.8	12.1	12.3			7.2	7.8	8.0	7.5			
Hydraulic radius (ft)	0.6	0.6	0.6	0.6			0.9	0.8	0.8	0.9			0.8	0.9	0.9	0.9			0.5	0.5	0.8	0.5			
Substrate	MY1	MY2	MY3	MY4	MY5	MY+	MY1	MY2	MY3	MY4			MY1	MY2	MY3	MY4			MY1	MY2	MY3	MY4	MY5	MY+	
		54	73	102				NA	NA	NA				NA	NA	NA									
		80	138	156				NA	NA	NA				NA	NA	NA									
Parameter	MY-01 (2008)					MY-02 (2009)					MY-03 (2010)					MY-04 (2011)					MY-05 (2012)				
Pattern	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	
Channel Beltwidth (ft)	10	35	20	10	35	20	10	35	20	10	35	20	10	35	20	10	35	20							
Radius of Curvature (ft)	10	20	35	10	20	35	10	20	35	10	20	35	10	20	35	10	20	35							
Meander Wavelength (ft)	25	55	35	25	55	35	25	55	35	25	55	35	25	55	35	25	55	35							
Meander Width ratio	2.0	7.0	4.0	2.0	7.0	4.0	2.0	7.0	4.0	2.0	7.0	4.0	2.0	7.0	4.0	2.0	7.0	4.0							
Profile	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	Min	Max	Med	
Riffle length (ft)	13	22	18	6	14	9	6	12	9	5	17	10													
Riffle slope (ft/ft)	NA*	NA*	NA*	NA*	NA*	NA*	0.0%	2.0%	1.0%	0.0%	1.0%	0.6%													
Pool length (ft)	15	42	24	10	31	16	11	34	25	10	32	16													
Pool spacing (ft)	15	50	25	15	50	25	15	50	25	15	50	25													
Additional Reach Parameters	MY-01 (2008)					MY-02 (2009)					MY-03 (2010)					MY-04 (2011)					MY-05 (2012)				
Valley Length (ft)	456					480					468					465									
Channel Length (ft)	593					624					609					605									
Sinuosity	1.3					1.3					1.3					1.3									
Water Surface Slope (ft/ft)	NA*					NA*					0.29%					NA*									
BF slope (ft/ft)	---					---					---					---									
Rosgen Classification	C type					C type					C-type					C type									
Number of Bankfull Events	0					2					3					1									

3.0 CONCLUSIONS

One of the five monitored gauges (Gauge 5) within restoration areas was inundated/saturated within 12 inches of the surface for greater than 5 percent of the growing season. A summary of groundwater gauge data for the is included in Table 11.

Table 11. Summary of Groundwater Gauge Results

Gauge	Success Criteria Achieved/Max Consecutive Days During Growing Season (Percentage)				
	Year 1 (2008)*	Year 2 (2009)*	Year 3 (2010)	Year 4 (2011)	Year 5 (2012)
1	No/0 days (0.0%)	No/0 days (0.0%)	No/0 days (0.0%)	No/0 days (0.0%)	
2	No/0 days (0.0%)	No/0 days (0.0%)	No/0 days (0.0%)	No/0 days (0.0%)	
3	No/0 days (0.0%)	No/0 days (0.0%)	No/0 days (0.0%)	No/0 days (0.0%)	
4	No/1 day (0.0%)	No/4 days (0.0%)	No/0 days (0.0%)	No/0 days (0.0%)	
5	Yes/4 days (1.8%)	Yes/6 days (2.8%)	No/0 days (0.0%)	Yes/16 days (7.4%)	
Ref 1	2 days (0.9 %)	3 days (1.4 %)	1 day (0.005 %)	1 day (0.005 %)	

* Regional rainfall from January through October for Year 1 (2008) was 36.02 inches, 9.46 inches (20.8%) below the WETS mean of 45.48 inches; therefore, success criteria are based on the reference gauge.

** Regional rainfall from January through October for Year 2 (2008) was 43.27 inches, 2.21 inches (6.1%) below the WETS mean; therefore, success criteria are based on comparisons to reference gauge data.

Vegetation sampling across the Site was above the required average density with 645 planted stems per acre surviving. Thirteen of the fifteen plots are meeting success criteria based on planted stems alone. When including natural recruits of appropriate species such as box elder (*Acer negundo*), green ash (*Fraxinus pennsylvanica*), sycamore (*Platanus occidentalis*), tulip tree (*Liriodendron tulipifera*), black cherry (*Prunus serotina*), and black walnut (*Juglans nigra*), all plots are meeting success criteria. (Table 12).

Channel geometry compares favorably with the emulated, stable E/C type stream reach as set forth in the detailed mitigation plan and as constructed. Current monitoring has demonstrated dimension, pattern, and profile were stable over the course of the monitoring period.

Table 12. Summary of Planted Vegetation Plot Results

Plot	Planted Stems/Acre				
	Year 1 (2008)	Year 2 (2009)	Year 3 (2010)	Year 4 (2011)	Year 5 (2012)
1	0	121	121	121	
2	0	0	526	688	
3	324	486	567	607	
4	0	0	567	607	
5	243	1012	1295	1295	
6	162	850	1093	1052	
7	526	931	850	890	
8	486	688	607	809	
9	162	567	567	567	
10	202	526	486	526	
11	162	526	607	647	
12	486	810	728	728	
13	162	162	162	162	
14	243	486	526	567	
15	40	324	364	405	
Average of All Plots (1-15)	213	499	604	645	

4.0 REFERENCES

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**APPENDIX A
VEGETATION DATA**

- 1. Vegetation Survey Data Tables**
- 2. Vegetation Monitoring Plot Photos**

Report Prepared

By Corri Faquin

Date Prepared

7/11/2011 14:52

database name RestorationSystems-2011-A.mdb
database location C:\Axiom\Business\CVS
computer name CORRI-PC
file size 61538304

DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT-----

Metadata

Description of database file, the report worksheets, and a summary of project(s) and project data.

Proj, planted

Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.

Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.

Proj, total stems

List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).

Plots

Frequency distribution of vigor classes for stems for all plots.

Vigor

Frequency distribution of vigor classes listed by species.

Vigor by Spp

List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.

Damage

Damage values tallied by type for each species.

Damage by Spp

Damage values tallied by type for each plot.

Damage by Plot

A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.

Planted Stems by

A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.

ALL Stems by

A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.

Plot and spp

PROJECT SUMMARY-----

Project Code Cane
Project Name Cane Creek Restoration Site
Description Stream and Wetland Restoration Site in Rutherford County
Sampled Plots 15

Living planted stems, excluding live stakes, per acre: Negative (red) numbers indicate the project failed to reach requirements in a particular year.

Project Code	Project Name	River Basin	Year 4
Cane	Cane Creek Restoration Site	Broad	644.80

Total stems, including planted stems of all kinds (including live stakes) and natural/volunteer stems:

Project Code	Project Name	River Basin	Year 4
Cane	Cane Creek Restoration Site	Broad	2148

Plot Info (Datum for Lat/Long NAD83/WGS84)

Plot	Latitude	Longitude	Planted Living Stems	Planted Living Stems EXCLUDING Live Stakes	Dead/Missing Stems	Natural (Volunteer) Stems	Total Living Stems	Total Living Stems EXCLUDING Live Stakes	Planted Living Stems per ACRE	Planted Living Stems EXCLUDING Live Stakes PER ACRE	Natural (Volunteer) Stems PER ACRE	Total Living Stems PER ACRE	Total Living Stems EXCLUDING Live Stakes PER ACRE	# species
1	35.5393324	-81.855151	3	3	0	21	24	24	121	121	850	971	971	1
2	35.538196	-81.855381	17	17	0	9	26	26	688	688	364	1052	1052	4
3	35.536784	-81.855210	15	15	1	22	37	37	607	607	890	1497	1497	4
4	35.535790	-81.854678	15	15	0	5	20	20	607	607	202	809	809	8
5	35.534646	-81.855299	32	32	0	88	120	120	1295	1295	3561	4856	4856	6
6	35.533794	-81.855261	26	26	0	8	34	34	1052	1052	324	1376	1376	7
7	35.533174	-81.855107	22	22	2	25	47	47	890	890	1012	1902	1902	8
8	35.532462	-81.855102	20	20	1	87	107	107	809	809	3521	4330	4330	6
9	35.53146	-81.855548	14	14	3	85	99	99	567	567	3440	4006	4006	4
10	35.530742	-81.855395	13	13	2	5	18	18	526	526	202	728	728	5
11	35.529558	-81.855346	16	16	0	3	19	19	647	647	121	769	769	3
12	35.528784	-81.855327	18	18	1	22	40	40	728	728	890	1619	1619	6
13	35.529052	-81.854852	4	4	0	38	42	42	162	162	1538	1700	1700	1
14	35.532373	-81.854268	14	14	1	56	70	70	567	567	2266	2833	2833	5
15	35.533568	-81.853962	10	10	1	83	93	93	405	405	3359	3764	3764	5

Vigor

vigor	Count	Percent
0	1	0.4
2	4	1.6
3	47	18.7
4	188	74.9
Missing	11	4.4

Vigor by Species

Species	CommonName	4	3	2	1	0	Missing	Unknown
Asimina triloba	pawpaw	1						
Cephalanthus occidentalis	common buttonbush	15	12				2	
Cornus amomum	silky dogwood	33	11				1	
Diospyros virginiana	common persimmon	7						
Fraxinus pennsylvanica	green ash	16	1				2	
Quercus alba	white oak	28	3	1	1		4	
Quercus pagoda	cherrybark oak	1	3					
Sambucus canadensis	Common Elderberry	15		1				
Cercis canadensis	eastern redbud	8	2					
Quercus	oak	1						
Quercus rubra	northern red oak	19	6	1			1	
Carya	hickory	2	5	1			1	
Nyssa	tupelo	1	2					
Platanus occidentalis	American sycamore	28						
Cephalanthus	buttonbush		1					
Ulmus	elm	11						
Ulmus americana	American elm	1	1					
Unknown		1						
18	17	188	47	4	1	1	11	

Damage

Damage	Count	Percent Of Stems
(no damage)	240	95.6
Vine Strangulation	3	1.2
Deer	3	1.2
Unknown	2	0.8
Insects	2	0.8
Rodents	1	0.4

Damage by Plot

plot	Count of Damage Categories	(no damage)	Deer	Insects	Rodents	Unknown	Vine Strangulation
1	0	3					
2	2	15		1			1
3	1	15			1		
4	0	15					
5	0	32					
6	2	24			1		1
7	0	24					
8	1	20					1
9	0	17					
10	1	14		1			
11	0	16					
12	0	19					
13	3	1	3				
14	0	15					
15	1	10				1	
15	11	240	3	2	1	2	3

Damage by Species

Species	CommonName	Count of Damage Categories	(no damage)	Deer	Insects	Rodents	Unknown	Vine Strangulation
Asimina triloba	pawpaw	0	1					
Carya	hickory	2	7			1		1
Cephalanthus	buttonbush	0	1					
Cephalanthus occidentalis	common buttonbush	0	29					
Cercis canadensis	eastern redbud	1	9					1
Cornus amomum	silky dogwood	3	42	3				
Diospyros virginiana	common persimmon	0	7					
Fraxinus pennsylvanica	green ash	0	19					
Nyssa	tupelo	0	3					
Platanus occidentalis	American sycamore	1	27		1			
Quercus	oak	0	1					
Quercus alba	white oak	1	36				1	
Quercus pagoda	cherrybark oak	0	4					
Quercus rubra	northern red oak	1	26				1	
Sambucus canadensis	Common Elderberry	2	14		1			1
Ulmus	elm	0	11					
Ulmus americana	American elm	0	2					
Unknown		0	1					
18	17	11	240	3	2	1	2	3

Planted Stems by Plot and Species

Species	CommonName	Total Planted Stems	# plots	avg# stems	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Asimina triloba	pawpaw	1	1	1												1			
Carya	hickory	8	4	2					3	3	1							1	
Cephalanthus	buttonbush	1	1	1						1									
Cephalanthus occidentalis	common buttonbush	27	9	3				2	8	4	3	5	2	1		1			1
Cercis canadensis	eastern redbud	10	5	2		1	1		2	3	3								
Cornus amomum	silky dogwood	44	9	4.89				1	9	11		3	7	2		5	4	2	
Diospyros virginiana	common persimmon	7	3	2.33		1		3											3
Fraxinus pennsylvanica	green ash	17	6	2.83				2			2		1	7		4			1
Nyssa	tupelo	3	1	3														3	
Platanus occidentalis	American sycamore	28	6	4.67	3	14	2				2				1			6	
Quercus	oak	1	1	1								1							
Quercus alba	white oak	32	7	4.57				3		2			4	1	13	5			4
Quercus pagoda	cherrybark oak	4	1	4			4												
Quercus rubra	northern red oak	26	8	3.25		1	8	1	6	2	4	2						2	
Sambucus canadensis	Common Elderberry	16	6	2.67					4		1	5	2	2	2	2			
Ulmus	elm	11	3	3.67				1			6	4							
Ulmus americana	American elm	2	1	2				2											
Unknown		1	1	1															1
18	17	239	18		3	17	15	15	32	26	22	20	14	13	16	18	4	14	10

All Stems by Plot and Species

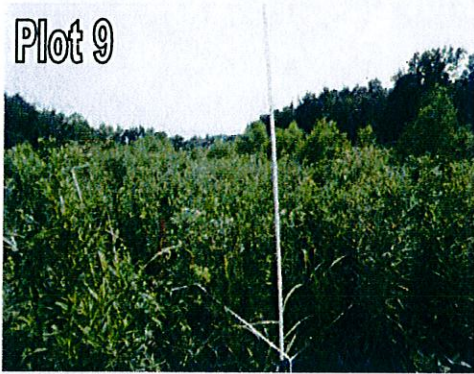
Species	Common Name	Total Stems	# plots	avg# stems	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Acer negundo	boxelder	396	15	26.4	12	2	8	2	76	3	14	87	83	4	3	9	9	26	58
Acer rubrum	red maple	9	5	1.8			1		2	1	1					1			4
Asimina triloba	pawpaw	1	1	1															
Betula nigra	river birch	1	1	1			1												
Carya	hickory	15	6	2.5					3	4	2		2			3		1	
Cephalanthus	buttonbush	1	1	1						1									
Cephalanthus occidentalis	common buttonbush	27	9	3				2	8	4	3	5	2	1		1			1
Cercis canadensis	eastern redbud	12	6	2		1	1	2	2	3	3								
Cornus amomum	silky dogwood	46	9	5.11				1	9	11		3	7	2		7	4	2	
Diospyros virginiana	common persimmon	8	4	2		1		3								1			3
Fraxinus pennsylvanica	green ash	103	11	9.36	8	4	4	2	9	3	9		1	8		9		30	20
Juglans nigra	black walnut	10	1	10													10		
Liriodendron tulipifera	tuliptree	2	1	2													2		
Nyssa	tupelo	3	1	3														3	
Pinus	pine	6	2	3															
Pinus taeda	loblolly pine	1	1	1															
Platanus occidentalis	American sycamore	38	6	6.33	4	20	4								1			6	
Prunus serotina	black cherry	20	3	6.67					1							2	17		
Quercus	oak	1	1	1															
Quercus alba	white oak	33	7	4.71				3		2			5	1	13	5			4
Quercus pagoda	cherrybark oak	4	1	4			4												
Quercus rubra	northern red oak	26	8	3.25		1	8	1	6	2	4	2						2	
Sambucus canadensis	Common Elderberry	16	6	2.67					4		1	5		2	2	2			
Ulmus	elm	13	3	4.33				2			7	4							
Ulmus americana	American elm	2	1	2				2											
Unknown		3	1	3															3
26	25	797	26		24	26	37	20	120	34	47	107	100	18	19	40	42	70	93

Cane Creek Stream and Wetland Restoration Site
Year 4 (2011) Annual Monitoring
Vegetation Plot Photos
Taken June 2011

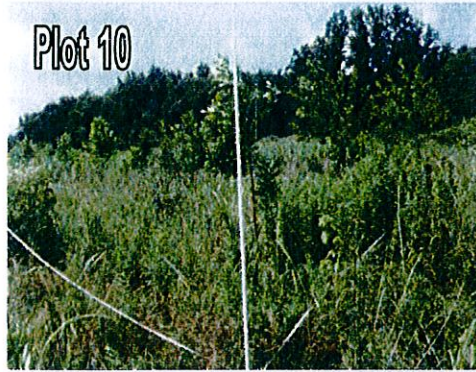


Cane Creek Stream and Wetland Restoration Site
Year 4 (2011) Annual Monitoring
Vegetation Plot Photos
Taken June 2011
(continued)

Plot 9



Plot 10



Plot 11



Plot 12



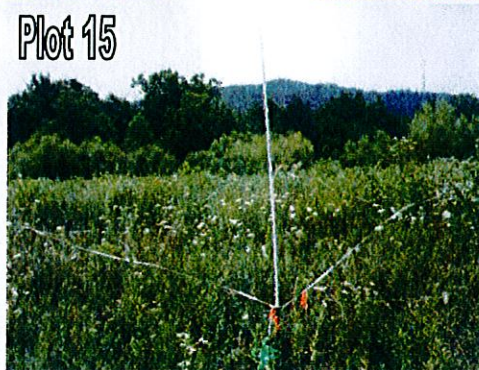
Plot 13



Plot 14



Plot 15



**APPENDIX B
GEOMORPHOLOGIC DATA**

- 1. Tables B1-B5. Qualitative Visual Stability Assessment**
- 2. Cross-section Plots and Tables**
- 3. Longitudinal Profile Plots**
- 4. Substrate Data**
- 5. Representative Structure Photographs**
- 6. Enhancement Reach Photographs**

Table B1. Visual Morphological Stability Assessment
Cane Creek
Reach 1 (Tributary 1 - Sta. 17+50 to 10+60)

Feature Category	Metric (per As-built and reference baselines)	(# Stable) Number Performing as Intended	Total number	Total Number / feet in unstable state	% Perform in Stable Condition	Feature Perform. Mean or Total
A. Riffles	1. Present	16	16	NA	100%	
	2. Armor stable (e.g. no displacement)?	16	16	NA	100%	
	3. Facet grade appears stable?	16	16	NA	100%	
	4. Minimal evidence of embedding / fining?	16	16	NA	100%	
	5. Length appropriate?	16	16	NA	100%	100%
B. Pools	1. Present? (e.g. not subject to severe aggrad. Or migrat.?)	18	21	NA	86%	
	2. Sufficiently deep (Max Pool D:Mean Bkf>1.6)?	21	21	NA	100%	
	3. Length appropriate?	21	21	NA	100%	95%
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	21	21	NA	100%	
	2. Downstream of meander (glide/inflection) centering?	21	21	NA	100%	100%
D. Meanders	1. Outer bend in state of limited/controlled erosion?	20	21	NA	95%	
	2. Of those eroding, # w/concomitant point bar formation?	NA	NA	NA	100%	
	3. Apparent Rc within spec?	21	21	NA	100%	
	4. Sufficient floodplain access and relief?	21	21	NA	100%	98%
E. Bed General	1. General channel bed aggradation areas (bar formation)	NA	NA	30	98.5%	
	2. Channel bed degradation – areas of increasing down-cutting or head cutting?	NA	NA	0	100%	96%
F. Vanes	1. Free of back or arm scour?	2	2	NA	100%	
	2. Height appropriate?	2	2	NA	100%	
	3. Angle and geometry appear appropriate?	2	2	NA	100%	
	4. Free of piping or other structural failures?	2	2	NA	100%	100%
G. Wads / Boulders	1. Free of scour?	NA	NA	NA	NA	NA
	2. Footing stable?	NA	NA	NA	NA	NA

**Table B2. Visual Morphological Stability Assessment
Cane Creek**

Reach 2 (Tributary 2 - Sta. 14+10 to 19+50)

Feature Category	Metric (per As-built and reference baselines)	(# Stable) Number Performing as Intended	Total number	Total Number / feet in unstable state	% Perform in Stable Condition	Feature Perform. Mean or Total
A. Riffles	1. Present	19	19	NA	100%	
	2. Armor stable (e.g. no displacement)?	19	19	NA	100%	
	3. Facet grade appears stable?	19	19	NA	100%	
	4. Minimal evidence of embedding / fining?	11	19	NA	58%	
	5. Length appropriate?	19	19	NA	100%	92%
B. Pools	1. Present? (e.g. not subject to severe aggrad. Or migrat.?)	21	23	NA	91%	
	2. Sufficiently deep (Max Pool D:Mean Bkf>1.6?)	21	23	NA	91%	
	3. Length appropriate?	23	23	NA	100%	94%
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	23	23	NA	100%	
	2. Downstream of meander (glide/inflection) centering?	23	23	NA	100%	100%
D. Meanders	1. Outer bend in state of limited/controlled erosion?	23	28	NA	100%	
	2. Of those eroding, # w/concomitant point bar formation?	0	0	NA	100%	
	3. Apparent Rc within spec?	23	23	NA	100%	
	4. Sufficient floodplain access and relief?	23	23	NA	100%	100%
E. Bed General	1. General channel bed aggradation areas (bar formation)	350	600	250	58%	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	NA	NA	0	100%	79%
F. Vanes	1. Free of back or arm scour?	2	2	NA	100%	
	2. Height appropriate?	0	2	NA	0%	
	3. Angle and geometry appear appropriate?	2	2	NA	100%	
G. Wads / Boulders	4. Free of piping or other structural failures?	2	2	NA	100%	75%
	1. Free of scour?	NA	NA	NA	NA	
	2. Footing stable?	NA	NA	NA	NA	NA

