Year 1 Monitoring Report

Cat Creek Stream and Wetland Restoration
Macon County, NC

SCO Project Number 050657901
EEP Project Number 71

Submitted to:

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

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EXECUTIVE SUMMARY

The following report presents the Year 1 monitoring of the Cat Creek stream and wetland restoration site in Macon County, North Carolina. The site consists of reaches on four separate tracts of land referred to as: Swartwout, Waldroop, Parker, and Preserve. The Swartwout, Parker, and Preserve tracts have been purchased by the NCDOT, while the Waldroop tract is in private ownership.

Table 1. Project Restoration Structure and Objectives

Project Component or Reach ID	Existing Feet/Acres	Restoration Level	Approach	Footage or Acreage	Stationing	Comment
Cat Creek - Upper Swartwout	900 feet	E2		900 feet	10+00 - 19+00	Livestock exclusion, buffer plantings, bank stabilization in 3 locations
Cat Creek - Lower Swartwout	770 feet	R	P1	926 feet	19+00 - 28+26	
UT 1	363 feet	R	P1	457 feet	10+00 - 14+57	
Swartwout wetlands		R		1.11 acres		
		E		0.51 acres		Livestock exclusion, removal of drain pipe, plantings
UT 1	100 feet	E2		100 feet	NA	Livestock exclusion, buffer plantings
Cat Creek - Upper Waldroop	1463 feet	E2		1463 feet	NA	Livestock exclusion, buffer plantings
Cat Creek - Lower Waldroop	480 feet	E1		480 feet	30+00 - 34+80	Livestock exclusion, buffer plantings, and structures to provide enhanced profile
Cat Creek - Parker	1750 feet	R	P1	1820 feet	34+80 - 53+00	
UT 2	210 feet	R	P1	374 feet	10+00 - 13+74	
UT 3	165 feet	R	P1	287 feet	10+00 - 12+87	
Parker wetlands		R		4.73 acres		
		E		0.25 acres		
Cat Creek Preserve	1765 feet	E1		1852 feet	60+00 - 78+52	Grade control, turbulent riffles to add habitat, buffer plantings, and invasive species management

Project Component or Reach ID	Existing Feet/Acres	Restoration Level	Approach	Footage or Acreage	Stationing	Comment
UT 4	110 feet	R	P1	230 feet	10+00 - 12+30	
Preserve wetlands		R		0.71 acres		
		E		0.66 acres		

This project has the following goals:

- Provide a stable stream channel for the main channel and the unnamed tributaries to Cat Creek that neither aggrades nor degrades while maintaining their dimension, pattern, and profile with the capacity to transport their watershed's water and sediment load.
- Improve water quality to the receiving watershed through stream bank stabilization measures, the installation of a woody riparian buffer, and the exclusion of livestock.
- Improve aquatic habitat of the main channel and tributaries with the use of natural material stabilization structures such as root wads, rock and log vanes, constructed riffles with river stone, and a riparian buffer.
- Provide aesthetic value, wildlife habitat, and bank stability through the creation or enhancement of a riparian zone.
- Create a contiguous wildlife corridor and provide diverse amphibian habitat with added topographic and wetland features.
- Provide shading and biomass input to the stream and mast for wildlife when vegetation is mature.
- Enhance wetland biochemical-and geo-chemical processes over an extended area.

Vegetation goals are for planted stem density minimums of 320 stems/acre through year three, 288 stems/acre in year four, and 260 stems/acre in year five. Overall stem density in the 14 vegetation plots is 598 stems/acre; well above the stated goal. Four of the 14 plots are below the three year density requirement. However, these four plots have dense stands of herbaceous vegetation. While a few stems within the plots had died, some of the lower stem density was due to not being able to locate stems because of the thick herbaceous vegetation.

The main tributary of Cat Creek is very stable with no signs of bank erosion or excessive aggradation or degradation. All structures appear to be stable and are performing as designed. Tributary 1 and 2 are also performing as designed with no areas of erosion. Tributary 3 is receiving a relatively large sediment load from its upstream watershed. The tributary appears stable but showed some signs of minor aggradation. Tributary 4 has degraded or downcut in the upper half. The presence of several sills will likely halt any further downcutting.

In the wetland restoration areas the hydrologic goal is for the soil to be saturated within 12 inches of the surface for at least 8 percent of the growing season under average climatic conditions. Eighteen groundwater gauges were installed across the project site to monitor proposed wetland restoration areas. Gauge MW-15 installed in an existing wetland area as reference, met wetland criteria for 55% of the growing season. Two gauges (MW-4 and MW-7)

are installed in areas currently not being considered for wetland mitigation credit. Both gauges did not meet the 8% criteria. Thirteen of the gauges met or exceeded the 8% criteria. One of the 12 gauges, MW-14 located on the Swartwout tract is in an area currently not proposed for wetland mitigation credit. One gauge (MW-18) located near the northern end of the wetland restoration area on the Preserve tract did not meet the 8% criteria. Two gauges did not produce reliable data (MW-13 and MW-17).

Summary information/data related to the occurrence of items such as beaver or encroachment and statistics related to performance of various project monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the Baseline Monitoring Report (formerly Mitigation Plan) and in the Mitigation Plan (formerly the Restoration Plan) documents available on EEP's website. All raw data supporting the tables and figures in the appendices is available from EEP upon request.

1.0. PROJECT GOALS, BACKGROUND, AND ATTRIBUTES

The North Carolina Department of Transportation (NCDOT) initialed identified a portion of Cat Creek in Macon County, North Carolina for potential stream, riparian buffer, and wetland restoration and/or enhancement (**Figure 1, Appendix A**). Following studies by NCDOT beginning in 2002, the project was turned over to the North Carolina Ecosystem Enhancement Program (EEP) in 2005 for design, construction and monitoring. The reaches of Cat Creek identified are located on four separate tracts of land: Swartwout, Waldroop, Parker, and Preserve. Three of the tracts, Swartwout, Parker, and Preserve have been purchased by NCDOT.

1.1 Location and Setting

The project site is located east of the town of Franklin in Macon County. Cat Creek Road (SR 1513) is located off of US 23/441 between Business 441 and US 64. If proceeding south on US 23 turn left onto Cat Creek Road. Proceed along Cat Creek Road for approximately 1.5 miles and turn left onto Ferguson Road to access the Preserve and the Parker tracts. Cat Creek crosses Ferguson Road about 1,900 feet from the turnoff from Cat Creek. Parking is available on either tract near the creek crossing.

To access the Waldroop Tract continue on Cat Creek Road past Ferguson about 0.5 mile. Bethel Church Road comes in from the right and just before the road there is a driveway on the left with a farmhouse and large barn beyond the farmhouse.

To access the Swartwout Tract continue on Cat Creek Road past Ferguson Road about 0.8 miles. Cat Creek Road takes an abrupt left turn (if you go straight you will be on Jack Cabe Road). Turn left (staying on Cat Creek Road). The Swartwout Tract is immediately on the right. A gate provides access to the field.

Cat Creek is located in the Little Tennessee River Basin in USGS Cataloging Unit 06010202. The NCDWQ Sub-basin is 04-04-01. The watershed to the end of the project site is approximately 3.6 square miles.

1.2 Project Goals and Objectives

Project Goals:

- Provide a stable stream channel for the main channel and the unnamed tributaries to Cat Creek that neither aggrades nor degrades while maintaining their dimension, pattern, and profile with the capacity to transport their watershed's water and sediment load.
- Improve water quality to the receiving watershed through stream bank stabilization measures, the installation of a woody riparian buffer, and the exclusion of livestock.
- Improve aquatic habitat of the main channel and tributaries with the use of natural material stabilization structures such as root wads, rock and log vanes, constructed riffles with river stone, and a riparian buffer.

- Provide aesthetic value, wildlife habitat, and bank stability through the creation or enhancement of a riparian zone.
- Create a contiguous wildlife corridor and provide diverse amphibian habitat with added topographic and wetland features.
- Provide shading and biomass input to the stream and mast for wildlife when vegetation is mature.
- Enhance wetland biochemical-and geo-chemical processes over an extended area.

Project Objectives:

- Restore or enhance over 8,200 feet of Cat Creek and its tributaries..
- Restore a natural riparian buffer.
- Restore 5 acres of swamp forest bog complex wetlands.
- Plant native trees and shrubs throughout the site.

1.3 Project Structure, Restoration Type and Approach

The project restored 4,094 linear feet of Cat Creek and four tributaries, and enhanced 4,795 linear feet of Cat Creek. Additionally, 6.55 acres of wetlands were restored and 1.42 acres of wetlands were enhanced.

Cat Creek on the upper reach of the Swartwout Tract was enhanced by the removal of livestock, planting of the riparian buffer and stabilization of the bank in three locations. Wetlands on the upper portion of the tract were restored by the removal of drain tile and planting with hardwoods. The lower reach of Cat Creek on the Swartwout Tract underwent a Priority 1 restoration and was reconnected to its floodplain. Unnamed Tributary 1 on the Swartwout Tract also underwent a Priority 1 restoration. Wetlands on the lower portion of the tract underwent restoration by the removal of fill, removal of drain tile, and reconnection of Cat Creek and Tributary 1 to their abandoned floodplains. Existing wetlands were enhanced by increasing hydrology, planting of hardwoods, and removal of livestock.

Cat Creek on the upper portion of the Waldroop Tract underwent enhancement by fencing out livestock and planting the riparian buffer. Additional activities on the lower portion of Cat Creek included the addition of vanes and sills to create pools and riffles.

Cat Creek on the Parker Tract underwent full restoration by reconnecting the stream to its floodplain, and restoring pattern, dimension, and profile. Unnamed Tributary 2 and 3 were also restored in the same manner. Wetlands on the Parker Tract were restored by removing fill placed in the wetlands when it was developed as a golf course, removal of drain tiles, and reconnecting Cat Creek to its abandoned floodplain to provide periodic flooding. The wetlands and riparian areas were planted in hardwoods.

Cat Creek on the Preserve Tract underwent enhancement. A riparian buffer was established and mowing of the buffer no longer occurs. The profile of the channel was enhanced by the addition of sills and vanes. Boulders were added to two long runs to create “turbulent riffles” that

enhanced structure within the channel and improved aquatic habitat. Unnamed Tributary 4 was restored by restoring dimension, pattern, and profile. Wetlands on the Preserve Tract were restored by removing fill placed in the wetlands when it was developed as a golf course. Existing wetlands on the Preserve were enhanced by prohibiting mowing. The wetlands and riparian areas were planted in hardwoods.

1.4 Project History, Contacts and Attribute Data

The site was first identified by NCDOT in 2002, at which time Feasibility Studies were performed on several separate tracts of land. Following the Feasibility Studies, NCDOT purchased the Swartwout Tract, Parker Tract, and Preserve Tract. Following the formation of the EEP, NCDOT turned the site over to EEP in 2005 for final design, construction, and monitoring. A permanent Conservation Easement on the Waldroop property was recorded in 2008. Design was completed in 2008 and construction began in August 2009. Planting was performed in January 2010. Construction on the project was not completed until invasive species control was performed in June and July, 2010.

2.0 METHODOLOGY

The following section outlines methods used to collect data for the Year 1 monitoring event.

2.1 Morphometric Parameters and Channel Stability

Nineteen permanent monitoring cross-sections are established on the site, 11 on the main stem of Cat Creek and two on each of the four tributaries. On the Swartwout tract three cross-sections (2 riffle and 1 pool) are established on Cat Creek and a pool and riffle cross-section are established on Tributary 1. On the Parker Tract 8 cross-sections (4 riffle and 4 pool) are established on Cat Creek and two cross-sections (1 riffle and 1 pool) are established on Tributary 2 and Tributary 3. On the Preserve Tract one riffle and 1 pool cross-section are established on Tributary 4. Permanent monuments of rebar have been established at each end of these cross-sections. While cross-section have been established on all tributaries only the mainstem of Cat Creek and Tributary 1 are to be surveyed each year.

The survey of the cross-sections and longitudinal profile were performed using RTK survey-grade GPS survey equipment to detect thalweg, bankfull, and water surface elevations of Cat Creek and its tributaries. A monitoring baseline was established in the Year 0 baseline/as-built effort, and was stationed from the upstream end of the project.

Data was entered into the stream morphology applications program, Rivermorph, to obtain the dimensions of the cross sections and parameters applicable to the longitudinal profile. Reports generated by Rivermorph are used in this report to display and summarize stream survey data.

Visual observations of the entire channel were also performed. Photos were obtained at 10 pre-established locations as well as at other significant site features.

2.2 Substrate

Pebble count data was obtained at all surveyed cross-sections following the Wolman pebble count method.

2.3 Vegetation

Fourteen vegetation plots have been established on the project site. Vegetation data collection followed the CVS-EEP Protocol for Recording Vegetation (Lee et al. 2006, http://cvs.bio.unc.edu/methods.htm). The Year 1 vegetation monitoring was conducted as a Level 1: Inventory of Planted Stems.

2.4 Hydrology

Eighteen monitoring gauges were installed in wetland enhancement/restoration areas to monitor site hydrology. Data was downloaded from the gauges on a bimonthly (every 2 months) basis during the growing season.

3.0 PROJECT CONDITION AND MONITORING RESULTS

3.1 Morphometric Parameters and Channel Stability

The main tributary of Cat Creek is very stable with no signs of bank erosion or excessive aggradation or degradation within reaches of the channel that were restored. All structures appear to be performing as designed. Several small areas of bank erosion (slumping) were observed on the main channel on the Preserve tract, around Sta. 67+00. No channel work was performed in this reach of the stream. The banks in this reach are relatively well vegetated and the bank erosion was localized. This erosion is not considered a "problem" at this time, but warrants further watching.

Tributary 1 and 2 are performing as designed with no areas of bank erosion, aggradation or degradation. Structures in the channel are all stable.

Tributary 3 appears stable but showed some signs of aggradation. This tributary is receiving a relatively large sediment load from its upstream watershed.

Tributary 4 has degraded or downcut in the upper half. The presence of several sills will likely halt any additional degredation.

3.4 Vegetation

Vegetation success is based on the criteria established in the USACE Stream Mitigation Guidelines (2003). Planted stem density minimums of 320 stems/acre through year three, 288 stems/acre in year four, and 260 stems/acre in year five are required.

Overall stem density in the 14 vegetation plots is 598 stems/acre; well above the stated goal. Four of the 14 plots are below the three year density requirement. The majority of stems are healthy and growing vigorously. Little damage due to beaver or dear were observed. Herbaceous vegetation has become well established in the plots as well as throughout the restoration site.

As noted, four plots do not meet the three year criteria. All four plots have dense stands of herbaceous vegetation. While a few stems within the plots had died, some of the lower stem density was due to not being able to locate stems because of the thick herbaceous vegetation. Additional planting is not recommended at this time as newly planted stems would likely be out competed by the thick herbaceous vegetation.

Invasives

Invasives are present on both the Parker and the Preserve tracts. The two species of concern are privet and kudzu. These species typically require multiple treatments for control. Herbicide treatment for invasives was performed during the summer of 2010. Areas that were treated are shown on the Current Condition Plan View. These areas should be inspected during the summer of 2011 and additional treatment performed af necessary.

3.5 Wetland Hydrology

Eighteen monitoring gauges were installed in wetland enhancement/restoration areas to monitor site hydrology. In the wetland restoration areas the hydrologic goal is for the soil to be saturated within 12 inches of the surface for at least 8 percent of the growing season under average climatic conditions. The Macon County growing season extends from April 25 to October 10 for a 168 day growing season. The 8% criteria is equivalent to 13.4 days.

Thirteen of the gauges met or exceeded the 8% criteria. Gauge MW-15 installed on the Preserve tract within in an existing wetland area as reference, met wetland criteria for 35% of the growing season. Gauges MW-1, MW-4, MW-5, MW-8, MW-12, MW-14, and MW-16 were as wet as or wetter than this reference wetland. One of the 12 gauges, MW-14 located on the Swartwout tract is in an area currently not proposed for wetland mitigation credit.

One gauge (MW-18) located near the northern end of the wetland restoration area on the Preserve tract did not meet the 8% criteria.

Two gauges (MW-4 and MW-7) are installed in areas currently not being considered for wetland mitigation credit. Both gauges did not meet the 8% criteria.

Two gauges did not produce reliable data (MW-13 and MW-17). For one gauge the depth to groundwater readings exceeded the depth of the gauge, and the other did not appear to be reading at all with providing constant depth to groundwater. These two gauges should be replaced.

One gauge (MW-14) located in an area with thick herbaceous vegetation, could not be located during the final download period in December, but produced reliable data thorough June. This gauge may have been removed from the site. This gauge should be replaced.

Macon County experienced 46.46 inches of precipitation in the 2010 calendar year, below the average of 52 inches per year. March and April were below normal with 2.8 and 2.38 inches of rain respectively. June and October were also below normal. May and August were quite wet with over 5 inches of rain in each month.

3.6 Bankfull Verification

There was no evidence that a bankfull flow event occurred during the Year 1 monitoring period.

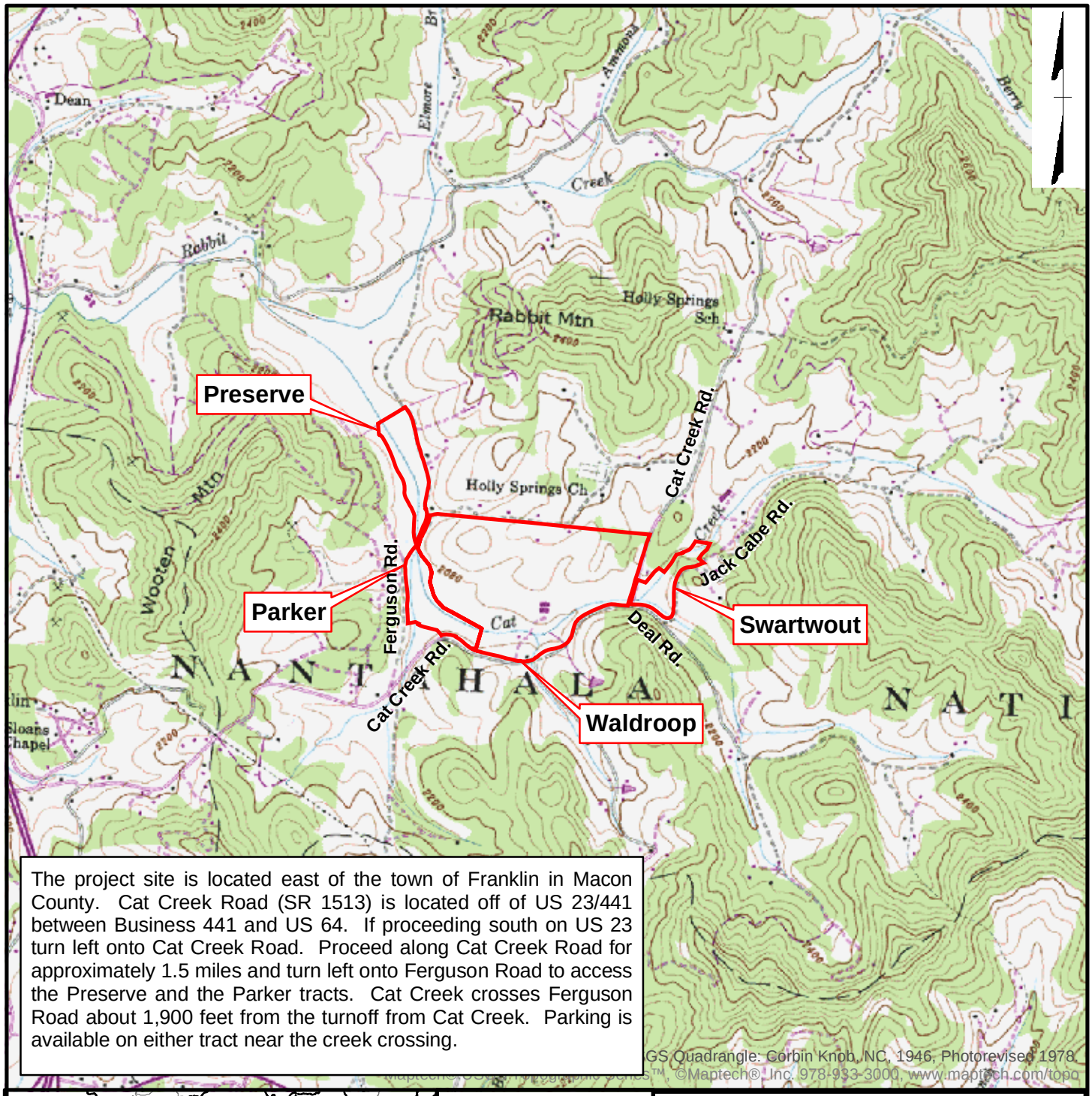
4.0 REFERENCES

Lee, M.T., R.K. Peet, S.D. Roberts, T.R. Wentworth. 2006. *CVS-EEP Protocol for RecordingVegetation Version 4.0*.

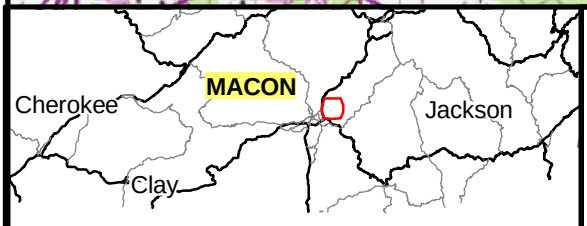
APPENDIX A

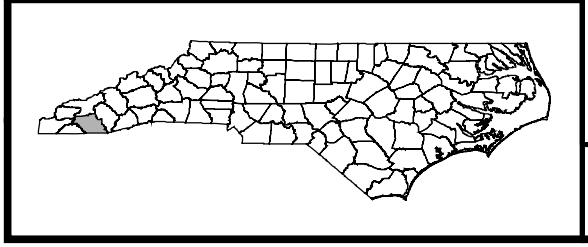
General Figures and Tables

Figure 1 - Vicinity Map
Table 1 Project Components
Table 2 Project Activity and Reporting History
Table 3 – Project Components
Table 4 Project Attributes



The project site is located east of the town of Franklin in Macon County. Cat Creek Road (SR 1513) is located off of US 23/441 between Business 441 and US 64. If proceeding south on US 23 turn left onto Cat Creek Road. Proceed along Cat Creek Road for approximately 1.5 miles and turn left onto Ferguson Road to access the Preserve and the Parker tracts. Cat Creek crosses Ferguson Road about 1,900 feet from the turnoff from Cat Creek. Parking is available on either tract near the creek crossing.





Ecosystem Enhancement PROGRAM

FIGURE 1
VICINITY MAP

Monitoring Report - Year 1
Cat Creek Stream and Wetland
Restoration Site (EEP # 71)
Macon County, North Carolina

2,000 1,000 0 2,000 4,000 Feet

Table 1a. Project Components Cat Creek Stream and Wetland Restoration - EEP # 71 SCO # 050657901								
Project Component or Reach ID	**Existing Feet/Acres**	**Restoration Level**	**Approach**	**Footage or Acreage**	**Stationing**	**Buffer Acres**	**BMP Elements**	**Comment**
Cat Creek - Upper Swartwout	900 feet	E2		900 feet	10+00 - 19+00	10.6		Livestock exclusion, buffer plantings, bank stabilization in 3 locations
Cat Creek - Lower Swartwout	770 feet	R	P1	926 feet	19+00 - 28+26			
UT 1	363 feet	R	P1	457 feet	10+00 - 14+57			
Swartwout wetlands		R		1.11 acres				
		E		0.51 acres				Livestock exclusion, removal of drain pipe, plantings
UT 1	100 feet	E2		100 feet	NA			Livestock exclusion, buffer plantings
Cat Creek - Upper Waldroup	1463 feet	E2		1463 feet	NA	2.07	Equipment crossing and watering stations	Livestock exclusion, buffer plantings
Cat Creek - Lower Waldroup	480 feet	E1		480 feet	30+00 - 34+80		Cattle crossing and watering stations	Livestock exlusion, buffer plantings, and structures to provide enhanced profile
Cat Creek - Parker	1750 feet	R	P1	1820 feet	34+80 - 53+00	13		
UT 2	210 feet	R	P1	374 feet	10+00 - 13+74			
UT 3	165 feet	R	P1	287 feet	10+00 - 12+87			
Parker wetlands		R		4.73 acres				
		E		0.25 acres				
Cat Creek Preserve	1765 feet	E1		1852 feet	60+00 - 78+52	13.9		Grade control, turbulent riffles to add habitat, buffer plantings, and invasive species management
UT 4	110 feet	R	P1	230 feet	10+00 - 12+30			
Preserve wetlands		R		0.71 acres				
		E		0.66 acres				

Table 1b. Component Summations
Cat Creek Stream and Wetland Restoration - EEP # 71 (SCO # 050657901)

Restoration	Stream	Riparian		Non-Ripar	Upland	Buffer	
Level	(lf)	Wetland (Ac)		(Ac)	(Ac)	(Ac)	BMP
		Riverine	Non-Riverine				
Restoration	4,094	6.55					
Enhancement		1.42			31		
Enhancement I	2,332						
Enhancement II	2,463						
Creation							
Preservation							
HQ Preservation							
		7.97	0				
Totals	**8889**	**7.97**		**0**	**31**	**0**	**Count**

Non-Applicable

Table 2. Project Activity and Reporting History Cat Creek Stream and Wetland Restoration - EEP # 71 (SCO # 050657901)		
Activity or Deliverable	**Data Collection Complete**	**Completion or Delivery**
Mitigation Plan	Sep-07	Jul-07
Final Design – Construction Plans	Jul-08	Jul-08
Construction	NA	May-10
Temporary S&E mix applied to entire project area	NA	Jan-10
Permanent seed mix applied to entire project area	NA	Jan-10
Containerized and B&B plantings for entire project	NA	Mar-10
Mitigation Plan / As-built (Year 0 Monitoring – baseline)	Jun-10	Mar-11
Year 1 Monitoring	Dec-10	Mar-11
Year 2 Monitoring	Dec-11	-
Year 3 Monitoring	Dec-12	-
Year 4 Monitoring	Dec-13	-
Year 5 Monitoring	Dec-14	-

Table 3. Project Contacts Table Cat Creek Stream and Wetland Restoration - EEP # 71 (SCO # 050657901)	
Designer	AECOM 701 Corporate Center Drive, Suite 475 Raleigh, NC 27607 Phone: (919) 854-6200
Construction Contractor	Fluvial Sloutions P.O. Box 28749 Raleigh, NC 27611
Survey Contractor	Turner Land Surveying 3201 Glenridge Drive Raleigh, NC 27604
Planting Contractor	Bruton Natural Systems, Inc. Charlie Bruton PO Box 1197 Fremont, NC 27830 (919) 242-6555 Office
Seeding Contractor	Fluvial Solutions
Seed Mix Sources	Mellow Marsh Farm, Inc. 1312 Woody Store Rd. Siler City, NC 27344 Phone: (919) 742-1200
Nursery Stock Suppliers	Various
Monitoring Performers **Year 1 only**	AECOM 701 Corporate Center Drive, Suite 475 Raleigh, NC 27607
Stream Monitoring	AECOM Phone: (919) 854-6200
Vegetation Monitoring	AECOM Phone: (919) 854-6200

Table 4. Project Attribute Table
Cat Creek Stream and Wetland Restoration - EEP # 71 (SCO # 050657901)

Project County	Macon County
Physiographic Region	Mountains
Ecoregion	Blue Ridge Mountains - Broad Basins
Project River Basin	Little Tennessee River
USGS HUC for Project (14 digit)	6010202040010
NCDWQ Sub-basin for Project	04-04-01
Within extent of EEP Watershed Plan?	Yes -Franklin to Fontana Local Watershed Plan
WRC Hab Class (Warm, Cool, Cold)	Cool
% of project easement fenced or demarcated	100%
Beaver activity observed during design phase?	Yes

Restoration Component Attribute Table

	Cat Creek	Trib 1	Trib 2	Trib 3	Trib 4
Drainage area (square miles)	3.6	0.9	0.5	0.2	0.2
Stream order	3rd	2nd	2nd	1st	1st
Restored length (feet)	7,741	475	374	287	230
Perennial or Intermittent	Perennial	Perennial	Perennial	Perennial	Perennial
Watershed type (Rural, Urban, Developing etc.)	Rural	Rural	Rural	Rural	Rural
Watershed LULC Distribution (e.g.)					
Urban	0%	0%	0%	0%	0%
Ag-Pasture	30%	30%	50%	10%	80%
Forested	70%	70%	50%	90%	20%
Watershed impervious cover (%)	1%	1%	1%	1%	1%
NCDWQ AU/Index number					
NCDWQ classification	C	C	C	C	C
303d listed?	No	No	No	No	No
Upstream of a 303d listed segment?	No	No	No	No	No
Reasons for 303d listing or stressor	N/A	N/A	N/A	N/A	N/A
Total acreage of easement	39.6 acres total includes 2.1 acres in Conservation Easement on Waldroop property and acreage of Swartwout (10.6) , Parker (13), and Preserve (13.9) tracts owned fee simple by NCDOT.				
Total vegetated acreage within the easement	39.6 as described in total acreage of easement				
Total planted acreage as part of the restoration	20	Included in Cat Creek acreage			
Rosgen classification of pre-existing	G4	Cb4	N/A	N/A	N/A
Rosgen classification of As-built	C4	C4	C	C	Cb
Valley type	VII	VII	VII	VII	VII
Valley slope	0.0062 - 0.015	0.023	0.013	0.013	0.048
Valley side slope range (e.g. 2-3.%)	15 - 30%	15 - 30%	15 - 30%	15 - 30%	15 - 30%
Valley toe slope range (e.g. 2-3.%)	2 - 3 %	2 - 3 %	2 - 3 %	2 - 3 %	2 - 3 %
Cowardin classification					
Trout waters designation	N/A	N/A	N/A	N/A	N/A
Species of concern, endangered etc.? (Y/N)	No	No	No	No	No
Dominant soil series and characteristics					
Series	Nikwasi	Reddies	Nikwasi	Nikwasi	Udorthents
Depth	> 60 inches	> 60 inches	> 60 inches	> 60 inches	> 60 inches
Clay%	5 - 18%	1 - 18%	5 - 18%	5 - 18%	N/A
K	.05 - .20	.05 - .20	.05 - .20	.05 - .20	N/A
T	3	3	3	3	N/A

APPENDIX B

Visual Assessment Data

Figure 2 – Current Condition Plan View
Table 5 – Visual Stream Morphology Stability Assessment
Table 6 – Vegetation Condition Assessment
Stream Station Photos
Vegetation Plot photos

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Year 1 Conditions

Vegetation Plot Condition

- Criteria Met
- Criteria Unmet

Vegetation Problem Areas

- Invasive Population

Bed/Bank Condition

- Bed Degradation

Legend

- **Property Line**
- **Conservation Easement**
- **Environmentaly Sensitive Area**
- **Cross Section**
- **Vegetation Plots**
- **Monitor Well**
- **Photo Point**
- **Wetland Mitigation**
  - Wetland Enhancement
  - Wetland Restoration

