Valley Fields Farm
Monitoring Report
FINAL
Year 2 (2011)

Davidson County, North Carolina

USGS HUC: 03040103

EEP Project ID #407

EEP Project Manager: Robin Hoffman

Submitted to:

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

Submitted December 2011

Executive Summary

The project site is located in the USGS Hydrologic Unit Code 03040103. It began as a North Carolina Department of Transportation (NCDOT) feasibility report performed by Kimley-Horn and Associates, Inc. (KHA) in May of 2003. The Ecosystem Enhancement Program (EEP) oversaw the project after completion of the feasibility study. KHA finalized the construction plans in January of 2007. North State Environmental, Inc. (North State) completed construction of the project in June of 2008 with repairs to Reach B completed in November 2008.

The goals of the restoration project are to improve the hydrologic function, water quality and biological habitat of the site's streams and wetlands through the following objectives:

- Preserve stable on-site streams, wetlands, and riparian buffers in catchments draining into the primary enhancement / restoration reaches;
- Enhance and restore (pattern, dimension, and profile) unstable streams using natural channel design techniques;
- Installing in-stream structures such as rock vanes, log vanes, and constructed riffles;
- Removing invasive vegetation;
- Re-establish riparian buffers;
- Remove crowns from wetland areas;
- Reconnect the floodplain by raising the streambed and/or lower the floodplains;
- Enhance and restore wetlands through modifications to hydrology, vegetation, and soils;
- Improve water quality of non point source stormwater through Best Management Practices.

KHA performed stream and riparian monitoring in the fall of 2011 for this Year 2 Monitoring Report with the site visit occurring on November 2nd – 4th, 2011. Site monitoring field work included CVS vegetation assessment, geomorphic survey, groundwater well data collection, and visual assessment of the vegetation, stream, and wetland restoration components of the project.

Vegetation Condition: During the monitoring process KHA conducted a CVS vegetation assessment of eighteen (18) vegetation quads, and a visual assessment of the vegetation community. Refer to the Appendices B and C of this report for the collected vegetation data and assessment summary data. The following observations were made regarding the vegetation condition during the Year 2 Monitoring site visit:

- Eleven (11) of the eighteen quads met or exceeded the success criteria of 320 stems/area (minimum stem count after 3 years).
- Areas of isolated non-native/invasive species were located along all project reaches, and mostly consist of isolated populations of multi flora rose and cattails within the restored wetland (Photos VP08 – VP10).
- The planted vegetation of Rich Fork Tributary (Reach B) has been distressed in previous monitoring years with one (1) of the four (4) vegetation quads not meeting its success

criteria in Year 1; however, improvement in density and vigor was noted during the Year 2 assessment with two (2) of the four (4) quads meeting success criteria on Reach B. Repair work conducted along Reach B in previous years has mostly likely led to this delay in meeting vegetation success criteria.

- Although the vegetation has not yet met the success criteria for the site, the trend is an annual increase in the density and vigor of the stem count data.
- Through visual assessment of the vegetation, a confounding factor to the lack of sufficient vegetation density appears to be beaver activity. There is evidence of active beavers within the project boundaries, which have affected the woody stem densities through physical removal and inundation of vegetation communities.
- There are no physical barriers surrounding the site easement. The site is open to impacts near the landowner's residence and along the existing utility easements. A potential encroachment was noted during the site visit on the Lower A reach (approximately station 87+50), where crops appear to have been planted within the easement (Photos VP01-02).
- The utility easement located parallel to Reach C and which crosses Reach Upper A just above the confluence with Reach C was cleared sometime between the 2011 initial site assessment and the monitoring survey field visits (Photos VP11-13).

Future bare root and live stake planting remediation is being planned; however, is currently on hold due to property owner coordination issues. Refer to the Project Tables and Appendix C of this report for the collected vegetation data and assessment summary data.

Stream Condition: A geomorphic survey and visual assessment of stream condition were completed for the site. Morphology monitoring included twenty-two (22) cross sections and seven (7) longitudinal profile segments. Channel stability assessment includes the entire restored length and includes thirty-eight (38) permanent photo point locations. Refer to the Appendices B and D of this report for the collected geomorphic data and stream assessment summary data. The following observations were made regarding the stream condition during the Year 2 Monitoring site visit:

- Geomorphic survey data collected indicated that a majority of the project reaches were performing within established success criteria ranges.
- Reaches Upper A and Lower A have been impacted by beaver dam impoundments. Both reaches have a lack of bedform features due to the aggradation upstream of the dams as seen in the longitudinal profiles (Appendix D).
- Most of the structures were observed in good stable condition and holding grade. Several structures on Lower A were noted as missing, most likely due to aggradation of the channel resulting from the beaver dam. Refer to the CCPV (Figures 2-6) in Appendix B for a map displaying structure conditions.
- Small stretches of bank scour and erosion were observed fairly regularly, and in varying degrees on Reach A and Reach B. In most cases the scour and erosion seemed to be a result of poorly vegetated banks and beaver activity, and comprised of approximately 11% of the total stream length of each reach. Reach Upper A2 has some erosion on the

outsides of the meander bends. This bank erosion was not considered consistent throughout the reach, and may have been a result of the backwater condition previously created by the beaver dam on Reach Lower A. Reach B also had a 200 foot section of bank erosion occurring on both banks. A repair plan for Reach B was designed by KHA in 2010; however the planned repairs have been postponed due to adjacent property owner negotiations.

- Two significant sized areas of unvegetated floodplain bench are located along Reach Lower A (approximately 175 feet total), and Reach Lower B (approximately 350 feet total). These locations are showing signs of erosion as a result of the bare, unvegetated soil (Photos VP03-VP07, Appendix A; SP02-SP03, Appendix B).
- Three beaver dams have been documented throughout the monitoring period to date, however, only one of these dams is still actively impounding water. The large beaver dam on Reach Lower A near station 95+50 is no longer impounding water, as the right bank of the stream has eroded. Erosion from the beaver dam at this location has re-routed the stream centerline, as evident in Figure 3, and has created a near vertical bank (Photos SP04-SP06, Appendix B). The initial assessment site visit conducted in April 2011 documented a small beaver dam at station 70+00. This beaver dam was not present during the monitoring site visit. Finally, a large two to three foot tall beaver dam is still actively present near station 59+50 on Reach Upper A. This beaver dam is causing backwater to extend to the upstream project extents of Reach Upper A.
- A manhole on reach Upper A (approximately station 59+00) has erosion in and around the manhole, and another manhole at the top of Reach C is missing its cover. These two conditions provide surface water runoff and stream floodplain discharge the ability to flow into the sanitary sewer line, as well as, create a safety hazard (Photo SP01). The Landowner and/or the City of High Point have not been contacted regarding these issues.
- Bankfull wracklines were present in the floodplain on Reach A, Reach B, and Reach C, which indicated that a bankfull event occurred during this monitoring period. Refer to Appendix E for Table 12: Verification of Bankfull.
- The rip rap at the Reach Upper A utility crossing also appeared to be maintained during the easement clearing process (Photos VP11-13).

Wetland Condition: The restored wetland area was visually assessed and wetland gauge data was downloaded and assessed as part of the Year 2 monitoring. The downloaded wetland gauge data was assessed graphically against local precipitation data to determine if the wetland area was meeting the United States Army Corps of Engineers (ACOE) minimum criteria for hydrology. This criteria states that the area should be inundated for a minimum of 7.5% of the growing season (18 consecutive days). Refer to the Appendices B and E of this report for the collected wetland assessment summary data. The following observations were made regarding the wetland condition during the Year 2 Monitoring site visit:

- The low areas of the wetland were inundated and the entire wetland was covered by wetland indicator vegetation species.

Per the Natural Resource Conservation Service (NRCS) Davidson County Soil Survey the growing season in Davidson County is from March 26 until November 6 (226 total days). All

four of the groundwater gages indicate that the wetland is meeting the minimum ACOE definition for hydrology.
Stream Success Criteria (from approved Restoration/Mitigation Plan):

- Stream Type: Maintenance of the design stream type or progression or conversion to stable stream type such as B, C, or E will indicate stability.
- Bank Height Ratio: Bank height ratio between 1.0 and 1.1 will indicate flood flows have access to the active floodplain and that higher flows do not apply excessive stresses to stream banks.

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

Methodology

- Surveys/topographic data collections were completed using survey grade GPS, such that each survey point has three-dimensional coordinates, and is georeferenced (NAD83-State Plane Feet – FIPS3200).
- Longitudinal stationing was developed using the as-built survey thalweg as a baseline.
- The particle size distribution protocol used is the Modified-Wolman pebble count.
- CVS level 2 is used as the vegetation plot methodology.

References

Rosgen, David L. 1996. Applied River Morphology, Second Edition., Wildland Hydrology, Pagosa Springs, Colorado.

Lee, Michael T., Peet, Robert K., Roberts, Steven D., Wentworth, Thomas R. 2006. CVS-EEP Protocol for Recording Vegetation, All Levels of Sampling, Version 4.0.,

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. United States Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. LeGrand, H.E. and S.P. Hall.

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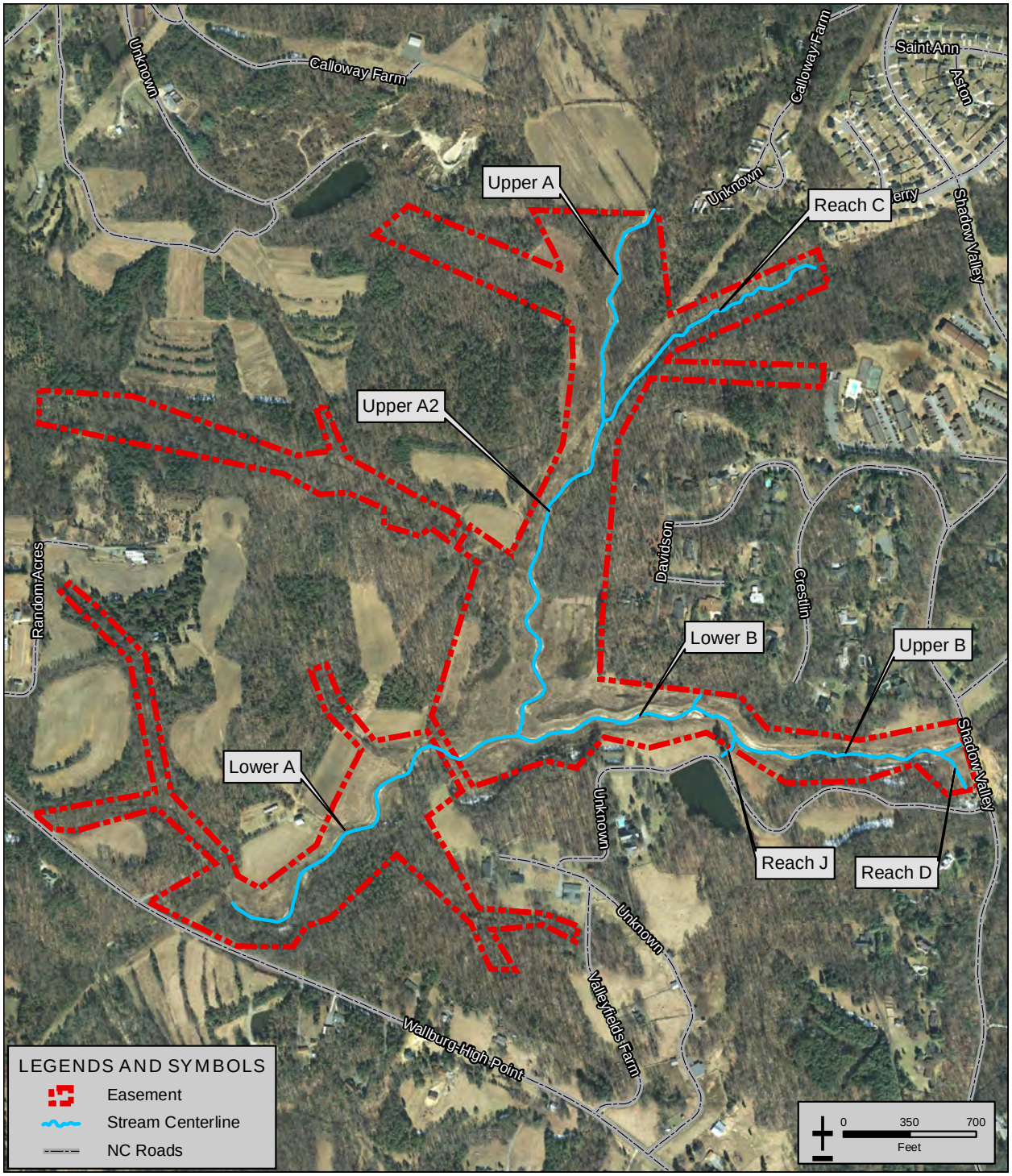
APPENDIX A:

