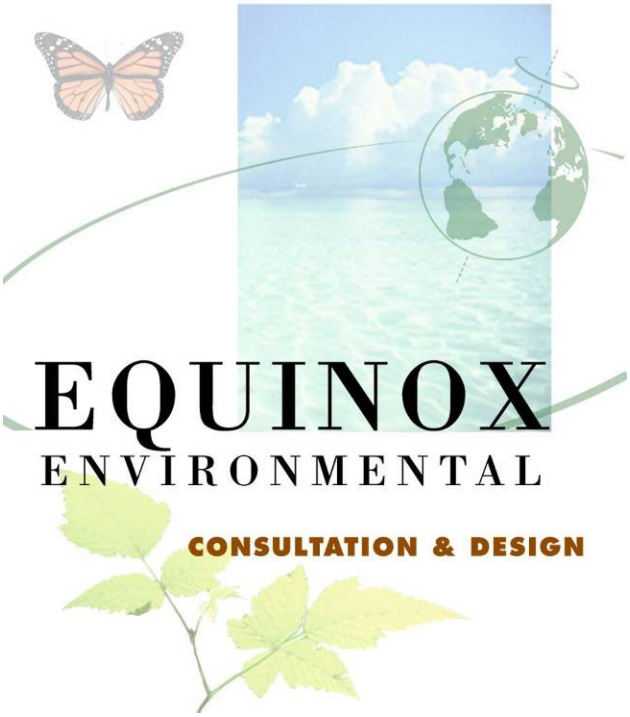
Cat Creek
Stream and Wetland Restoration
NCEEP Project Number: 71
Monitoring Year 2
2011 Final Report

Submitted to
North Carolina Ecosystem Enhancement Program
North Carolina Department of Environment and Natural Resources
November 2011

1652 Mail Service Center
Raleigh, NC 27699

Monitoring Firm



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Cat Creek Stream and Wetland Restoration
2011 Monitoring Report (MY 2)

Table of Contents

Appendices

1.0 EXECUTIVE SUMMARY / PROJECT ABSTRACT

The goals and objectives stated in the Cat Creek Restoration Plan (NCEEP 2007) are as follows:

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 and reduce erosion by stabilizing the stream banks for all streams by improving riparian vegetation.
- Improve aquatic habitat of the main channel and tributaries with the use of natural material stabilization structures such as root wads, rock vanes, woody debris, and a riparian buffer.
- Provide aesthetic value, wildlife habitat, and bank stability through the creation or enhancement of a riparian zone.
- Create 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 8,881 feet of Cat Creek and its tributaries.
- Restore a natural riparian buffer.
- Restore or enhance 7.97 acres of swamp forest bog complex wetlands.
- Plant native trees and shrubs throughout the site.

The monitoring year two (MY2) vegetation plot data indicate that the project meets the established criterion for planted stem density, which is a minimum survival of 320 planted stems per acre at the end of the year three monitoring period. While the average living stem densities for planted stems in MY2 is approximately 405 stems per acre, several plots (~29%) did not meet the year three interim success criteria numbers per acre. These include VP 2, 7, 10, and 12, which had 202, 202, 121, and 283, stems per acre, respectively.

Of the planted stems recorded within the monitoring plots, nearly 9% were reported as dead or missing. There was however an approximately 5% increase in total stem densities between MY1 and MY2. The increase in stem densities is attributed to additional stems being discovered during the (MY2) field assessment. When planted and natural stems are combined, the average stem density is 674 stems per acre, which is well above the minimum established criterion. While exotic invasive vegetation was treated in 2010, vegetation problem areas noted in MY2 consist of 40 currently isolated patches of high threat invasive plant species that span the project extent. Additionally, 1 area of easement encroachment was noted during MY2 which is impacting vegetative coverage.

Stream longitudinal profiles have remained stable among monitoring years. Stream issues observed during MY2 were minimal and consisted of six bank erosion areas and one area of bed degradation, with all but one of these areas occurring within the Preserve project reaches. Based on the presence of wrack lines and crest gauge monitoring no bankfull event was documented in MY2.

Data from the groundwater monitoring stations resulted in all but one station exceeding saturation of the upper soil surfaces for eight percent of the growing season. The on-site rain gauge documented below normal precipitation during most of the growing season. During normal rainfall years all groundwater gauges are expected to meet criteria.

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

Additionally, due to inconsistencies with previous thalweg stationing, the baseline thalweg data and 2010 aerial imagery was utilized to apply the corrected stationing for the project site.

2.0 Methodology

The stream monitoring methodologies utilized in MY2 were intended to replicate those employed during the previous monitoring year and are based on standard guidance and procedures documents (Rosgen 1996 and USACE 2003). Vegetation monitoring data were collected following the standard CVS-EEP Protocol for Recording Vegetation, Level II (Lee et al. 2008). Wetland hydrology was considered established if groundwater monitoring data indicated saturated soils within 12 inches of the soil surface for 8% of the growing season. The growing season for the site was based on the Natural Resource Conservation Service (NRCS) data set for Macon County (NRCS 2011).

3.0 References

Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation. Version 4.2.

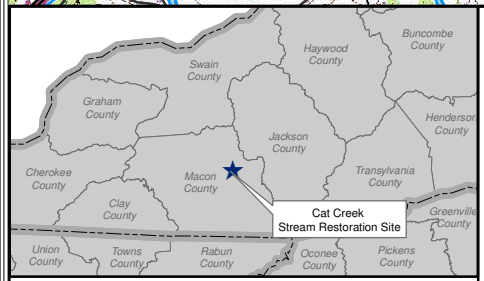
NCEEP (North Carolina Ecosystem Enhancement Program). July 2007. Cat Creek Stream and Wetland Restoration. Macon County, North Carolina. Restoration Plan. Raleigh, NC.

NRCS (Natural Resources Conservation Service). Accessed June 2011. Climate Analysis for Wetlands by County. http://www.wcc.nrcs.usda.gov/climate/wetlands.html

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

USACE (U.S. Army Corps of Engineers). 2003. Stream Mitigation Guidelines. USACOE, USEPA, NCWRC, NCDENR-DWQ. Wilmington District.

Appendix A
Project Vicinity Map and Background Tables



Directions: From Raleigh, proceed west on I-40 towards Knoxville, TN. Merge onto US-74 (Exit 27) toward Waynesville. Follow US-74 to exit 81 US-23/US-441. Proceed south on US-441 for 17 miles to Cat Creek Road. Turn left onto Cat Creek Rd. and follow ~1 mile to Ferguson Road. Turn left on Ferguson and continue ~0.5 mile to the bridge crossing Cat Creek. The project site is upstream and downstream of the bridge.

Figure 1 - Vicinity Map

Cat Creek Stream &
Wetland Restoration Site
Project No. 71

Macon County, North Carolina

N

EQUINOX ENVIRONMENTAL
CONSULTATION & DESIGN

Ecosystem Enhancement PROGRAM

0 0.25 0.5 Miles

7.5 Minute Series Corbin Knob Quadrangle

Table 1a. Project Components Cat Creek Stream & Wetland / Project No. 71							
Project Component or Reach ID	**Existing Feet/Acres**	**Restoration Level**	**Approach**	**Footage or Acreage**	***Stationing**	**BMP Elements**	**Comment**
Cat Creek - Upper Swartwout	900 lf	E2		900 lf	00+00 - 09+00		Livestock exclusion, buffer plantings, bank stabilization in 3 locations
Cat Creek - Lower Swartwout	770 lf	R	P1	818 lf	09+00 - 17+18		
Cat Creek - Upper Waldroup	1,438 lf	E2		1,439 lf	**17+49 - 32+13	Equipment crossing and watering stations	Livestock exclusion, buffer plantings
Cat Creek - Lower Waldroup	482 lf	E1		482 lf	34+37 - 39+19	Cattle crossing and watering stations	Livestock exclusion, buffer plantings, and structure to provide enhanced profile
Cat Creek - Parker	1,750 lf	R	P1	1,871 lf	39+19 - 57+90		
Cat Creek Preserve	1,765 lf	E1		1,879 lf	59+24 - 78+03		Grade control, turbulent riffles to add habitat, buffer plantings, and invasive
UT1	100 lf	E2		115 lf	100+00 - 101+15		Livestock exclusion, buffer plantings
UT1	363 lf	R	P1	458 lf	101+15 - 105+73		
UT2	210 lf	R	P1	381 lf	200+00 - 203+81		
UT3	165 lf	R	P1	294 lf	300+00 - 302+94		
UT4	110 lf	R	P1	244 lf	400+00 - 402+44		
Swartwout Wetlands		R		1.11 ac			
		E		0.51 ac			Livestock exclusion, removal of drain pipe, plantings
Parker Wetlands		R		4.73 ac			
		E		0.25 ac			
Preserve Wetlands		R		0.71 ac			
		E		0.66 ac			

Non-Applicable

* See Appendix B Fig. 2. Stationing was Realigned in MY2 to Accurately Depict the Stream Reaches (See Executive Summaryk, Page 2)

** Stationing Includes a 25 Foot Crossing

Table 1b. Component Summations Cat Creek Stream & Wetland / Project No. 71							
Restoration Level	**Stream (lf)**	**Riparian Wetland (Ac)**		**Non-Riparian (Ac)**	**Upland (Ac)**	**Buffer (Ac)**	**BMP**
		Riverine	**Non-Riverine**				
Restoration	4,066	6.55					
Enhancement		1.42					
Enhancement I	2,361						1
Enhancement II	2,454						1
Creation							
Preservation							
HQ Preservation							
Totals	**8,881**	**7.97**		**0**	**0**	**0**	**2**

Non-Applicable

Table 2. Project Activity & Reporting History Cat Creek Stream and Wetland / Project No. 71 Elapsed Time Since Grading Complete: 1 Year 6 Months Number of Reporting Years: 2		
Activity or Report	**Data Collection Complete**	**Actual Completion or Delivery**
Restoration Plan	-	Jul-07
Final Design - Construction Plans	Jul-08	Jul-08
Construction	N/A	May-10
Temporary S&E mix applied	N/A	Jan-10
Permanent seed mix applied	N/A	Feb-10
Planting	N/A	Feb-10
Initial Wetland Monitoring Gauges & Rain Gauge Installed	N/A	Apr-10
Mitigation Plan / As-built (Year 0 Monitoring - Baseline)	Jun-10	Mar-11
Year 1 Monitoring	Dec-10	Mar-11
Year 2 Monitoring	Nov-11	Dec-11
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

N/A - Item does not apply.
- Information unavailable.

Table 3. Project Contacts Cat Creek Stream and Wetland / Project No. 71	
Designer	AECOM 701 Corporate Center Dr., Suite 475 Raleigh, NC 27607
Primary Project Design POC	Ron Johnson (919) 854-6210
Construction Contractor	Fluvial Solutions P.O. Box 28749 Raleigh, NC 27611
Construction Contractor POC	Peter Jelenevsky (919) 605-6134
Planting Contractor	Bruton Natural Systems, Inc P.O. Box 1197 Fremont, NC 27830
Planting Contractor POC	Charlie Bruton (919) 242-6555
Seeding Contractor	Fluvial Solutions P.O. Box 28749 Raleigh, NC 27611
Seeding Contractor POC	Peter Jelenevsky (919) 605-6134
Seed Mix Sources	Mellow Marsh Farm, Inc 1312 Woody Store Road Siler City, NC 27344 (919) 742-1200
Monitoring Performers (Y0) - 2010	AECOM 701 Corporate Center Dr., Suite 475 Raleigh, NC 27607
Stream Monitoring POC	Ron Johnson (919) 854-6210
Monitoring Performers (Y1) - 2010	AECOM 701 Corporate Center Dr., Suite 475 Raleigh, NC 27607
Stream Monitoring POC	Ron Johnson (919) 854-6210
Monitoring Performers (Y2) - 2011	Equinox Environmental Consultation & Design, Inc. 37 Haywood Street, Suite 100 Asheville, North Carolina 28801
Stream Monitoring POC	Steve Melton (828) 253-6856
Vegetation Monitoring POC	Kevin Mitchell (828) 253-6856
Wetland Monitoring POC	Win Taylor (828) 253-6856
Monitoring Performers (Y3)- 2012	
Stream Monitoring POC	
Vegetation Monitoring POC	
Wetland Monitoring POC	
Monitoring Performers (Y4)- 2013	
Stream Monitoring POC	
Vegetation Monitoring POC	
Wetland Monitoring POC	
Monitoring Performers (Y5)- 2014	
Stream Monitoring POC	
Vegetation Monitoring POC	
Wetland Monitoring POC	

Table 4. Project Attributes Cat Creek Stream and Wetland / Project No. 71					
Project County	Macon				
Physiographic Region	Blue Ridge				
Ecoregion	Blue Ridge Mountains - Broad Basins				
River Basin	Little Tennessee River				
USGS HUC	06010202040010				
NCDWQ Sub-Basin	04-04-01				
Within Extent of EEP Watershed Plan	Franklin to Fontana Planning Area				
WRC Class	Cold				
% of Project Easement Fenced or Demarcated	100%				
Beaver Activity Observed During Design Phase	Yes				
Restoration Component Attributes					
	Cat Creek	**UT1**	**UT2**	**UT3**	**UT4**
Drainage Area (sq.mi.)	3.6	0.9	0.5	0.2	0.2
Stream Order	Third	Second	Second	First	First
Restored Length (feet)	*7,389	573	381	294	244
Perennial or Intermittent	Perennial				
Watershed Type	Rural				
Watershed LULC Distribution					
Forest	70%	70%	50%	90%	20%
Pasture/Managed Herbaceous	30%	30%	50%	10%	80%
Other	0%	0%	0%	0%	0%
Watershed Impervious Cover	1%	1%	1%	1%	1%
NCDWQ AU/Index Number	2-23-4	2-23-4	2-23-4	2-23-4	2-23-4
NCDWQ Classification	C				
303d Listed	No				
Upstream of 303d Listed Segment	No				
Reasons for 303d Listing or Stressor	N/A				
Total Acreage of Easement	38.9				
Total Vegetated Acreage within Easement	38.9				
Total Planted Acreage as Part of Restoration	20				
Rosgen Classification of Pre-Existing	G4	Cb4	-	-	-
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	15-30%	15-30%	15-30%	15-30%	15-30%
Valley Toe Slope Range	2-3%	2-3%	2-3%	2-3%	2-3%
Cowardin Classification	-	-	-	-	-
Trout Waters Designation	No				
Species of Concern, Endangered, Etc.	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	3.000	N/A

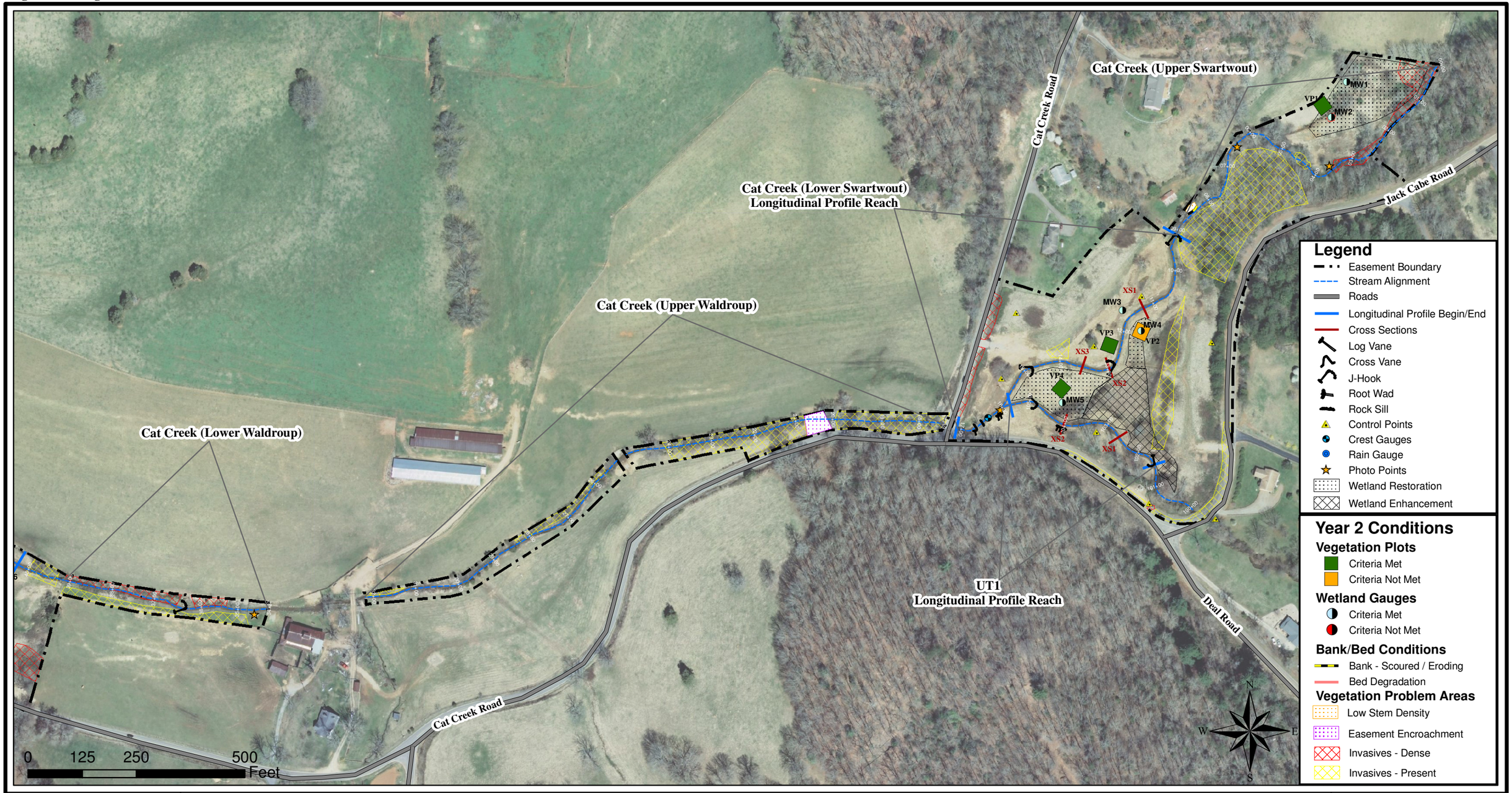
- Information unavailable.
N/A - Item does not apply.
* Stationing Includes a 25 Foot Crossing.

Appendix B
Visual Assessment Data

Figure 2. Integrated Current Condition Plan View

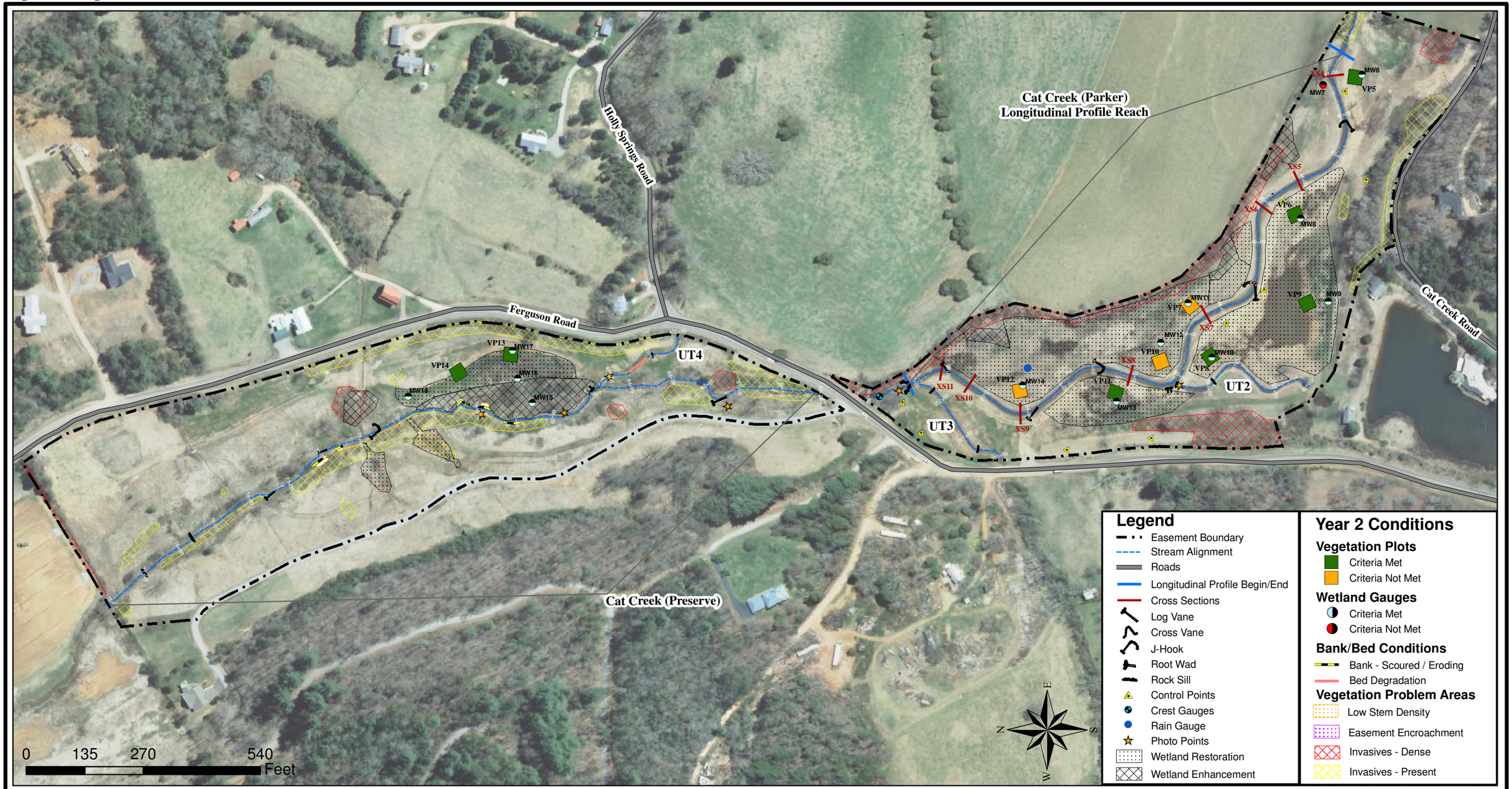
Prepared for	**Project:**	Notes:	Prepared by
Ecosystem Enhancement PROGRAM	Cat Creek Stream and Wetland Restoration Year 2 Monitoring Macon County, North Carolina	1) 2010 Aerial Photo 2) Base Map Data Provided by AECOM.	EQUINOX ENVIRONMENTAL CONSULTATION & DESIGN
	Sheet 1 of 3		
	Date	Project Number	
	November 2011	NCEEP # 71	

Figure 2. Integrated Current Condition Plan View



Prepared for	Project:	Notes:	Prepared by
Ecosystem Enhancement Program	Cat Creek Stream and Wetland Restoration Year 2 Monitoring Macon County, North Carolina	1) 2010 Aerial Photo 2) Base Map Data Provided by AECOM.	EQUINOX ENVIRONMENTAL CONSULTATION & DESIGN
	Sheet 2 of 3		
	Date	Project Number	
	November 2011	NCEEP # 71	

Figure 2. Integrated Current Condition Plan View



Prepared for Ecosystem Enhancement Program	**Project:** Cat Creek Stream and Wetland Restoration Year 2 Monitoring Macon County, North Carolina	Notes: 1) 2010 Aerial Photo 2) Base Map Data Provided by AECOM.	Prepared by EQUINOX ENVIRONMENTAL CONSULTATION & DESIGN
	Sheet 3 of 3		
	Date November 2011	Project Number NCEEP # 71	

Table 5. Visual Stream Morphology Stability Assessment
Cat Creek Stream & Wetland / Project No. 71 - Cat Creek
Assessed Length 7,389 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	43	43			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6).	42	42			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	42	42			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	42	42			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	42	42			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			6	178	99%	6	80	99%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	6	178	99%	6	80	99%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	21	21			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	13	13			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	18	18			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	17	17			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	14	14			100%			

N/A - Item does not apply.

Table 5. Visual Stream Morphology Stability Assessment
Cat Creek Stream & Wetland / Project No. 71 - UT1
Assessed Length 573 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	7	7			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6).	6	6			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	6	6			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	6	6			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	7	7			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	N/A	N/A	N/A
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	3	3			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	2	2			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	3	3			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	3	3			100%			

N/A - Item does not apply.

Table 5. Visual Stream Morphology Stability Assessment
Cat Creek Stream & Wetland / Project No. 71 - UT2
Assessed Length 381 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	5	5			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6).	4	4			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	4	4			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	4	4			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	4	4			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	N/A	N/A	N/A
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	2	2			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	2	2			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	N/A	N/A			N/A			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	N/A	N/A			N/A			

N/A - Item does not apply.

Table 5. Visual Stream Morphology Stability Assessment
Cat Creek Stream & Wetland / Project No. 71 - UT3
Assessed Length 294 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	4	4			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6).	3	3			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	3	3			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	3	3			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	3	3			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	N/A	N/A	N/A
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	2	2			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	2	2			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	N/A	N/A			N/A			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	N/A	N/A			N/A			

N/A - Item does not apply.

Table 5. Visual Stream Morphology Stability Assessment
Cat Creek Stream & Wetland / Project No. 71 - UT4
Assessed Length 244 feet

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	**1. Vertical Stability** (Riffle and Run Units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars).			0	0	100%			
		2. Degradation - Evidence of downcutting.			1	50	80%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	5	5			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6).	4	4			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	4	4			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	4	4			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	4	4			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	N/A	N/A	N/A
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	2	2			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	2	2			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	2	2			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	2	2			100%			

N/A - Item does not apply.

Table 6. Vegetation Condition Assessment Cat Creek Stream & Wetland / Project No. 71 Planted Acreage 20					
Vegetation Category	**Definitions**	**CCPV Depiction**	**Number of Polygons**	**Combined Acreage**	**% of Planted Acreage**
1. Bare Areas	Very limited cover of both woody and herbaceous material.	N/A	0	0	0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	Stipple Orange Dots White Background	5	0.02	<1%
		Totals	5	0.02	<1%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	N/A	0	0	0%
		Cumulative Totals	5	0.02	<1%
Easement Acreage 38.9					
Vegetation Category	**Definitions**	**CCPV Depiction**	**Number of Polygons**	**Combined Acreage**	**% of Easement Acreage**
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	Cross Hatch (Red - Dense/Yellow - Present)	40	6.22	16%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	Stipple Purple Dots White Background	1	0.05	<1%

N/A - Item does not apply.

Cat Creek – Permanent Photo Station 1
Station 3+65 - Looking Downstream

Cat Creek – Permanent Photo Station 2
Station 6+30 - Looking Downstream

Cat Creek – Permanent Photo Station 3
Station 15+98 - Looking Downstream

Cat Creek – Permanent Photo Station 4
Station 34+70 - Looking Downstream

Cat Creek – Permanent Photo Station 5
Station 50+20 - Looking Upstream

Cat Creek – Permanent Photo Station 6
Station 57+36 - Looking Downstream

Cat Creek – Permanent Photo Station 7
Station 61+43 - Looking Downstream

UT4 – Permanent Photo Station 8
Station 402+08 - Looking Upstream

Cat Creek – Permanent Photo Station 9
Station 65+80 - Looking Downstream

Cat Creek – Permanent Photo Station 10
Station 67+88 - Looking Downstream

Appendix C
Vegetation Plot Data

Table 7. Vegetation Plot Criteria Attainment Cat Creek / Project No. 71		
Vegetation Plot ID	**Vegetation Survival Threshold Met?**	**Tract Mean**
1	Yes	71%
2	No	
3	Yes	
4	Yes	
5	Yes	
6	Yes	
7	No	
8	Yes	
9	Yes	
10	No	
11	Yes	
12	No	
13	Yes	
14	Yes	

Vegetation Monitoring Plot 1
Monitoring Year 2 – June 7, 2011

Vegetation Monitoring Plot 2
Monitoring Year 2 – June 7, 2011

Vegetation Monitoring Plot 3
Monitoring Year 2 – June 7, 2011

Vegetation Monitoring Plot 4
Monitoring Year 2 – June 7, 2011

Vegetation Monitoring Plot 5
Monitoring Year 2 – June 7, 2011

Vegetation Monitoring Plot 6
Monitoring Year 2 – June 7, 2011

Vegetation Monitoring Plot 7
Monitoring Year 2 – June 7, 2011

Vegetation Monitoring Plot 8
Monitoring Year 2 – June 7, 2011

Vegetation Monitoring Plot 9
Monitoring Year 2 – June 7, 2011

Vegetation Monitoring Plot 10
Monitoring Year 2 – June 7, 2011

Vegetation Monitoring Plot 11
Monitoring Year 2 – June 7, 2011

Vegetation Monitoring Plot 12
Monitoring Year 2 – June 7, 2011

Vegetation Monitoring Plot 13
Monitoring Year 2 – June 7, 2011

Vegetation Monitoring Plot 14
Monitoring Year 2 – June 7, 2011

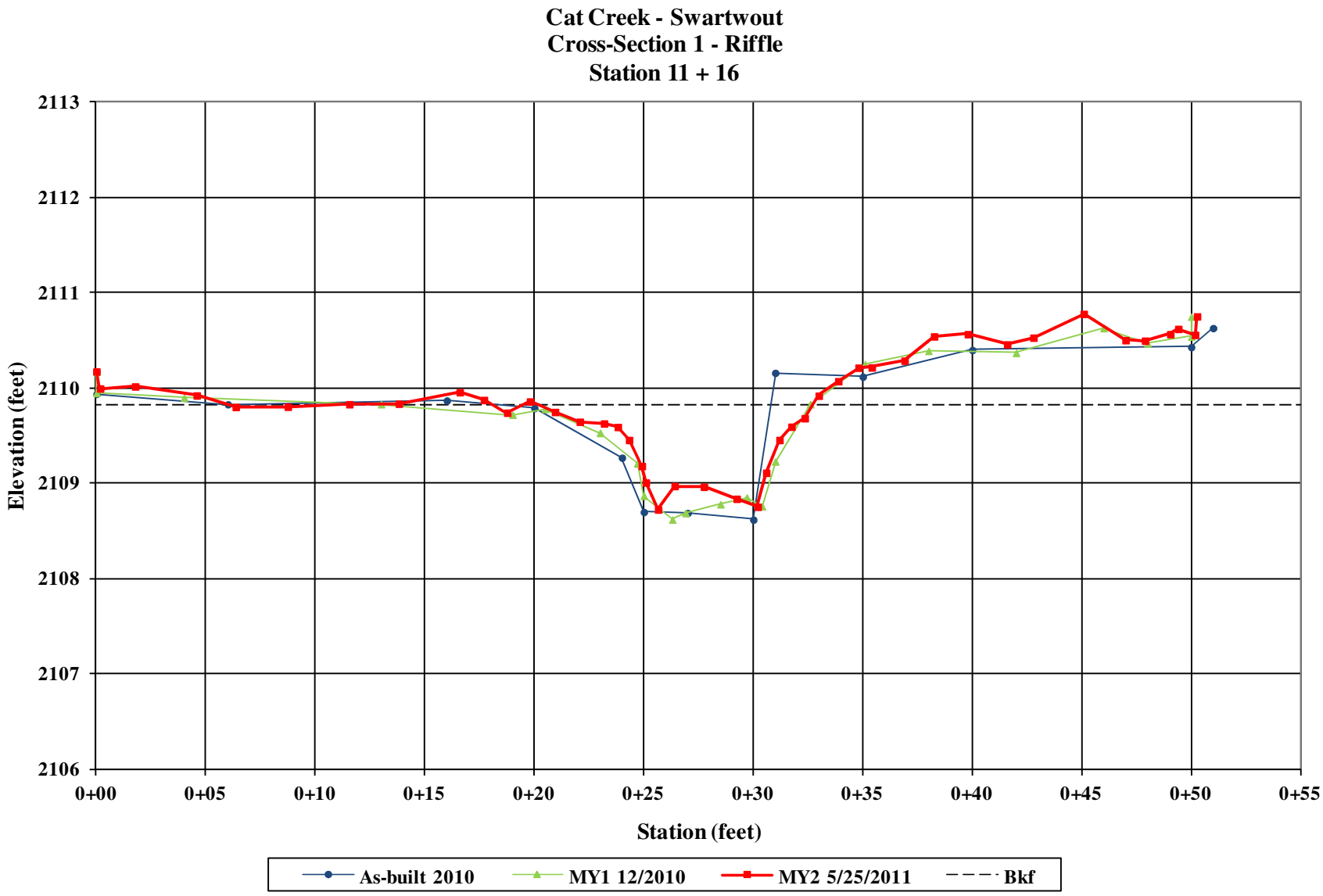
Table 8. CVS Vegetation Plot Metadata Cat Creek / Project No. 71	
Report Prepared By	Kevin Mitchell
Date Prepared	7/7/2011 10:35
Database Name	Equinox-2011-A-CatCreek-MY2.mdb
Database Location	Z:\ES\NRI&M\EEP Monitoring\Cat Creek\CC-MY2-2011\Data\Veg
Computer Name	D16TNK71
File Size	55304192
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, Planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, Total Stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY----------	
Project Code	71
project Name	Cat Creek
Description	
River Basin	Little Tennessee
Length(ft)	
Stream-to-Edge Width (ft)	
Area (sq m)	
Required Plots (calculated)	
Sampled Plots	14

Table 9. Planted and Total Stem Counts (Species by Plot with Annual Means)
Cat Creek Stream and Wetland / Project No. 71

			Current Plot Data (MY2 2011)																																								Annual Means
			EI071-01-0001			EI071-01-0002			EI071-01-0003			EI071-01-0004			EI071-01-0005			EI071-01-0006			EI071-01-0007			EI071-01-0008			EI071-01-0009			EI071-01-0010			EI071-01-0011			EI071-01-0012			EI071-01-0013			EI071-01-0014			MY2 (2011)		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer rubrum	Red maple	Tree			13																																	1								14
Alnus serrulata	Hazel alder	Shrub Tree				2	2	3	5	5	5				1	1	1	5	5	5	1	1	1	3	3	3	2	2	2	2	2	2	3	3	4	1	1	1				2	2	2	27	27	29
Aronia arbutifolia	Red chokeberry	Shrub																																								3	3	3	3	3	3
Betula nigra	River birch	Tree				2	2	2				2	2	2	2	2	2	4	4	4				4	4	4	1	1	1				3	3	3	1	1	1	2	2	2				21	21	21
Carpinus caroliniana	American hornbeam	Shrub Tree	1	1	1				3	3	3	4	4	5	1	1	1							5	5	5	1	1	1	1	1	1				3	3	3				1	1	1	20	20	21
Cornus amomum	Silky dogwood	Shrub															41																			1	1	1							1	1	42
Diospyros virginiana	Common persimmon	Tree									1																																			1
Fagus grandifolia	American beech	Tree																1	1	1																2	2	2	3	3	3	6	6	6
Fraxinus pennsylvanica	Green ash	Tree							1	1	1	1	1	1	3	3	3	1	1	1				2	2	2							3	3	3				4	4	4	1	1	1	16	16	16
Juglans nigra	Black walnut	Tree			7									4																															11
Liriodendron tulipifera	Tuliptree	Tree							3	3	3				2	2	2	1	1	1																								6	6	6
Nyssa sylvatica	Blackgum	Tree	3	3	3									1													1	1	1															4	4	5
Platanus occidentalis var. occidentalis	Sycamore, Plane-tree	Tree	5	5	7													1	1	1																					11	1	1	1	7	7	20
Prunus serotina	Black cherry	Shrub Tree												1																															1
Quercus phellos	Willow oak	Tree				1	1	1				2	2	2	1	1	1	5	5	5	4	4	4	3	3	3	4	4	4				2	2	2	2	2	2							24	24	24
Rosa palustris	Swamp rose	Shrub																																					1							1
Salix nigra	Black willow	Tree												4																					1					2						7
Sambucus canadensis	Common elderberry	Shrub Tree																																								2	2	2	2	2	2
Unknown	Unknown	Unknown													1	1	1										2	2	2															3	3	3
Stem count			9	9	31	5	5	6	12	12	13	9	9	20	11	11	52	18	18	18	5	5	5	17	17	17	11	11	11	3	3	3	11	11	13	7	7	7	9	9	24	13	13	13	140	140	233
Size (ares)			1			1			1			1			1			1			1			1			1			1			1			1			1			1			14		
Size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.35		
Species count			3	3	5	3	3	3	4	4	5	4	4	8	7	7	8	7	7	7	2	2	2	5	5	5	6	6	6	2	2	2	4	4	5	4	4	4	4	4	8	7	7	7	13	13	19
Stems per ACRE			364.22	364.22	1254.5	202.34	202.34	242.81	485.62	485.62	526.09	364.22	364.22	809.37	445.15	445.15	2104.4	728.43	728.43	728.43	202.34	202.34	202.34	687.97	687.97	687.97	445.15	445.15	445.15	121.41	121.41	121.41	445.15	445.15	526.09	283.28	283.28	283.28	364.22	364.22	971.25	526.09	526.09	526.09	404.69	404.69	673.51

Exceeds requirements by 10%
Fails to meet requirements by more than 10%

Appendix D
Stream Survey Data

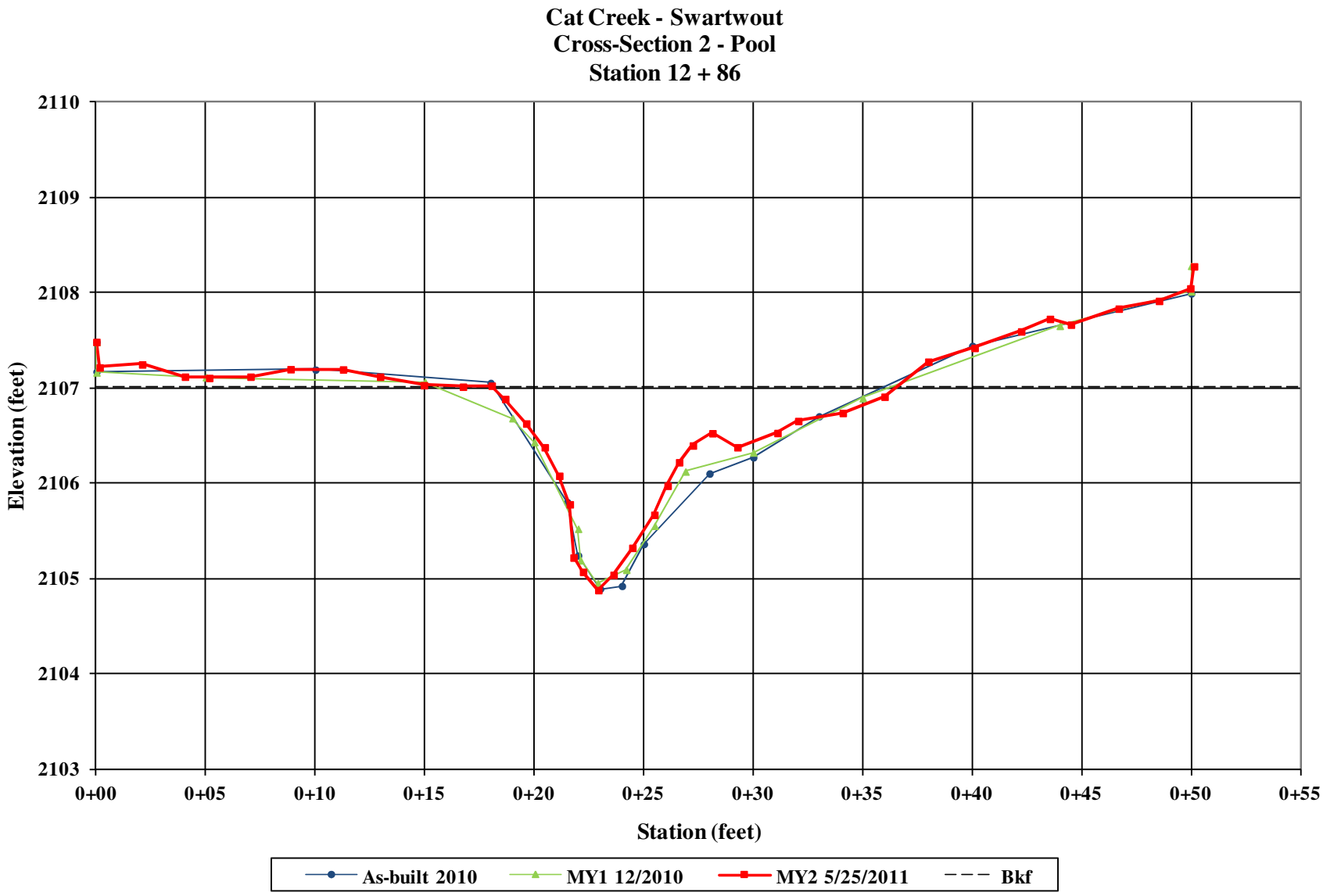

Cat Creek - Swartwout
Cross-Section 1 - Riffle
Station 11 + 16
Elevation (feet)
2113
2112
2111
2110
2109
2108
2107
2106
0+00
0+05
0+10
0+15
0+20
0+25
0+30
0+35
0+40
0+45
0+50
0+55
Station (feet)
As-built 2010
MY1 12/2010
MY2 5/25/2011
Bkf