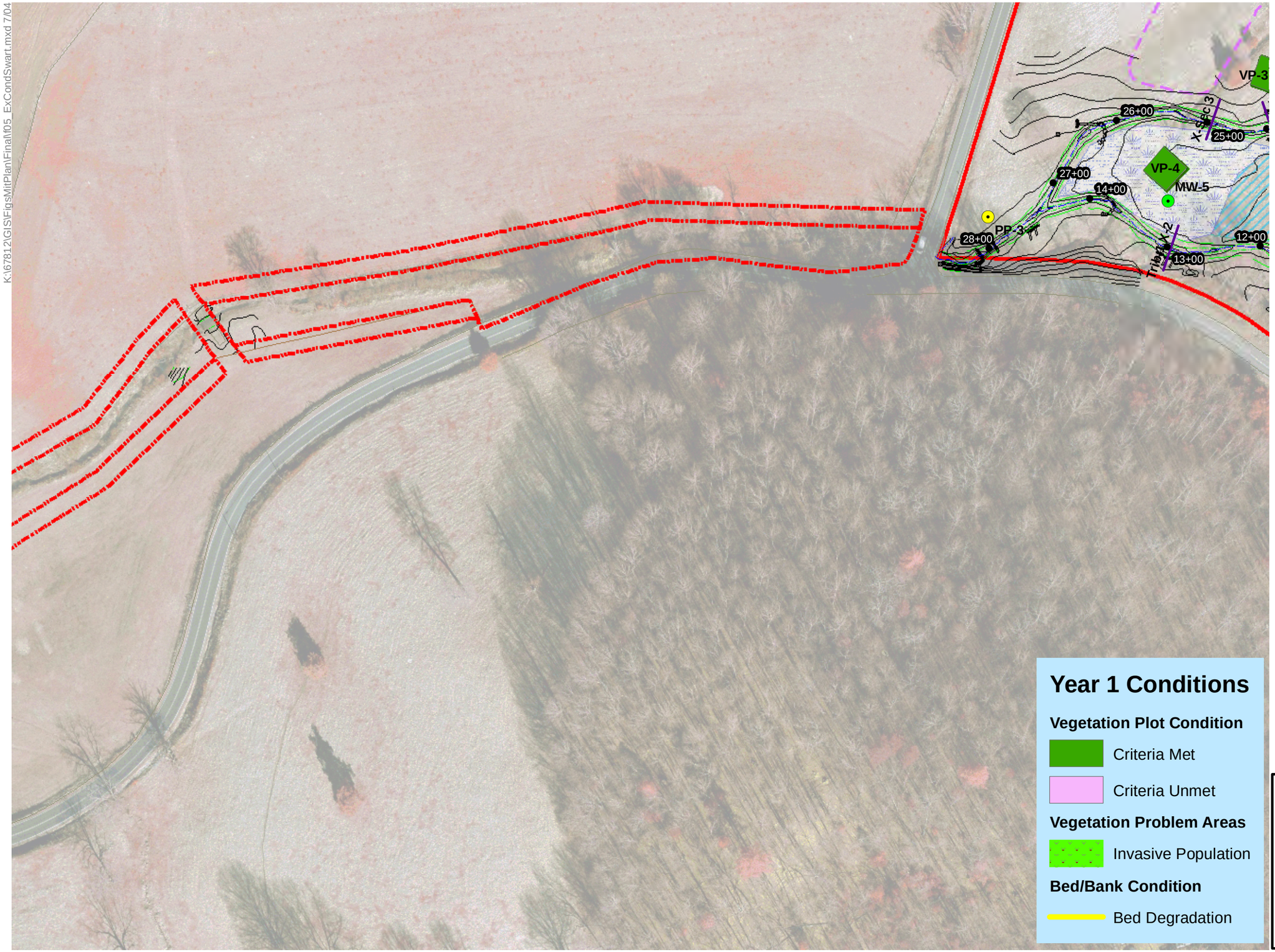
0 25 50 100 150 Feet

Ecosystem Enhancement Program

Figure 2
CURRENT CONDITION PLAN VIEW

Year 1 Monitoring Report
Cat Creek Stream and Wetland Restoration Site (EEP #71)
Macon County, North Carolina

K:\67812\GIS\FigsMitPlan\Final\f05_ExCondSwart.mxd 7/04



Legend

- Property Line
- Conservation Easement
- Environmentaly Sensitive Area
- Cross Section
- Vegetation Plots
- Monitor Well
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- Wetland Mitigation
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Year 1 Conditions

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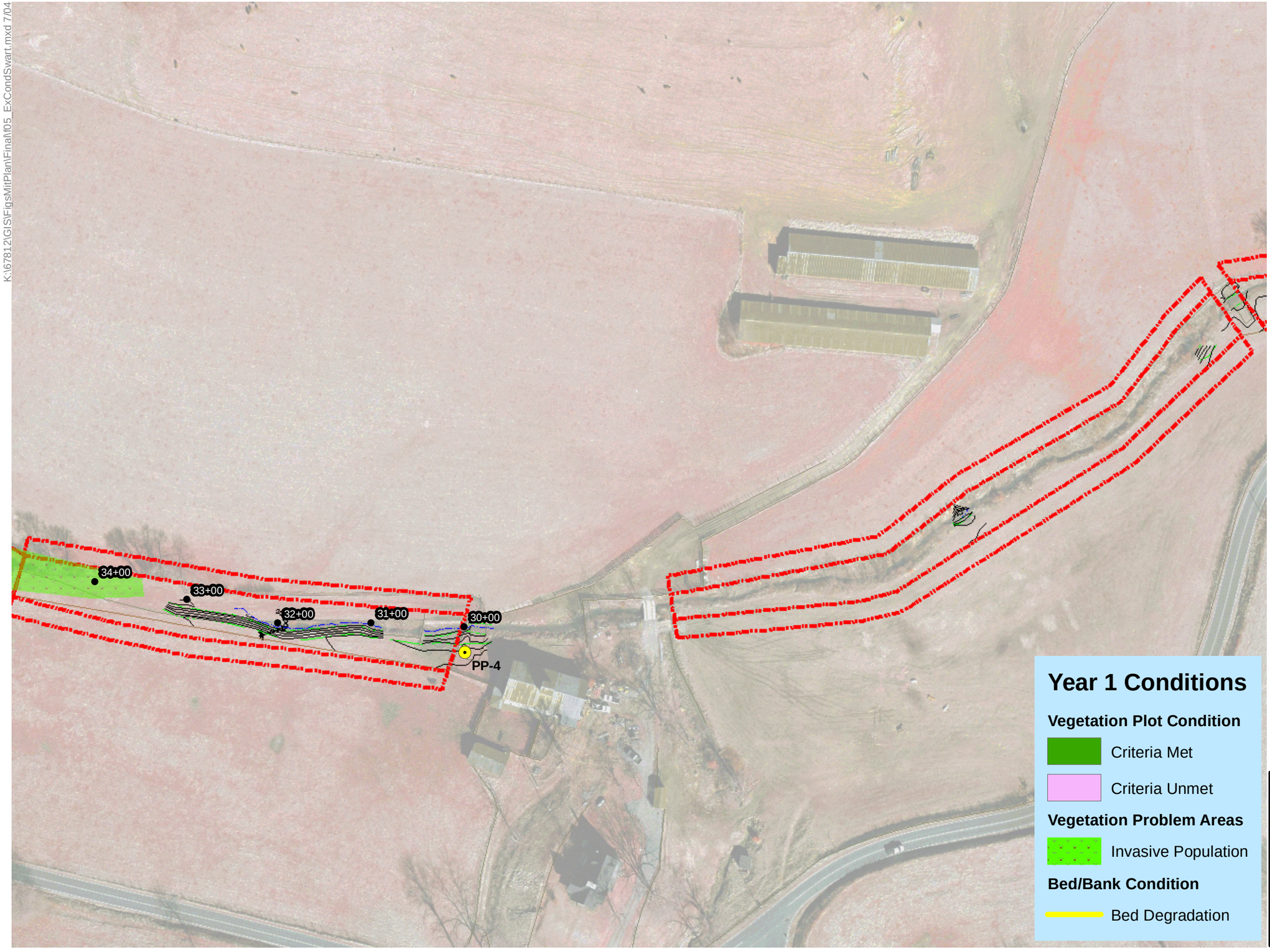
Ecosystem Enhancement Program

Figure 2
CURRENT CONDITION PLAN VIEW

Year 1 Monitoring Report
Cat Creek Stream and Wetland Restoration Site (EEP #71)
Macon County, North Carolina

K:\67812\GIS\FigsMitPlan\Final\f05_ExCondSwart.mxd 7/04



Year 1 Conditions

Vegetation Plot Condition

- Criteria Met
- Criteria Unmet

Vegetation Problem Areas

- Invasive Population

Bed/Bank Condition

- Bed Degradation

N
W E
S

Legend

- **Property Line**
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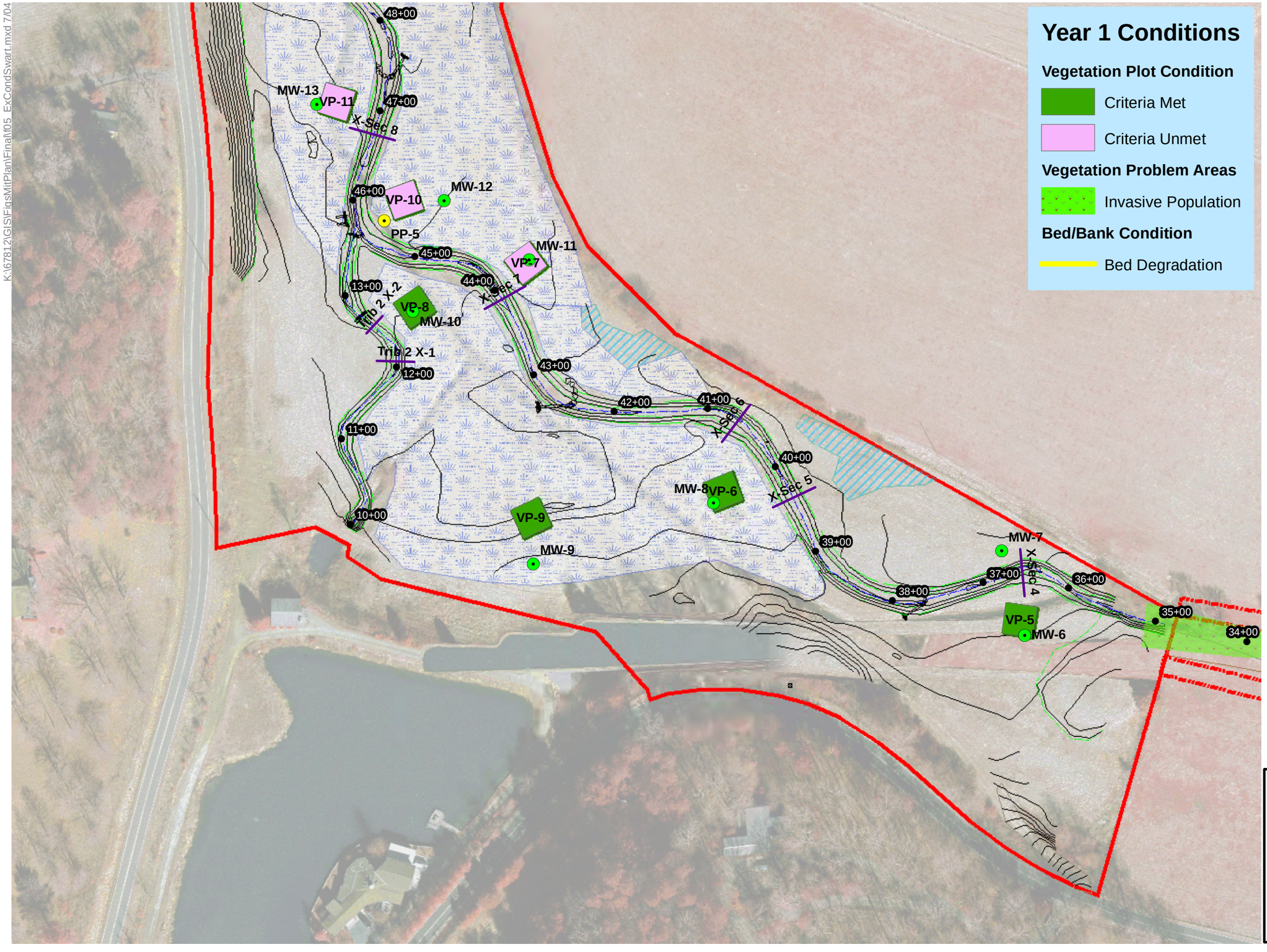
0 25 50 100 150 Feet

Ecosystem Enhancement Program

Figure 2
CURRENT CONDITION PLAN VIEW

Year 1 Monitoring Report
Cat Creek Stream and Wetland Restoration Site (EEP #71)
Macon County, North Carolina

K:\67812\GIS\FigsMitPlan\Final\f05_ExCondSwart.mxd 7/04



Year 1 Conditions

Vegetation Plot Condition

- Criteria Met
- Criteria Unmet

Vegetation Problem Areas

- Invasive Population

Bed/Bank Condition

- Bed Degradation

N W E S

Legend

- **Property Line**
- **Conservation Easement**
- **Environmentaly Sensitive Area**
- **Cross Section**
- **Vegetation Plots**
- **Monitor Well**
- **Photo Point**
- **Wetland Mitigation**
  - Wetland Enhancement
  - Wetland Restoration

0 25 50 100 150 Feet

Ecosystem Enhancement PROGRAM

Figure 2
CURRENT CONDITION PLAN VIEW

Year 1 Monitoring Report
Cat Creek Stream and Wetland Restoration Site (EEP #71)
Macon County, North Carolina

K:\67812\GIS\FigsMitPlan\Final\f05_ExCondSwart.mxd 7/04

Year 1 Conditions

Vegetation Plot Condition

- Criteria Met
- Criteria Unmet

Vegetation Problem Areas

- Invasive Population

Bed/Bank Condition

- Bed Degradation

Legend

- **Property Line**
- **Conservation Easement**
- **Environmentaly Sensitive Area**
- **Cross Section**
- **Vegetation Plots**
- **Monitor Well**
- **Photo Point**
- **Wetland Mitigation**
  - Wetland Enhancement
  - Wetland Restoration

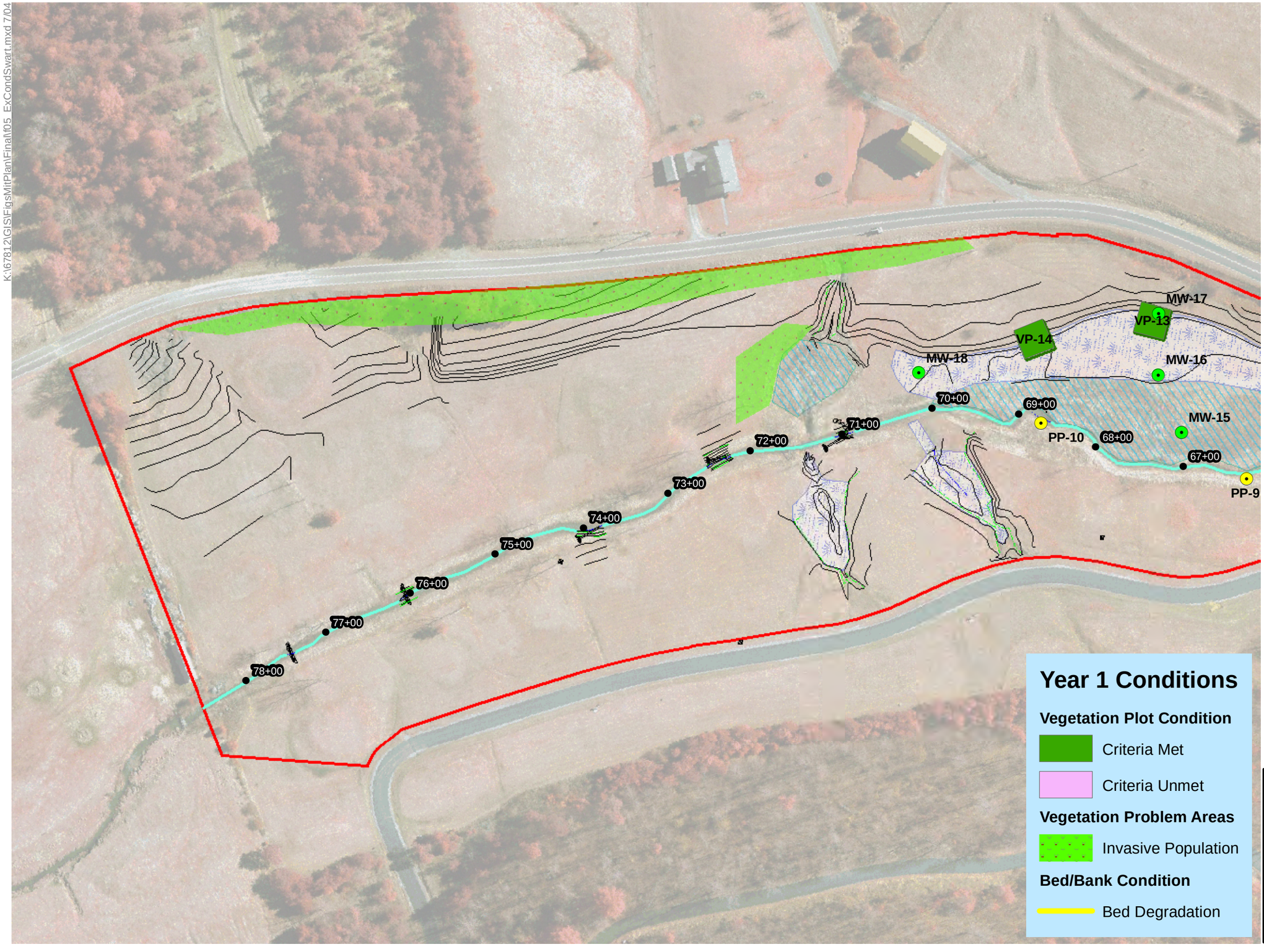
0 25 50 100 150 Feet

Ecosystem Enhancement Program

Figure 2
CURRENT CONDITION PLAN VIEW

Year 1 Monitoring Report
Cat Creek Stream and Wetland Restoration Site (EEP #71)
Macon County, North Carolina

K:\67812\GIS\FigsMitPlan\Final\f05_ExCondSwart.mxd 7/04



Year 1 Conditions

Vegetation Plot Condition

- Criteria Met
- Criteria Unmet

Vegetation Problem Areas

- Invasive Population

Bed/Bank Condition

- Bed Degradation

Legend

- Property Line
- Conservation Easement
- Environmentaly Sensitive Area
- Cross Section
- Vegetation Plots
- Monitor Well
- Photo Point

Wetland Mitigation

- Wetland Enhancement
- Wetland Restoration

0 25 50 100 150 Feet

Ecosystem Enhancement Program

Figure 2
CURRENT CONDITION PLAN VIEW

Year 1 Monitoring Report
Cat Creek Stream and Wetland Restoration Site (EEP #71)
Macon County, North Carolina

Table 5. Visual Morphological Stability Assessment
Cat Creek Stream and Wetland Restoration - EEP # 71 (SCO # 050657901)
Cat Creek Main Channel (626 ft on Swartwout tract and 1750 feet on Parker tract)

Feature Category	Metric (Per As-built and reference baselines)	# Stable Number Perform. as Intended	Total No. per As-built	Total Number/ feet in unstable state	% Perform. in stable condition	Feature Perform. Mean or Total
A. Riffles	1. Present?	19	19	NA	100	100
	2. Armor stable (e.g. no displacement)	19	19	0	100	100
	3. Facet grade appears stable	19	19	NA	100	100
	4. Minimal evidence of embedding/fining	19	19	NA	100	100
	5. Length appropriate	19	19	NA	100	100
B. Pools	1. Present? (e.g. not subject to severe aggrad. Or migrat.?)	16	16	0	100	100
	2. Sufficiently deep (Max Pool D:Mean Bkf>1.6?	NA	NA	NA	NA	NA
	3. Length appropriate?	16	16	NA	100	100
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	NA	NA	0	NA	NA
	2. Downstream of meander (glide/inflection) centering?	NA	NA	NA	NA	NA
D. Meanders	1. Outer bend in state of limited/controlled erosion?	16	16	0	100	100
	2. Of those eroding, # w/concomitant point bar formation?	NA	NA	NA	100	100
	3. Apparent Rc within spec?	16	16	NA	100	100
	4. Sufficient floodplain access and relief?	16	16	NA	100	100
E. Bed General	1. General channel bed aggradation areas (bar formation)	None	None	0	100	100
	2. Channel bed degradation - areas of increasing down-cutting or headcutting	None	None	0	100	100
F. Bank	1. Actively eroding, wasting, or slumping bank	None	None	0	100	100
G. Vanes	1. Free of back or arm scour?	12	12	NA	100	100
	2. Height appropriate?	12	12	NA	100	100
	3. Angle and geometry appear appropriate?	12	12	NA	100	100
	4. Free of piping or other structural failures?	12	12	NA	100	100
H. Wads/ Boulders	1. Free of scour?	2	2	0	NA	NA
	2. Footing stable?	2	2	0	NA	NA

Table 5. Visual Morphological Stability Assessment
Cat Creek Stream and Wetland Restoration - EEP # 71 (SCO # 050657901)
Tributary 1 (557 ft)

Feature Category	Metric (Per As-built and reference baselines)	# Stable Number Perform. as Intended	Total No. per As-built	Total Number/ feet in unstable state	% Perform. in stable condition	Feature Perform. Mean or Total
A. Riffles	1. Present?	6	6	NA	100	100
	2. Armor stable (e.g. no displacement)	6	6	0	100	100
	3. Facet grade appears stable	6	6	NA	100	100
	4. Minimal evidence of embedding/fining	6	6	NA	100	100
	5. Length appropriate	6	6	NA	100	100
B. Pools	1. Present? (e.g. not subject to severe aggrad. Or migrat.?)	5	5	NA	100	100
	2. Sufficiently deep (Max Pool D:Mean Bkf>1.6?	NA	NA	NA	NA	NA
	3. Length appropriate?	5	5	NA	100	100
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	NA	NA	NA	NA	NA
	2. Downstream of meander (glide/inflection) centering?	NA	NA	NA	NA	NA
D. Meanders	1. Outer bend in state of limited/controlled erosion?	5	5	NA	100	100
	2. Of those eroding, # w/concomitant point bar formation?	NA	NA	NA	100	100
	3. Apparent Rc within spec?	5	5	NA	100	100
	4. Sufficient floodplain access and relief?	5	5	NA	100	100
E. Bed General	1. General channel bed aggradation areas (bar formation)	None	None		100	100
	2. Channel bed degradation - areas of increasing down-cutting or headcutting	None	None		100	100
F. Bank	1. Actively eroding, wasting, or slumping bank	None	None		100	100
G. Vanes	1. Free of back or arm scour?	2	2	NA	100	100
	2. Height appropriate?	2	2	NA	100	100
	3. Angle and geometry appear appropriate?	2	2	NA	100	100
	4. Free of piping or other structural failures?	2	2	NA	100	100
H. Wads/ Boulders	1. Free of scour?	1	1	NA	NA	NA
	2. Footing stable?	1	1	NA	NA	NA

Table 6. Vegetation Condition Assessment
Cat Creek Stream and Wetland Restoration - EEP # 71 (SCO # 050657901)

Planted Areage

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of botyh woody and herbaceous material	0.1 acres	NA	0	0	0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria	0.1 acres	NA	0	0	0%
			Total			
3. Ares of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitor year	0.25 acres	NA	0	0	0%
			Cumulative Total			

Easement Acreage

4. Invasive Areas of Concern		1000 SF	Bright Green	5	1	3%
5. Eaement Enchroachment Areas		None	NA	None	0	0%

Stream Station Photographs

Photo too dark to see detail

Stream Station 1 – 11/09/2010 – Year 1 Monitoring

Stream Station 2 – 8/12/2010 – Year 1 Monitoring

Stream Station Photographs

Stream Station 3 – 6/11/2010 – Year 1 Monitoring

Stream Station 4 – 11/09/2010 – Year 1 Monitoring

Stream Station Photographs

Stream Station 5 – 11/09/2010 – Year 1 Monitoring

Stream Station 6 – 11/09/2010 – Year 1 Monitoring

Stream Station Photographs

Stream Station 7 – 11/09/2010 – Year 1 Monitoring

Stream Station 8 – 11/09/2010 – Year 1 Monitoring

Stream Station Photographs

Stream Station 9 – 11/09/2010 – Year 1 Monitoring

Stream Station 10 – 11/09/2010 – Year 1 Monitoring

Vegetation Plot Photographs

Vegetation Plot 1 – 11/09/2010 – Year 1 Monitoring

Vegetation Plot 2 – 11/09/2010 – Year 1 Monitoring

Vegetation Plot Photographs

Vegetation Plot 3 – 11/09/2010 – Year 1 Monitoring

Vegetation Plot 4 – 11/09/2010 – Year 1 Monitoring

Vegetation Plot 5 – 11/09/2010 – Year 1 Monitoring

Vegetation Plot 6 – 11/09/2010 – Year 1 Monitoring

Vegetation Plot Photographs

Vegetation Plot 7 – 11/09/2010 – Year 1 Monitoring

Vegetation Plot 8 – 11/09/2010 – Year 1 Monitoring

Vegetation Plot Photographs

Vegetation Plot 9 – 11/09/2010 – Year 1 Monitoring

Vegetation Plot 10 – 11/09/2010 – Year 1 Monitoring

Vegetation Plot 11 – 11/09/2010 – Year 1 Monitoring

Vegetation Plot 12 – 11/09/2010 – Year 1 Monitoring

Vegetation Plot 13 – 11/09/2010 – Year 1 Monitoring

Vegetation Plot 14 – 11/09/2010 – Year 1 Monitoring

APPENDIX C

Vegetative Data

Table 7 – Vegetation Plot Mitigation Success Summary
Table 8 – CVS Vegetation Metadata
Table 9 – Stem Counts for Each Species by Plot

Table 7. Vegetation Plot Mitigation Success Summary
Cat Creek Stream and Wetland Restoration - EEP # 71 (SCO # 050657901)

Plot ID	Community Type	Planting Zone ID	Vegetation Survival Threshold Met?	Tract Mean
1	Swamp Forest Bog Complex	Wetlands	Yes	
2	Swamp Forest Bog Complex	Wetlands	No	
3	Low Mountain Alluvial Forest	Well Drained	Yes	
4	Swamp Forest Bog Complex	Wetlands	Yes	
5	Mesic Mixed Hardwood Forest	Well Drained	Yes	
6	Swamp Forest Bog Complex	Wetlands	Yes	
7	Swamp Forest Bog Complex	Wetlands	No	
8	Swamp Forest Bog Complex	Wetlands	Yes	
9	Swamp Forest Bog Complex	Wetlands	Yes	
10	Swamp Forest Bog Complex	Wetlands	No	
11	Swamp Forest Bog Complex	Wetlands	Yes	
12	Swamp Forest Bog Complex	Wetlands	No	
13	Swamp Forest Bog Complex	Wetlands	Yes	
14	Swamp Forest Bog Complex	Wetlands	Yes	

Table 8. cvs Vegetation Plot Metadata Cat Creek Stream and Wetland Restoration - EEP # 71 (SCO # 050657901)	
Report Prepared By	Ron Johnson
Date Prepared	3/15/2011 9:24
database name	Cat_Creek_cvs-eep-entrytool-v2.2.7.mdb
database location	Q:\92531\Monitoring\Vegetation
computer name	USRAL3LT068
file size	38666240
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
PROJECT SUMMARY----------	
Project Code	1
project Name	Cat Creek
Description	
River Basin	Little Tennessee
length(ft)	5500
stream-to-edge width (ft)	50
area (sq m)	51091.5
Required Plots (calculated)	13
Sampled Plots	0

Table 9. Stem Counts for Each Species by Plot
Cat Creek/EEP Project # 71 (SCO # 050657901)

Species		Plots														Year 1	Year 0
Scientific Name	**Common Name**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**		
Shrubs																	
Alnus serrulata	Hazel alder		2	5		1	5	1	3	2	2	3	1		2	***27***	***29***
Sambucus canadensis	Common elderberry														2	***2***	***6***
Cephalanthus occidentalis	Common buttonbush					1				1						***2***	***2***
Total Shrubs		**0**	**2**	**5**	**0**	**2**	**5**	**1**	**3**	**3**	**2**	**3**	**1**	**0**	**4**	**31**	**37**
Trees																	
Aronia arbutifolia	Red chokeberry						2	1		1					3	***7***	***7***
Betula nigra	River birch		2		3	1	2		6	1		3		2		***20***	***17***
Carpinus caroliniana	American hornbeam	1		3	2	1			4	1			2		1	***15***	***20***
Cornus florida	Flowering dogwood													1		***1***	***1***
Fagus grandifolia	American beech						1							1	3	***5***	***5***
Fraxinus pennsylvanica	Green ash			1	1	3	1		2			1		4	1	***14***	***15***
Juglans nigra	black walnut	1														***1***	***1***
Liriodendron tulipifera	Tuliptree			3			1									***4***	***7***
Nyssa sylvatica	Blackgum	3														***3***	***3***
Platanus occidentalis	American sycamore	3					1								1	***5***	***5***
Quercus phellos	Willow oak		1		2	2	5	4	2	3		1	2			***22***	***24***
Quercus rubra	Northern red oak		1													***1***	***1***
Ulmus americana	American elm									2						***2***	***4***
Unknown					2											***2***	***3***
Total Trees		**8**	**4**	**7**	**10**	**7**	**13**	**5**	**14**	**8**	**0**	**5**	**4**	**8**	**9**	**102**	**113**
TABLE SUMMARY	*Total Stems of planted woody vegetation*	**8**	**6**	**12**	**10**	**9**	**18**	**6**	**17**	**11**	**2**	**8**	**5**	**8**	**13**	**133**	**150**
	Current Density																
	Shrubs per acre	**0**	**81**	**202**	**0**	**81**	**202**	**40**	**121**	**121**	**81**	**121**	**40**	**0**	**162**	**139**	**166**
	Shrubs per hectare	**0**	**200**	**500**	**0**	**200**	**500**	**100**	**300**	**300**	**200**	**300**	**100**	**0**	**400**	**344**	**411**
	Trees per acre	**324**	**162**	**283**	**405**	**283**	**526**	**202**	**567**	**324**	**0**	**202**	**162**	**324**	**364**	**459**	**508**
	Trees per hectare	**800**	**400**	**700**	**1000**	**700**	**1300**	**500**	**1400**	**800**	**0**	**500**	**400**	**800**	**900**	**1133**	**1256**
	Total stems per acre	***324***	***243***	***486***	***405***	***364***	***728***	***243***	***688***	***445***	***81***	***324***	***202***	***324***	***526***	***598***	***674***
	Total stems per hectare	***800***	***600***	***1200***	***1000***	***900***	***1800***	***600***	***1700***	***1100***	***200***	***800***	***500***	***800***	***1300***	***1478***	***1667***

Note: No volunteer stems were counted during the Year 1 montioring. Stems shown above are all planted stems.