PROJECT VICINITY MAP AND BACKGROUND TABLES



Title	Project Setting

Prepared For:	**Project**	Valley Fields Farm Stream and Wetland Restoration Monitoring Year 2 – 2011 Davidson County, North Carolina		
Ecosystem Enhancement Program	**Date**		**Project Number**	**Figure**
	12/15/11		407	1

Table 1a. Project Components Valley Fields Farm/407									
Project Component or Reach ID	**Existing Feet/Acres**	**Restoration Level[1]**	**Approach[2]**	**Footage or Acreage**	**Stationing**	**Mitigation Ratio**	**Mitigation Units**	**BMP Elements[3]**	**Comment**
Upper A (includes A2)	3100	R	P2	3078	50+00 - 80+78	1:1	3078		
Lower A	2284	R	P2	1935	80+78 - 100+13	1:1	1935		
Reach B	2550	R	P2	2492	1500+00 - 1524+92	1:1	2492		
Reach C	1560	R	P1	1489	1000+00 - 1014+89	1:1	1489		
Reach D	240	R	P1	295	200+00 - 202+95	1:1	295		
Reach J (Pond Tributary)	61	R	P2	61	350+00 - 350+61	1:1	61		
Reach A	276	P	--	276	100+13 - 102+89	5:1	55		
Reach E	2930	P	--	2930	--	5:1	586		
Reach F	1840	P	--	1840	--	5:1	368		
Reach G	1200	P	--	1200	--	5:1	240		
Reach H	1400	P	--	1400	--	5:1	280		
Reach K	240	P	--	240	--	5:1	48		
Reach L	700	P	--	700	--	5:1	140		
Reach M	420	P	--	420	--	5:1	84		
Wetland A-5	--	R	--	3.00	--	1:1	3.00		
Wetland A-4	--	R	--	0.10	--	1:1	0.10		
Wetland B-1	0.10	E	--	0.10	--	2:1	0.05		
Wetland B-2	0.70	E	--	0.40	--	2:1	0.20		
Wetland B-3	0.20	E	--	0.08	--	2:1	0.04		
Wetland D-1	0.20	E	--	0.20	--	2:1	0.10		
Wetland A-6	1.70	E	--	1.70	--	2:1	0.85		
Wetland A-4	1.80	E	--	1.80	--	2:1	0.90		
Wetland A-3	0.20	E	--	0.20	--	2:1	0.10		
Wetland A-1	0.60	P	--	0.60	--	5:1	0.12		
Wetland A-2	0.50	P	--	0.50	--	5:1	0.10		
Wetland A-7	0.40	P	--	0.40	--	5:1	0.08		
Wetland A-8	1.20	P	--	1.20	--	5:1	0.24		

1 = R = Restoration; E1 = Enhancement I; E2 = Enhancement II; P = Preservation

2 = P1 = Priority I; P2 = Priority II; P3 = Priority III

3 = BR = Bioretention Cell; SF = Sand Filter; SW = Stormwater Wetland; WDP = Wet Detention Pond; DDP = Dry Detention Pond;
FS = Filter Strip; Grassed Swale = S; LS = Level Spreader; NI = Natural Infiltration Area, O = Other
CF = Cattle Fencing; WS = Watering System; CH = Livestock Housing

Table 1b. Component Summations Valley Fields Farm/407							
Restoration Level	Stream (lf)	Riparian Wetland (Ac)		Non-Ripar (Ac)	Upland (Ac)	Buffer (Ac)	BMP
		Riverine	Non-Riverine				
Restoration	9,350	3.1					
Enhancement		4.5					
Enhancement I							
Enhancement II							
Creation							
Preservation	9,006	2.7					
HQ Preservation							
		10.3	0				
Totals (Feet/Acres)	**18,356**	**10.3**		**0**	**0**	**0**	**0**
MU Totals	**11,151**	**5.9**		**0**	**0**	**0**	**0**

Non-Applicable

Table 2. Project Activity and Reporting History
Valley Fields Farm/407

Elapsed Time Since Grading Complete: 3 yrs 6 months
Elapsed Time Since Planting Complete: 3 yrs 6 Months
Number of Reporting Years[1]: 2

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Restoration Plan	N/A	3/1/2006
Final Design – Construction Plans	N/A	1/31/2007
Construction	N/A	5/16/2008
Temporary S&E mix applied to entire project area	N/A	5/16/2008
Permanent seed mix applied	N/A	5/16/2008
Baseline Monitoring Report	5/1/2008	N/A
Repair Plans – Construction Plans (Reach B - repair)	**N/A**	**11/12/2008**
Structural maintenance (new alignment, bench expansion) Reach B	**N/A**	**12/5/2008**
Temporary S&E mix applied to Reach B	**N/A**	**12/5/2008**
Permanent seed mix applied to Reach B	**N/A**	**12/5/2008**
Baseline Monitoring Report	6/1/2009	8/17/2009
Year 1 Monitoring	10/15/2010	3/28/2011
Year 2 Monitoring	11/4/2010	
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		
Closeout		

Bolded items are examples of those items that are not standard, but may come up and should be included
Non-bolded items represent events that are standard components over the course of a typical project.
The above are obviously not the extent of potential relevant project activities, but are just provided as example as part of this exhibit.
If planting and morphology are on split monitoring schedules that should be made clear in the table
1 = Equals the number of reports or data points produced excluding the baseline

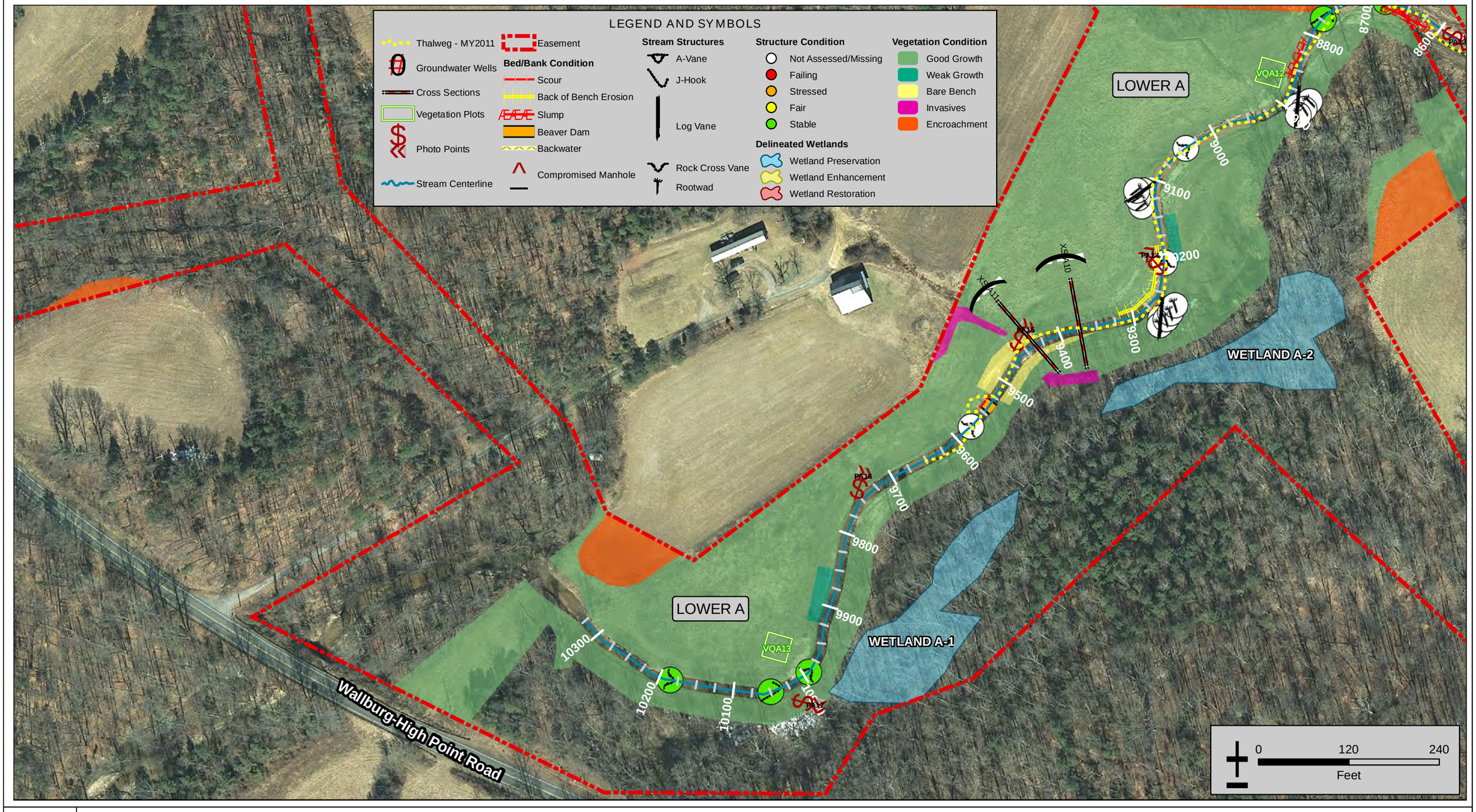
Table 3. Project Contacts Table Valley Fields Farm/407	
Designer Kimley-Horn and Associates, Inc.	P.O. BOX 33068 Raleigh, North Carolina 27636-3068 Will Wilhelm Phone: (704) 333-5131
Construction Contractor North State Environmental	2889 Lowery Street Winston-Salem, NC 27101 Phone: (336) 725-2010
Survey Contractor Cavanaugh and Associates, P.A.	530 North Trade Street, Suite 302 Winston-Salem, NC 27101 Phone: (336) 759-9001
Planting Contractor North State Environmental	2889 Lowery Street Winston-Salem, NC 27101 Phone: (336) 725-2010
Seeding Contractor North State Environmental	2889 Lowery Street Winston-Salem, NC 27101 Phone: (336) 725-2010
Seed Mix Sources	Green Resource, LLC (800) 225-6061
Nursery Stock Suppliers	Green Resource, LLC (800) 225-6061
Monitoring Performers	Kimley-Horn and Associates, Inc. P.O. BOX 33068 Raleigh, North Carolina 27636-3068
Stream Monitoring POC Vegetation Monitoring POC Wetland Monitoring POC	Daren Pait Phone: (919) 677-2000 Daren Pait Phone: (919) 677-2000 Daren Pait Phone: (919) 677-2000