Cross-Section 1 – Riffle
(Looking at Left Bank Descending)
Monitoring Year 2 – May 25, 2011

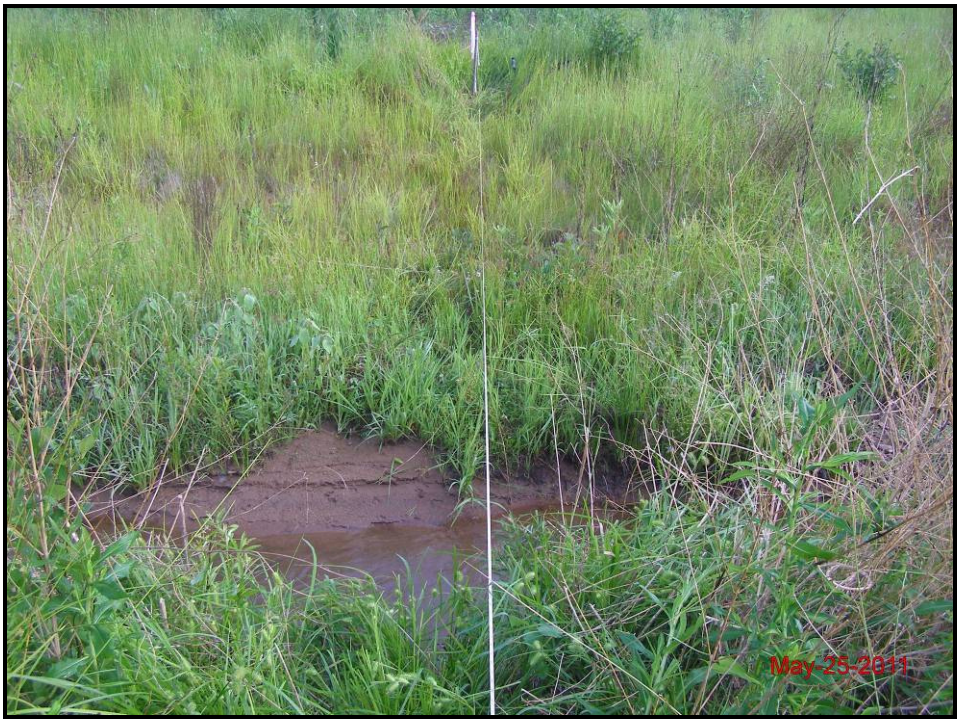
Cross-Section 1 – Riffle
(Looking at Right Bank Descending)
Monitoring Year 2 – May 25, 2011

Cross-Section 1 – Riffle
(Looking Downstream)
Monitoring Year 2 – May 25, 2011

Cross-Section 1 – Riffle
(Looking Upstream)
Monitoring Year 2 – May 25, 2011


Cat Creek - Swartwout
Cross-Section 2 - Pool
Station 12 + 86
Elevation (feet)
2110
2109
2108
2107
2106
2105
2104
2103
0+00
0+05
0+10
0+15
0+20
0+25
0+30
0+35
0+40
0+45
0+50
0+55
Station (feet)
As-built 2010
MY1 12/2010
MY2 5/25/2011
Bkf

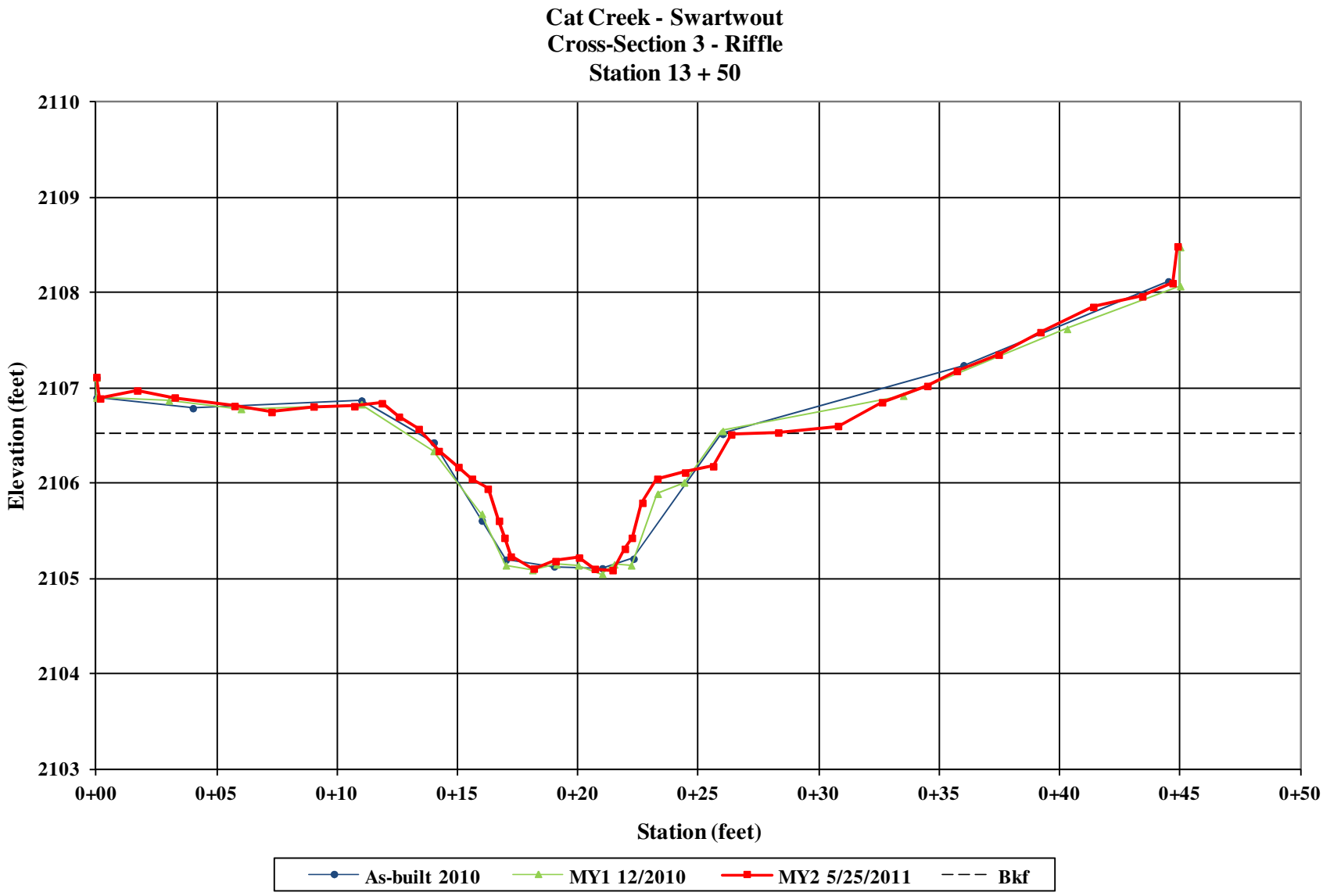
Cross-Section 2 – Pool
(Looking at Left Bank Descending)
Monitoring Year 2 – May 25, 2011



Cross-Section 2 – Pool
(Looking at Right Bank Descending)
Monitoring Year 2 – May 25, 2011

Cross-Section 2 – Pool
(Looking Downstream)
Monitoring Year 2 – May 25, 2011

Cross-Section 2 – Pool
(Looking Upstream)
Monitoring Year 2 – May 25, 2011

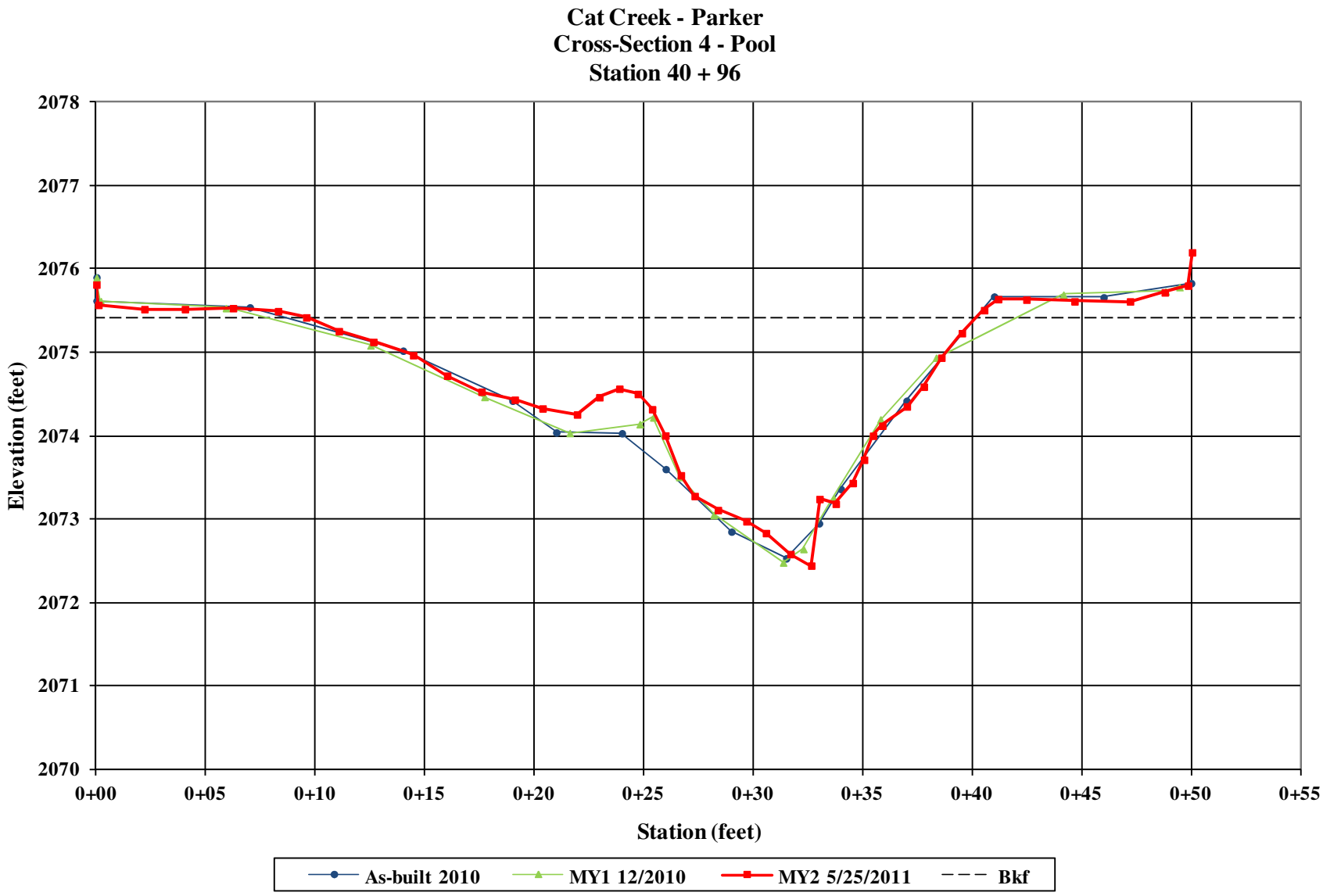

Cat Creek - Swartwout
Cross-Section 3 - Riffle
Station 13 + 50
Elevation (feet)
2110
2109
2108
2107
2106
2105
2104
2103
0+00
0+05
0+10
0+15
0+20
0+25
0+30
0+35
0+40
0+45
0+50
Station (feet)
As-built 2010
MY1 12/2010
MY2 5/25/2011
Bkf

Cross-Section 3 – Riffle
(Looking at Left Bank Descending)
Monitoring Year 2 – May 25, 2011

Cross-Section 3 – Riffle
(Looking at Right Bank Descending)
Monitoring Year 2 – May 25, 2011

Cross-Section 3 – Riffle
(Looking Downstream)
Monitoring Year 2 – May 25, 2011

Cross-Section 3 – Riffle
(Looking Upstream)
Monitoring Year 2 – May 25, 2011

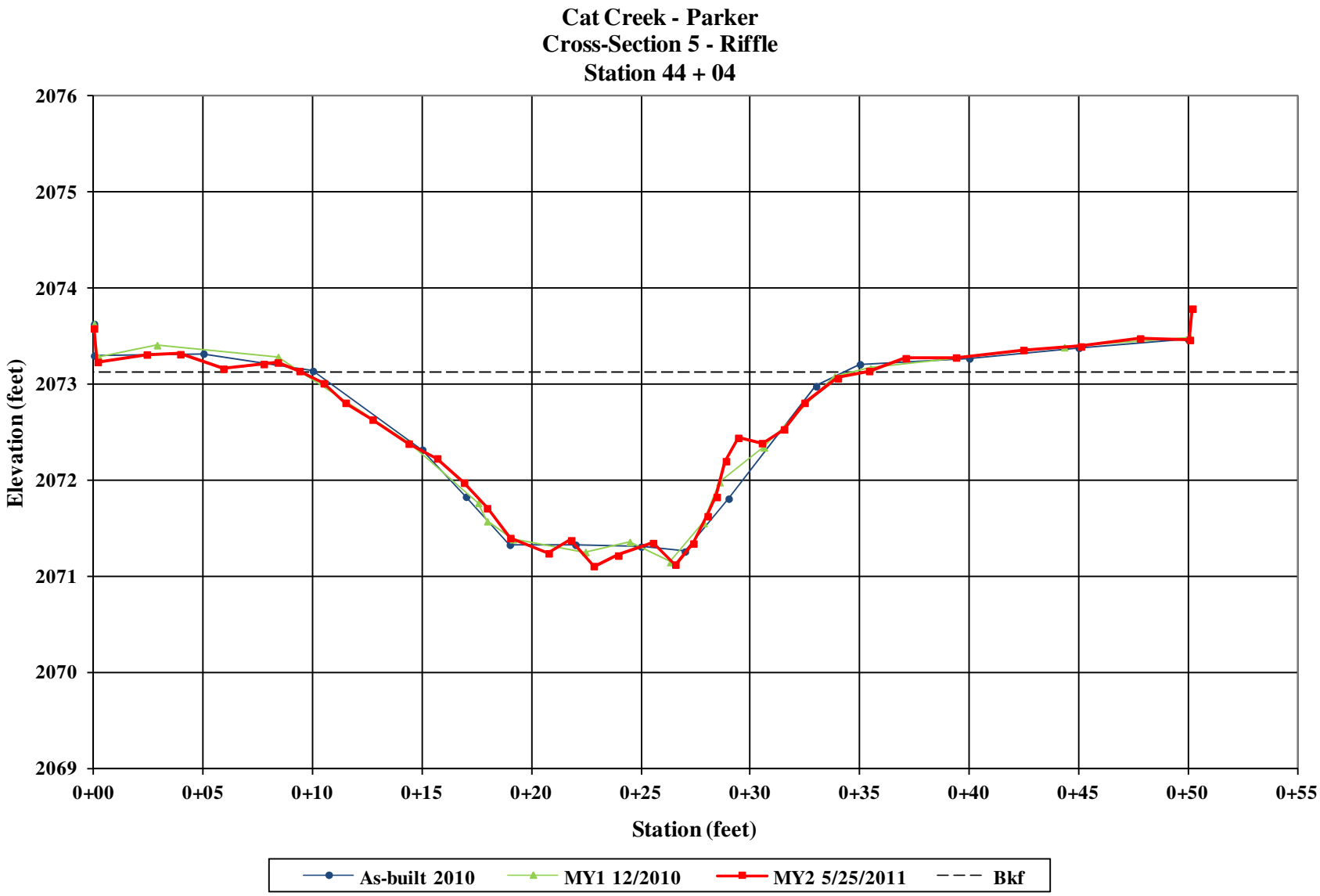

Cat Creek - Parker
Cross-Section 4 - Pool
Station 40 + 96
Elevation (feet)
2078
2077
2076
2075
2074
2073
2072
2071
2070
0+00
0+05
0+10
0+15
0+20
0+25
0+30
0+35
0+40
0+45
0+50
0+55
Station (feet)
As-built 2010
MY1 12/2010
MY2 5/25/2011
Bkf

Cross-Section 4 – Pool
(Looking at Left Bank Descending)
Monitoring Year 2 – May 25, 2011

Cross-Section 4 – Pool
(Looking at Right Bank Descending)
Monitoring Year 2 – May 25, 2011

Cross-Section 4 – Pool
(Looking Downstream)
Monitoring Year 2 – May 25, 2011

Cross-Section 4 – Pool
(Looking Upstream)
Monitoring Year 2 – May 25, 2011

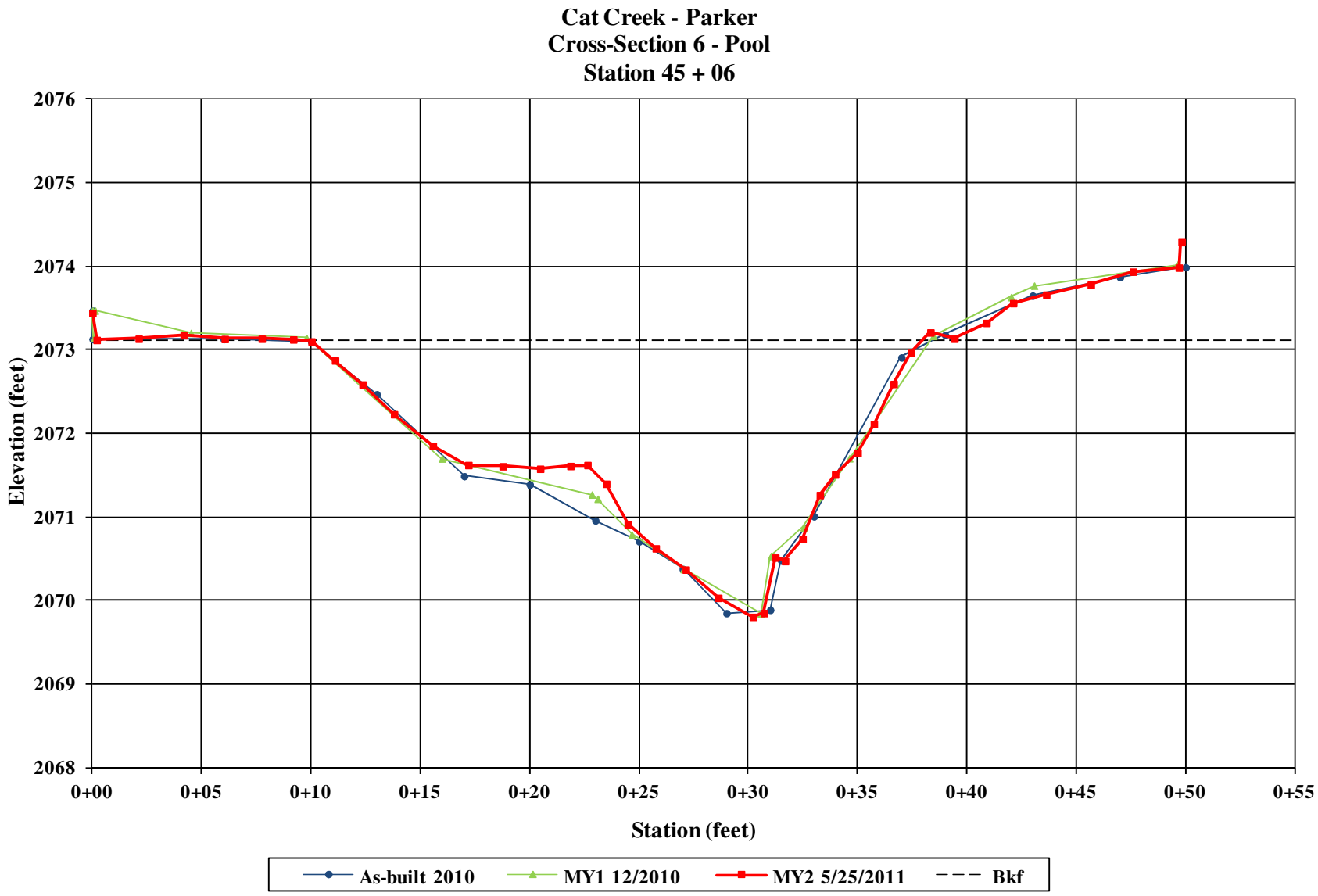

Cat Creek - Parker
Cross-Section 5 - Riffle
Station 44 + 04
Elevation (feet)
2076
2075
2074
2073
2072
2071
2070
2069
0+00
0+05
0+10
0+15
0+20
0+25
0+30
0+35
0+40
0+45
0+50
0+55
Station (feet)
As-built 2010
MY1 12/2010
MY2 5/25/2011
Bkf

Cross-Section 5 – Riffle
(Looking at Left Bank Descending)
Monitoring Year 2 – May 25, 2011

Cross-Section 5 – Riffle
(Looking at Right Bank Descending)
Monitoring Year 2 – May 25, 2011

Cross-Section 5 – Riffle
(Looking Downstream)
Monitoring Year 2 – May 25, 2011

Cross-Section 5 – Riffle
(Looking Upstream)
Monitoring Year 2 – May 25, 2011

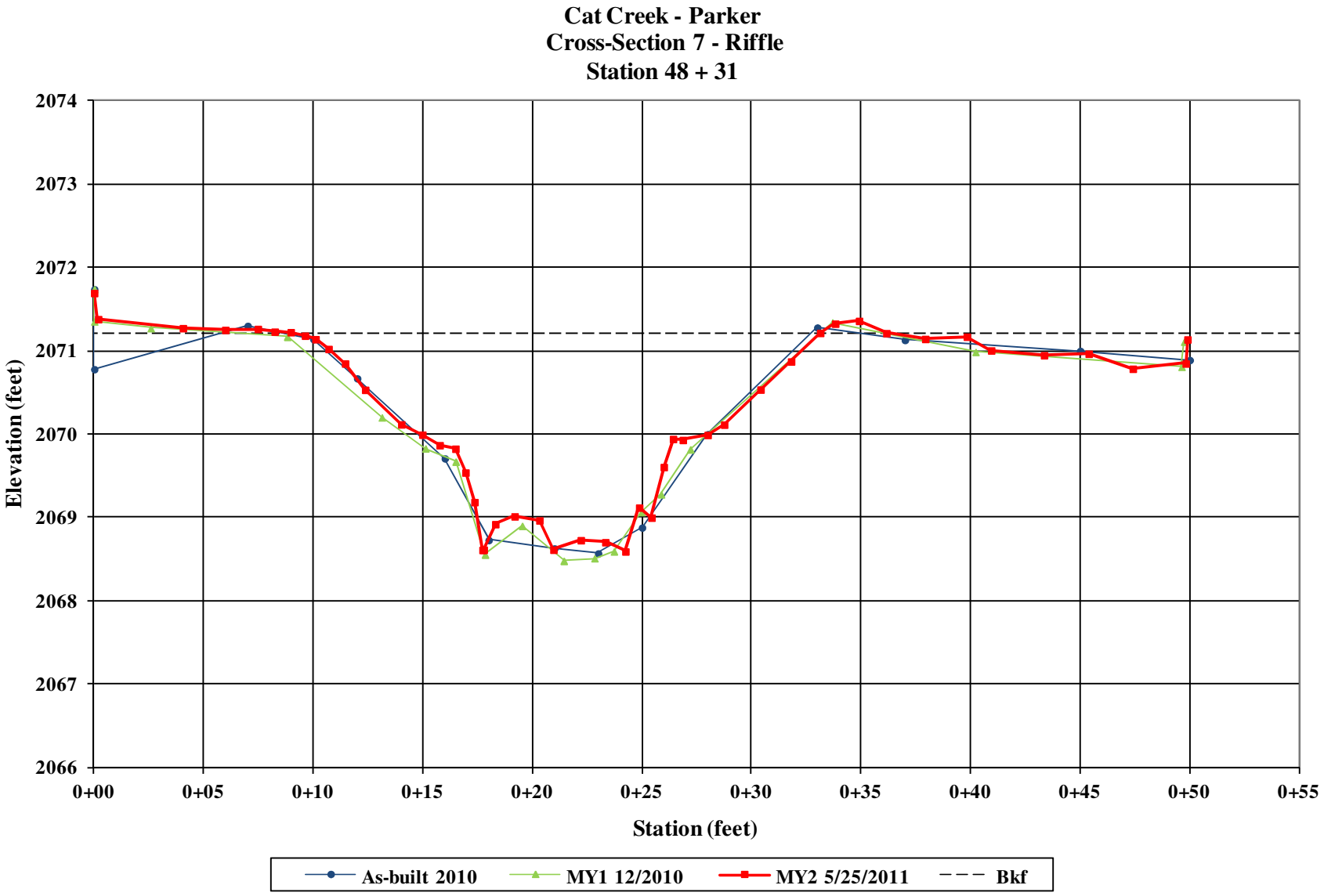

Cat Creek - Parker
Cross-Section 6 - Pool
Station 45 + 06
Elevation (feet)
2076
2075
2074
2073
2072
2071
2070
2069
2068
0+00
0+05
0+10
0+15
0+20
0+25
0+30
0+35
0+40
0+45
0+50
0+55
Station (feet)
As-built 2010
MY1 12/2010
MY2 5/25/2011
Bkf

Cross-Section 6 – Pool
(Looking at Left Bank Descending)
Monitoring Year 2 – May 25, 2011

Cross-Section 6 – Pool
(Looking at Right Bank Descending)
Monitoring Year 2 – May 25, 2011

Cross-Section 6 – Pool
(Looking Downstream)
Monitoring Year 2 – May 25, 2011

Cross-Section 6 – Pool
(Looking Upstream)
Monitoring Year 2 – May 25, 2011

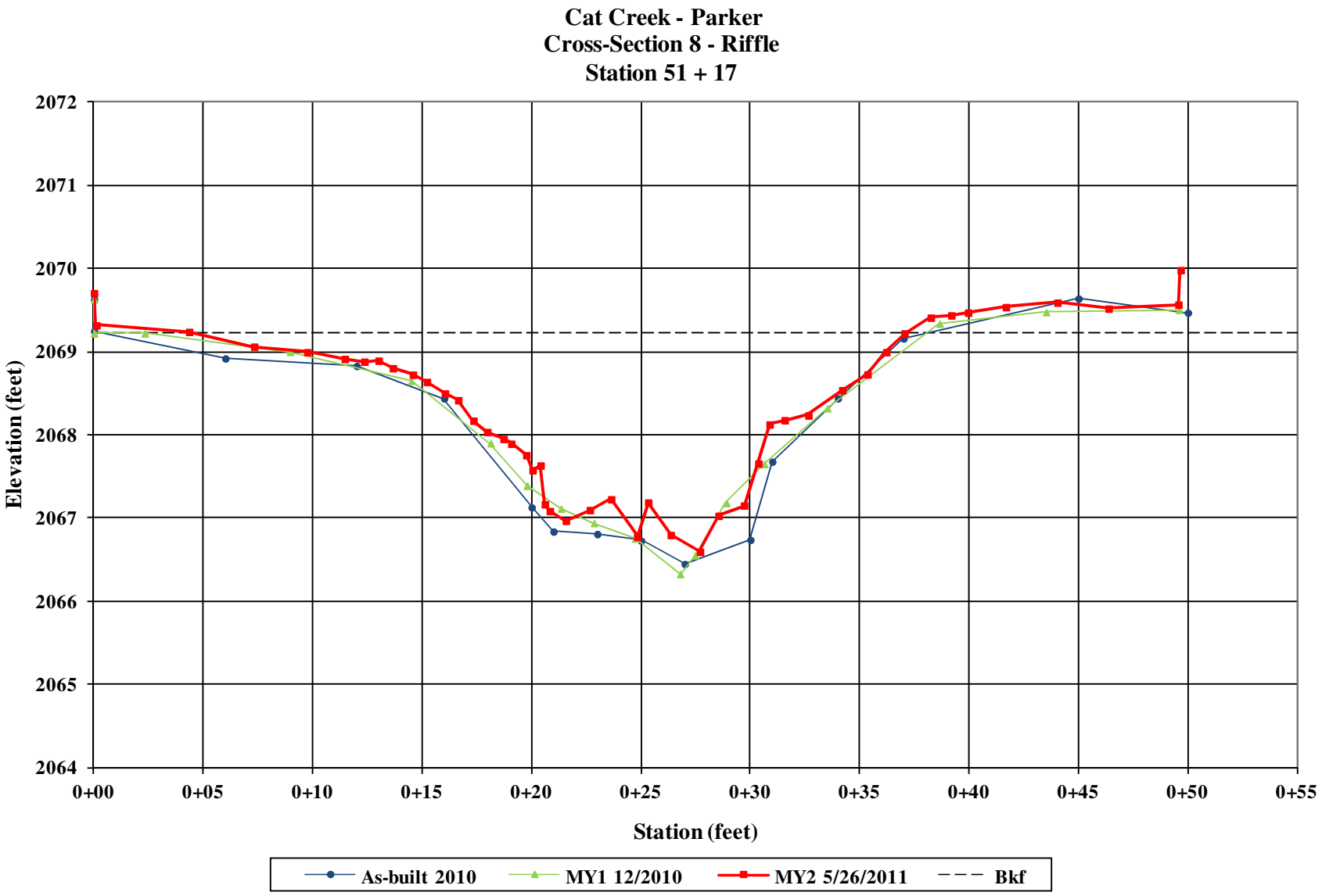

Cat Creek - Parker
Cross-Section 7 - Riffle
Station 48 + 31
Elevation (feet)
2074
2073
2072
2071
2070
2069
2068
2067
2066
0+00
0+05
0+10
0+15
0+20
0+25
0+30
0+35
0+40
0+45
0+50
0+55
Station (feet)
As-built 2010
MY1 12/2010
MY2 5/25/2011
Bkf

Cross-Section 7 – Riffle
(Looking at Left Bank Descending)
Monitoring Year 2 – May 26, 2011

Cross-Section 7 – Riffle
(Looking at Right Bank Descending)
Monitoring Year 2 – May 26, 2011

Cross-Section 7 – Riffle
(Looking Downstream)
Monitoring Year 2 – May 26, 2011

Cross-Section 7 – Riffle
(Looking Upstream)
Monitoring Year 2 – May 26, 2011

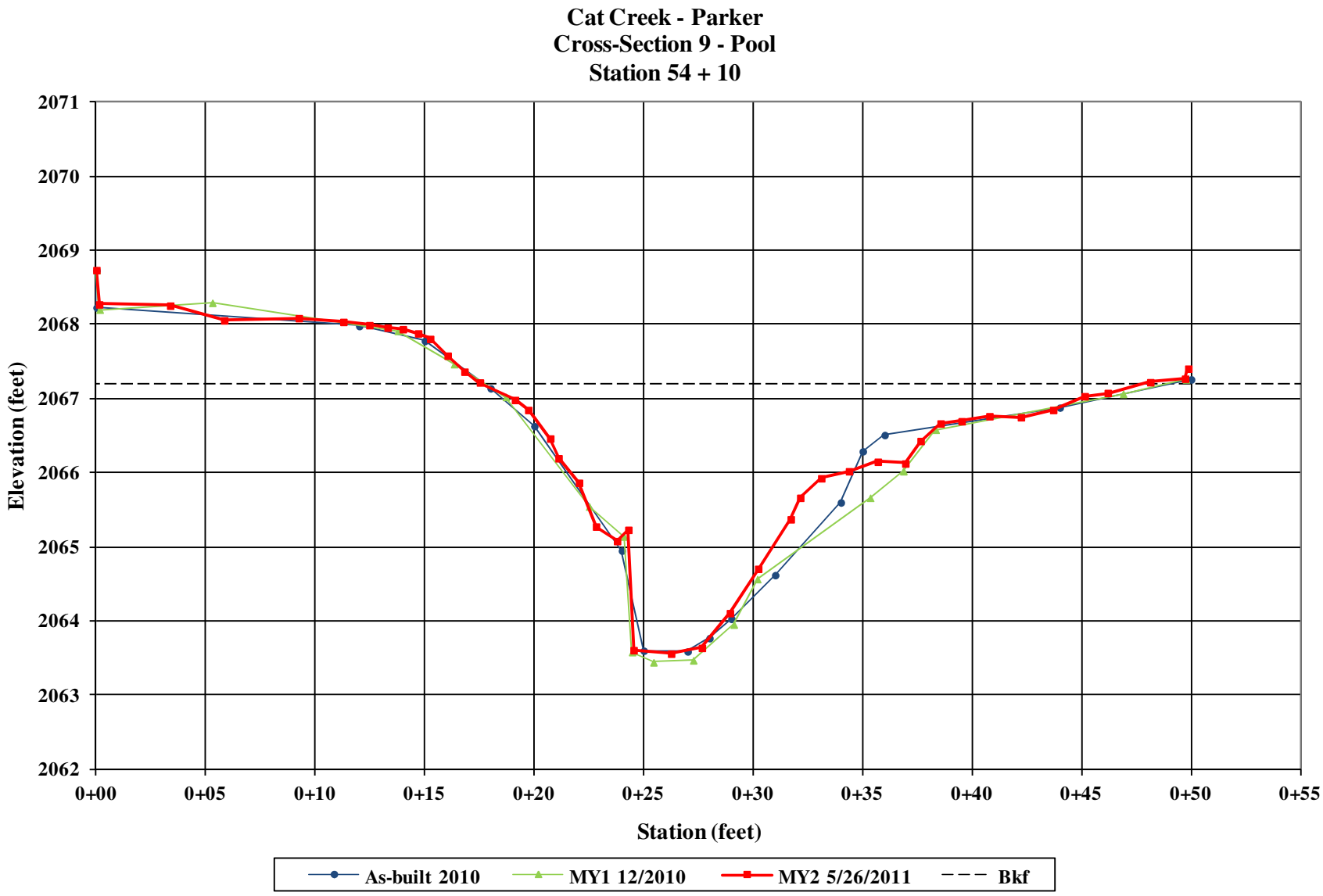

Cat Creek - Parker
Cross-Section 8 - Riffle
Station 51 + 17
Elevation (feet)
2072
2071
2070
2069
2068
2067
2066
2065
2064
0+00
0+05
0+10
0+15
0+20
0+25
0+30
0+35
0+40
0+45
0+50
0+55
Station (feet)
As-built 2010
MY1 12/2010
MY2 5/26/2011
Bkf

Cross-Section 8 – Riffle
(Looking at Left Bank Descending)
Monitoring Year 2 – May 26, 2011

Cross-Section 8 – Riffle
(Looking at Right Bank Descending)
Monitoring Year 2 – May 26, 2011

Cross-Section 8 – Riffle
(Looking Downstream)
Monitoring Year 2 – May 26, 2011

Cross-Section 8 – Riffle
(Looking Upstream)
Monitoring Year 2 – May 26, 2011

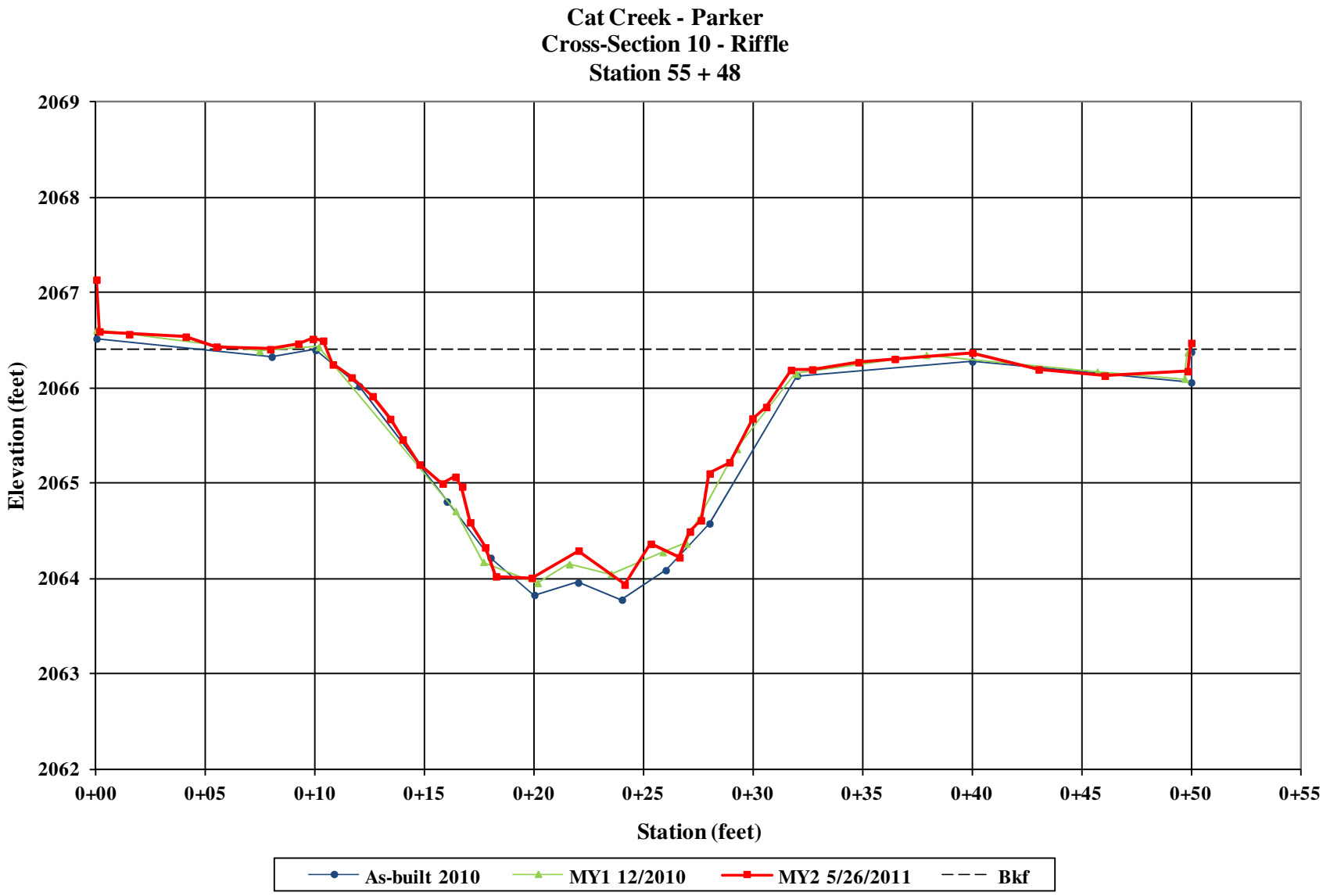

Cat Creek - Parker
Cross-Section 9 - Pool
Station 54 + 10
Elevation (feet)
2071
2070
2069
2068
2067
2066
2065
2064
2063
2062
0+00
0+05
0+10
0+15
0+20
0+25
0+30
0+35
0+40
0+45
0+50
0+55
Station (feet)
As-built 2010
MY1 12/2010
MY2 5/26/2011
Bkf