APPENDIX D

Morphological Summary and Data Plots

Cross-section Plots
Longitudinal Profile Plot
Pebble Count Plots
Table 10 – Baseline Stream Data Summary
Table 11 – Morphology and Hydraulic Monitoring Summary

Cross-section Plot Exhibit

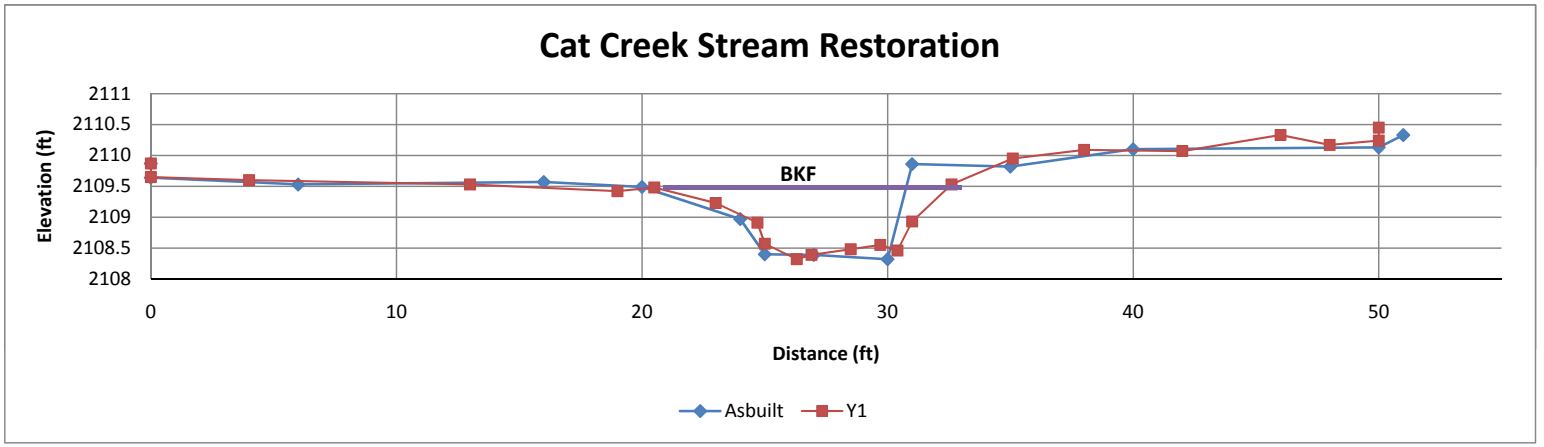
River Basin	Little Tennessee
Watershed	Cat Creek
X-Sec ID	1
Feature	Riffle
Dranage Area (sq mi)	1.2
Date	Dec-10
Field Crew	Ron Johnson, Ian Jewell

Station	Elevation
0	2109.65
4	2109.6
13	2109.53
19	2109.42
20.5	2109.48
23	2109.23
24.7	2108.91
25	2108.57
26.3	2108.32
26.9	2108.39
28.5	2108.48
29.7	2108.55
30.4	2108.46
31	2108.93
32.6	2109.53
35.1	2109.95
38	2110.09
42	2110.07
46	2110.33
48	2110.17
50	2110.24

Summary Data

Bankfull Elevation	2019.48
Bankfull Width (ft)	11.97
Floodprone Width (ft)	45
Bankfull Mean Depth (ft)	0.64
Bankfull Max Depth (ft)	1.16
Bankfull Cross Sectional Area (ft^2)	7.64
Bankfull Width/Depth Ratio	18.7
Bankfull Entrenchment Ratio	3.76

Photo: Sta. 21+40 looking downstream stream



Cross-section Plot Exhibit

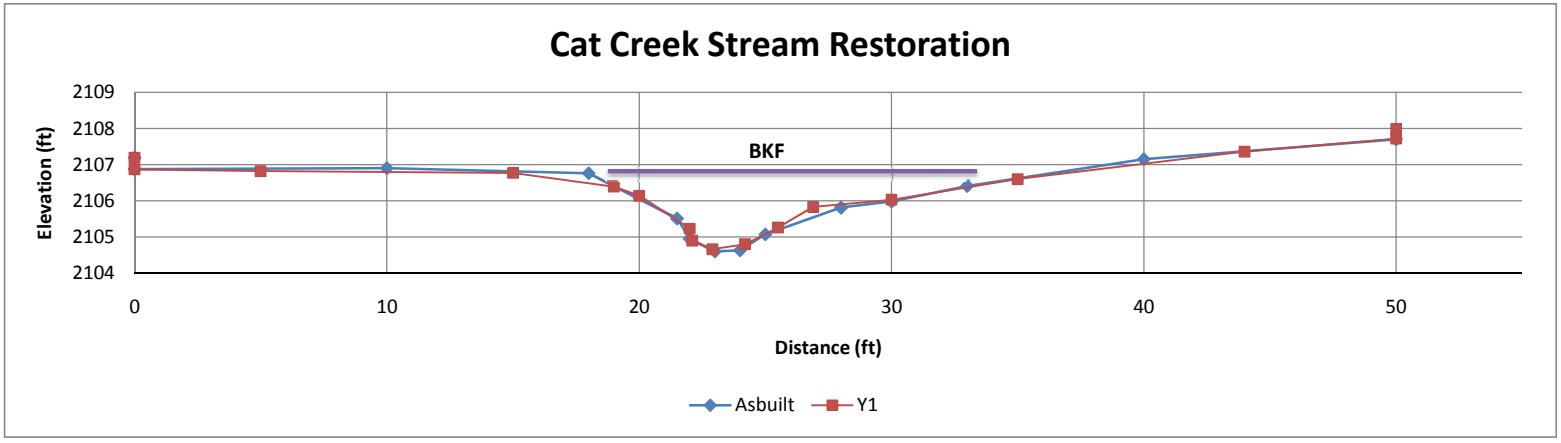
River Basin	Little Tennessee
Watershed	Cat Creek
X-Sec ID	2
Feature	Pool
Dranage Area (sq mi)	1.2
Date	Dec-10
Field Crew	Ron Johnson, Ian Jewell

Station	Elevation
0	2107.19
5	2106.87
15	2106.82
19	2106.77
20	2106.39
22	2106.14
22.1	2105.23
22.9	2104.9
24.2	2104.66
25.5	2104.8
26.9	2105.26
30	2105.83
35	2106.03
44	2106.6
50	2107.36
	2107.72
	2107.99

Summary Data

Bankfull Elevation	2106.77
Bankfull Width (ft)	22.01
Floodprone Width (ft)	60
Bankfull Mean Depth (ft)	0.77
Bankfull Max Depth (ft)	2.73
Bankfull Cross Sectional Area (ft^2)	16.88
Bankfull Width/Depth Ratio	28.58
Bankfull Entrenchment Ratio	2.73

Photo: Sta. 24+00 looking downstream



Cross-section Plot Exhibit

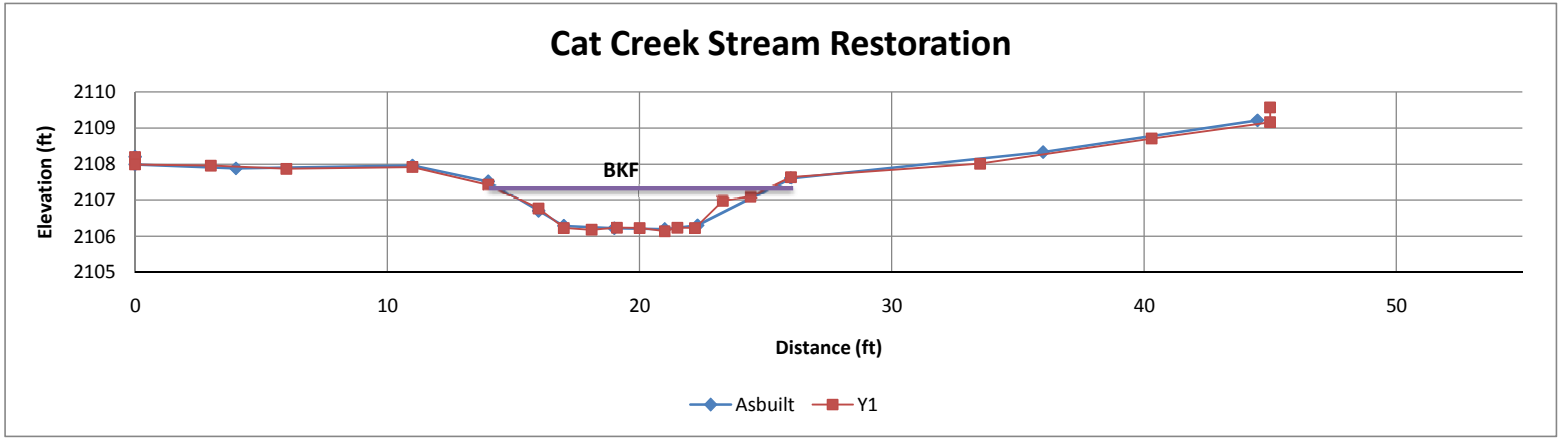
River Basin	Little Tennessee
Watershed	Cat Creek
X-Sec ID	3
Feature	Riffle
Dranage Area (sq mi)	1.2
Date	Dec-10
Field Crew	Ron Johnson, Ian Jewell

Station	Elevation
0	2109.65
4	2109.6
13	2109.53
19	2109.42
20.5	2109.48
23	2109.23
24.7	2108.91
25	2108.57
26.3	2108.32
26.9	2108.39
28.5	2108.48
29.7	2108.55
30.4	2108.46
31	2108.93
32.6	2109.53
35.1	2109.95
38	2110.09
42	2110.07
46	2110.33
48	2110.17
50	2110.24

Summary Data

Bankfull Elevation	2107.61
Bankfull Width (ft)	13.26
Floodprone Width (ft)	45
Bankfull Mean Depth (ft)	0.9
Bankfull Max Depth (ft)	1.5
Bankfull Cross Sectional Area (ft^2)	12.02
Bankfull Width/Depth Ratio	14.77
Bankfull Entrenchment Ratio	3.39

Photo: Sta. 25+00 looking downstream



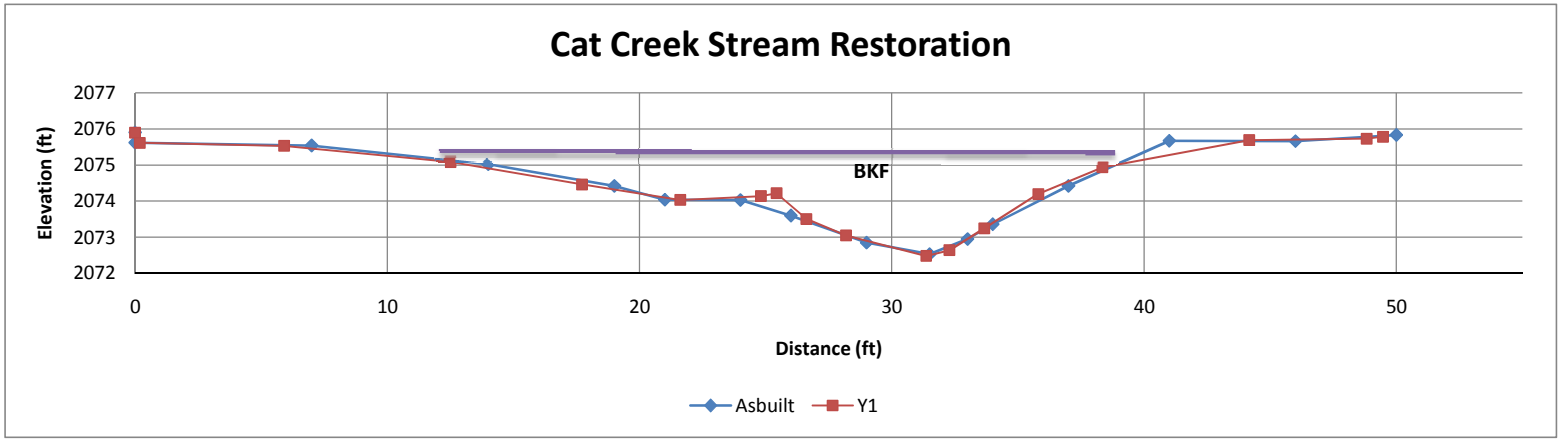
Cross-section Plot Exhibit

River Basin	Little Tennessee
Watershed	Cat Creek
X-Sec ID	4
Feature	Pool
Dranage Area (sq mi)	2
Date	Dec-10
Field Crew	Ron Johnson, Ian Jewell

Station	Elevation
0	2109.65
4	2109.6
13	2109.53
19	2109.42
20.5	2109.48
23	2109.23
24.7	2108.91
25	2108.57
26.3	2108.32
26.9	2108.39
28.5	2108.48
29.7	2108.55
30.4	2108.46
31	2108.93
32.6	2109.53
35.1	2109.95
38	2110.09
42	2110.07
46	2110.33
48	2110.17
50	2110.24

Summary Data	
Bankfull Elevation	2075.02
Bankfull Width (ft)	25.96
Floodprone Width (ft)	80
Bankfull Mean Depth (ft)	1.09
Bankfull Max Depth (ft)	2.54
Bankfull Cross Sectional Area (ft^2)	28.18
Bankfull Width/Depth Ratio	23.82
Bankfull Entrenchment Ratio	3.08

Photo: Sta. 36+50 looking downstream



Cross-section Plot Exhibit

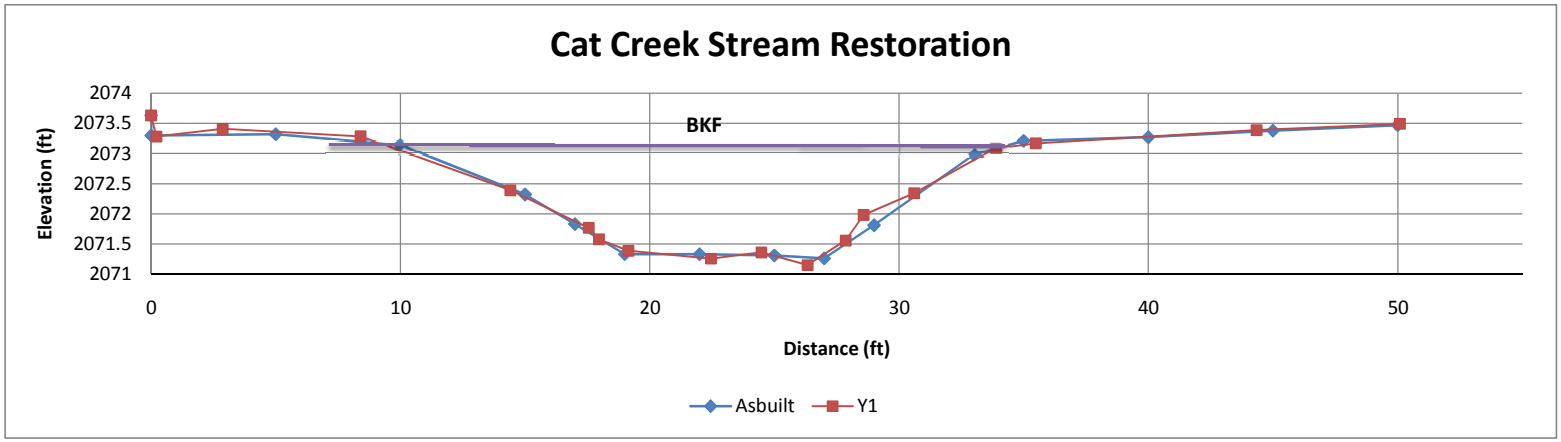
River Basin	Little Tennessee
Watershed	Cat Creek
X-Sec ID	5
Feature	Riffle
Dranage Area (sq mi)	2
Date	Dec-10
Field Crew	Ron Johnson, Ian Jewell

Station	Elevation
0	2109.65
4	2109.6
13	2109.53
19	2109.42
20.5	2109.48
23	2109.23
24.7	2108.91
25	2108.57
26.3	2108.32
26.9	2108.39
28.5	2108.48
29.7	2108.55
30.4	2108.46
31	2108.93
32.6	2109.53
35.1	2109.95
38	2110.09
42	2110.07
46	2110.33
48	2110.17
50	2110.24

Summary Data

Bankfull Elevation	2073.08
Bankfull Width (ft)	24.06
Floodprone Width (ft)	180
Bankfull Mean Depth (ft)	1.11
Bankfull Max Depth (ft)	1.93
Bankfull Cross Sectional Area (ft^2)	26.6
Bankfull Width/Depth Ratio	21.7
Bankfull Entrenchment Ratio	7.48

Photo: Sta. 39+50 looking downstream



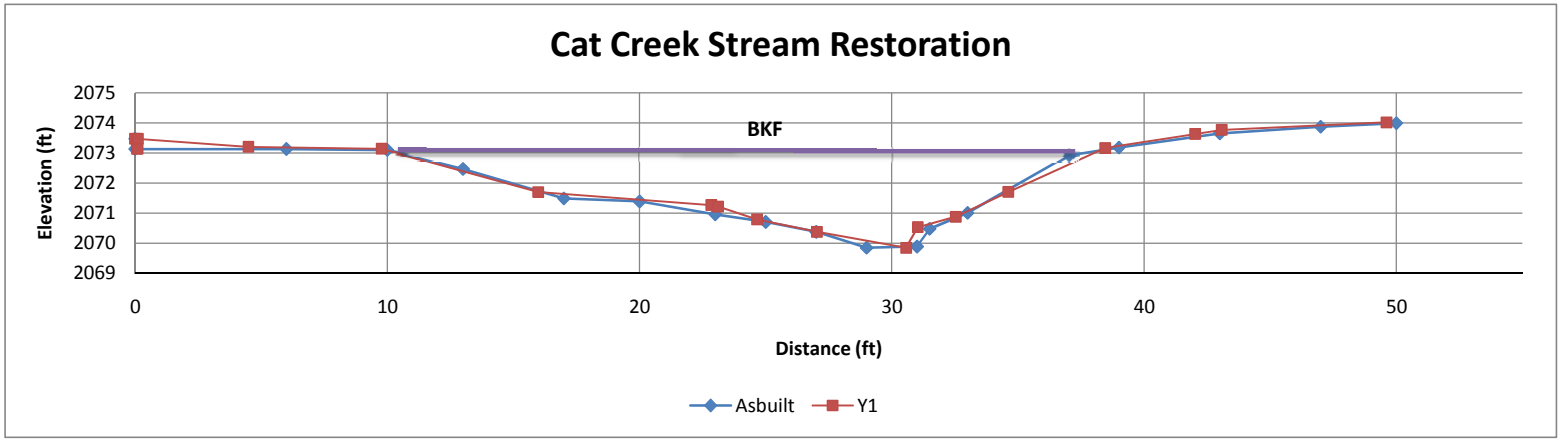
Cross-section Plot Exhibit

River Basin	Little Tennessee
Watershed	Cat Creek
X-Sec ID	6
Feature	Pool
Dranage Area (sq mi)	2
Date	Dec-10
Field Crew	Ron Johnson, Ian Jewell

Station	Elevation
0	2109.65
4	2109.6
13	2109.53
19	2109.42
20.5	2109.48
23	2109.23
24.7	2108.91
25	2108.57
26.3	2108.32
26.9	2108.39
28.5	2108.48
29.7	2108.55
30.4	2108.46
31	2108.93
32.6	2109.53
35.1	2109.95
38	2110.09
42	2110.07
46	2110.33
48	2110.17
50	2110.24

Summary Data	
Bankfull Elevation	2073.14
Bankfull Width (ft)	28.6
Floodprone Width (ft)	160
Bankfull Mean Depth (ft)	1.68
Bankfull Max Depth (ft)	3.29
Bankfull Cross Sectional Area (ft^2)	47.96
Bankfull Width/Depth Ratio	17.02
Bankfull Entrenchment Ratio	5.59

Photo: Sta. 40+70 looking downstream



Cross-section Plot Exhibit

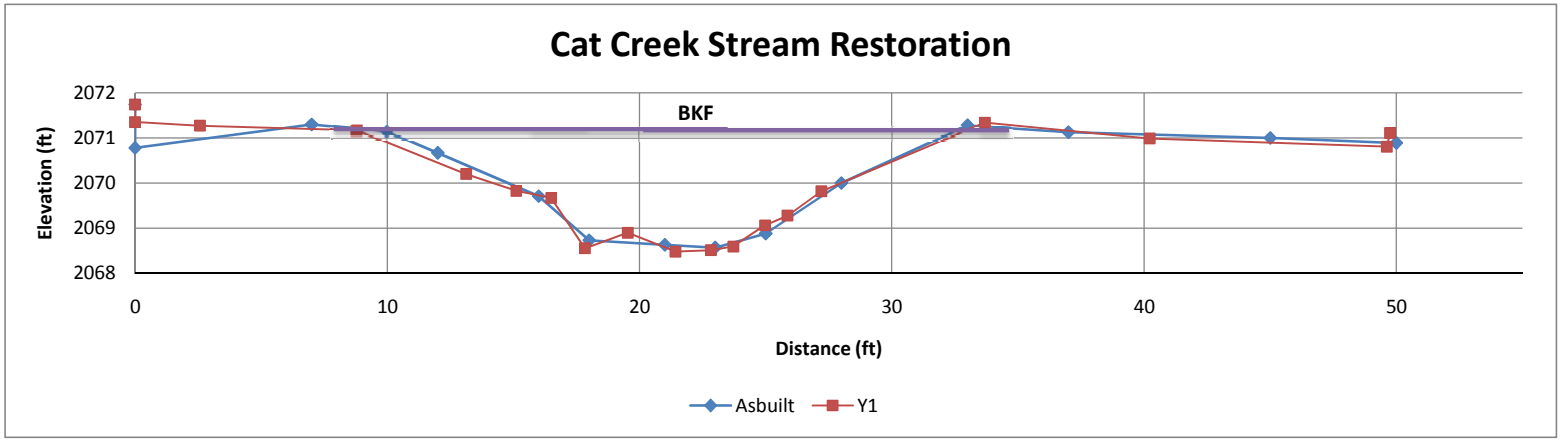
River Basin	Little Tennessee
Watershed	Cat Creek
X-Sec ID	7
Feature	Riffle
Dranage Area (sq mi)	2
Date	Dec-10
Field Crew	Ron Johnson, Ian Jewell

Station	Elevation
0	2109.65
4	2109.6
13	2109.53
19	2109.42
20.5	2109.48
23	2109.23
24.7	2108.91
25	2108.57
26.3	2108.32
26.9	2108.39
28.5	2108.48
29.7	2108.55
30.4	2108.46
31	2108.93
32.6	2109.53
35.1	2109.95
38	2110.09
42	2110.07
46	2110.33
48	2110.17
50	2110.24

Summary Data

Bankfull Elevation	2071.6
Bankfull Width (ft)	23.96
Floodprone Width (ft)	270
Bankfull Mean Depth (ft)	1.45
Bankfull Max Depth (ft)	2.69
Bankfull Cross Sectional Area (ft^2)	34.82
Bankfull Width/Depth Ratio	16.52
Bankfull Entrenchment Ratio	11.27

Photo: Sta. 40+70 looking downstream



Cross-section Plot Exhibit

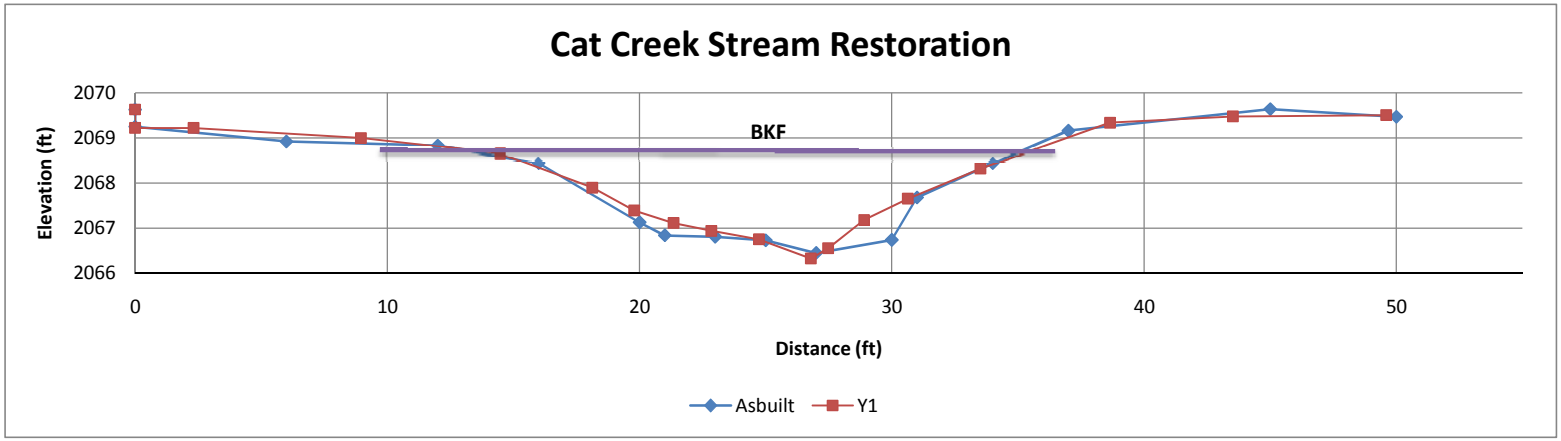
River Basin	Little Tennessee
Watershed	Cat Creek
X-Sec ID	8
Feature	Riffle
Dranage Area (sq mi)	2.5
Date	Dec-10
Field Crew	Ron Johnson, Ian Jewell

Station	Elevation
0	2109.65
4	2109.6
13	2109.53
19	2109.42
20.5	2109.48
23	2109.23
24.7	2108.91
25	2108.57
26.3	2108.32
26.9	2108.39
28.5	2108.48
29.7	2108.55
30.4	2108.46
31	2108.93
32.6	2109.53
35.1	2109.95
38	2110.09
42	2110.07
46	2110.33
48	2110.17
50	2110.24

Summary Data

Bankfull Elevation	2068.65
Bankfull Width (ft)	20.68
Floodprone Width (ft)	170
Bankfull Mean Depth (ft)	1.15
Bankfull Max Depth (ft)	2.32
Bankfull Cross Sectional Area (ft^2)	23.75
Bankfull Width/Depth Ratio	17.98
Bankfull Entrenchment Ratio	8.22

Photo: Sta. 46+50 looking downstream



Cross-section Plot Exhibit

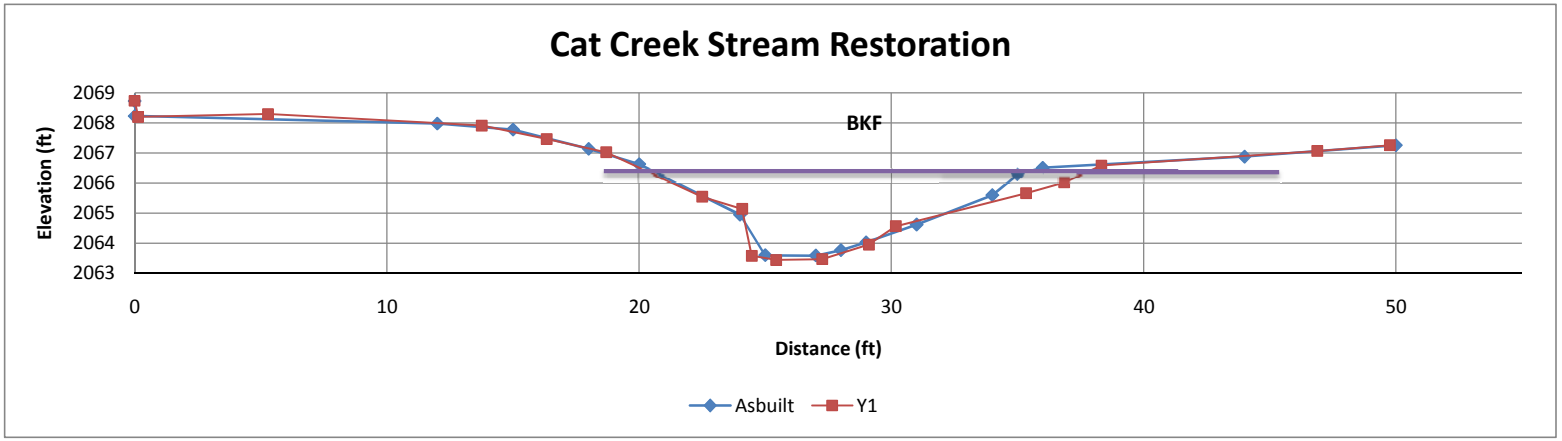
River Basin	Little Tennessee
Watershed	Cat Creek
X-Sec ID	9
Feature	Pool
Dranage Area (sq mi)	2.5
Date	Dec-10
Field Crew	Ron Johnson, Ian Jewell

Station	Elevation
0	2109.65
4	2109.6
13	2109.53
19	2109.42
20.5	2109.48
23	2109.23
24.7	2108.91
25	2108.57
26.3	2108.32
26.9	2108.39
28.5	2108.48
29.7	2108.55
30.4	2108.46
31	2108.93
32.6	2109.53
35.1	2109.95
38	2110.09
42	2110.07
46	2110.33
48	2110.17
50	2110.24

Summary Data

Bankfull Elevation	2066.51
Bankfull Width (ft)	18.49
Floodprone Width (ft)	260
Bankfull Mean Depth (ft)	1.61
Bankfull Max Depth (ft)	3.14
Bankfull Cross Sectional Area (ft^2)	29.73
Bankfull Width/Depth Ratio	11.48
Bankfull Entrenchment Ratio	14.06

Photo: Sta. 49+60 looking downstream



Cross-section Plot Exhibit

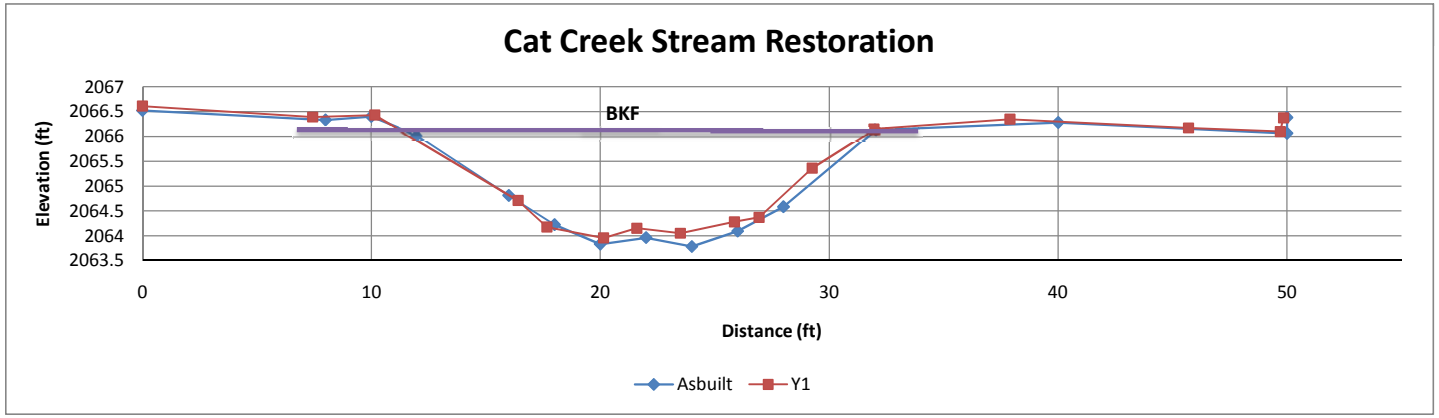
River Basin	Little Tennessee
Watershed	Cat Creek
X-Sec ID	10
Feature	Riffle
Dranage Area (sq mi)	2.5
Date	Dec-10
Field Crew	Ron Johnson, Ian Jewell

Station	Elevation
0	2109.65
4	2109.6
13	2109.53
19	2109.42
20.5	2109.48
23	2109.23
24.7	2108.91
25	2108.57
26.3	2108.32
26.9	2108.39
28.5	2108.48
29.7	2108.55
30.4	2108.46
31	2108.93
32.6	2109.53
35.1	2109.95
38	2110.09
42	2110.07
46	2110.33
48	2110.17
50	2110.24

Summary Data

Bankfull Elevation	2066.15
Bankfull Width (ft)	23.63
Floodprone Width (ft)	140
Bankfull Mean Depth (ft)	1.22
Bankfull Max Depth (ft)	2.19
Bankfull Cross Sectional Area (ft^2)	28.8
Bankfull Width/Depth Ratio	19.37
Bankfull Entrenchment Ratio	5.92

Photo: Sta. 51+00 looking downstream



Cross-section Plot Exhibit

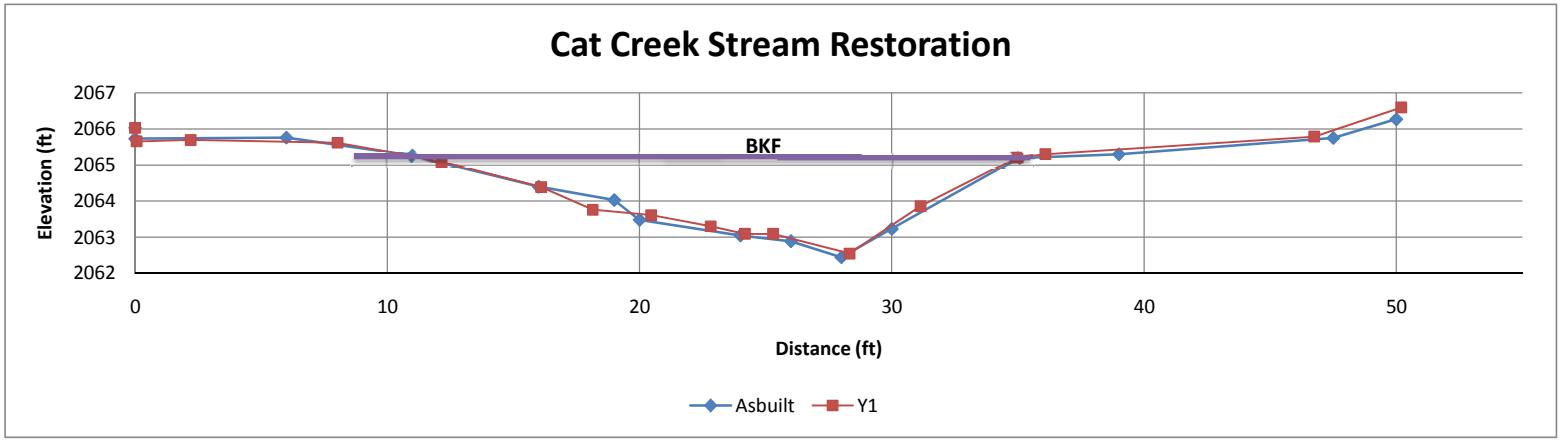
River Basin	Little Tennessee
Watershed	Cat Creek
X-Sec ID	11
Feature	Pool
Dranage Area (sq mi)	2.5
Date	Dec-10
Field Crew	Ron Johnson, Ian Jewell

Station	Elevation
0	2109.65
4	2109.6
13	2109.53
19	2109.42
20.5	2109.48
23	2109.23
24.7	2108.91
25	2108.57
26.3	2108.32
26.9	2108.39
28.5	2108.48
29.7	2108.55
30.4	2108.46
31	2108.93
32.6	2109.53
35.1	2109.95
38	2110.09
42	2110.07
46	2110.33
48	2110.17
50	2110.24

Summary Data

Bankfull Elevation	2065.2
Bankfull Width (ft)	23.73
Floodprone Width (ft)	140
Bankfull Mean Depth (ft)	1.37
Bankfull Max Depth (ft)	2.66
Bankfull Cross Sectional Area (ft^2)	32.43
Bankfull Width/Depth Ratio	17.32
Bankfull Entrenchment Ratio	5.9