Table 4. Project Attribute Table Valley Fields Farm/407						
Project County	Davidson County					
Physiographic Region	Piedmont					
Ecoregion	Southern Outer Piedmont					
Project River Basin	Yadkin					
USGS HUC for Project (14 digit)	3040103030030					
NCDWQ Sub-basin for Project	Yadkin Sub Basin					
Within extent of EEP Watershed Plan?	Yadkin Pee-Dee River Basin Restoration Priorities 2009					
WRC Hab Class (Warm, Cool, Cold)	Cool					
% of project easement fenced or demarcated	0					
Beaver activity observed during design phase?	Yes					
Restoration Component Attribute Table						
	Reach A	Reach B	Reach C	Reach D	Reach J	Wetland A-5
Drainage area (mi2)	6.5	2.3	0.2	0.2	0.1	N/A
Stream order	3	2	1	1	1	N/A
Restored length (feet)	5013	2492	1489	295	61	N/A
Perennial (P) or Intermittent (I)	P	P	P	P	P	N/A
Watershed type (Rural, Urban, Developing etc.)	Developing	Developing	Developing	Developing	Developing	N/A
Watershed LULC Distribution (e.g.)						
Developed	0.35					
Cultivated	0.22					
Forested	0.43					
Watershed impervious cover (%)	4.7	23.5	1.9	1	1	N/A
NCDWQ AU/Index number	C/3	C/2	C/1	C/1	C/1	N/A
NCDWQ classification	C	C	C	C	C	N/A
303d listed?	Yes	Yes	Yes	Yes	Yes	N/A
Upstream of a 303d listed segment?	Yes	Yes	Yes	Yes	Yes	N/A
Reasons for 303d listing or stressor	Degraded water quality due to sediment					
Total acreage of easement	31	8.5	2.3	0.5	0.1	N/A
Total vegetated acreage within the easement	22.4	6.9	1.7	0.4	0.08	N/A
Total planted acreage as part of the restoration	22.4	6.9	1.7	0.4	0.08	N/A
Rosgen classification of pre-existing	G5	G5	Incised B5	Incised B5	G	N/A
Rosgen classification of As-built	B5	B5c	C5	B5c	Ba	N/A
Valley type	VIII	VIII	VIII	VIII	VIII	N/A
Valley slope	0.003	0.005	0.011	0.011	0.15	N/A
Valley side slope range (e.g. 2-3.%)	15-20%	12-20%	15-40%	25-30%	30-35%	N/A
Valley toe slope range (e.g. 2-3.%)	2-3%	1-3%	3-5%	10-14%	1-2%	N/A
Cowardin classification	N/A	N/A	N/A	N/A	N/A	NC
Trout waters designation	No	No	No	No	No	N/A
Species of concern, endangered etc.? (Y/N)	Greensboro burrowing crayfish is of concern					
Dominant soil series and characteristics	Chewacla loam and Wehadkee loam					
Series	N/A	N/A	N/A	N/A	N/A	ChA
Depth	N/A	N/A	N/A	N/A	N/A	80"
Clay%	N/A	N/A	N/A	N/A	N/A	5-40%
K	N/A	N/A	N/A	N/A	N/A	0.28
T	N/A	N/A	N/A	N/A	N/A	5

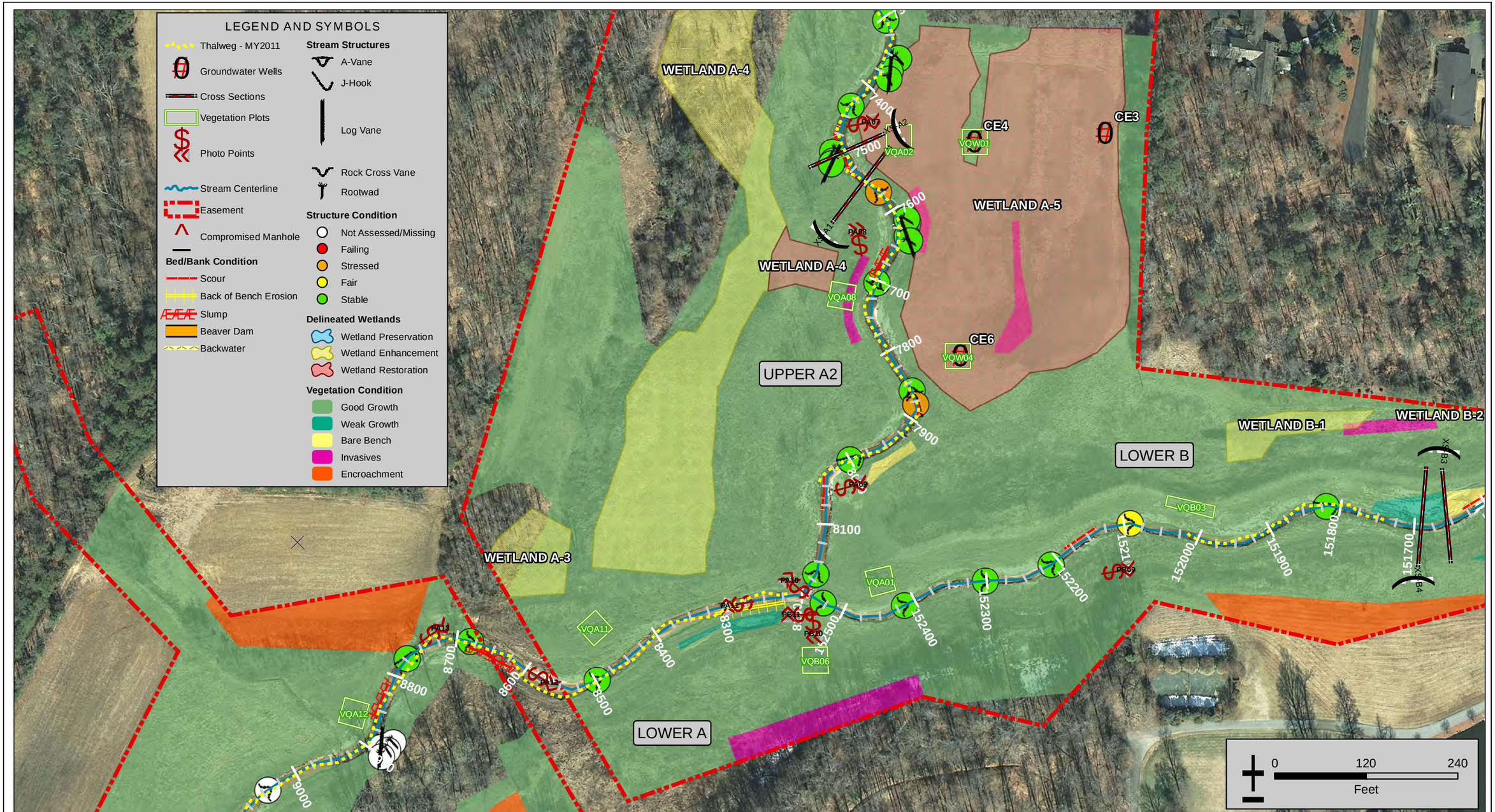
Use N/A for items that may not apply. Use "-" for items that are unavailable and "U" for items that are unknown

APPENDIX B:

VISUAL ASSESSMENT DATA



Title	Current Conditions Plan View (2010 Aerial courtesy of NC One Map)		
Prepared For: Ecosystem Enhancement Program	**Project**	Valley Fields Farm Stream and Wetland Restoration Monitoring Year 2 – 2011 Davidson County, North Carolina	
	Date	**Project Number**	**Figure**
	12/15/11	407	2



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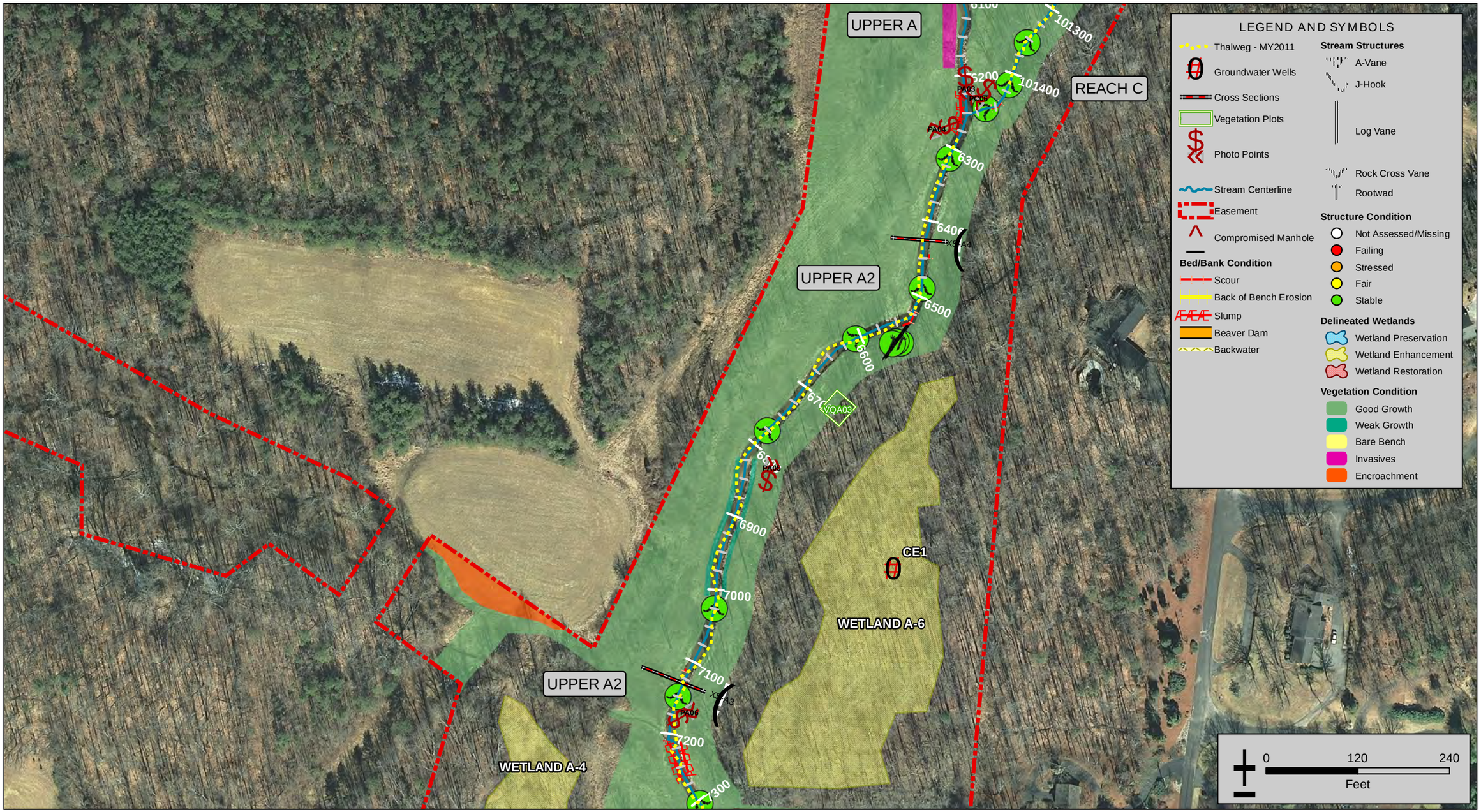