Cross-Section 9 – Pool
(Looking at Left Bank Descending)
Monitoring Year 2 – May 26, 2011

Cross-Section 9 – Pool
(Looking at Right Bank Descending)
Monitoring Year 2 – May 26, 2011

Cross-Section 9 – Pool
(Looking Downstream)
Monitoring Year 2 – May 26, 2011

Cross-Section 9 – Pool
(Looking Upstream)
Monitoring Year 2 – May 26, 2011

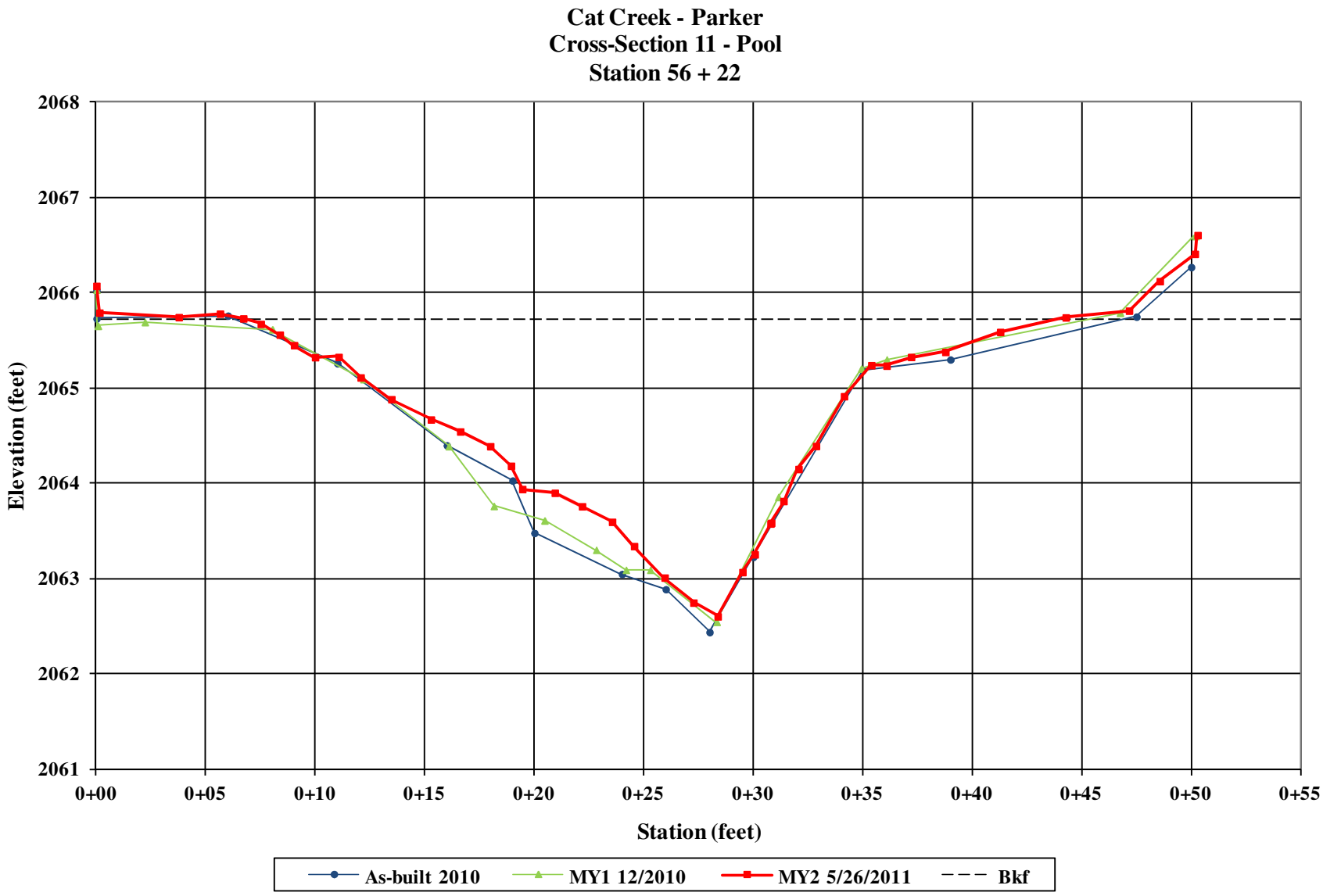

Cat Creek - Parker
Cross-Section 10 - Riffle
Station 55 + 48
Elevation (feet)
2069
2068
2067
2066
2065
2064
2063
2062
0+00
0+05
0+10
0+15
0+20
0+25
0+30
0+35
0+40
0+45
0+50
0+55
Station (feet)
As-built 2010
MY1 12/2010
MY2 5/26/2011
Bkf

Cross-Section 10 – Riffle
(Looking at Left Bank Descending)
Monitoring Year 2 – May 26, 2011

Cross-Section 10 – Riffle
(Looking at Right Bank Descending)
Monitoring Year 2 – May 26, 2011

Cross-Section 10 – Riffle
(Looking Downstream)
Monitoring Year 2 – May 26, 2011

Cross-Section 10 – Riffle
(Looking Upstream)
Monitoring Year 2 – May 26, 2011

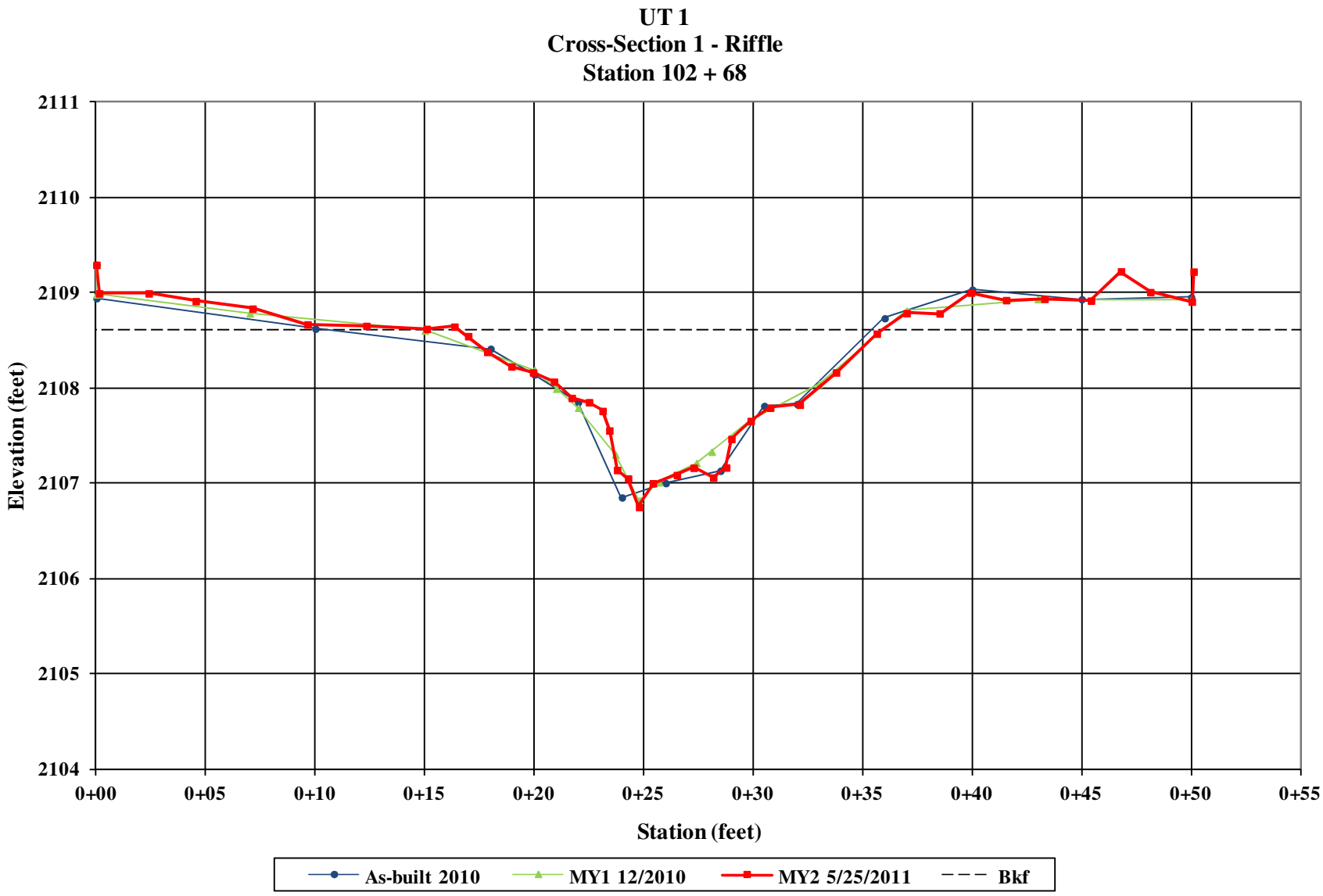

Cat Creek - Parker
Cross-Section 11 - Pool
Station 56 + 22
Elevation (feet)
2068
2067
2066
2065
2064
2063
2062
2061
0+00
0+05
0+10
0+15
0+20
0+25
0+30
0+35
0+40
0+45
0+50
0+55
Station (feet)
As-built 2010
MY1 12/2010
MY2 5/26/2011
Bkf

Cross-Section 11 – Pool
(Looking at Left Bank Descending)
Monitoring Year 2 – May 26, 2011

Cross-Section 11 – Pool
(Looking at Right Bank Descending)
Monitoring Year 2 – May 26, 2011

Cross-Section 11 – Pool
(Looking Downstream)
Monitoring Year 2 – May 26, 2011

Cross-Section 11 – Pool
(Looking Upstream)
Monitoring Year 2 – May 26, 2011

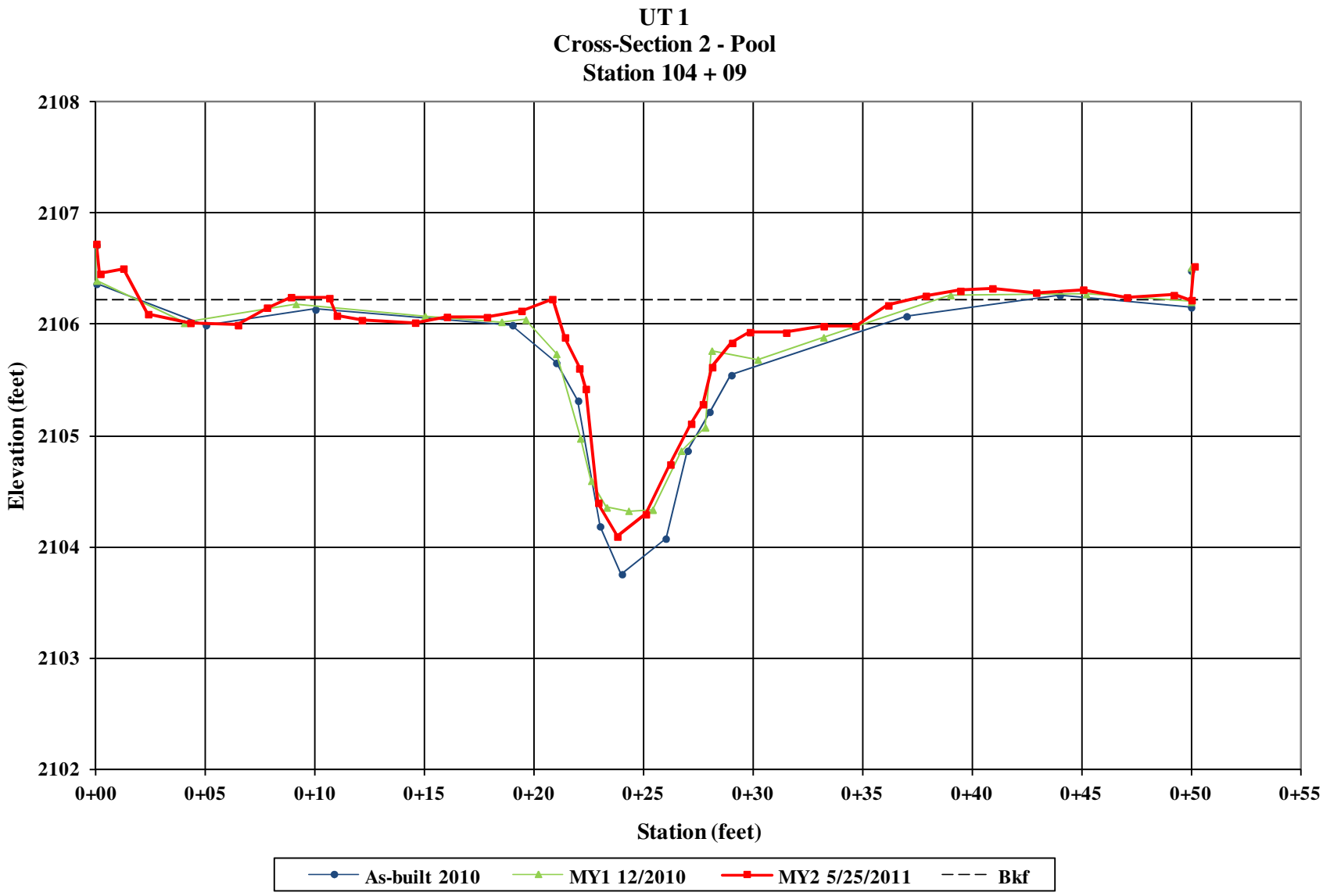

UT 1
Cross-Section 1 - Riffle
Station 102 + 68
Elevation (feet)
2111
2110
2109
2108
2107
2106
2105
2104
0+00
0+05
0+10
0+15
0+20
0+25
0+30
0+35
0+40
0+45
0+50
0+55
Station (feet)
As-built 2010
MY1 12/2010
MY2 5/25/2011
Bkf

UT 1 Cross-Section 1 – Riffle
(Looking at Left Bank Descending)
Monitoring Year 2 – May 25, 2011

UT1 Cross-Section 1 – Riffle
(Looking at Right Bank Descending)
Monitoring Year 2 – May 25, 2011

UT1 Cross-Section 1 – Riffle
(Looking Downstream)
Monitoring Year 2 – May 25, 2011

UT1 Cross-Section 1 – Riffle
(Looking Upstream)
Monitoring Year 2 – May 25, 2011


UT 1
Cross-Section 2 - Pool
Station 104 + 09
Elevation (feet)
2108
2107
2106
2105
2104
2103
2102
0+00
0+05
0+10
0+15
0+20
0+25
0+30
0+35
0+40
0+45
0+50
0+55
Station (feet)
As-built 2010
MY1 12/2010
MY2 5/25/2011
Bkf

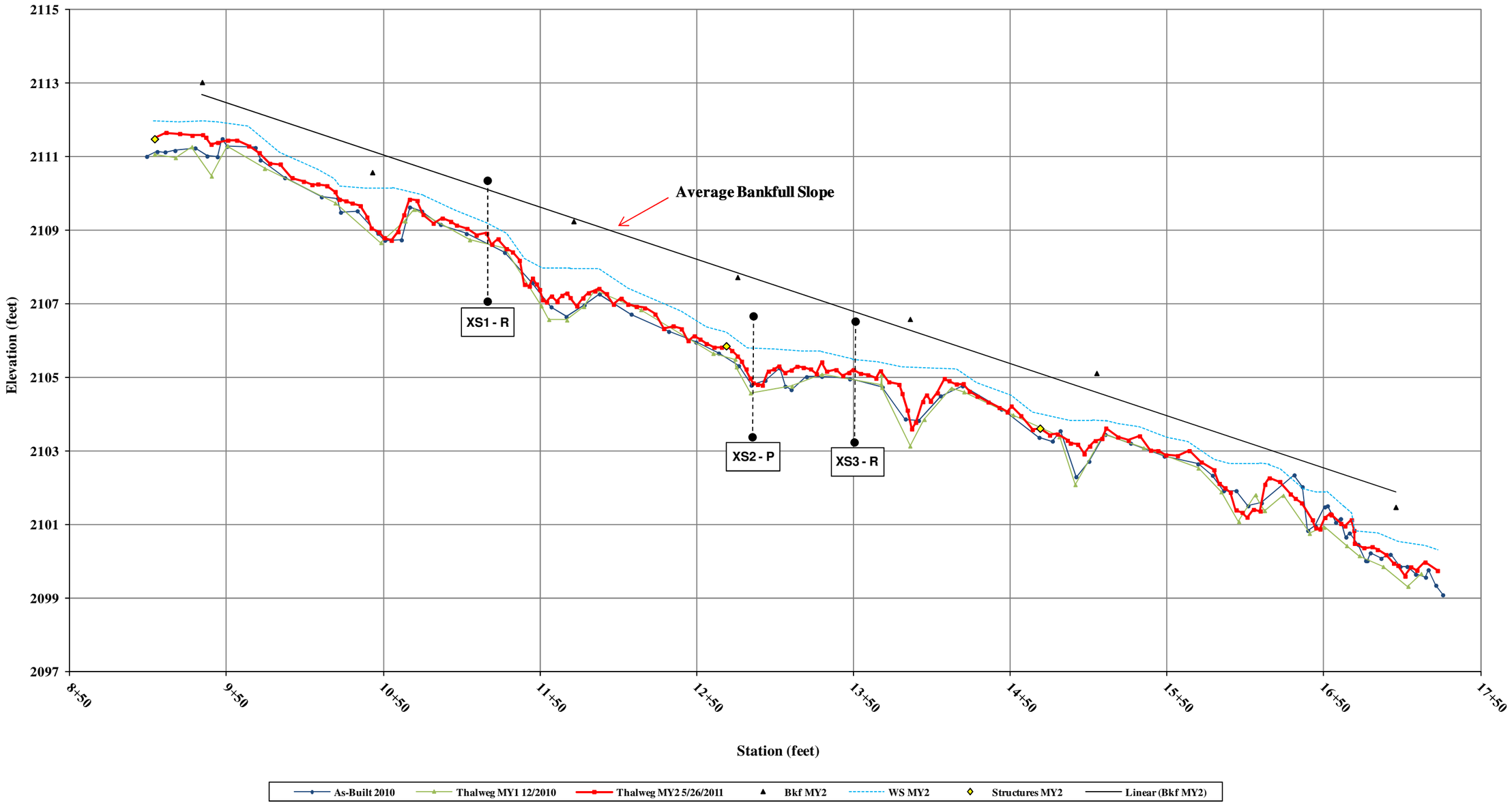
UT1 Cross-Section 2 – Pool
(Looking at Left Bank Descending)
Monitoring Year 2 – May 25, 2011

UT1 Cross-Section 2 – Pool
(Looking at Right Bank Descending)
Monitoring Year 2 – May 25, 2011

UT1 Cross-Section 2 – Pool
(Looking Downstream)
Monitoring Year 2 – May 25, 2011

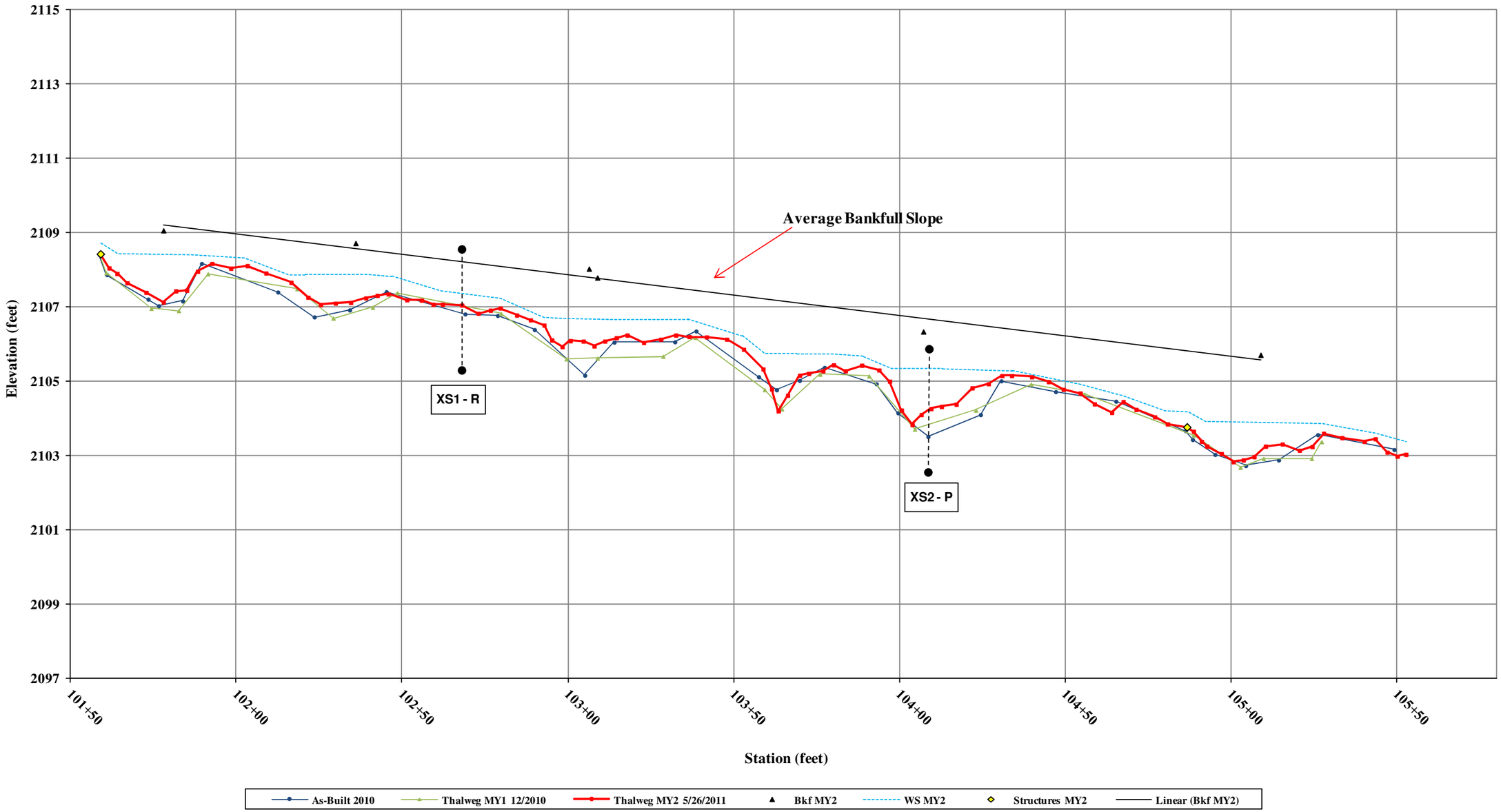
UT1 Cross-Section 2 – Pool
(Looking Upstream)
Monitoring Year 2 – May 25, 2011

Cat Creek - Swartwout
Longitudinal Profile
Stationing 09+04 - 17+23



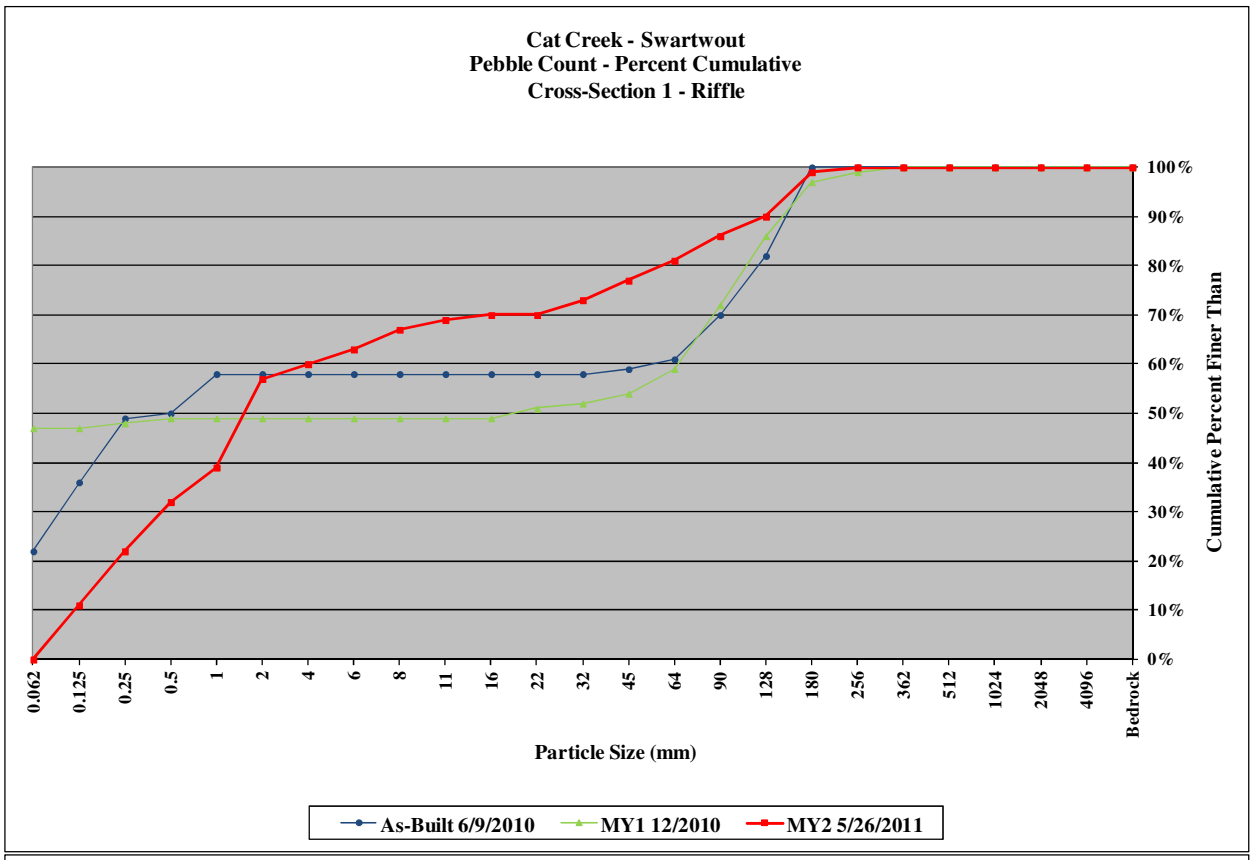
Cat Creek - Parker
Longitudinal Profile
Stationing 40+35 - 57+07

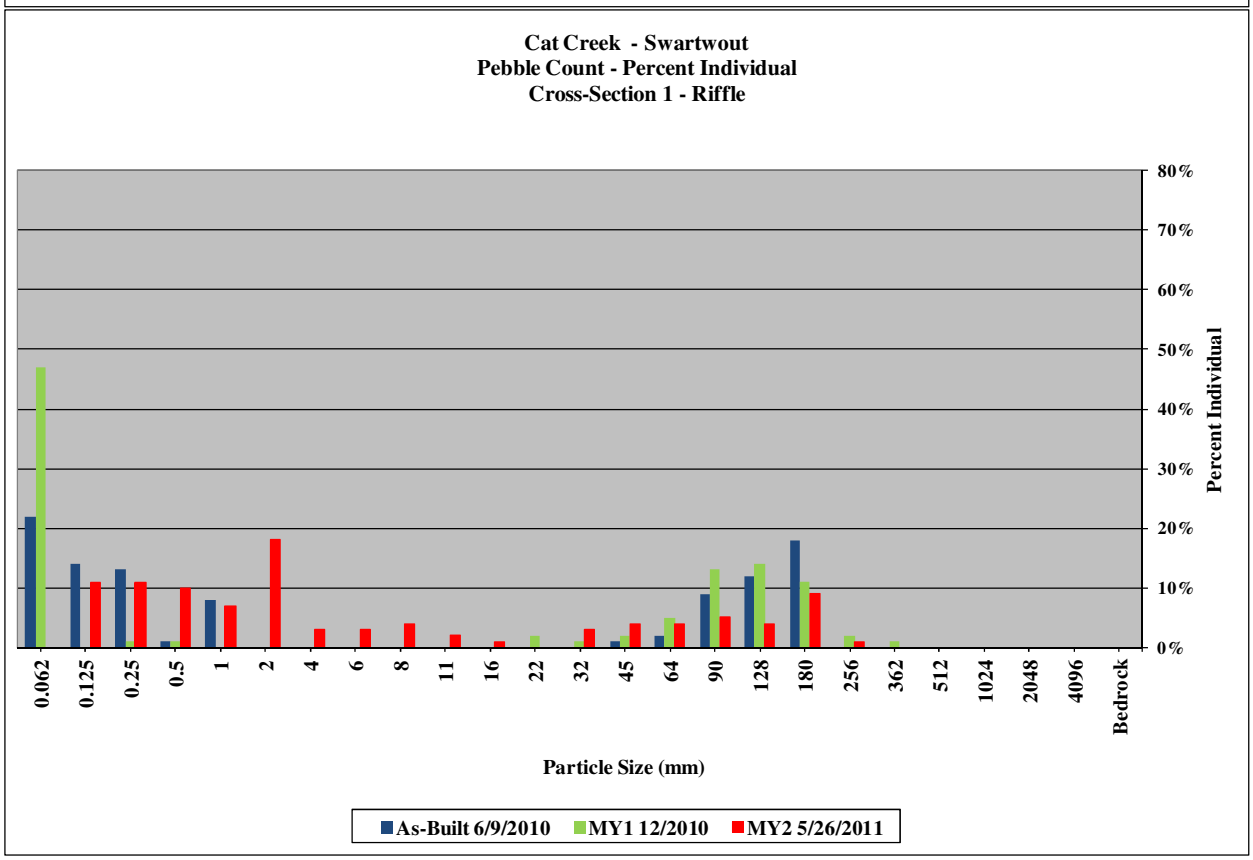
UT1
Longitudinal Profile
Stationing 101+59 - 105+53



Cat Creek Stream & Wetland / Project No. 71 Cat Creek - Swartwout - Cross-Section 1 - Riffle Pebble Count Summary					
			Monitoring Year 2		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062		0%	0%
Sand	very fine sand	0.125	11	11%	11%
	fine sand	0.25	11	11%	22%
	medium sand	0.50	10	10%	32%
	coarse sand	1.00	7	7%	39%
	very coarse sand	2.00	18	18%	57%
Gravel	very fine gravel	4.0	3	3%	60%
	fine gravel	5.7	3	3%	63%
	fine gravel	8.0	4	4%	67%
	medium gravel	11.3	2	2%	69%
	medium gravel	16.0	1	1%	70%
	coarse gravel	22.3		0%	70%
	coarse gravel	32	3	3%	73%
	very coarse gravel	45	4	4%	77%
	very coarse gravel	64	4	4%	81%
Cobble	small cobble	90	5	5%	86%
	medium cobble	128	4	4%	90%
	large cobble	180	9	9%	99%
	very large cobble	256	1	1%	100%
Boulder	small boulder	362		0%	100%
	small boulder	512		0%	100%
	medium boulder	1024		0%	100%
	large boulder	2048		0%	100%
	very large boulder	4096		0%	100%
Bedrock	bedrock	>4096		0%	100%
TOTALS			100	100%	100%

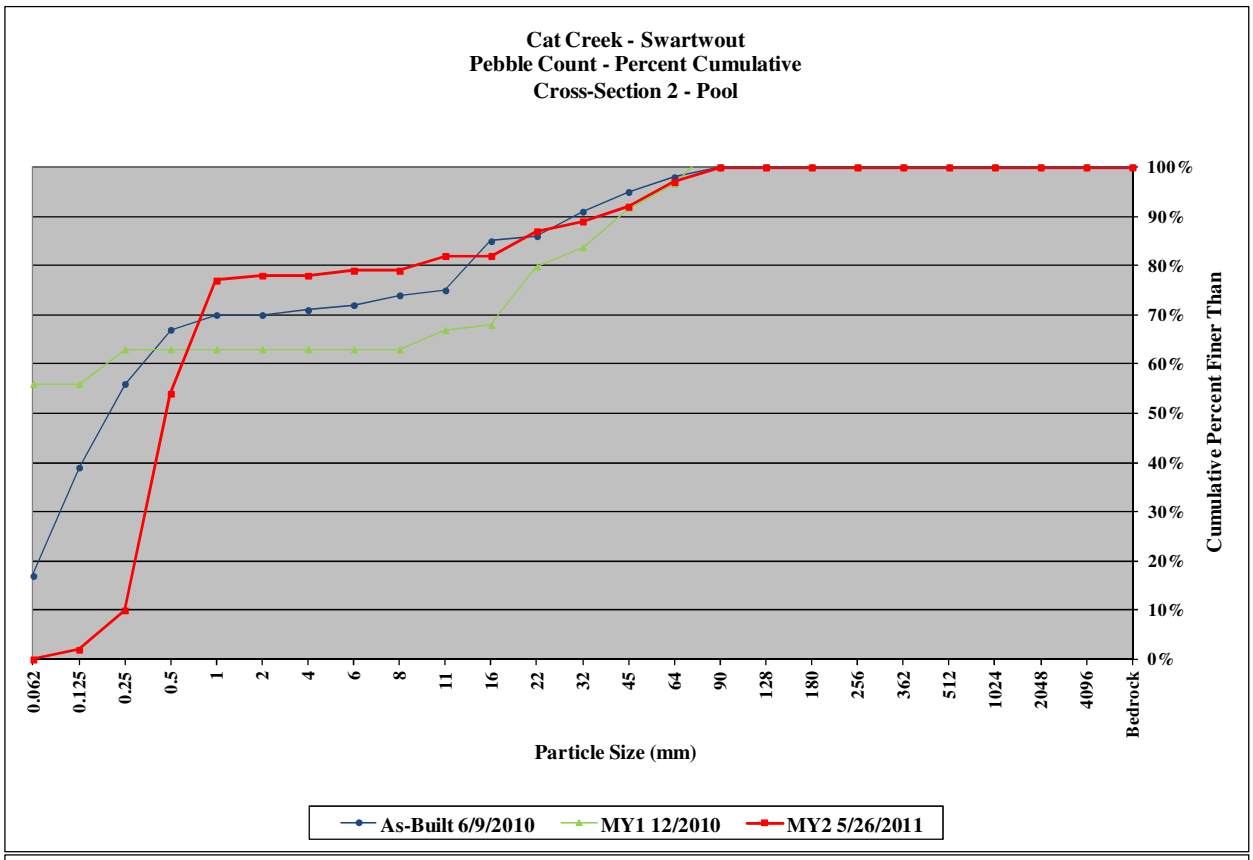
Summary Data	
D50	1.5
D84	79
D95	150

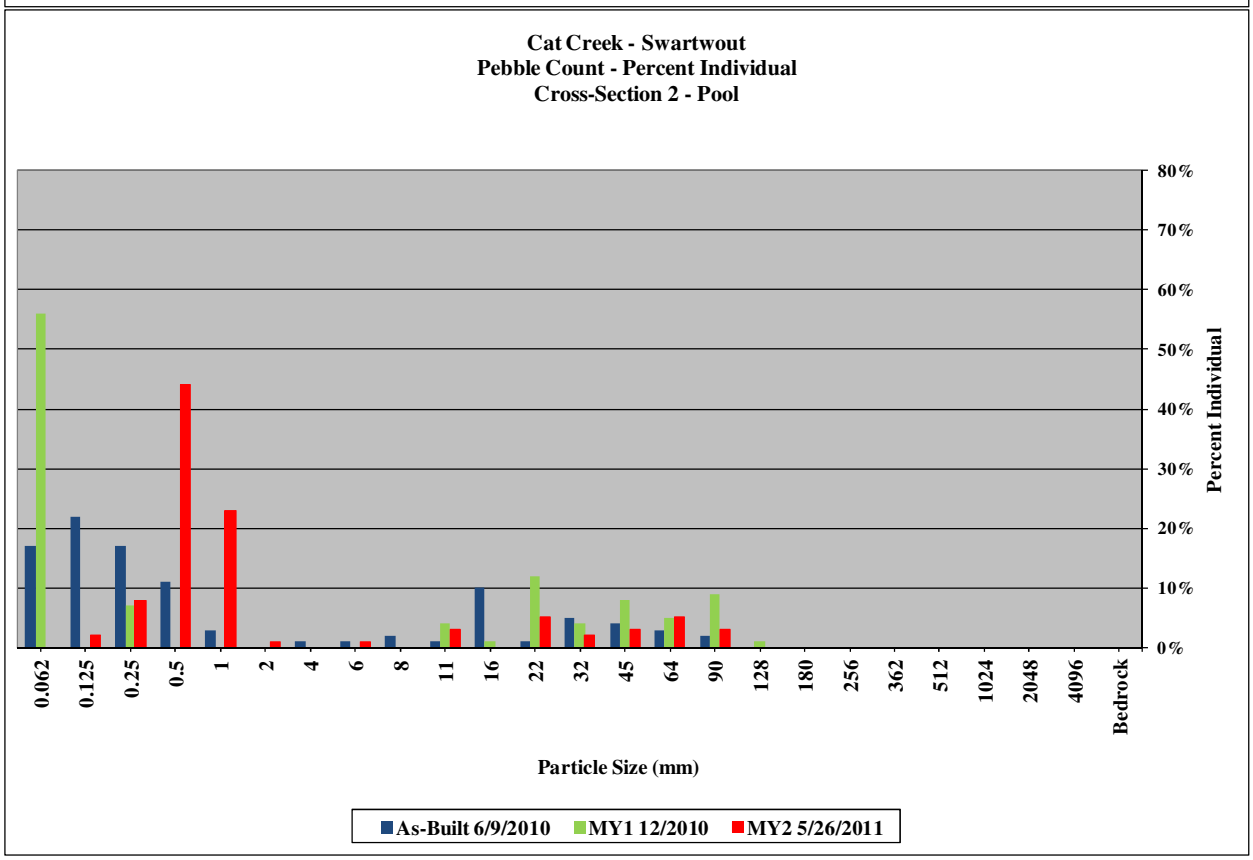

Cat Creek - Swartwout
Pebble Count - Percent Cumulative
Cross-Section 1 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Percent Finer Than
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011


Cat Creek - Swartwout
Pebble Count - Percent Individual
Cross-Section 1 - Riffle
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Individual
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011

Cat Creek Stream & Wetland / Project No. 71 Cat Creek - Swartwout - Cross-Section 2 - Pool Pebble Count Summary					
			Monitoring Year 2		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062		0%	0%
Sand	very fine sand	0.125	2	2%	2%
	fine sand	0.25	8	8%	10%
	medium sand	0.50	44	44%	54%
	coarse sand	1.00	23	23%	77%
	very coarse sand	2.00	1	1%	78%
Gravel	very fine gravel	4.0		0%	78%
	fine gravel	5.7	1	1%	79%
	fine gravel	8.0		0%	79%
	medium gravel	11.3	3	3%	82%
	medium gravel	16.0		0%	82%
	coarse gravel	22.3	5	5%	87%
	coarse gravel	32	2	2%	89%
	very coarse gravel	45	3	3%	92%
	very coarse gravel	64	5	5%	97%
Cobble	small cobble	90	3	3%	100%
	medium cobble	128		0%	100%
	large cobble	180		0%	100%
	very large cobble	256		0%	100%
Boulder	small boulder	362		0%	100%
	small boulder	512		0%	100%
	medium boulder	1024		0%	100%
	large boulder	2048		0%	100%
	very large boulder	4096		0%	100%
Bedrock	bedrock	>4096		0%	100%
TOTALS			100	100%	100%