Photo: Sta. 51+70 looking downstream



Cross-section Plot Exhibit

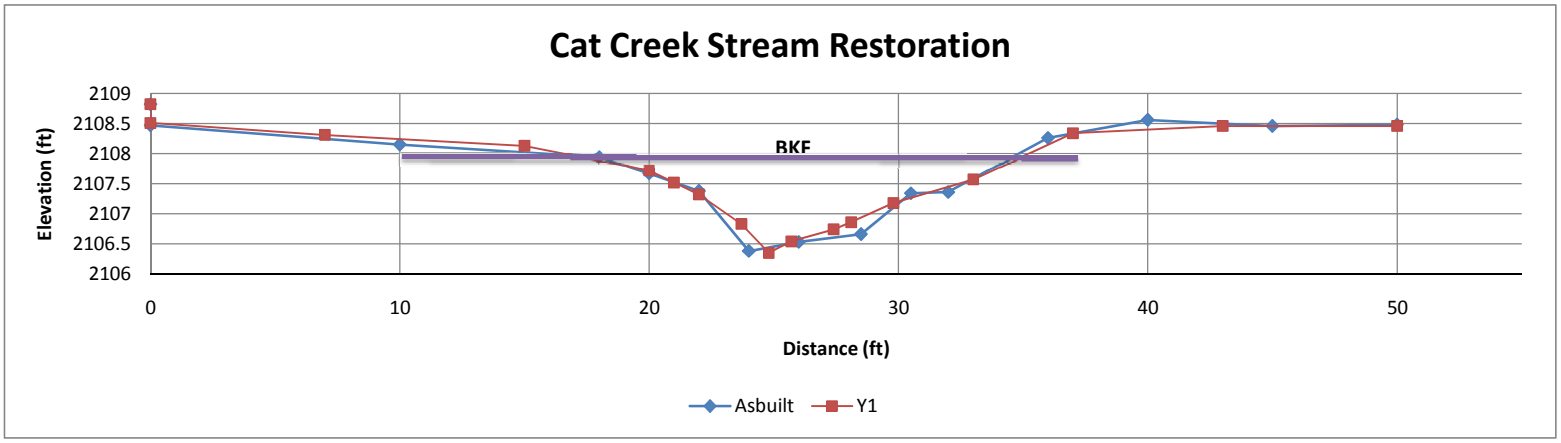
River Basin	Little Tennessee
Watershed	Trib 1 to Cat Creek
X-Sec ID	1
Feature	Riffle
Dranage Area (sq mi)	0.9
Date	Dec-10
Field Crew	Ron Johnson, Ian Jewell

Station	Elevation
0	2109.65
4	2109.6
13	2109.53
19	2109.42
20.5	2109.48
23	2109.23
24.7	2108.91
25	2108.57
26.3	2108.32
26.9	2108.39
28.5	2108.48
29.7	2108.55
30.4	2108.46
31	2108.93
32.6	2109.53
35.1	2109.95
38	2110.09
42	2110.07
46	2110.33
48	2110.17
50	2110.24

Summary Data

Bankfull Elevation	2107.94
Bankfull Width (ft)	20.91
Floodprone Width (ft)	85
Bankfull Mean Depth (ft)	0.76
Bankfull Max Depth (ft)	1.78
Bankfull Cross Sectional Area (ft^2)	15.83
Bankfull Width/Depth Ratio	27.51
Bankfull Entrenchment Ratio	4.07

Photo: Sta. 11+50 looking downstream



Cross-section Plot Exhibit

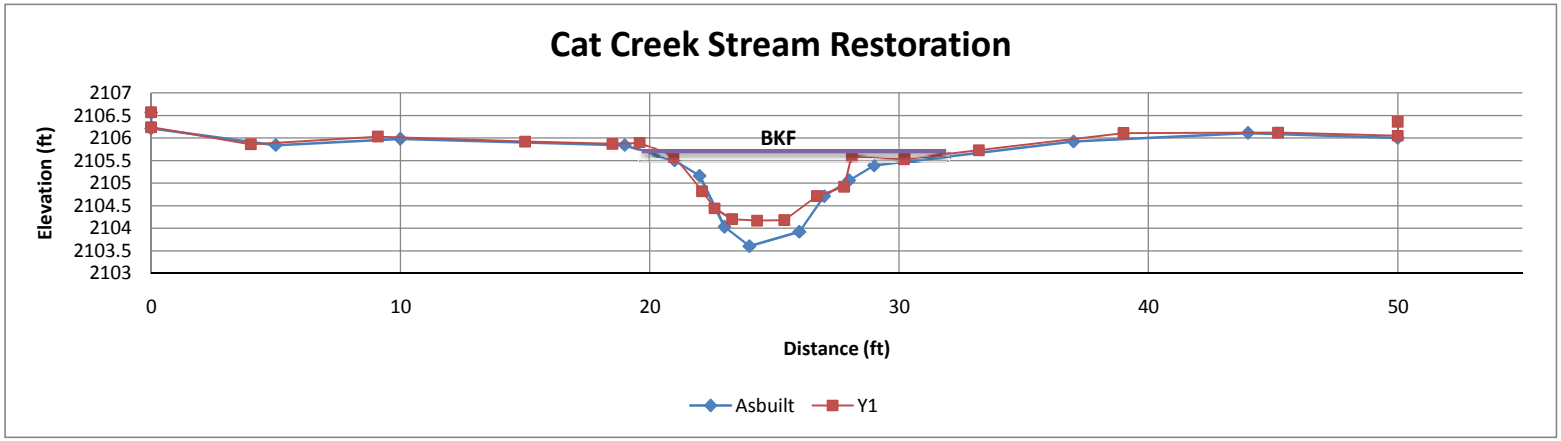
River Basin	Little Tennessee
Watershed	Trib 1 to Cat Creek
X-Sec ID	2
Feature	Pool
Dranage Area (sq mi)	0.9
Date	Dec-10
Field Crew	Ron Johnson, Ian Jewell

Station	Elevation
0	2109.65
4	2109.6
13	2109.53
19	2109.42
20.5	2109.48
23	2109.23
24.7	2108.91
25	2108.57
26.3	2108.32
26.9	2108.39
28.5	2108.48
29.7	2108.55
30.4	2108.46
31	2108.93
32.6	2109.53
35.1	2109.95
38	2110.09
42	2110.07
46	2110.33
48	2110.17
50	2110.24

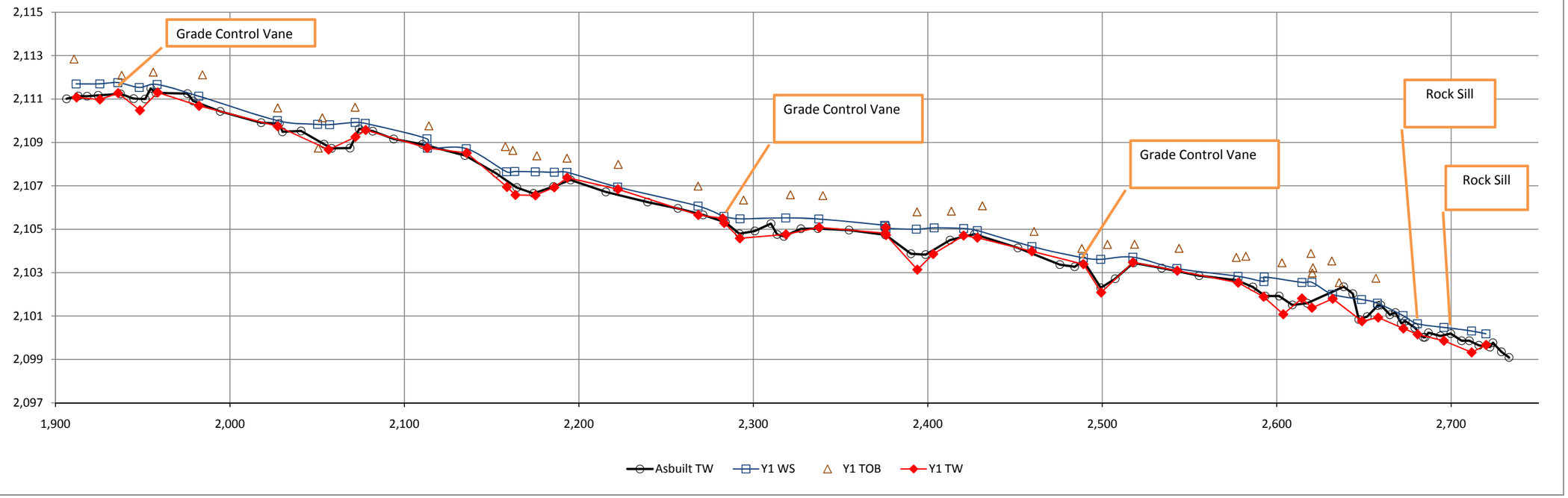
Summary Data

Bankfull Elevation	2105.84
Bankfull Width (ft)	17.9
Floodprone Width (ft)	200
Bankfull Mean Depth (ft)	0.62
Bankfull Max Depth (ft)	1.71
Bankfull Cross Sectional Area (ft^2)	11.05
Bankfull Width/Depth Ratio	28.87
Bankfull Entrenchment Ratio	11.17

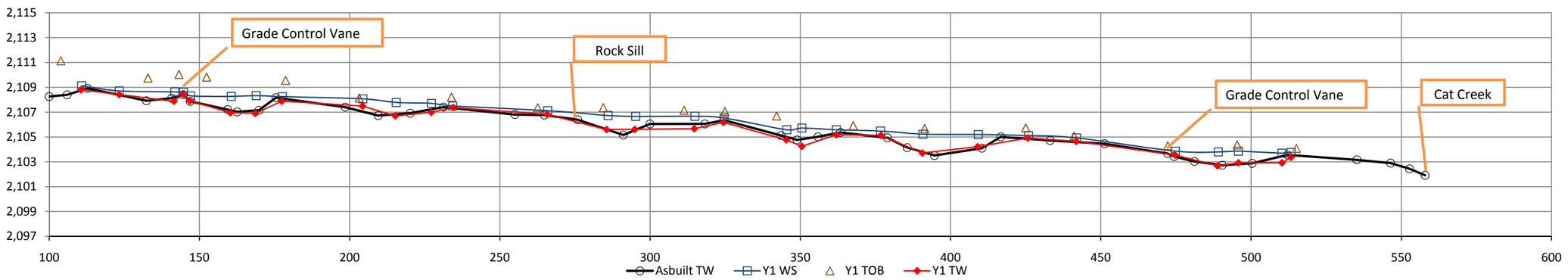
Photo: Sta. 12+95 looking downstream

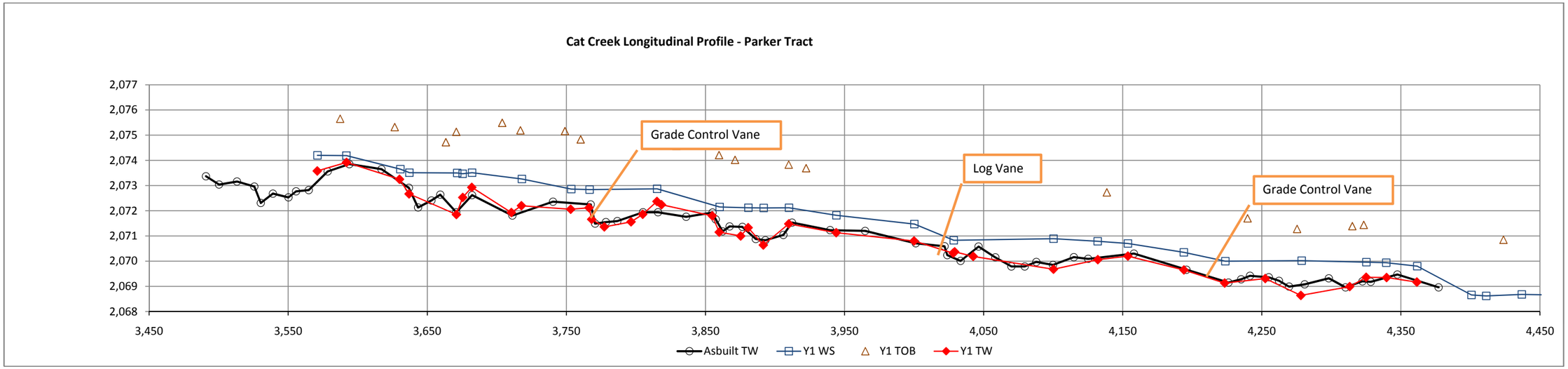


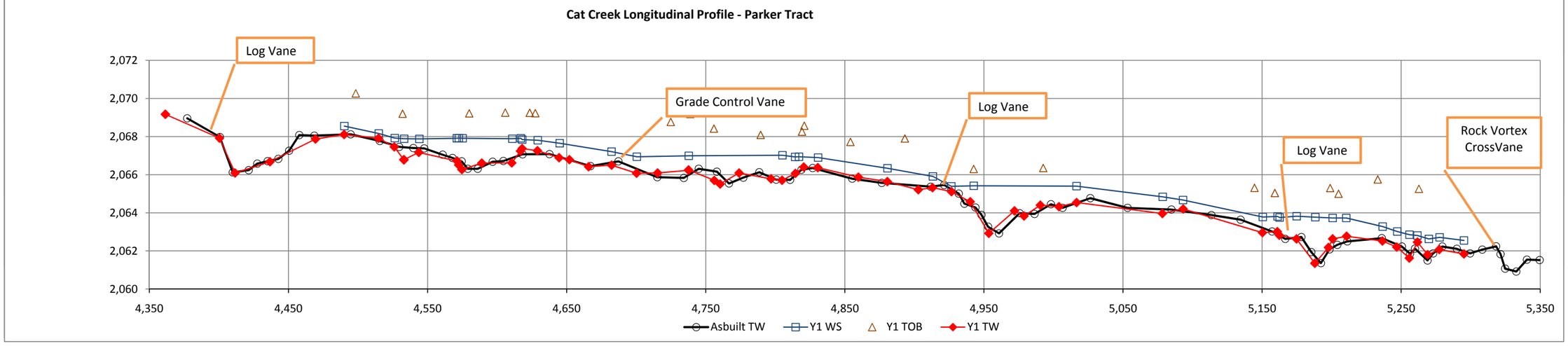
Cat Creek Longitudinal Profile - Swartwout Tract



Trib 1 Longitudinal Profile - Swartwout Tract




Cat Creek Longitudinal Profile - Parker Tract
2,077
2,076
2,075
2,074
2,073
2,072
2,071
2,070
2,069
2,068
3,450
3,550
3,650
3,750
3,850
3,950
4,050
4,150
4,250
4,350
4,450
Grade Control Vane
Log Vane
Grade Control Vane
Asbuilt TW
Y1 WS
Y1 TOB
Y1 TW

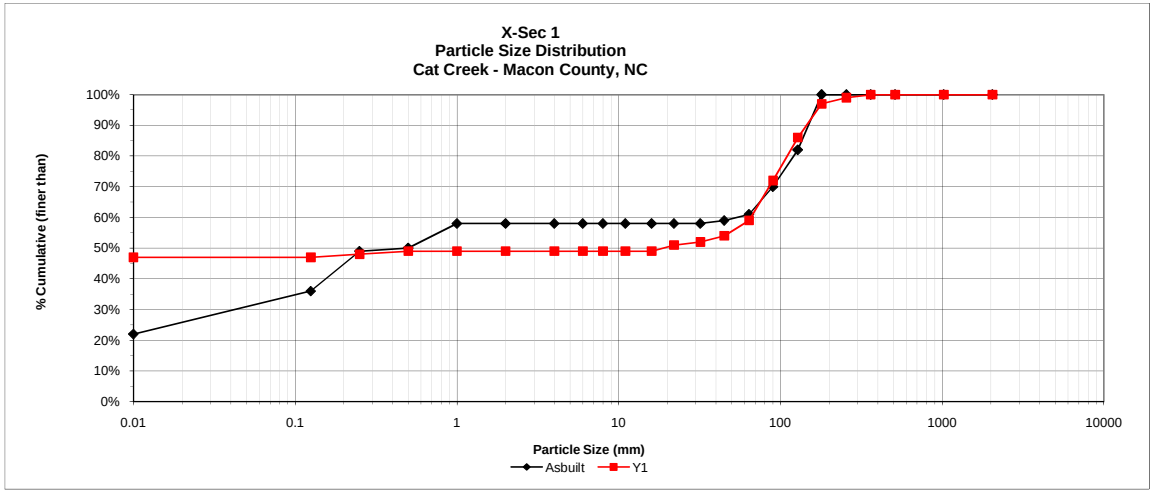

Cat Creek Longitudinal Profile - Parker Tract
2,072
2,070
2,068
2,066
2,064
2,062
2,060
4,350
4,450
4,550
4,650
4,750
4,850
4,950
5,050
5,150
5,250
5,350
Log Vane
Grade Control Vane
Log Vane
Log Vane
Rock Vortex CrossVane
Asbuilt TW
Y1 WS
Y1 TOB
Y1 TW

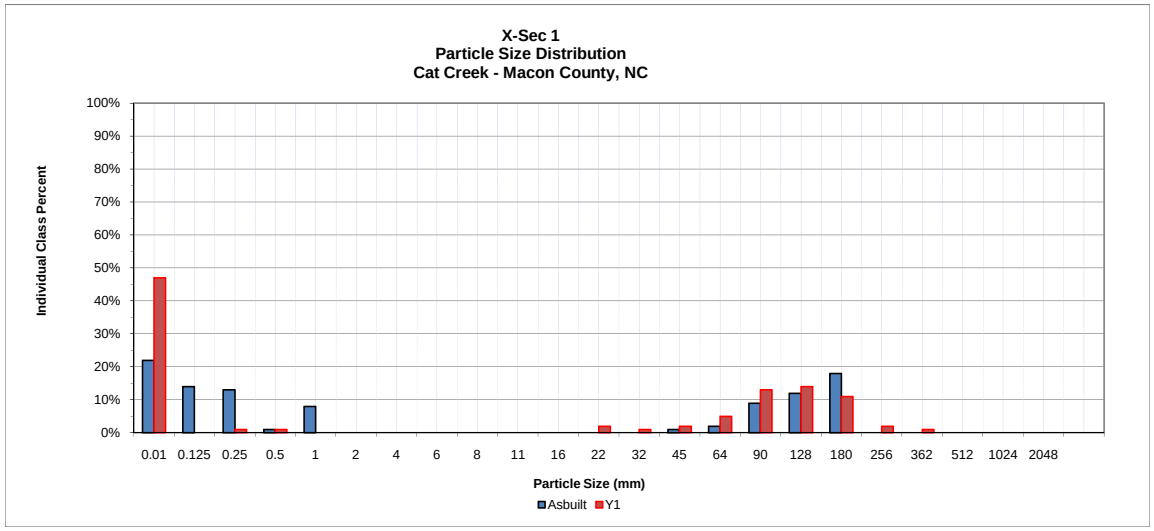
Cross - Section Pebble Count

Project Name : Cat Creek Swartwout Tract
Cross Section: 1
Feature: Riffle

Description	Particle	Millimeter	Total #	Item %	Cum %
S/C	Silt/Clay	< 0.062	47	47%	47%
S	Very Fine	.062 - .125	0	0%	47%
A	Fine	.125 - .25	1	1%	48%
N	Medium	.25 - .50	1	1%	49%
D	Coarse	.50 - 1.0	0	0%	49%
S	Very Coarse	1.0 - 2.0	0	0%	49%
	Very Fine	2.0 - 4.0	0	0%	49%
G	Fine	4.0 - 5.7	0	0%	49%
R	Fine	5.7 - 8.0	0	0%	49%
A	Medium	8.0 - 11.3	0	0%	49%
V	Medium	11.3 - 16.0	0	0%	49%
E	Coarse	16.0 - 22.6	2	2%	51%
L	Coarse	22.6 - 32.0	1	1%	52%
S	Very Coarse	32.0 - 45.0	2	2%	54%
	Very Coarse	45.0 - 64.0	5	5%	59%
C	Small	64 - 90	13	13%	72%
O	Small	90 - 128	14	14%	86%
B	Large	128 - 180	11	11%	97%
L	Large	180 - 256	2	2%	99%
B	Small	256 - 362	1	1%	100%
L	Small	362 - 512	0	0%	100%
D	Medium	512 - 1024	0	0%	100%
R	Lrg- Very Lrg	1024 - 2048	0	0%	100%
BDRK	Bedrock		0	0%	100%
Totals			100	100%	

Summary Data	
D50	19.3
D84	122.57
D95	170.55



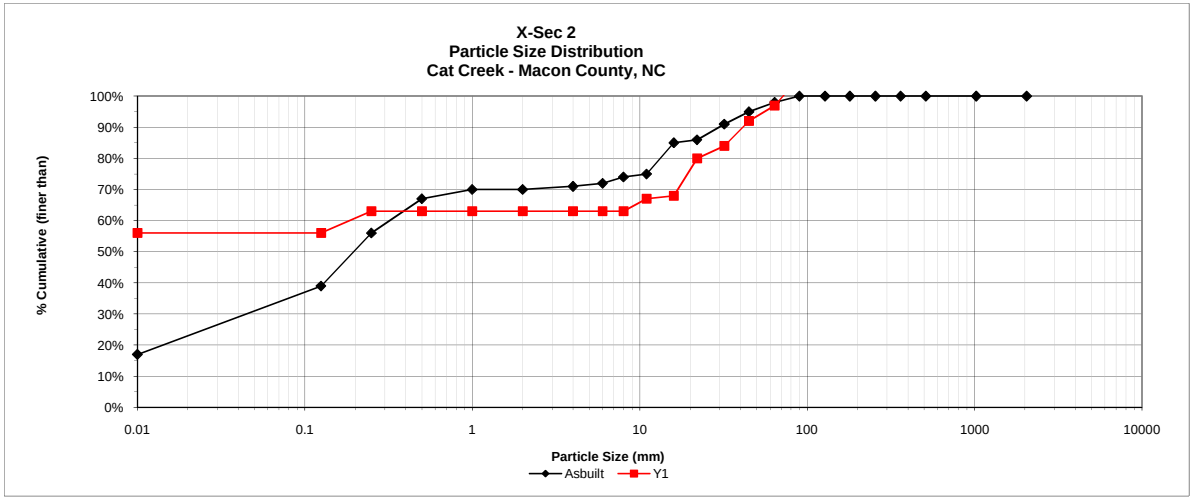


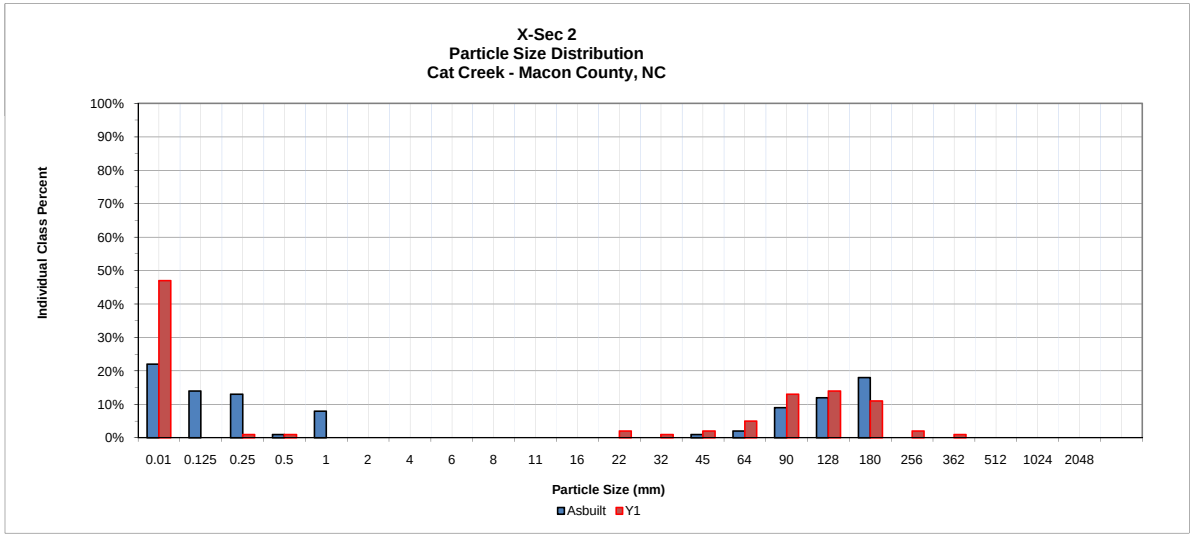
Cross - Section Pebble Count

Project Name : Cat Creek Swartwout Tract
Cross Section: 2
Feature: Pool

Description	Particle	Millimeter	Total #	Item %	Cum %
S/C	Silt/Clay	< 0.062	56	52.34	52.34
S	Very Fine	.062 - .125	0	0	52.34
A	Fine	.125 - .25	7	6.54	58.88
N	Medium	.25 - .50	0	0	58.88
D	Coarse	.50 - 1.0	0	0	58.88
S	Very Coarse	1.0 - 2.0	0	0	58.88
	Very Fine	2.0 - 4.0	0	0	58.88
G	Fine	4.0 - 5.7	0	0	58.88
R	Fine	5.7 - 8.0	0	0	58.88
A	Medium	8.0 - 11.3	4	3.74	62.62
V	Medium	11.3 - 16.0	1	0.93	63.55
E	Coarse	16.0 - 22.6	12	11.21	74.77
L	Coarse	22.6 - 32.0	4	3.74	78.5
S	Very Coarse	32.0 - 45.0	8	7.48	85.98
	Very Coarse	45.0 - 64.0	5	4.67	90.65
C	Small	64 - 90	9	8.41	99.07
O	Small	90 - 128	1	0.93	100
B	Large	128 - 180	0	0	100
L	Large	180 - 256	0	0	100
B	Small	256 - 362	0	0	100
L	Small	362 - 512	0	0	100
D	Medium	512 - 1024	0	0	100
R	Lrg- Very Lrg	1024 - 2048	0	0	100
BDRK	Bedrock		0	0	100
Totals			107	9999%	

Summary Data	
D50	0.06
D84	41.56
D95	77.43



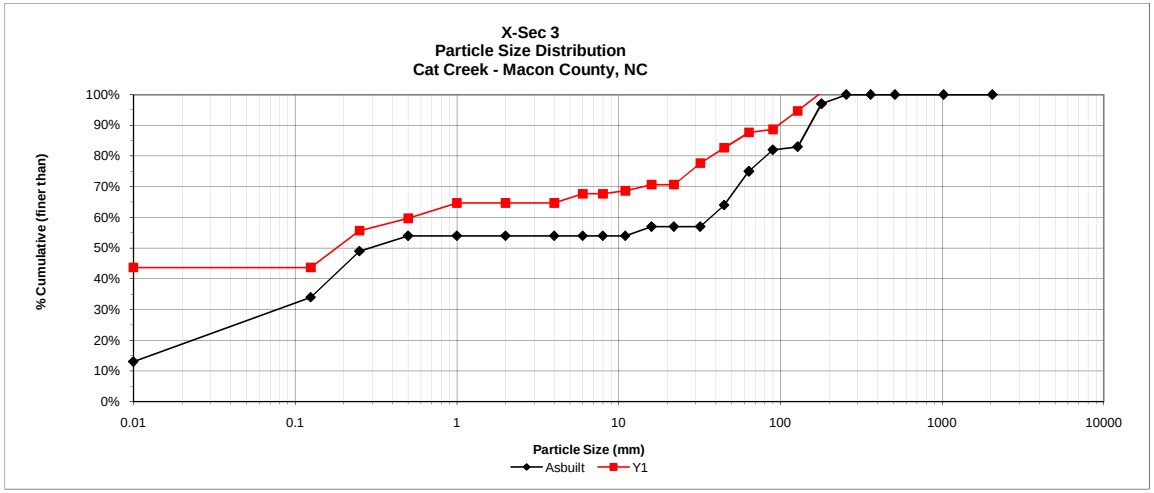


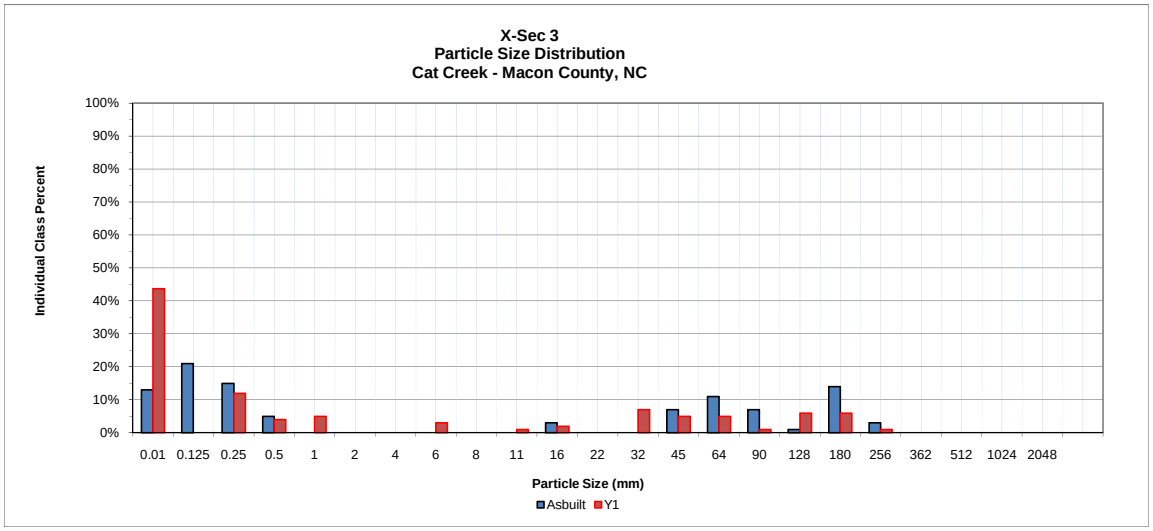
Cross - Section Pebble Count

Project Name : Cat Creek Swartwout Tract
Cross Section: 3
Feature: Riffle

Description	Particle	Millimeter	Total #	Item %	Cum %
S/C	Silt/Clay	< 0.062	45	44%	44%
S	Very Fine	.062 - .125	0	0%	44%
A	Fine	.125 - .25	12	12%	56%
N	Medium	.25 - .50	4	4%	60%
D	Coarse	.50 - 1.0	5	5%	65%
S	Very Coarse	1.0 - 2.0	0	0%	65%
	Very Fine	2.0 - 4.0	0	0%	65%
G	Fine	4.0 - 5.7	3	3%	68%
R	Fine	5.7 - 8.0	0	0%	68%
A	Medium	8.0 - 11.3	1	1%	69%
V	Medium	11.3 - 16.0	2	2%	71%
E	Coarse	16.0 - 22.6	0	0%	71%
L	Coarse	22.6 - 32.0	7	7%	78%
S	Very Coarse	32.0 - 45.0	5	5%	83%
	Very Coarse	45.0 - 64.0	5	5%	88%
C	Small	64 - 90	1	1%	89%
O	Small	90 - 128	6	6%	95%
B	Large	128 - 180	6	6%	101%
L	Large	180 - 256	1	1%	102%
B	Small	256 - 362	0	0%	102%
L	Small	362 - 512	0	0%	102%
D	Medium	512 - 1024	0	0%	102%
R	Lrg- Very Lrg	1024 - 2048	0	0%	102%
BDRK	Bedrock		0	0%	102%
Totals			103	102%	