**Table B3. Visual Morphological Stability Assessment
Cane Creek**

Reach 3 (Tributary 2 - Sta.19+84 to 26+10)

Feature Category	Metric (per As-built and reference baselines)	(# Stable) Number Performing as Intended	Total number	Total Number / feet in unstable state	% Perform in Stable Condition	Feature Perform. Mean or Total
A. Riffles	1. Present	20	20	NA	100%	
	2. Armor stable (e.g. no displacement)?	20	20	NA	100%	
	3. Facet grade appears stable?	20	20	NA	100%	
	4. Minimal evidence of embedding / fining?	20	20	NA	100%	
	5. Length appropriate?	20	20	NA	100%	100%
B. Pools	1. Present? (e.g. not subject to severe aggrad. Or migrat.?)	28	28	NA	100%	
	2. Sufficiently deep (Max Pool D:Mean Bkf>1.6)?	28	28	NA	100%	
	3. Length appropriate?	28	28	NA	100%	100%
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	28	28	NA	100%	
	2. Downstream of meander (glide/inflection) centering?	28	28	NA	100%	100%
D. Meanders	1. Outer bend in state of limited/controlled erosion?	28	28	NA	100%	
	2. Of those eroding, # w/concomitant point bar formation?	0	0	NA	100%	
	3. Apparent Rc within spec?	28	28	NA	100%	
	4. Sufficient floodplain access and relief?	28	28	NA	100%	100%
E. Bed General	1. General channel bed aggradation areas (bar formation) cutting?	NA	NA	0	100%	
	2. Channel bed degradation – areas of increasing down-cutting or head cutting?	NA	NA	0	100%	100%
F. Vanes	1. Free of back or arm scour?	2	2	NA	100%	
	2. Height appropriate?	2	2	NA	100%	
	3. Angle and geometry appear appropriate?	2	2	NA	100%	
	4. Free of piping or other structural failures?	2	2	NA	100%	100%
G. Wads / Boulders	1. Free of scour?	NA	NA	NA	NA	NA
	2. Footing stable?	NA	NA	NA	NA	NA

Table B4. Visual Morphological Stability Assessment

Cane Creek

Reach 4 (Tributary 3 - Sta. 14+45 to 20+40)

Feature Category	Metric (per As-built and reference baselines)	(# Stable) Number Performing as Intended	Total number	Total Number / feet in unstable state	% Perform in Stable Condition	Feature Perform. Mean or Total
A. Riffles	1. Present	19	19	NA	100%	
	2. Armor stable (e.g. no displacement)?	19	19	NA	100%	
	3. Facet grade appears stable?	19	19	NA	100%	
	4. Minimal evidence of embedding / fining?	19	19	NA	100%	
	5. Length appropriate?	19	19	NA	100%	100%
B. Pools	1. Present? (e.g. not subject to severe aggrad. Or migrat.?)	26	26	NA	100%	
	2. Sufficiently deep (Max Pool D:Mean Bkt> 1.6?)	26	26	NA	100%	
	3. Length appropriate?	26	26	NA	100%	100%
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	26	26	NA	100%	
	2. Downstream of meander (glide/inflection) centering?	26	26	NA	100%	100%
D. Meanders	1. Outer bend in state of limited/controlled erosion?	26	26	NA	100%	
	2. Of those eroding, # w/concomitant point bar formation?	0	0	NA	100%	
	3. Apparent Rc within spec?	26	26	NA	100%	
	4. Sufficient floodplain access and relief?	26	26	NA	100%	100%
E. Bed General	1. General channel bed aggradation areas (bar formation)	NA	NA	0	100%	
	2. Channel bed degradation – areas of increasing down-cutting or head cutting?	NA	NA	0	100%	100%
F. Vancs	1. Free of back or arm scour?	2	2	NA	100%	
	2. Height appropriate?	2	2	NA	100%	
	3. Angle and geometry appear appropriate?	2	2	NA	100%	
	4. Free of piping or other structural failures?	2	2	NA	100%	100%
G. Wads / Boulders	1. Free of scour?	NA	NA	NA	NA	NA
	2. Footing stable?	NA	NA	NA	NA	NA

Table B5. Visual Morphological Stability Assessment

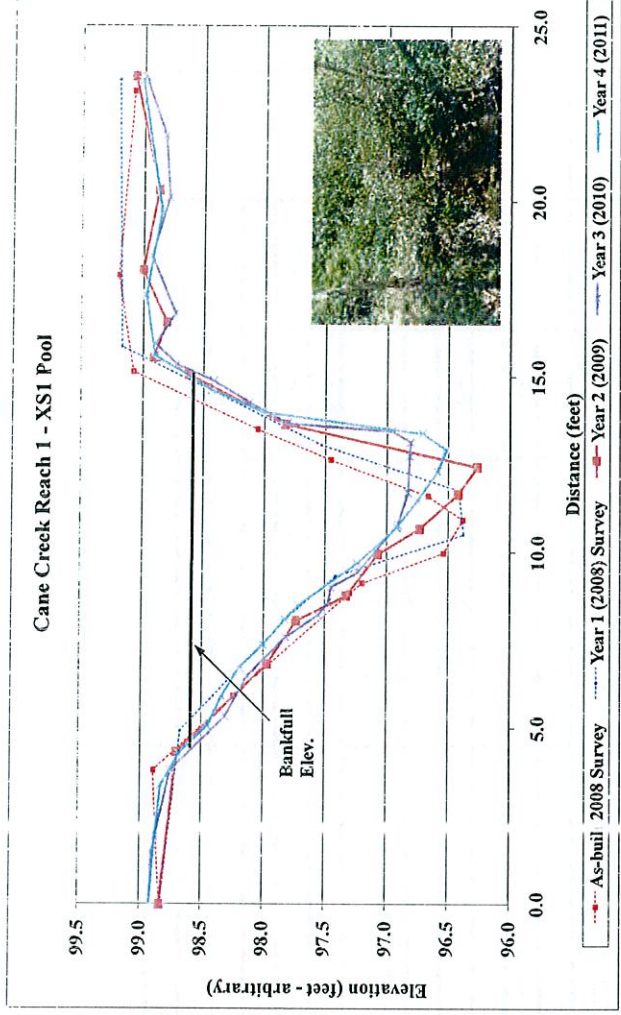
Cane Creek

Reach 5 (Tributary 3 - Sta. 20+68 to 26+60)

Feature Category	Metric (per As-built and reference baselines)	(# Stable) Number Performing as Intended	Total number	Total Number / feet in unstable state	% Perform in Stable Condition	Feature Perform. Mean or Total
A. Riffles	1. Present	20	20	NA	100%	
	2. Armor stable (e.g. no displacement)?	20	20	NA	100%	
	3. Facet grade appears stable?	20	20	NA	100%	
	4. Minimal evidence of embedding / fining?	20	20	NA	100%	
	5. Length appropriate?	20	20	NA	100%	100%
B. Pools	1. Present? (e.g. not subject to severe aggrad. Or migrat.?)	30	30	NA	100%	
	2. Sufficiently deep (Max Pool D:Mean Bkt>1.6?)	30	30	NA	100%	
	3. Length appropriate?	30	30	NA	100%	100%
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	30	30	NA	100%	
	2. Downstream of meander (glide/inflection) centering?	30	30	NA	100%	
	1. Outer bend in state of limited/controlled erosion?	30	30	NA	100%	
	2. Of those eroding, # w/concomitant point bar formation?	0	0	NA	100%	
D. Meanders	3. Apparent Rc within spec?	30	30	NA	100%	
	4. Sufficient floodplain access and relief?	30	30	NA	100%	100%
	1. General channel bed aggradation areas (bar formation)	NA	NA	0	100%	
	2. Channel bed degradation - areas of increasing down-cutting or head cutting?	NA	NA	0	100%	100%
E. Bed General	1. Free of back or arm scour?	3	3	NA	100%	
	2. Height appropriate?	3	3	NA	100%	
	3. Angle and geometry appear appropriate?	3	3	NA	100%	
F. Vanes	4. Free of piping or other structural failures?	3	3	NA	100%	100%
	1. Free of scour?	NA	NA	NA	NA	
G. Wads / Boulders	2. Footing stable?	NA	NA	NA	NA	NA

Project Name Cane Creek
 Cross Section R1-XS1
 Feature Pool
 Date 4/22/11
 Crew Dean, Perkinson

As-built		2008 Survey		2009 Survey		2010 Survey		2011 Survey	
Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation
0.0	98.8	0.0	98.8	0.0	98.8	-0.1	98.9	-0.1	98.9
3.8	98.9	4.9	98.7	4.3	98.7	1.5	98.9	1.9	98.9
5.9	98.2	8.0	97.8	6.8	98.0	3.8	98.7	3.4	98.8
8.9	97.2	9.3	97.4	8.1	97.7	5.3	98.3	4.3	98.7
9.1	97.2	10.5	96.4	8.8	97.3	6.5	98.1	5.1	98.5
10.0	96.5	11.8	96.4	10.0	97.1	7.6	97.8	5.9	98.3
10.9	96.4	13.1	97.5	10.7	96.7	8.2	97.6	6.7	98.2
11.6	96.7	15.8	99.2	11.7	96.4	8.6	97.5	7.4	98.0
12.6	97.4	23.5	99.2	12.4	96.3	9.0	97.4	8.1	97.8
13.5	98.0			13.7	97.8	9.4	97.2	8.5	97.7
15.1	99.1			15.1	98.6	10.8	96.9	9.7	97.2
17.9	99.2			15.6	98.9	11.7	96.8	10.7	96.9
23.1	99.1			16.5	98.8	12.7	96.8	11.5	96.7
				18.0	99.0	13.1	96.8	12.3	96.6
				20.3	98.9	13.5	97.0	12.9	96.5
				23.6	99.1	13.7	97.8	13.4	96.7
						14.3	98.1	14.0	98.0
						14.9	98.4	14.6	98.4
						15.3	98.7	15.6	98.9
						15.9	98.9	17.3	99.0
						16.8	98.7	19.8	98.9
						18.4	98.9		
						20.1	98.8		
						21.9	98.8		
						23.6	99.0		

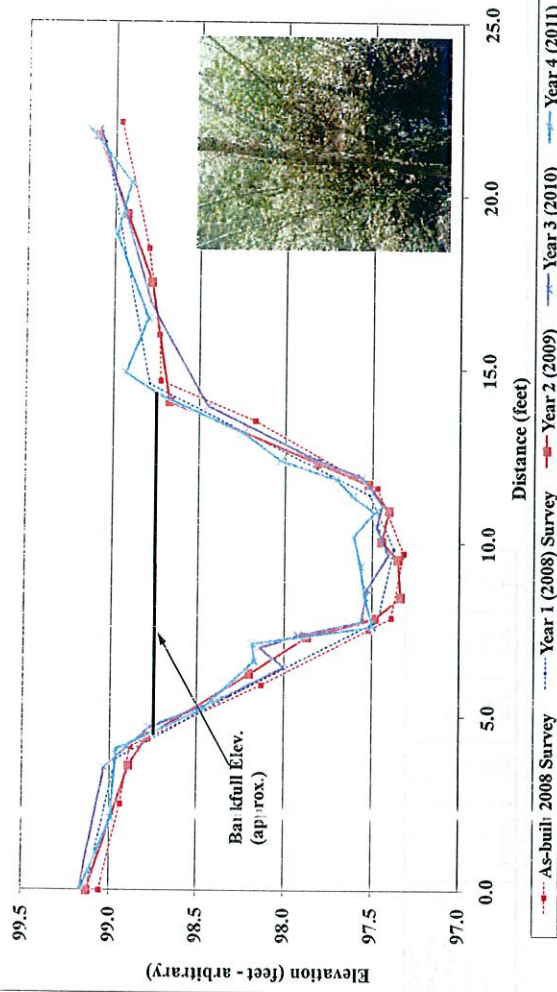


	2008	2009	2010	2011
Area	13.5	11.1	10.6	11.1
Width	11.0	10.1	10.2	10.7
Mean Depth	1.2	1.1	1.0	1.0
Max Depth	2.5	2.3	1.8	2.1
W/D Ratio	NA	NA	NA	NA

Project Name Cane Creek
 Cross Section R1-XS2
 Feature Riffle
 Date 4/22/11
 Crew Dean Perkinson

As-built		2008 Survey		2009 Survey		2010 Survey		2011 Survey	
Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation
0.0	99.1	0.0	99.1	0.0	99.1	-0.2	99.2	-0.2	99.2
2.5	98.9	3.8	99.0	3.6	98.9	3.5	99.0	2.1	99.0
4.1	98.9	5.6	98.3	4.4	98.8	4.7	98.8	4.0	99.0
5.9	98.1	7.8	97.5	6.2	98.2	5.5	98.4	5.2	98.5
7.5	97.5	9.8	97.4	7.3	97.9	6.4	98.0	6.6	98.2
7.9	97.4	11.4	97.5	7.8	97.5	7.0	98.1	7.1	98.2
9.7	97.3	14.5	98.8	8.5	97.3	7.3	97.9	7.6	97.5
11.6	97.5	21.5	99.1	9.5	97.3	7.7	97.6	8.4	97.5
11.9	97.6			10.0	97.4	8.7	97.5	9.3	97.6
13.5	98.2			10.9	97.4	9.7	97.4	10.2	97.6
14.7	98.7			11.7	97.5	10.5	97.5	10.9	97.5
16.0	98.7			12.3	97.8	11.1	97.4	11.3	97.6
18.5	98.8			14.1	98.7	11.9	97.6	11.8	97.7
22.1	99.0			17.5	98.8	12.4	97.8	12.4	98.0
				19.4	98.9	13.9	98.4	13.1	98.2
				21.7	99.1	16.8	98.8	14.3	98.7
						21.9	99.1	14.9	98.9
								16.4	98.8
								18.8	99.0
								20.4	98.9
								21.9	99.1

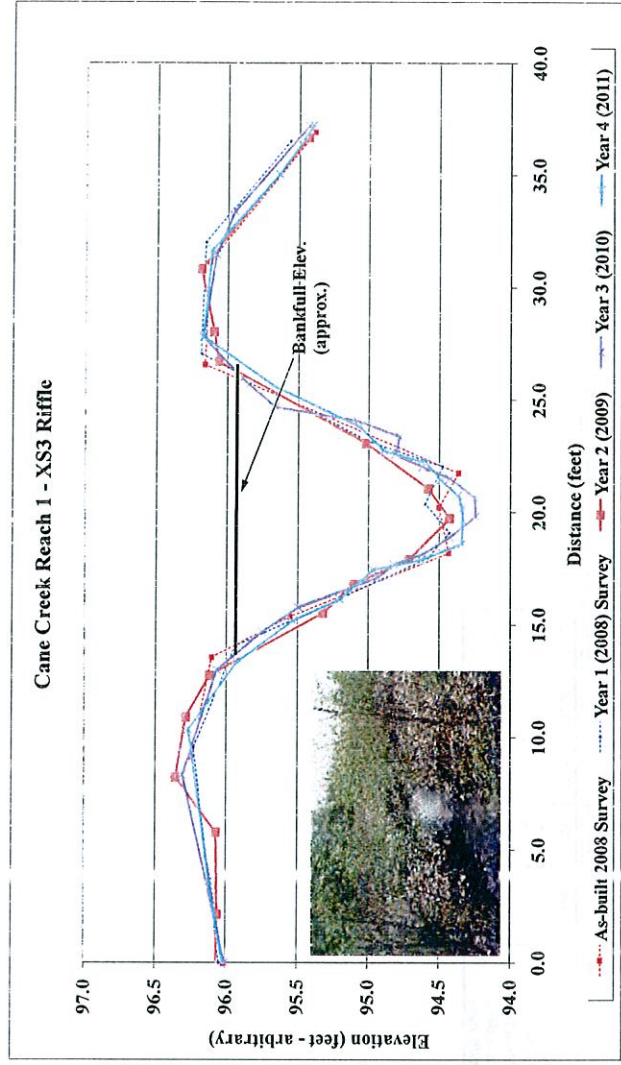
Cane Creek Reach 1 - XS2 Riffle



	As-built	2008 Survey	Year 1 (2008) Survey	Year 2 (2009)	Year 3 (2010)	Year 4 (2011)
Area	9.4	9.3	7.8	7.9	7.9	7.9
Width	10.1	10.4	9.3	11.0	9.9	9.9
Mean Depth	0.9	0.9	0.3	0.7	0.8	0.8
Max Depth	1.4	1.4	1.3	1.3	1.3	1.3
W/D Ratio	11.0	11.7	11.1	15.2	12.3	12.3

Project Name Cane Creek
 Cross Section R1-XS3
 Feature Riffle
 Date 4/22/11
 Crew Dean, Perkinson

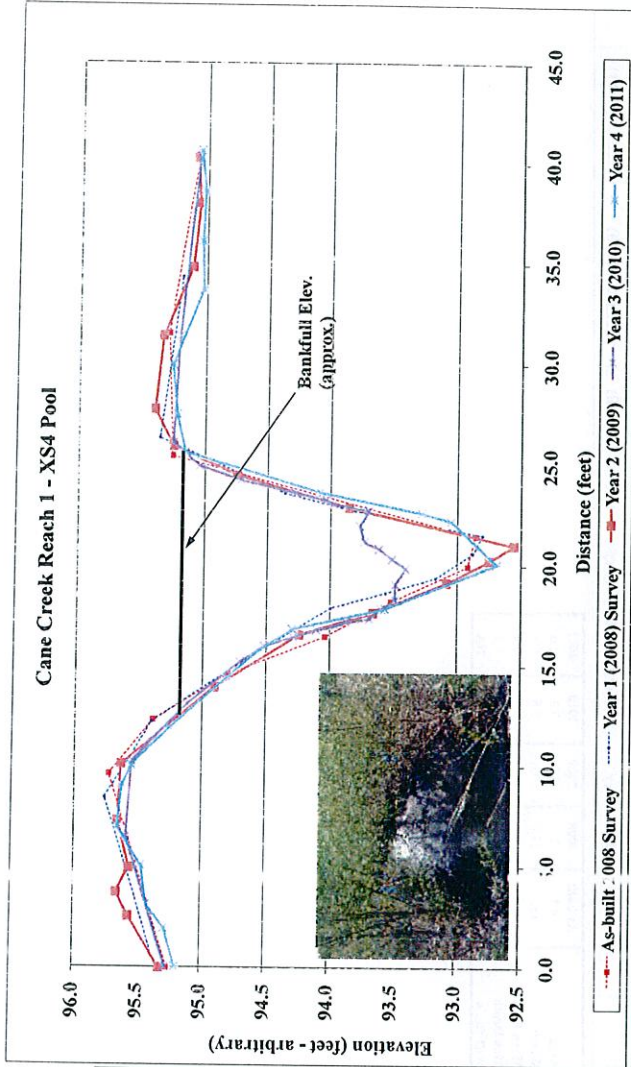
As-built		2008 Survey		2009 Survey		2010 Survey		2011 Survey	
Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation
0.0	96.0	0.0	96.0	-1.0	96.1	0.0	96.0	-0.6	96.0
9.1	96.2	9.5	96.2	2.2	96.1	8.3	96.3	3.6	96.1
13.6	96.1	14.0	95.9	5.8	96.1	13.0	96.1	10.3	96.3
15.4	95.5	18.0	94.6	8.2	96.4	14.7	95.7	13.4	95.9
18.2	94.4	19.1	94.4	10.9	96.3	15.8	95.5	15.2	95.5
20.2	94.5	20.4	94.6	12.8	96.1	17.1	94.9	16.1	95.2
21.8	94.4	22.1	94.5	15.3	95.3	17.7	94.8	17.4	95.0
26.6	96.2	23.2	95.0	16.8	95.1	18.2	94.6	17.9	94.6
31.1	96.1	27.1	96.2	17.9	94.7	18.9	94.4	18.6	94.3
36.9	95.4	32.0	96.2	19.8	94.4	19.8	94.2	19.5	94.3
		36.5	95.6	21.1	94.6	20.7	94.2	20.2	94.3
				23.1	95.0	21.5	94.4	20.8	94.4
				26.7	96.1	22.0	94.6	21.4	94.5
				28.0	96.1	22.6	94.8	22.2	94.6
				30.8	96.2	23.4	94.8	22.7	94.9
				36.7	95.4	24.1	95.1	23.8	95.1
						24.7	95.7	25.6	95.7
						25.7	95.8	27.8	96.2
						27.8	96.2	31.7	96.1
						31.5	96.1	35.0	95.6
						33.4	96.0	37.2	95.4
						37.2	95.4		