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Prepared For:

Ecosystem Enhancement Program

Project	Valley Fields Farm Stream and Wetland Restoration Monitoring Year 2 – 2011 Davidson County, North Carolina		
Date		**Project Number**	**Figure**
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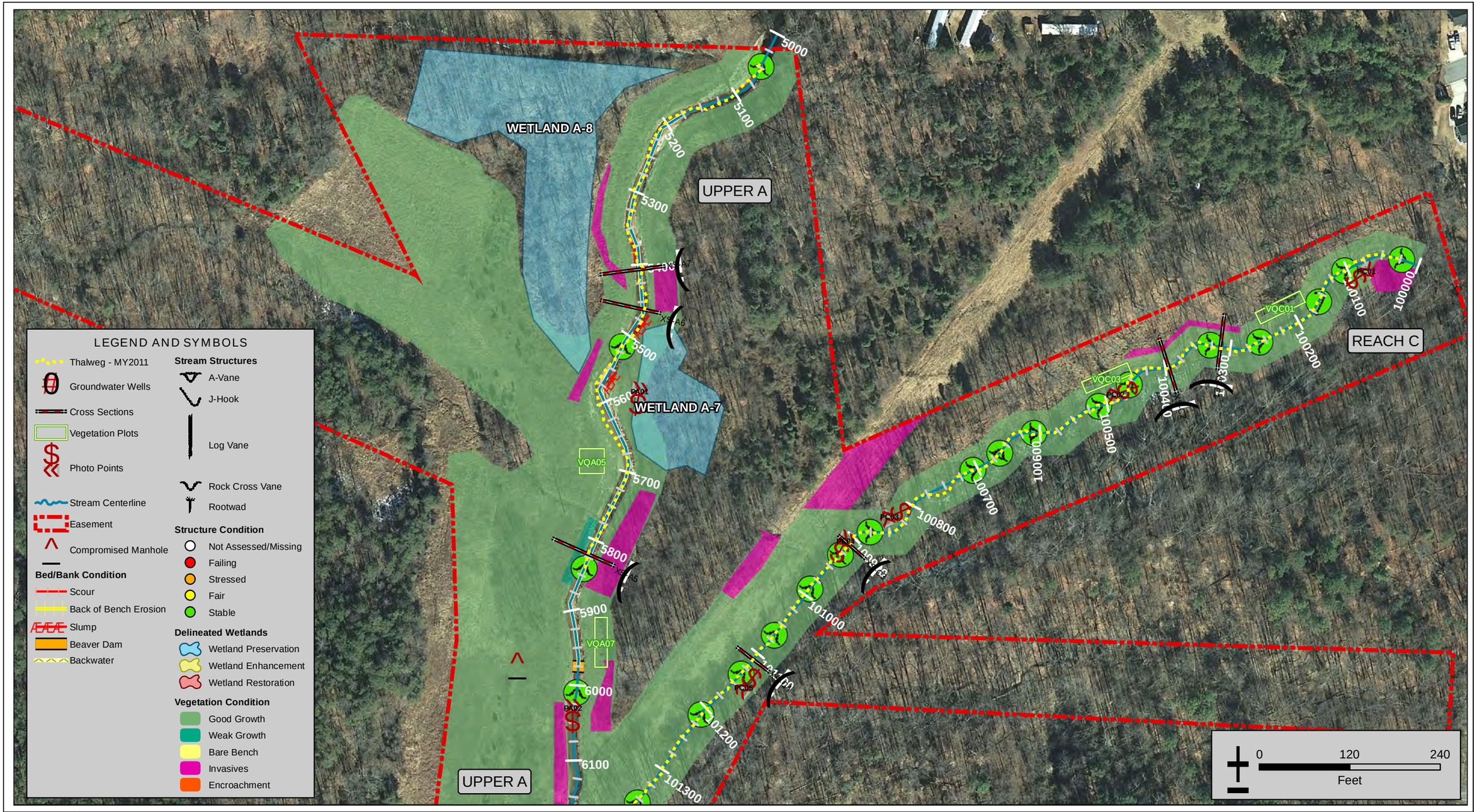
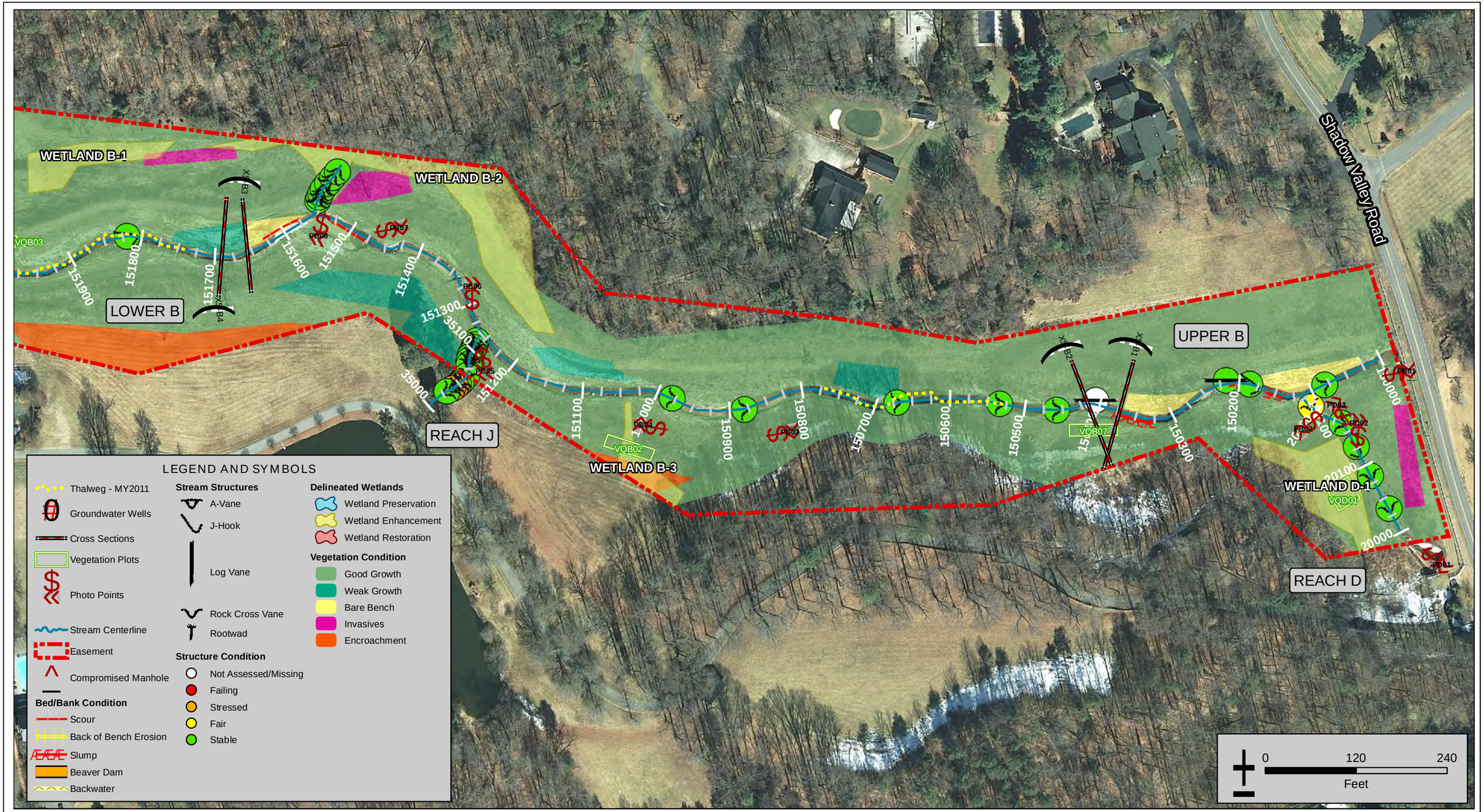


Title	Current Conditions Plan View (2010 Aerial courtesy of NC One Map)

Prepared For:

Ecosystem Enhancement Program

Project	Valley Fields Farm Stream and Wetland Restoration Monitoring Year 2 – 2011 Davidson County, North Carolina		
Date		**Project Number**	**Figure**
12/15/11		407	5



Title	Current Conditions Plan View (2010 Aerial courtesy of NC One Map)
Prepared For: Ecosystem Enhancement Program	**Project** Valley Fields Farm Stream and Wetland Restoration Monitoring Year 2 – 2011 Davidson County, North Carolina

Date	Project Number	Figure
12/15/11	407	6

Table 5.1 **Visual Stream Morphology Stability Assessment**
Reach ID **Upper A**
Assessed Length (ft) **1,250**

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)	5	5			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	5	5			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	5	5			100%			
		2. Thalweg centering at downstream of meander (Glide)	5	5			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			1	34	99%	0	0	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.			3	97	96%	0	0	96%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	4	131	95%	0	0	95%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	4	4			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	4	4			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	4	4			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	4	4			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	4	4			100%			

Table 5.2 **Visual Stream Morphology Stability Assessment**
Reach ID **Upper A2**
Assessed Length (ft) **2,050**

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	20	20			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	20	20			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	20	20			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	20	20			100%			
		2. Thalweg centering at downstream of meander (Glide)	20	20			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			5	131	97%	0	0	97%
	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.			4	177	96%	0	0	96%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	9	308	92%	0	0	92%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	13	13			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	13	13			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	11	13			85%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	13	13			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	13	13			100%			

Table 5.3 **Visual Stream Morphology Stability Assessment**
Reach ID **Lower A**
Assessed Length (ft) **2,000**

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	10	10			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	10	10			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	10	10			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	10	10			100%			
		2. Thalweg centering at downstream of meander (Glide)	10	10			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			1	93	98%	0	0	98%
	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.			2	107	97%	0	0	97%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	3	200	95%	0	0	95%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	3	6			50%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	3	6			50%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	3	6			50%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	3	6			50%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	3	6			50%			

Table 5.4 **Visual Stream Morphology Stability Assessment**
Reach ID **Upper B**
Assessed Length (ft) **1,275**

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	2	2			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	2	2			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	2	2			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	2	2			100%			
		2. Thalweg centering at downstream of meander (Glide)	2	2			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			1	12	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			2	70	97%	0	0	97%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	3	82	97%	0	0	97%
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%. (See guidance for this table in EEP monitoring guidance document)	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%			

Table 5.5 **Visual Stream Morphology Stability Assessment**
Reach ID **Lower B**
Assessed Length (ft) **1,275**

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	2	2			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	2	2			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	2	2			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	2	2			100%			
		2. Thalweg centering at downstream of meander (Glide)	2	2			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			4	198	92%	0	0	92%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	4	198	92%	0	0	92%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	1	1			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	1	1			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	1	1			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	1	1			100%			

Table 5.6 **Visual Stream Morphology Stability Assessment**
Reach ID **Reach C**
Assessed Length (ft) **1,500**

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	24	24			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	24	24			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	24	24			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	24	24			100%			
		2. Thalweg centering at downstream of meander (Glide)	24	24			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			1	8	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	1	8	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	17	17			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	17	17			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	17	17			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	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.	17	17			100%			

Table 6 Vegetation Condition Assessment

Planted Acreage[1] **81.9**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acres	Pattern and Color	6	0.30	0.4%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Pattern and Color	5	0.30	0.4%
			Total	11	0.60	0.7%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	Pattern and Color	5	0.30	0.4%
			Cumulative Total	16	0.90	1.1%

Easement Acreage[2] **97.5**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive Areas of Concern[4]	Areas or points (if too small to render as polygons at map scale).	1000 SF	Pattern and Color	19	1.20	1.2%
5. Easement Encroachment Areas[3]	Areas or points (if too small to render as polygons at map scale).	none	Pattern and Color	9	1.60	2.0%

1 = Enter the planted acreage within the easement. This number is calculated as the easement acreage minus any existing mature tree stands that were not subject to supplemental planting of the understory, the channel acreage, crossings or any other elements not directly planted as part of the project effort.