Summary Data	
D50	0.19
D84	54.58
D95	114.05



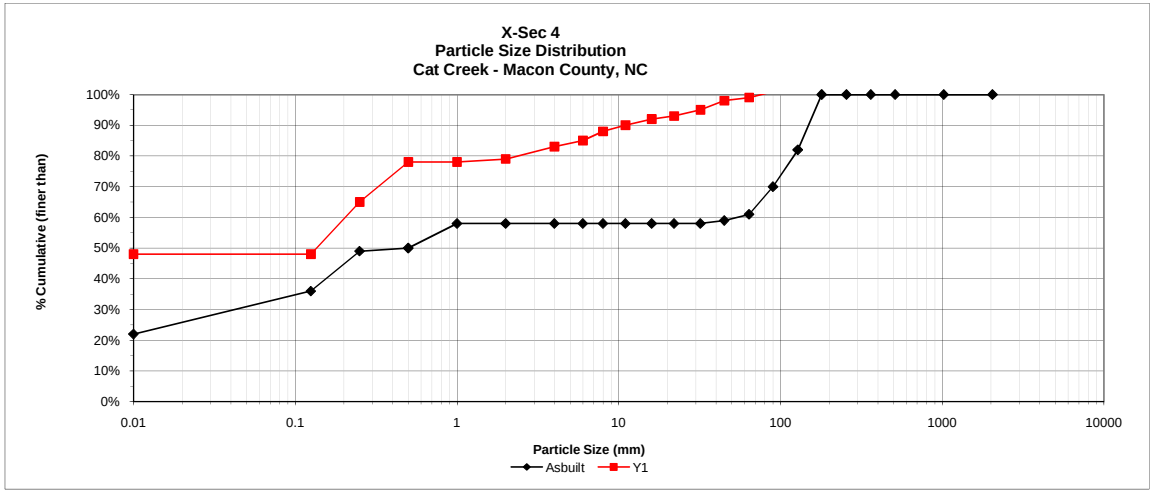


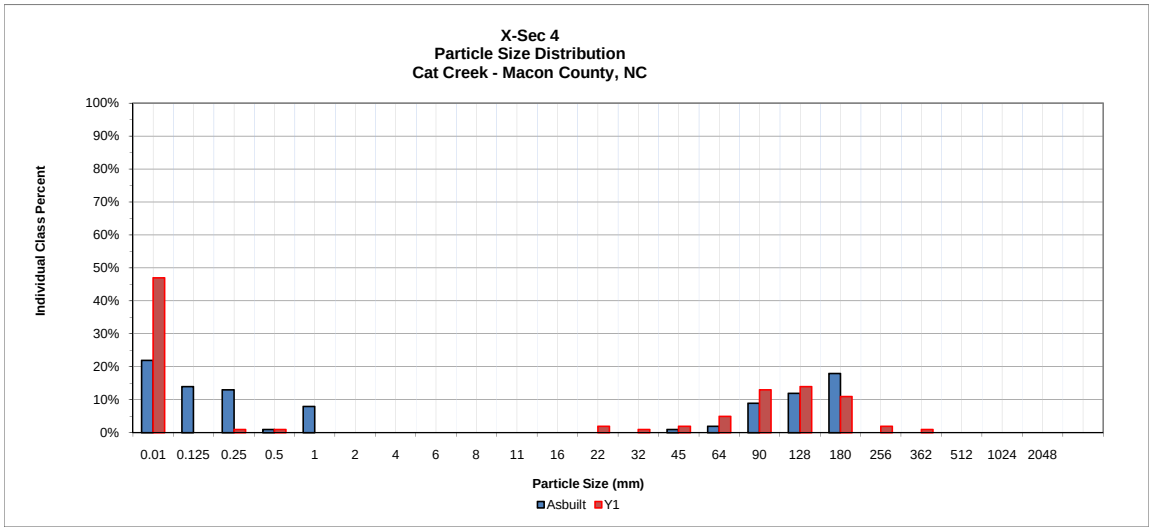
Cross - Section Pebble Count

Project Name : Cat Creek Parker Tract
Cross Section: 4
Feature: Pool

Description	Particle	Millimeter	Total #	Item %	Cum %
S/C	Silt/Clay	< 0.062	49	48%	48%
S	Very Fine	.062 - .125	0	0%	48%
A	Fine	.125 - .25	17	17%	65%
N	Medium	.25 - .50	13	13%	78%
D	Coarse	.50 - 1.0	0	0%	78%
S	Very Coarse	1.0 - 2.0	1	1%	79%
	Very Fine	2.0 - 4.0	4	4%	83%
G	Fine	4.0 - 5.7	2	2%	85%
R	Fine	5.7 - 8.0	3	3%	88%
A	Medium	8.0 - 11.3	2	2%	90%
V	Medium	11.3 - 16.0	2	2%	92%
E	Coarse	16.0 - 22.6	1	1%	93%
L	Coarse	22.6 - 32.0	2	2%	95%
S	Very Coarse	32.0 - 45.0	3	3%	98%
	Very Coarse	45.0 - 64.0	1	1%	99%
C	Small	64 - 90	2	2%	101%
O	Small	90 - 128	0	0%	101%
B	Large	128 - 180	0	0%	101%
L	Large	180 - 256	0	0%	101%
B	Small	256 - 362	0	0%	101%
L	Small	362 - 512	0	0%	101%
D	Medium	512 - 1024	0	0%	101%
R	Lrg- Very Lrg	1024 - 2048	0	0%	101%
BDRK	Bedrock		0	0%	101%
Totals			102	101%	

Summary Data	
D50	0.14
D84	5.43
D95	35.89



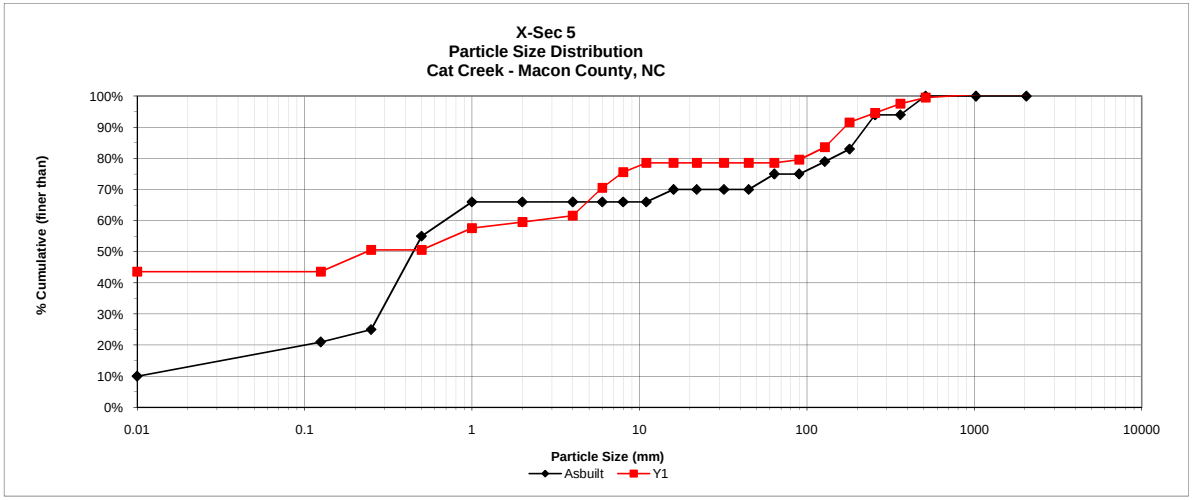


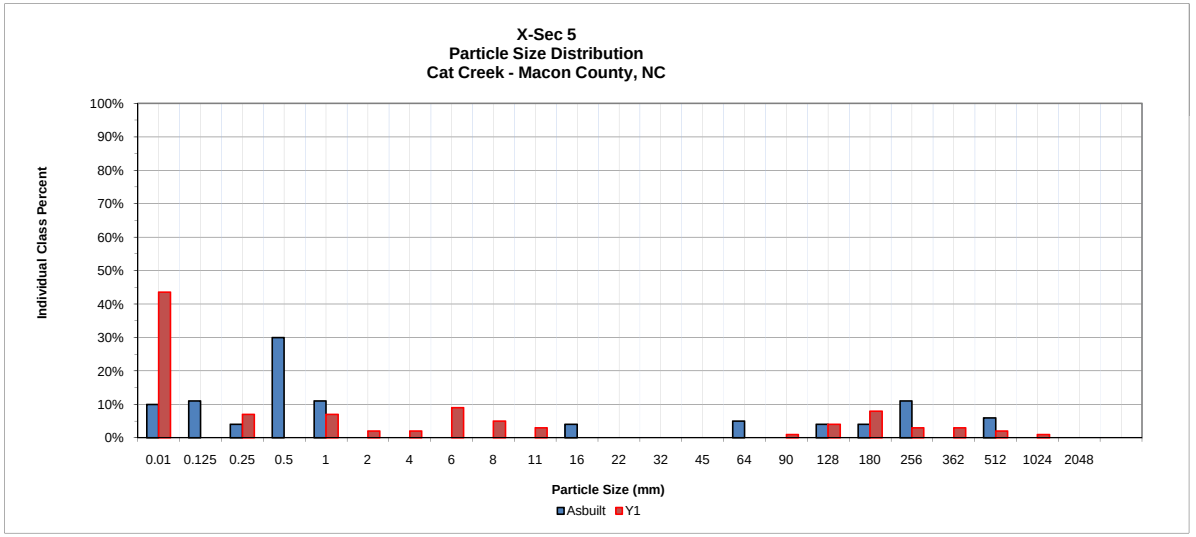
Cross - Section Pebble Count

Project Name : Cat Creek Parker Tract
Cross Section: 5
Feature: Riffle

Description	Particle	Millimeter	Total #	Item %	Cum %
S/C	Silt/Clay	< 0.062	44	44%	44%
S	Very Fine	.062 - .125	0	0%	44%
A	Fine	.125 - .25	7	7%	51%
N	Medium	.25 - .50	0	0%	51%
D	Coarse	.50 - 1.0	7	7%	58%
S	Very Coarse	1.0 - 2.0	2	2%	60%
	Very Fine	2.0 - 4.0	2	2%	62%
G	Fine	4.0 - 5.7	9	9%	71%
R	Fine	5.7 - 8.0	5	5%	76%
A	Medium	8.0 - 11.3	3	3%	79%
V	Medium	11.3 - 16.0	0	0%	79%
E	Coarse	16.0 - 22.6	0	0%	79%
L	Coarse	22.6 - 32.0	0	0%	79%
S	Very Coarse	32.0 - 45.0	0	0%	79%
	Very Coarse	45.0 - 64.0	0	0%	79%
C	Small	64 - 90	1	1%	80%
O	Small	90 - 128	4	4%	84%
B	Large	128 - 180	8	8%	92%
L	Large	180 - 256	3	3%	95%
B	Small	256 - 362	3	3%	98%
L	Small	362 - 512	2	2%	100%
D	Medium	512 - 1024	1	1%	101%
R	Lrg- Very Lrg	1024 - 2048	0	0%	101%
BDRK	Bedrock		0	0%	101%
Totals			101	101%	

Summary Data	
D50	0.24
D84	133.45
D95	289.55



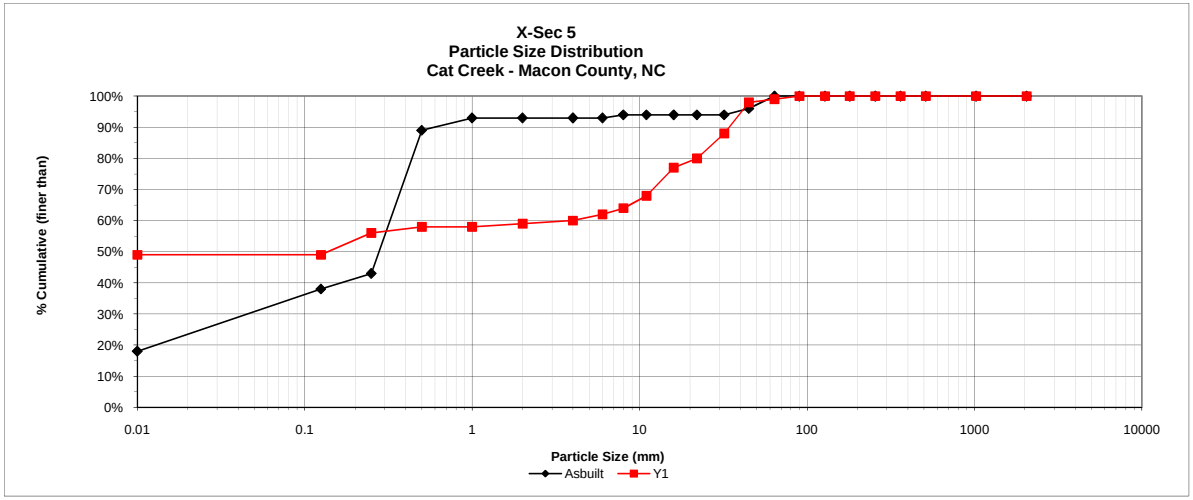


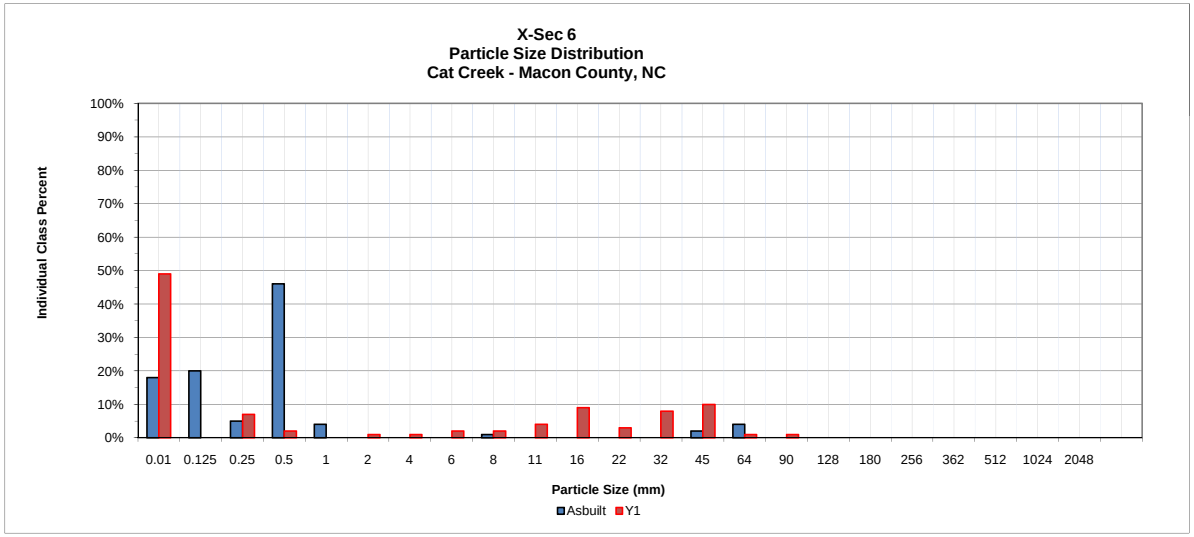
Cross - Section Pebble Count

Project Name : Cat Creek Parker Tract
Cross Section: 6
Feature: Pool

Description	Particle	Millimeter	Total #	Item %	Cum %
S/C	Silt/Clay	< 0.062	49	49%	49%
S	Very Fine	.062 - .125	0	0%	49%
A	Fine	.125 - .25	7	7%	56%
N	Medium	.25 - .50	2	2%	58%
D	Coarse	.50 - 1.0	0	0%	58%
S	Very Coarse	1.0 - 2.0	1	1%	59%
	Very Fine	2.0 - 4.0	1	1%	60%
G	Fine	4.0 - 5.7	2	2%	62%
R	Fine	5.7 - 8.0	2	2%	64%
A	Medium	8.0 - 11.3	4	4%	68%
V	Medium	11.3 - 16.0	9	9%	77%
E	Coarse	16.0 - 22.6	3	3%	80%
L	Coarse	22.6 - 32.0	8	8%	88%
S	Very Coarse	32.0 - 45.0	10	10%	98%
	Very Coarse	45.0 - 64.0	1	1%	99%
C	Small	64 - 90	1	1%	100%
O	Small	90 - 128	0	0%	100%
B	Large	128 - 180	0	0%	100%
L	Large	180 - 256	0	0%	100%
B	Small	256 - 362	0	0%	100%
L	Small	362 - 512	0	0%	100%
D	Medium	512 - 1024	0	0%	100%
R	Lrg- Very Lrg	1024 - 2048	0	0%	100%
BDRK	Bedrock		0	0%	100%
Totals			100	100%	

Summary Data	
D50	0.14
D84	27.3
D95	41.1



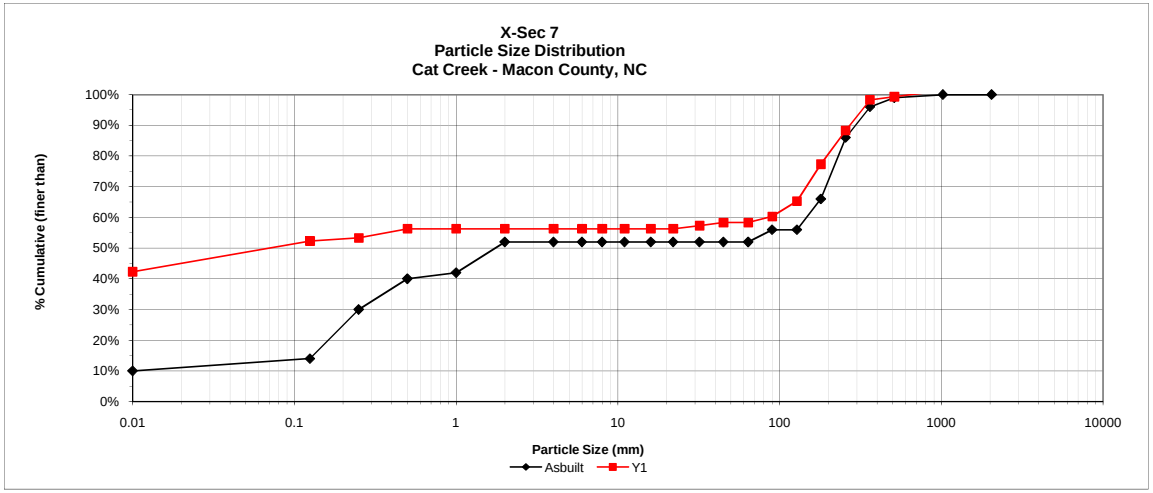


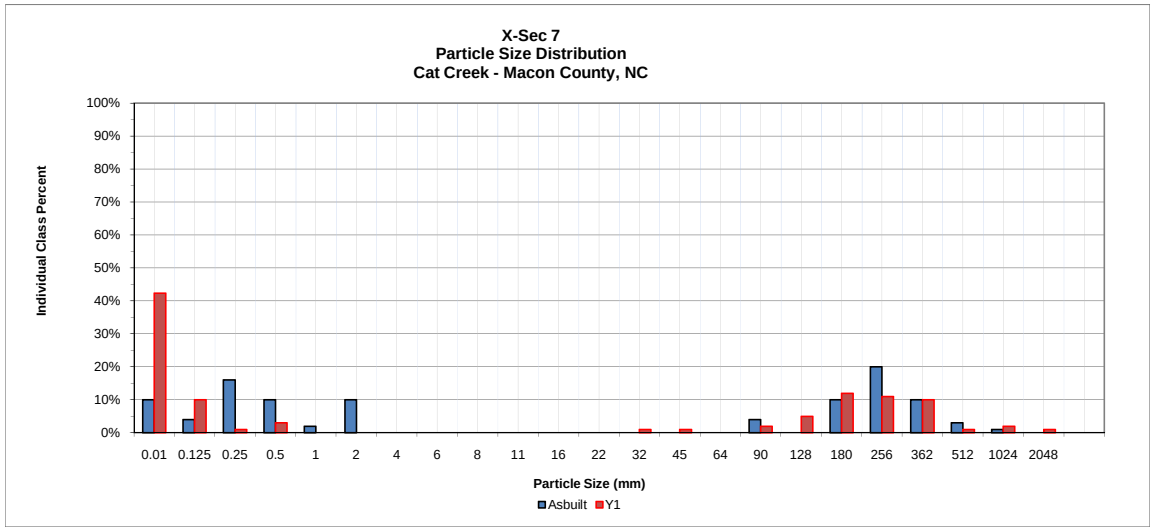
Cross - Section Pebble Count

Project Name : Cat Creek Parker Tract
Cross Section: 7
Feature: Riffle

Description	Particle	Millimeter	Total #	Item %	Cum %
S/C	Silt/Clay	< 0.062	44	42%	42%
S	Very Fine	.062 - .125	10	10%	52%
A	Fine	.125 - .25	1	1%	53%
N	Medium	.25 - .50	3	3%	56%
D	Coarse	.50 - 1.0	0	0%	56%
S	Very Coarse	1.0 - 2.0	0	0%	56%
	Very Fine	2.0 - 4.0	0	0%	56%
G	Fine	4.0 - 5.7	0	0%	56%
R	Fine	5.7 - 8.0	0	0%	56%
A	Medium	8.0 - 11.3	0	0%	56%
V	Medium	11.3 - 16.0	0	0%	56%
E	Coarse	16.0 - 22.6	0	0%	56%
L	Coarse	22.6 - 32.0	1	1%	57%
S	Very Coarse	32.0 - 45.0	1	1%	58%
	Very Coarse	45.0 - 64.0	0	0%	58%
C	Small	64 - 90	2	2%	60%
O	Small	90 - 128	5	5%	65%
B	Large	128 - 180	12	12%	77%
L	Large	180 - 256	11	11%	88%
B	Small	256 - 362	10	10%	98%
L	Small	362 - 512	1	1%	99%
D	Medium	512 - 1024	2	2%	101%
R	Lrg- Very Lrg	1024 - 2048	1	1%	102%
BDRK	Bedrock		0	0%	102%
Totals			104	102%	

Summary Data	
D50	0.11
D84	237.75
D95	349.32



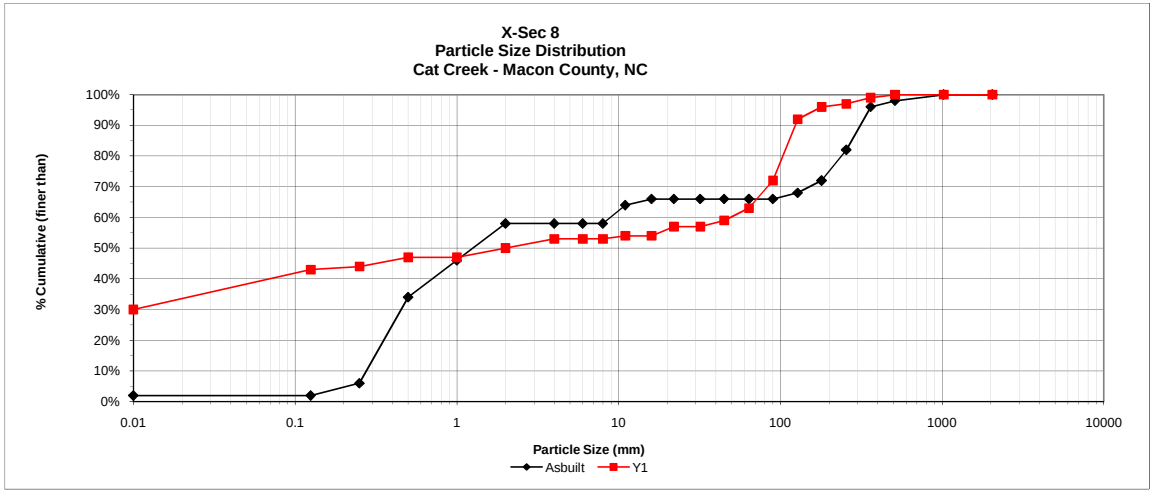


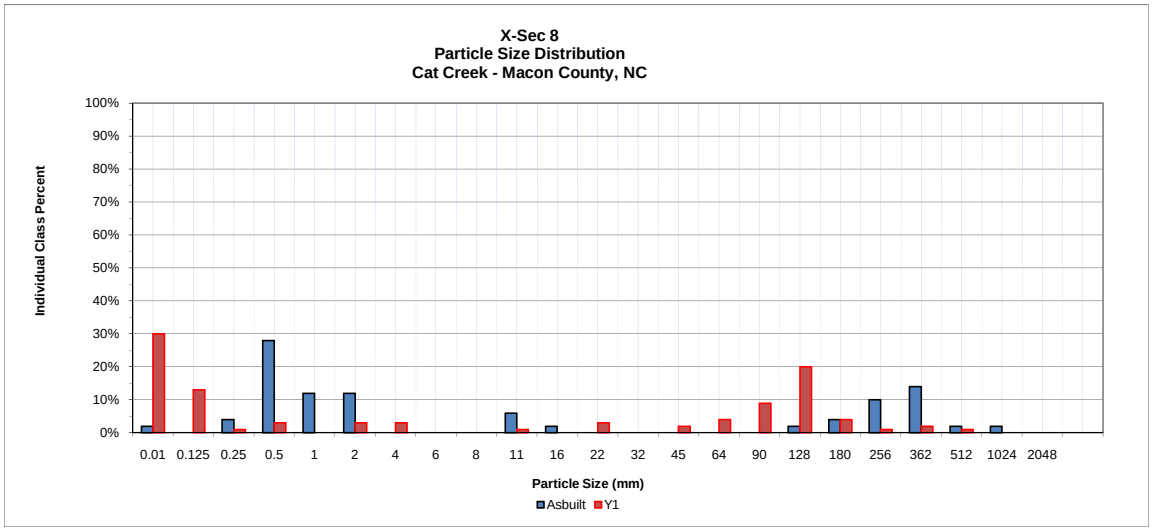
Cross - Section Pebble Count

Project Name : Cat Creek Parker Tract
Cross Section: 8
Feature: Riffle

Description	Particle	Millimeter	Total #	Item %	Cum %
S/C	Silt/Clay	< 0.062	30	30%	30%
S	Very Fine	.062 - .125	13	13%	43%
A	Fine	.125 - .25	1	1%	44%
N	Medium	.25 - .50	3	3%	47%
D	Coarse	.50 - 1.0	0	0%	47%
S	Very Coarse	1.0 - 2.0	3	3%	50%
	Very Fine	2.0 - 4.0	3	3%	53%
G	Fine	4.0 - 5.7	0	0%	53%
R	Fine	5.7 - 8.0	0	0%	53%
A	Medium	8.0 - 11.3	1	1%	54%
V	Medium	11.3 - 16.0	0	0%	54%
E	Coarse	16.0 - 22.6	3	3%	57%
L	Coarse	22.6 - 32.0	0	0%	57%
S	Very Coarse	32.0 - 45.0	2	2%	59%
	Very Coarse	45.0 - 64.0	4	4%	63%
C	Small	64 - 90	9	9%	72%
O	Small	90 - 128	20	20%	92%
B	Large	128 - 180	4	4%	96%
L	Large	180 - 256	1	1%	97%
B	Small	256 - 362	2	2%	99%
L	Small	362 - 512	1	1%	100%
D	Medium	512 - 1024	0	0%	100%
R	Lrg- Very Lrg	1024 - 2048	0	0%	100%
BDRK	Bedrock		0	0%	100%
Totals			100	100%	

Summary Data	
D50	2
D84	112.8
D95	167



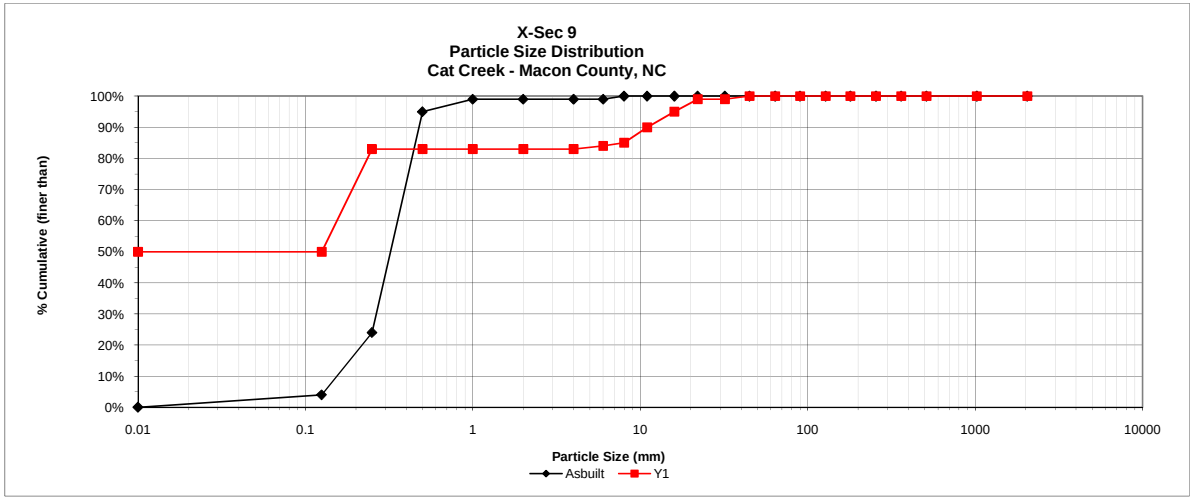


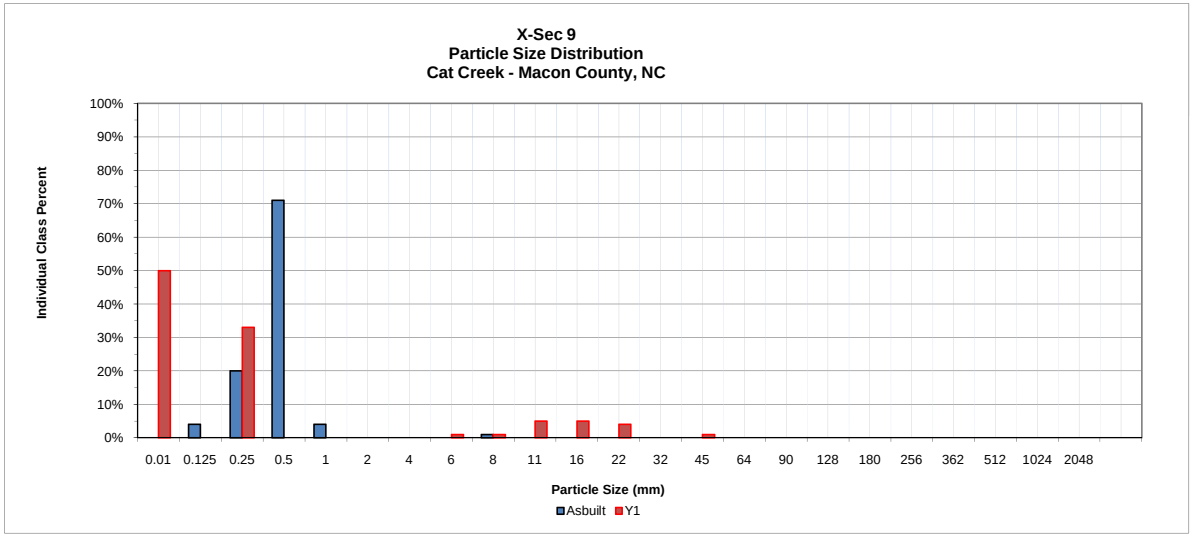
Cross - Section Pebble Count

Project Name : Cat Creek Parker Tract
Cross Section: 9
Feature: Pool

Description	Particle	Millimeter	Total #	Item %	Cum %
S/C	Silt/Clay	< 0.062	50	50%	50%
S	Very Fine	.062 - .125	0	0%	50%
A	Fine	.125 - .25	33	33%	83%
N	Medium	.25 - .50	0	0%	83%
D	Coarse	.50 - 1.0	0	0%	83%
S	Very Coarse	1.0 - 2.0	0	0%	83%
	Very Fine	2.0 - 4.0	0	0%	83%
G	Fine	4.0 - 5.7	1	1%	84%
R	Fine	5.7 - 8.0	1	1%	85%
A	Medium	8.0 - 11.3	5	5%	90%
V	Medium	11.3 - 16.0	5	5%	95%
E	Coarse	16.0 - 22.6	4	4%	99%
L	Coarse	22.6 - 32.0	0	0%	99%
S	Very Coarse	32.0 - 45.0	1	1%	100%
	Very Coarse	45.0 - 64.0	0	0%	100%
C	Small	64 - 90	0	0%	100%
O	Small	90 - 128	0	0%	100%
B	Large	128 - 180	0	0%	100%
L	Large	180 - 256	0	0%	100%
B	Small	256 - 362	0	0%	100%
L	Small	362 - 512	0	0%	100%
D	Medium	512 - 1024	0	0%	100%
R	Lrg- Very Lrg	1024 - 2048	0	0%	100%
BDRK	Bedrock		0	0%	100%
Totals			100	100%	