	As-built	2008	2009	2010	2011
Area	13.6	11.3	12.5	11.9	11.7
Width	12.9	12.2	13.8	13.0	13.3
Mean Depth	1.1	0.9	0.9	0.9	0.9
Max Depth	1.7	1.5	1.6	1.7	1.6
W/D Ratio	12.2	13.3	15.1	14.1	15.2

Project Name Cane Creek
 Cross Section R1-XS4
 Feature Pool
 Date 4/22/11
 Crew Dean, Perkinson

As-built		2008 Survey		2009 Survey		2010 Survey		2011 Survey	
Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation
0.0	95.3	0.0	95.3	0.0	95.3	0.0	95.3	0.0	95.2
9.6	95.7	8.4	95.8	2.5	95.6	6.5	95.6	1.9	95.3
12.3	95.4	12.2	95.4	3.7	95.7	10.2	95.6	3.1	95.4
14.6	94.8	15.0	94.7	5.0	95.6	13.1	95.1	5.0	95.5
16.5	94.0	17.9	94.0	7.3	95.7	15.2	94.7	6.9	95.7
18.2	93.5	18.6	93.6	10.1	95.6	16.0	94.5	9.0	95.6
20.0	92.9	19.4	93.2	13.9	94.9	16.4	94.3	10.0	95.6
21.5	92.9	20.6	92.9	16.6	94.2	16.8	94.1	11.9	95.3
25.4	95.3	21.5	92.8	17.7	93.7	17.0	94.0	14.4	94.8
31.5	95.3	22.7	93.8	19.2	93.1	17.2	93.9	15.7	94.6
40.4	95.1	23.6	94.4	20.3	92.7	17.4	93.7	16.8	94.3
		26.3	95.4	21.0	92.6	17.8	93.6	17.8	93.6
		34.3	95.2	22.9	93.9	18.3	93.5	20.1	92.7
				24.5	94.7	19.1	93.5	22.2	93.0
				25.9	95.2	19.9	93.4	22.6	93.3
				27.7	95.4	20.3	93.5	23.6	94.1
				31.4	95.3	20.8	93.6	25.6	95.2
				34.8	95.1	21.2	93.7	27.5	95.2
				38.0	95.1	22.0	93.8	29.9	95.3
				40.3	95.1	22.7	93.7	33.7	95.0
						23.0	94.0	36.1	95.0
						23.3	94.0	38.6	95.0
						23.6	94.3	40.6	95.1
						24.2	94.7		
						24.9	95.0		
						26.1	95.2		
						31.4	95.2		
						40.3	95.1		

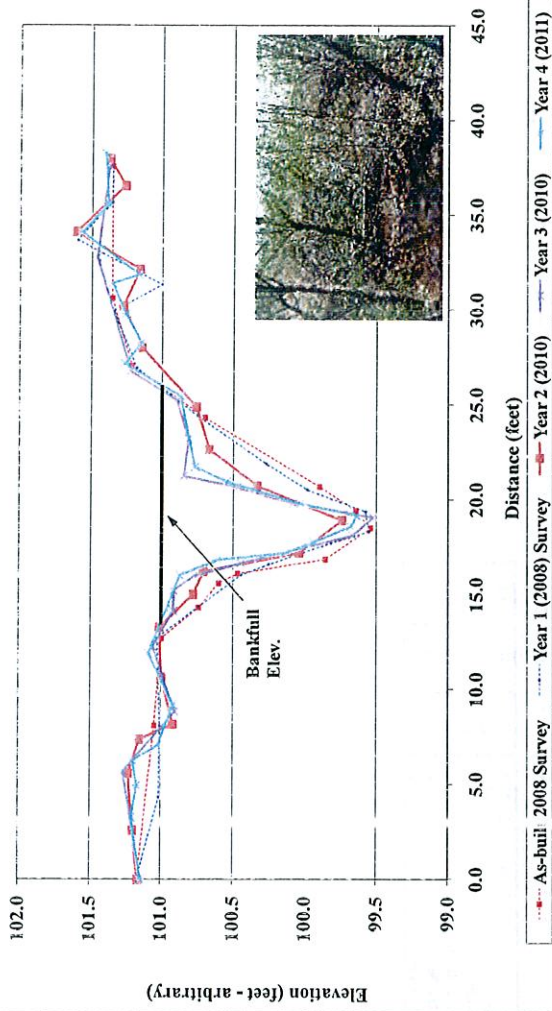


	As-built	2008 Survey	2009 Survey	Year 1 (2008 Survey)	Year 2 (2009)	Year 3 (2010)	Year 4 (2011)
Area	16.4	16.3	16.6	16.6	13.5	15.8	NA
Width	12.6	13.9	13.9	13.8	13.8	13.3	NA
Mean Depth	1.3	1.2	1.2	1.0	1.2	1.2	NA
Max Depth	2.4	2.6	2.7	1.8	2.5	2.5	NA
W/D Ratio	NA	NA	NA	NA	NA	NA	NA

Project Name Cane Creek
 Cross Section RZ-XS1
 Feature Pool
 Date 4/22/11
 Crew Dean, Perkinson

As-built 2008 Survey Station	2008 Survey		2009 Survey		2010 Survey		2011 Survey		
	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	
0.0	101.2	0.0	101.2	0.0	101.2	0.0	101.1	0.0	101.1
8.1	101.0	4.3	101.0	2.6	101.2	5.7	101.3	3.2	101.2
12.7	101.0	8.1	101.0	5.6	101.2	8.8	100.9	4.9	101.2
14.3	100.7	12.7	101.0	7.4	101.1	12.2	101.1	6.2	101.2
15.6	100.6	16.0	100.4	8.2	100.9	14.1	100.9	7.0	101.0
16.1	100.5	16.6	100.2	10.7	101.0	15.2	100.9	9.2	100.9
16.9	99.9	17.7	99.8	13.3	101.0	16.0	100.8	11.9	101.1
18.5	99.5	18.3	99.5	15.0	100.8	16.6	100.4	14.2	101.0
19.4	99.6	19.4	99.6	16.2	100.7	18.1	99.7	16.0	100.9
20.7	99.9	20.5	100.0	17.2	100.0	19.1	99.5	16.8	100.6
24.3	100.7	21.9	100.3	18.9	99.7	19.8	100.1	17.2	100.1
27.0	101.2	24.4	100.7	20.7	100.3	20.6	100.5	17.7	99.9
30.6	101.3	26.9	101.2	22.6	100.7	21.2	100.8	18.6	99.9
37.6	101.3	29.9	101.3	24.9	100.8	23.2	100.8	19.1	99.6
		31.3	101.0	28.0	101.1	25.2	100.9	19.8	100.0
		33.7	101.6	30.2	101.3	26.8	101.2	20.9	100.5
		35.6	101.4	32.1	101.2	32.7	101.5	21.7	100.8
		37.7	101.3	34.1	101.6	37.6	101.4	25.4	100.9
				36.5	101.3			27.1	101.3
				38.0	101.4			28.2	101.1
								29.8	101.3
								31.4	101.3
								31.8	101.2
								34.1	101.6
								35.6	101.4
								38.2	101.4

Cane Creek Reach 2 - XSI Pool

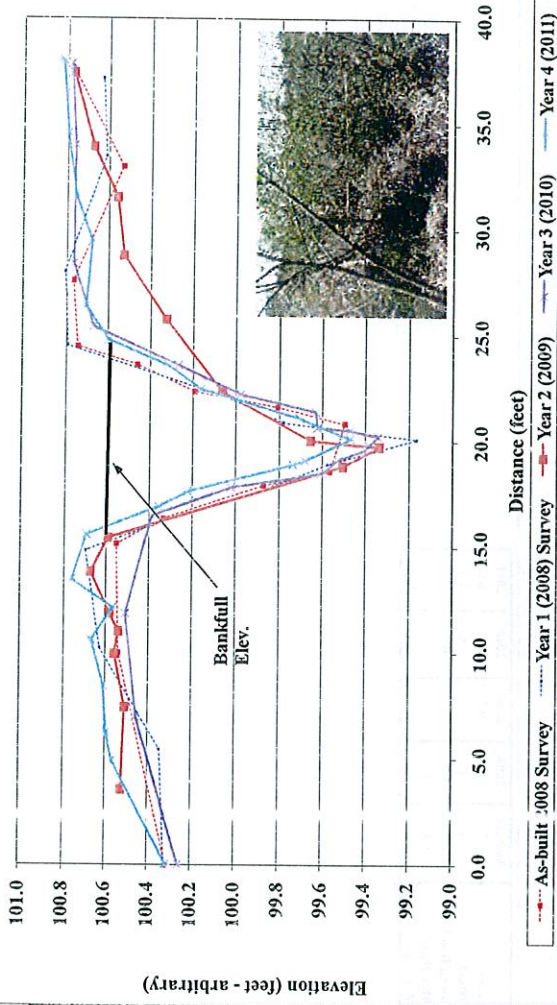


	2008	2009	2010	2011
As-built	9.3	8.6	6.7	5.8
Area	13.4	13.0	13.6	5.6
Width	0.7	0.7	0.5	0.7
Mean Depth	1.5	1.4	1.3	1.3
Max Depth	N/A	NA	NA	NA
W/D Ratio				

Project Name Cane Creek
 Cross Section RZ-XS2
 Feature Riffle
 Date 4/22/11
 Crew Dean, Perkinson

As-built		2008 Survey		2009 Survey		2010 Survey		2011 Survey	
Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation
0.0	100.3	0.0	100.3	3.6	100.5	0.0	100.3	0.0	100.3
10.0	100.5	5.4	100.3	7.4	100.5	7.0	100.5	4.9	100.6
15.2	100.5	10.2	100.6	10.0	100.6	11.8	100.5	6.2	100.6
16.4	100.3	14.8	100.7	11.0	100.5	16.5	100.4	8.4	100.6
17.9	99.9	16.5	100.2	11.9	100.6	17.8	100.0	10.6	100.7
18.6	99.6	17.5	99.9	13.8	100.7	18.5	99.6	12.1	100.6
20.9	99.5	18.2	99.7	15.4	100.6	19.1	99.5	13.4	100.8
21.7	99.8	18.9	99.6	18.9	99.5	19.6	99.4	15.6	100.7
22.4	100.2	20.1	99.2	19.8	99.3	19.9	99.4	16.9	100.4
23.6	100.5	20.9	99.8	20.1	99.7	20.3	99.3	17.6	100.2
24.5	100.7	22.2	100.1	22.5	100.1	20.6	99.5	18.9	99.7
27.6	100.8	24.5	100.8	25.8	100.3	20.7	99.6	19.1	99.7
33.0	100.5	28.0	100.8	28.8	100.5	21.4	99.6	20.1	99.5
37.4	100.8	33.5	100.6	31.5	100.6	22.2	100.0	21.1	99.7
		37.2	100.6	33.9	100.7	23.6	100.3	22.5	100.2
				37.4	100.8	25.4	100.7	25.6	100.3
						28.4	100.8	24.8	100.6
						34.0	100.8	26.4	100.7
						37.9	100.8	29.5	100.7
								31.7	100.8
								34.6	100.8
								38.0	100.8

Cane Creek Reach 2 - XS2 Riffle

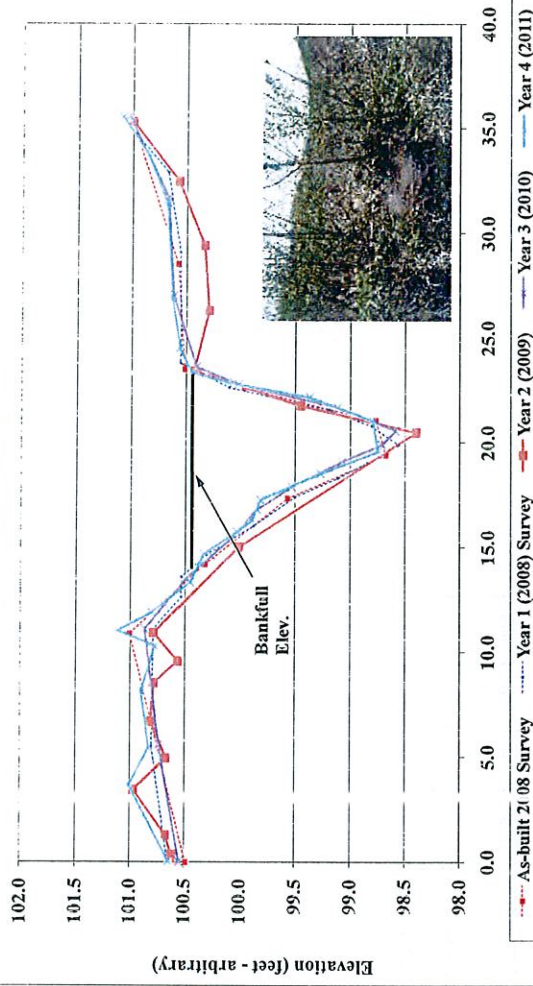


	2008	2009	2010	2011
Area	5.1	5.9	4.1	4.8
Width	9.2	13.3	7.7	9.1
Mean Depth	0.6	0.7	0.4	0.5
Max Depth	1.1	1.5	1.0	1.1
W/D Ratio	16.5	29.9	14.5	17.1

Project Name Cane Creek
 Cross Section R2-XS3
 Feature Pool
 Date 4/22/11
 Crew Dean, Perkinson

As-built		2008 Survey		2009 Survey		2010 Survey		2011 Survey	
Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation
0.0	100.5	0.0	100.6	-0.5	100.5	0.0	100.5	0.0	100.6
10.9	101.0	5.5	100.8	0.4	100.6	5.6	100.7	3.6	101.0
14.2	100.3	11.1	100.8	1.3	100.7	11.1	100.9	5.4	100.8
17.3	99.6	12.6	100.5	3.5	101.0	12.3	100.7	8.1	100.9
19.4	98.7	13.6	100.5	5.0	100.7	13.5	100.5	10.3	100.8
21.1	98.8	14.6	100.3	6.7	100.8	14.6	100.3	11.0	101.1
22.6	100.0	16.0	99.9	8.5	100.8	15.4	100.1	11.9	100.8
23.5	100.5	17.4	99.5	9.6	100.6	16.8	99.8	13.3	100.4
28.5	100.6	18.3	99.1	10.9	100.8	17.9	99.3	14.7	100.3
35.3	101.0	19.0	98.8	15.0	100.0	19.1	99.1	15.7	100.0
		19.9	98.6	20.5	98.4	19.9	98.7	16.2	99.9
		20.8	98.8	21.8	99.4	20.6	98.6	17.3	99.8
		21.6	99.2	23.4	100.4	21.7	99.1	18.5	99.3
		22.6	100.1	26.5	100.3	22.8	100.0	19.5	98.7
		23.8	100.5	29.4	100.3	23.6	100.4	21.0	98.8
		25.3	100.5	32.5	100.6	27.0	100.6	22.2	99.4
		29.1	100.6	35.3	101.0	31.7	100.7	22.8	100.1
		32.9	100.7			31.4	100.7	24.5	100.4
		35.2	101.0			35.6	101.0	26.8	100.6
								33.8	100.9
								35.5	101.1

Cane Creek Reach 2 - XS3 Pool

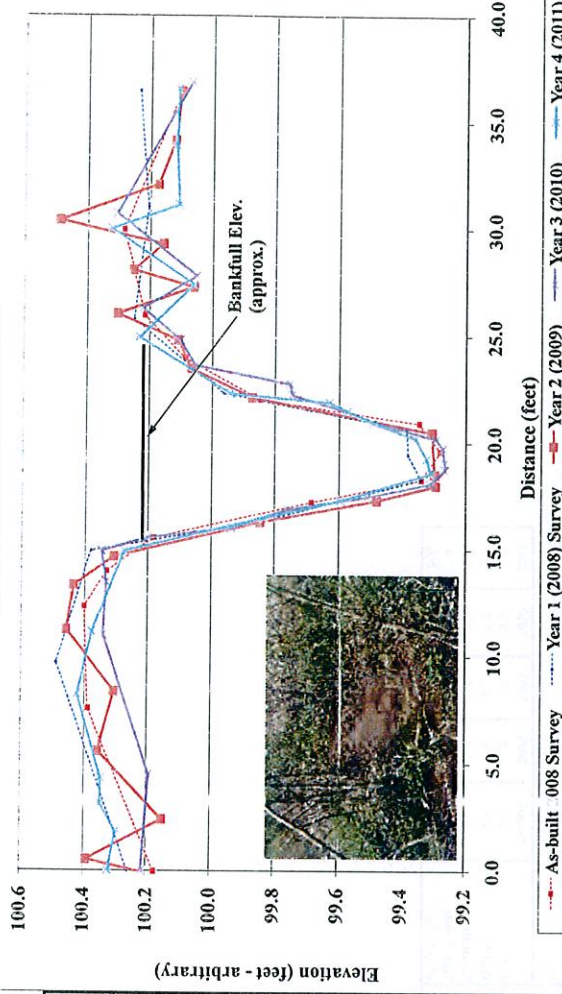


	As-built	2008	2009	2010	2011
Area	9.7	9.8	9.8	8.1	8.0
Width	10.2	11.2	10.5	9.6	9.4
Mean Depth	1.0	0.9	0.9	0.8	0.9
Max Depth	1.8	2.0	2.0	1.8	1.7
W/D Ratio	N/A	NA	NA	NA	NA

Project Name Cane Creek
 Cross Section R2-XS4
 Feature Riffle
 Date 4/22/11
 Crew Dean, Perkinson

As-built		2008 Survey		2009 Survey		2010 Survey		2011 Survey	
Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation
0.0	100.2	0.0	100.3	0.0	100.2	0.0	100.2	0.0	100.3
7.6	100.4	9.7	100.5	-1.7	100.3	4.5	100.2	1.8	100.3
12.3	100.4	14.9	100.4	-0.1	100.2	11.0	100.3	3.1	100.3
14.0	100.3	16.3	99.8	0.5	100.4	15.5	100.3	4.3	100.3
15.6	100.2	18.3	99.3	2.4	100.1	14.9	100.3	8.2	100.4
17.3	99.7	19.5	99.4	5.6	100.4	15.6	100.2	11.1	100.4
18.3	99.3	20.7	99.4	8.4	100.3	16.0	99.9	14.9	100.3
19.6	99.3	22.3	100.0	11.3	100.5	16.9	99.8	16.5	99.8
20.9	99.3	25.8	100.2	13.3	100.4	17.5	99.5	17.3	99.6
22.0	99.8	31.0	100.2	14.7	100.3	18.1	99.3	18.6	99.3
24.0	100.1	36.5	100.2	16.3	99.8	18.8	99.5	19.3	99.5
26.0	100.2			17.3	99.5	19.1	99.3	20.2	99.4
30.0	100.3			18.0	99.3	19.8	99.3	20.9	99.5
36.5	100.1			18.6	99.3	20.2	99.3	21.9	99.6
				20.5	99.3	20.9	99.5	22.3	99.9
				22.1	99.9	21.5	99.6	24.9	100.2
				23.5	100.1	22.3	99.7	27.4	100.1
				24.8	100.1	22.8	99.8	30.0	100.3
				26.0	100.3	23.6	100.1	31.1	100.1
				27.3	100.1	24.8	100.1	33.9	100.1
				28.1	100.3	26.3	100.2	36.6	100.1
				29.5	100.2	27.8	100.0		
				30.4	100.5	30.7	100.3		
				32.1	100.2	36.9	100.1		
				34.2	100.1				
				36.5	100.1				

Cane Creek Reach 2 - XS4 Riffle

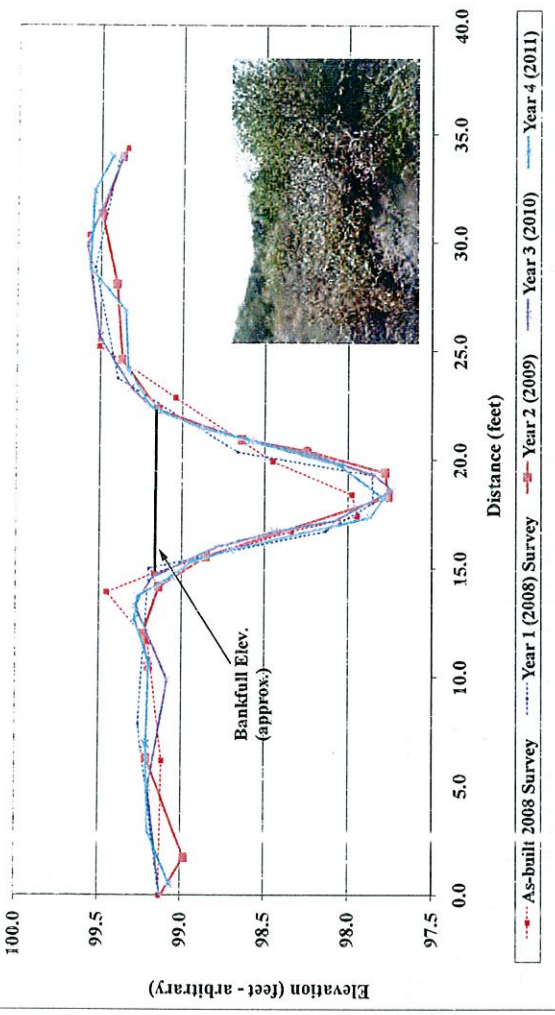


	As-built	2008 Survey	2009 Survey	Year 1 (2008) Survey	Year 2 (2009)	Year 3 (2010)	Year 4 (2011)
Area	3.7	5.0	5.0	3.8	5.0	5.0	5.0
Width	8.1	10.5	10.3	7.9	9.8	9.8	9.8
Mean Depth	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Max Depth	0.8	0.9	0.9	0.8	0.9	0.8	0.9
W/D Ratio	17.8	21.9	21.2	16.2	19.4	19.4	19.4