2 = The acreage within the easement boundaries.

3 = Encroachment may occur within or outside of planted areas and will therefore be calculated against the overall easement acreage. In the event a polygon is cataloged into items 1, 2 or 3 in the table and is the result of encroachment, the associated acreage should be tallied in the relevant item (i.e., item 1,2 or 3) as well as a parallel tally in item 5.

4 = Invasives may occur in or out of planted areas, but still within the easement and will therefore be calculated against the overall easement acreage. Invasives of concern/interest are listed below. The list of high concern spcies are those with the potential to directly outcompete native, young, woody stems in the short-term (e.g. monitoring period or shortly thereafter) or affect the community structure for existing, more established tree/shrub stands over timeframes that are slightly longer (e.g. 1-2 decades). The low/moderate concern group are those species that generally do not have this capacity over the timeframes discussed and therefore are not expected to be mapped with regularity, but can be mapped, if in the judgement of the observer their coverage, density or distribution is suppressing the viability, density, or growth of planted woody stems. Decisions as to whether remediation will be needed are based on the integration of risk factors by EEP such as species present, their coverage, distribution relative to native biomass, and the practicality of treatment. For example, even modest amounts of Kudzu or Japanese Knotweed early in the projects history will warrant control, but potentially large coverages of Microstegium in the herb layer will not likley trigger control because of the limited capacities to impact tree/shrub layers within the timeframes discussed and the potential impacts of treating extensive amounts of ground cover. Those species with the "watch list" designator in gray shade are of interest as well, but have yet to be observed across the state with any frequency. Those in *red italics* are of particular interest given their extreme risk/threat level for mapping as points where isolated specimens are found, particularly ealry in a projects monitoring history. However, areas of discreet, dense patches will of course be mapped as polygons. The symbology scheme below was one that was found to be helpful for symbolzing invasives polygons, particulalry for situations where the conditon for an area is somewhere between isolated specimens and dense, discreet patches. In any case, the point or polygon/area feature can be symbolized to describe things like high or low concern and species can be listed as a map inset, in legend items if the number of species are limited or in the narrative section of the executive summary.

PA01 (2011)

PA02 (2011)

PA03 (2011)

PA04 (2011)

PA05 (2011)

PA06 (2011)

PA07 (2011)

PA08 (2011)

PA09 (2011)

PA10 (2011)

PA11 (2011)

PA12 (2011)

PA13 (2011)

PA14 (2011)

PA15 (2011)

PA16 (2011)

PA17 (2011)

PB01 (2011)

PB02 (2011)

PB03 (2011)

PB04 (2011)

PB05 (2011)

PB06 (2011)

PB07 (2011)

PB08 (2011)

PB09 (2011)

PB10 (2011)

PB11 (2011)

PC01 (2011)

PC02 (2011)

PC03 (2011)

PC04 (2011)

PC05 (2011)

PC06 (2011)

PD01 (2011)

PD02 (2011)

PD03 (2011)

SP01 (2011) - Manhole with missing cover on Reach C (STA 100+000)

SP02 (2011) - Bank Slump on left bank of Reach B (STA 150+350)

SP03 (2011) - Bank scour on left bank of Reach B (STA 151+475)

SP04 (2011) - Bank scour on right bank of Reach Lower A (STA 95+50)

SP05 (2011) - 2-foot tall beaver dam on Reach A (STA 95+50)

SP06 (2011) - 2-foot tall beaver dam on Reach A (STA 95+50)

SP07 (2011) - 2 to 3 foot tall beaver dam on Reach Upper A (STA 59+75)

SP08 (2011) - Bankfull indicator (deposition) on Reach B

SP09 (2011) - Bankfull indicator (wracklines) on Reach A

VQA01 (2011)

VQA02 (2011)

VQA03 (2011)

VQA05 (2011)

VQA07 (2011)

VQA08 (2011)

VQA11 (2011)

VQA12 (2011)

VQA13 (2011)

VQB02 (2011)

VQB03 (2011)

VQB06 (2011)

VQB07 (2011)

VQC01 (2011)

VQC03 (2011)

VQD01 (2011)

VQW01 (2011)

VQW04 (2011)

VP01 (2011) - Potential encroachment along Reach Lower A (STA: 87+50)

VP02 (2011) - Potential encroachment along Reach Lower A (STA: 87+50)

VP03 (2011) - Weak growth on right bank of Reach B (STA 150+700)

VP04 (2011) - Weak growth on right bank of Reach B (STA 151+650)

VP05 (2011) - Weak growth on left bank of Reach B (STA 152+450)

VP06 (2011) - Bare bench on right bank of Reach B (STA 151+575)

VP07 (2011) - Bare bench on left bank of Reach Lower A (STA 94+00)

VP08 (2011) - Multiflora Rose located on right buffer of Reach B (STA 151+700)

VP09 (2011) - Cattails located in Wetland A-5

VP10 (2011) - Multiflora Rose along tree line north of Wetland A-5

VP11 (2011) – Cleared utility easement running parallel to Reach Upper A2 (STA 63+00)

VP12 (2011) - Cleared utility easement at Reach Upper A (STA 61+50)

VP13 (2011) - Cleared utility easement running parallel to Reach C (STA 101+350)

APPENDIX C:

VEGETATION PLOT DATA

Table 7. Vegetation Plot Criteria Attainment
Valley Fields Farm/407

Vegetation Plot ID	MY1		MY2		MY3		MY4		MY5	
	Vegetation Survival Threshold Met?	Tract Mean	Vegetation Survival Threshold Met?	Tract Mean	Vegetation Survival Threshold Met?	Tract Mean	Vegetation Survival Threshold Met?	Tract Mean	Vegetation Survival Threshold Met?	Tract Mean
VQA1	N	33%	Y	56%						
VQA2	N		N							
VQA3	N		N							
VQA5	Y		Y							
VQA7	N		Y							
VQA8	N		N							
VQA11	Y		Y							
VQA12	N		Y							
VQA13	Y		Y							
VQB2	N	25%	N	50%						
VQB3	Y		Y							
VQB6	N		N							
VQB7	N		Y							
VQC1	Y	100%	Y	100%						
VQC3	Y		Y							
VQD1	N	0%	N	0%						
VQW1	Y	50%	Y	50%						
VQW4	N		N							

Table 8. CVS Vegetation Plot Metadata Valley Fields Farm/407	
Report Prepared By	Josh Allen
Date Prepared	11/14/2011 16:03
database name	cvs-eep-entrytool-v2.2.7.mdb
database location	K:\RAL_Environmental\011795 Valley Fields Farm VFF\VFF VEGETATION
computer name	DD83052
file size	39591936
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
PROJECT SUMMARY----------	
Project Code	407
project Name	Valley Fields Farm
Description	stream and wetland restoration
River Basin	Yadkin
length(ft)	9350
stream-to-edge width (ft)	100
area (sq m)	167, 540
Required Plots (calculated)	18
Sampled Plots	18

Table 9 Planted and Total Stem Counts (Species by Plot with Annual Means)