Summary Data	
D50	0.06
D84	5.7
D95	16



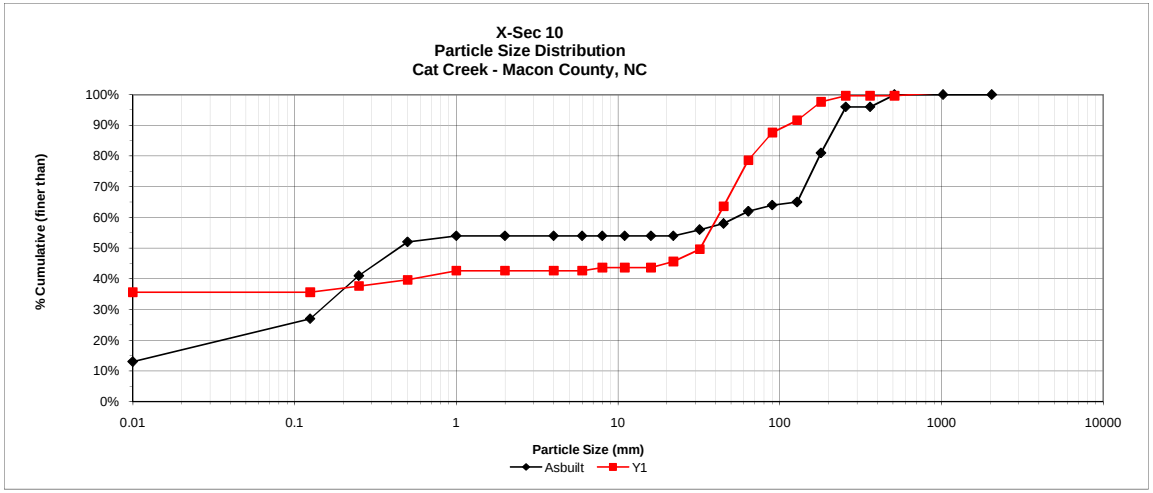


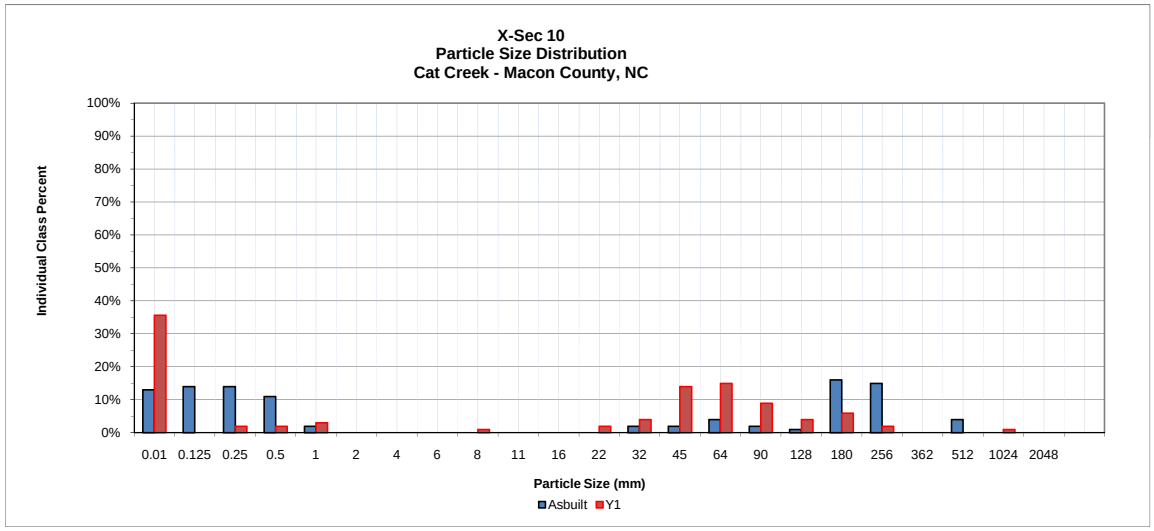
Cross - Section Pebble Count

Project Name : Cat Creek Parker Tract
Cross Section: 10
Feature: Riffle

Description	Particle	Millimeter	Total #	Item %	Cum %
S/C	Silt/Clay	< 0.062	36	36%	36%
S	Very Fine	.062 - .125	0	0%	36%
A	Fine	.125 - .25	2	2%	38%
N	Medium	.25 - .50	2	2%	40%
D	Coarse	.50 - 1.0	3	3%	43%
S	Very Coarse	1.0 - 2.0	0	0%	43%
	Very Fine	2.0 - 4.0	0	0%	43%
G	Fine	4.0 - 5.7	0	0%	43%
R	Fine	5.7 - 8.0	1	1%	44%
A	Medium	8.0 - 11.3	0	0%	44%
V	Medium	11.3 - 16.0	0	0%	44%
E	Coarse	16.0 - 22.6	2	2%	46%
L	Coarse	22.6 - 32.0	4	4%	50%
S	Very Coarse	32.0 - 45.0	14	14%	64%
	Very Coarse	45.0 - 64.0	15	15%	79%
C	Small	64 - 90	9	9%	88%
O	Small	90 - 128	4	4%	92%
B	Large	128 - 180	6	6%	98%
L	Large	180 - 256	2	2%	100%
B	Small	256 - 362	0	0%	100%
L	Small	362 - 512	0	0%	100%
D	Medium	512 - 1024	1	1%	101%
R	Lrg- Very Lrg	1024 - 2048	0	0%	101%
BDRK	Bedrock		0	0%	101%
Totals			**101**	**101%**	

Summary Data	
D50	32.47
D84	80.87
D95	162.23



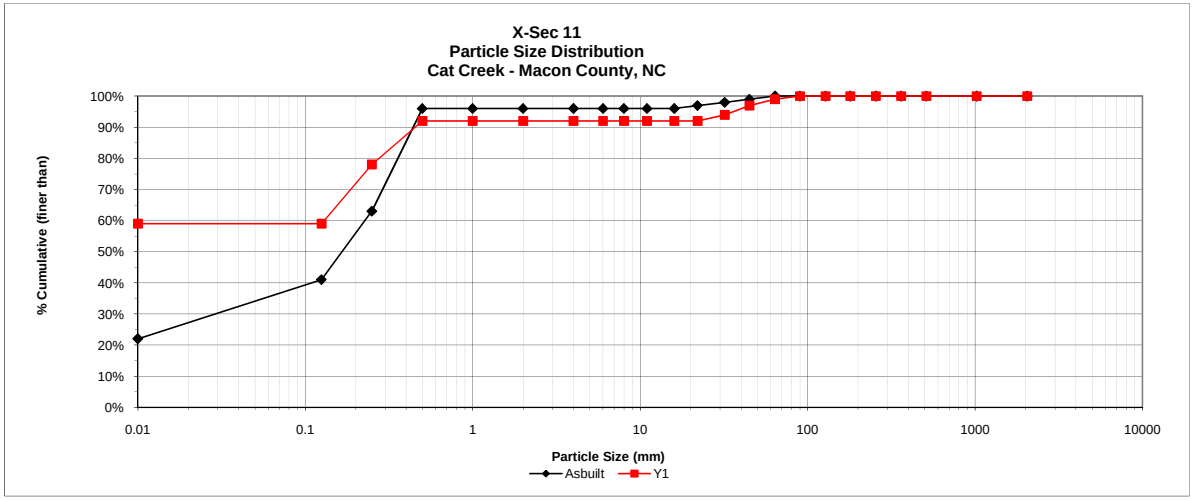


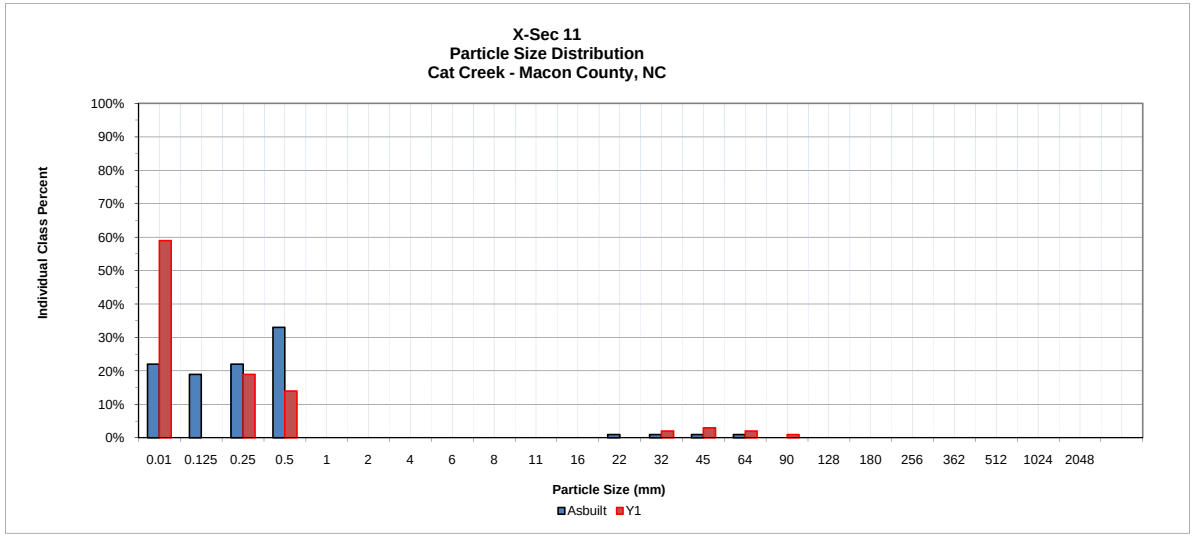
Cross - Section Pebble Count

Project Name : Cat Creek Parker Tract
Cross Section: 11
Feature: Pool

Description	Particle	Millimeter	Total #	Item %	Cum %
S/C	Silt/Clay	< 0.062	59	59%	59%
S	Very Fine	.062 - .125	0	0%	59%
A	Fine	.125 - .25	19	19%	78%
N	Medium	.25 - .50	14	14%	92%
D	Coarse	.50 - 1.0	0	0%	92%
S	Very Coarse	1.0 - 2.0	0	0%	92%
	Very Fine	2.0 - 4.0	0	0%	92%
G	Fine	4.0 - 5.7	0	0%	92%
R	Fine	5.7 - 8.0	0	0%	92%
A	Medium	8.0 - 11.3	0	0%	92%
V	Medium	11.3 - 16.0	0	0%	92%
E	Coarse	16.0 - 22.6	0	0%	92%
L	Coarse	22.6 - 32.0	2	2%	94%
S	Very Coarse	32.0 - 45.0	3	3%	97%
	Very Coarse	45.0 - 64.0	2	2%	99%
C	Small	64 - 90	1	1%	100%
O	Small	90 - 128	0	0%	100%
B	Large	128 - 180	0	0%	100%
L	Large	180 - 256	0	0%	100%
B	Small	256 - 362	0	0%	100%
L	Small	362 - 512	0	0%	100%
D	Medium	512 - 1024	0	0%	100%
R	Lrg- Very Lrg	1024 - 2048	0	0%	100%
BDRK	Bedrock		0	0%	100%
Totals			100	100%	

Summary Data	
D50	0.05
D84	0.36
D95	36.33



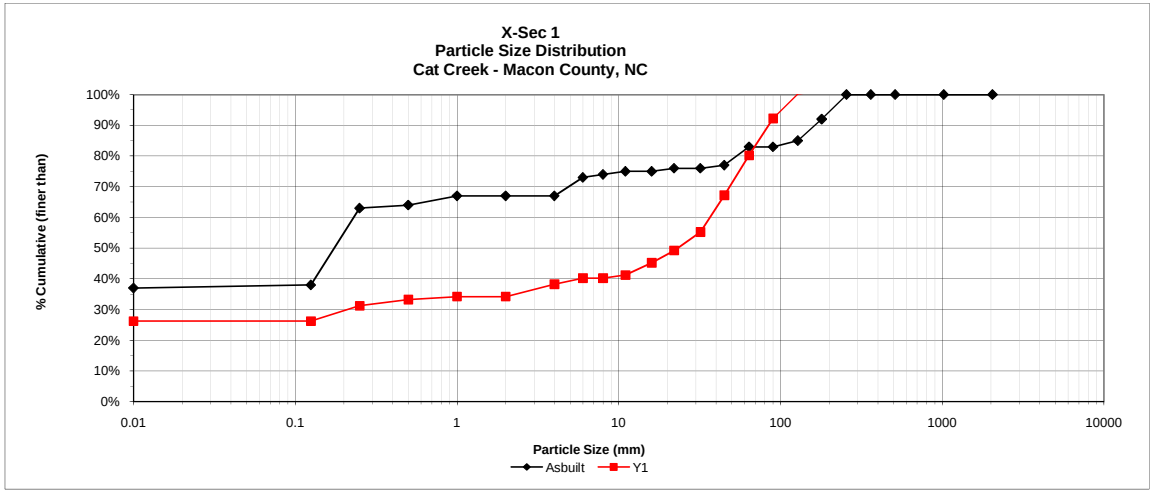


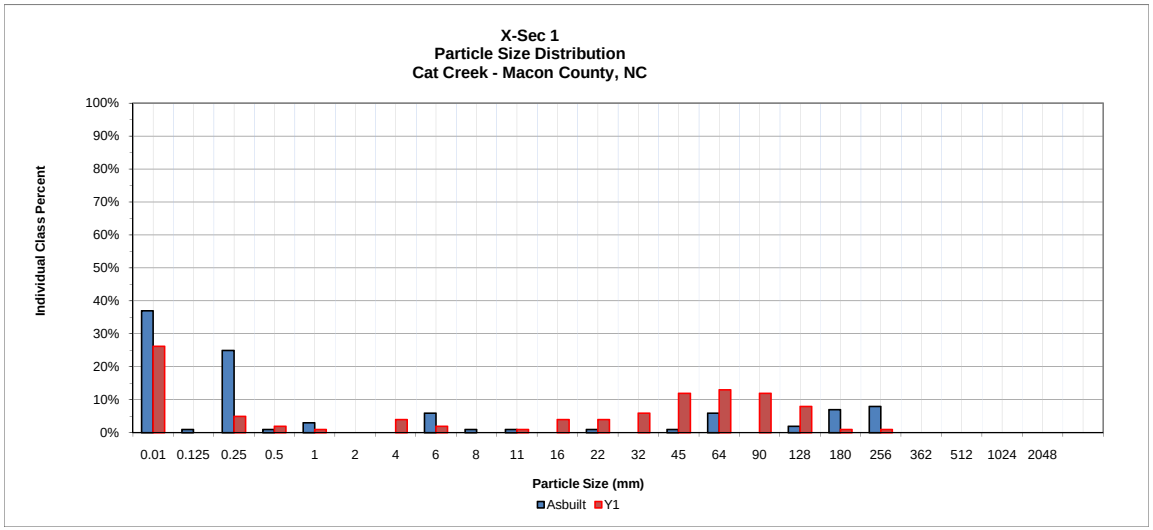
Cross - Section Pebble Count

Project Name : Trib 1 Swartwout Tract
Cross Section: 1
Feature: Riffle

Description	Particle	Millimeter	Total #	Item %	Cum %
S/C	Silt/Clay	< 0.062	27	26%	26%
S	Very Fine	.062 - .125	0	0%	26%
A	Fine	.125 - .25	5	5%	31%
N	Medium	.25 - .50	2	2%	33%
D	Coarse	.50 - 1.0	1	1%	34%
S	Very Coarse	1.0 - 2.0	0	0%	34%
	Very Fine	2.0 - 4.0	4	4%	38%
G	Fine	4.0 - 5.7	2	2%	40%
R	Fine	5.7 - 8.0	0	0%	40%
A	Medium	8.0 - 11.3	1	1%	41%
V	Medium	11.3 - 16.0	4	4%	45%
E	Coarse	16.0 - 22.6	4	4%	49%
L	Coarse	22.6 - 32.0	6	6%	55%
S	Very Coarse	32.0 - 45.0	12	12%	67%
	Very Coarse	45.0 - 64.0	13	13%	80%
C	Small	64 - 90	12	12%	92%
O	Small	90 - 128	8	8%	100%
B	Large	128 - 180	1	1%	101%
L	Large	180 - 256	1	1%	102%
B	Small	256 - 362	0	0%	102%
L	Small	362 - 512	0	0%	102%
D	Medium	512 - 1024	0	0%	102%
R	Lrg- Very Lrg	1024 - 2048	0	0%	102%
BDRK	Bedrock		0	0%	102%
Totals			103	102%	

Summary Data	
D50	24.95
D84	75.96
D95	113.03



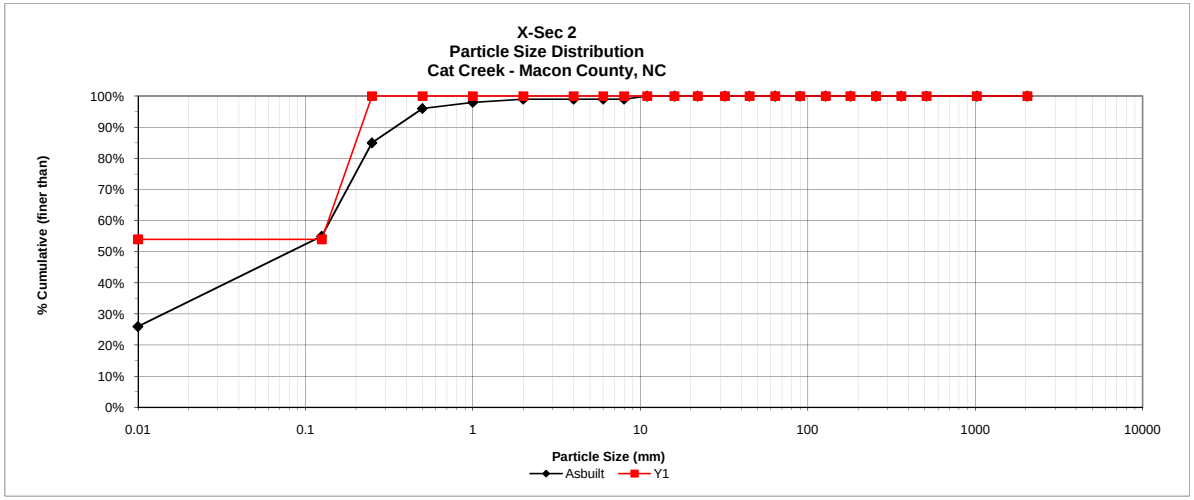


Cross - Section Pebble Count

Project Name : Trib 1 Swartwout Tract
Cross Section: 2
Feature: Pool

Description	Particle	Millimeter	Total #	Item %	Cum %
S/C	Silt/Clay	< 0.062	54	54%	54%
S	Very Fine	.062 - .125	0	0%	54%
A	Fine	.125 - .25	46	46%	100%
N	Medium	.25 - .50	0	0%	100%
D	Coarse	.50 - 1.0	0	0%	100%
S	Very Coarse	1.0 - 2.0	0	0%	100%
	Very Fine	2.0 - 4.0	0	0%	100%
G	Fine	4.0 - 5.7	0	0%	100%
R	Fine	5.7 - 8.0	0	0%	100%
A	Medium	8.0 - 11.3	0	0%	100%
V	Medium	11.3 - 16.0	0	0%	100%
E	Coarse	16.0 - 22.6	0	0%	100%
L	Coarse	22.6 - 32.0	0	0%	100%
S	Very Coarse	32.0 - 45.0	0	0%	100%
	Very Coarse	45.0 - 64.0	0	0%	100%
C	Small	64 - 90	0	0%	100%
O	Small	90 - 128	0	0%	100%
B	Large	128 - 180	0	0%	100%
L	Large	180 - 256	0	0%	100%
B	Small	256 - 362	0	0%	100%
L	Small	362 - 512	0	0%	100%
D	Medium	512 - 1024	0	0%	100%
R	Lrg- Very Lrg	1024 - 2048	0	0%	100%
BDRK	Bedrock		0	0%	100%
Totals			100	100%	

Summary Data	
D50	19.3
D84	122.57
D95	170.55



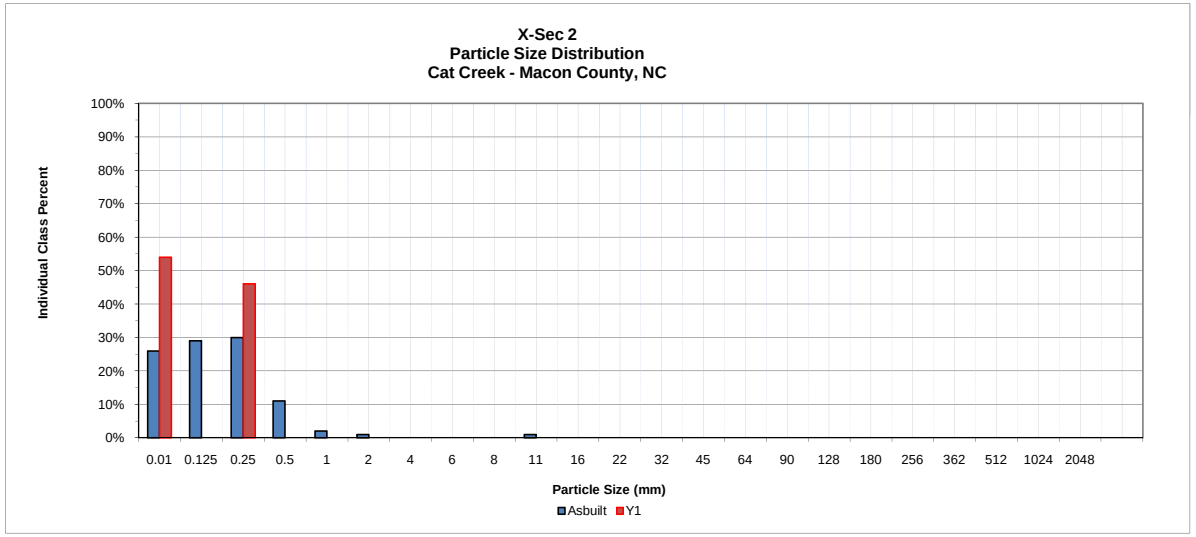


Exhibit Table 10. Baseline Stream Data Summary
Cat Creek Stream and Wetland Restoration - EEP # 71 (SCO # 050657901)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition			Reference Reach			Design Cat Creek (Swartwout)			Design Tributary 1			Design Cat Creek (Parker)			Design (Trib 2)			Design (Trib 3)			Design (Trib 4)		
Dimension and Substrate - Riffle		LL	UL	Eq.	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Bankfull Width (ft)	NA				17.5	22.9	19.7			26			16.2			15			21.5			13			10			9.1
Floodprone Width (ft)																											
Bankfull Mean Depth (ft)	NA				0.8	2.2	1.4			2.5			1.4			1.3			1.8			0.98			0.75			0.69
[1]Bankfull Max Depth (ft)	NA				2	3.8	2.8			NA			2			1.8			2.6			1.5			1.2			1.1
Bankfull Cross Sectional Area (ft^2)	NA				16.7	40.3	28.3			65			22.4			18.9			39			12.75			7.4			6.3
Width/Depth Ratio	NA				8.4	23.7	15.9			10.4			11.8			11.9			11.9			13.25			13.24			13.1
Entrenchment Ratio	NA				1.6	6.9	4.3			5			>2.2			>2.2			>2.2			>2.2			>2.2			>2.2
[1]Bank Height Ratio	NA				1.3	1.5	1.4	NA	NA	NA			1			1			1			1			1			1
Profile																												
Riffle Length (ft)					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Riffle Slope (ft/ft)					0.006	0.03	0.016	0.009	0.01	0.01	0.011	0.02	0.017	0.011	0.021	0.018	0.005	0.009	0.007	0.007	0.014	0.012	0.01	0.019	0.016	0.01	0.019	0.016
Pool Length (ft)					5.68	46.69	23.7	53.9	158.1	90.5	29.7	50.2	43.3	27.45	46.5	40.05	39.4	66.7	57.4	23.8	40.3	34.7	18.1	30.7	26.4	16.7	28.2	24.3
Pool Max depth (ft)					NA	NA	NA	NA	NA	NA			3.1			2.8			4			2			2			1.7
Pool Spacing (ft)					25.4	108.9	59.5	NA	NA	158.12	110	134	126	102	124	117	147	178	167	89	108	101	67	82	77	62	75	71
Pattern																												
Channel Beltwidth (ft)					NA	NA	NA	71	118	91.3	30	78	51	28	72	47	40	104	68	24	63	41	18	48	31	17	44	29
Radius of Curvature (ft)					NA	NA	NA	23.6	73	48.3	24	58	34	22.8	54.3	135.2	32.7	77.8	45.6	20	47	26	15	36	21	14	33	19
Rc/Bankfull width (ft/ft)					NA	NA	NA			**1.86**			**2.10**			**9.01**			**2.12**			**2.00**			**2.10**			**2.09**
Meander Wavelength (ft)					NA	NA	NA	82	484	205	107	205	145	99	190	131	143	273	194	86	165	117	66	126	89	61	115	82
Meander Width Ratio					NA	NA	NA	2.73	4.54	3.51	1.86	4.83	3.15	1.86	4.83	3.15	6.65	12.69	9.01	1.86	4.83	3.15	1.86	4.83	3.15	1.86	4.83	3.15
Transport parameters																												
Reach Shear Stress (competency) lb/f^2					NA																							
Max part size (mm) mobilized at bankfull					NA																							
Stream Power (transport capacity) W/m^2					NA																							
Additional Reach Parameters																												
Rosgen Classification					C4 - G4			C4			C4			Cb4			C4			C4			C4			Cb4		
Bankfull Velocity (fps)					NA																							
Bankfull Discharge (cfs)					NA																							
Valley length (ft)					NA			142			690			490			1480			311			318			217		
Channel Thalweg length (ft)					NA			271			832			581			1809			374			342			244		
Sinuosity (ft)					1.01 - 1.06			1.9			1.2			1.2			1.2			1.2			1.1			1.1		
Water Surface Slope (Channel) (ft/ft)					0.0058 - 0.015			0.0097			0.0116			0.0125			0.0052			0.008			0.0114			0.0251		
BF slope (ft/ft)					NA			NA						NA			NA			NA			NA			NA		
[3]Bankfull Floodplain Area (acres)					NA			NA																				
[4]Proportion over wide (%)					NA			NA																				
Channel Stability or Habitat Metric					NA			NA																				
Biological or Other					NA			NA																				

Exhibit Table 11. Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)

Cat Creek/EEP # 71 (SCO # 050657901) Segment/Reach: Swartwout and Parker (2,746 feet)

	Cross Section 1 (Riffle)							Cross Section 2 (Pool)							Cross Section 3 (Riffle)							Cross Section 4 (Pool)							Cross Section 5 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record Elevation (datum) used		2019.48							2106.77							2107.61							2075.02							2073.08						
Bankfull Width (ft)	10.76	11.97						18.31	22.01						12.61	13.26						24.92	25.96						24.39	24.06						
Floodprone Width (ft)	45	45						60	60						45	45						80	80						180	180						
Bankfull Mean Depth (ft)	0.73	0.64						0.93	0.77						0.94	0.9						1.16	1.09						1.16	1.11						
Bankfull Max Depth (ft)	1.17	1.16						2.16	2.73						1.41	1.5						2.49	2.54						1.88	1.93						
Bankfull Cross Sectional Area (ft^2)	7.88	7.64						16.96	16.88						11.84	12.02						28.91	28.18						28.2	26.6						
Bankfull Width/Depth Ratio	14.74	18.7						19.69	28.58						13.41	14.77						21.48	23.82						21.3	21.7						
Bankfull Entrenchment Ratio	4.18	3.76						3.28	2.73						3.57	3.39						3.21	3.08						7.38	7.48						
Bankfull Bank Height Ratio																																				
Cross Sectional Area between end pins (ft^2)																																				
d50 (mm)	0.5	19.3						0.21	0.06						0.3	0.19						0.36	0.14						0.46	0.24						

	Cross Section 6 (Pool)							Cross Section 7 (Riffle)							Cross Section 8 (Riffle)							Cross Section 9 (Pool)							Cross Section 10 (Riffle)						
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record Elevation (datum) used		2073.14							2071.6							2068.65							2066.51							2066.15						
Bankfull Width (ft)	28.41	28.6						22.45	23.96						18	20.68						15.71	18.49						20.58	23.63						
Floodprone Width (ft)	160	160						240	270						170	170						260	260						140	140						
Bankfull Mean Depth (ft)	1.69	1.68						1.47	1.45						1.24	1.15						1.63	1.61						1.48	1.22						
Bankfull Max Depth (ft)	3.25	3.29						2.57	2.69						1.99	2.32						2.92	3.14						2.35	2.19						
Bankfull Cross Sectional Area (ft^2)	47.93	47.96						33.04	34.82						22.25	23.75						25.65	29.73						30.4	28.8						
Bankfull Width/Depth Ratio	16.81	17.02						15.27	16.52						14.52	17.98						9.65	11.48						13.91	19.37						
Bankfull Entrenchment Ratio	5.63	5.59						10.69	11.27						9.44	8.22						16.55	14.06						6.80	5.92						
Bankfull Bank Height Ratio																																				
Cross Sectional Area between end pins (ft^2)																																				
d50 (mm)	0.29	0.14						1.8	0.11						1.33	2						0.34	0.26						0.45	32.45						

	Cross Section 11 (Pool)							Trib 1 Cross Section 1 (Riffle)							Trib 1 Cross Section 2 (Pool)																								
Based on fixed baseline bankfull elevation	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record Elevation (datum) used		2065.2							2107.94							2105.84																				
Bankfull Width (ft)	23.59	23.73						16.58	20.91						16.58	17.9																				
Floodprone Width (ft)	140	140						85	85						200	200																				
Bankfull Mean Depth (ft)	1.4	1.37						0.79	0.76						0.77	0.62																				
Bankfull Max Depth (ft)	2.75	2.66						1.56	1.78						2.24	1.71																				
Bankfull Cross Sectional Area (ft^2)	32.97	32.43						13.07	15.83						12.09	11.05																				
Bankfull Width/Depth Ratio	2.75	17.32						20.99	27.51						21.81	28.87																				
Bankfull Entrenchment Ratio	5.93	5.9						5.13	4.07						12.06	11.17																				
Bankfull Bank Height Ratio																																				
Cross Sectional Area between end pins (ft^2)																`																				
d50 (mm)	0.18	0.05						0.19	24.95						0.11	0.06																				

Exhibit Table 11B. Stream Reach Data Summary
Cat Creek Stream and Wetland Restoration - EEP # 71 (SCO # 050657901)

Parameter	As-built Baseline (Swartwout)			MY-1			MY-2			MY-3			MY-4			MY-5		
Dimension and Substrate - Riffle	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Bankfull Width (ft)	10.76	12.61	11.69	11.97	22.01	16.99												
Floodprone Width (ft)	45	47	46	45	45	45												
Bankfull Mean Depth (ft)	0.73	0.94	0.83	0.64	0.9	0.77												
[1]Bankfull Max Depth (ft)	1.17	1.41	1.29	1.16	1.5	1.33												
Bankfull Cross Sectional Area (ft^2)	7.88	11.84	9.86	7.64	12.02	9.83												
Width/Depth Ratio	13.41	14.74	14.08	14.77	18.7	16.74												
Entrenchment Ratio			3.93	3.39	3.76	3.56												
[1]Bank Height Ratio																		
Profile																		
Riffle Length (ft)	61.01	94.9	74.2	27.49	150.23	85.66												
Riffle Slope (ft/ft)	0.013	0.024	0.019	0.0102	0.025	0.017												
Pool Length (ft)	26.7	57.1	39.8	27.49	83.75	46.54												
Pool Max depth (ft)	2.11	3.03	2.53	1.94	2.55	2.34												
Pool Spacing (ft)	76.4	141.1	106.9	105.48	186.03	132.97												
Pattern																		
Channel Beltwidth (ft)	60	100	75															
Radius of Curvature (ft)																		
Rc/Bankfull width (ft/ft)																		
Meander Wavelength (ft)	200	340	254															
Meander Width Ratio			6.42															
Transport parameters																		
Reach Shear Stress (competency) lb/ft^2																		
Max part size (mm) mobilized at bankfull																		
Stream Power (transport capacity) W/m^2																		
Additional Reach Parameters																		
Rosgen Classification		C																
Bankfull Velocity (fps)																		
Bankfull Discharge (cfs)																		
Valley length (ft)		682																
Channel Thalweg length (ft)		926																
Sinuosity (ft)		1.36																
Water Surface Slope (Channel) (ft/ft)		0.0138																
BF slope (ft/ft)		0.0129																
[3]Bankfull Floodplain Area (acres)																		
[4]Proportion over wide (%)																		
Channel Stability or Habitat Metric																		
Biological or Other																		

Exhibit Table 11B. Stream Reach Data Summary
Cat Creek Stream and Wetland Restoration - EEP # 71 (SCO # 050657901)

Parameter	As-built Baseline (Parker)			MY-1			MY-2			MY-3			MY-4			MY-5		
Dimension and Substrate - Riffle	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Bankfull Width (ft)	18	24.39	21.36	20.68	24.06	23.08												
Floodprone Width (ft)	140	280	200	140	280	200												
Bankfull Mean Depth (ft)	1.16	1.48	1.34	1.11	1.45	1.23												
[1]Bankfull Max Depth (ft)	1.88	2.57	2.19	1.93	2.69	2.28												
Bankfull Cross Sectional Area (ft^2)	22.25	33.04	28.47	23.75	34.82	28.49												
Width/Depth Ratio	13.91	21.3	16.25	16.52	21.7	18.89												
Entrenchment Ratio	6.8	10.69	9.36	5.92	11.27	8.22												
[1]Bank Height Ratio																		
Profile																		
Riffle Length (ft)	31.82	116.8	62.86	38.13	135.44	76.76												
Riffle Slope (ft/ft)	0.011	0.035	0.017	0.007	0.032	0.014												
Pool Length (ft)	44.84	112.1	82.05	38.1	112.35	71.33												
Pool Max depth (ft)	2.55	4.72	3.57	2.81	4.53	3.49												
Pool Spacing (ft)	99	230	168	106	232	168												
Pattern																		
Channel Beltwidth (ft)	53	125	88	53	125	88												
Radius of Curvature (ft)																		
Rc/Bankfull width (ft/ft)																		
Meander Wavelength (ft)	185	345	259	185	345	259												
Meander Width Ratio			4.12															
Transport parameters																		
Reach Shear Stress (competency) lb/ft^2																		
Max part size (mm) mobilized at bankfull																		
Stream Power (transport capacity) W/m^2																		
Additional Reach Parameters																		
Rosgen Classification		C			C													
Bankfull Velocity (fps)																		
Bankfull Discharge (cfs)																		
Valley length (ft)		1120			1120													
Channel Thalweg length (ft)		1820			1820													
Sinuosity (ft)		1.63			1.63													
Water Surface Slope (Channel) (ft/ft)		0.0062			0.0062													
BF slope (ft/ft)		0.0066			0.0066													
[3]Bankfull Floodplain Area (acres)																		
[4]Proportion over wide (%)																		
Channel Stability or Habitat Metric																		
Biological or Other																		