Project Name Cane Creek
 Cross Section R3-XS5
 Feature Pool
 Date 4/22/11
 Crew Dean, Perkinson

As-built 2008 Survey Station	Elevation	2008 Survey		2009 Survey		2010 Survey		2011 Survey	
		Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation
0.0	99.1	0.0	99.1	-0.2	99.1	-0.3	99.1	0.5	99.1
6.2	99.1	7.9	99.3	1.7	99.0	4.9	99.2	2.9	99.2
11.7	99.2	15.0	99.2	6.3	99.2	9.9	99.1	6.9	99.2
13.9	99.5	16.7	98.1	10.5	99.2	13.3	99.3	10.7	99.2
14.8	99.2	18.0	97.8	12.0	99.2	14.6	99.2	12.6	99.3
16.7	98.5	19.3	97.9	14.2	99.1	16.0	98.8	13.7	99.3
17.4	97.9	20.4	98.7	15.6	98.9	16.7	98.4	14.6	99.1
18.4	98.0	23.7	99.4	18.3	97.8	17.2	98.1	15.3	98.9
19.9	98.4	28.9	99.5	19.4	97.8	17.8	97.9	15.8	98.7
22.9	99.0	33.8	99.4	20.4	98.2	18.6	97.7	17.4	97.9
25.2	99.5			20.9	98.6	19.3	97.8	18.2	97.8
30.3	99.6			22.3	99.1	20.2	98.2	19.7	98.0
34.3	99.3			24.6	99.4	21.4	98.8	20.9	98.6
				28.1	99.4	22.3	99.2	21.2	98.8
				31.3	99.5	23.3	99.3	21.5	98.9
				33.9	99.4	29.9	99.6	24.1	99.5
						34.0	99.4	26.9	99.3
								28.8	99.6
								30.8	99.5
								31.9	99.5
								32.4	99.5
								33.9	99.4

Cane Creek Reach 3 - XS5 Pool

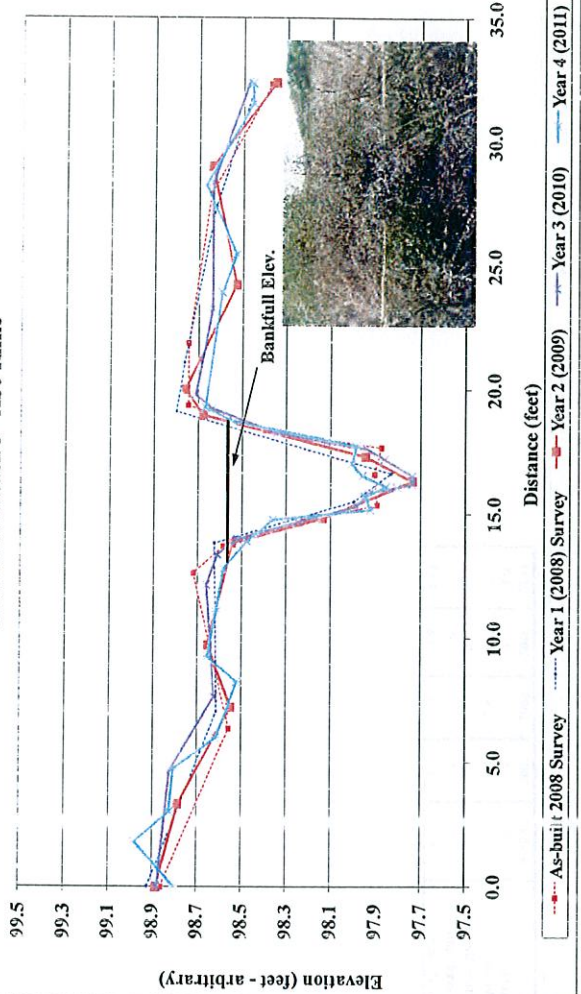


	As-built	2008	2009	2010	2011
Area	5.4	5.8	5.8	5.8	5.9
Width	8.7	7.8	8.1	7.7	8.1
Mean Depth	0.6	0.7	0.7	0.8	0.7
Max Depth	1.2	1.3	1.4	1.4	1.4
W/D Ratio	N/A	NA	NA	NA	NA

Cane Creek Reach 3 - XS6 Riffle

Project Name Cane Creek
 Cross Section R5-XS6
 Feature Riffle
 Date 4/22/11
 Crew Dean, Perkinson

As-built Station	2007 Survey		2008 Survey		2009 Survey		2010 Survey		2011 Survey	
	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation
0.0	98.9	0.0	98.9	0.0	98.9	0.0	98.9	0.0	98.8	
6.4	98.6	7.1	98.6	4.7	98.8	3.3	98.8	4.7	98.8	
12.6	98.7	13.8	98.6	7.2	98.5	7.2	98.7	3.0	98.8	
13.7	98.6	15.5	98.0	9.7	98.7	12.1	98.7	4.7	98.8	
14.7	98.2	16.6	97.8	13.8	98.5	13.4	98.6	6.0	98.6	
15.4	97.9	19.1	98.8	14.0	98.5	14.0	98.5	8.2	98.5	
16.6	97.9	21.1	98.8	14.2	98.4	14.2	98.4	9.2	98.7	
17.7	97.9	27.4	98.6	14.7	98.2	14.7	98.2	11.1	98.6	
18.4	98.4	32.0	98.5	15.3	98.0	15.3	98.0	12.8	98.6	
19.4	98.7			15.8	97.9	20.0	98.8	13.9	98.5	
21.9	98.7			24.2	98.5	16.1	97.8	14.7	98.4	
27.9	98.6			29.0	98.6	16.2	97.7	15.2	97.9	
32.3	98.4			32.4	98.3	16.5	97.7	15.7	97.9	
						17.2	97.9	16.1	97.9	
						17.6	97.9	16.5	98.0	
						17.9	98.1	17.0	98.0	
						18.3	98.3	17.7	98.0	
						19.2	98.6	18.7	98.5	
						19.8	98.7	19.2	98.7	
						23.2	98.6	23.9	98.6	
						28.5	98.6	25.4	98.5	
						32.4	98.5	28.2	98.7	
								31.5	98.5	
								32.3	98.5	

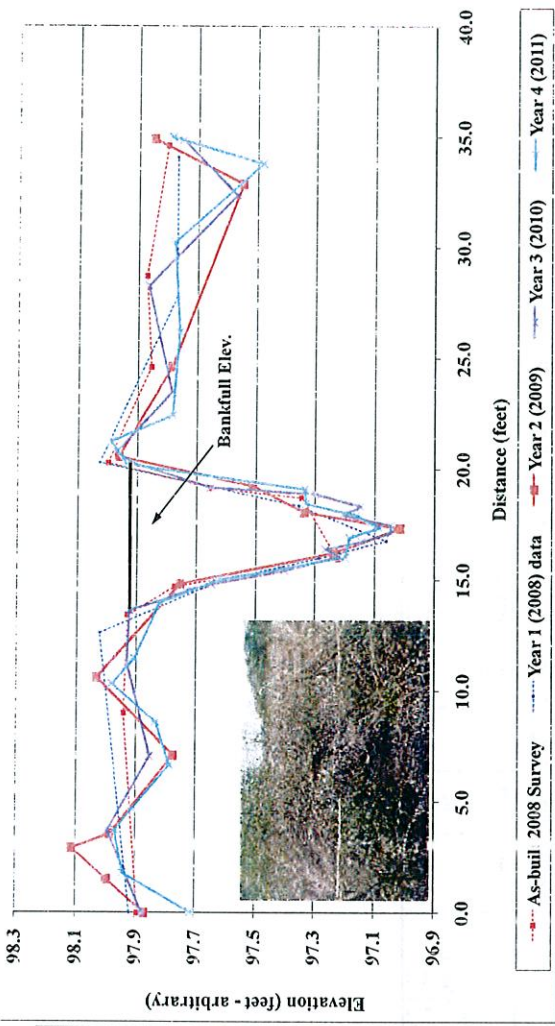


	2008	2009	2010	2011
As-built	3.3	2.1	2.2	2.1
Area	6.6	4.8	5.0	5.7
Width	0.5	0.4	0.4	0.5
Mean Depth	0.8	0.8	0.8	0.9
Max Depth	13.5	11.0	11.1	12.4
W/D Ratio				14.9

Project Name Cane Creek
 Cross Section R3>XS7
 Feature Riffle
 Date 4/22/11
 Crew Dean Perkinson

As-built		2008 Survey		2009 Survey		2010 Survey		2011 Survey	
Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation
0.0	97.9	0.0	97.9	0.0	97.9	0.0	97.9	0.0	97.7
9.0	97.9	12.6	98.0	1.5	98.0	3.7	98.0	1.8	97.9
13.4	97.9	15.0	97.6	2.9	98.1	7.0	97.9	3.7	98.0
14.7	97.8	16.0	97.3	3.6	98.0	11.2	97.9	4.7	97.9
16.0	97.2	16.8	97.1	7.1	97.8	13.6	97.9	6.6	97.8
18.7	97.3	18.3	97.4	10.6	98.0	14.2	97.8	8.6	97.8
19.2	97.6	20.3	98.0	14.8	97.8	14.5	97.7	10.3	98.0
20.3	98.0	27.7	97.8	16.2	97.2	14.8	97.6	11.4	97.9
24.6	97.9	34.1	97.8	17.4	97.0	15.4	97.4	13.9	97.8
28.7	97.9			18.1	97.3	16.1	97.2	15.0	97.6
34.6	97.8			19.3	97.5	16.4	97.3	16.0	97.2
				20.6	98.0	16.7	97.1	16.9	97.2
				24.6	97.8	17.1	97.0	17.4	97.1
				32.9	97.5	17.5	97.0	17.9	97.2
				34.9	97.8	17.9	97.2	18.4	97.3
						18.3	97.1	19.1	97.3
						18.9	97.3	20.2	97.9
						19.2	97.7	21.2	98.0
						20.3	97.9	22.4	97.8
						20.8	98.0	26.2	97.8
						23.5	97.8	30.2	97.8
						28.3	97.9	33.8	97.5
						32.4	97.6	35.0	97.8
						34.9	97.8		

Cane Creek Reach 3 - XS7 Riffle

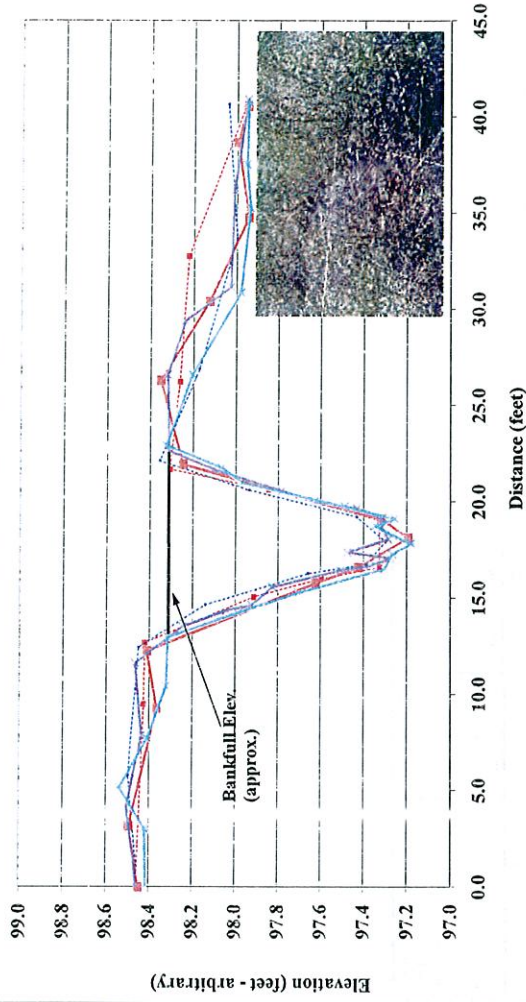


	As-built	2008 Survey	2009	2010	2011
Area	2.7	3.5	3.4	3.2	3.0
Width	6.6	7.4	8.8	6.6	7.6
Mean Depth	0.4	0.5	0.4	0.5	0.4
Max Depth	0.7	0.9	0.9	0.9	0.8
W/D Ratio	16.0	16.1	22.9	13.8	19.5

Project Name Cane Creek
 Cross Section R4-XS1
 Feature Riffle
 Date 4/22/11
 Crew Dean, Perkinson

As-built		2008 Survey		2009 Survey		2010 Survey		2011 Survey	
Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation
0.0	98.5	0.0	98.4	0.0	98.4	-0.4	98.5	-0.4	98.4
9.5	98.4	5.8	98.5	3.2	98.5	4.1	98.5	3.0	98.4
12.7	98.4	12.4	98.4	9.3	98.4	7.9	98.4	5.1	98.5
15.1	97.9	14.6	98.1	12.3	98.4	11.6	98.5	7.7	98.4
16.0	97.6	16.3	97.7	15.8	97.6	13.5	98.2	10.4	98.3
16.6	97.3	16.7	97.4	16.6	97.4	14.3	98.0	12.9	98.3
19.0	97.3	17.9	97.3	18.1	97.2	14.6	97.9	14.2	98.0
20.6	97.8	19.2	97.4	19.1	97.3	15.6	97.8	15.2	97.7
21.7	98.3	20.6	97.9	21.9	98.2	16.4	97.5	16.5	97.3
26.2	98.3	22.1	98.4	26.3	98.3	16.7	97.4	17.2	97.3
32.8	98.2	26.9	98.2	30.4	98.1	17.1	97.3	17.8	97.2
40.7	98.0	33.7	98.0	34.8	97.9	17.4	97.5	18.2	97.3
		40.6	98.0	38.7	98.0	18.0	97.3	18.7	97.3
				40.5	97.9	18.6	97.3	19.1	97.3
						19.6	97.4	20.9	98.0
						20.0	97.6	21.7	98.1
						20.5	97.8	22.9	98.3
						21.7	98.1	26.6	98.2
						22.6	98.3	30.8	98.0
						26.6	98.3	35.2	97.9
						29.4	98.2	37.5	98.0
						31.1	98.0	40.7	97.9
						36.1	98.0		
						40.9	97.9		

Cane Creek Reach 4 - XS1 Riffle

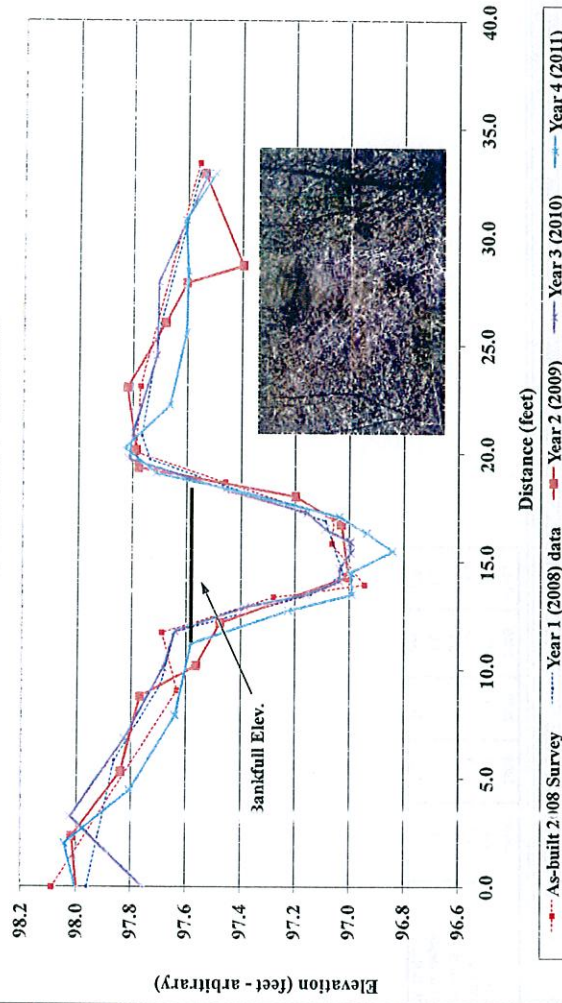


As-built 2008 Survey		Year 1 (2008) Survey		Year 2 (2009) Survey		Year 3 (2010) Survey		Year 4 (2011) Survey	
Area	Width	Area	Width	Area	Width	Area	Width	Area	Width
5.2	8.5	5.2	9.0	5.2	9.0	5.2	9.0	5.2	9.0
0.6	1.0	0.6	1.1	0.6	1.1	0.6	1.1	0.6	1.1
13.8	16.1	13.8	16.1	13.8	16.1	13.8	16.1	13.8	16.1

Project Name Cane Creek
 Cross Section R4-XS2
 Feature Riffle
 Date 4/22/11
 Crew Dean, Perkinson

As-built		2008 Survey		2009 Survey		2010 Survey		2011 Survey	
Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation
0.0	98.1	0.0	98.0	-0.6	98.0	-0.6	97.7	-0.6	98.0
9.1	97.6	5.8	97.9	2.3	98.0	3.2	98.0	2.0	98.0
11.7	97.7	9.4	97.7	5.3	97.8	6.8	97.8	4.4	97.8
13.4	97.3	11.8	97.6	8.8	97.8	10.1	97.7	7.9	97.6
14.0	96.9	13.5	97.1	10.2	97.6	11.8	97.6	11.2	97.6
15.9	97.1	14.4	97.0	12.2	97.5	12.9	97.4	12.7	97.2
17.0	97.1	16.9	97.1	14.3	97.0	13.5	97.2	13.5	97.0
18.7	97.5	19.7	97.7	16.7	97.0	14.1	97.0	14.5	97.0
20.1	97.8	20.8	97.8	18.0	97.2	14.7	97.0	15.5	96.8
23.1	97.8	26.0	97.7	19.4	97.8	15.4	97.0	16.3	96.9
33.4	97.6	32.9	97.6	20.2	97.8	15.9	97.0	17.1	97.0
				23.1	97.8	16.5	97.1	18.2	97.4
				26.0	97.7	17.3	97.2	19.0	97.7
				27.9	97.6	18.3	97.5	20.2	97.8
				28.7	97.4	19.7	97.8	22.2	97.7
				32.9	97.5	20.9	97.8	25.6	97.6
						24.5	97.7	28.4	97.6
						27.9	97.7	30.8	97.6
						32.9	97.5	32.9	97.5

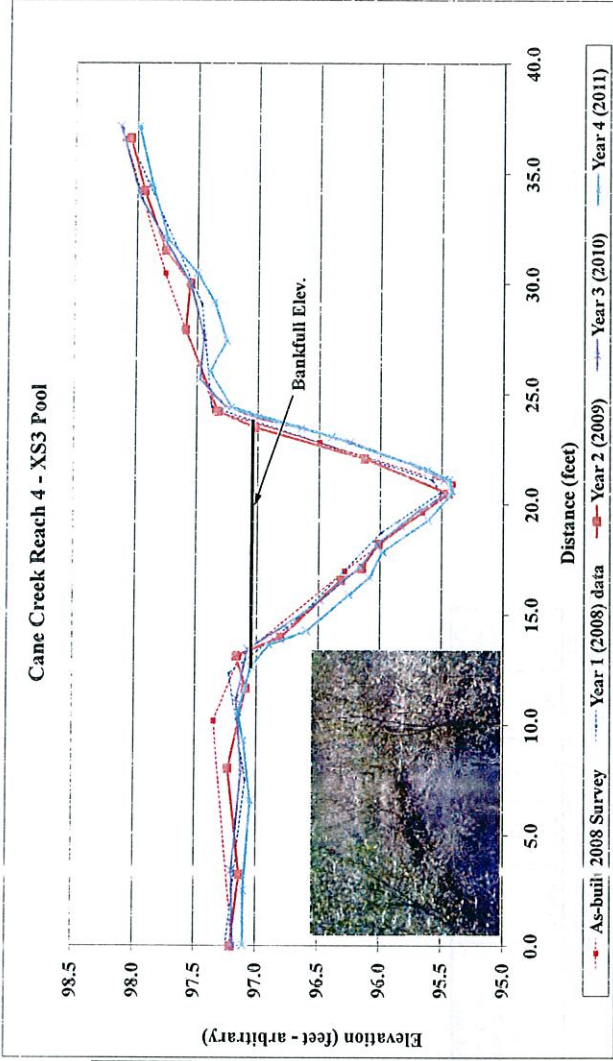
Cane Creek Reach 4 - XS2 Riffle



	As-built	2008	2009	2010	2011
Area	3.5	3.1	4.7	3.0	3.4
Width	7.9	7.5	10.5	7.2	7.5
Mean Depth	0.4	0.4	0.4	0.4	0.4
Max Depth	0.7	0.6	0.8	0.6	0.7
W/D Ratio	17.7	18.5	23.3	17.6	16.7