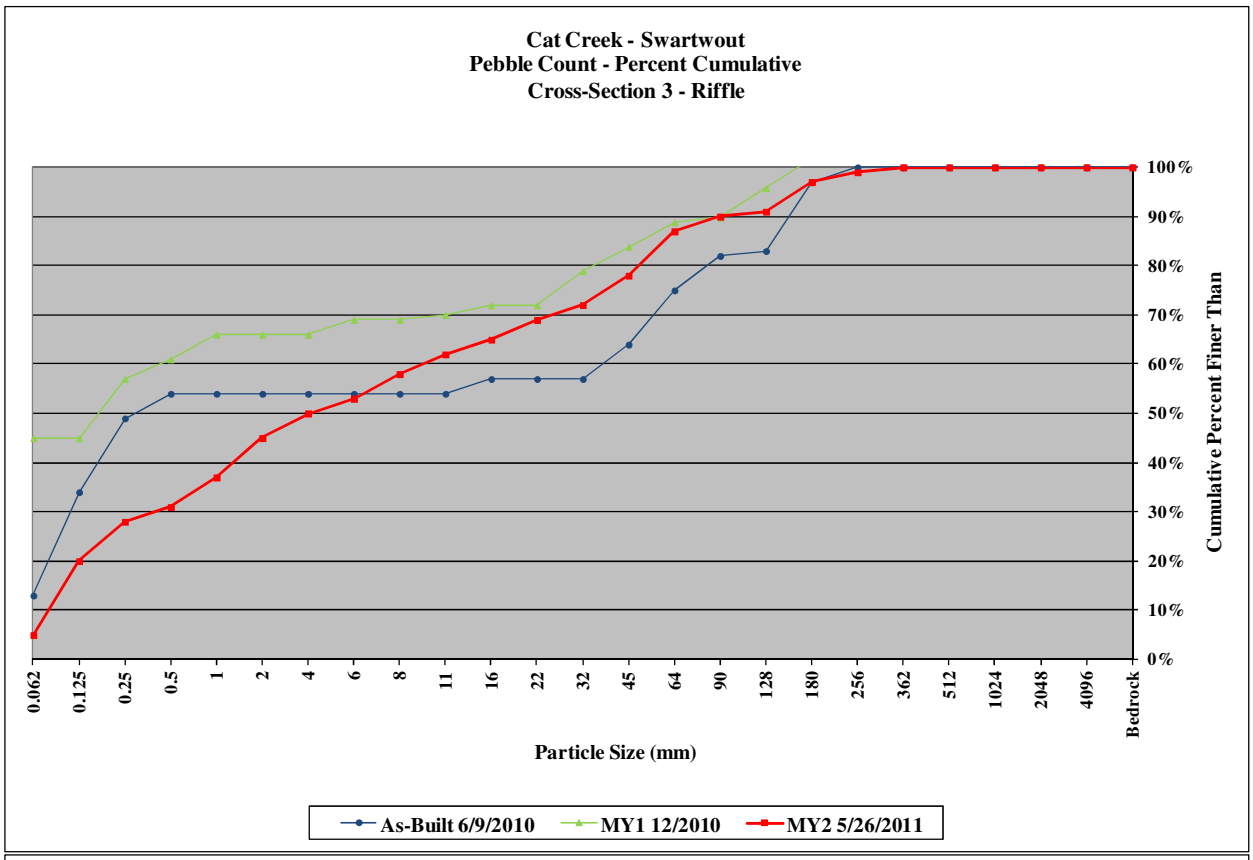
Summary Data	
D50	0.47
D84	18
D95	56

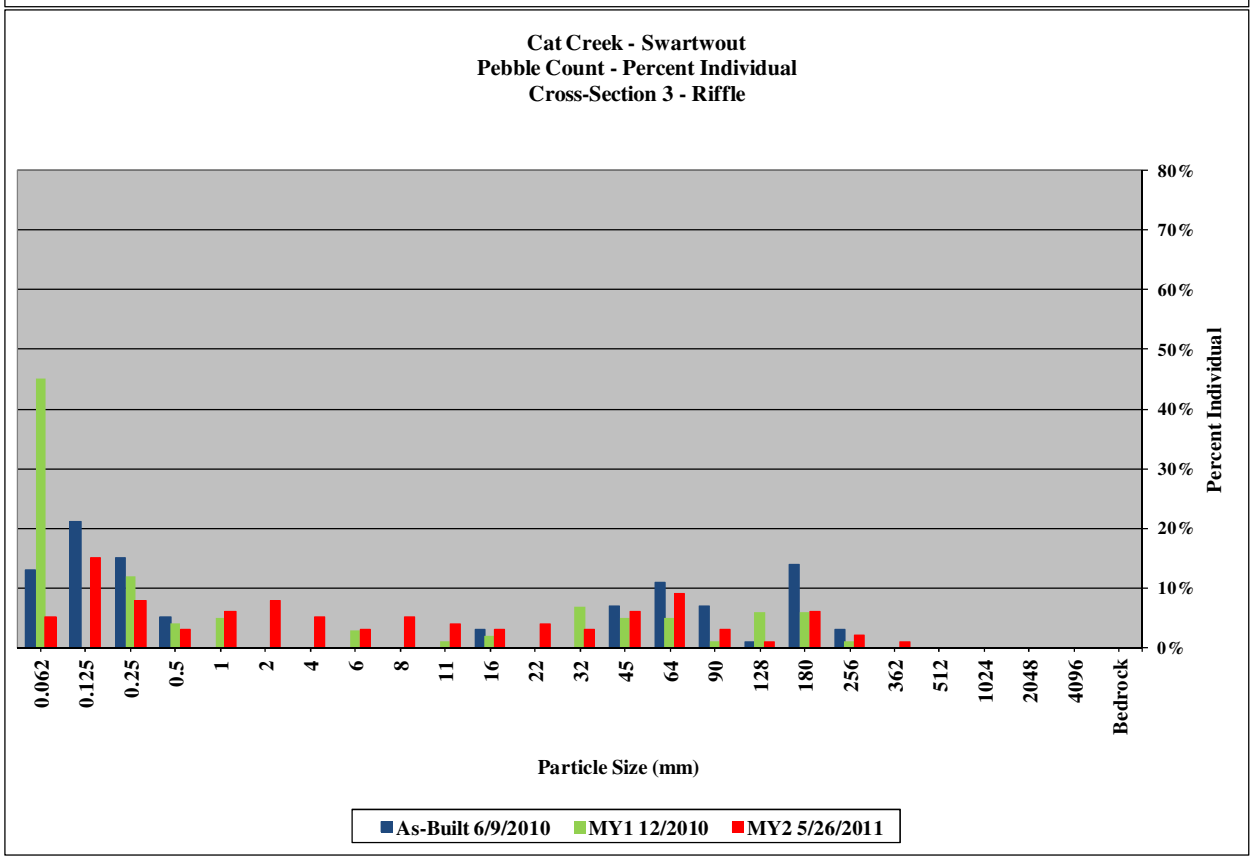

Cat Creek - Swartwout
Pebble Count - Percent Cumulative
Cross-Section 2 - Pool
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Percent Finer Than
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011


Cat Creek - Swartwout
Pebble Count - Percent Individual
Cross-Section 2 - Pool
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Individual
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011

Cat Creek Stream & Wetland / Project No. 71 Cat Creek - Swartwout - Cross-Section 3 - Riffle Pebble Count Summary					
			Monitoring Year 2		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	5	5%	5%
Sand	very fine sand	0.125	15	15%	20%
	fine sand	0.25	8	8%	28%
	medium sand	0.50	3	3%	31%
	coarse sand	1.00	6	6%	37%
	very coarse sand	2.00	8	8%	45%
Gravel	very fine gravel	4.0	5	5%	50%
	fine gravel	5.7	3	3%	53%
	fine gravel	8.0	5	5%	58%
	medium gravel	11.3	4	4%	62%
	medium gravel	16.0	3	3%	65%
	coarse gravel	22.3	4	4%	69%
	coarse gravel	32	3	3%	72%
	very coarse gravel	45	6	6%	78%
	very coarse gravel	64	9	9%	87%
Cobble	small cobble	90	3	3%	90%
	medium cobble	128	1	1%	91%
	large cobble	180	6	6%	97%
	very large cobble	256	2	2%	99%
Boulder	small boulder	362	1	1%	100%
	small boulder	512		0%	100%
	medium boulder	1024		0%	100%
	large boulder	2048		0%	100%
	very large boulder	4096		0%	100%
Bedrock	bedrock	>4096		0%	100%
TOTALS			100	100%	100%

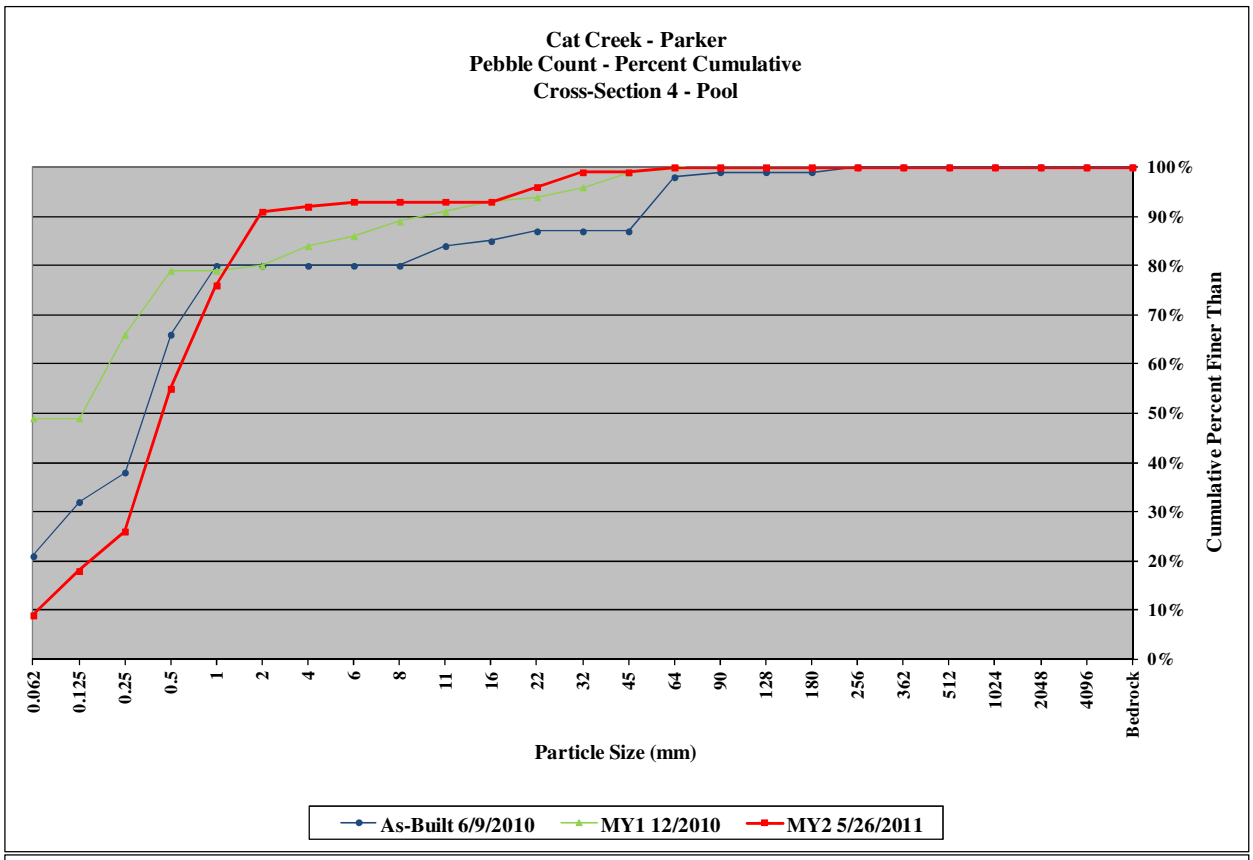
Summary Data	
D50	4
D84	57
D95	160

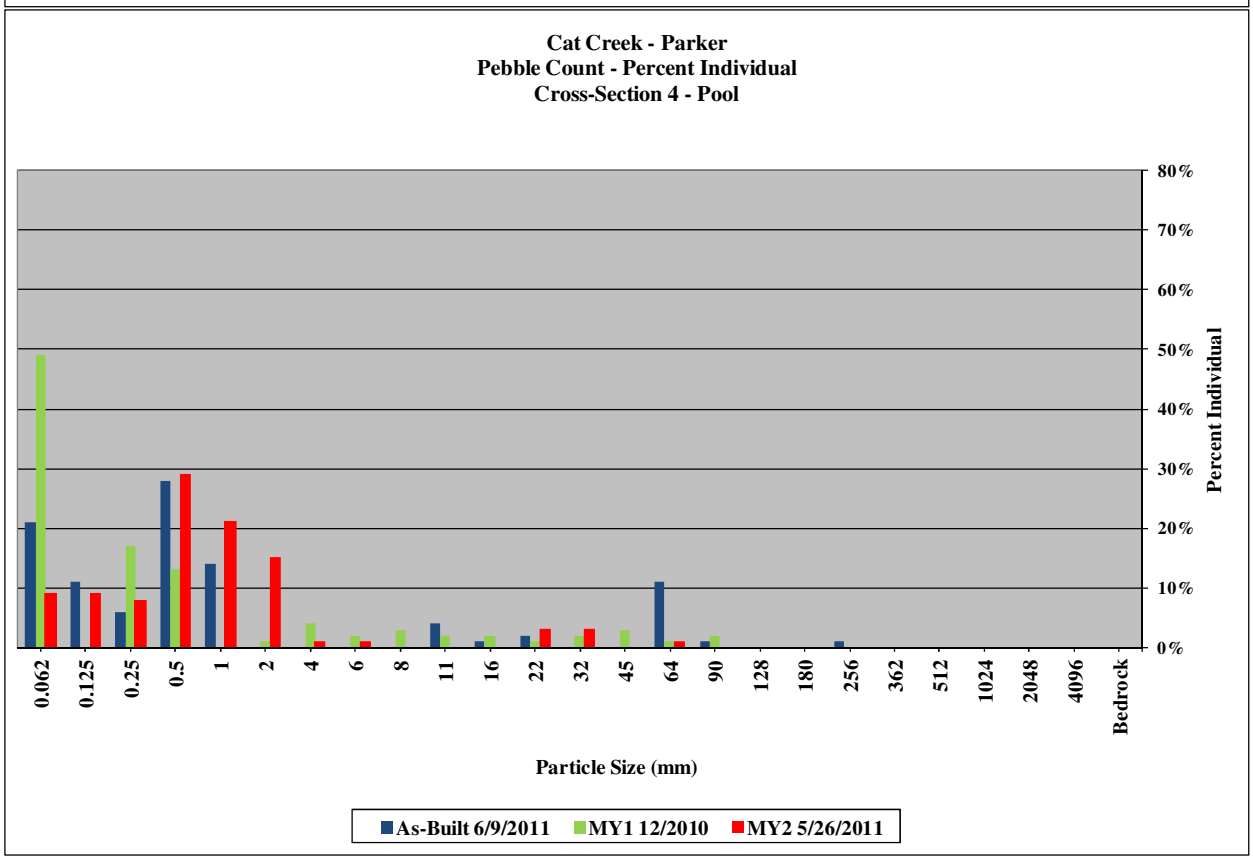

Cat Creek - Swartwout
Pebble Count - Percent Cumulative
Cross-Section 3 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Percent Finer Than
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011


Cat Creek - Swartwout
Pebble Count - Percent Individual
Cross-Section 3 - Riffle
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Individual
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011

Cat Creek Stream & Wetland / Project No. 71 Cat Creek - Parker - Cross-Section 4 - Pool Pebble Count Summary					
			Monitoring Year 2		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	9	9%	9%
Sand	very fine sand	0.125	9	9%	18%
	fine sand	0.25	8	8%	26%
	medium sand	0.50	29	29%	55%
	coarse sand	1.00	21	21%	76%
	very coarse sand	2.00	15	15%	91%
Gravel	very fine gravel	4.0	1	1%	92%
	fine gravel	5.7	1	1%	93%
	fine gravel	8.0		0%	93%
	medium gravel	11.3		0%	93%
	medium gravel	16.0		0%	93%
	coarse gravel	22.3	3	3%	96%
	coarse gravel	32	3	3%	99%
	very coarse gravel	45		0%	99%
	very coarse gravel	64	1	1%	100%
Cobble	small cobble	90		0%	100%
	medium cobble	128		0%	100%
	large cobble	180		0%	100%
	very large cobble	256		0%	100%
Boulder	small boulder	362		0%	100%
	small boulder	512		0%	100%
	medium boulder	1024		0%	100%
	large boulder	2048		0%	100%
	very large boulder	4096		0%	100%
Bedrock	bedrock	>4096		0%	100%
TOTALS			100	100%	100%

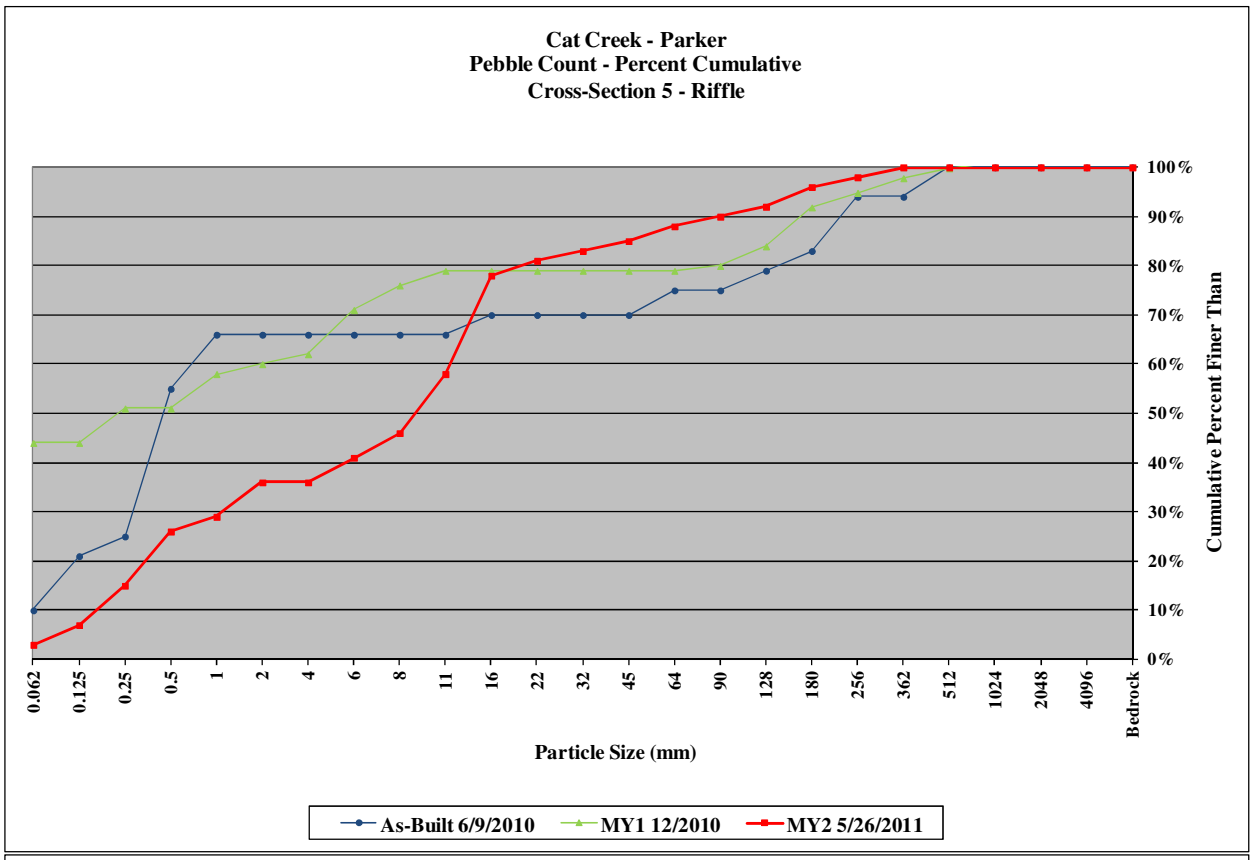
Summary Data	
D50	0.44
D84	1.4
D95	20

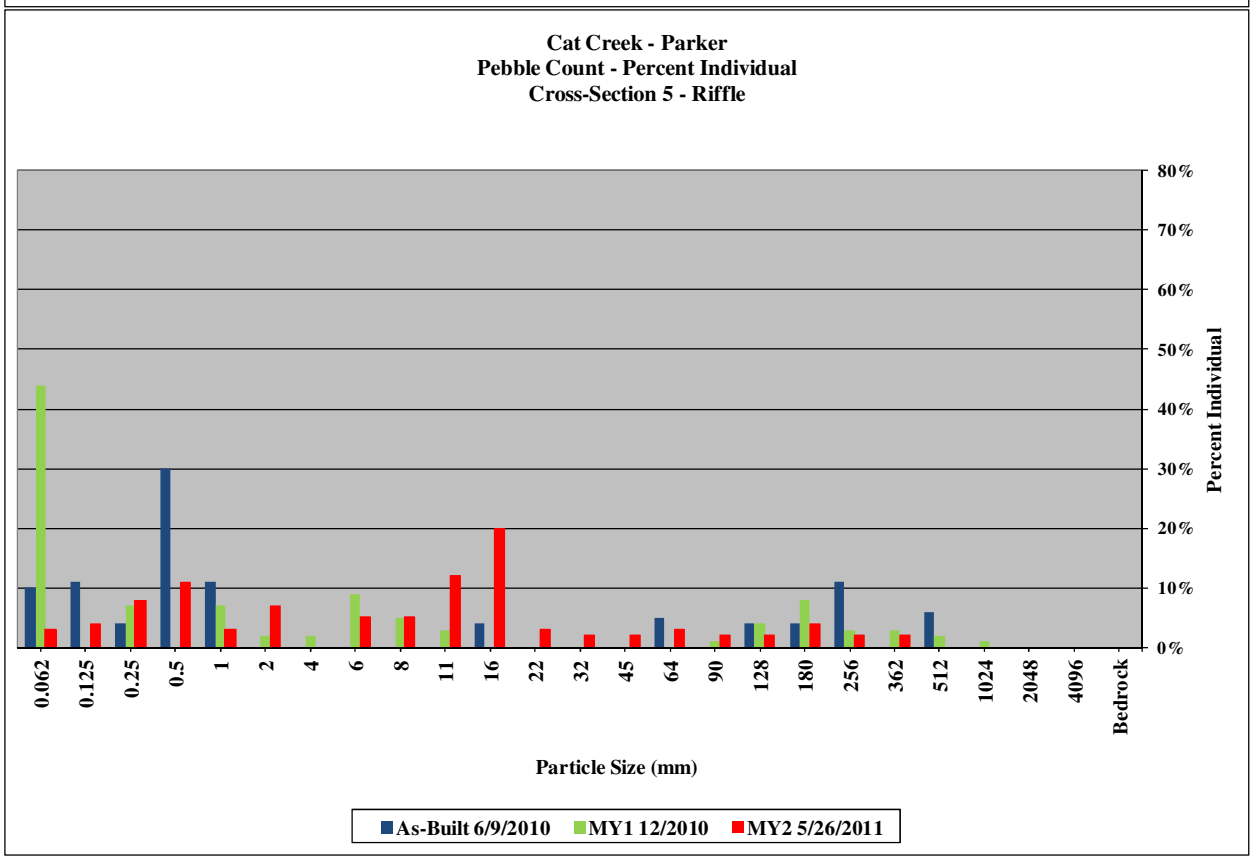

Cat Creek - Parker
Pebble Count - Percent Cumulative
Cross-Section 4 - Pool
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Percent Finer Than
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011


Cat Creek - Parker
Pebble Count - Percent Individual
Cross-Section 4 - Pool
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Individual
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2011
MY1 12/2010
MY2 5/26/2011

Cat Creek Stream & Wetland / Project No. 71 Cat Creek - Parker - Cross-Section 5 - Riffle Pebble Count Summary					
			Monitoring Year 2		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	3	3%	3%
Sand	very fine sand	0.125	4	4%	7%
	fine sand	0.25	8	8%	15%
	medium sand	0.50	11	11%	26%
	coarse sand	1.00	3	3%	29%
	very coarse sand	2.00	7	7%	36%
Gravel	very fine gravel	4.0		0%	36%
	fine gravel	5.7	5	5%	41%
	fine gravel	8.0	5	5%	46%
	medium gravel	11.3	12	12%	58%
	medium gravel	16.0	20	20%	78%
	coarse gravel	22.3	3	3%	81%
	coarse gravel	32	2	2%	83%
	very coarse gravel	45	2	2%	85%
	very coarse gravel	64	3	3%	88%
Cobble	small cobble	90	2	2%	90%
	medium cobble	128	2	2%	92%
	large cobble	180	4	4%	96%
	very large cobble	256	2	2%	98%
Boulder	small boulder	362	2	2%	100%
	small boulder	512		0%	100%
	medium boulder	1024		0%	100%
	large boulder	2048		0%	100%
	very large boulder	4096		0%	100%
Bedrock	bedrock	>4096		0%	100%
TOTALS			100	100%	100%

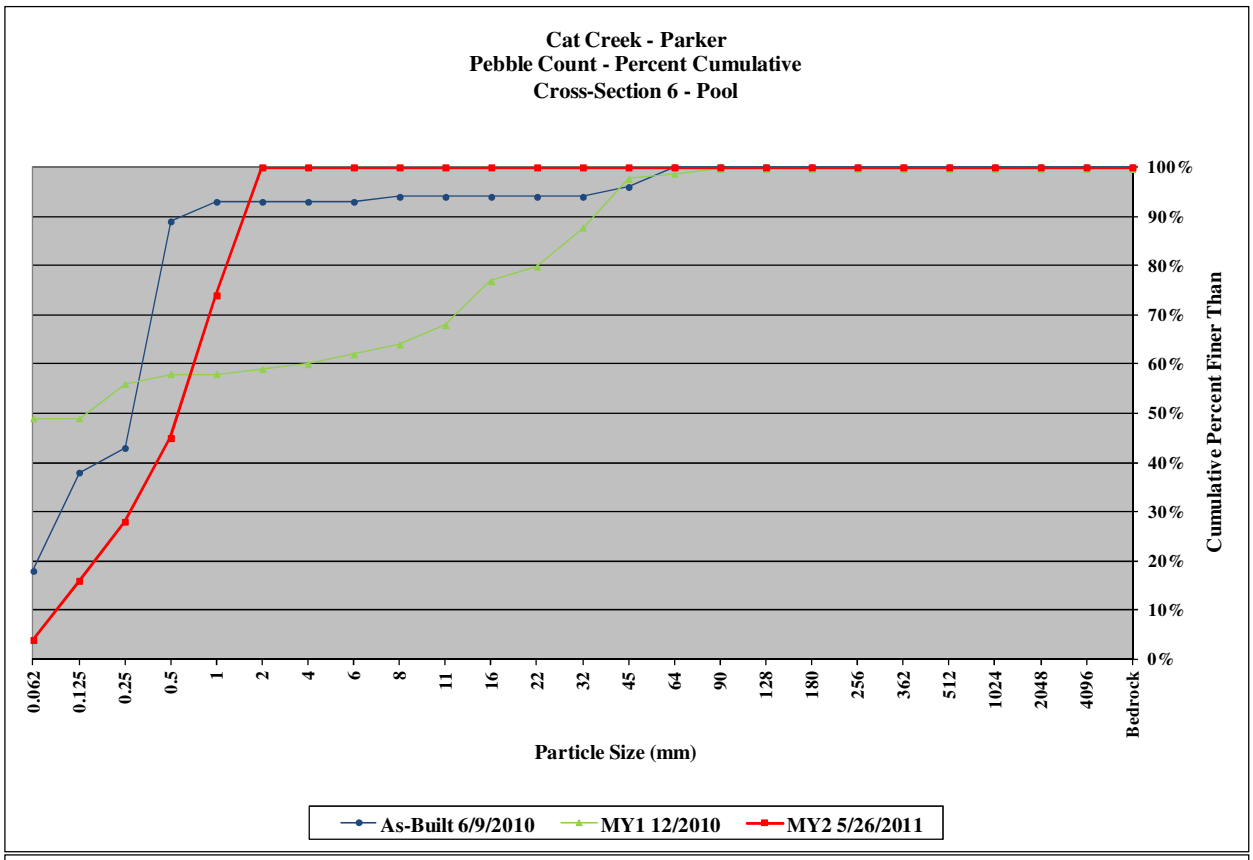
Summary Data	
D50	8.9
D84	38
D95	170

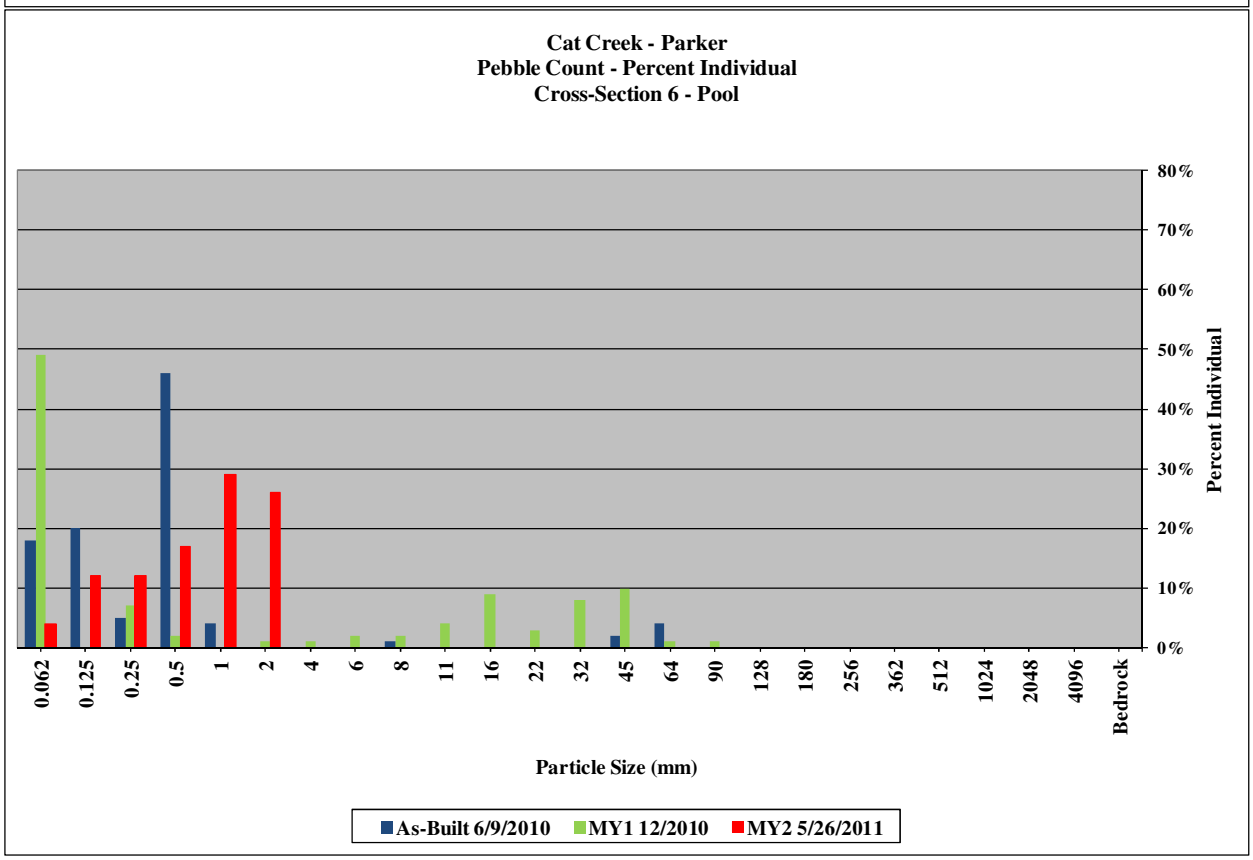

Cat Creek - Parker
Pebble Count - Percent Cumulative
Cross-Section 5 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Percent Finer Than
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011


Cat Creek - Parker
Pebble Count - Percent Individual
Cross-Section 5 - Riffle
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Individual
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011

Cat Creek Stream & Wetland / Project No. 71 Cat Creek - Parker - Cross-Section 6 - Pool Pebble Count Summary					
			Monitoring Year 2		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	4	4%	4%
Sand	very fine sand	0.125	12	12%	16%
	fine sand	0.25	12	12%	28%
	medium sand	0.50	17	17%	45%
	coarse sand	1.00	29	29%	74%
	very coarse sand	2.00	26	26%	100%
Gravel	very fine gravel	4.0		0%	100%
	fine gravel	5.7		0%	100%
	fine gravel	8.0		0%	100%
	medium gravel	11.3		0%	100%
	medium gravel	16.0		0%	100%
	coarse gravel	22.3		0%	100%
	coarse gravel	32		0%	100%
	very coarse gravel	45		0%	100%
	very coarse gravel	64		0%	100%
Cobble	small cobble	90		0%	100%
	medium cobble	128		0%	100%
	large cobble	180		0%	100%
	very large cobble	256		0%	100%
Boulder	small boulder	362		0%	100%
	small boulder	512		0%	100%
	medium boulder	1024		0%	100%
	large boulder	2048		0%	100%
	very large boulder	4096		0%	100%
Bedrock	bedrock	>4096		0%	100%
TOTALS			100	100%	100%

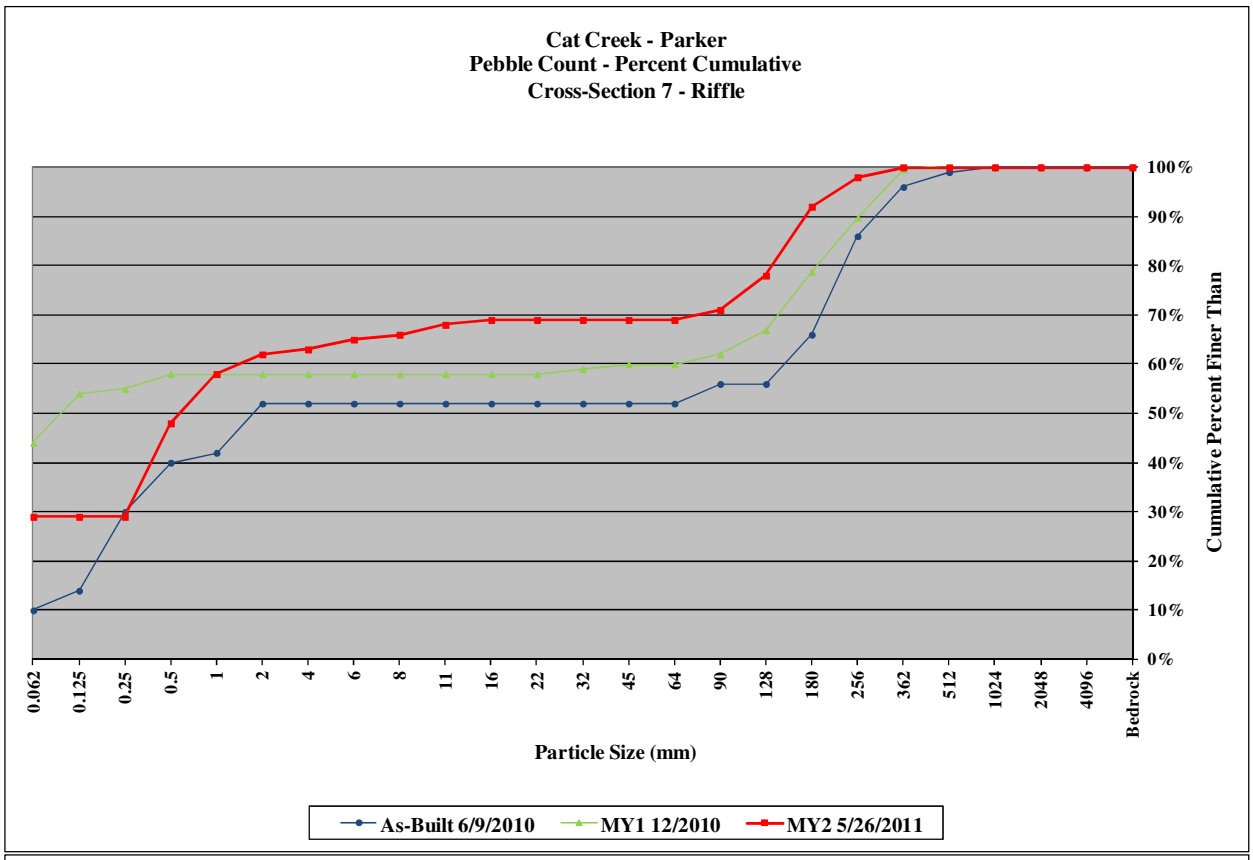
Summary Data	
D50	0.56
D84	1.3
D95	1.8

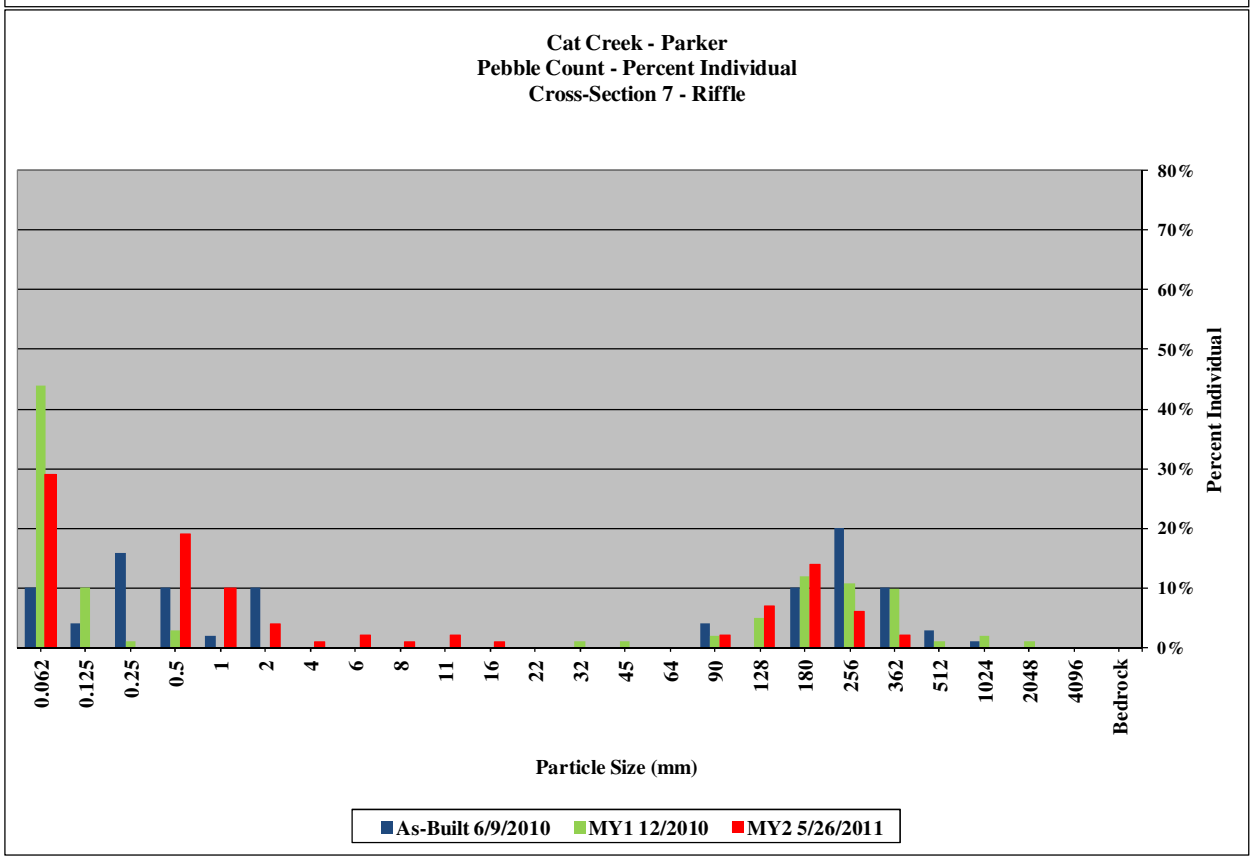

Cat Creek - Parker
Pebble Count - Percent Cumulative
Cross-Section 6 - Pool
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Percent Finer Than
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011