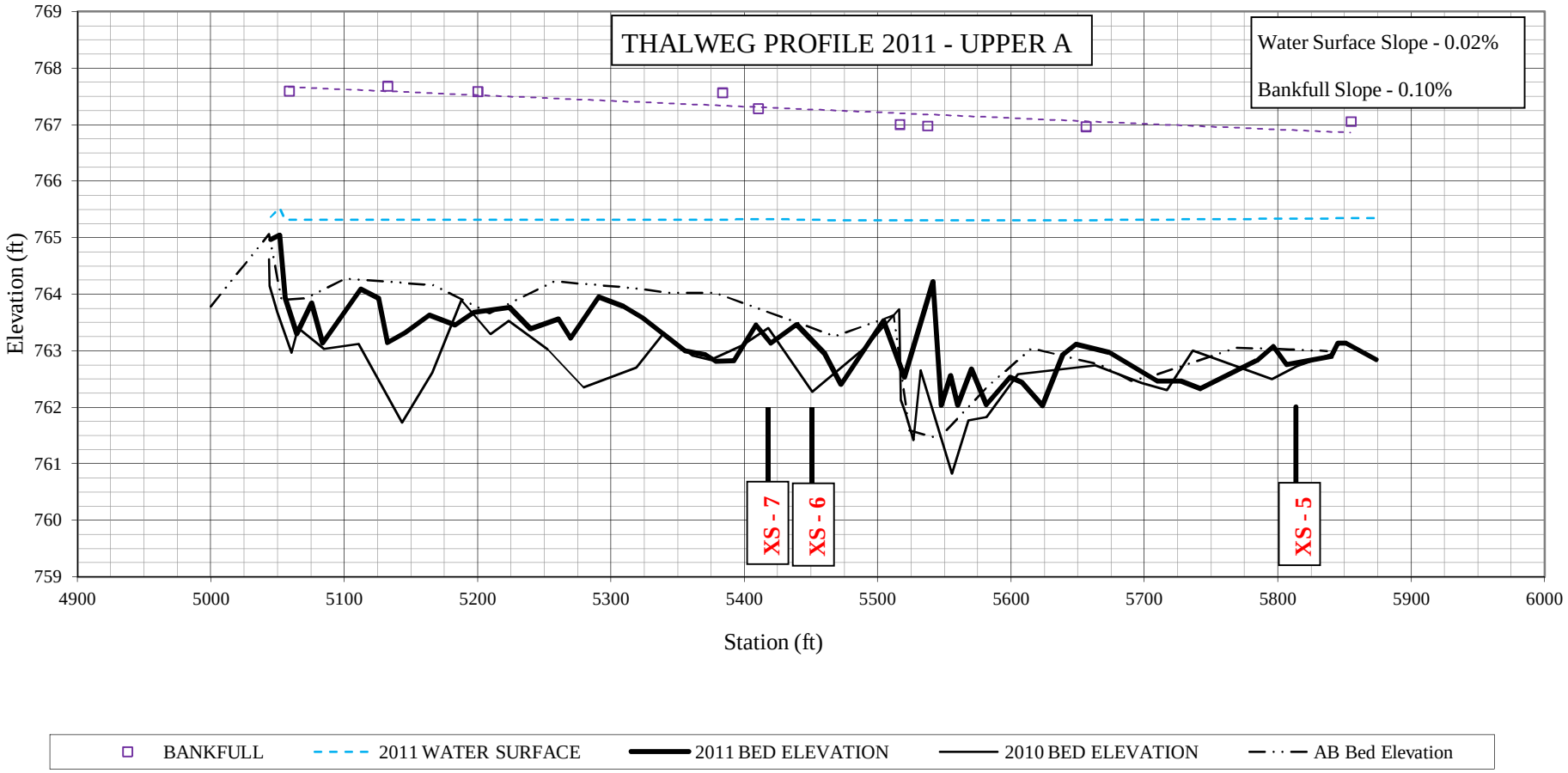
Scientific Name	Common Name	Type	Current Data (MY2 2011)																		Annual Means					
			VQA1		VQA2		VQA3		VQA5		VQA7		VQA8		VQA11		VQA12		VQA13		Current Mean		MY1 (2010)		MY0 (2008)	
			P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T
Acer negundo	Box Elder	T																			0.0	0.0	1.0	0.0	1.0	1.0
Acer rubrum	Red Maple	T									1	1			1	1					1.0	1.0	1.5	0.0	1.5	1.5
Alnus serrulata	Common Alder	S																			0.0	0.0	1.0	0.0	1.0	1.0
Betula nigra	River Birch	T			1	1			1	1	1	1							1	1	1.6	1.6	2.3	1.4	2.3	2.3
Carpinus caroliniana	Ironwood, American hornbeam	T																			0.0	0.0	1.5	0.0	1.5	1.5
Celtis laevigata	Sugarberry, Hackberry	T																			1.0	1.0	0.0	0.0	0.0	0.0
Cephalanthus occidentalis	Common Buttonbush	S																			0.0	0.0	3.0	0.0	3.0	3.0
Cornus amomum	Silky Dogwood	L															3	3			3.0	3.0	1.0	1.0	1.0	1.0
Crategeou crus-galli	Cockspur Hawthorn	T																			0.0	0.0	1.0	0.0	1.0	1.0
Diospyros virginiana	American Persimmon	T																	5	5	4.0	4.0	0.0	4.5	0.0	0.0
Fraxinus pennsylvanica	Green Ash	T	2	2	5	5					1	1			12	12	1	1	3	3	3.7	3.7	1.2	3.3	1.2	1.2
Hamamelis virginiana	Witch-hazel	S											1	1							2.0	2.0	0.0	0.0	0.0	0.0
Ilex opaca	American Holly	T																			0.0	0.0	0.0	2.0	0.0	0.0
Liquidambar styraciflua	American Sweetgum	T													1	1	5	5			2.8	2.8	0.0	2.0	0.0	0.0
Liriodendron tulipera	Tulip Poplar, Yellow Poplar	T																			3.0	3.0	1.0	6.0	1.0	1.0
Pinus echinata	Shortleaf Pine	T																			0.0	0.0	1.0	0.0	1.0	1.0
Plantanus occidentalis	American Sycamore	T	4	4			2	2	8	8	2	2	2	2			1	1			4.4	4.4	2.5	5.2	2.5	2.5
Quercus michauxii	Swamp Chestnut Oak	T																			0.0	0.0	1.0	0.0	1.0	1.0
Quercus nigra	Water Oak	T																			0.0	0.0	1.0	0.0	1.0	1.0
Quercus phellos	Willow Oak	T																			0.0	0.0	0.0	0.0	0.0	0.0
Quercus phellos	Willow Oak	L																			0.0	0.0	0.0	1.0	0.0	0.0
Quercus shumardii	Shumard Oak	T																			1.0	1.0	0.0	1.0	0.0	0.0
Quercus sp.	Oak, species unknown	T																			1.0	1.0	0.0	0.0	0.0	0.0
Salix nigra	Black Willow	L							1	1									1	1	4.7	4.7	0.0	4.5	0.0	0.0
Salix sericea	Silky Willow	S	4	4																	4.0	4.0	0.0	0.0	0.0	0.0
Ulmus americana	American Elm	T									3	3							1	1	1.4	1.4	0.0	1.8	0.0	0.0
Unidentified	Unidentified	T					3	3													3.0	3.0	3.4	0.0	3.4	3.4
Unknown	Unknown	T					1	1													1.0	1.0	3.4	0.0	3.4	3.4
Plot area (acres)			0.0247		0.0247		0.0247		0.0247		0.0247		0.0247		0.0247		0.0247		0.0247							
Species count			3	3	2	2	3	3	3	3	5	5	2	2	3	3	4	4	5	5						
Stem Count			**10**	**10**	**6**	**6**	**6**	**6**	**10**	**10**	**8**	**8**	**3**	**3**	**14**	**14**	**10**	**10**	**11**	**11**						
Stems per Acre			405	405	243	243	243	243	405	405	324	324	122	122	567	567	405	405	446	446						

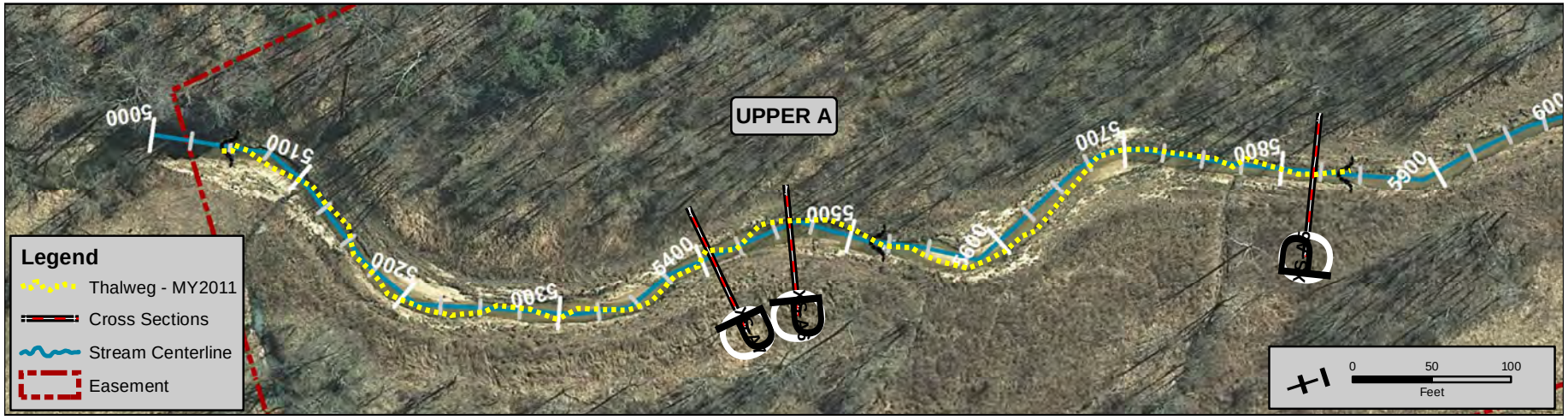
Scientific Name	Common Name	Type	VQB2		VQB3		VQB6		VQB7		VQC1		VQC3		VQD1		VQW1		VQW4		Current Mean		MY1 (2010)		MY0 (2008)	
			P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T
Acer negundo	Box Elder	T																			0.0	0.0	1.0	0.0	1.0	1.0
Acer rubrum	Red Maple	T					1	1													1.0	1.0	1.5	0.0	1.5	1.5
Alnus serrulata	Common Alder	S																			0.0	0.0	1.0	0.0	1.0	1.0
Betula nigra	River Birch	T	1	1	4	4	2	2											2	2	1.6	1.6	2.3	1.4	2.3	2.3
Carpinus caroliniana	Ironwood, American hornbeam	T																			0.0	0.0	1.5	0.0	1.5	1.5
Celtis laevigata	Sugarberry, Hackberry	T	1	1																	1.0	1.0	0.0	0.0	0.0	0.0
Cephalanthus occidentalis	Common Buttonbush	S																			0.0	0.0	3.0	0.0	3.0	3.0
Cornus amomum	Silky Dogwood	L																			3.0	3.0	1.0	1.0	1.0	1.0
Crategeou crus-gali	Cockspur Hawthorn	T																			0.0	0.0	1.0	0.0	1.0	1.0
Diospyros virginiana	American Persimmon	T															3	3			4.0	4.0	0.0	4.5	0.0	0.0
Fraxinus pennsylvanica	Green Ash	T			1	1	1	1									7	7			3.7	3.7	1.2	3.3	1.2	1.2
Hamamelis virginiana	Witch-hazel	S			3	3							3	3			1	1			2.0	2.0	0.0	0.0	0.0	0.0
Ilex opaca	American Holly	T																			0.0	0.0	0.0	2.0	0.0	0.0
Liquidambar styraciflua	American Sweetgum	T			3	3			2	2											2.8	2.8	0.0	2.0	0.0	0.0
Liriodendron tulipera	Tulip Poplar, Yellow Poplar	T							1	1	5	5									3.0	3.0	1.0	6.0	1.0	1.0
Pinus echinata	Shortleaf Pine	T																			0.0	0.0	1.0	0.0	1.0	1.0
Plantanus occidentalis	American Sycamore	T			18	18			4	4			4	4	2	2	1	1			4.4	4.4	2.5	5.2	2.5	2.5
Quercus michauxii	Swamp Chestnut Oak	T																			0.0	0.0	1.0	0.0	1.0	1.0
Quercus nigra	Water Oak	T																			0.0	0.0	1.0	0.0	1.0	1.0
Quercus phellos	Willow Oak	T																			0.0	0.0	0.0	0.0	0.0	0.0
Quercus phellos	Willow Oak	L																			0.0	0.0	0.0	1.0	0.0	0.0
Quercus shumardii	Shumard Oak	T			1	1															1.0	1.0	0.0	1.0	0.0	0.0
Quercus sp.	Oak, species unknown	T							1	1											1.0	1.0	0.0	0.0	0.0	0.0
Salix nigra	Black Willow	L							1	1	13	13	8	8	4	4					4.7	4.7	0.0	4.5	0.0	0.0
Salix sericea	Silky Willow	S																			4.0	4.0	0.0	0.0	0.0	0.0
Ulmus americana	American Elm	T									1	1					1	1	1	1	1.4	1.4	0.0	1.8	0.0	0.0
Unidentified	Unidentified	T																			3.0	3.0	3.4	0.0	3.4	3.4
Unknown	Unknown	T	1	1																	1.0	1.0	3.4	0.0	3.4	3.4
Plot area (acres)			0.0247		0.0247		0.0247		0.0247		0.0247		0.0247		0.0247		0.0247		0.0247							
Species count			3	3	6	6	3	3	5	5	3	3	3	3	2	2	5	5	2	2	3.4	3.4	3.4	2.4	3.4	3.4
Stem Count			**3**	**3**	**30**	**30**	**4**	**4**	**9**	**9**	**19**	**19**	**15**	**15**	**6**	**6**	**13**	**13**	**3**	**3**	**10.0**	**10.0**	**7.8**	**7.9**	**7.8**	**7.8**
Stems per Acre			122	122	1215	1215	162	162	365	365	770	770	608	608	243	243	527	527	122	122	405.2	405.2	315.2	319.8	315.2	315.2