Project Name Cane Creek
 Cross Section R4-XS3
 Feature Pool
 Date 4/22/11
 Crew Duon, Perkinson

As-built Station	2008 Survey		2009 Survey		2010 Survey		2011 Survey		
	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	
0.0	97.2	0.0	97.2	0.0	97.2	0.0	97.1	0.0	97.1
10.2	97.3	7.5	97.1	3.2	97.1	3.4	97.2	2.5	97.1
13.0	97.1	12.3	97.2	8.0	97.2	7.8	97.1	6.6	97.0
17.0	96.3	14.8	96.7	11.7	97.1	11.2	97.2	9.3	97.1
19.7	95.7	18.7	96.0	13.1	97.2	13.4	97.1	10.6	97.0
21.0	95.4	20.5	95.5	14.0	96.8	14.5	96.8	12.6	97.0
22.8	96.5	21.1	95.6	16.6	96.3	15.6	96.5	13.6	96.9
24.2	97.3	24.4	97.4	17.1	96.1	17.2	96.2	14.2	96.6
30.5	97.8	29.1	97.5	18.2	96.0	18.2	96.0	15.9	96.3
36.6	98.1	36.6	98.1	20.5	95.4	19.0	95.8	16.6	96.1
				22.1	96.1	19.7	95.7	17.8	96.0
				23.5	97.0	20.6	95.4	19.3	95.6
				24.2	97.3	21.1	95.5	20.5	95.4
				27.9	97.6	21.8	95.7	21.1	95.4
				30.0	97.6	22.8	96.2	21.5	95.6
				31.5	97.8	23.4	96.6	23.0	96.4
				34.2	97.9	23.9	97.0	24.4	97.2
				36.6	98.1	24.4	97.3	26.0	97.4
						25.6	97.5	27.4	97.3
						27.6	97.4	29.1	97.4
						29.9	97.5	30.5	97.5
						34.0	98.0	32.0	97.7
						37.1	98.1	34.5	97.9
						37.1	98.0	37.1	98.0

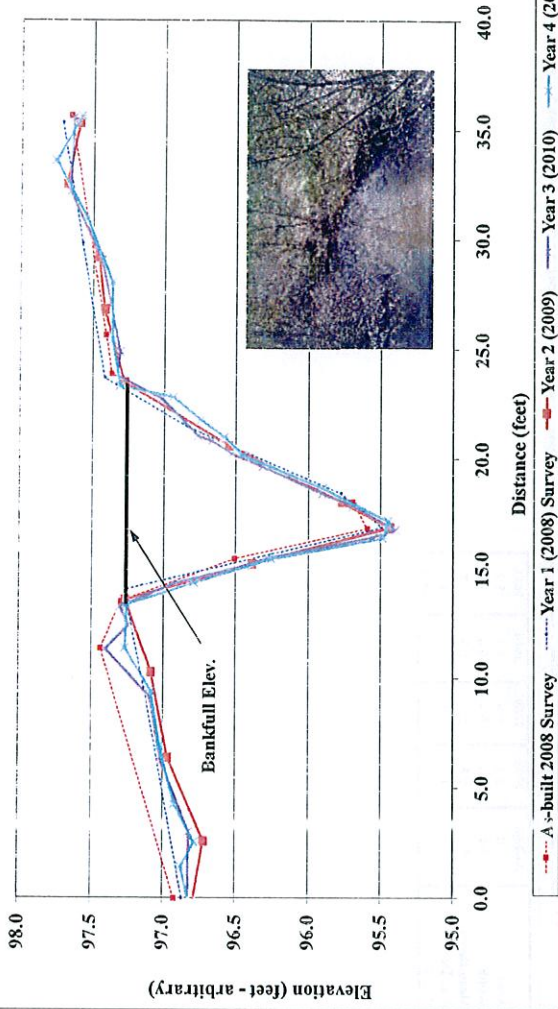


	As-built	2008 Survey	Year 1 (2008) data	Year 2 (2009)	Year 3 (2010)	Year 4 (2011)
Area	9.5	10.3	9.7	10.1	10.1	10.1
Width	10.9	11.8	10.7	11.3	11.3	11.3
Mean Depth	0.9	0.9	0.9	0.9	0.9	0.9
Max Depth	1.7	1.7	1.7	1.7	1.6	1.6
W/D Ratio	N/A	N/A	N/A	N/A	N/A	N/A

Project Name Cane Creek
 Cross Section R4-XS4
 Feature Pool
 Date 4/22/11
 Crew Dean Perkinson

As-built 2008 Survey Station Elevation	2008 Survey		2009 Survey		2010 Survey		2011 Survey		
	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	
0.0	96.9	0.0	96.9	-0.5	96.8	-0.5	96.8	-0.5	96.8
11.4	97.4	9.4	97.1	2.6	96.7	3.0	96.8	1.4	96.9
13.5	97.3	14.0	97.3	6.4	97.0	6.2	97.0	2.5	96.8
15.5	96.5	16.9	95.5	10.3	97.1	9.1	97.1	4.2	96.9
16.8	95.6	18.4	95.8	13.6	97.3	11.3	97.4	6.9	97.0
18.0	95.7	21.4	96.8	15.2	96.4	12.4	97.2	9.4	97.1
20.5	96.5	23.7	97.4	16.9	95.4	13.2	97.3	11.4	97.3
23.9	97.4	29.8	97.6	18.0	95.8	14.3	96.9	13.4	97.2
25.7	97.4	35.3	97.7	20.6	96.5	15.1	96.4	14.3	96.8
35.7	97.7			23.5	97.3	15.5	96.3	15.4	96.2
				26.8	97.4	16.4	95.5	16.4	95.5
				29.2	97.5	16.8	95.4	17.2	95.4
				32.5	97.7	17.9	95.7	18.7	95.9
				35.3	97.6	18.4	95.9	20.2	96.4
						19.6	96.3	21.0	96.6
						20.2	96.5	21.7	96.7
						20.8	96.7	22.8	96.9
						21.0	96.8	23.3	97.3
						22.7	97.0	25.4	97.4
						23.8	97.3	28.0	97.4
						24.9	97.3	30.9	97.5
						29.0	97.4	33.6	97.8
						32.2	97.7	35.6	97.6
						35.5	97.6		

Cane Creek Reach 4 - XS4 Pool

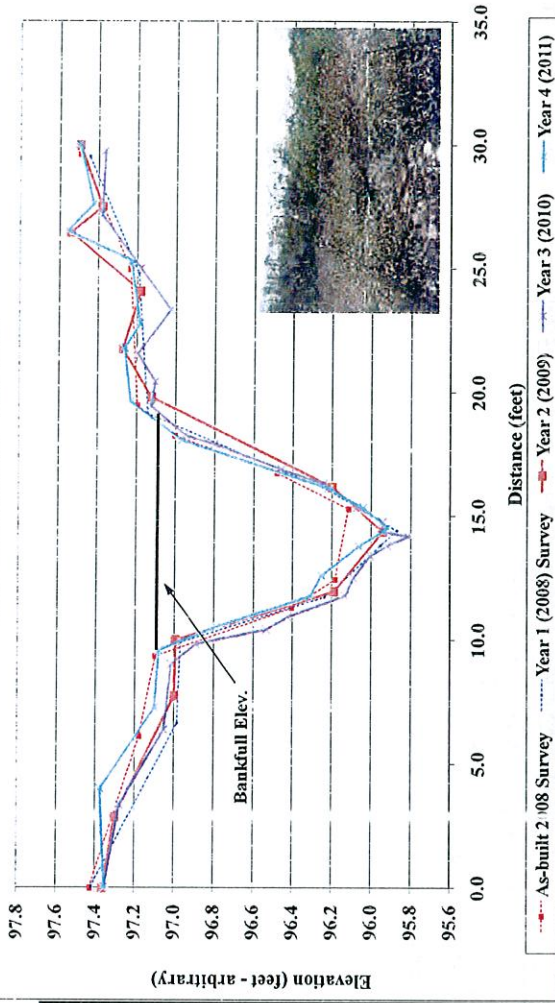


	As-built	2008	2009	2010	2011
Area	8.5	8.3	8.7	9.0	9.3
Width	10.1	9.1	9.8	10.4	10.0
Mean Depth	0.8	0.9	0.9	0.9	0.9
Max Depth	1.7	1.8	1.8	1.9	1.8
W/D Ratio	NA	NA	NA	NA	NA

Project Name Cane Creek
 Cross Section R3-XSS
 Feature Riffle
 Date 4/21/11
 Crew Dean, Perkinson

As-built		2008 Survey		2009 Survey		2010 Survey		2011 Survey	
Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation
0.0	97.4	0.0	97.4	0.0	97.4	0.0	97.4	0.0	97.4
6.1	97.2	6.6	97.0	2.9	97.3	3.3	97.3	4.0	97.4
9.5	97.1	9.9	97.0	7.7	97.0	6.4	97.1	7.2	97.1
11.3	96.4	11.7	96.2	10.0	97.0	9.0	97.0	9.6	97.1
12.5	96.2	12.3	96.2	12.0	96.2	9.8	96.9	10.5	96.8
15.3	96.1	13.8	95.9	14.4	95.9	10.4	96.5	11.8	96.3
16.7	96.5	14.4	95.9	16.2	96.2	10.9	96.4	12.6	96.2
18.2	97.0	16.0	96.2	19.8	97.1	11.8	96.1	13.8	96.1
19.5	97.2	19.1	97.1	21.8	97.3	12.5	96.1	14.5	95.9
25.0	97.2	24.8	97.2	24.1	97.2	13.4	96.0	15.3	96.0
29.6	97.5	29.5	97.4	26.5	97.5	13.8	95.9	16.1	96.2
				27.5	97.4	14.2	95.8	18.0	97.0
				30.0	97.5	14.4	95.9	19.6	97.2
						15.4	96.1	21.8	97.3
						16.3	96.2	22.8	97.2
						16.9	96.5	25.2	97.2
						17.9	96.8	26.5	97.6
						18.3	96.9	27.6	97.4
						19.4	97.1	30.0	97.5
						20.4	97.1		
						21.5	97.2		
						23.3	97.0		
						25.0	97.2		
						27.2	97.4		
						29.7	97.4		

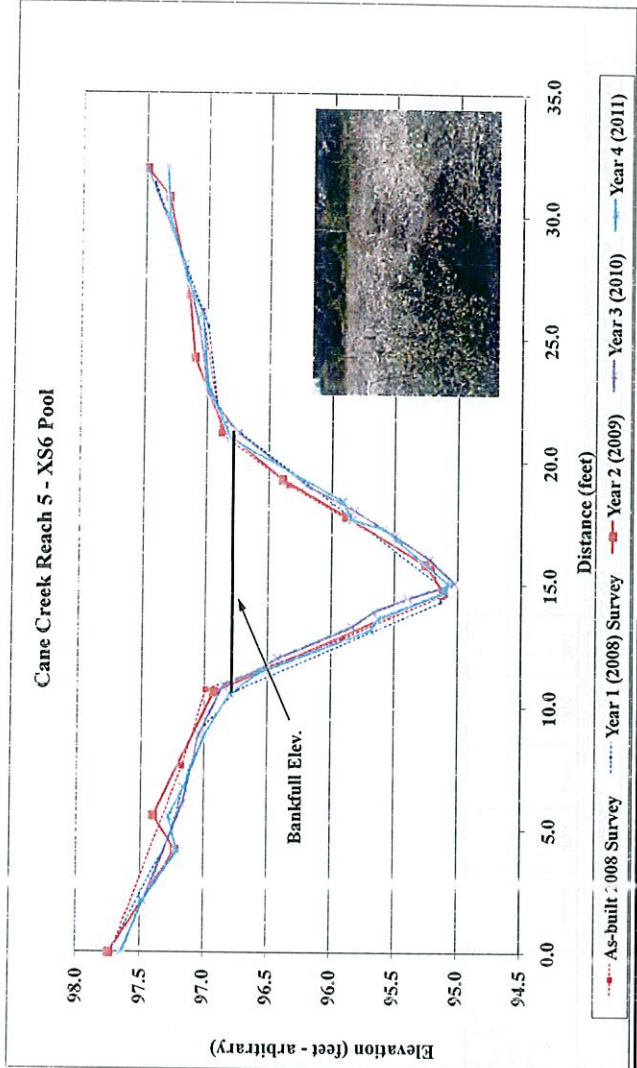
Cane Creek Reach 5 - XSS Riffle



	As-built	2008	2009	2010	2011
Area	6.0	5.5	5.9	6.4	5.9
Width	9.4	8.6	9.3	9.6	9.1
Mean Depth	0.6	0.6	0.6	0.7	0.7
Max Depth	1.0	1.1	1.1	1.2	1.2
W/D Ratio	14.9	13.4	14.5	14.5	13.9

Project Name Cane Creek
 Cross Section R3-XS6
 Feature Pool
 Date 4/21/11
 Crew Dean, Perkinson

As-built 2008 Survey Station Elevation	2008 Survey		2009 Survey		2010 Survey		2011 Survey		
	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	
0.0	97.7	0.0	97.7	0.0	97.7	0.0	97.6	0.0	97.6
7.6	97.2	-4.6	97.3	4.2	97.2	3.1	97.4	2.1	97.5
10.7	97.0	9.0	97.0	5.6	97.4	6.0	97.2	4.1	97.2
12.8	95.9	10.6	96.7	10.6	96.9	8.8	97.0	5.5	97.3
14.6	95.1	14.3	95.1	14.7	95.1	10.9	96.8	6.7	97.2
15.7	95.2	15.0	95.1	15.8	95.2	11.4	96.6	8.9	97.0
19.0	96.3	21.8	96.9	17.8	95.9	12.0	96.4	10.5	96.8
21.1	96.9	25.5	97.0	19.2	96.4	13.3	95.8	11.4	96.6
26.1	97.0	31.3	97.4	21.3	96.9	15.9	95.7	13.1	95.7
31.9	97.5			24.2	97.1	14.4	95.4	13.6	95.6
				26.8	97.1	15.0	95.0	14.7	95.1
				30.8	97.3	16.0	95.2	15.1	95.1
				31.9	97.5	17.0	95.5	16.8	95.5
						18.0	95.8	17.2	95.6
						19.0	96.2	17.6	95.8
						21.1	96.7	18.4	95.9
						22.7	97.0	20.9	96.8
						25.4	97.1	23.1	97.0
						28.0	97.2	26.0	97.0
						31.9	97.5	30.0	97.3
								32.0	97.3

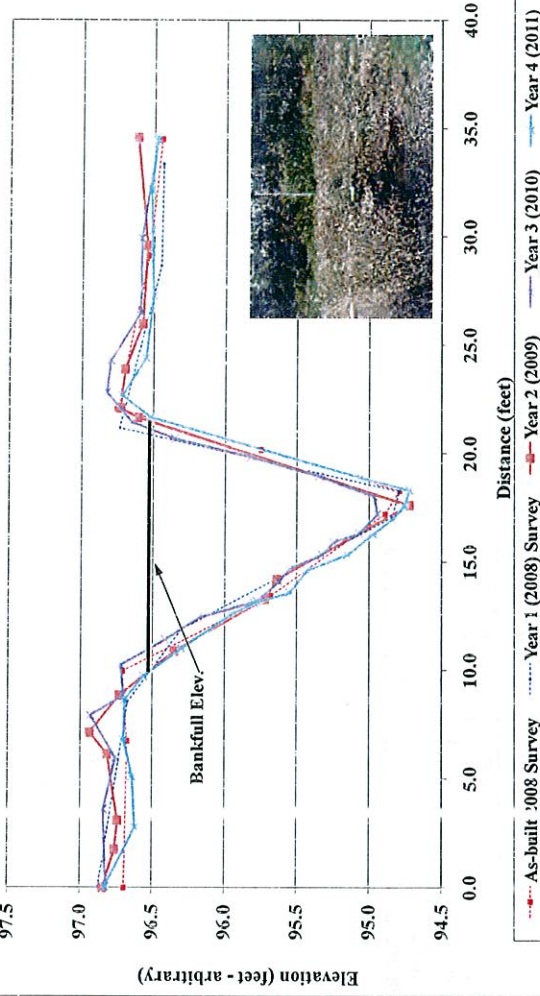


	As-built	2008	2009	2010	2011
Area	8.5	10.9	10.2	9.5	9.6
Width	9.6	12.1	11.6	10.8	10.5
Mean Depth	0.9	0.9	0.9	0.9	0.9
Max Depth	1.7	1.8	1.8	1.8	1.7
W/D Ratio	NA	NA	NA	NA	NA

Project Name: Cane Creek
 Cross Section: RS-XS7
 Feature: Pool
 Date: 4/21/11
 Crew: Dean, Perkinson

As-built		2008 Survey		2009 Survey		2010 Survey		2011 Survey	
Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation
0.0	96.7	0.0	96.9	0.0	96.8	0.0	96.8	0.0	96.8
6.8	96.7	8.5	96.7	1.8	96.8	3.6	96.8	2.7	96.6
10.0	96.7	11.9	96.3	3.1	96.7	6.0	96.8	5.1	96.6
13.5	95.7	17.0	94.8	6.1	96.8	7.9	96.9	6.8	96.7
17.2	94.9	18.3	94.8	7.1	96.9	8.8	96.7	8.6	96.7
18.3	94.8	21.2	96.7	8.9	96.7	10.2	96.7	9.7	96.6
20.2	95.7	28.6	96.4	10.9	96.3	11.4	96.4	11.0	96.3
22.1	96.7	33.4	96.4	13.3	95.7	12.4	96.2	12.6	96.0
29.1	96.5			14.2	95.6	13.2	95.8	13.1	95.8
34.5	96.4			17.6	94.7	14.1	95.6	13.6	95.5
				21.6	96.6	14.7	95.5	14.6	95.4
				22.1	96.7	15.3	95.3	15.3	95.1
				23.9	96.7	15.9	95.2	16.3	95.0
				26.0	96.6	16.3	95.1	17.0	94.8
				29.6	96.5	17.2	94.9	17.5	94.8
				34.6	96.6	18.0	95.0	18.3	94.7
						18.9	95.3	18.9	95.1
						19.8	95.8	21.7	96.5
						20.7	96.3	22.6	96.7
						21.4	96.7	24.4	96.6
						22.8	96.8	27.2	96.5
						24.3	96.8	30.2	96.5
						26.5	96.6	32.2	96.5
						29.9	96.6	34.6	96.5
						34.4	96.5		96.5

Cane Creek Reach 5 - XS7 Pool

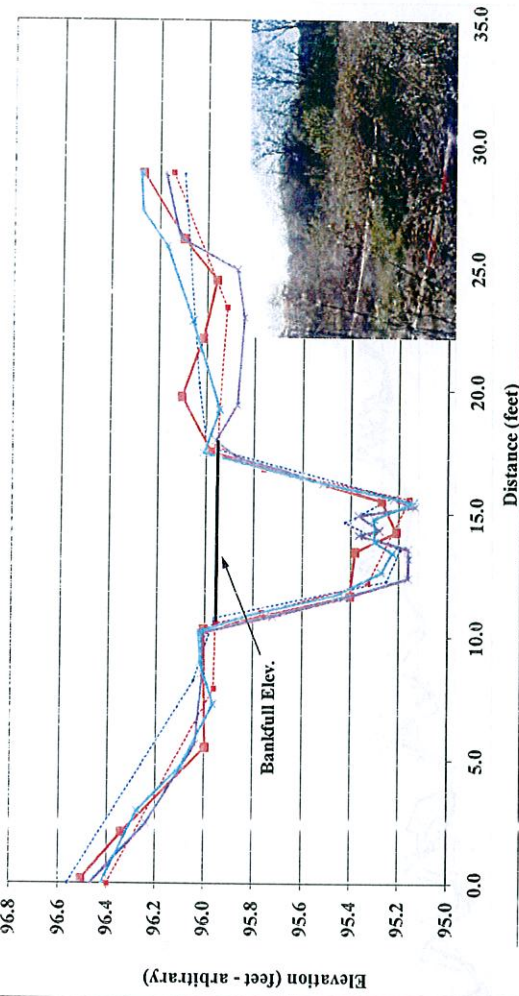


	As-built	2008	2009	2010	2011
Area	12.3	11.2	12.5	10.9	11.0
Width	11.8	12.5	13.2	11.4	11.6
Mean Depth	1.0	0.9	1.0	1.0	1.0
Max Depth	1.9	1.9	2.0	1.8	1.8
W/D Ratio	N/A	NA	NA	NA	NA

Project Name Cane Creek
 Cross Section RS-XS8
 Feature Riffle
 Date 4/13/11
 Crew Dean, Perkinson