Cat Creek - Parker
Pebble Count - Percent Individual
Cross-Section 6 - Pool
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Individual
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011

Cat Creek Stream & Wetland / Project No. 71 Cat Creek - Parker - Cross-Section 7 - Riffle Pebble Count Summary					
			Monitoring Year 2		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	29	29%	29%
Sand	very fine sand	0.125		0%	29%
	fine sand	0.25		0%	29%
	medium sand	0.50	19	19%	48%
	coarse sand	1.00	10	10%	58%
	very coarse sand	2.00	4	4%	62%
Gravel	very fine gravel	4.0	1	1%	63%
	fine gravel	5.7	2	2%	65%
	fine gravel	8.0	1	1%	66%
	medium gravel	11.3	2	2%	68%
	medium gravel	16.0	1	1%	69%
	coarse gravel	22.3		0%	69%
	coarse gravel	32		0%	69%
	very coarse gravel	45		0%	69%
	very coarse gravel	64		0%	69%
Cobble	small cobble	90	2	2%	71%
	medium cobble	128	7	7%	78%
	large cobble	180	14	14%	92%
	very large cobble	256	6	6%	98%
Boulder	small boulder	362	2	2%	100%
	small boulder	512		0%	100%
	medium boulder	1024		0%	100%
	large boulder	2048		0%	100%
	very large boulder	4096		0%	100%
Bedrock	bedrock	>4096		0%	100%
TOTALS			100	100%	100%

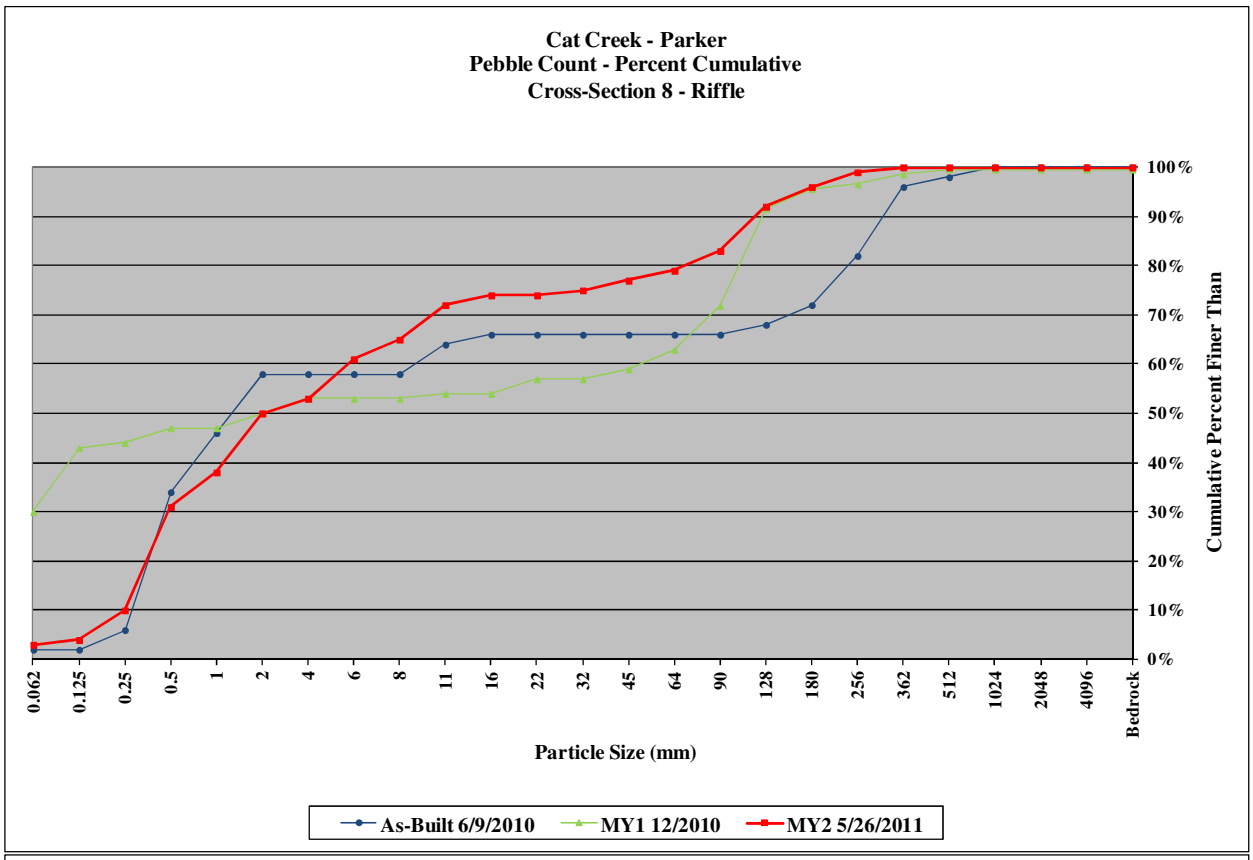
Summary Data	
D50	0.062
D84	150
D95	210

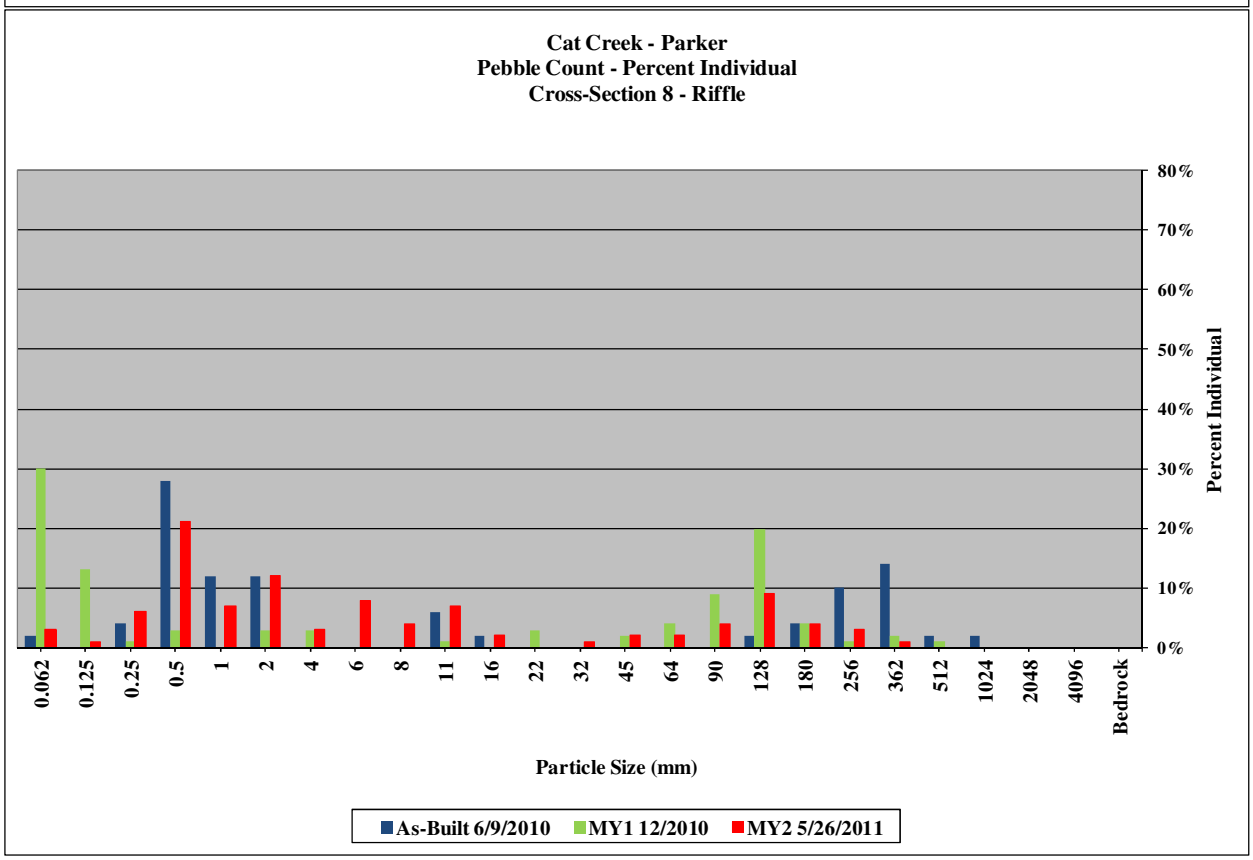

Cat Creek - Parker
Pebble Count - Percent Cumulative
Cross-Section 7 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Percent Finer Than
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011


Cat Creek - Parker
Pebble Count - Percent Individual
Cross-Section 7 - Riffle
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Individual
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011

Cat Creek Stream & Wetland / Project No. 71 Cat Creek - Parker - Cross-Section 8 - Riffle Pebble Count Summary					
			Monitoring Year 2		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	3	3%	3%
Sand	very fine sand	0.125	1	1%	4%
	fine sand	0.25	6	6%	10%
	medium sand	0.50	21	21%	31%
	coarse sand	1.00	7	7%	38%
	very coarse sand	2.00	12	12%	50%
Gravel	very fine gravel	4.0	3	3%	53%
	fine gravel	5.7	8	8%	61%
	fine gravel	8.0	4	4%	65%
	medium gravel	11.3	7	7%	72%
	medium gravel	16.0	2	2%	74%
	coarse gravel	22.3		0%	74%
	coarse gravel	32	1	1%	75%
	very coarse gravel	45	2	2%	77%
	very coarse gravel	64	2	2%	79%
Cobble	small cobble	90	4	4%	83%
	medium cobble	128	9	9%	92%
	large cobble	180	4	4%	96%
	very large cobble	256	3	3%	99%
Boulder	small boulder	362	1	1%	100%
	small boulder	512		0%	100%
	medium boulder	1024		0%	100%
	large boulder	2048		0%	100%
	very large boulder	4096		0%	100%
Bedrock	bedrock	>4096		0%	100%
TOTALS			100	100%	100%

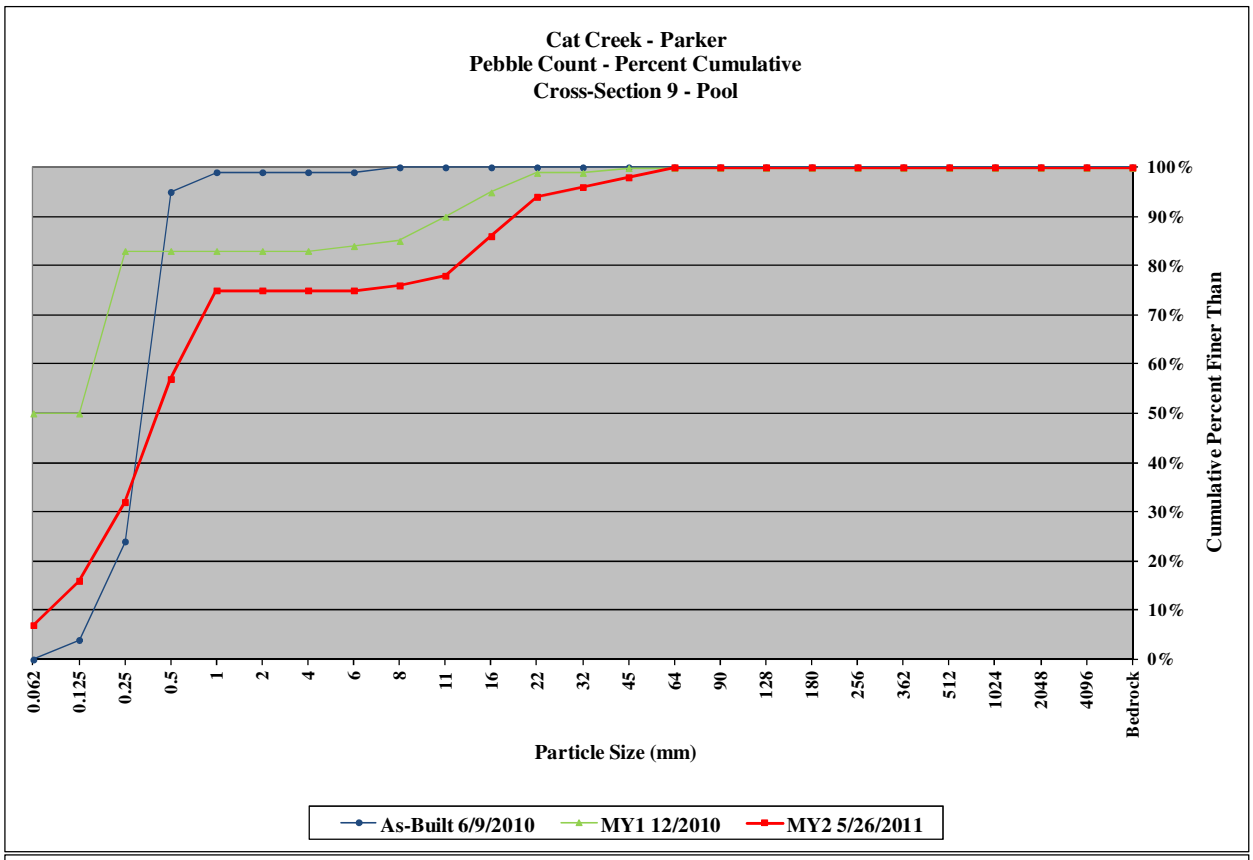
Summary Data	
D50	2
D84	94
D95	170

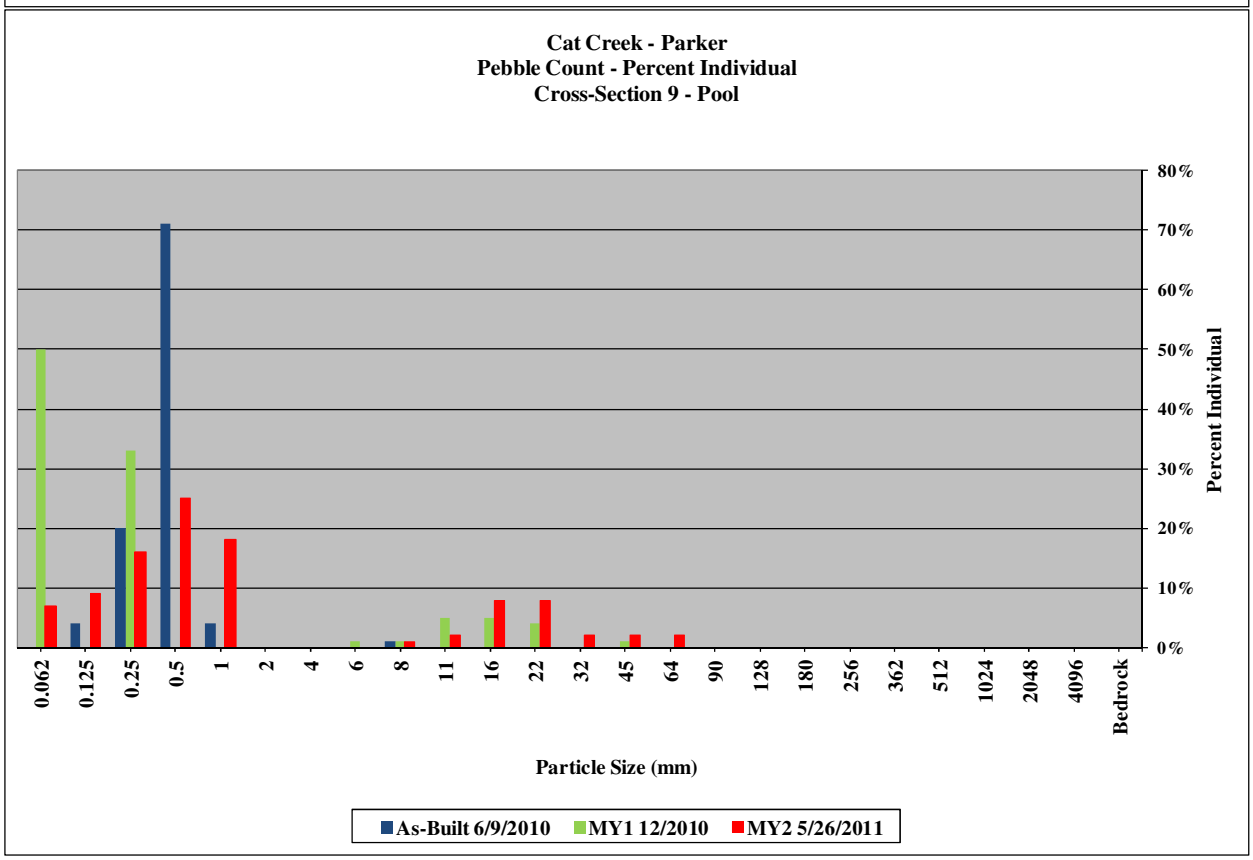

Cat Creek - Parker
Pebble Count - Percent Cumulative
Cross-Section 8 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Percent Finer Than
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011


Cat Creek - Parker
Pebble Count - Percent Individual
Cross-Section 8 - Riffle
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Individual
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011

Cat Creek Stream & Wetland / Project No. 71 Cat Creek - Parker - Cross-Section 9 - Pool Pebble Count Summary					
			Monitoring Year 2		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	7	7%	7%
Sand	very fine sand	0.125	9	9%	16%
	fine sand	0.25	16	16%	32%
	medium sand	0.50	25	25%	57%
	coarse sand	1.00	18	18%	75%
	very coarse sand	2.00		0%	75%
Gravel	very fine gravel	4.0		0%	75%
	fine gravel	5.7		0%	75%
	fine gravel	8.0	1	1%	76%
	medium gravel	11.3	2	2%	78%
	medium gravel	16.0	8	8%	86%
	coarse gravel	22.3	8	8%	94%
	coarse gravel	32	2	2%	96%
	very coarse gravel	45	2	2%	98%
	very coarse gravel	64	2	2%	100%
Cobble	small cobble	90		0%	100%
	medium cobble	128		0%	100%
	large cobble	180		0%	100%
	very large cobble	256		0%	100%
Boulder	small boulder	362		0%	100%
	small boulder	512		0%	100%
	medium boulder	1024		0%	100%
	large boulder	2048		0%	100%
	very large boulder	4096		0%	100%
Bedrock	bedrock	>4096		0%	100%
TOTALS			100	100%	100%

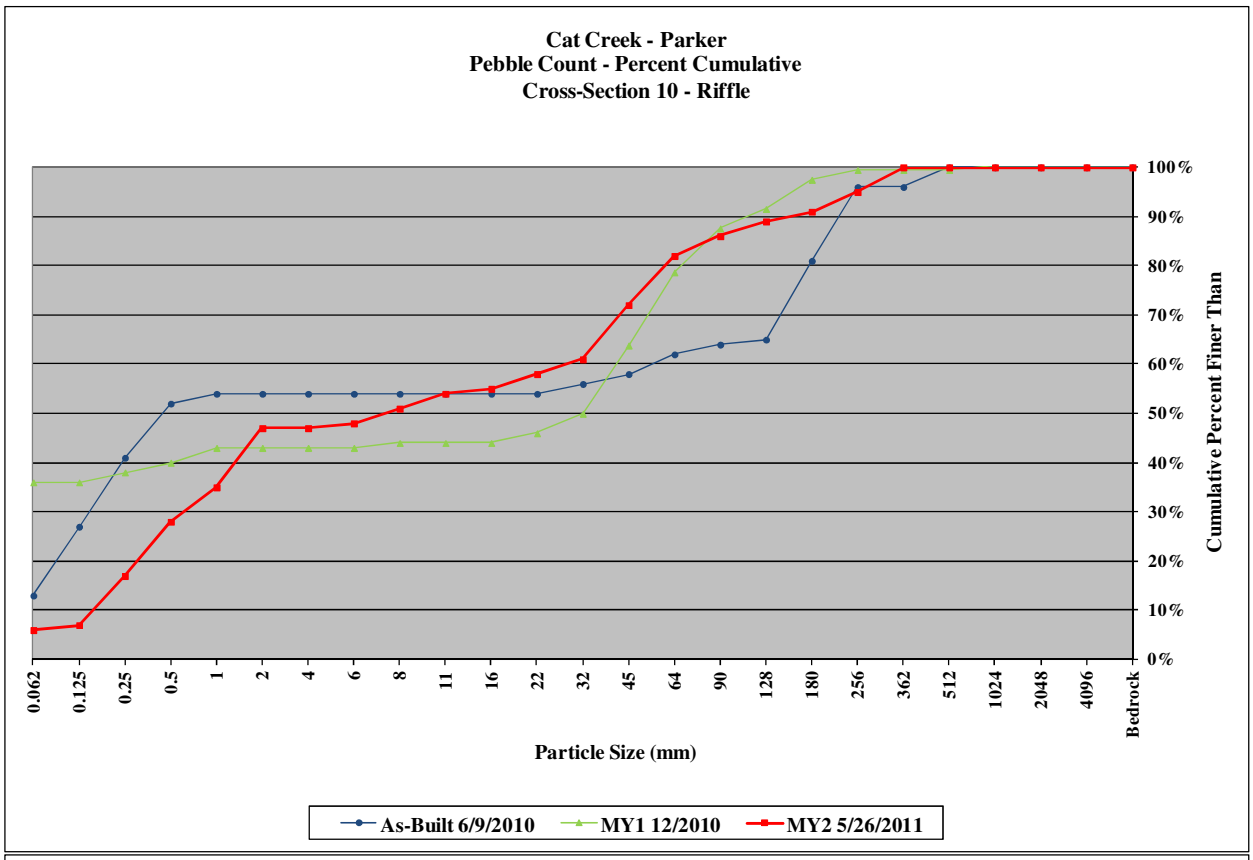
Summary Data	
D50	0.41
D84	15
D95	27

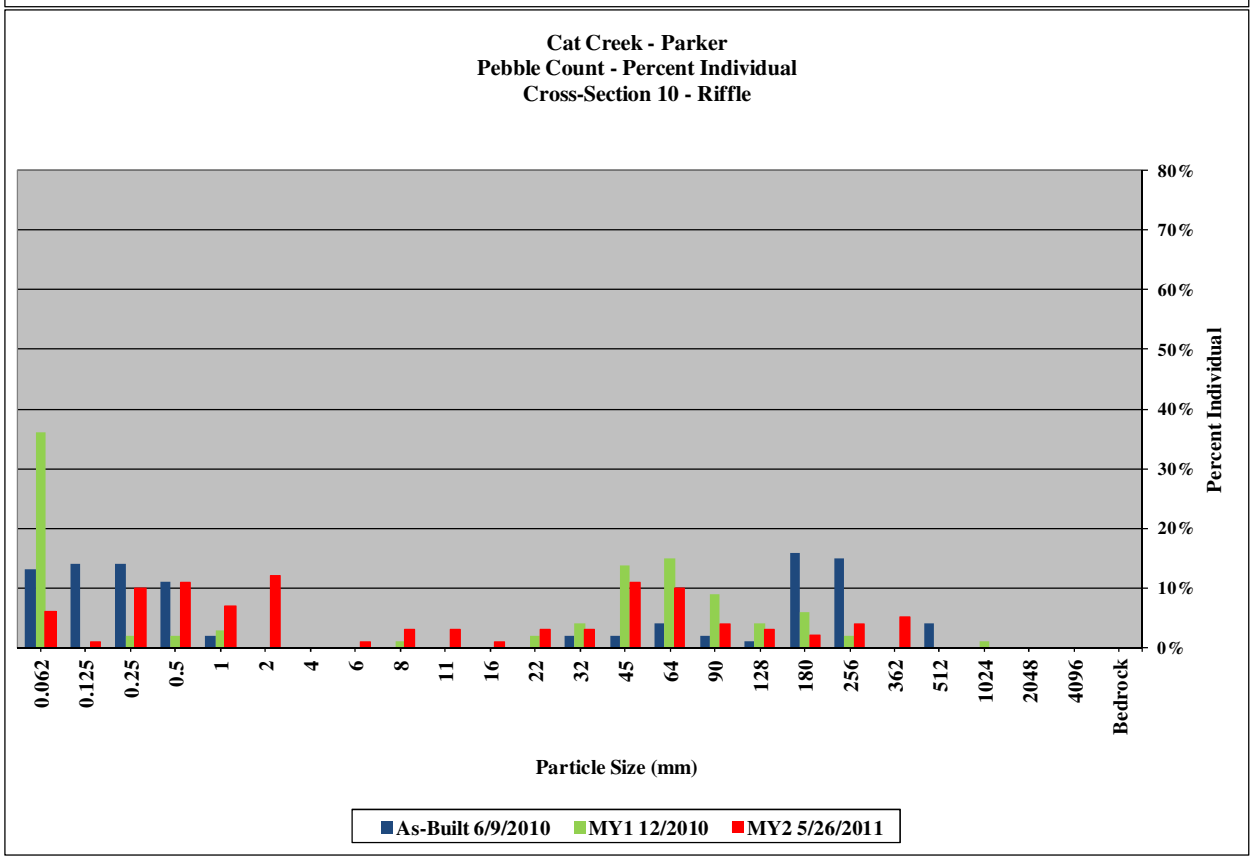

Cat Creek - Parker
Pebble Count - Percent Cumulative
Cross-Section 9 - Pool
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Percent Finer Than
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011


Cat Creek - Parker
Pebble Count - Percent Individual
Cross-Section 9 - Pool
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Individual
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011

Cat Creek Stream & Wetland / Project No. 71 Cat Creek - Parker - Cross-Section 10 - Riffle Pebble Count Summary					
			Monitoring Year 2		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	6	6%	6%
Sand	very fine sand	0.125	1	1%	7%
	fine sand	0.25	10	10%	17%
	medium sand	0.50	11	11%	28%
	coarse sand	1.00	7	7%	35%
	very coarse sand	2.00	12	12%	47%
Gravel	very fine gravel	4.0		0%	47%
	fine gravel	5.7	1	1%	48%
	fine gravel	8.0	3	3%	51%
	medium gravel	11.3	3	3%	54%
	medium gravel	16.0	1	1%	55%
	coarse gravel	22.3	3	3%	58%
	coarse gravel	32	3	3%	61%
	very coarse gravel	45	11	11%	72%
	very coarse gravel	64	10	10%	82%
Cobble	small cobble	90	4	4%	86%
	medium cobble	128	3	3%	89%
	large cobble	180	2	2%	91%
	very large cobble	256	4	4%	95%
Boulder	small boulder	362	5	5%	100%
	small boulder	512		0%	100%
	medium boulder	1024		0%	100%
	large boulder	2048		0%	100%
	very large boulder	4096		0%	100%
Bedrock	bedrock	>4096		0%	100%
TOTALS			100	100%	100%

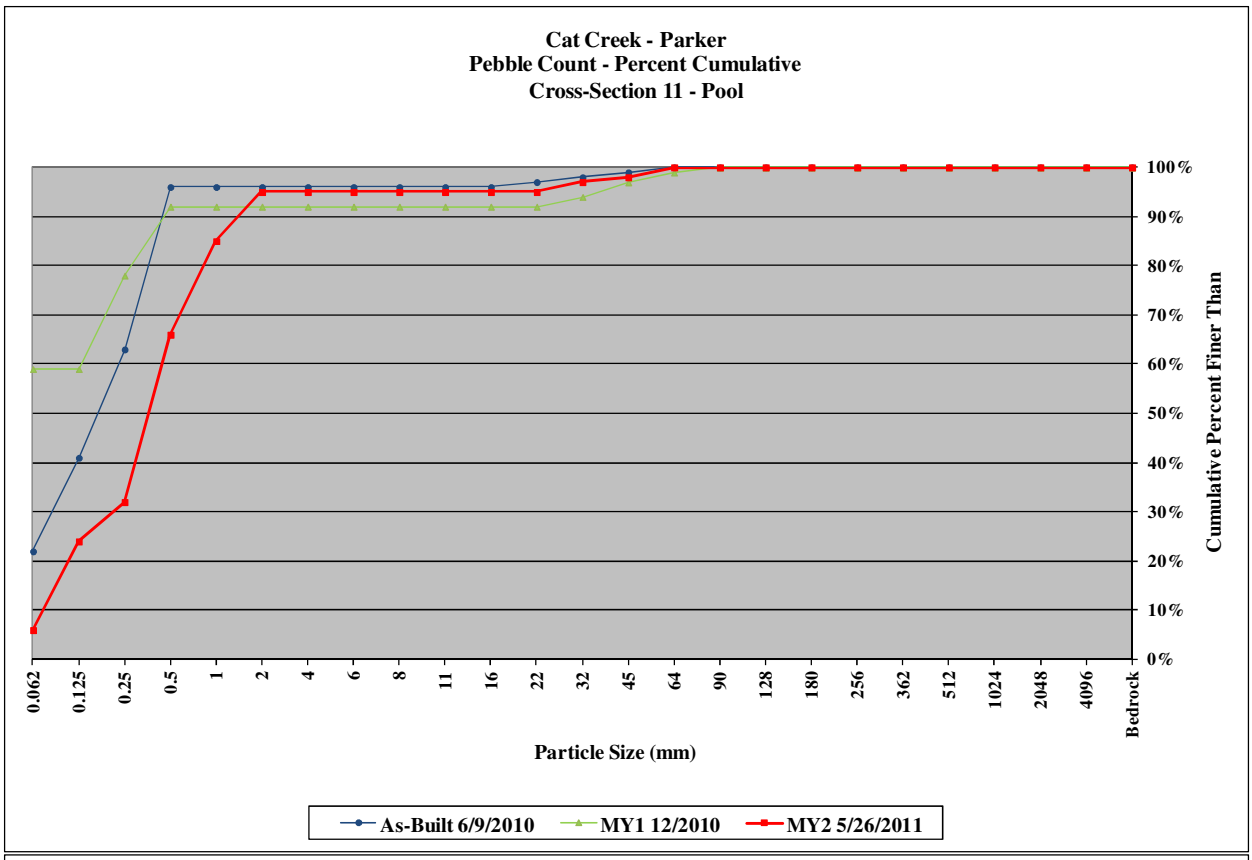
Summary Data	
D50	7.3
D84	76
D95	260

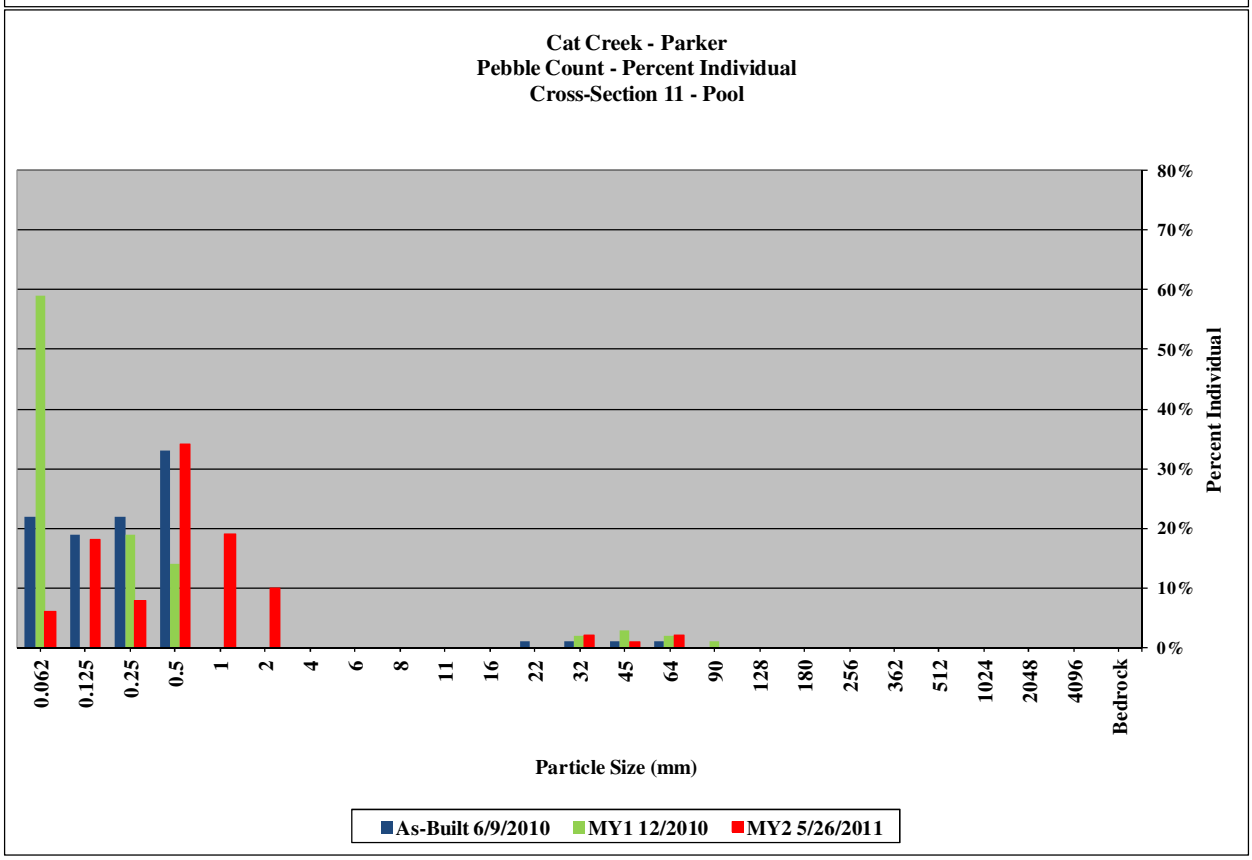

Cat Creek - Parker
Pebble Count - Percent Cumulative
Cross-Section 10 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Percent Finer Than
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011


Cat Creek - Parker
Pebble Count - Percent Individual
Cross-Section 10 - Riffle
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Individual
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011

Cat Creek Stream & Wetland / Project No. 71 Cat Creek - Parker - Cross-Section 11 - Pool Pebble Count Summary					
			Monitoring Year 2		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	6	6%	6%
Sand	very fine sand	0.125	18	18%	24%
	fine sand	0.25	8	8%	32%
	medium sand	0.50	34	34%	66%
	coarse sand	1.00	19	19%	85%
	very coarse sand	2.00	10	10%	95%
Gravel	very fine gravel	4.0		0%	95%
	fine gravel	5.7		0%	95%
	fine gravel	8.0		0%	95%
	medium gravel	11.3		0%	95%
	medium gravel	16.0		0%	95%
	coarse gravel	22.3		0%	95%
	coarse gravel	32	2	2%	97%
	very coarse gravel	45	1	1%	98%
	very coarse gravel	64	2	2%	100%
Cobble	small cobble	90		0%	100%
	medium cobble	128		0%	100%
	large cobble	180		0%	100%
	very large cobble	256		0%	100%
Boulder	small boulder	362		0%	100%
	small boulder	512		0%	100%
	medium boulder	1024		0%	100%
	large boulder	2048		0%	100%
	very large boulder	4096		0%	100%
Bedrock	bedrock	>4096		0%	100%
TOTALS			100	100%	100%

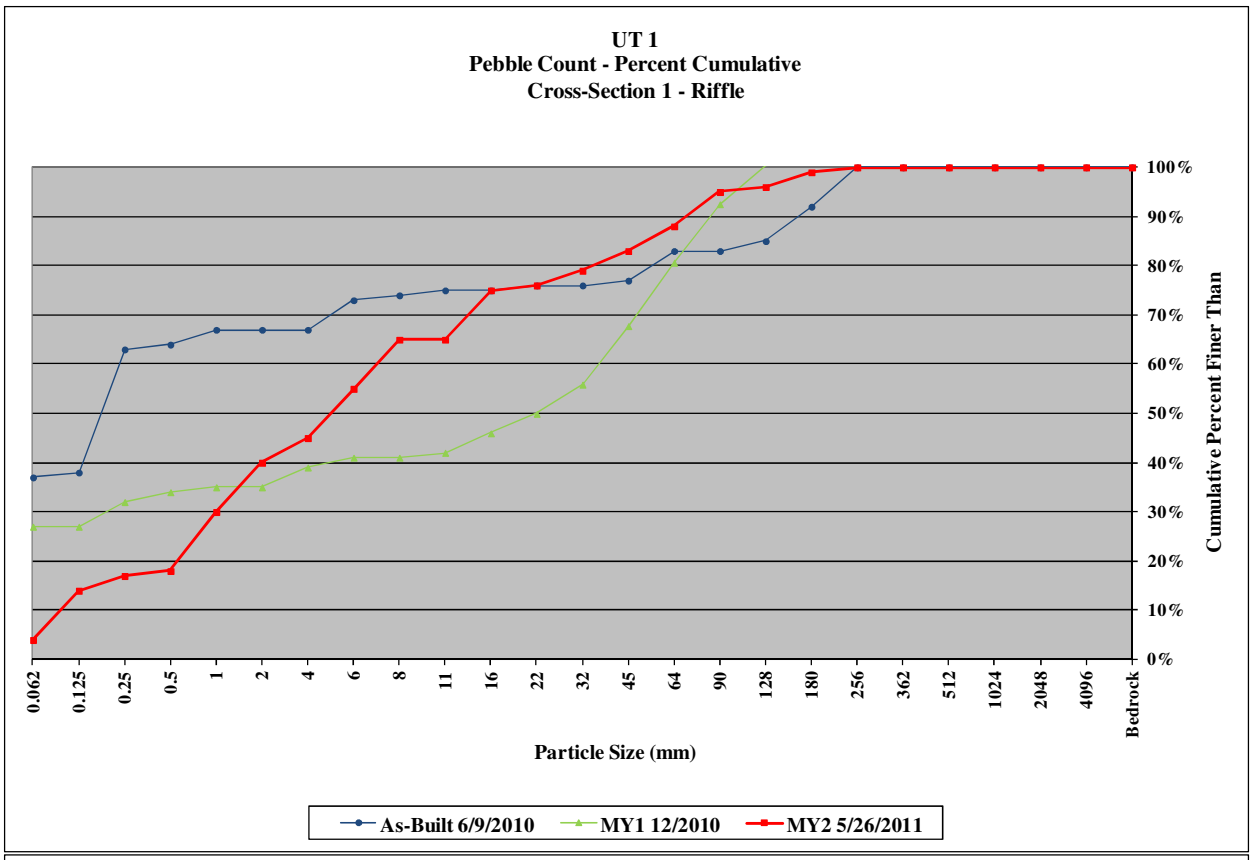
Summary Data	
D50	0.36
D84	0.96
D95	2

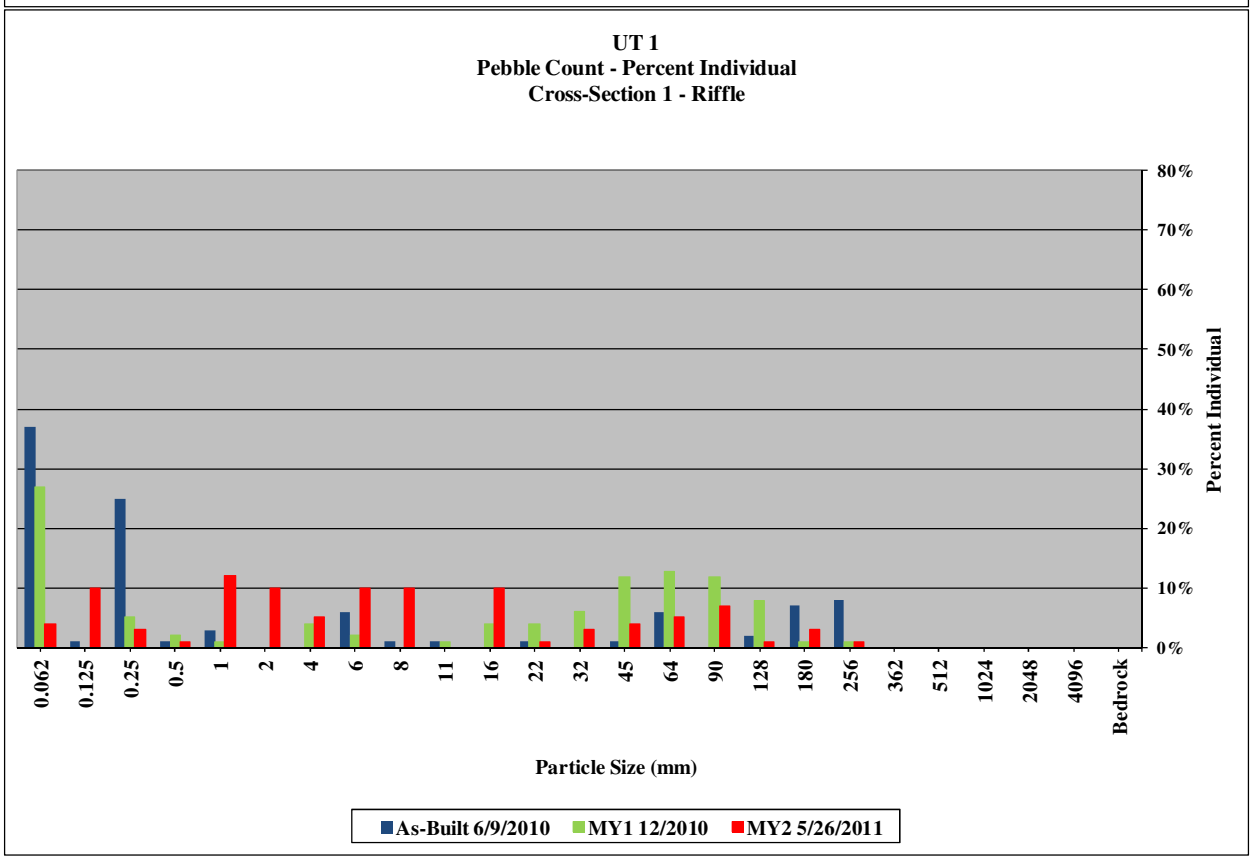

Cat Creek - Parker
Pebble Count - Percent Cumulative
Cross-Section 11 - Pool
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Percent Finer Than
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011