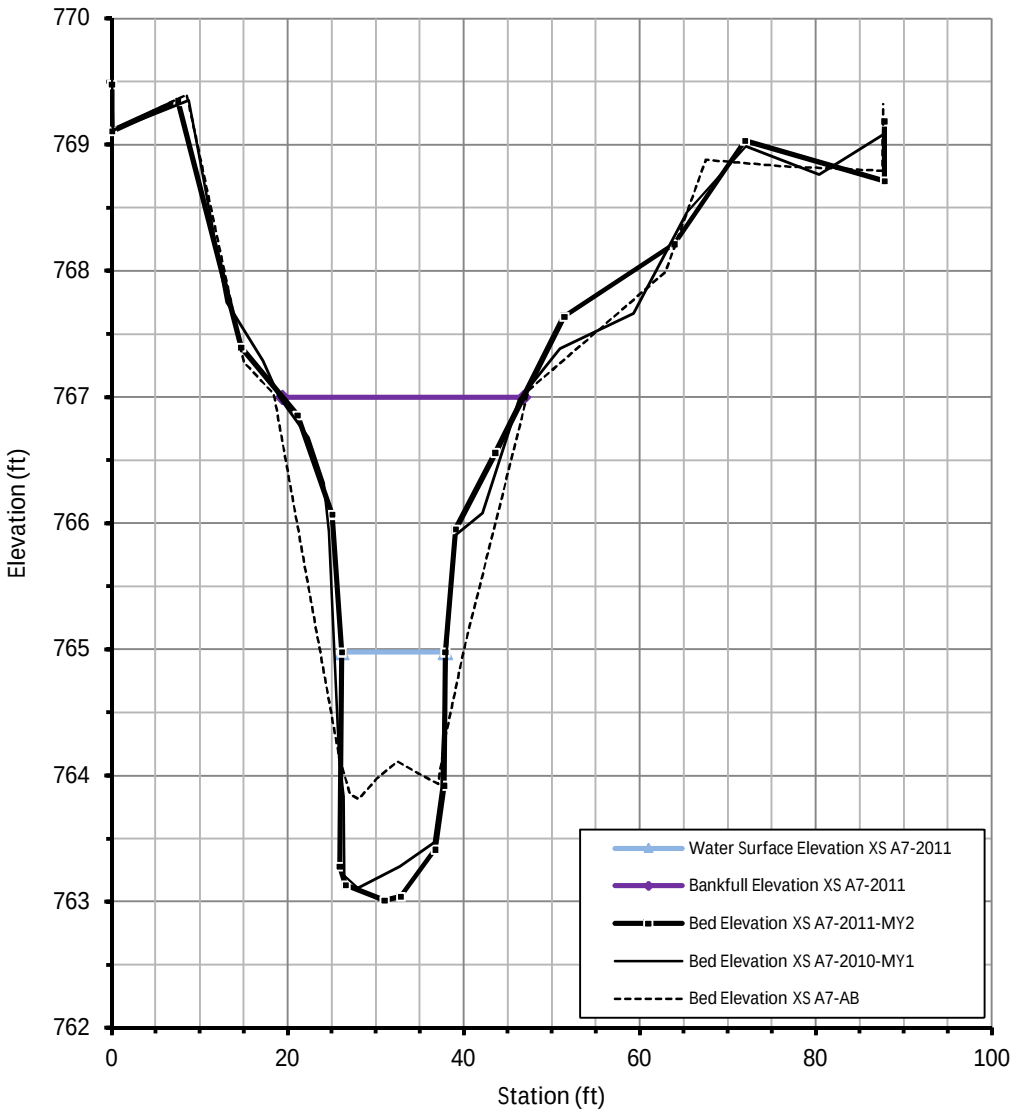
Type = Tree (T), Shrub (S), Livestake (L)
P = Planted
T = Total

APPENDIX D:

STREAM SURVEY DATA

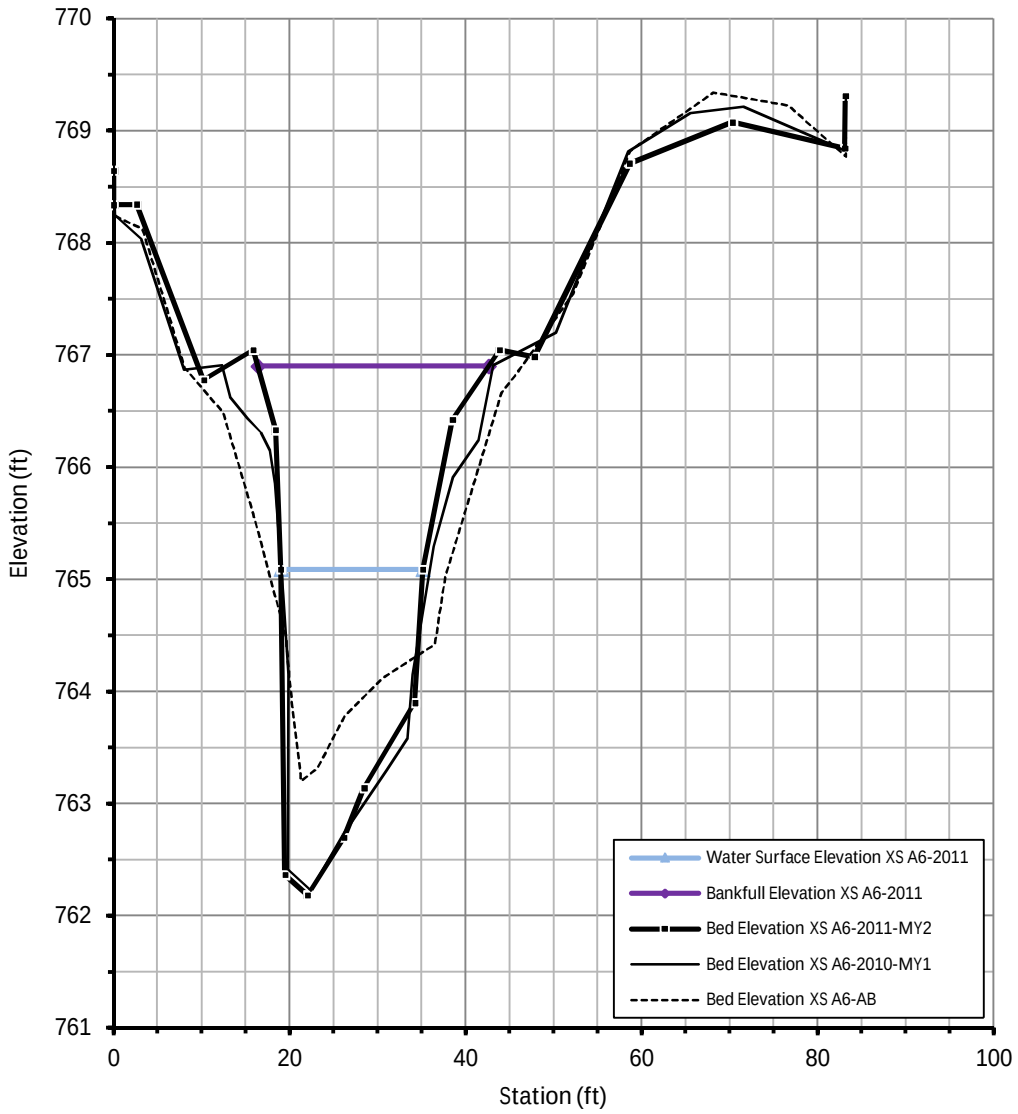

THALWEG PROFILE 2011 - UPPER A
Water Surface Slope - 0.02%
Bankfull Slope - 0.10%
Elevation (ft)
Station (ft)
769
768
767
766
765
764
763
762
761
760
759
4900
5000
5100
5200
5300
5400
5500
5600
5700
5800
5900
6000
XS - 7
XS - 6
XS - 5
BANKFULL
2011 WATER SURFACE
2011 BED ELEVATION
2010 BED ELEVATION
AB Bed Elevation


UPPER A
Legend
Thalweg - MY2011
Cross Sections
Stream Centerline
Easement
0
50
100
Feet



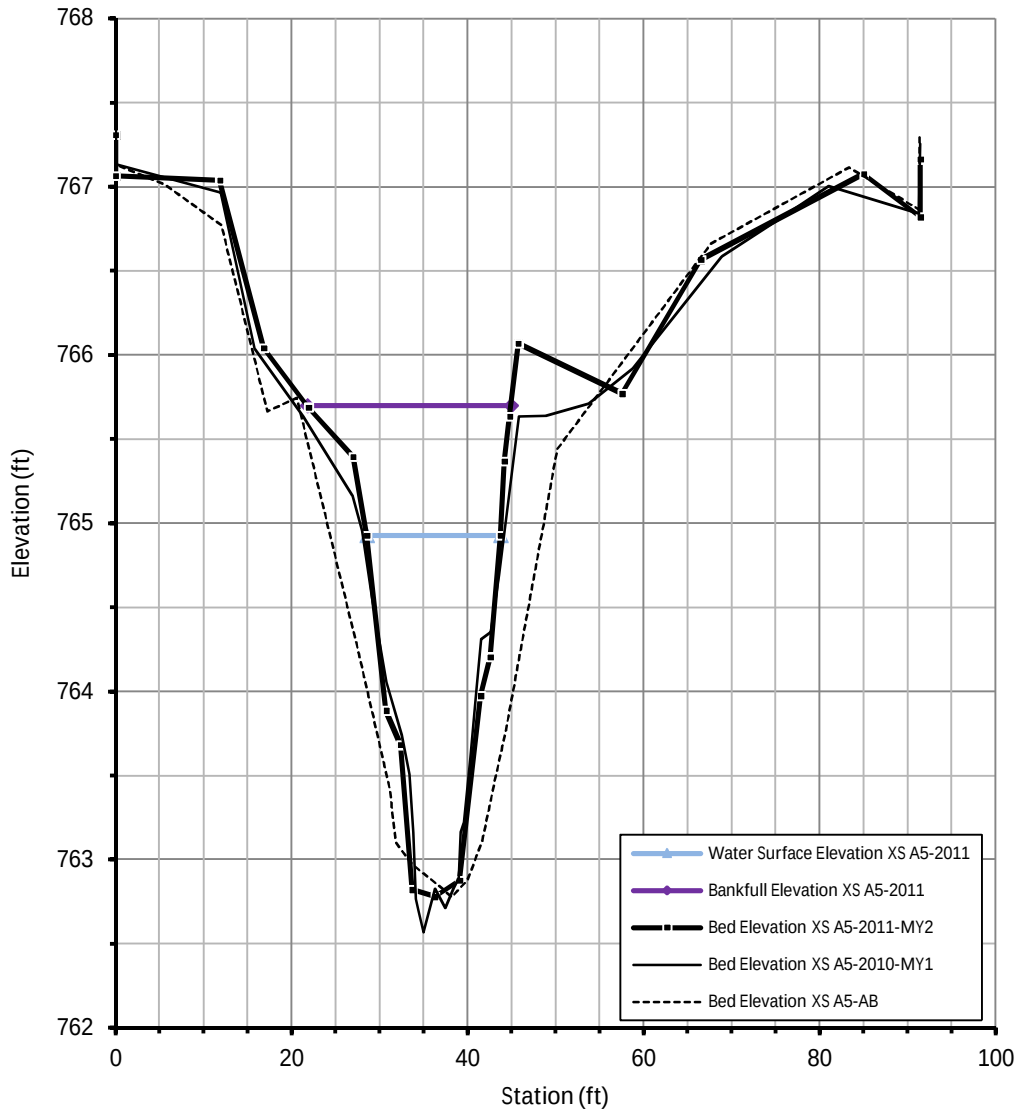
ID	YEAR	PHASE	FACET TYPE	Wbkf	Abkf	Dbkf
XS A7	2008	AB	RIFFLE	29.1	60.1	3.2
XS A7	2010	MY1	RIFFLE	27.2	54.8	3.9
XS A7	2011	MY2	RIFFLE	27.4	54.7	4.0