Exhibit Table 11B. Stream Reach Data Summary
Cat Creek Stream and Wetland Restoration - EEP # 71 (SCO # 050657901)

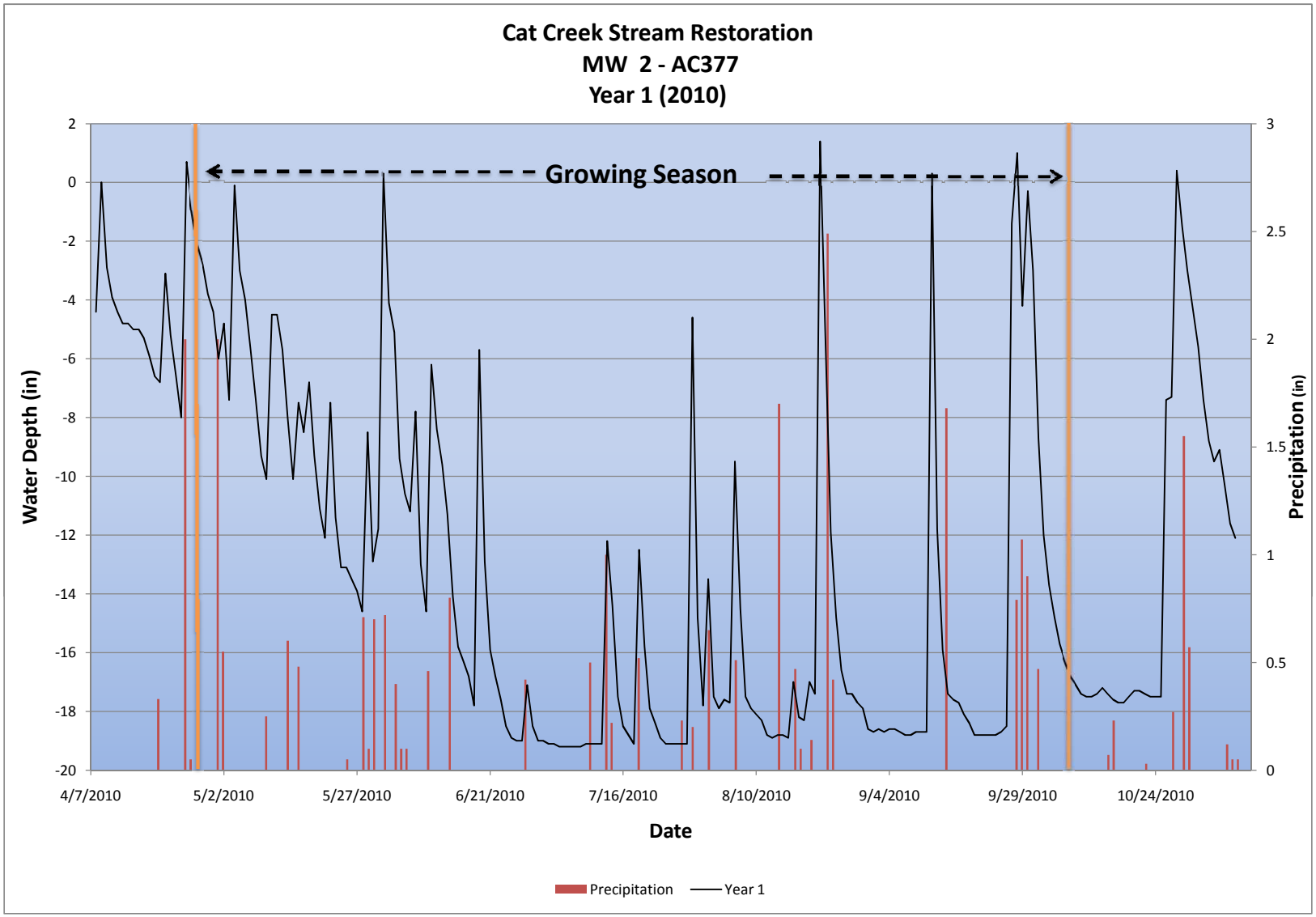
Parameter	As-built Baseline (Trib 1)			MY-1			MY-2			MY-3			MY-4			MY-5		
Dimension and Substrate - Riffle	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg
Bankfull Width (ft)			16.58			20.91												
Floodprone Width (ft)			85			85												
Bankfull Mean Depth (ft)			0.79			0.76												
[1]Bankfull Max Depth (ft)			1.56			1.78												
Bankfull Cross Sectional Area (ft^2)			13.07			15.83												
Width/Depth Ratio			20.99			27.51												
Entrenchment Ratio			5.13			4.07												
[1]Bank Height Ratio																		
Profile																		
Riffle Length (ft)	18.98	45.13	29.01	13.76	48	28.35												
Riffle Slope (ft/ft)	0.017	0.048	0.029	0.009	0.046	0.021												
Pool Length (ft)	19.3	49.1	33	26.88	42.88	35.14												
Pool Max depth (ft)	2.06	2.72	2.3	1.61	2.55	2.06												
Pool Spacing (ft)	45.1	95.6	65.3	40	96.97	63.94												
Pattern																		
Channel Beltwidth (ft)	35	55	49	35	55	49												
Radius of Curvature (ft)																		
Rc/Bankfull width (ft/ft)																		
Meander Wavelength (ft)	129	180	155	129	180	155												
Meander Width Ratio			2.96															
Transport parameters																		
Reach Shear Stress (competency) lb/f^2																		
Max part size (mm) mobilized at bankfull																		
Stream Power (transport capacity) W/m^2																		
Additional Reach Parameters																		
Rosgen Classification		C			C													
Bankfull Velocity (fps)																		
Bankfull Discharge (cfs)																		
Valley length (ft)		400			400													
Channel Thalweg length (ft)		457			457													
Sinuosity (ft)		1.14			1.14													
Water Surface Slope (Channel) (ft/ft)		0			0													
BF slope (ft/ft)		0.0145			0.0145													
[3]Bankfull Floodplain Area (acres)																		
[4]Proportion over wide (%)																		
Channel Stability or Habitat Metric																		
Biological or Other																		

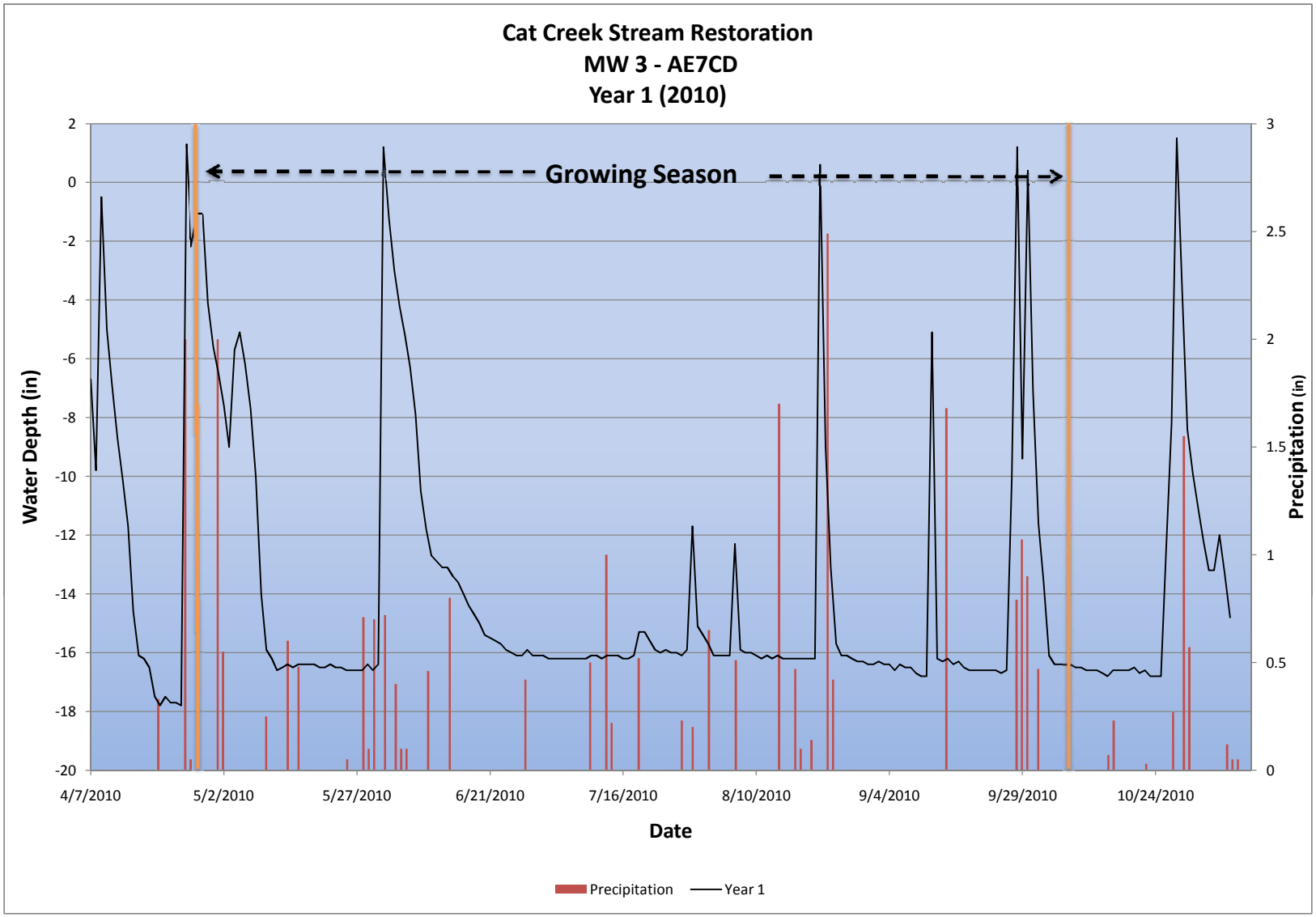
APPENDIX E

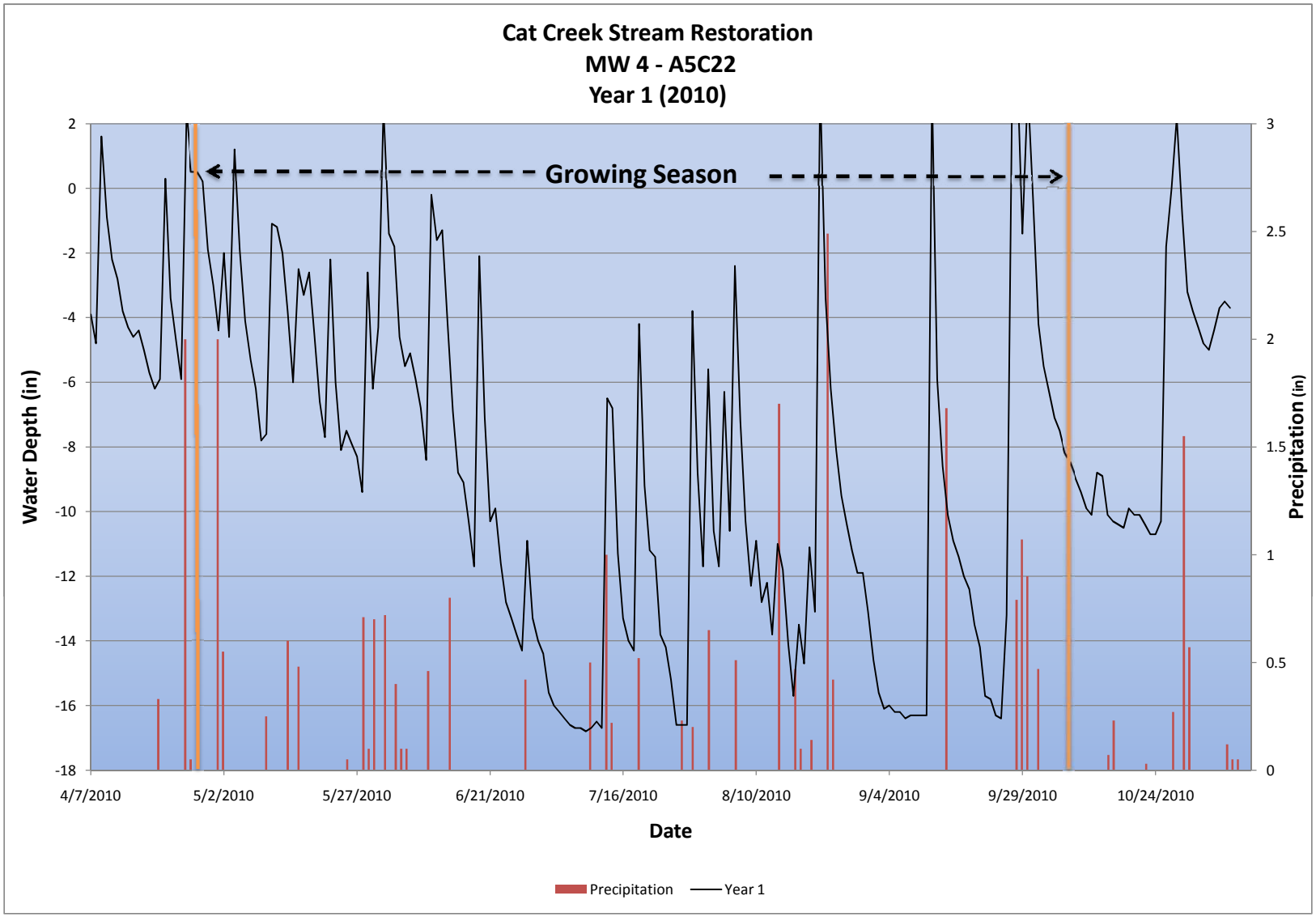
Hydrology Data

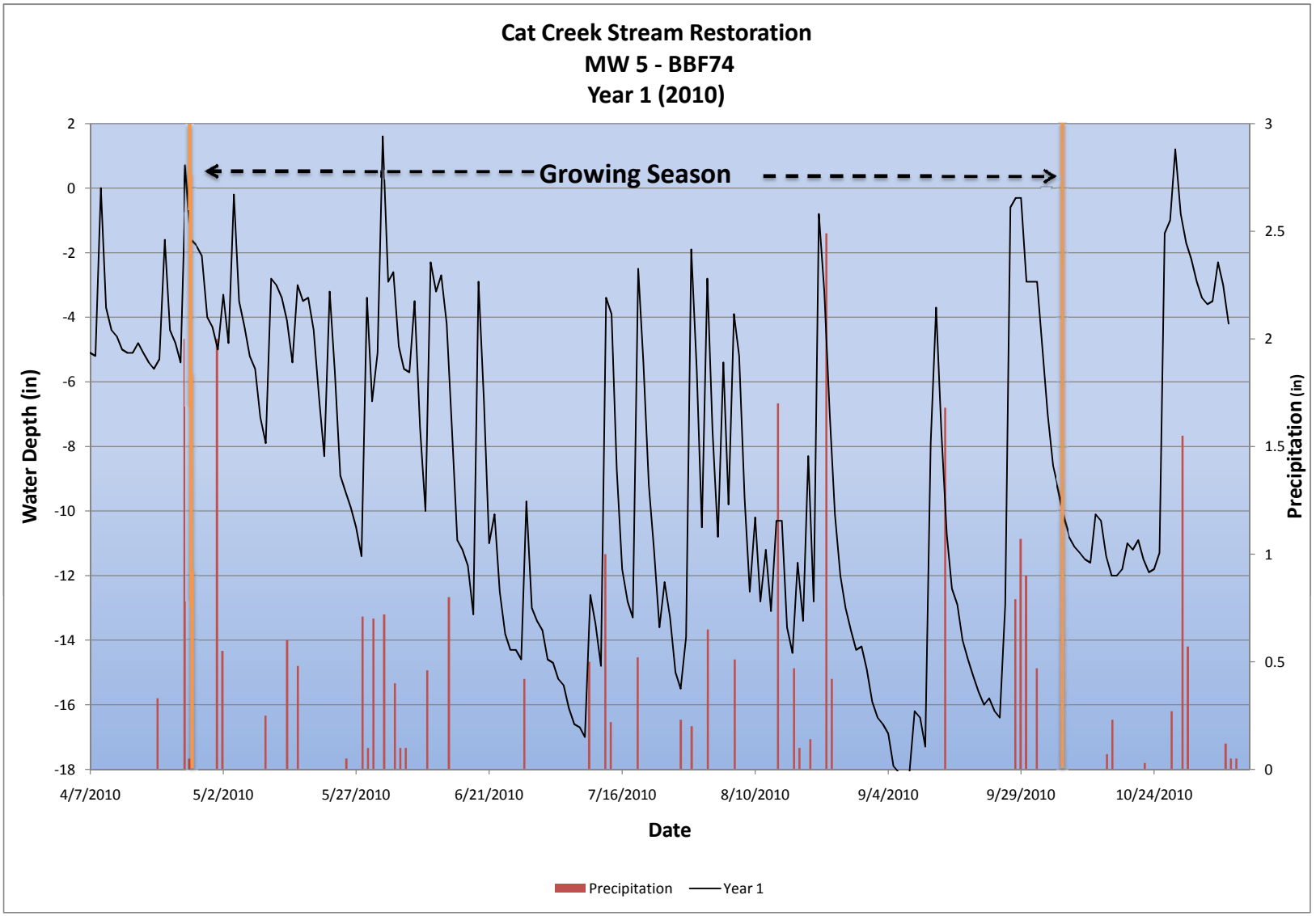
Table 12 – Verification of Bankfull Events
Monthly Rainfall Data for Calendar Year
Precipitation and Water Level Plots
Table 13 – Wetland Hydrology Criteria Attainment

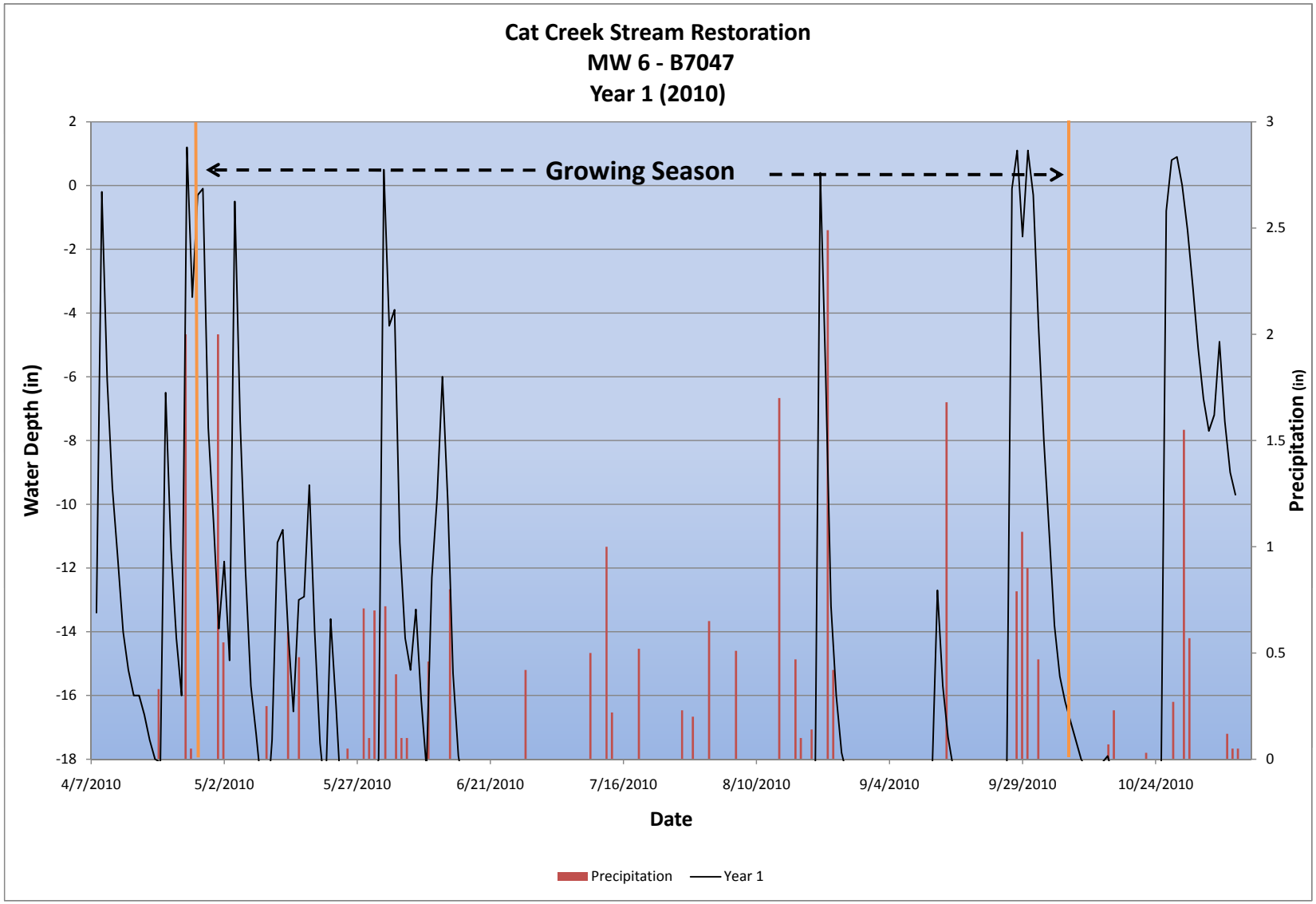
Table 12. Verification of Bankfull Events Cat Creek Stream and Wetland Restoration - EEP # 71 (SCO # 050657901)			
Date of Data Collection	**Date of Occurrence**	**Method**	**Photo # if Available**
No events on 2010			

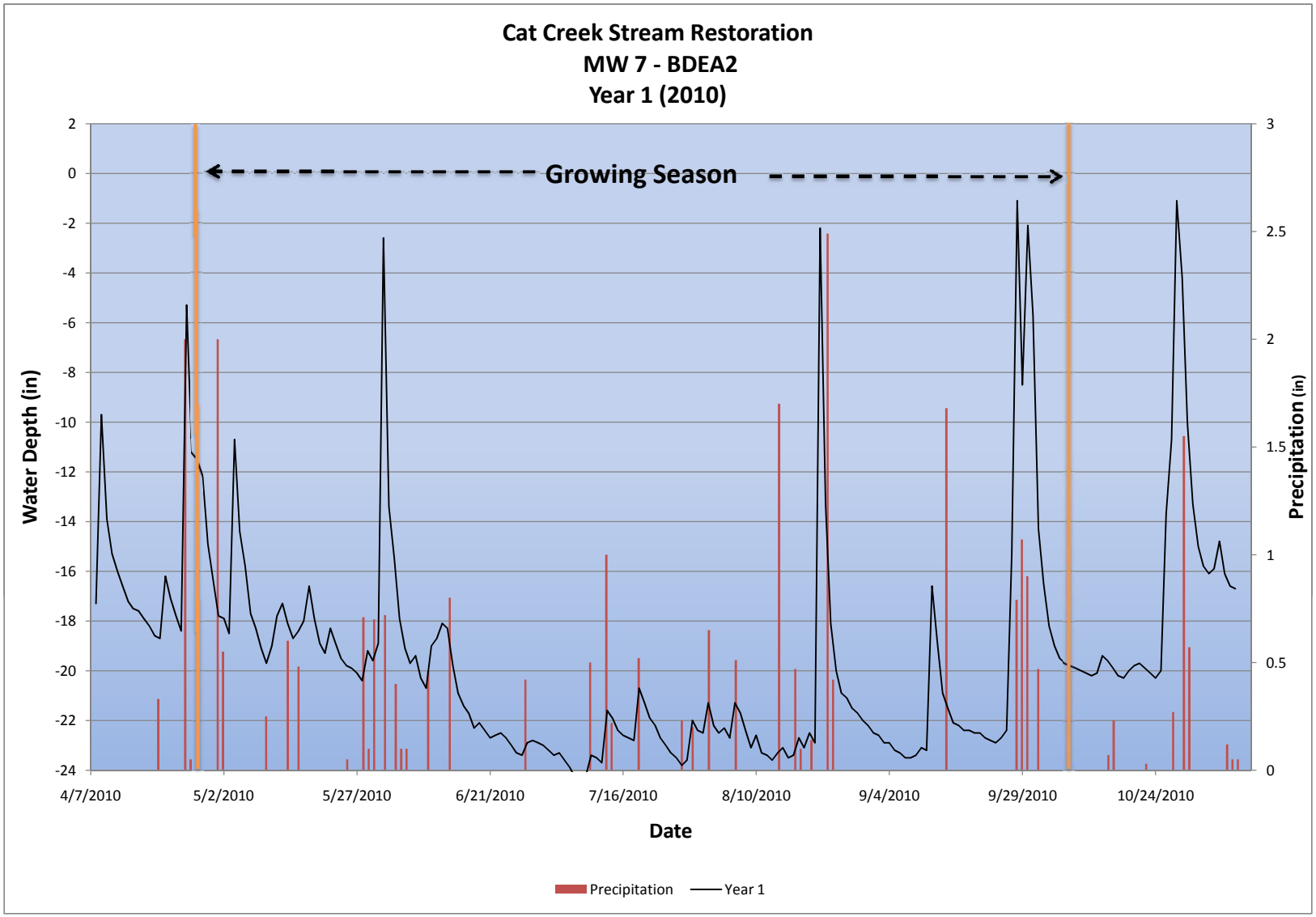

Cat Creek Stream Restoration
MW 2 - AC377
Year 1 (2010)
Growing Season
Water Depth (in)
Precipitation (in)
Date
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
3
2.5
2
1.5
1
0.5
0
4/7/2010
5/2/2010
5/27/2010
6/21/2010
7/16/2010
8/10/2010
9/4/2010
9/29/2010
10/24/2010
Precipitation
Year 1

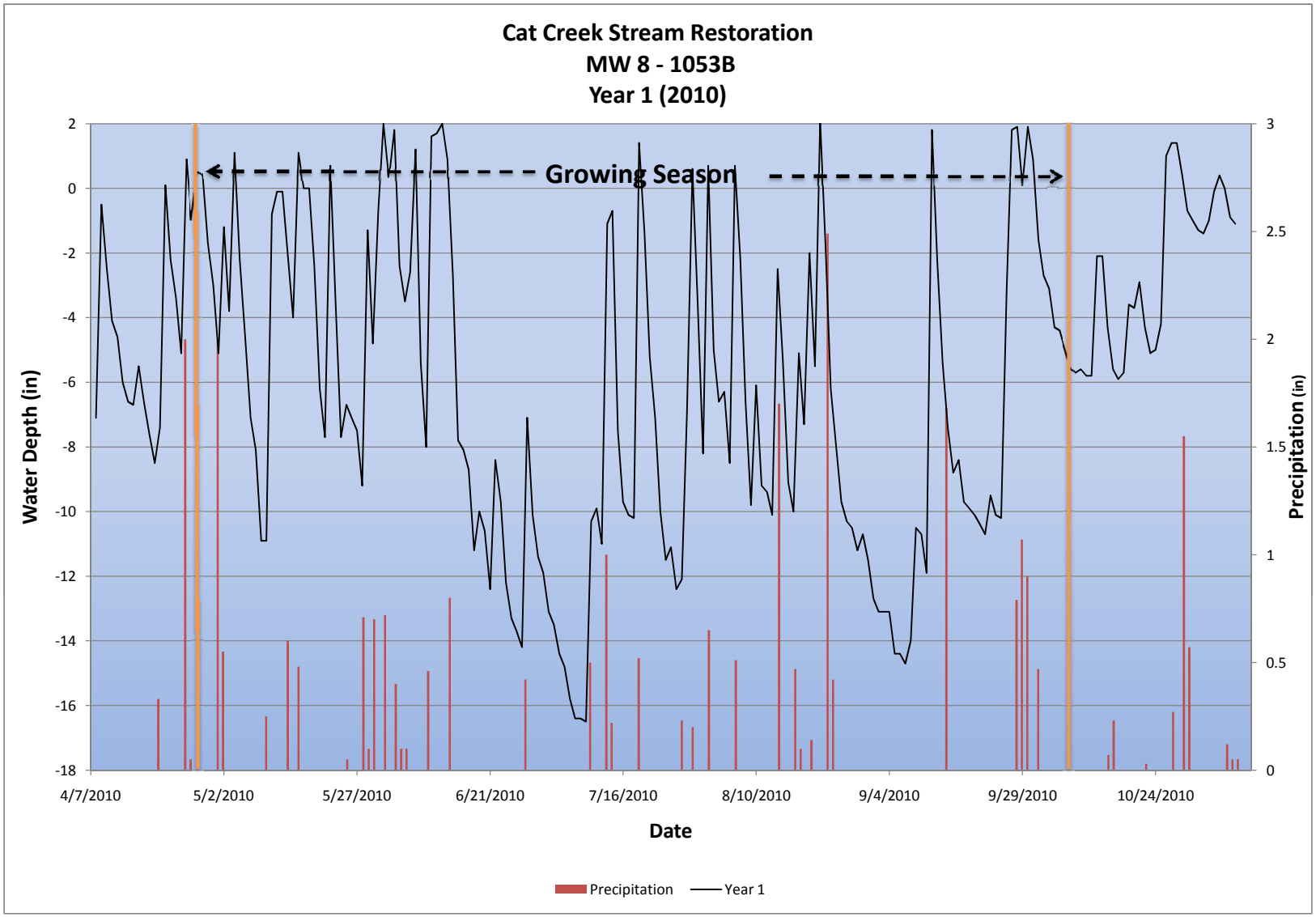

Cat Creek Stream Restoration
MW 3 - AE7CD
Year 1 (2010)
Growing Season
Water Depth (in)
Precipitation (in)
Date
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
3
2.5
2
1.5
1
0.5
0
4/7/2010
5/2/2010
5/27/2010
6/21/2010
7/16/2010
8/10/2010
9/4/2010
9/29/2010
10/24/2010
Precipitation
Year 1

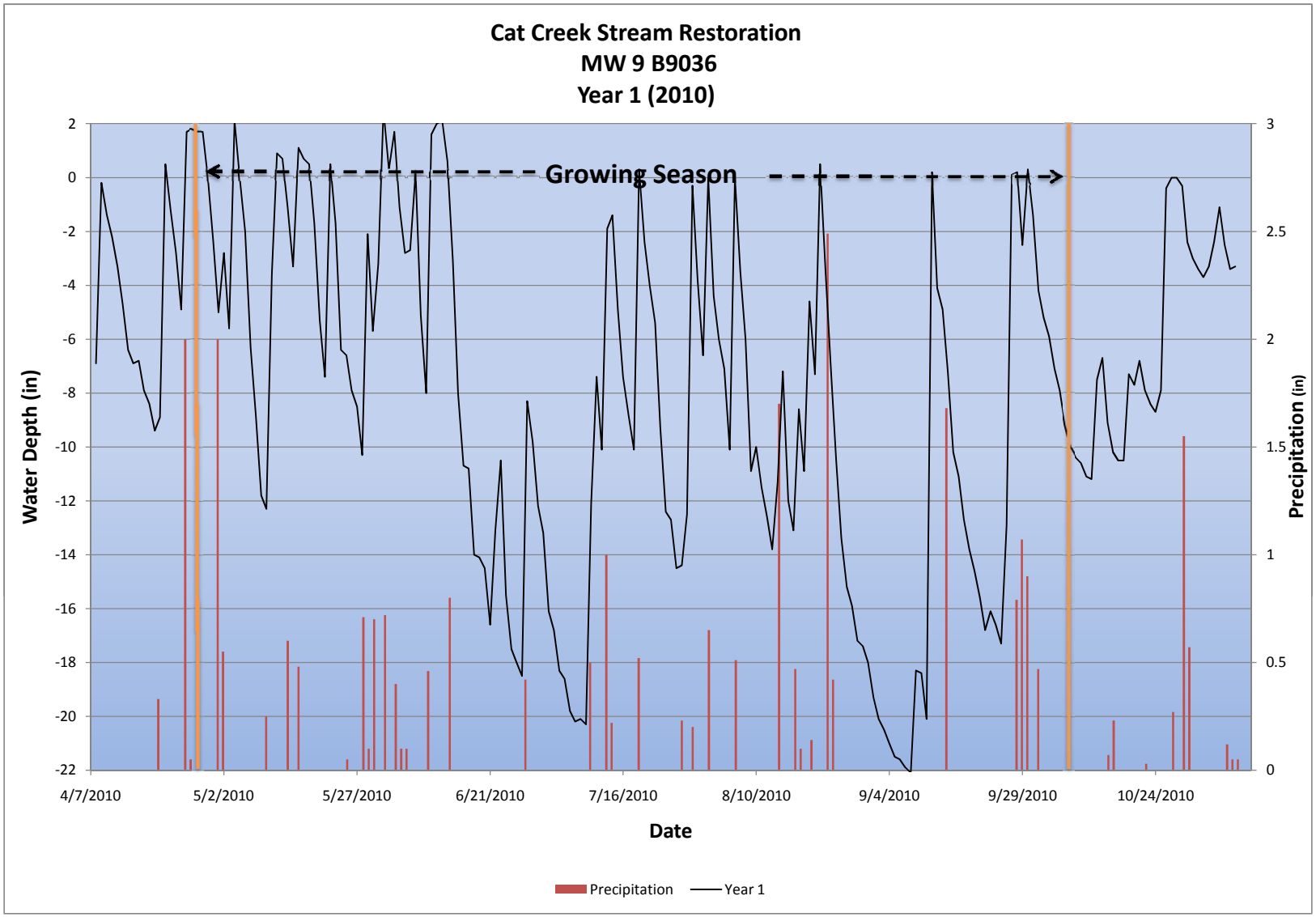

Cat Creek Stream Restoration
MW 4 - A5C22
Year 1 (2010)
Growing Season
Water Depth (in)
Precipitation (in)
Date
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
3
2.5
2
1.5
1
0.5
0
4/7/2010
5/2/2010
5/27/2010
6/21/2010
7/16/2010
8/10/2010
9/4/2010
9/29/2010
10/24/2010
Precipitation
Year 1