As-built 2008 Survey Station	2008 Survey		2009 Survey		2010 Survey		2011 Survey		
	Station	Elevation	Station	Elevation	Station	Elevation	Station	Elevation	
0.0	96.4	0.0	96.6	0.2	96.5	-0.6	96.5	-0.6	96.5
7.9	96.0	8.2	96.0	2.1	96.3	2.4	96.2	2.9	96.3
10.6	96.0	10.7	96.0	5.5	96.0	5.6	96.0	4.7	96.1
11.0	95.8	12.3	95.2	10.3	96.0	8.5	96.0	7.3	96.0
12.2	95.3	13.3	95.2	11.7	95.4	10.2	96.0	8.9	96.0
15.6	95.2	14.6	95.4	13.5	95.4	10.8	95.7	10.2	96.0
16.8	95.8	15.7	95.2	14.3	95.2	11.6	95.4	10.8	95.8
17.7	96.0	17.7	96.0	15.5	95.3	12.4	95.2	11.7	95.5
23.4	95.9	20.3	96.0	17.5	96.0	13.2	95.2	12.6	95.3
28.8	96.1	28.7	96.1	19.7	96.1	13.6	95.2	13.4	95.2
				22.1	96.0	14.1	95.4	13.8	95.3
				24.5	96.0	14.3	95.3	14.8	95.3
				26.1	96.1	14.9	95.4	15.5	95.1
				28.8	96.3	15.3	95.1	16.5	95.6
						15.6	95.2	17.4	96.0
						16.2	95.5	19.2	95.9
						16.8	95.7	22.8	96.1
						17.2	95.9	25.8	96.2
						17.9	96.0	27.3	96.3
						19.4	95.9	28.8	96.3
						22.9	95.8		
						24.9	95.9		
						26.2	96.1		
						28.8	96.2		

Cane Creek Reach 5 - XS8 Riffle



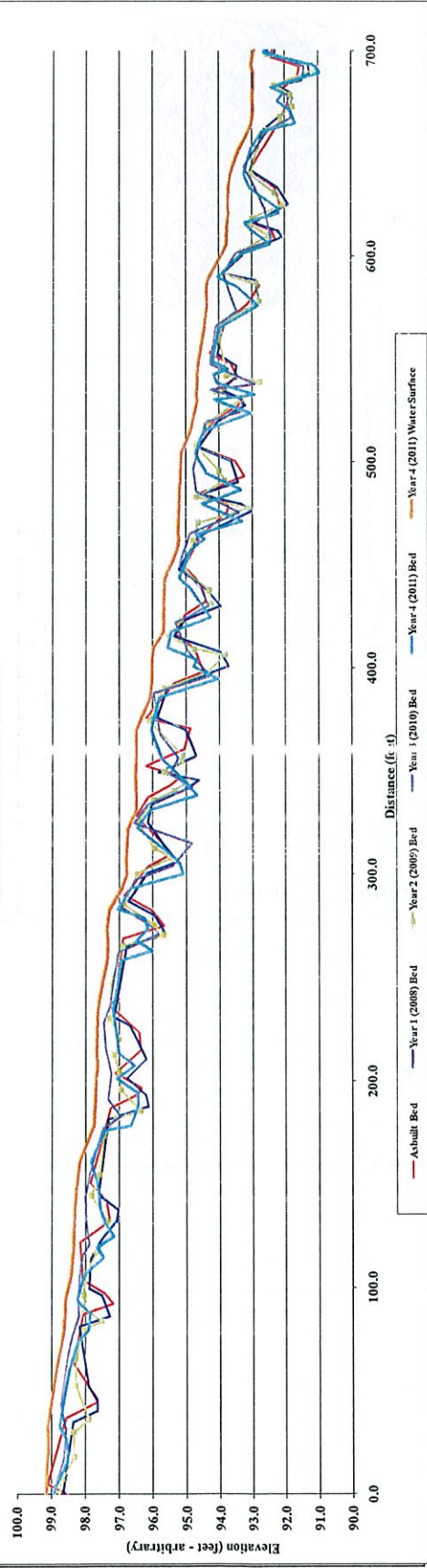
	2008	2009	2010	2011
As-built	3.6	3.8	3.8	3.9
Area	7.1	7.6	7.6	7.2
Width	0.5	0.5	0.5	0.5
Mean Depth	0.8	0.8	0.8	0.9
Max Depth	13.9	13.1	14.9	13.3
W/D Ratio				

Project Name: Cane Creek, AS-Built
 Reach: 1
 Profile:
 Feature:
 Date: 4/19/11
 Crew: Dean, Peckham

Station	2008 Survey		2009 Survey		2010 Survey		2011 Survey	
	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation	Station	Bed Elevation	Water Elevation
0.0	98.5	99.2	751.1	91.215091	92.2	716.4	92.2	716.4
4.0	99.1	99.2	751.3	91.359377	92.4	708.5	92.4	699.8
8.0	98.7	98.7	751.5	91.403663	92.6	698.1	92.6	692.2
12.0	98.7	98.7	751.7	91.447949	92.6	698.1	92.6	692.2
16.0	98.7	98.7	751.9	91.492235	92.6	698.1	92.6	692.2
20.0	98.3	98.7	752.1	91.536521	92.6	698.1	92.6	692.2
24.0	98.3	98.7	752.3	91.580807	92.6	698.1	92.6	692.2
28.0	98.3	98.7	752.5	91.625093	92.6	698.1	92.6	692.2
32.0	98.3	98.7	752.7	91.669379	92.6	698.1	92.6	692.2
36.0	98.3	98.7	752.9	91.713665	92.6	698.1	92.6	692.2
40.0	98.3	98.7	753.1	91.757951	92.6	698.1	92.6	692.2
44.0	98.3	98.7	753.3	91.802237	92.6	698.1	92.6	692.2
48.0	98.3	98.7	753.5	91.846523	92.6	698.1	92.6	692.2
52.0	98.3	98.7	753.7	91.890809	92.6	698.1	92.6	692.2
56.0	98.3	98.7	753.9	91.935095	92.6	698.1	92.6	692.2
60.0	98.3	98.7	754.1	91.979381	92.6	698.1	92.6	692.2
64.0	98.3	98.7	754.3	92.023667	92.6	698.1	92.6	692.2
68.0	98.3	98.7	754.5	92.067953	92.6	698.1	92.6	692.2
72.0	98.3	98.7	754.7	92.112239	92.6	698.1	92.6	692.2
76.0	98.3	98.7	754.9	92.156525	92.6	698.1	92.6	692.2
80.0	98.3	98.7	755.1	92.200811	92.6	698.1	92.6	692.2
84.0	98.3	98.7	755.3	92.245097	92.6	698.1	92.6	692.2
88.0	98.3	98.7	755.5	92.289383	92.6	698.1	92.6	692.2
92.0	98.3	98.7	755.7	92.333669	92.6	698.1	92.6	692.2
96.0	98.3	98.7	755.9	92.377955	92.6	698.1	92.6	692.2
100.0	98.3	98.7	756.1	92.422241	92.6	698.1	92.6	692.2
104.0	98.3	98.7	756.3	92.466527	92.6	698.1	92.6	692.2
108.0	98.3	98.7	756.5	92.510813	92.6	698.1	92.6	692.2
112.0	98.3	98.7	756.7	92.555099	92.6	698.1	92.6	692.2
116.0	98.3	98.7	756.9	92.599385	92.6	698.1	92.6	692.2
120.0	98.3	98.7	757.1	92.643671	92.6	698.1	92.6	692.2
124.0	98.3	98.7	757.3	92.687957	92.6	698.1	92.6	692.2
128.0	98.3	98.7	757.5	92.732243	92.6	698.1	92.6	692.2
132.0	98.3	98.7	757.7	92.776529	92.6	698.1	92.6	692.2
136.0	98.3	98.7	757.9	92.820815	92.6	698.1	92.6	692.2
140.0	98.3	98.7	758.1	92.865101	92.6	698.1	92.6	692.2
144.0	98.3	98.7	758.3	92.909387	92.6	698.1	92.6	692.2
148.0	98.3	98.7	758.5	92.953673	92.6	698.1	92.6	692.2
152.0	98.3	98.7	758.7	92.997959	92.6	698.1	92.6	692.2
156.0	98.3	98.7	758.9	93.042245	92.6	698.1	92.6	692.2
160.0	98.3	98.7	759.1	93.086531	92.6	698.1	92.6	692.2
164.0	98.3	98.7	759.3	93.130817	92.6	698.1	92.6	692.2
168.0	98.3	98.7	759.5	93.175103	92.6	698.1	92.6	692.2
172.0	98.3	98.7	759.7	93.219389	92.6	698.1	92.6	692.2
176.0	98.3	98.7	759.9	93.263675	92.6	698.1	92.6	692.2
180.0	98.3	98.7	760.1	93.307961	92.6	698.1	92.6	692.2
184.0	98.3	98.7	760.3	93.352247	92.6	698.1	92.6	692.2
188.0	98.3	98.7	760.5	93.396533	92.6	698.1	92.6	692.2
192.0	98.3	98.7	760.7	93.440819	92.6	698.1	92.6	692.2
196.0	98.3	98.7	760.9	93.485105	92.6	698.1	92.6	692.2
200.0	98.3	98.7	761.1	93.529391	92.6	698.1	92.6	692.2
204.0	98.3	98.7	761.3	93.573677	92.6	698.1	92.6	692.2
208.0	98.3	98.7	761.5	93.617963	92.6	698.1	92.6	692.2
212.0	98.3	98.7	761.7	93.662249	92.6	698.1	92.6	692.2
216.0	98.3	98.7	761.9	93.706535	92.6	698.1	92.6	692.2
220.0	98.3	98.7	762.1	93.750821	92.6	698.1	92.6	692.2
224.0	98.3	98.7	762.3	93.795107	92.6	698.1	92.6	692.2
228.0	98.3	98.7	762.5	93.839393	92.6	698.1	92.6	692.2
232.0	98.3	98.7	762.7	93.883679	92.6	698.1	92.6	692.2
236.0	98.3	98.7	762.9	93.927965	92.6	698.1	92.6	692.2
240.0	98.3	98.7	763.1	93.972251	92.6	698.1	92.6	692.2
244.0	98.3	98.7	763.3	94.016537	92.6	698.1	92.6	692.2
248.0	98.3	98.7	763.5	94.060823	92.6	698.1	92.6	692.2
252.0	98.3	98.7	763.7	94.105109	92.6	698.1	92.6	692.2
256.0	98.3	98.7	763.9	94.149395	92.6	698.1	92.6	692.2
260.0	98.3	98.7	764.1	94.193681	92.6	698.1	92.6	692.2
264.0	98.3	98.7	764.3	94.237967	92.6	698.1	92.6	692.2
268.0	98.3	98.7	764.5	94.282253	92.6	698.1	92.6	692.2
272.0	98.3	98.7	764.7	94.326539	92.6	698.1	92.6	692.2
276.0	98.3	98.7	764.9	94.370825	92.6	698.1	92.6	692.2
280.0	98.3	98.7	765.1	94.415111	92.6	698.1	92.6	692.2
284.0	98.3	98.7	765.3	94.459397	92.6	698.1	92.6	692.2
288.0	98.3	98.7	765.5	94.503683	92.6	698.1	92.6	692.2
292.0	98.3	98.7	765.7	94.547969	92.6	698.1	92.6	692.2
296.0	98.3	98.7	765.9	94.592255	92.6	698.1	92.6	692.2
300.0	98.3	98.7	766.1	94.636541	92.6	698.1	92.6	692.2
304.0	98.3	98.7	766.3	94.680827	92.6	698.1	92.6	692.2
308.0	98.3	98.7	766.5	94.725113	92.6	698.1	92.6	692.2
312.0	98.3	98.7	766.7	94.769399	92.6	698.1	92.6	692.2
316.0	98.3	98.7	766.9	94.813685	92.6	698.1	92.6	692.2

Avg. Water Surface Slope	AS-Built	2008	2009	2010	2011
	0.0052	0.0052	0.0052	0.0051	0.0050
Avg. Bed Slope					
Avg. Bed Slope					
Pool Length		34	24	27	26
Avg. Pool Slope		0.0017	0.0018	0.0038	0.0023

Cane Creek Year 1 Profile - Reach 1

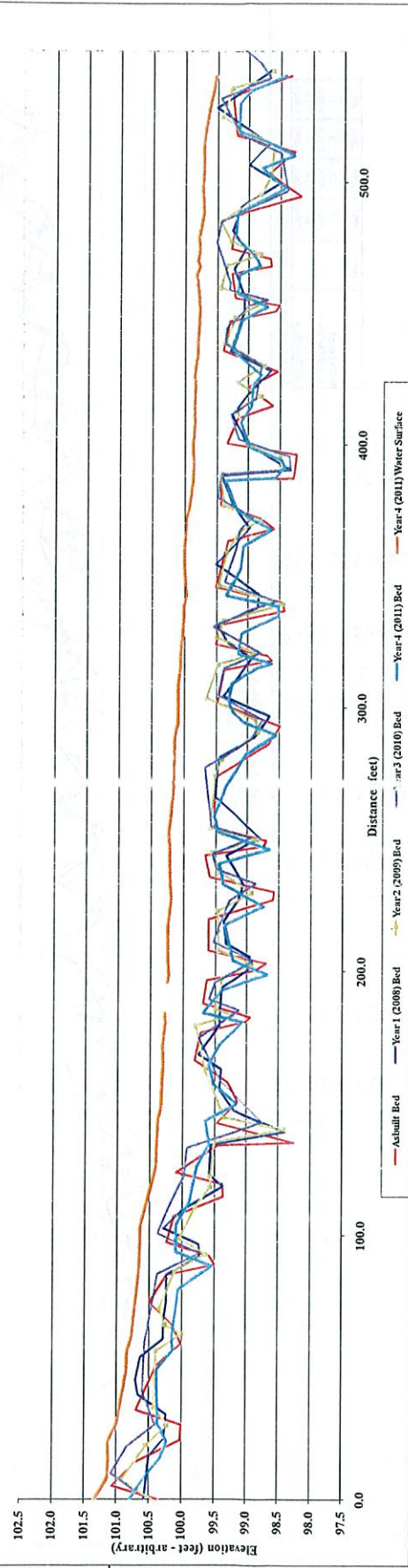


Project Name: Cane Creek As-built
 Reach: Profile
 Feature: Profile
 Date: 4/19/11
 Crew: Dean Parkinson

2008 Survey		2008 Survey		2009 Survey		2010 Survey		2011 Survey	
Station	Bed Elevation	Station	Bed Elevation	Station	Bed Elevation	Station	Bed Elevation	Station	Bed Elevation
0.0	100.4	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
5.1	101.1	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
10.2	100.7	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
15.3	100.5	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
20.4	100.4	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
25.5	100.3	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
30.6	100.2	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
35.7	100.1	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
40.8	100.0	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
45.9	99.9	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
51.0	99.8	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
56.1	99.7	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
61.2	99.6	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
66.3	99.5	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
71.4	99.4	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
76.5	99.3	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
81.6	99.2	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
86.7	99.1	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
91.8	99.0	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
96.9	98.9	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
102.0	98.8	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
107.1	98.7	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
112.2	98.6	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
117.3	98.5	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
122.4	98.4	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
127.5	98.3	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
132.6	98.2	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
137.7	98.1	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
142.8	98.0	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
147.9	97.9	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
153.0	97.8	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
158.1	97.7	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
163.2	97.6	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5
168.3	97.5	453.3	102.2	543.6	99.3	555.6	99.4	584.4	99.5

Avg. Water Surface Slope	2008	2009	2010
Avg. Water Surface Slope	0.0036	0.0038	0.0028
Run Length	15	13	10
Avg. Run Length	N/A	0.0036	0.0044
Run Length	18	11	19
Avg. Run Length	N/A	0.0032	0.0007

Cane Creek Profile - Reach 2

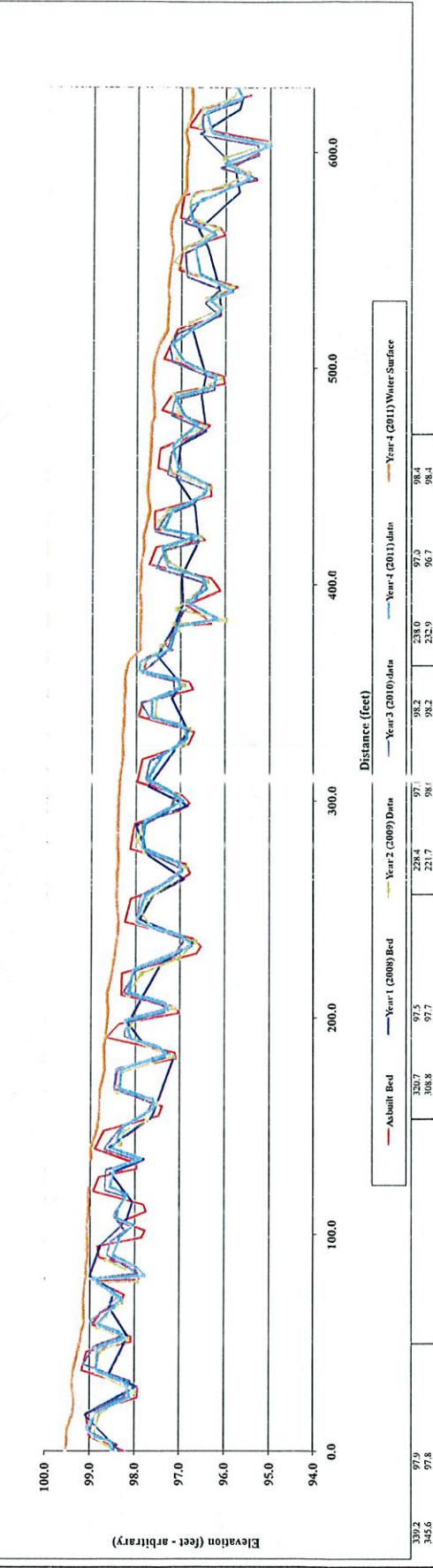


Project Name: Cane Creek Ashbalt
 Reach: 3
 Profile:
 Date: 4/19/11
 Crew: Dean, Peckham

Station	2008 Survey		2009 Survey		2010 Survey		2011 Survey	
	Red Elevation	Water Elevation	Red Elevation	Water Elevation	Red Elevation	Water Elevation	Red Elevation	Water Elevation
0.0	98.2		631.1	95.2	624.3	96.6	625.5	96.7
6.9	99.0		625.2	95.8	617.4	96.6	625.5	96.7
29.9	98.0		620.7	96.5	608.0	96.6	625.5	96.8
24.7	97.9		612.2	96.6	603.2	95.5	625.5	96.8
33.1	98.6		607.9	96.0	598.7	96.7	609.1	96.4
29.5	97.9		607.9	96.0	598.7	96.7	609.1	96.4
37.4	99.2		604.6	95.0	588.1	95.5	609.1	96.4
45.9	99.1		597.4	96.0	583.9	95.1	609.1	96.4
20.5	98.1		594.7	95.9	578.1	96.4	609.1	96.4
38.8	98.8		584.0	95.4	567.5	97.1	609.1	96.4
38.4	98.9		584.0	95.4	567.5	97.1	609.1	96.4
63.9	98.8		580.5	96.7	558.3	96.7	609.1	96.4
69.0	98.3		574.8	96.8	553.6	96.7	609.1	96.4
72.2	98.2		570.2	96.8	542.5	96.7	609.1	96.4
78.9	98.9		564.0	96.2	536.7	97.2	609.1	96.4
85.1	98.0		555.9	96.5	530.4	96.1	609.1	96.4
89.6	98.8		549.8	97.1	516.1	97.2	609.1	96.4
94.6	98.8		545.0	97.1	510.1	97.2	609.1	96.4
98.7	97.8		537.4	95.8	513.0	97.2	609.1	96.4
101.9								

Avg. Water Surface Slope	0.0036	2009	0.0043	2010	0.0044	2011
Run Length	15	15	10	9	11	11
Avg. Run Slope	N/A	N/A	N/A	0.0110	0.0082	0.0082
Pool Length	21	21	18	18	16	16
Avg. Pool Slope	N/A	N/A	N/A	0.0027	0.0020	0.0020

Cane Creek Profile - Reach 3



Distance (feet)

Legend:
 - Asphalt Bed
 - Year 1 (2008) Bed
 - Year 2 (2009) Data
 - Year 3 (2010) Data
 - Year 4 (2011) Data
 - Year 4 (2011) Water Surface