Cat Creek - Parker
Pebble Count - Percent Individual
Cross-Section 11 - Pool
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Individual
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011

Cat Creek Stream & Wetland / Project No. 71 UT 1 - Cross-Section 1 - Riffle Pebble Count Summary					
			Monitoring Year 2		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	4	4%	4%
Sand	very fine sand	0.125	10	10%	14%
	fine sand	0.25	3	3%	17%
	medium sand	0.50	1	1%	18%
	coarse sand	1.00	12	12%	30%
	very coarse sand	2.00	10	10%	40%
Gravel	very fine gravel	4.0	5	5%	45%
	fine gravel	5.7	10	10%	55%
	fine gravel	8.0	10	10%	65%
	medium gravel	11.3		0%	65%
	medium gravel	16.0	10	10%	75%
	coarse gravel	22.3	1	1%	76%
	coarse gravel	32	3	3%	79%
	very coarse gravel	45	4	4%	83%
	very coarse gravel	64	5	5%	88%
Cobble	small cobble	90	7	7%	95%
	medium cobble	128	1	1%	96%
	large cobble	180	3	3%	99%
	very large cobble	256	1	1%	100%
Boulder	small boulder	362		0%	100%
	small boulder	512		0%	100%
	medium boulder	1024		0%	100%
	large boulder	2048		0%	100%
	very large boulder	4096		0%	100%
Bedrock	bedrock	>4096		0%	100%
TOTALS			100	100%	100%

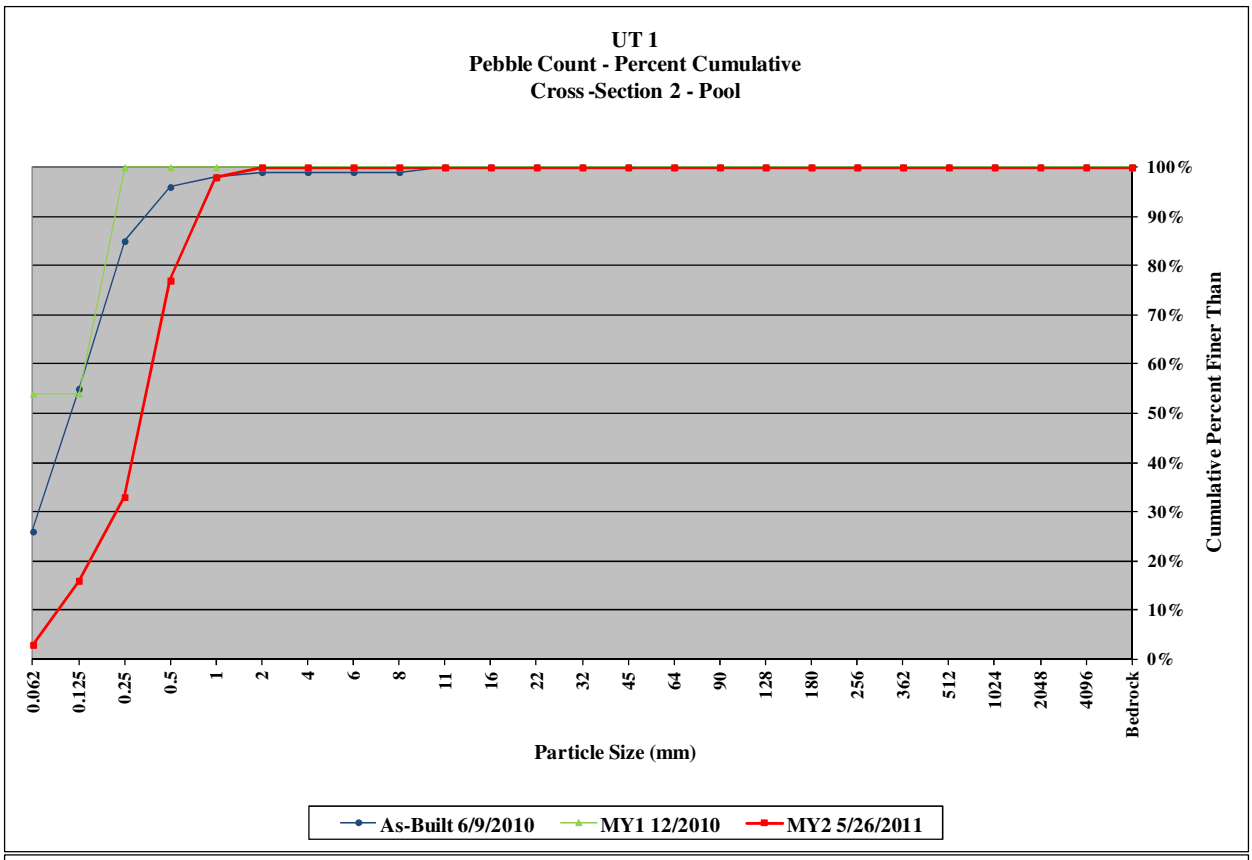
Summary Data	
D50	4.9
D84	48
D95	90


UT 1
Pebble Count - Percent Cumulative
Cross-Section 1 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Percent Finer Than
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011


UT 1
Pebble Count - Percent Individual
Cross-Section 1 - Riffle
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Individual
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011

Cat Creek Stream & Wetland / Project No. 71 UT 1 - Cross-Section 2 - Pool Pebble Count Summary					
			Monitoring Year 2		
Description	**Material**	**Size (mm)**	**Total #**	**Item %**	**Cum %**
Silt/Clay	silt/clay	0.062	3	3%	3%
Sand	very fine sand	0.125	13	13%	16%
	fine sand	0.25	17	17%	33%
	medium sand	0.50	44	44%	77%
	coarse sand	1.00	21	21%	98%
	very coarse sand	2.00	2	2%	100%
Gravel	very fine gravel	4.0		0%	100%
	fine gravel	5.7		0%	100%
	fine gravel	8.0		0%	100%
	medium gravel	11.3		0%	100%
	medium gravel	16.0		0%	100%
	coarse gravel	22.3		0%	100%
	coarse gravel	32		0%	100%
	very coarse gravel	45		0%	100%
	very coarse gravel	64		0%	100%
Cobble	small cobble	90		0%	100%
	medium cobble	128		0%	100%
	large cobble	180		0%	100%
	very large cobble	256		0%	100%
Boulder	small boulder	362		0%	100%
	small boulder	512		0%	100%
	medium boulder	1024		0%	100%
	large boulder	2048		0%	100%
	very large boulder	4096		0%	100%
Bedrock	bedrock	>4096		0%	100%
TOTALS			100	100%	100%

Summary Data	
D50	0.33
D84	0.63
D95	0.91


UT 1
Pebble Count - Percent Cumulative
Cross -Section 2 - Pool
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Cumulative Percent Finer Than
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011

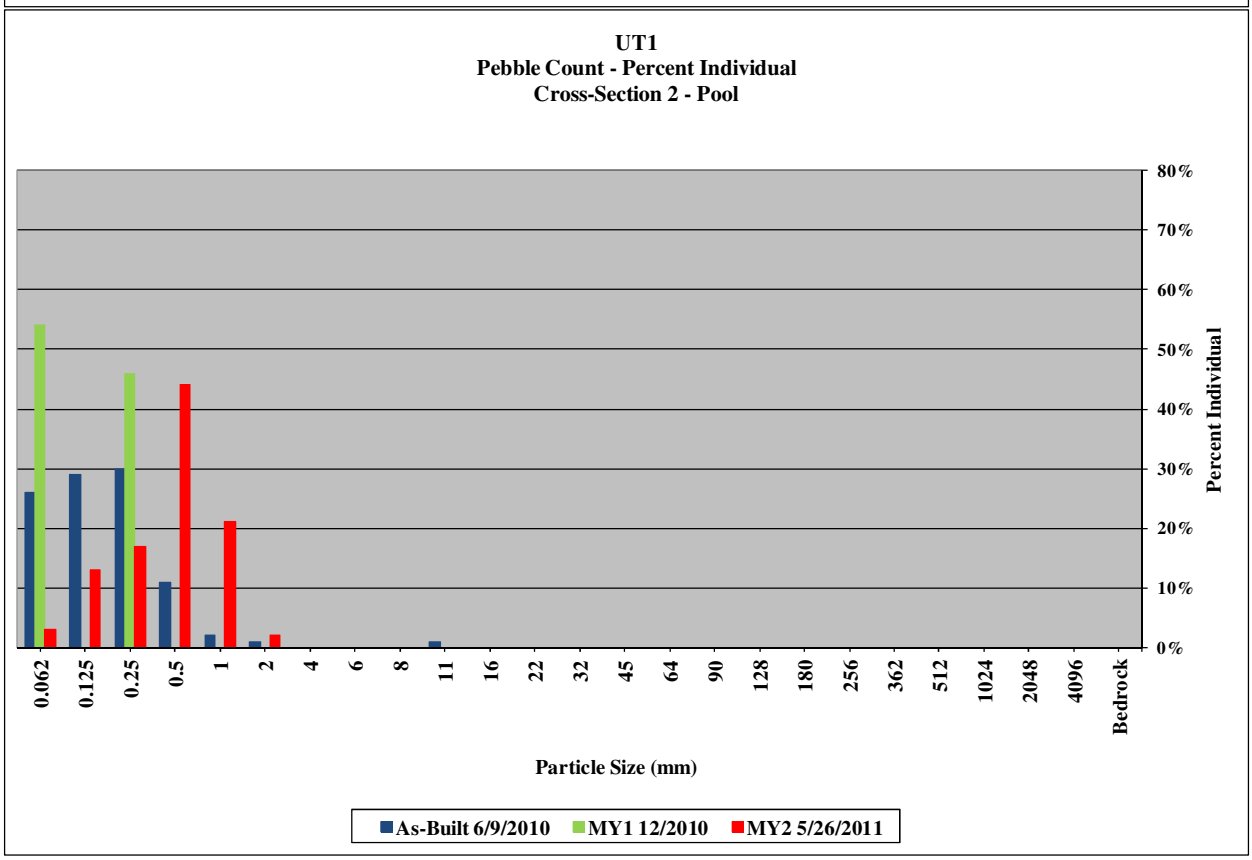

UT1
Pebble Count - Percent Individual
Cross-Section 2 - Pool
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent Individual
0.062
0.125
0.25
0.5
1
2
4
6
8
11
16
22
32
45
64
90
128
180
256
362
512
1024
2048
4096
Bedrock
Particle Size (mm)
As-Built 6/9/2010
MY1 12/2010
MY2 5/26/2011

Table 10. Baseline Stream Data Summary
Cat Creek Stream & Wetland / Project No. 71 - Cat Creek Swartwout (926 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			Monitoring Baseline					
Dimension & Substrate - Riffle	**LL**	**UL**	**Eq.**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**
Bankfull Width (ft)	-	-	-	17.5	19.7	-	22.9	-	-	-	11.8	-	-	-	-	-	16.2	-	10.8	11.7	-	12.6	-	-
Floodprone Width (ft)				-	-	-	-	-	-	-	332.0	-	-	-	-	-	>36.0	-	45.0	46.0	-	47.0	-	-
Bankfull Mean Depth (ft)	-	-	-	0.8	1.4	-	2.2	-	-	-	1.3	-	-	-	-	-	1.4	-	0.7	0.8	-	0.9	-	-
Bankfull Max Depth (ft)				2.0	2.8	-	3.8	-	-	-	2.1	-	-	-	-	-	2.0	-	1.2	1.3	-	1.4	-	-
Bankfull Cross Sectional Area (ft^2)	-			16.7	28.3	-	40.3	-	-	-	15.3	-	-	-	-	-	22.4	-	7.9	9.9	-	11.8	-	-
Width/Depth Ratio				8.4	15.9	-	23.7	-	-	-	9.1	-	-	-	-	-	11.8	-	13.4	14.1	-	14.7	-	-
Entrenchment Ratio				1.6	4.3	-	6.9	-	-	-	28.1	-	-	-	-	-	>2.2	-	-	3.9	-	-	-	-
Bank Height Ratio				1.3	1.4	-	1.5	-	-	1.0	1.0	-	1.1	-	-	-	1.0	-	-	-	-	-	-	-
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	61.0	74.2	-	94.9	-	-
Riffle Slope (ft/ft)				0.006	0.016	-	0.030	-	-	0.011	0.017	-	0.021	-	-	0.011	0.017	0.020	0.013	0.019	-	0.024	-	-
Pool Length (ft)				5.7	23.7	-	46.7	-	-	13.0	18.0	-	20.9	-	-	29.7	43.3	50.2	26.7	39.8	-	57.1	-	-
Pool Max Depth (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	3.1	-	2.1	2.5	-	3.0	-	-
Pool Spacing (ft)				25.4	59.5	-	108.9	-	-	79.5	88.2	-	97.0	-	-	110.0	126.0	134.0	76.4	106.9	-	141.1	-	-
Pattern																								
Channel Belt Width (ft)				-	-	-	-	-	-	22.0	37.2	-	57.1	-	-	30.0	51.0	78.0	60.0	75.0	-	100.0	-	-
Radius of Curvature (ft)				-	-	-	-	-	-	18.0	25.0	-	42.8	-	-	24.0	34.0	58.0	-	-	-	-	-	-
Rc: Bankfull Width (ft/ft)				-	-	-	-	-	-	1.5	2.1	-	3.6	-	-	-	2.1	-	-	-	-	-	-	-
Meander Wavelength (ft)				-	-	-	-	-	-	78.6	107.1	-	149.9	-	-	107.0	145.0	205.0	200.0	254.0	-	340.0	-	-
Meander Width Ratio				-	-	-	-	-	-	1.9	3.2	-	4.8	-	-	1.9	3.2	4.8	5.6	6.4	-	7.9	-	-
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					C4 - G4						E4						C4			C				
Bankfull Velocity (fps)	-				-						-						-			-				
Bankfull Discharge (cfs)	-				-						-						-			-				
Valley Length (ft)					-						200						690			682				
Channel Thalweg Length (ft)					-						288						832			926				
Sinuosity					1.01 - 1.06						1.44						1.20			1.36				
Water Surface Slope (Channel) (ft/ft)					0.006 - 0.015						0.012						0.012			0.014				
Bankfull Slope (ft/ft)					-						-						-			0.013				
Bankfull Floodplain Area (acres)																								
% of Reach with Eroding Banks																								
Channel Stability or Habitat Metric																								
Channel Stability or Habitat Metric																								
Biological or Other																								

- Information unavailable.
Non-Applicable.

Table 10. Baseline Stream Data Summary
Cat Creek Stream & Wetland / Project No. 71 - Cat Creek Parker (1,820 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			Monitoring Baseline					
Dimension & Substrate - Riffle	**LL**	**UL**	**Eq.**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**
Bankfull Width (ft)	-	-	-	-	18.5	-	-	-	-	-	26.0	-	-	-	-	-	21.5	-	18.0	21.4	-	24.4	-	-
Floodprone Width (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	140.0	200.0	-	280.0	-	-
Bankfull Mean Depth (ft)	-	-	-	-	2.2	-	-	-	-	-	2.5	-	-	-	-	-	1.8	-	1.2	1.3	-	1.5	-	-
Bankfull Max Depth (ft)				-	3.8	-	-	-	-	-	-	-	-	-	-	-	2.6	-	1.9	2.2	-	2.6	-	-
Bankfull Cross Sectional Area (ft^2)	-			-	40.3	-	-	-	-	-	65.0	-	-	-	-	-	39.0	-	22.3	28.5	-	33.0	-	-
Width/Depth Ratio				-	8.5	-	-	-	-	-	10.4	-	-	-	-	-	11.9	-	13.9	16.3	-	21.3	-	-
Entrenchment Ratio				-	5.7	-	-	-	-	-	5.0	-	-	-	-	-	>2.2	-	6.8	9.4	-	10.7	-	-
Bank Height Ratio				-	1.4	-	-	-	-	-	-	-	-	-	-	-	1.0	-	-	-	-	-	-	-
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31.8	62.9	-	116.8	-	-
Riffle Slope (ft/ft)				0.009	0.007	-	0.016	-	-	0.009	0.010	-	0.010	-	-	0.005	0.007	0.009	0.011	0.017	-	0.035	-	-
Pool Length (ft)				17.7	29.2	-	40.7	-	-	53.9	90.5	-	158.1	-	-	39.4	57.4	66.7	44.8	82.1	-	112.1	-	-
Pool Max Depth (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	4.0	-	2.6	3.6	-	4.7	-	-
Pool Spacing (ft)				54.3	72.3	-	90.2	-	-	-	158.1	-	-	-	-	147.0	167.0	178.0	99.0	168.0	-	230.0	-	-
Pattern																								
Channel Belt Width (ft)				-	-	-	-	-	-	71.0	91.3	-	118.0	-	-	40.0	68.0	104.0	53.0	88.0	-	125.0	-	-
Radius of Curvature (ft)				-	-	-	-	-	-	23.6	48.3	-	73.0	-	-	32.7	45.6	77.8	-	-	-	-	-	-
Rc: Bankfull Width (ft/ft)				-	-	-	-	-	-	0.9	1.9	-	2.9	-	-	-	2.1	-	-	-	-	-	-	-
Meander Wavelength (ft)				-	-	-	-	-	-	82.0	205.0	-	484.0	-	-	143.0	194.0	273.0	185.0	259.0	-	345.0	-	-
Meander Width Ratio				-	-	-	-	-	-	2.7	3.5	-	4.5	-	-	6.7	9.0	12.7	2.9	4.1	-	5.1	-	-
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							G4						C4				C4					C		
Bankfull Velocity (fps)	-						-						-				-					-		
Bankfull Discharge (cfs)	-						-						-				-					-		
Valley Length (ft)							2,150						142				1,480					1,120		
Channel Thalweg Length (ft)							2,280						271				1,809					1,820		
Sinuosity							1.06						1.90				1.22					1.63		
Water Surface Slope (Channel) (ft/ft)							0.006						0.010				0.005					0.006		
Bankfull Slope (ft/ft)							-						-				-					0.007		
Bankfull Floodplain Area (acres)																								
% of Reach with Eroding Banks																								
Channel Stability or Habitat Metric																								
Channel Stability or Habitat Metric																								
Biological or Other																								

- Information unavailable.
Non-Applicable.

Table 10. Baseline Stream Data Summary
Cat Creek Stream & Wetland / Project No. 71 - Cat Creek UT1 (457 feet)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data						Design			Monitoring Baseline					
Dimension & Substrate - Riffle	**LL**	**UL**	**Eq.**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**	**Min**	**Mean**	**Max**	**Min**	**Mean**	**Med**	**Max**	**SD**	**N**
Bankfull Width (ft)	-	-	-	-	16.0	-	-	-	-	-	11.8	-	-	-	-	-	15.0	-	-	16.6	-	-	-	-
Floodprone Width (ft)				-	54.0	-	-	-	-	-	332.0	-	-	-	-	-	>33.0	-	-	85.0	-	-	-	-
Bankfull Mean Depth (ft)	-	-	-	-	1.3	-	-	-	-	-	1.3	-	-	-	-	-	1.3	-	-	0.8	-	-	-	-
Bankfull Max Depth (ft)				-	2.2	-	-	-	-	-	2.1	-	-	-	-	-	1.8	-	-	1.6	-	-	-	-
Bankfull Cross Sectional Area (ft^2)		-		-	20.2	-	-	-	-	-	15.3	-	-	-	-	-	18.9	-	-	13.1	-	-	-	-
Width/Depth Ratio				-	12.7	-	-	-	-	-	9.1	-	-	-	-	-	11.9	-	-	21.0	-	-	-	-
Entrenchment Ratio				-	3.4	-	-	-	-	-	28.1	-	-	-	-	-	>2.2	-	-	5.1	-	-	-	-
Bank Height Ratio				-	1.4	-	-	-	-	1.0	1.0	-	1.1	-	-	-	1.0	-	-	-	-	-	-	-
Profile																								
Riffle Length (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19.0	29.0	-	45.1	-	-
Riffle Slope (ft/ft)				0.009	0.040	-	0.100	-	-	0.011	0.017	-	0.021	-	-	0.011	0.018	0.021	0.017	0.029	-	0.048	-	-
Pool Length (ft)				9.9	13.0	-	16.2	-	-	13.0	18.0	-	20.9	-	-	27.5	40.1	46.5	19.3	33.0	-	49.1	-	-
Pool Max Depth (ft)				-	-	-	-	-	-	-	-	-	-	-	-	-	2.8	-	2.1	2.3	-	2.7	-	-
Pool Spacing (ft)				43.4	68.8	-	91.7	-	-	79.5	88.2	-	97.0	-	-	102.0	117.0	124.0	45.1	65.3	-	95.6	-	-
Pattern																								
Channel Belt Width (ft)										22.0	37.2	-	57.1	-	-	28.0	47.0	72.0	35.0	49.0	-	55.0	-	-
Radius of Curvature (ft)										18.0	25.0	-	42.8	-	-	22.8	135.2	54.3	-	-	-	-	-	-
Rc: Bankfull Width (ft/ft)										1.5	2.1	-	3.6	-	-	-	9.0	-	-	-	-	-	-	-
Meander Wavelength (ft)										78.6	107.1	-	149.9	-	-	99.0	131.0	190.0	129.0	155.0	-	180.0	-	-
Meander Width Ratio										1.9	3.2	-	4.8	-	-	1.9	3.2	4.8	-	3.0	-	-	-	-
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					Cb4						E4						Cb4			C				
Bankfull Velocity (fps)		-			-						-						-			-				
Bankfull Discharge (cfs)		-			-						-						-			-				
Valley Length (ft)					440						200						490			400				
Channel Thalweg Length (ft)					470						288						581			457				
Sinuosity					1.06						1.40						1.20			1.14				
Water Surface Slope (Channel) (ft/ft)					0.021						0.012						0.013			-				
Bankfull Slope (ft/ft)					-						-						-			0.015				
Bankfull Floodplain Area (acres)																								
% of Reach with Eroding Banks																								
Channel Stability or Habitat Metric																								
Channel Stability or Habitat Metric																								
Biological or Other																								

- Information unavailable.
Non-Applicable.

Table 11a. Monitoring Data - Dimensional Morphology Summary
(Dimensional Parameters - Cross-Sections)
Cat Creek Stream & Wetland / Project No. 71 - Cat Creek Swartwout (810 feet)

	*Cross-Section 1 Riffle						*Cross-Section 2 Pool						*Cross-Section 3 Riffle					
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
Record Elevation (datum) Used	2109.5	2109.5	2109.8				2106.8	2106.8	2107.0				2107.6	2107.6	2106.5			
Bankfull Width (ft)	10.8	12.0	12.7				18.3	22.0	18.6				12.6	13.3	12.7			
Floodprone Width (ft)	45.0	45.0	>100.0				60.0	60.0	>100.0				45.0	45.0	>100.0			
Bankfull Mean Depth (ft)	0.7	0.6	0.6				0.9	0.8	0.8				0.9	0.9	0.8			
Bankfull Max Depth (ft)	1.2	1.2	1.1				2.2	2.7	2.1				1.4	1.5	1.4			
Bankfull Cross Sectional Area (ft^2)	7.9	7.6	7.0				17.0	16.9	14.2				11.8	12.0	10.4			
Bankfull Width/Depth Ratio	14.7	18.7	23.1				19.7	28.6	24.3				13.4	14.8	15.6			
Bankfull Entrenchment Ratio	4.2	3.8	>7.9				3.3	2.7	>5.4				3.6	3.4	>7.8			
Bankfull Bank Height Ratio	-	-	1.0				-	-	1.0				-	-	1.0			
Cross Sectional Area between End Pins (ft^2)	-	-	7.2				-	-	14.2				-	-	10.4			
d50 (mm)	0.50	19.30	1.50				0.21	0.06	0.47				0.30	0.19	4.00			

- Information unavailable.
*Elevation data was offset to match MY2 data

Table 11a. Monitoring Data - Dimensional Morphology Summary
(Dimensional Parameters - Cross-Sections)
Cat Creek Stream & Wetland / Project No. 71 - Cat Creek Parker (1,672 feet)

	Cross-Section 4 Pool						Cross-Section 5 Riffle						Cross-Section 6 Pool						Cross-Section 7 Riffle					
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
Record Elevation (datum) Used	2075.0	2075.0	2075.5				2073.1	2073.1	2073.1				2073.1	2073.1	2073.1				2071.1	2071.2	2071.2			
Bankfull Width (ft)	24.9	26.0	31.3				24.4	24.1	26.0				28.4	28.6	27.9				22.5	24.0	23.0			
Floodprone Width (ft)	80.0	80.0	>200				180.0	180.0	>200.0				160.0	160.0	>200.0				240.0	270.0	>200.0			
Bankfull Mean Depth (ft)	1.2	1.1	1.2				1.2	1.1	1.1				1.7	1.7	1.6				1.5	1.5	1.4			
Bankfull Max Depth (ft)	2.5	2.5	3.0				1.9	1.9	2.0				3.3	3.3	3.3				2.6	2.7	2.6			
Bankfull Cross Sectional Area (ft^2)	28.9	28.2	38.2				28.2	26.6	27.8				47.9	48.0	45.5				33.0	34.8	33.3			
Bankfull Width/Depth Ratio	21.5	23.8	25.6				21.3	21.7	24.3				16.8	17.0	17.1				15.3	16.5	16.0			
Bankfull Entrenchment Ratio	3.2	3.1	>6.4				7.4	7.5	>7.7				5.6	5.6	>7.2				10.7	11.3	>8.7			
Bankfull Bank Height Ratio	-	-	1.0				-	-	1.0				-	-	1.0				-	-	1.0			
Cross Sectional Area between End Pins (ft^2)	-	-	38.2				-	-	27.8				-	-	45.5				-	-	36.4			
d50 (mm)	0.36	0.14	0.44				0.46	0.24	8.90				0.29	0.14	0.56				1.80	0.11	0.06			

N/A - Item does not apply.
- Information unavailable.

Table 11a. Monitoring Data - Dimensional Morphology Summary
(Dimensional Parameters - Cross-Sections)
Cat Creek Stream & Wetland / Project No. 71 - Cat Creek Parker (1,672 feet)

	Cross-Section 8 Riffle						Cross-Section 9 Pool						Cross-Section 10 Riffle						*Cross-Section 11 Pool					
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
Record Elevation (datum) Used	2068.4	2068.7	2069.2				2066.5	2066.5	2067.2				2066.1	2066.2	2066.4				2065.2	2065.2	2065.7			
Bankfull Width (ft)	18.0	20.7	32.6				15.7	18.5	30.6				20.6	23.6	25.9				23.6	23.7	37.3			
Floodprone Width (ft)	170.0	170.0	>200.0				260.0	260.0	>200.0				140.0	140.0	>200.0				140.0	140.0	>200.0			
Bankfull Mean Depth (ft)	1.2	1.2	1.1				1.6	1.6	1.3				1.5	1.2	1.3				1.4	1.4	1.2			
Bankfull Max Depth (ft)	2.0	2.3	2.6				2.9	3.1	3.7				2.4	2.2	2.5				2.8	2.7	3.1			
Bankfull Cross Sectional Area (ft^2)	22.3	23.8	35.5				25.7	29.7	40.8				30.4	28.8	33.2				33.0	32.4	45.0			
Bankfull Width/Depth Ratio	14.5	18.0	29.9				9.7	11.5	23.0				13.9	19.4	20.3				16.9	17.3	31.0			
Bankfull Entrenchment Ratio	9.4	8.2	>6.1				16.6	14.1	>6.5				6.8	5.9	>7.7				5.9	5.9	>5.4			
Bankfull Bank Height Ratio	-	-	1.0				-	-	1.0				-	-	1.0				-	-	1.0			
Cross Sectional Area between End Pins (ft^2)	-	-	35.5				-	-	40.8				-	-	35.4				-	-	45.0			
d50 (mm)	1.33	2.00	2.00				0.34	0.26	0.41				0.45	32.45	7.30				0.18	0.05	0.36			

- Information unavailable.
*Elevation data was offset to match MY2 data

Table 11a. Monitoring Data - Dimensional Morphology Summary
(Dimensional Parameters - Cross-Sections)
Cat Creek Stream & Wetland / Project No. 71 - Cat Creek UT1 (396 feet)

	*Cross-Section 1 Riffle						*Cross-Section 2 Pool					
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
Record Elevation (datum) Used	2107.9	2107.9	2108.6				2105.8	2105.8	2106.2			
Bankfull Width (ft)	16.6	20.9	19.5				16.6	17.9	16.3			
Floodprone Width (ft)	85.0	85.0	>100.0				200.0	200.0	>100.0			
Bankfull Mean Depth (ft)	0.8	0.8	0.8				0.8	0.6	0.7			
Bankfull Max Depth (ft)	1.6	1.8	1.9				2.2	1.7	2.1			
Bankfull Cross Sectional Area (ft^2)	13.1	15.8	16.3				12.1	11.1	12.0			
Bankfull Width/Depth Ratio	21.0	27.5	23.3				21.8	28.9	22.2			
Bankfull Entrenchment Ratio	5.1	4.1	>5.1				12.1	11.2	>6.1			
Bankfull Bank Height Ratio	-	-	1.0				-	-	1.0			
Cross Sectional Area between End Pins (ft^2)	-	-	16.3				-	-	14.5			
d50 (mm)	0.19	24.95	4.90				0.11	0.06	0.33			

- Information unavailable.
*Elevation data was offset to match MY2 data

Table 11b. Monitoring Data - Stream Reach Data Summary
Cat Creek Stream & Wetland / Project No.71 - Cat Creek Swartwout (810 feet)

Parameter	Baseline						MY - 1						MY - 2						MY - 3						MY - 4						MY - 5					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	10.8	11.7	-	12.6	-	-	12.0	17.0	-	22.0	-	-	12.7	12.7	12.7	12.7	N/A	2																		
Floodprone Width (ft)	45.0	46.0	-	47.0	-	-	45.0	45.0	-	45.0	-	-	>100.0	>100.0	>100.0	>100.0	N/A	2																		
Bankfull Mean Depth (ft)	0.7	0.8	-	0.9	-	-	0.6	0.8	-	0.9	-	-	0.6	0.7	0.7	0.8	N/A	2																		
Bankfull Max Depth (ft)	1.2	1.3	-	1.4	-	-	1.2	1.3	-	1.5	-	-	1.1	1.3	1.3	1.4	N/A	2																		
Bankfull Cross-Sectional Area (ft^2)	7.9	9.9	-	11.8	-	-	7.6	9.8	-	12.0	-	-	7.0	8.7	8.7	10.4	N/A	2																		
Width/Depth Ratio	13.4	14.1	-	14.7	-	-	14.8	16.7	-	18.7	-	-	15.6	19.4	19.4	23.1	N/A	2																		
Entrenchment Ratio	-	3.9	-	-	-	-	3.4	3.6	-	3.8	-	-	>7.8	>7.9	>7.9	>7.9	N/A	2																		
Bank Height Ratio	-	-	-	-	-	-	-	-	-	-	-	-	1.0	1.0	1.0	1.0	N/A	2																		
Profile																																				
Riffle Length (ft)	61.0	74.2	-	94.9	-	-	27.5	85.7	-	150.2	-	-	16.2	48.4	53.4	81.1	20.9	9																		
Riffle Slope (ft/ft)	0.013	0.019	-	0.024	-	-	0.010	0.017	-	0.025	-	-	0.008	0.021	0.021	0.033	0.009	9																		
Pool Length (ft)	26.7	39.8	-	57.1	-	-	27.5	46.5	-	83.8	-	-	12.6	18.8	18.0	27.5	5.1	8																		
Pool Max Depth (ft)	2.1	2.5	-	3.0	-	-	1.9	2.3	-	2.6	-	-	1.5	2.2	2.2	2.9	0.5	8																		
Pool Spacing (ft)	76.4	106.9	-	141.1	-	-	105.5	133.0	-	186.0	-	-	46.4	100.6	109.3	118.8	25.4	7																		
Pattern																																				
Channel Belt Width (ft)	60.0	75.0	-	100.0	-	-							50.0	76.3	83.5	88.0	17.9	4																		
Radius of Curvature (ft)	-	-	-	-	-	-							45.0	49.5	50.5	52.0	3.3	4																		
Rc: Bankfull Width (ft/ft)	-	-	-	-	-	-							3.6	3.9	4.0	3.9	0.1	4																		
Meander Wavelength (ft)	200.0	254.0	-	340.0	-	-							198.0	261.8	244.5	360.0	69.3	4																		
Meander Width Ratio	-	6.4	-	-	-	-							3.7	5.7	6.6	6.5	1.3	4																		
Additional Reach Parameters																																				
Rosgen Classification	C						-						C5																							
Channel Thalweg Length (ft)	926						-						810																							
Sinuosity (ft)	1.36						-						1.15																							
Water Surface Slope (Channel) (ft/ft)	0.0138						-						0.0145																							
Bankfull Slope (ft/ft)	0.0129						-						0.0147																							
Ri% / Ru% / P% / G% / S%													57%	13%	20%	10%	0%																			
SC% / SA% / G% / C% / B% / Be%*													2%	58%	28%	11%	0%	0%																		
d16 / d35 / d50 / d84 / d95 (mm)																																				
% of Reach with Eroding Banks													0%																							
Channel Stability or Habitat Metric													N/A																							
Biological or Other													N/A																							

N/A - Information does not apply.
Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step
SC = Silt-Clay / SA = Sand / G = Gravel / C = Cobble / B = Boulder / Be = Bedrock
*Percentages based on riffle and pool pebble counts.
- Information unavailable

Table 11b. Monitoring Data - Stream Reach Data Summary
Cat Creek Stream & Wetland / Project No. 71 - Cat Creek Parker (1,672 feet)

Parameter	Baseline						MY - 1						MY - 2						MY - 3						MY - 4						MY - 5					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	18.0	21.4	-	24.4	-	-	20.7	23.1	-	24.1	-	-	23.0	26.9	26.0	32.6	4.1	4																		
Floodprone Width (ft)	140.0	200.0	-	280.0	-	-	140.0	200.0	-	280.0	-	-	>200.0	>200.0	>200.0	>200.0	0.0	4																		
Bankfull Mean Depth (ft)	1.2	1.3	-	1.5	-	-	1.1	1.2	-	1.5	-	-	1.1	1.2	1.2	1.4	0.2	4																		
Bankfull Max Depth (ft)	1.9	2.2	-	2.6	-	-	1.9	2.3	-	2.7	-	-	2.0	2.4	2.6	2.6	0.3	4																		
Bankfull Cross-Sectional Area (ft^2)	22.3	28.5	-	33.0	-	-	23.8	28.5	-	34.8	-	-	27.8	32.5	33.3	35.5	3.3	4																		
Width/Depth Ratio	13.9	16.3	-	21.3	-	-	16.5	18.9	-	21.7	-	-	16.0	22.6	22.3	29.9	5.9	4																		
Entrenchment Ratio	6.8	9.4	-	10.7	-	-	5.9	8.2	-	11.3	-	-	>6.1	>7.5	>7.7	>8.7	1.1	4																		
Bank Height Ratio	-	-	-	-	-	-	-	-	-	-	-	-	1.0	1.0	1.0	1.0	0.0	4																		
Profile																																				
Riffle Length (ft)	31.8	62.9	-	116.8	-	-	38.1	76.6	-	135.4	-	-	16.3	55.3	52.2	104.4	30.4	12																		
Riffle Slope (ft/ft)	0.011	0.017	-	0.035	-	-	0.007	0.014	-	0.032	-	-	0.004	0.014	0.013	0.030	0.007	13																		
Pool Length (ft)	44.8	82.1	-	112.1	-	-	38.1	71.3	-	112.4	-	-	33.1	51.2	46.6	109.9	22.3	10																		
Pool Max Depth (ft)	2.6	3.6	-	4.7	-	-	2.8	3.5	-	4.5	-	-	2.9	3.6	3.4	4.7	0.6	9																		
Pool Spacing (ft)	99.0	168.0	-	230.0	-	-	106.0	168.0	-	232.0	-	-	104.0	168.6	174.1	227.7	38.3	9																		
Pattern																																				
Channel Belt Width (ft)	53.0	88.0	-	125.0	-	-							53.0	101.4	108.5	114.0	20.2	8																		
Radius of Curvature (ft)	-	-	-	-	-	-							50.0	74.1	74.0	122.0	24.0	8																		
Rc: Bankfull Width (ft/ft)	-	-	-	-	-	-							1.9	2.8	2.8	4.5	0.9	8																		
Meander Wavelength (ft)	185.0	259.0	-	345.0	-	-							255.0	308.7	314.0	357.0	46.8	7																		
Meander Width Ratio	-	4.1	-	-	-	-							2.0	3.8	4.0	4.2	0.8	8																		
Additional Reach Parameters																																				
Rosgen Classification	C						C						C5																							
Channel Thalweg Length (ft)	1,820						1,820						1,672																							
Sinuosity (ft)	1.63						1.63						1.16																							
Water Surface Slope (Channel) (ft/ft)	0.0062						0.0062						0.0064																							
Bankfull Slope (ft/ft)	0.0066						0.0066						0.0066																							
Ri% / Ru% / P% / G% / S%													40%	13%	31%	17%	0%																			
SC% / SA% / G% / C% / B% / Be%*													8%	61%	20%	9%	1%	0%																		
d16 / d35 / d50 / d84 / d95 (mm)																																				
% of Reach with Eroding Banks													0%																							
Channel Stability or Habitat Metric													N/A																							
Biological or Other													N/A																							