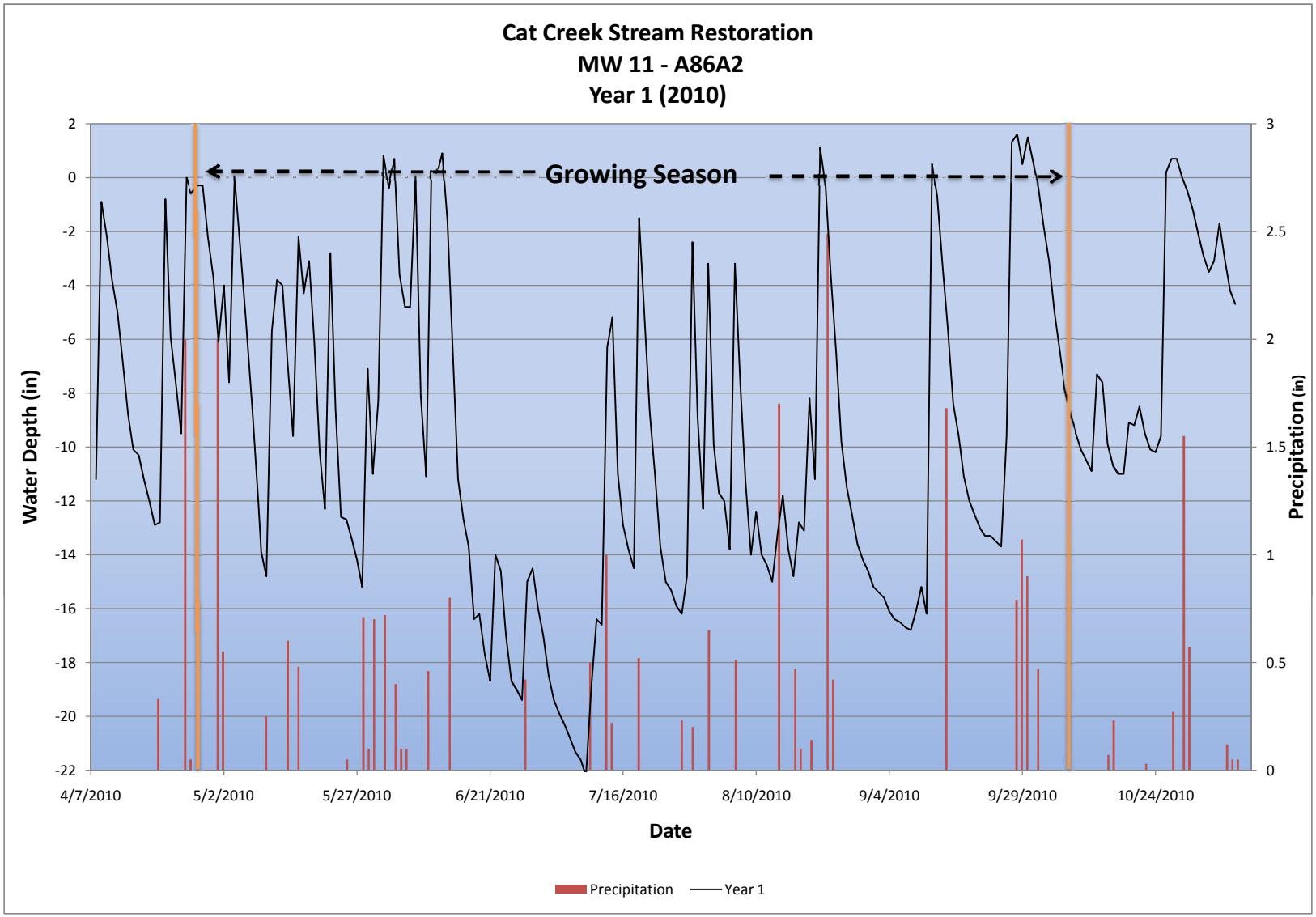

Cat Creek Stream Restoration
MW 5 - BBF74
Year 1 (2010)
Growing Season
Water Depth (in)
Precipitation (in)
Date
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
3
2.5
2
1.5
1
0.5
0
4/7/2010
5/2/2010
5/27/2010
6/21/2010
7/16/2010
8/10/2010
9/4/2010
9/29/2010
10/24/2010
Precipitation
Year 1

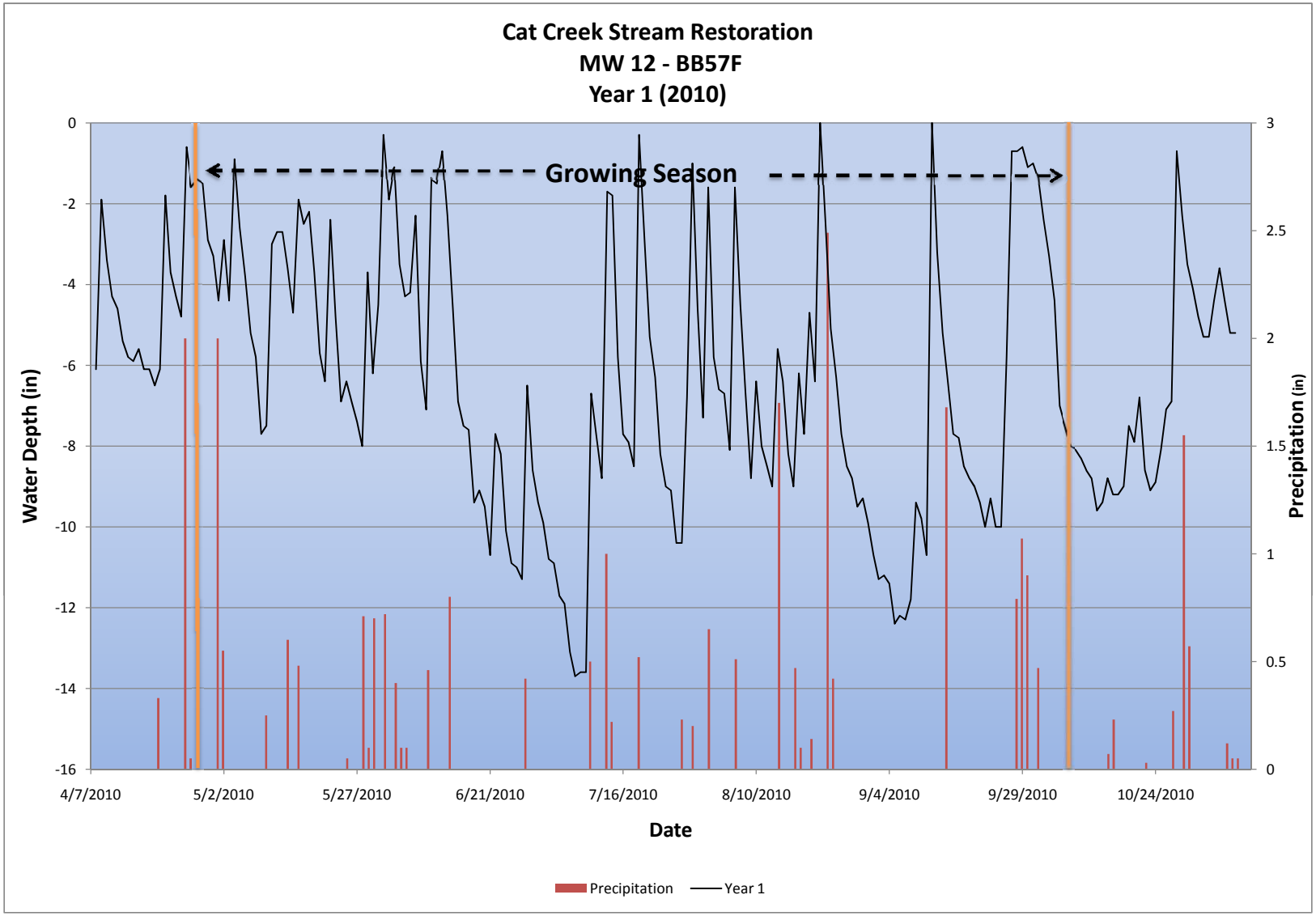

Cat Creek Stream Restoration
MW 6 - B7047
Year 1 (2010)
Growing Season
Water Depth (in)
Precipitation (in)
Date
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
3
2.5
2
1.5
1
0.5
0
4/7/2010
5/2/2010
5/27/2010
6/21/2010
7/16/2010
8/10/2010
9/4/2010
9/29/2010
10/24/2010
Precipitation
Year 1

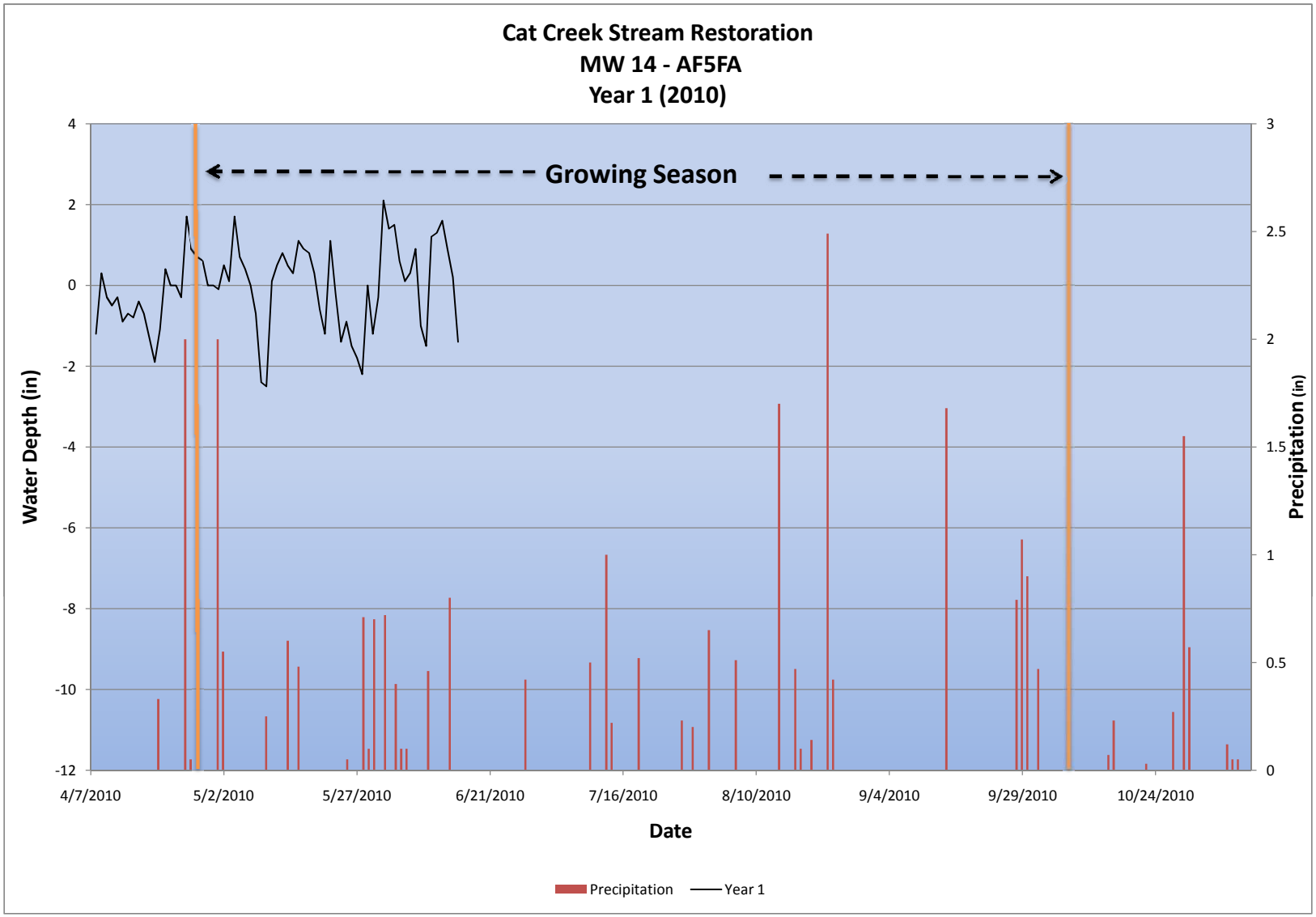

Cat Creek Stream Restoration
MW 7 - BDEA2
Year 1 (2010)
Growing Season
Water Depth (in)
Precipitation (in)
Date
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
3
2.5
2
1.5
1
0.5
0
4/7/2010
5/2/2010
5/27/2010
6/21/2010
7/16/2010
8/10/2010
9/4/2010
9/29/2010
10/24/2010
Precipitation
Year 1

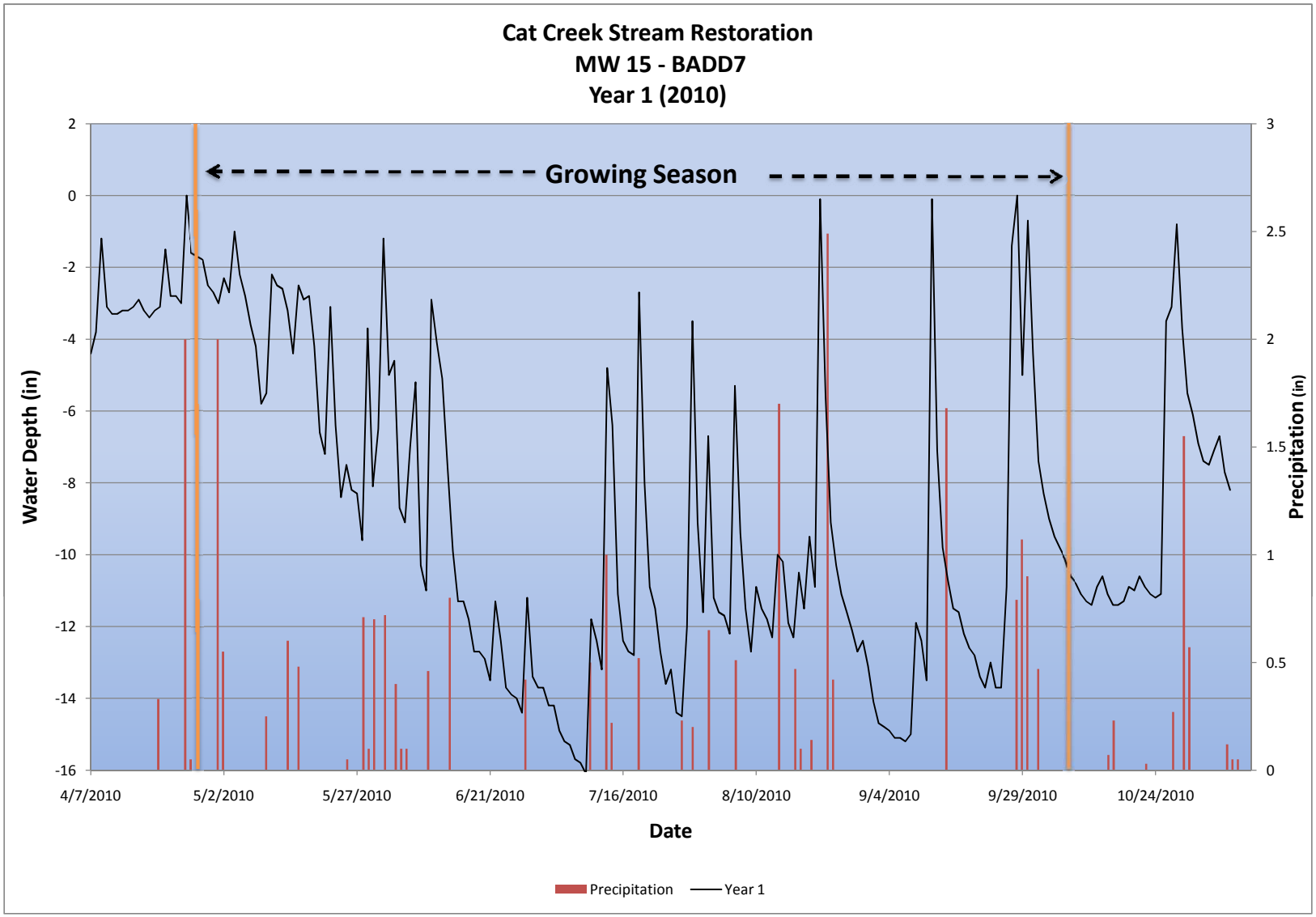

Cat Creek Stream Restoration
MW 8 - 1053B
Year 1 (2010)
Growing Season
Water Depth (in)
Precipitation (in)
Date
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
3
2.5
2
1.5
1
0.5
0
4/7/2010
5/2/2010
5/27/2010
6/21/2010
7/16/2010
8/10/2010
9/4/2010
9/29/2010
10/24/2010
Precipitation
Year 1

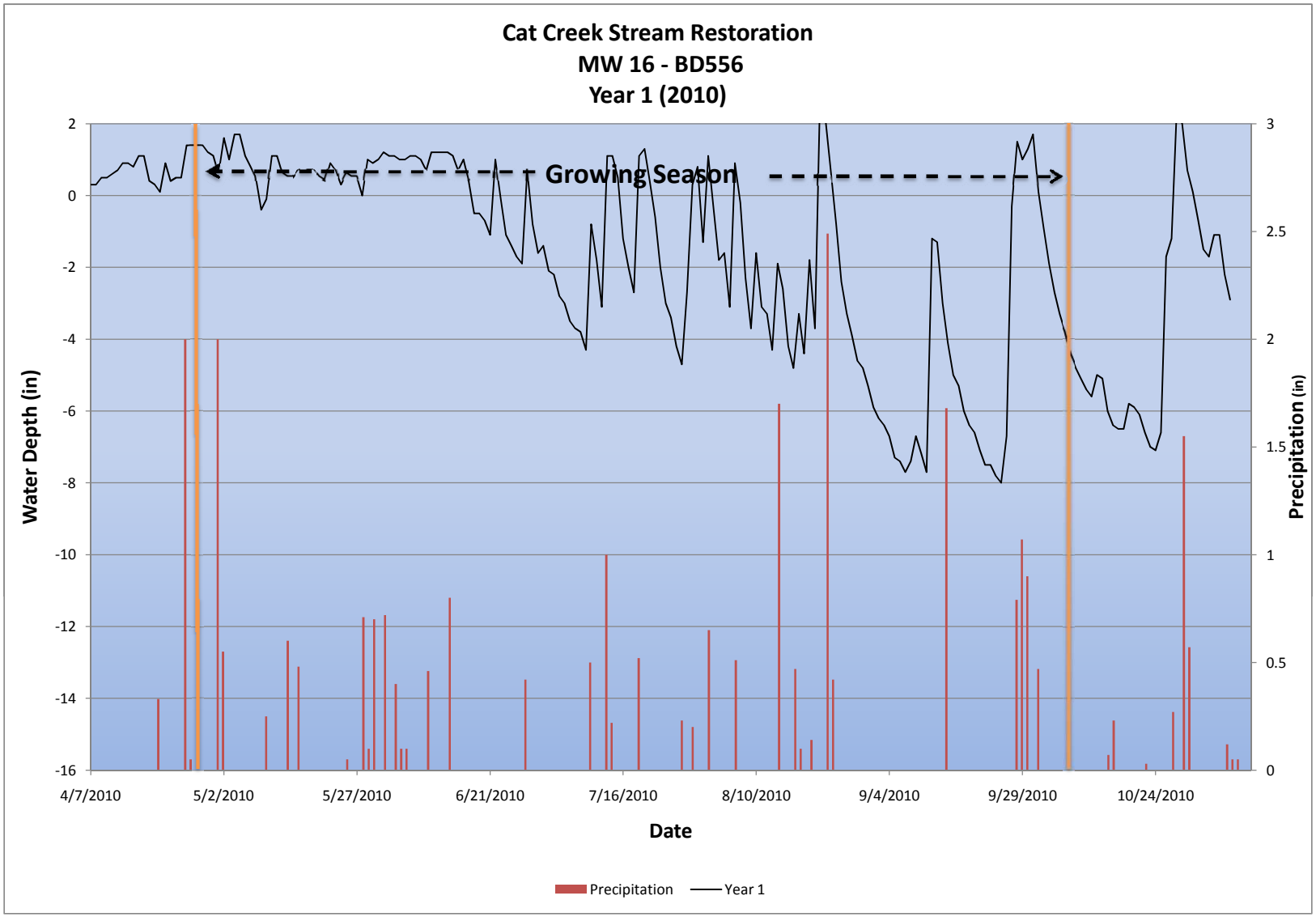

Cat Creek Stream Restoration
MW 9 B9036
Year 1 (2010)
Growing Season
Water Depth (in)
Precipitation (in)
Date
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
3
2.5
2
1.5
1
0.5
0
4/7/2010
5/2/2010
5/27/2010
6/21/2010
7/16/2010
8/10/2010
9/4/2010
9/29/2010
10/24/2010
Precipitation
Year 1

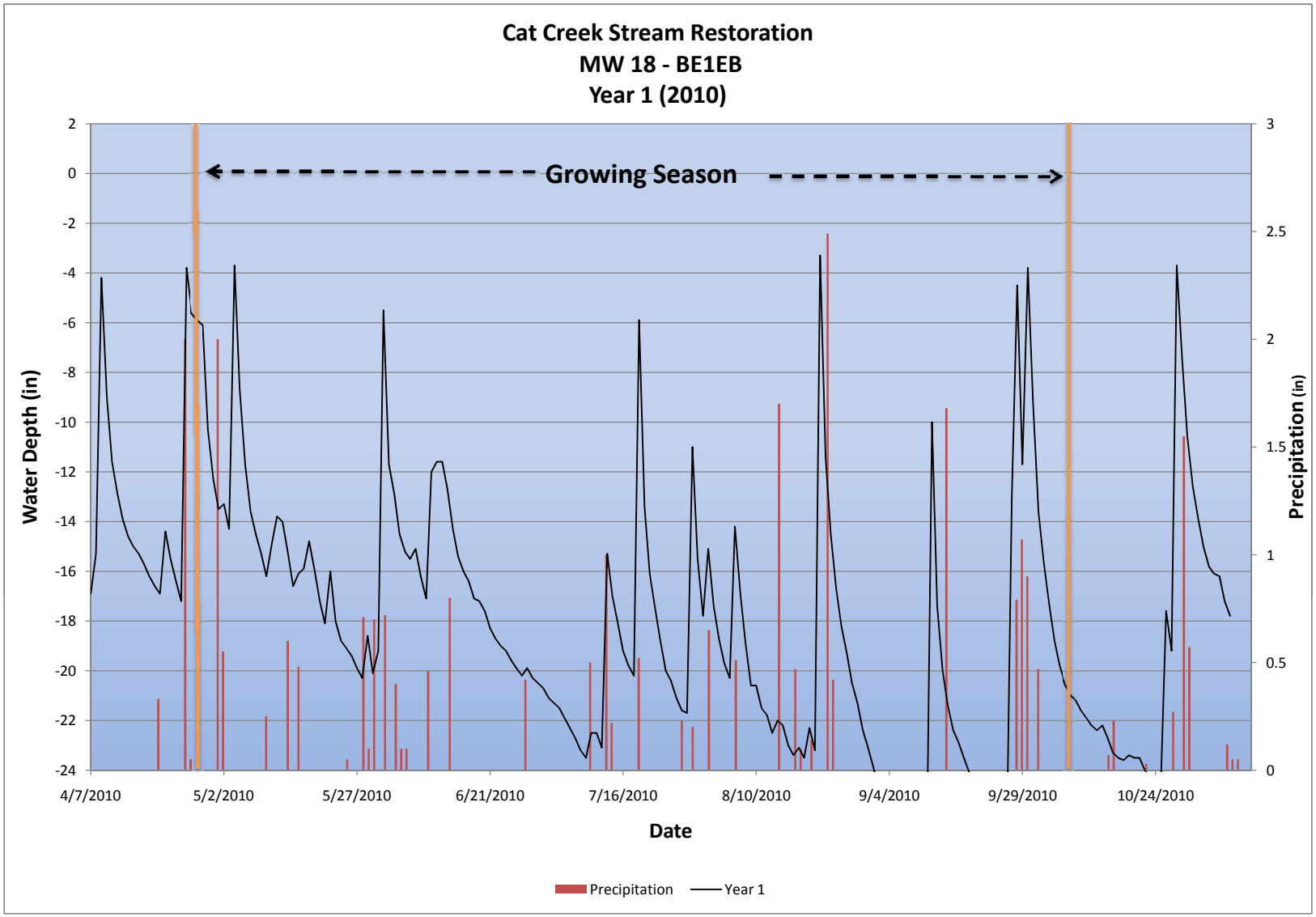

Cat Creek Stream Restoration
MW 11 - A86A2
Year 1 (2010)
Growing Season
Water Depth (in)
Precipitation (in)
Date
4/7/2010
5/2/2010
5/27/2010
6/21/2010
7/16/2010
8/10/2010
9/4/2010
9/29/2010
10/24/2010
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
3
2.5
2
1.5
1
0.5
0
Precipitation
Year 1


Cat Creek Stream Restoration
MW 12 - BB57F
Year 1 (2010)
Growing Season
Water Depth (in)
Precipitation (in)
0
-2
-4
-6
-8
-10
-12
-14
-16
3
2.5
2
1.5
1
0.5
0
4/7/2010
5/2/2010
5/27/2010
6/21/2010
7/16/2010
8/10/2010
9/4/2010
9/29/2010
10/24/2010
Date
Precipitation
Year 1


Cat Creek Stream Restoration
MW 14 - AF5FA
Year 1 (2010)
Growing Season
Water Depth (in)
Precipitation (in)
Date
4/7/2010
5/2/2010
5/27/2010
6/21/2010
7/16/2010
8/10/2010
9/4/2010
9/29/2010
10/24/2010
Precipitation
Year 1


Cat Creek Stream Restoration
MW 15 - BADD7
Year 1 (2010)
Growing Season
Water Depth (in)
Precipitation (in)
Date
2
0
-2
-4
-6
-8
-10
-12
-14
-16
3
2.5
2
1.5
1
0.5
0
4/7/2010
5/2/2010
5/27/2010
6/21/2010
7/16/2010
8/10/2010
9/4/2010
9/29/2010
10/24/2010
Precipitation
Year 1


Cat Creek Stream Restoration
MW 16 - BD556
Year 1 (2010)
Growing Season
Water Depth (in)
Precipitation (in)
Date
2
0
-2
-4
-6
-8
-10
-12
-14
-16
3
2.5
2
1.5
1
0.5
0
4/7/2010
5/2/2010
5/27/2010
6/21/2010
7/16/2010
8/10/2010
9/4/2010
9/29/2010
10/24/2010
Precipitation
Year 1


Cat Creek Stream Restoration
MW 18 - BE1EB
Year 1 (2010)
Growing Season
Water Depth (in)
Precipitation (in)
Date
4/7/2010
5/2/2010
5/27/2010
6/21/2010
7/16/2010
8/10/2010
9/4/2010
9/29/2010
10/24/2010
Precipitation
Year 1

Cat Creek 30-70 Percentile Graph for Rainfall in 2010
Macon Co., NC

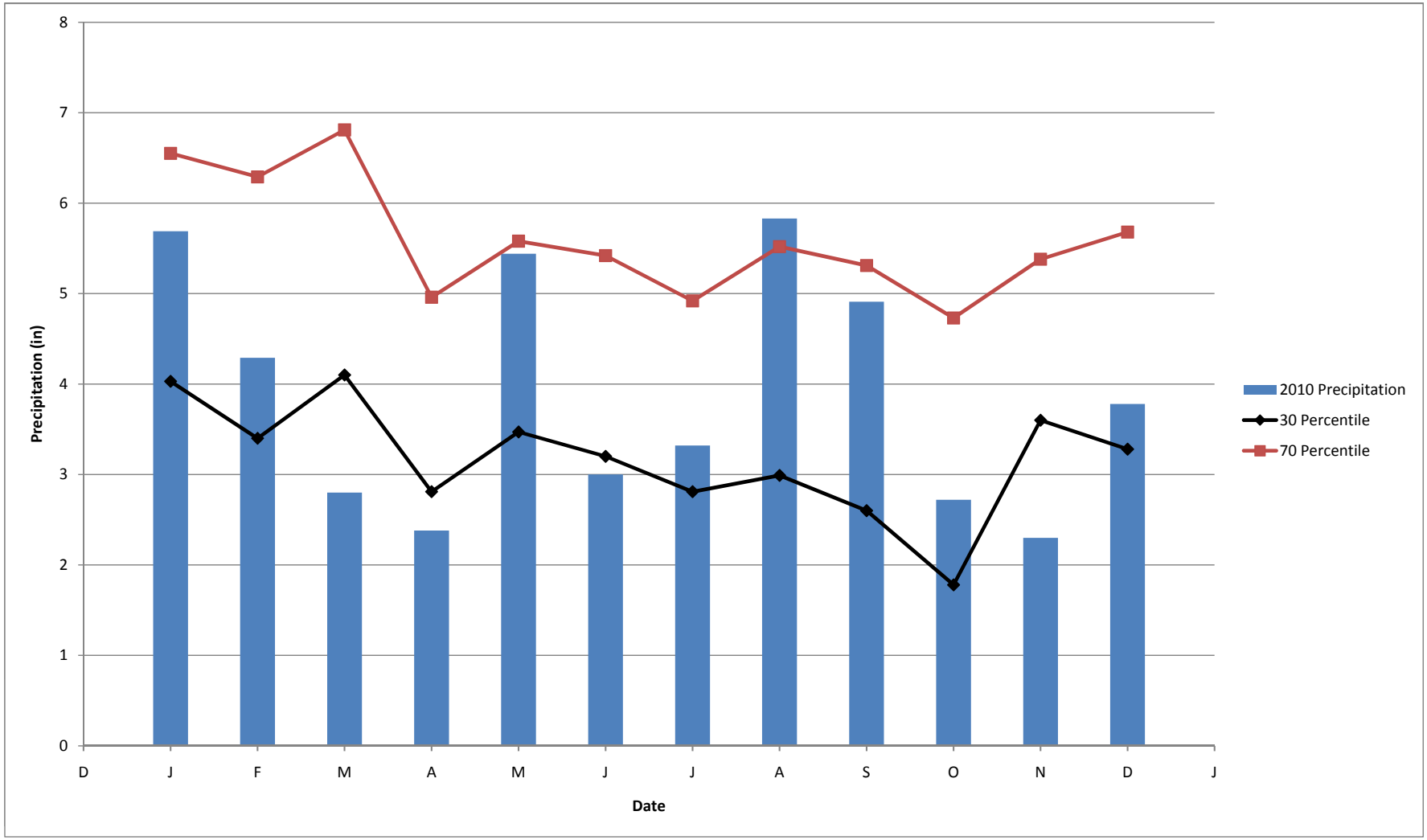


Table 13. Summary of Groundwater Gauge Results Cat Creek Stream and Wetland Restoration - EEP # 71 (SCO # 050657901)					
Gauge	Success Criteria Achieved/Max Consecutive Days During Growing Season (%)				
	Year 1 (2010)	Year 2 (2011)	Year 3 (2012)	Year 4 (2013)	Year 5 (2014)
1	Yes/35%				
2	Yes/16%				
3	Yes/8.3%				
4	Yes/35%				
5	Yes/32%				
6	No/2%				
7	No/0%				
8	Yes/33%				
9	Yes/22%				
10	Yes/9%				
11	Yes/11%				
12	Yes/41%				
13	NA				
14	Yes/30%				
15	Yes/33%				
16	Yes/100%				
17	NA				
18	No/3%				

Note: Gauges 6 and 7 are in locations that are not proposed for wetland mitigation credit.