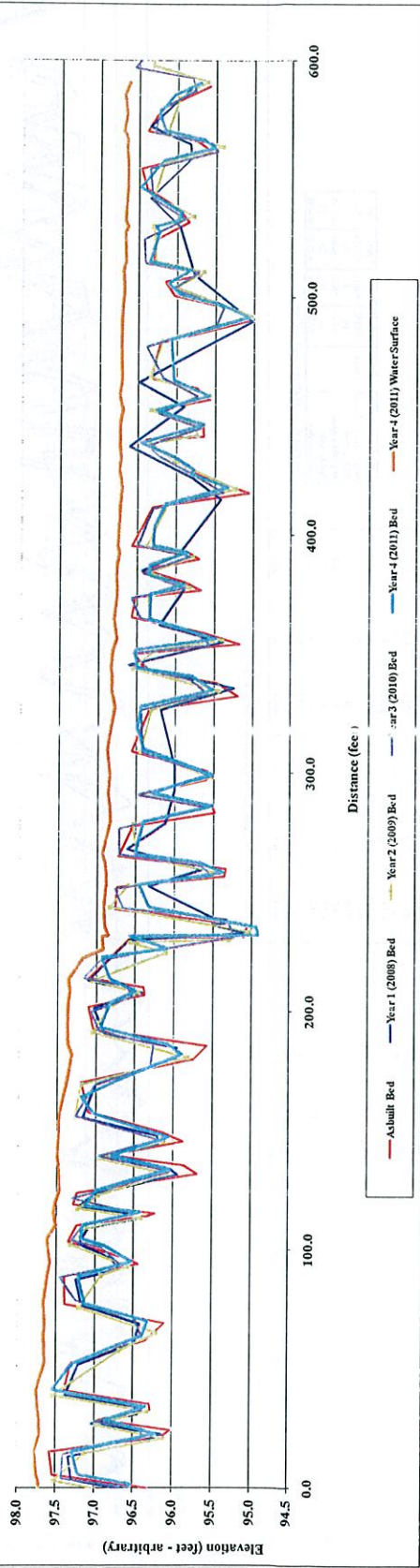
Project Name: Cane Creek Ashbuilt
 Bench: 4
 Profile
 Date: 4/19/11
 Crew: Dean, Perkinsen

2008 Survey		2008 Survey		2009 Survey		2010 Survey		2011 Survey	
Station	Bed Elevation	Station	Bed Elevation	Station	Bed Elevation	Station	Bed Elevation	Station	Bed Elevation
0.0	96.3	-5.2	96.5	-1.4	96.4	691.1	96.5	382.8	96.6
5.6	97.5	-1.6	97.5	3.0	97.5	691.1	96.5	382.8	96.6
12.2	97.6	3.3	97.3	14.6	97.1	691.1	96.4	382.8	96.7
18.8	97.6	10.9	97.3	20.9	96.1	691.1	96.4	382.8	96.7
24.3	96.0	15.3	96.1	26.9	96.1	691.1	96.4	382.8	96.7
28.6	97.0	22.5	96.1	32.1	97.3	691.1	96.5	382.8	96.6
32.6	96.3	26.8	97.0	39.0	97.5	691.1	96.5	382.8	96.6
35.3	96.3	30.7	96.4	45.7	96.7	691.1	96.6	382.8	96.6
40.9	97.4	33.5	96.4	51.1	96.2	691.1	96.5	382.8	96.7
44.2	97.4	38.9	97.4	56.1	97.2	691.1	96.5	382.8	96.7
46.9	96.3	41.9	97.4	61.9	97.2	691.1	96.5	382.8	96.7
51.9	96.3	47.1	97.4	67.1	97.2	691.1	96.5	382.8	96.7
60.3	96.1	51.9	96.5	72.9	97.2	691.1	96.5	382.8	96.7
69.3	97.4	60.7	96.4	78.8	97.3	691.1	96.5	382.8	96.7
77.3	97.4	68.6	97.2	102.1	97.1	691.1	96.5	382.8	96.7
88.9	97.4	76.6	97.2	109.0	97.1	691.1	96.5	382.8	96.7
93.9	96.4	87.1	97.2	113.3	96.4	691.1	96.5	382.8	96.7
100.4	96.6	91.7	96.7	117.2	97.2	691.1	96.6	382.8	96.7
105.4	96.4	96.6	96.8	122.7	97.0	691.1	96.5	382.8	96.7
110.1	97.2	102.5	97.2	127.9	97.1	691.1	96.5	382.8	96.7
114.0	96.3	108.9	97.1	138.1	97.0	691.1	96.5	382.8	96.7
115.4	96.2	112.6	96.5	145.3	96.1	691.1	96.6	382.8	96.7
118.9	97.3	115.0	96.5	155.8	97.3	691.1	96.6	382.8	96.7
123.8	97.2	117.4	97.2	160.2	97.2	691.1	96.6	382.8	96.7
131.9	95.7	122.7	97.0	180.6	95.8	691.1	96.6	382.8	96.7

As-built	2008	2009	2010	2011
Avg. Water Surface	0.0025	0.0111	0.0020	0.0019
Rifle Length	11	13	10	10
Avg. Rifle Slope	*NA	*NA	0.0020	0.0025
Pool Length	21	17	17	17
Avg. Pool Slope	*NA	*NA	0.0010	0.0005

* No water in channel due to rough conditions

Cane Creek Profile - Reach 4



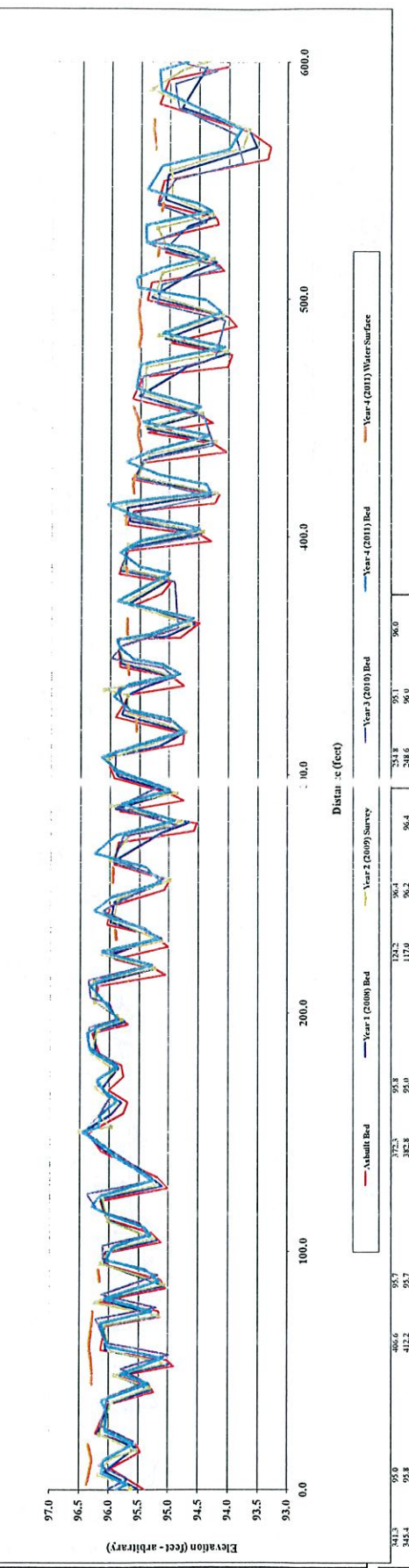
Project Name: Cane Creek
 Reach: 5
 Station: 410311
 Date: 4/10/11
 Crew: Dena, Paul, Lamm

Station	2008 Survey		2009 Survey		2010 Survey		2011 Survey	
	Station	Water Elevation	Station	Water Elevation	Station	Water Elevation	Station	Water Elevation
8.0	95.4	95.5	96.3	96.2	96.2	96.2	96.2	96.2
8.9	96.9	96.1	96.7	96.2	96.3	96.2	96.2	96.2
9.8	96.9	96.1	96.7	96.2	96.3	96.2	96.2	96.2
10.0	95.5	95.7	96.2	96.2	96.3	96.2	96.2	96.2
11.5	95.5	95.7	96.2	96.2	96.3	96.2	96.2	96.2
23.7	96.2	96.2	96.0	96.0	96.0	96.0	96.0	96.0
35.8	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0
41.1	95.2	95.3	95.5	95.5	95.5	95.5	95.5	95.5
41.1	95.2	95.3	95.5	95.5	95.5	95.5	95.5	95.5
47.9	95.8	95.9	96.1	96.1	96.1	96.1	96.1	96.1
52.0	94.9	95.1	95.3	95.3	95.3	95.3	95.3	95.3
54.4	95.0	95.1	95.1	95.1	95.1	95.1	95.1	95.1
60.8	95.1	95.1	95.1	95.1	95.1	95.1	95.1	95.1
62.8	95.1	95.1	95.1	95.1	95.1	95.1	95.1	95.1
72.5	95.1	95.1	95.1	95.1	95.1	95.1	95.1	95.1
75.1	95.2	95.1	95.2	95.2	95.2	95.2	95.2	95.2
79.2	96.2	96.1	96.3	96.3	96.3	96.3	96.3	96.3
83.7	96.2	96.1	96.3	96.3	96.3	96.3	96.3	96.3
88.3	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0
94.1	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0
99.1	96.1	96.1	96.1	96.1	96.1	96.1	96.1	96.1
103.9	95.1	95.1	95.2	95.2	95.2	95.2	95.2	95.2
107.7	95.3	95.3	95.3	95.3	95.3	95.3	95.3	95.3
112.3	95.3	95.3	95.3	95.3	95.3	95.3	95.3	95.3
112.3	95.3	95.3	95.3	95.3	95.3	95.3	95.3	95.3
121.3	96.1	96.1	96.1	96.1	96.1	96.1	96.1	96.1

Actual	2008	2009	2010	2011
Avg. Water Surface Slope	0.0014	0.0029	0.0031	0.0029
Bed Slope	0.0014	0.0029	0.0031	0.0029
Avg. Fills Slope	0.0014	0.0029	0.0031	0.0029
Avg. Bed Slope	0.0014	0.0029	0.0031	0.0029

* No water in channel due to drought conditions

Cane Creek Profil - Reach 5

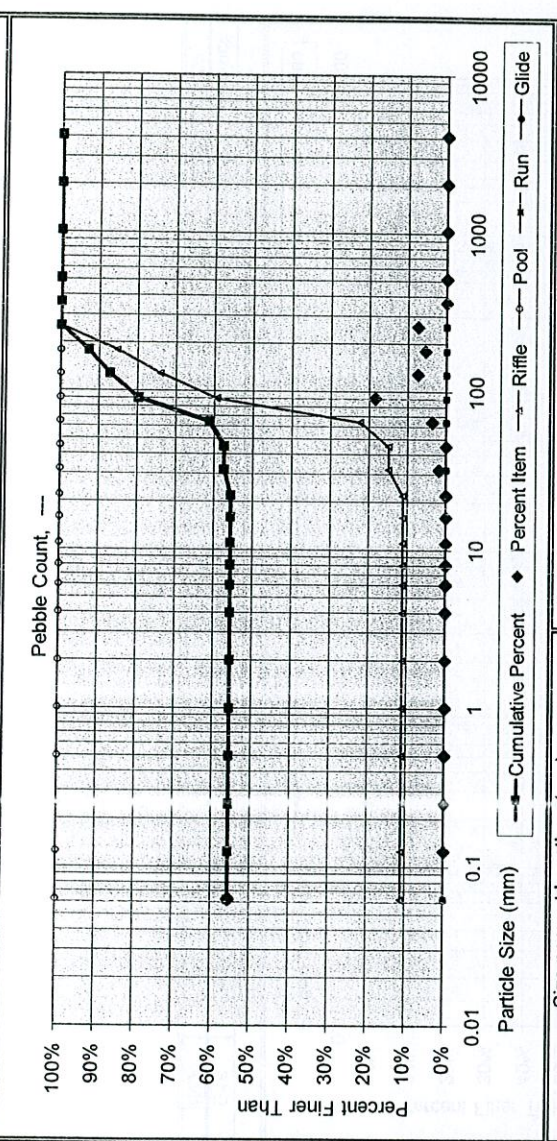


Weighted Pebble Count

Percent Riffle:	50	Percent Run:	
Percent Pool:	50	Percent Glide:	

Material	Size Range (mm)	Total #	Weighted Count
silt/clay	0	0.062	55.6
very fine sand	0.062	0.13	0.0
fine sand	0.13	0.25	0.0
medium sand	0.25	0.5	0.0
coarse sand	0.5	1	0.0
very coarse sand	1	2	0.0
very fine gravel	2	4	0.0
fine gravel	4	6	0.0
fine gravel	6	8	0.0
medium gravel	8	11	0.0
medium gravel	11	16	0.0
coarse gravel	16	22	0.0
coarse gravel	22	32	1.9
very coarse gravel	32	45	0.0
very coarse gravel	45	64	3.7
small cobble	64	90	18.5
medium cobble	90	128	7.4
large cobble	128	180	5.6
very large cobble	180	256	7.4
small boulder	256	362	0.0
small boulder	362	512	0.0
medium boulder	512	1024	0.0
large boulder	1024	2048	0.0
very large boulder	2048	4096	0.0
bedrock			0.0

Note: Cane Creek 2011 - Reach 3 Substrate



Size percent less than (mm)		Percent by substrate type	
D16	D85	silt/clay	bedrock
#N/A	D35	sand	boulder
#N/A	D50	gravel	0%
#N/A	#N/A	0%	0%
111	D84	0%	0%
202	D95	39%	0%
		56%	0%

Weighted Count:	100
True Total Particle Count	52

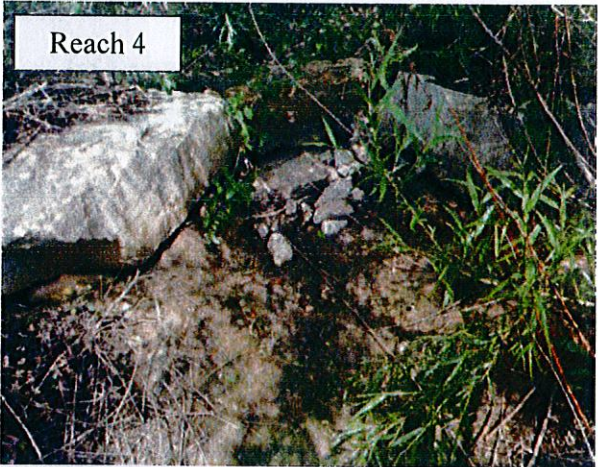
Weighted Pebble Count

Percent Riffle:		Percent Run:		Pebble Count:	
Percent Pool	50	Percent Run:	50	Percent Glide:	
Material	Size Range (mm)	Total #	Percent Run	Percent Glide	Pebble Count
silt/clay	0	0.062	50.0	#	
very fine sand	0.062	0.13	0.0	#	
fine sand	0.13	0.25	0.0	#	
medium sand	0.25	0.5	0.0	#	
coarse sand	0.5	1	0.0	#	
very coarse sand	1	2	0.0	#	
very fine gravel	2	4	0.0	#	
fine gravel	4	6	0.0	#	
fine gravel	6	8	0.0	#	
medium gravel	8	11	0.0	#	
medium gravel	11	16	0.0	#	
coarse gravel	16	22	0.0	#	
coarse gravel	22	32	1.9	#	
very coarse gravel	32	45	0.0	#	
very coarse gravel	45	64	11.1	#	
small cobble	64	90	7.4	#	
medium cobble	90	128	13.0	#	
large cobble	128	180	14.8	#	
very large cobble	180	256	1.9	#	
small boulder	256	362	0.0	#	
small boulder	362	512	0.0	#	
medium boulder	512	1024	0.0	#	
large boulder	1024	2048	0.0	#	
very large boulder	2048	4096	0.0	#	
bedrock			0.0	#	
Weighted Count:		100			
True Total Particle Count		52			

Size percent less than (mm)		Percent by substrate type								
D16	D35	D50	D84	D95	D16	D35	D50	D84	D95	
#/N/A	#/N/A	#/N/A	130	167	silt/clay	sand	gravel	cobble	boulder	bedrock
					50%	0%	13%	37%	0%	0%

Note: Cane Creek 2011 - Reach 4 and 5 Substrat

Cane Creek Stream and Wetland Restoration Site
Year 4 (2011) Annual Monitoring
Representative Structure Photos
Taken May-June 2011



Cane Creek Stream and Wetland Restoration Site
Year 4 (2011) Annual Monitoring
Enhancement Reach Photos
Taken May-June 2011

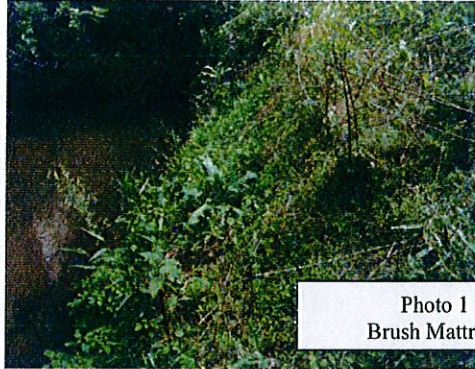


Photo 1
Brush Mattress



Photo 2-3
Stabilization and staking of left and right banks, respectively, adjacent to ford

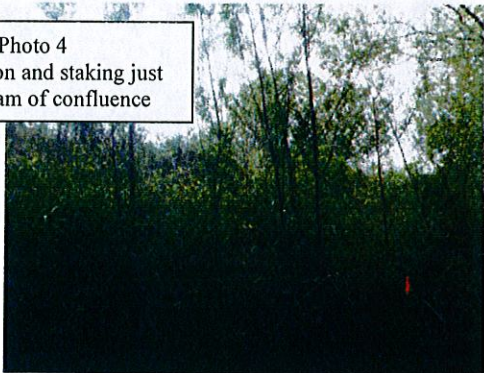


Photo 4
Stabilization and staking just downstream of confluence

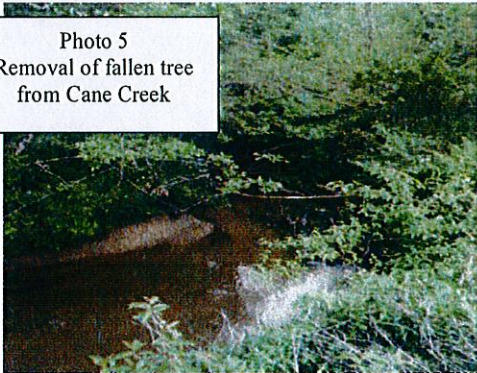
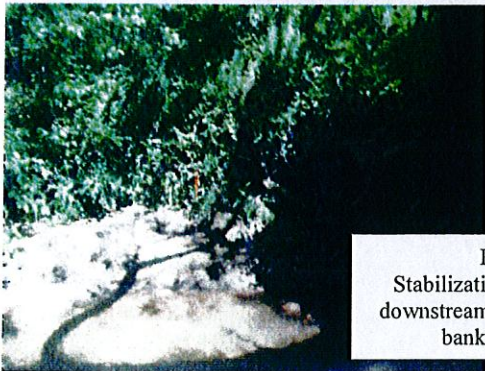


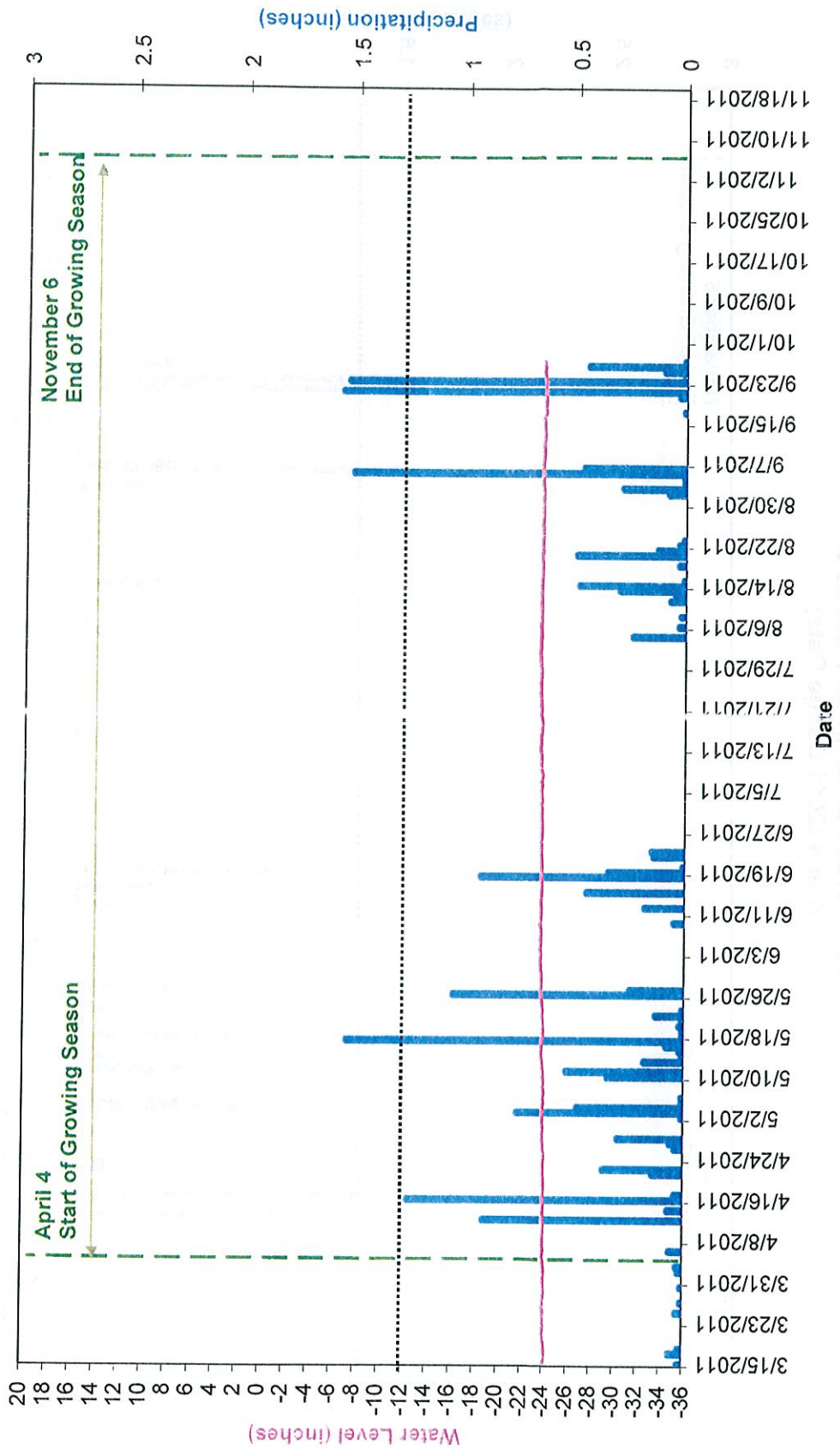
Photo 5
Removal of fallen tree from Cane Creek