N/A - Information does not apply.
Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step
SC = Silt-Clay / SA = Sand / G = Gravel / C = Cobble / B = Boulder / Be = Bedrock
*Percentages based on riffle and pool pebble counts.
- Information unavailable

Table 11b. Monitoring Data - Stream Reach Data Summary
Cat Creek Stream & Wetland / Project No. 71 - Cat Creek - UT1 (396 feet)

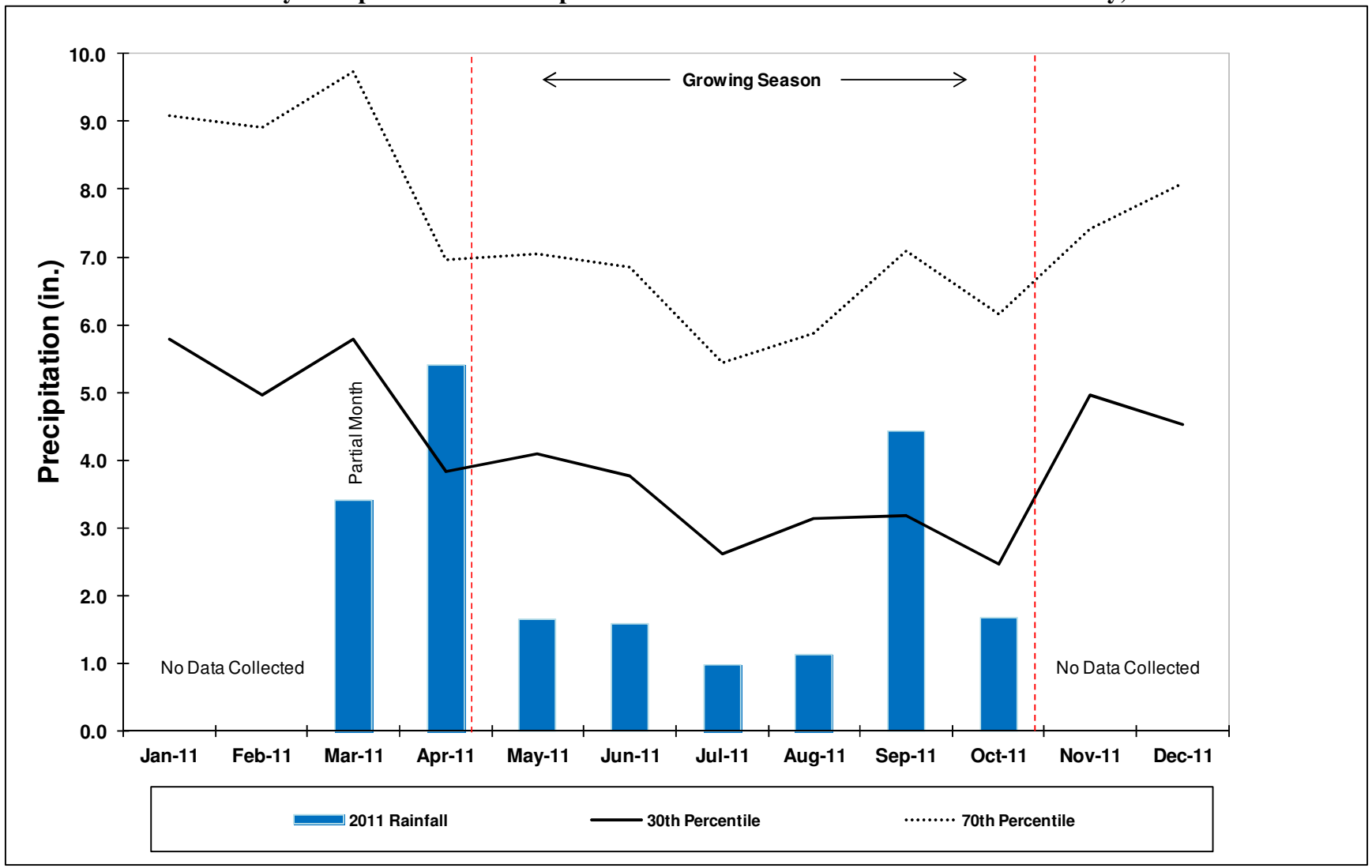
Parameter	Baseline						MY - 1						MY - 2						MY - 3						MY - 4						MY - 5					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	16.6	16.6	16.6	16.6	N/A	1	20.9	20.9	20.9	20.9	N/A	1	19.5	19.5	19.5	19.5	N/A	1																		
Floodprone Width (ft)	85.0	85.0	85.0	85.0	N/A	1	85.0	85.0	85.0	85.0	N/A	1	>100.0	>100.0	>100.0	>100.0	N/A	1																		
Bankfull Mean Depth (ft)	0.8	0.8	0.8	0.8	N/A	1	0.8	0.8	0.8	0.8	N/A	1	0.8	0.8	0.8	0.8	N/A	1																		
Bankfull Max Depth (ft)	1.6	1.6	1.6	1.6	N/A	1	1.8	1.8	1.8	1.8	N/A	1	1.9	1.9	1.9	1.9	N/A	1																		
Bankfull Cross-Sectional Area (ft^2)	13.1	13.1	13.1	13.1	N/A	1	15.8	15.8	15.8	15.8	N/A	1	16.3	16.3	16.3	16.3	N/A	1																		
Width/Depth Ratio	21.0	21.0	21.0	21.0	N/A	1	27.5	27.5	27.5	27.5	N/A	1	23.3	23.3	23.3	23.3	N/A	1																		
Entrenchment Ratio	5.1	5.1	5.1	5.1	N/A	1	4.1	4.1	4.1	4.1	N/A	1	>5.1	>5.1	>5.1	>5.1	N/A	1																		
Bank Height Ratio	-	-	-	-	-	-	-	-	-	-	-	1	1.0	1.0	1.0	1.0	N/A	1																		
Profile																																				
Riffle Length (ft)	19.0	29.0	-	45.1	-	-	13.8	28.4	-	48.0	-	-	9.2	24.1	21.3	45.6	13.6	6																		
Riffle Slope (ft/ft)	0.0170	0.0290	-	0.0480	-	-	0.0090	0.0210	-	0.0460	-	-	0.018	0.025	0.025	0.032	0.006	6																		
Pool Length (ft)	19.3	33.0	-	49.1	-	-	26.9	35.1	-	42.9	-	-	14.9	21.5	21.2	32.0	5.9	6																		
Pool Max Depth (ft)	2.06	2.3	-	2.7	-	-	1.6	2.1	-	2.6	-	-	1.6	2.4	2.4	3.0	0.6	6																		
Pool Spacing (ft)	45.1	65.3	-	95.6	-	-	40.0	63.9	-	97.0	-	-	40.5	64.3	65.0	96.3	22.2	5																		
Pattern																																				
Channel Belt Width (ft)	35.0	49.0	-	55.0	-	-							43.1	47.2	47.3	51.3	4.6	4																		
Radius of Curvature (ft)	-	-	-	-	-	-							26.0	30.4	30.8	34.0	3.8	4																		
Rc: Bankfull Width (ft/ft)	-	-	-	-	-	-							1.3	1.6	1.6	1.7	0.2	4																		
Meander Wavelength (ft)	129.0	155.0	-	180.0	-	-							124.0	157.7	166.0	183.0	30.4	3																		
Meander Width Ratio	-	3.0	-	-	-	-							2.2	2.4	2.4	2.6	0.2	4																		
Additional Reach Parameters																																				
Rosgen Classification	C						C						C5																							
Channel Thalweg Length (ft)	457						457						396																							
Sinuosity (ft)	1.14						1.14						1.07																							
Water Surface Slope (Channel) (ft/ft)	-						-						0.0136																							
Bankfull Slope (ft/ft)	0.0145						0.0145						0.0139																							
Ri% / Ru% / P% / G% / S%													37%	10%	33%	19%	2%																			
SC% / SA% / G% / C% / B% / Be%*													4%	67%	24%	6%	0%	0%																		
d16 / d35 / d50 / d84 / d95 (mm)																																				
% of Reach with Eroding Banks													0%																							
Channel Stability or Habitat Metric													N/A																							
Biological or Other													N/A																							

N/A - Information does not apply.
Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step
SC = Silt-Clay / SA = Sand / G = Gravel / C = Cobble / B = Boulder / Be = Bedrock
*Percentages based on riffle and pool pebble counts.
- Information unavailable

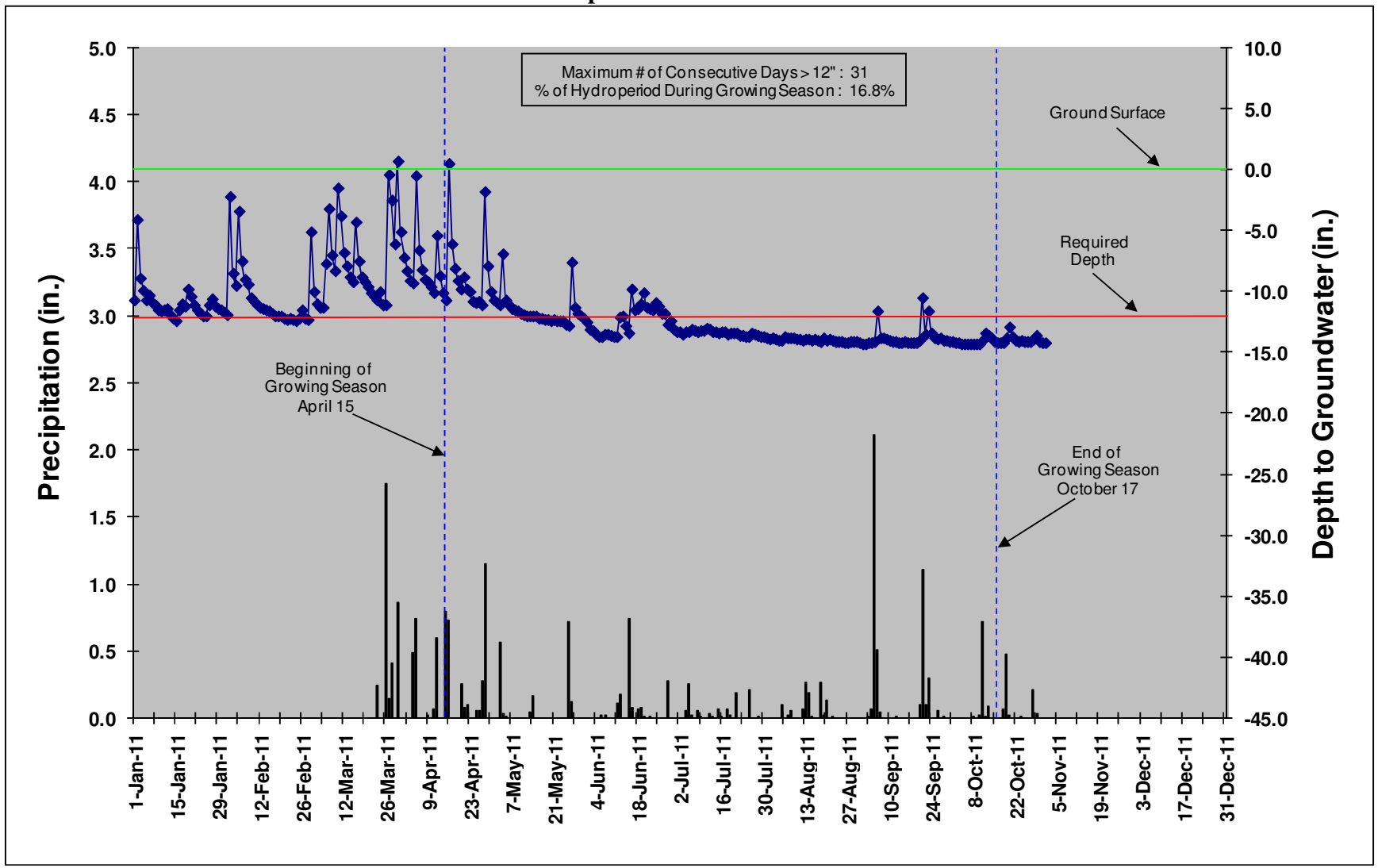
Appendix E
Hydrologic Data

Table 12. Verification of Bankfull Events Cat Creek Stream & Wetland / Project No.71			
Date of Data Collection	**Date of Occurrence**	**Method**	**Photo # (if available)**
No Events in 2010			
No Events in 2011			

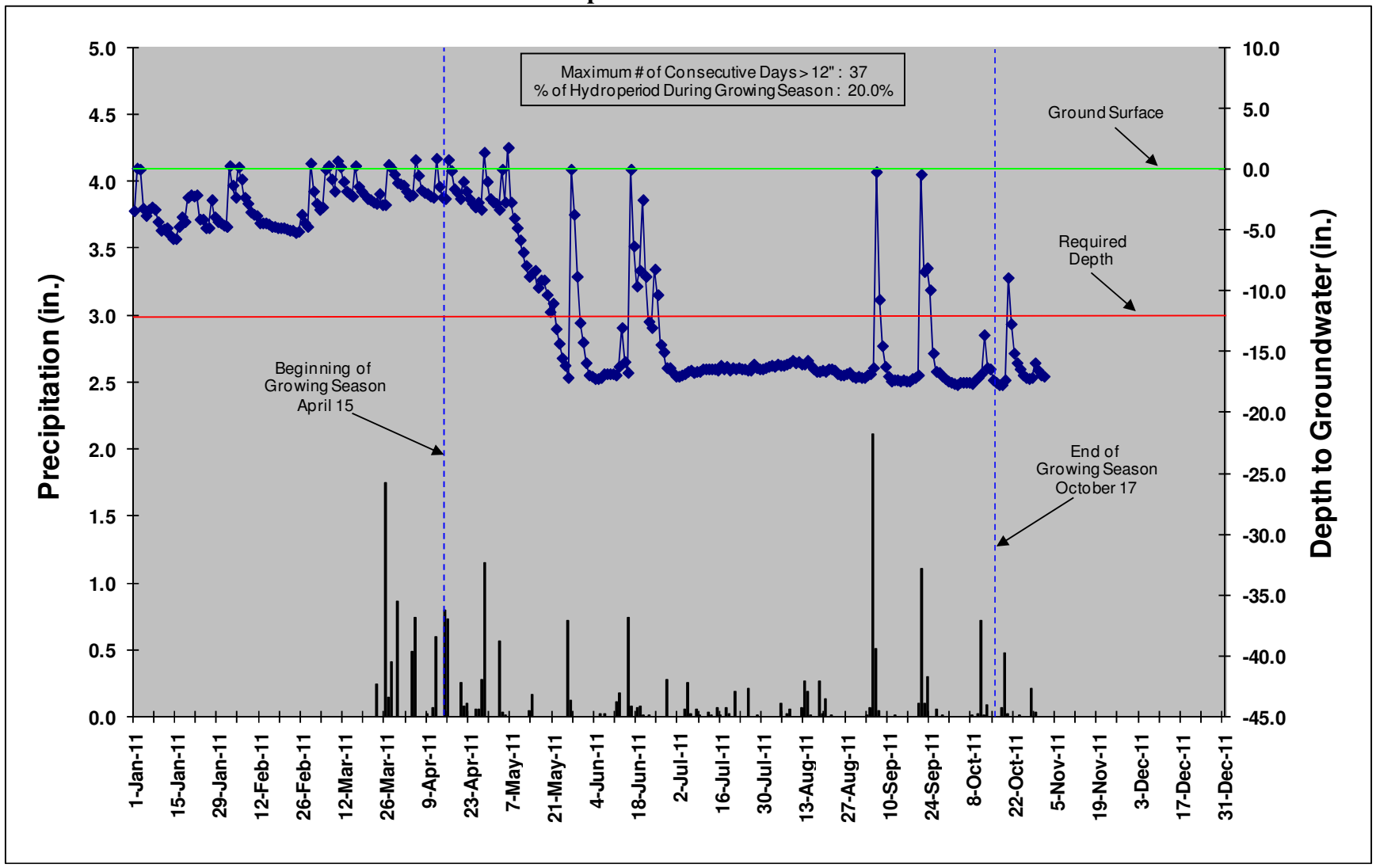
Monthly Precipitation Data Compared to 30th and 70th Percentiles for Macon County, NC



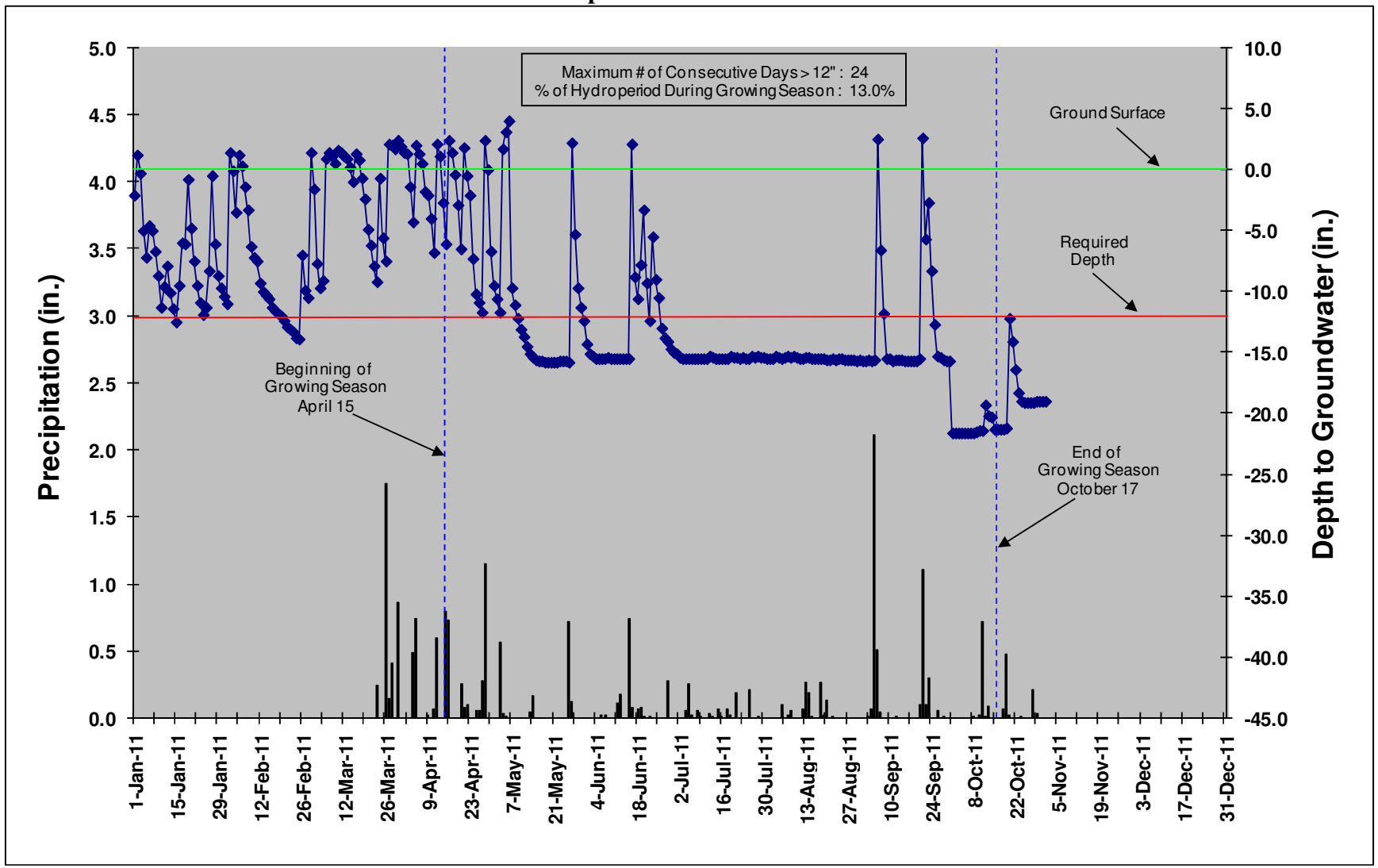
CC-1 Precipitation and Water Level Plot



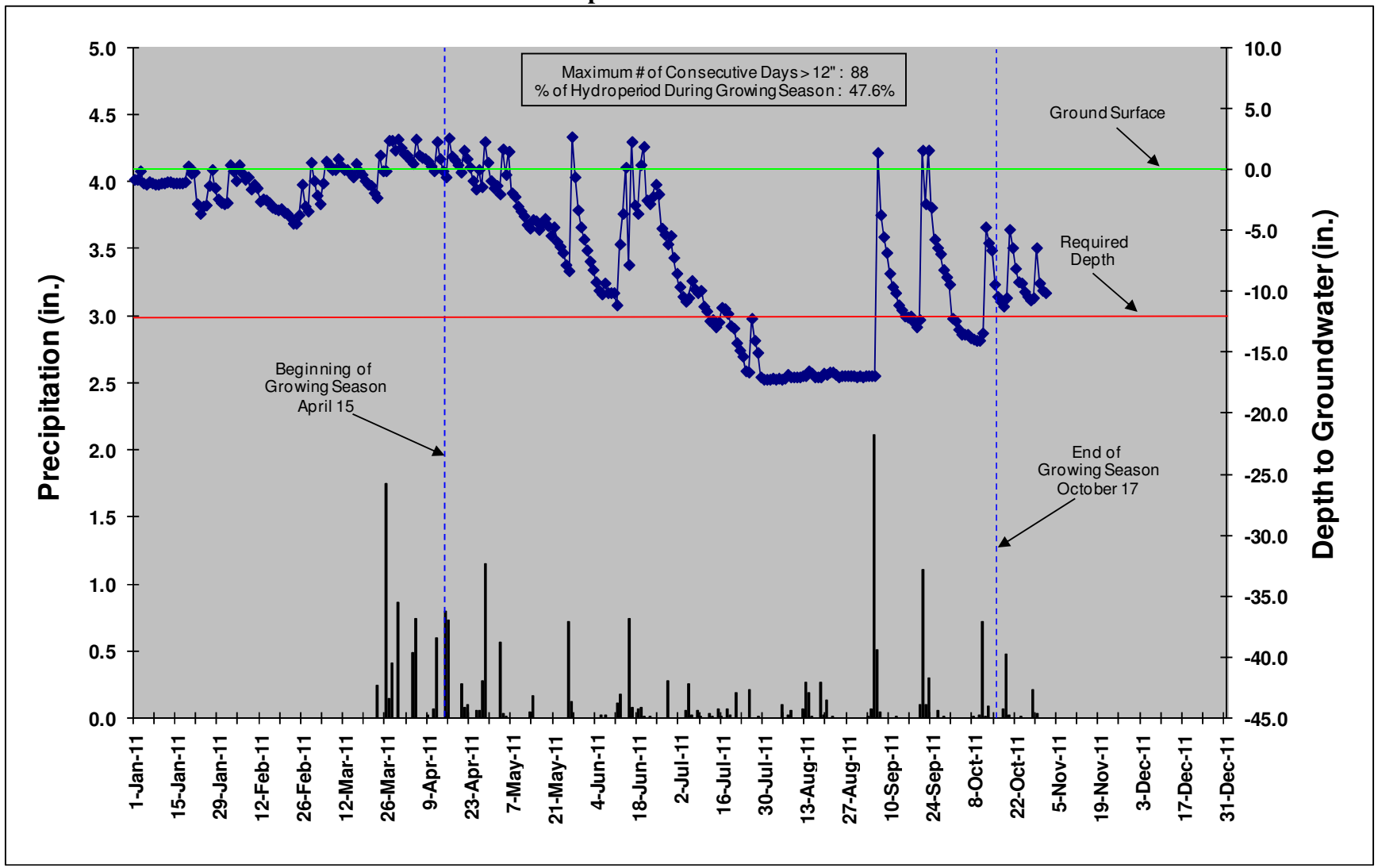
CC-2 Precipitation and Water Level Plot



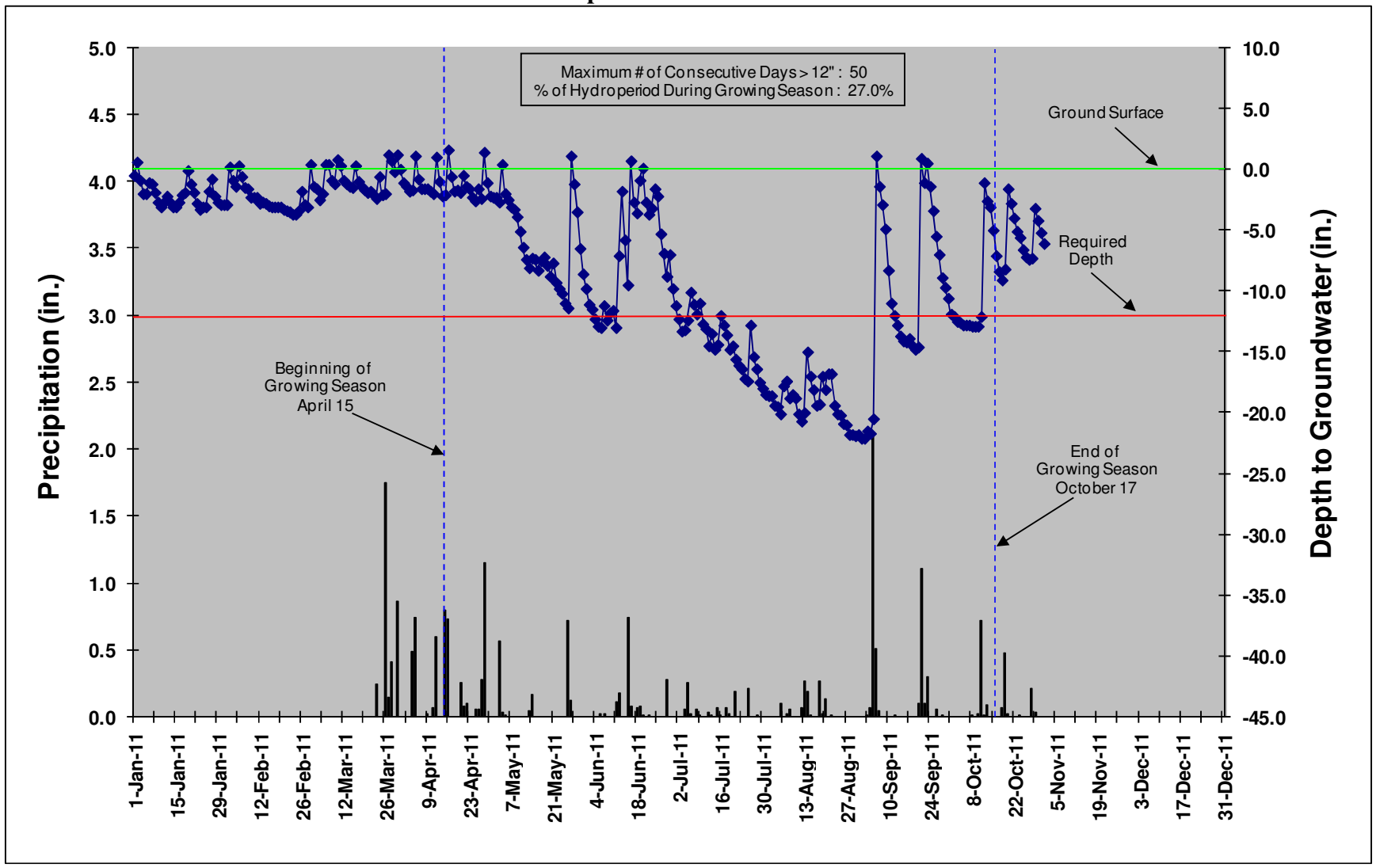
CC-3 Precipitation and Water Level Plot



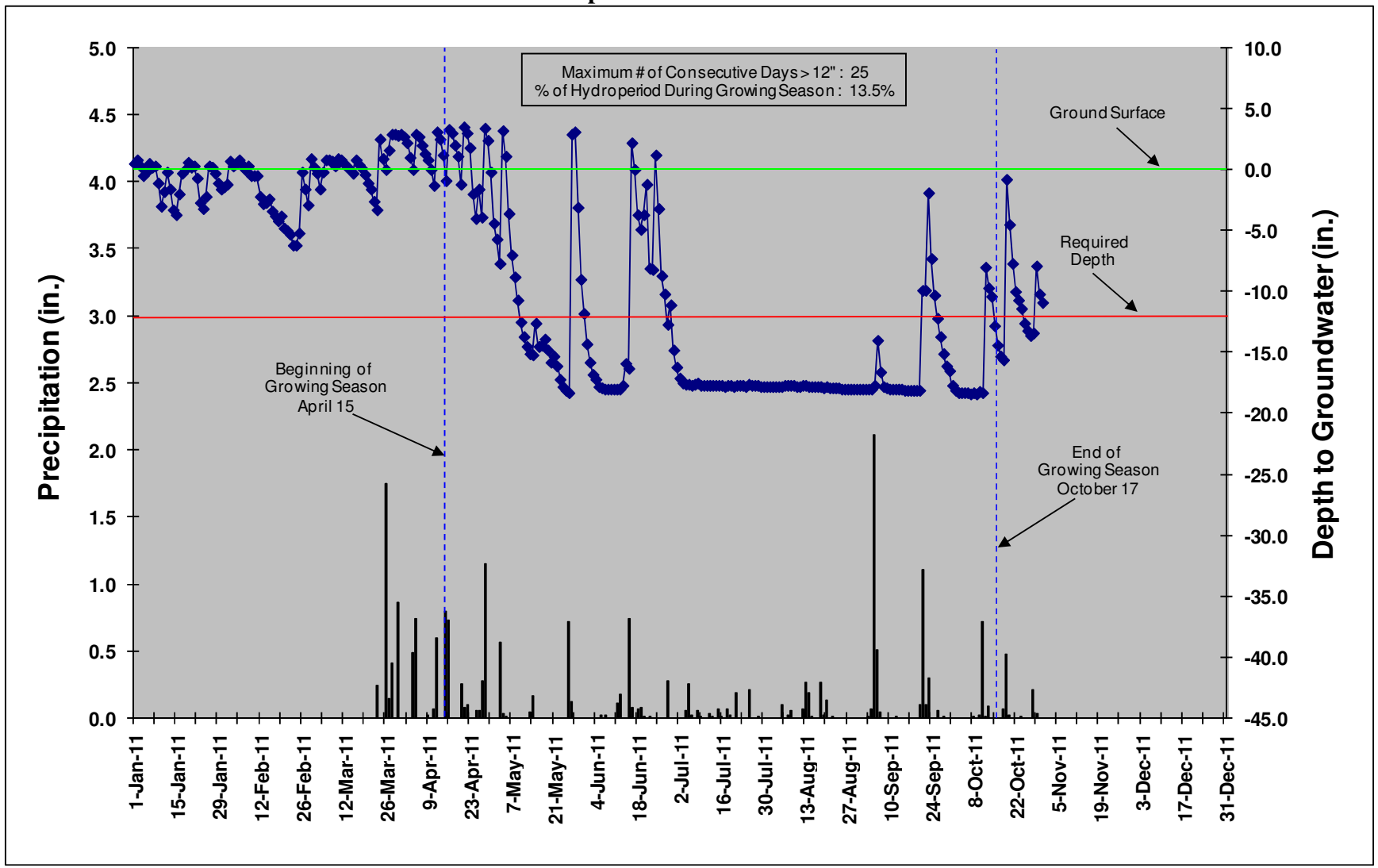
CC-4 Precipitation and Water Level Plot



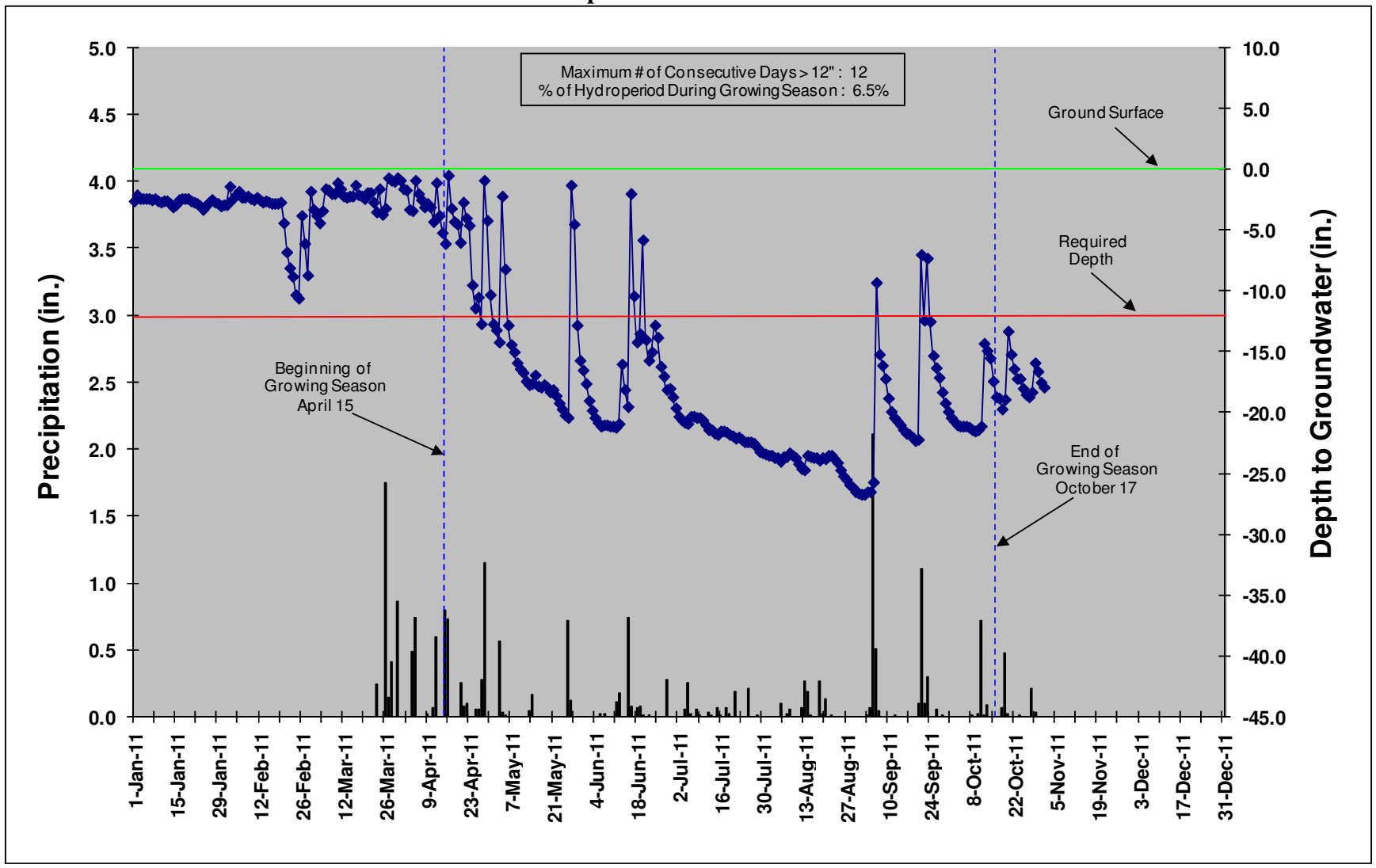
CC-5 Precipitation and Water Level Plot



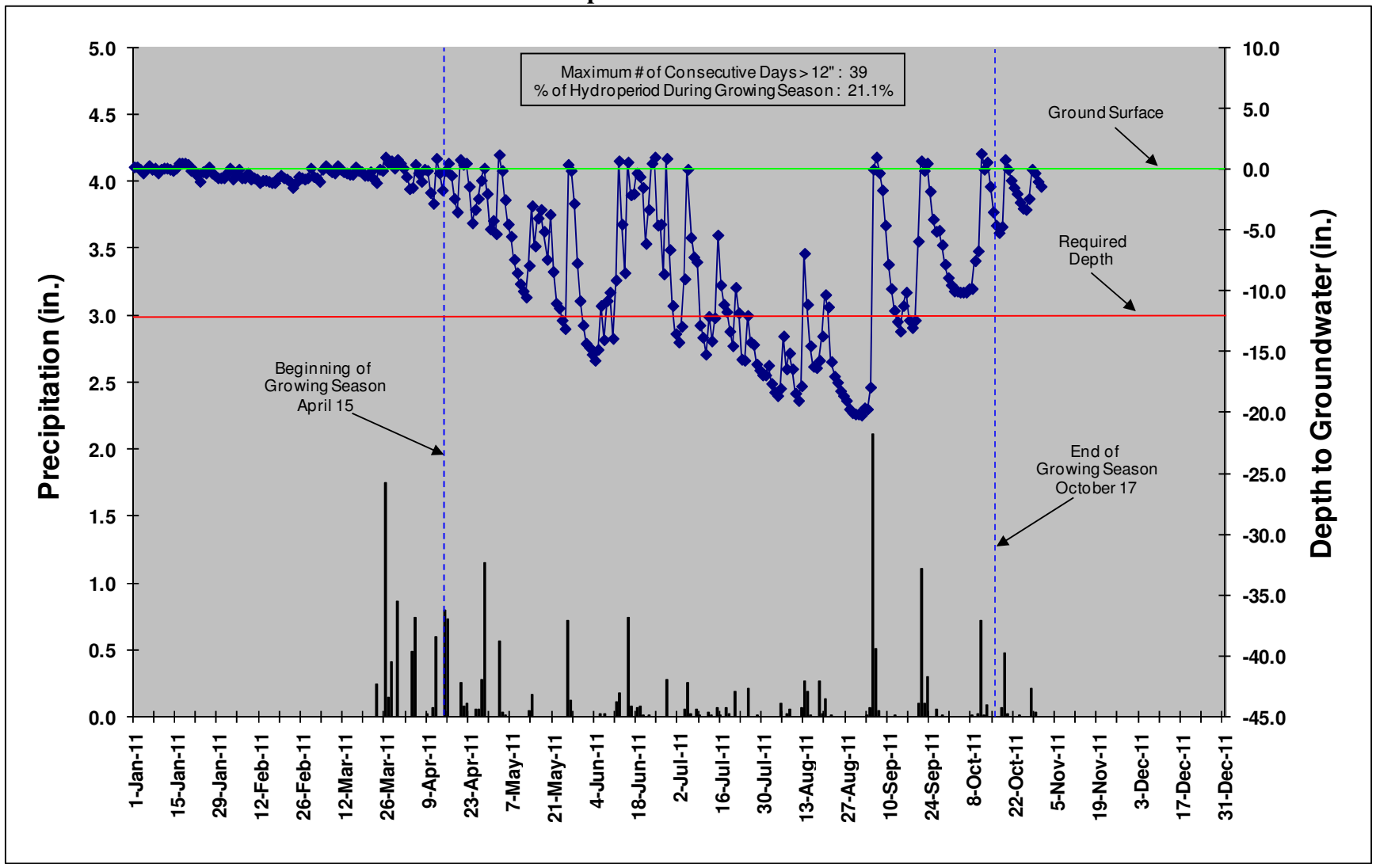
CC-6 Precipitation and Water Level Plot



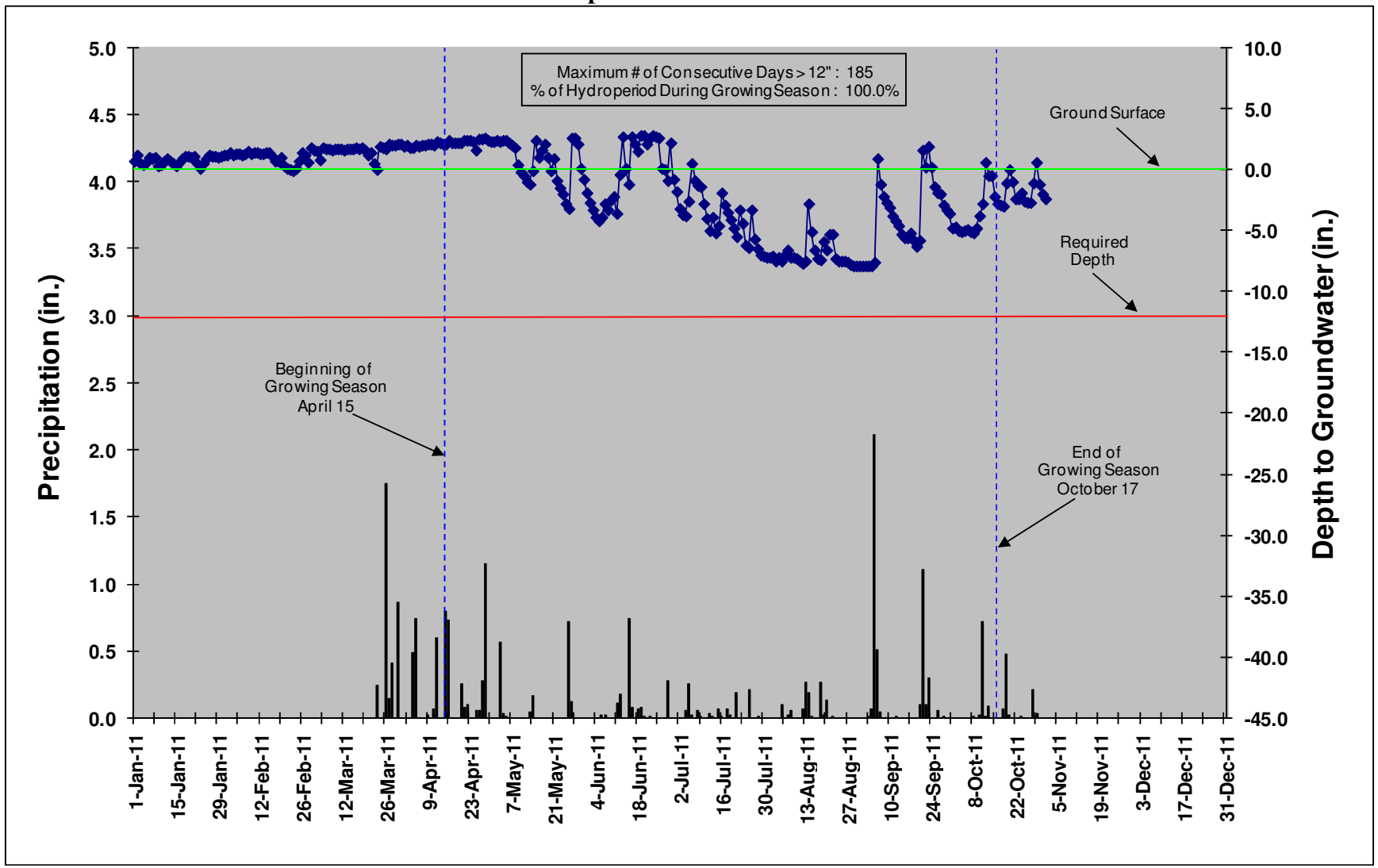
CC-7 Precipitation and Water Level Plot



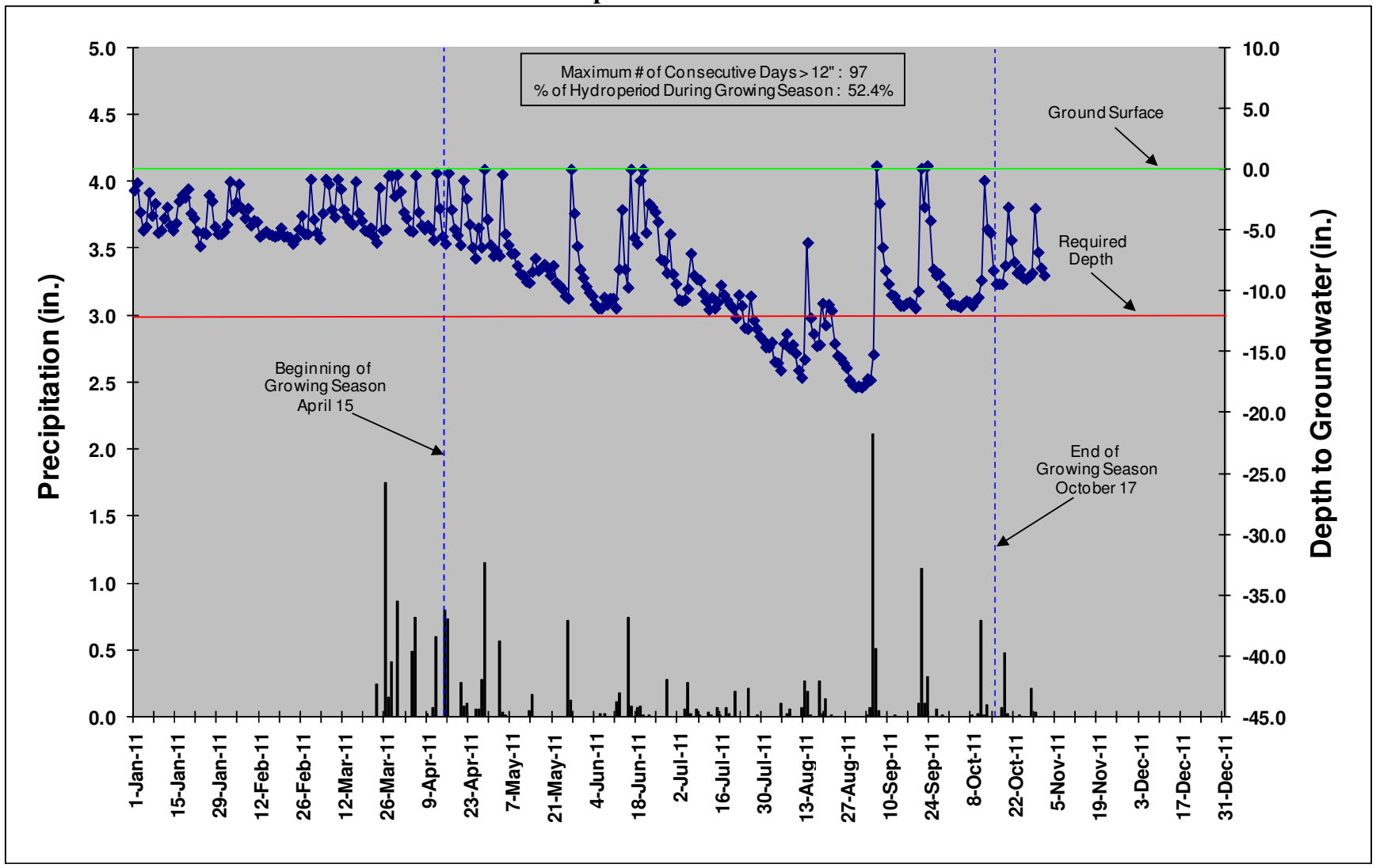
CC-8 Precipitation and Water Level Plot



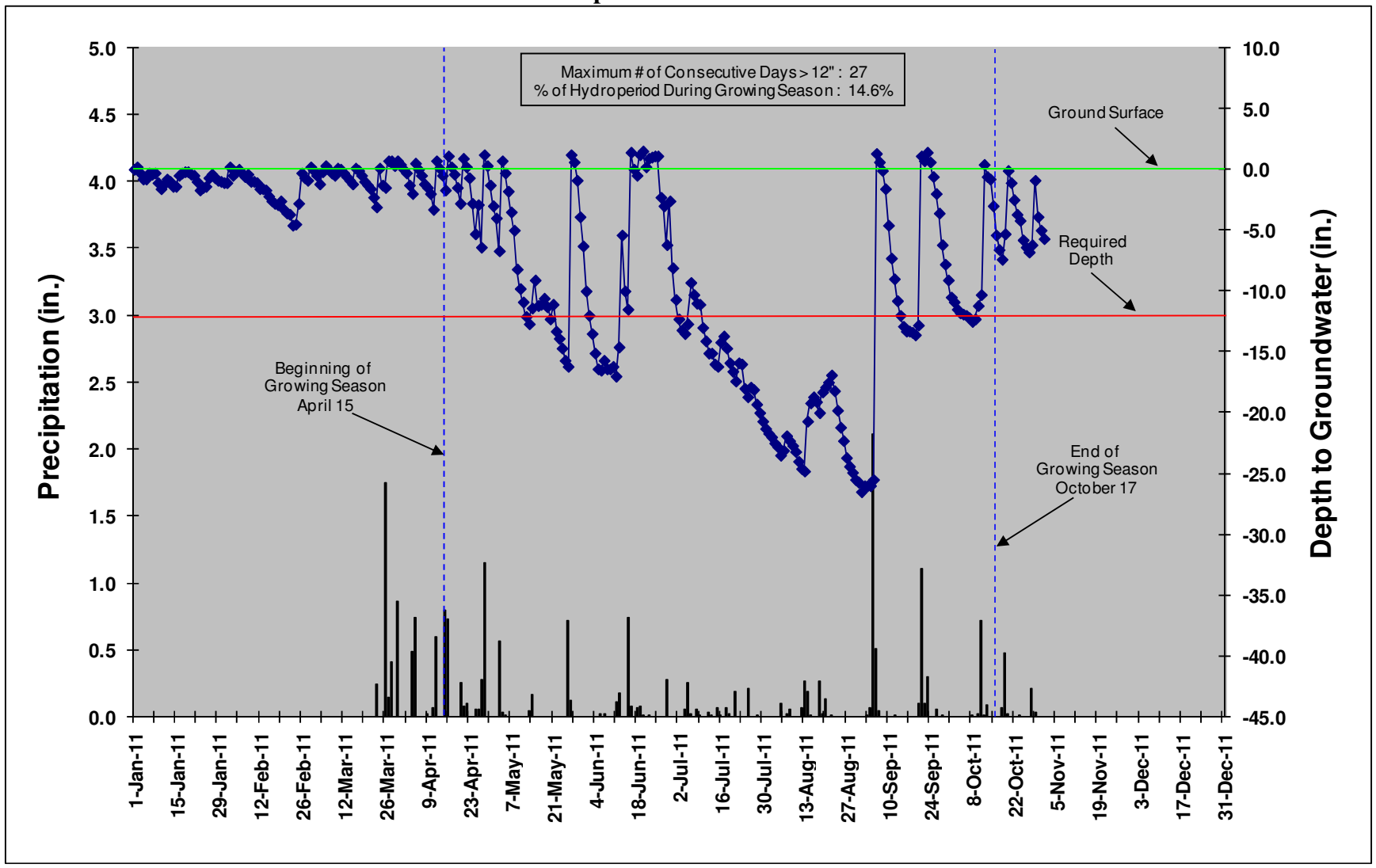
CC-9 Precipitation and Water Level Plot



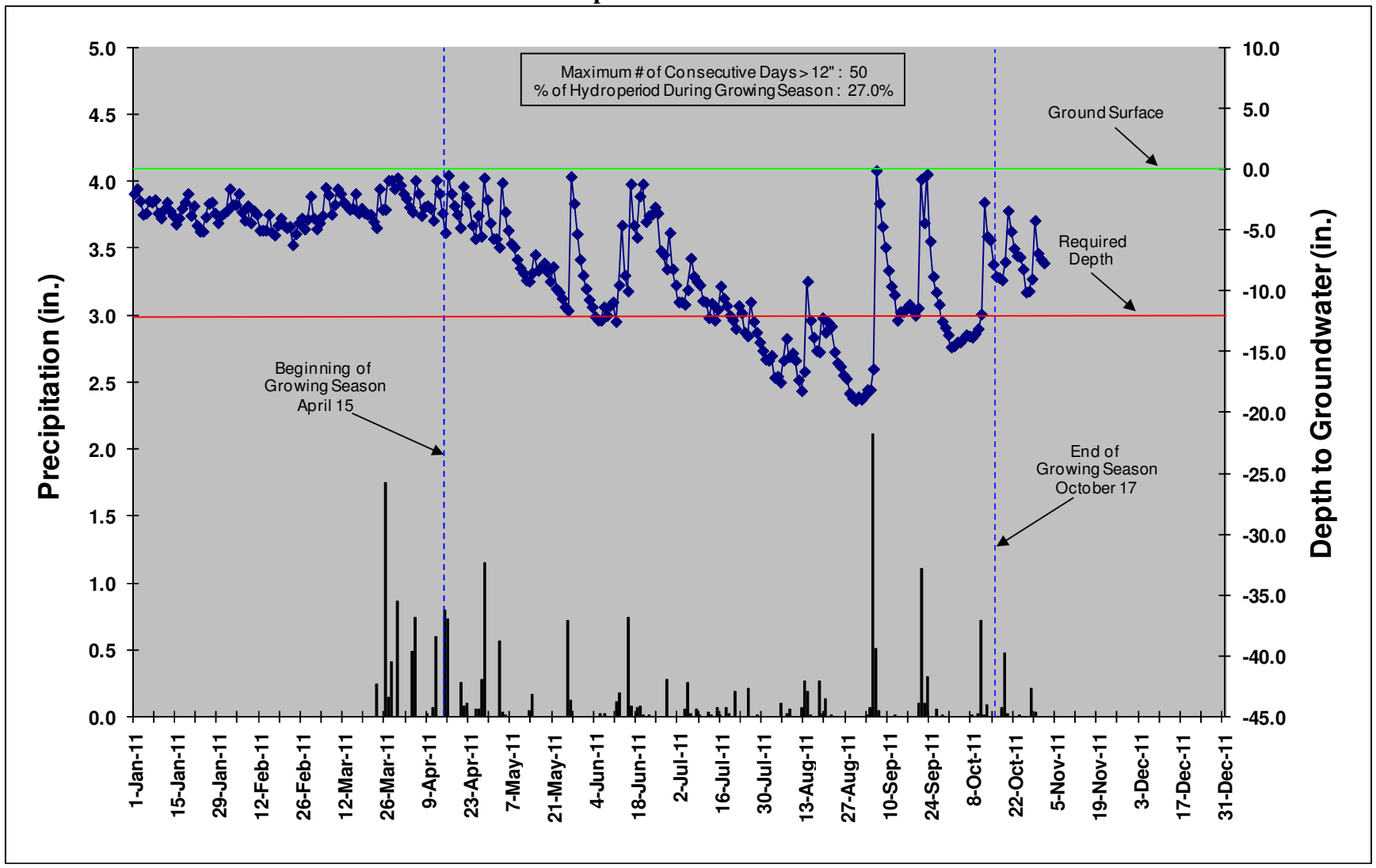
CC-10 Precipitation and Water Level Plot



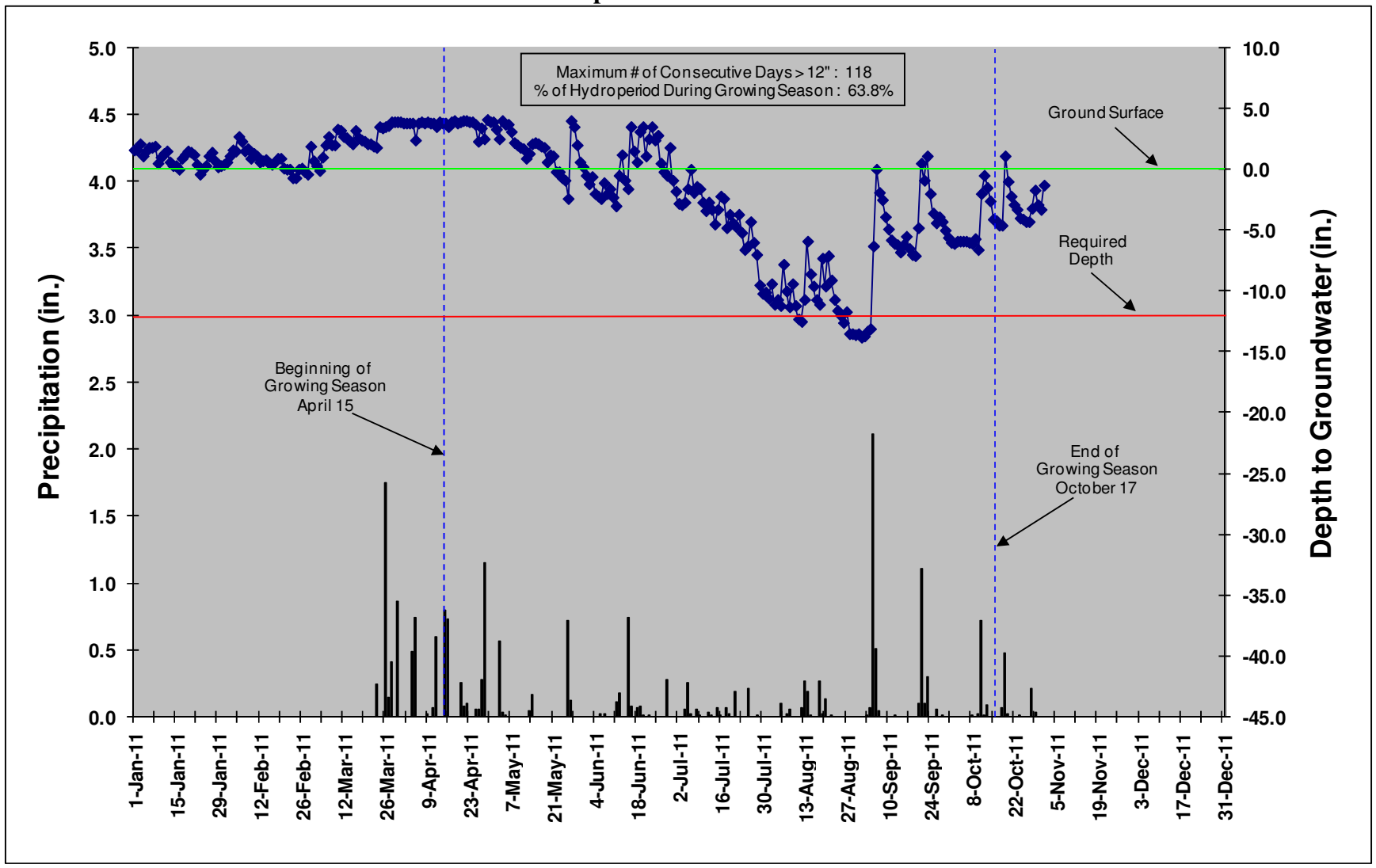
CC-11 Precipitation and Water Level Plot



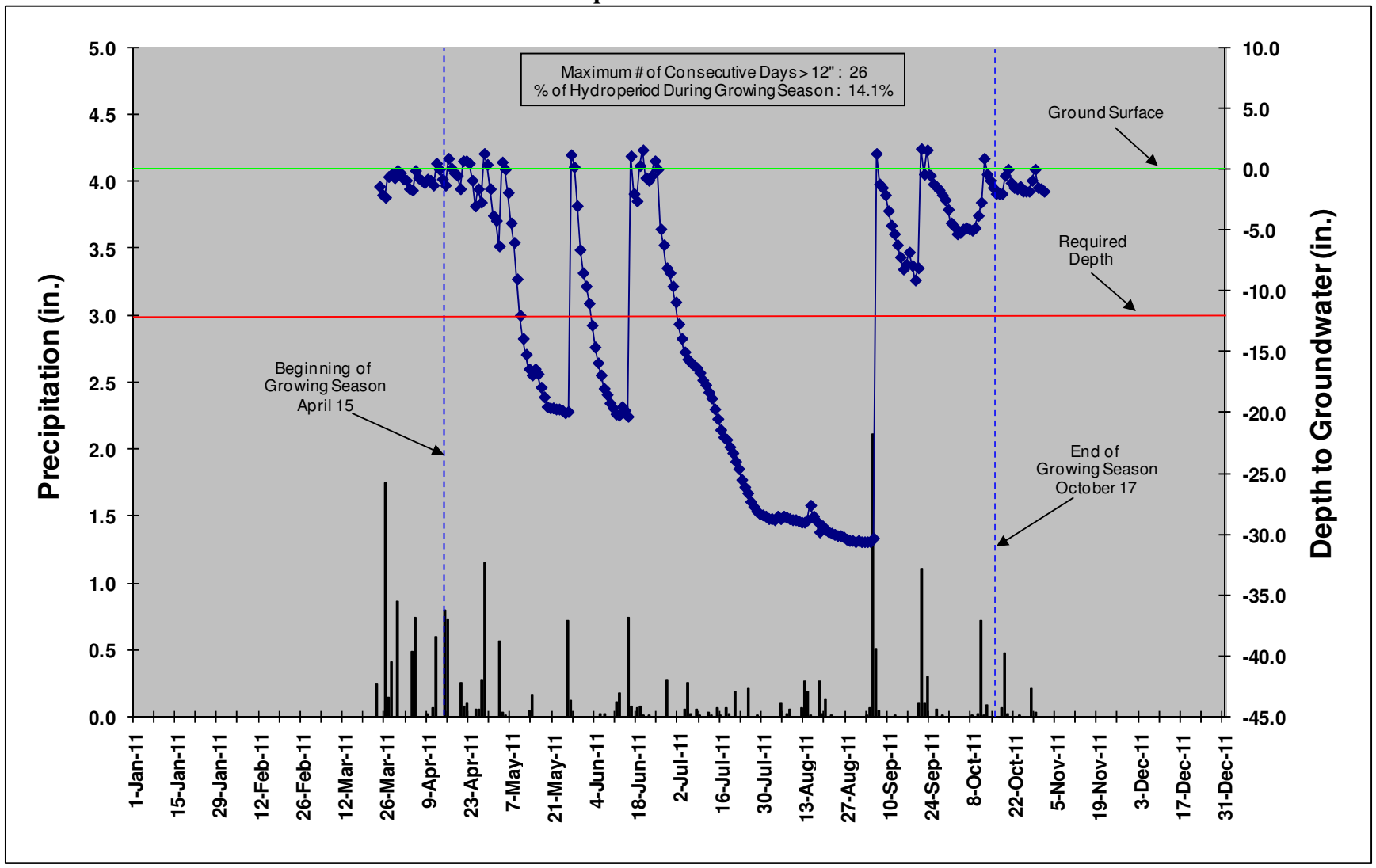
CC-12 Precipitation and Water Level Plot



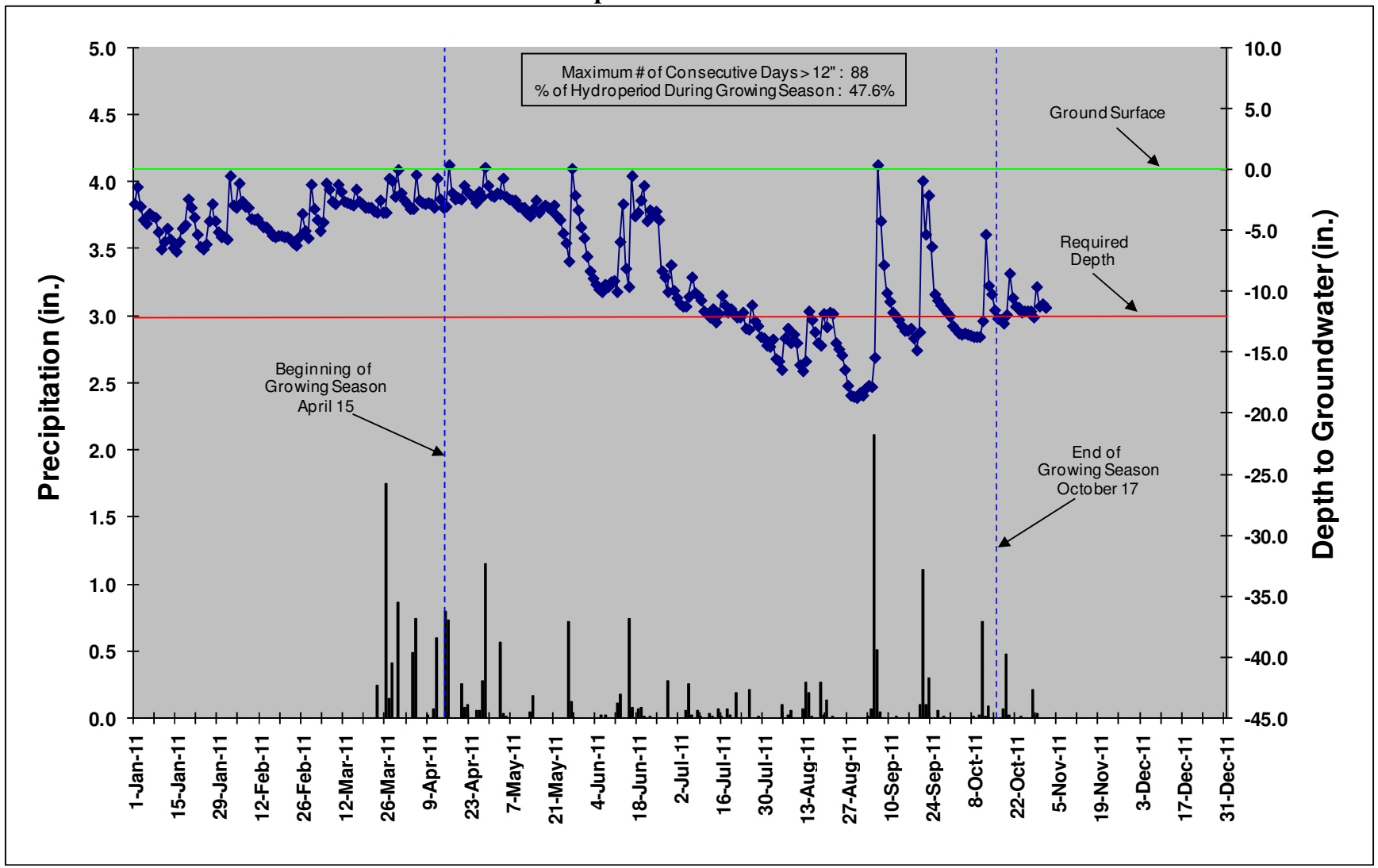
CC-13 Precipitation and Water Level Plot



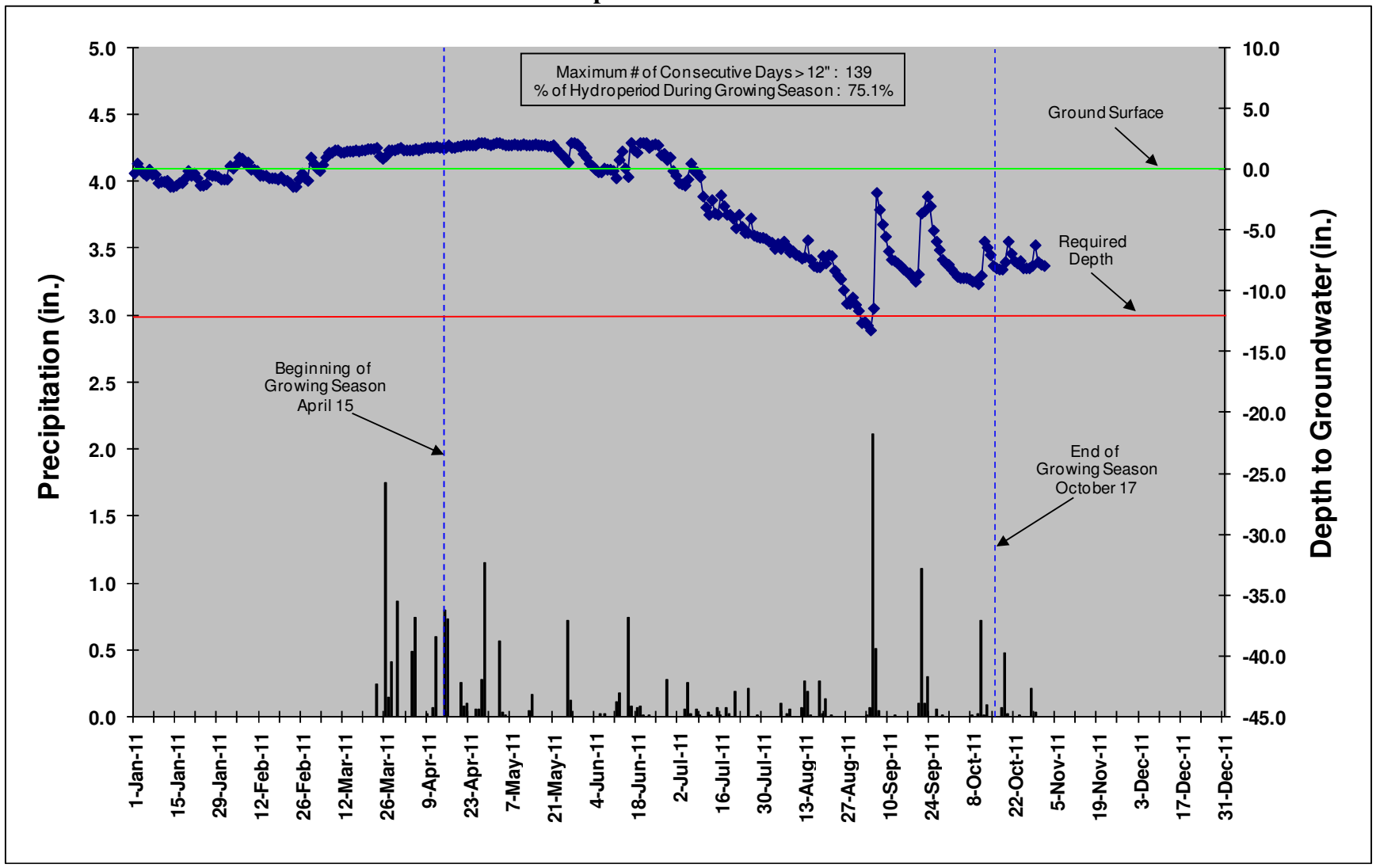
CC-14 Precipitation and Water Level Plot



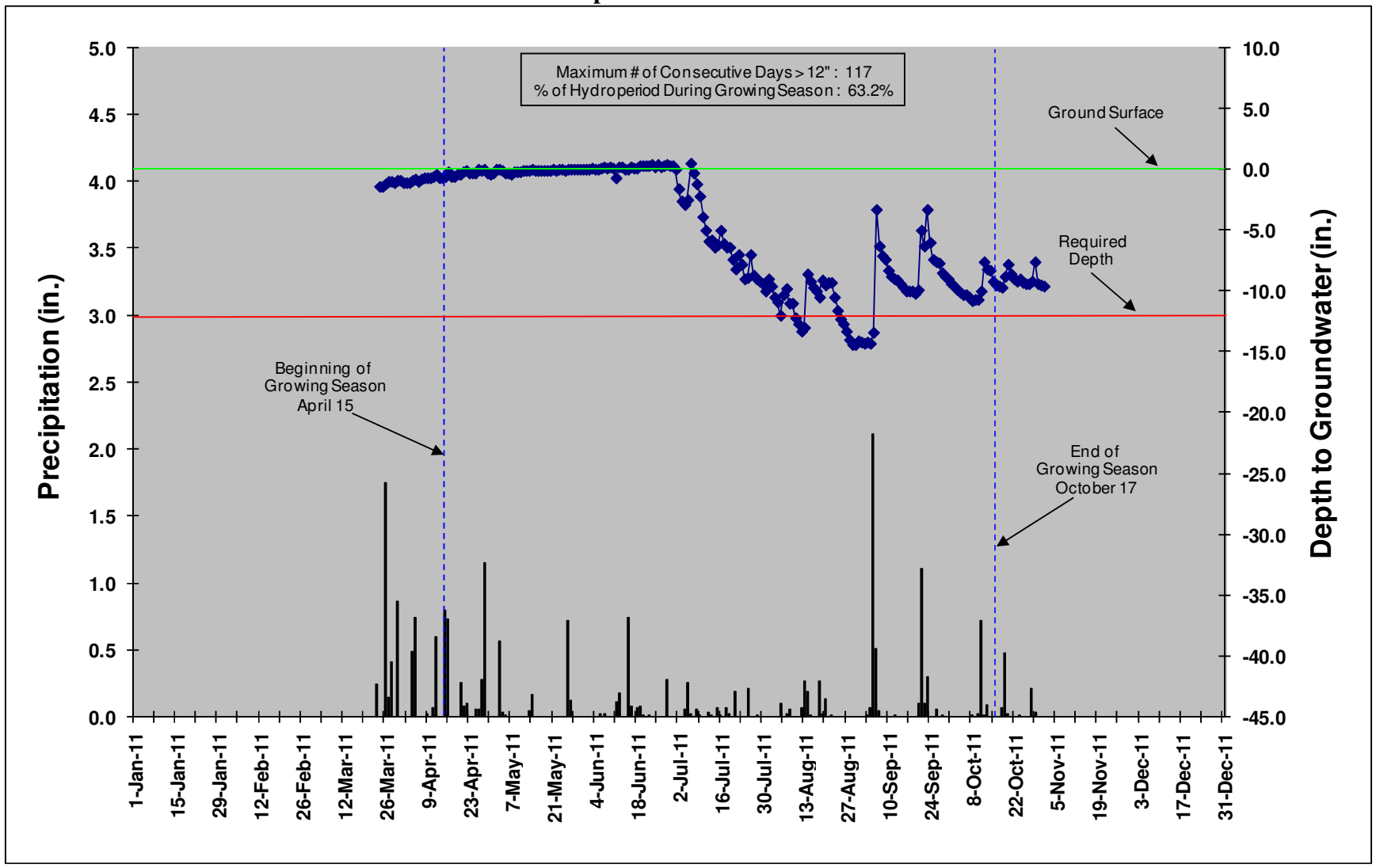
CC-15 Precipitation and Water Level Plot



CC-16 Precipitation and Water Level Plot



CC-17 Precipitation and Water Level Plot



CC-18 Precipitation and Water Level Plot

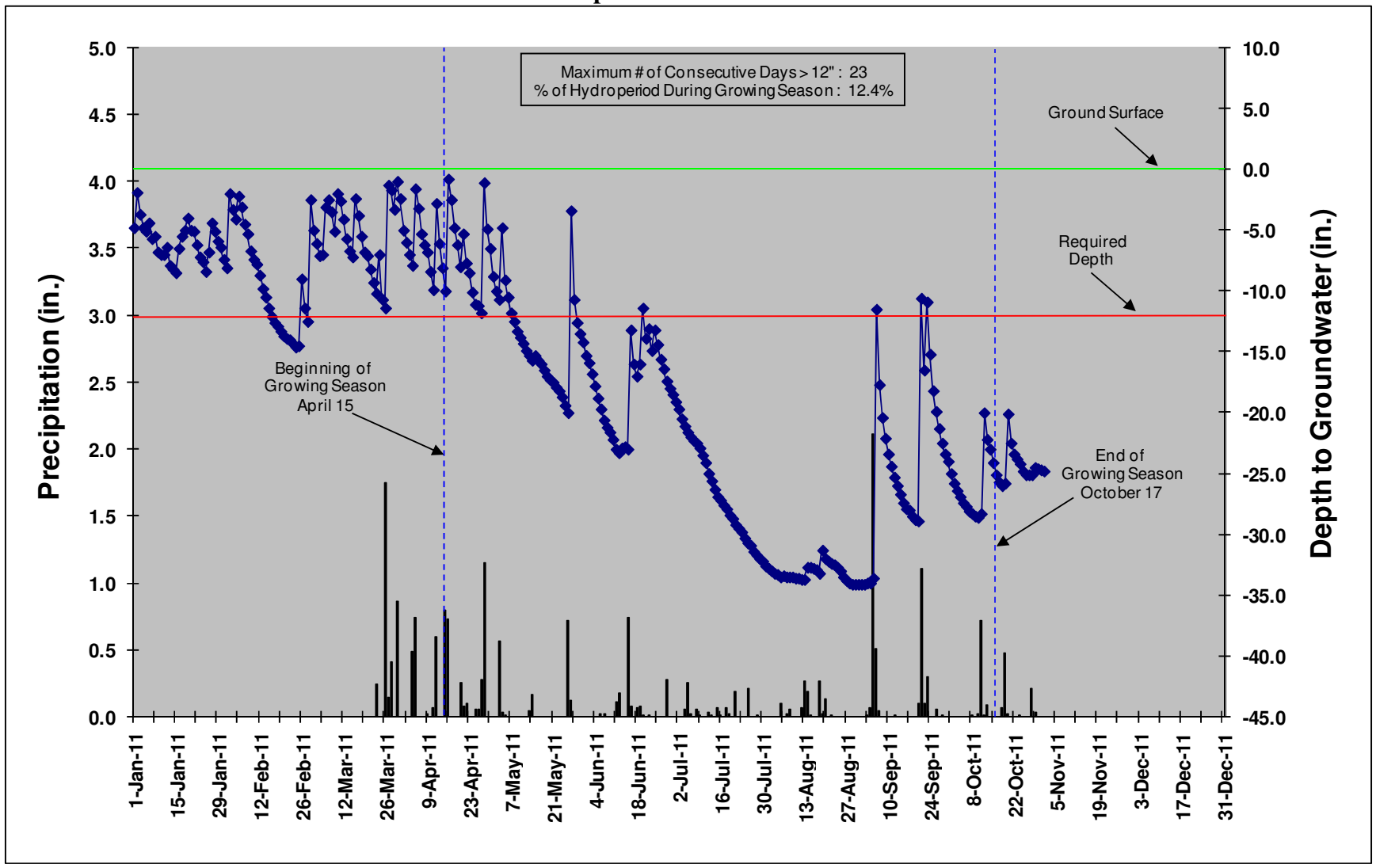


Table 13. Wetland Gauge Attainment Data Summary of Groundwater Gauge Results Cat Creek Stream & Wetland / Project No. 71					
Gauge ID	Success Criteria Achieved/Max Consecutive Days During Growing Season (Percentage)				
	Year 1 (2010)	Year 2 (2011)	Year 3 (2012)	Year 4 (2013)	Year 5 (2014)
CC-1	Yes/ 35 Percent	Yes/31 16.8 Percent			
CC-2	Yes/ 16 Percent	Yes/37 20.0 Percent			
CC-3	Yes/ 8 Percent	Yes/24 13.0 Percent			
CC-4	Yes/ 35 Percent	Yes/88 47.6 Percent			
CC-5	Yes/ 32 Percent	Yes/50 27.0 Percent			
CC-6	No/ 2 Percent	Yes/25 13.5 Percent			
CC-7	No/ 0 Percent	No/12 6.5 Percent			
CC-8	Yes/ 33 Percent	Yes/39 21.1 Percent			
CC-9	Yes/ 22 Percent	Yes/185 100.0 Percent			
CC-10	Yes/ 9 Percent	Yes/97 52.4 Percent			
CC-11	Yes/ 11 Percent	Yes/27 14.6 Percent			
CC-12	Yes/ 41 Percent	Yes/50 27.0 Percent			
CC-13	N/A	Yes/118 63.8 Percent			
CC-14	Yes/ 30 Percent	Yes/26 14.1 Percent			
CC-15	Yes/ 33 Percent	Yes/88 47.6 Percent			
CC-16	Yes/ 100 Percent	Yes/139 75.1 Percent			
CC-17	N/A	Yes/117 63.2 Percent			
CC-18	No/ 3 Percent	Yes/23 12.4 Percent			

N/A - Information does not apply.