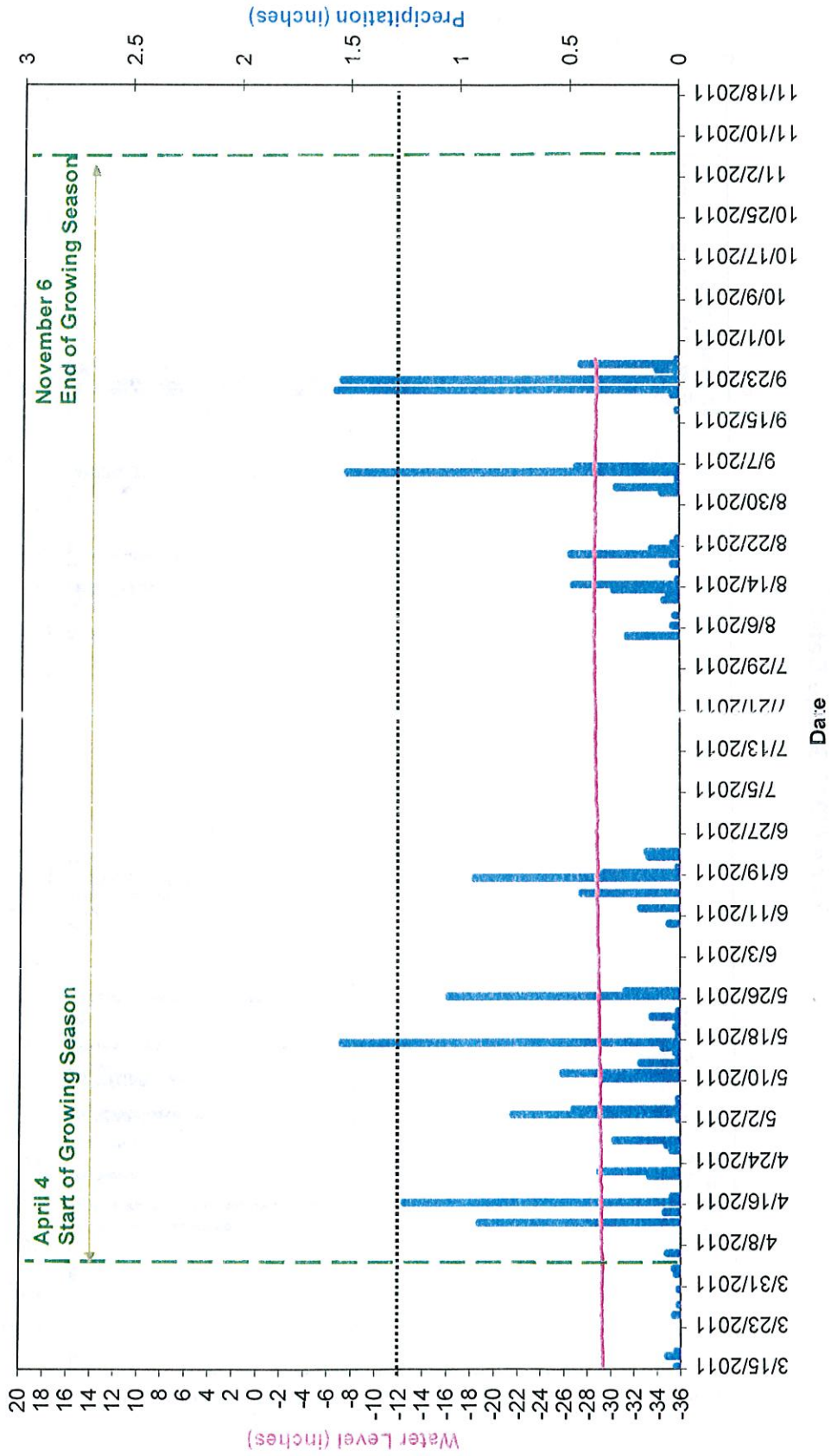
Photos 6-7
Stabilization and staking near downstream end of left and right banks, respectively

**APPENDIX C
HYDROLOGY DATA
2011 Groundwater Gauge Graphs**

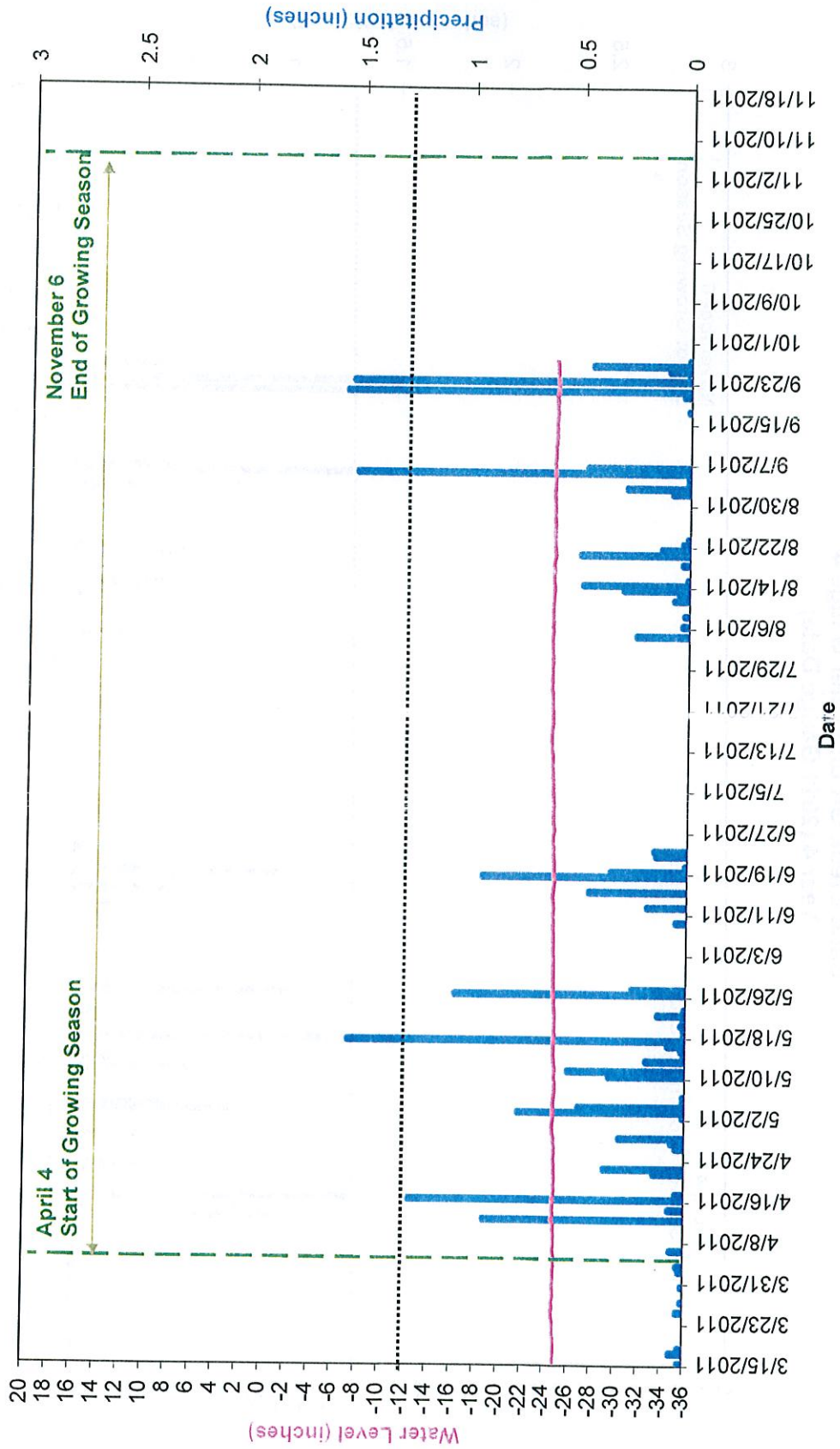
Cane Creek Groundwater Gauge 1 Year 4 (2011 Gauge Data)



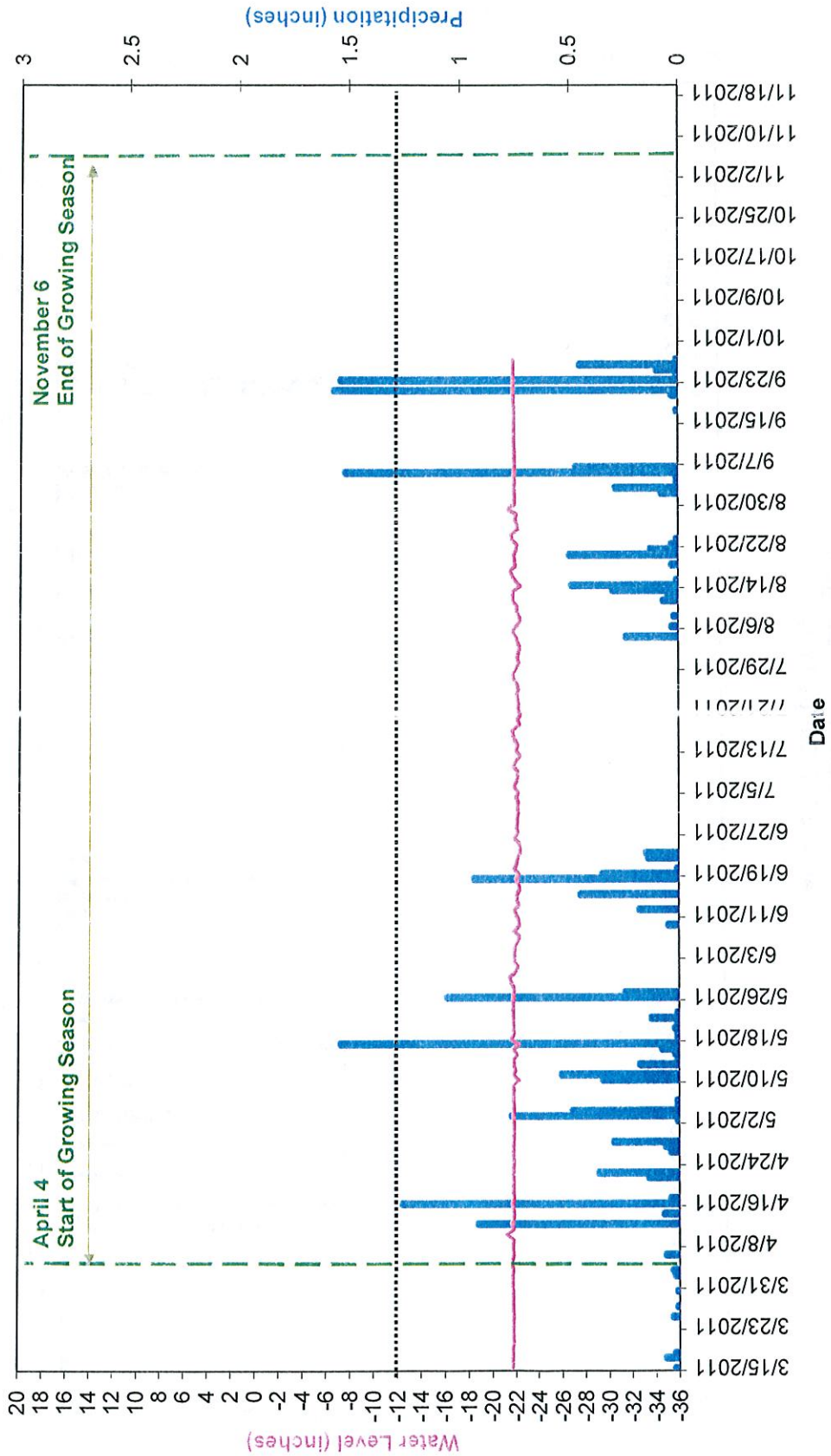
Cane Creek Groundwater Gauge 2 Year 4 (2011 Gauge Data)



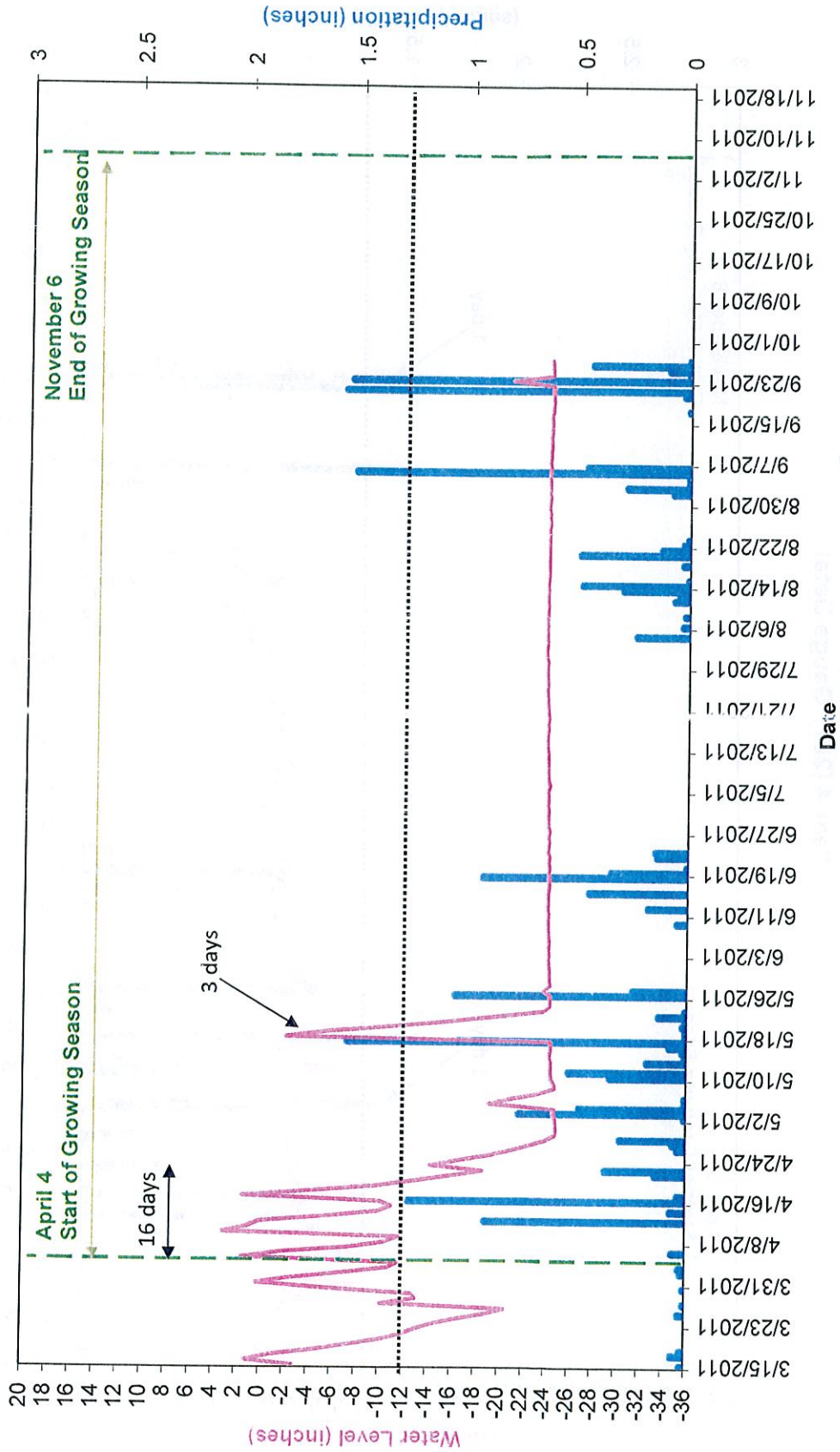
Cane Creek Groundwater Gauge 3 Year 4 (2011 Gauge Data)



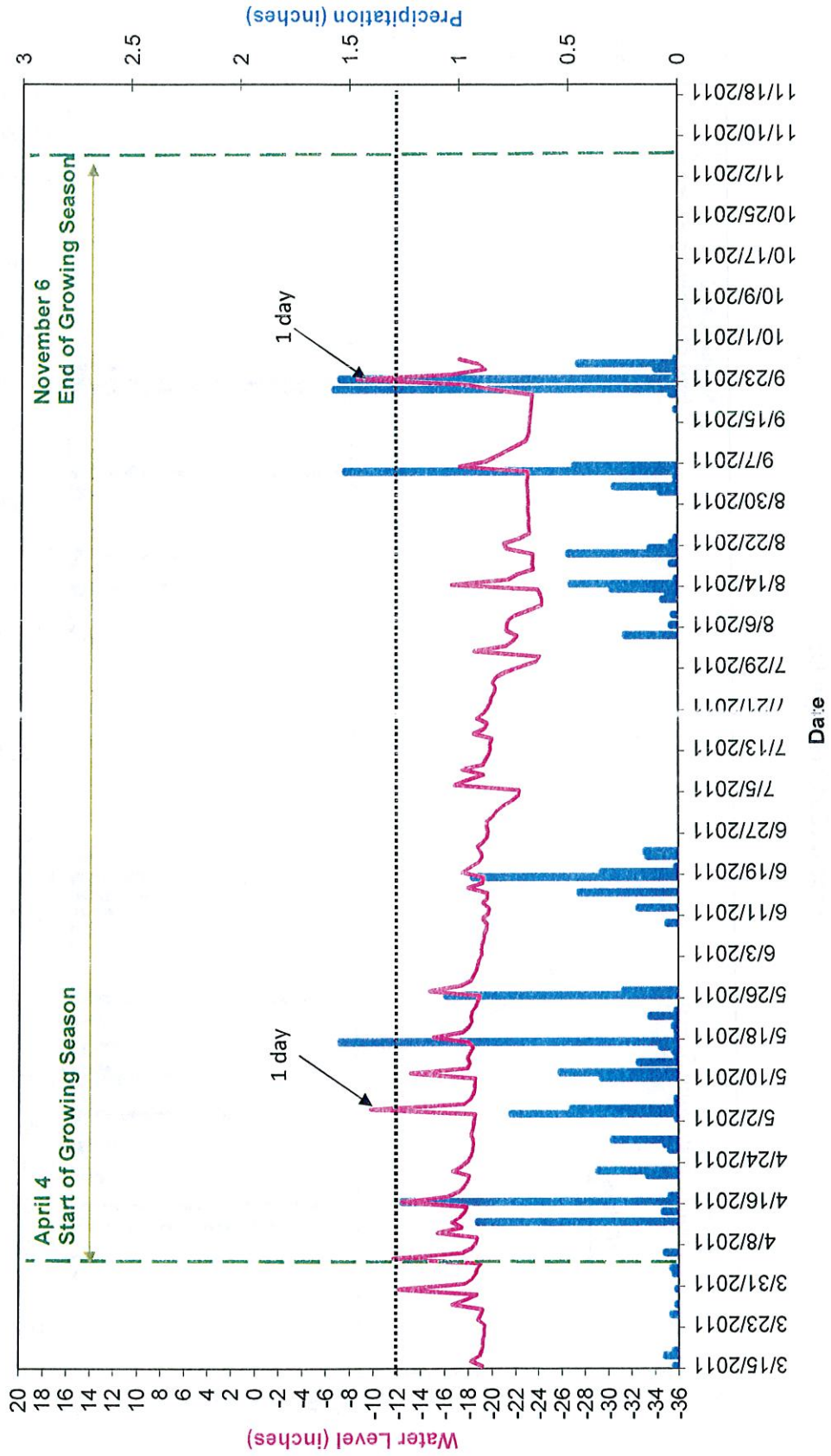
Cane Creek Groundwater Gauge 4 Year 4 (2011 Gauge Data)



Cane Creek Groundwater Gauge 5 Year 4 (2011 Gauge Data)



Cane Creek Groundwater Reference Gauge Year 4 (2011 Gauge Data)



**APPENDIX D
MONITORING PLAN VIEW**