NOTES:



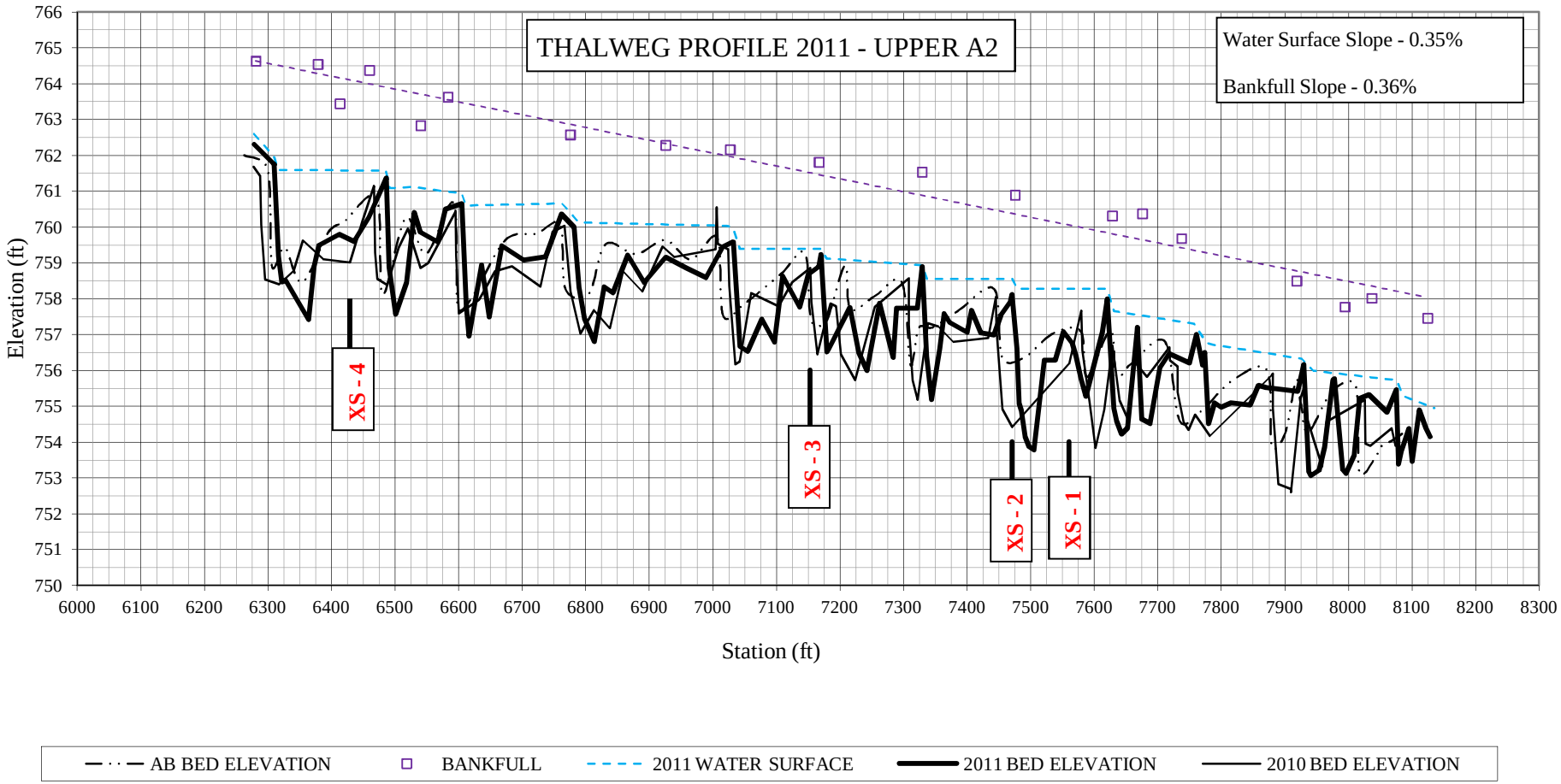
ID	YEAR	PHASE	FACET TYPE	Wbkf	Abkf	Dbkf
XS A6	2008	AB	POOL	38.3	71.0	3.7
XS A6	2010	MY1	POOL	34.7	75.6	4.7
XS A6	2011	MY2	POOL	26.2	68.7	4.7

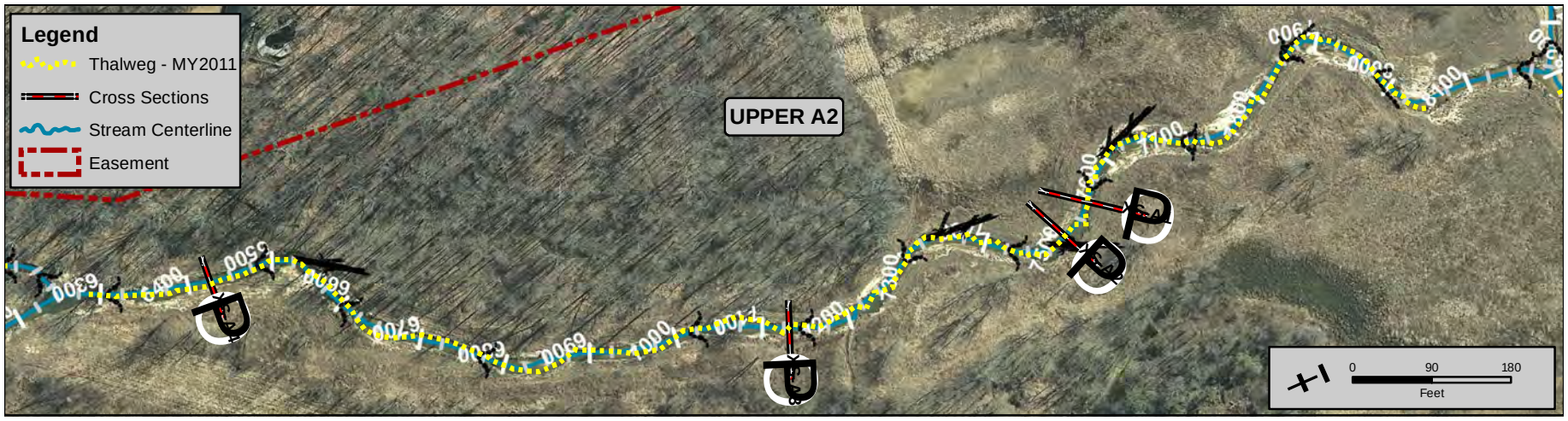
NOTES:



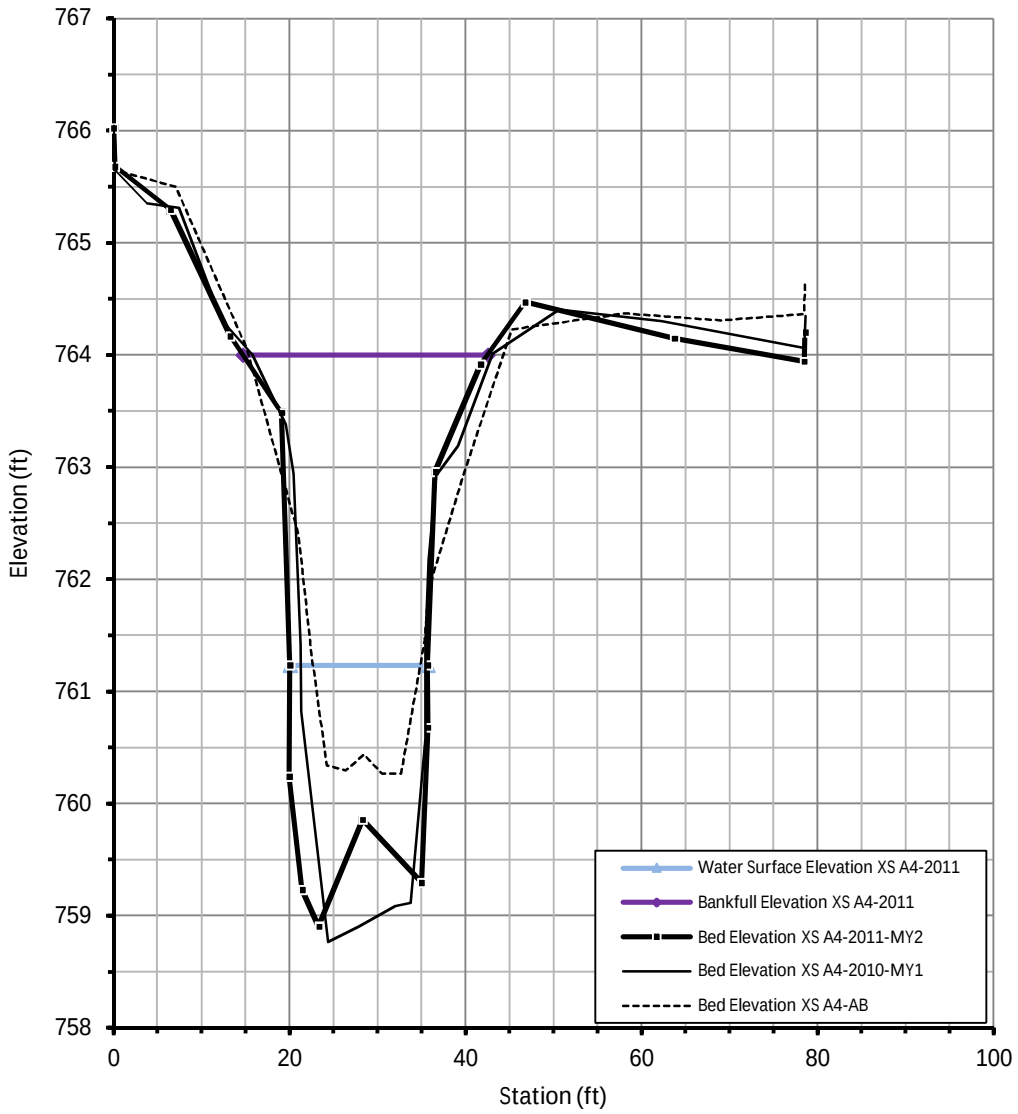
ID	YEAR	PHASE	FACET TYPE	Wbkf	Abkf	Dbkf
XS A5	2008	AB	RIFFLE	31.0	50.1	2.8
XS A5	2010	MY1	RIFFLE	29.9	35.5	3.1
XS A5	2011	MY2	RIFFLE	23.2	35.3	2.9

NOTES:



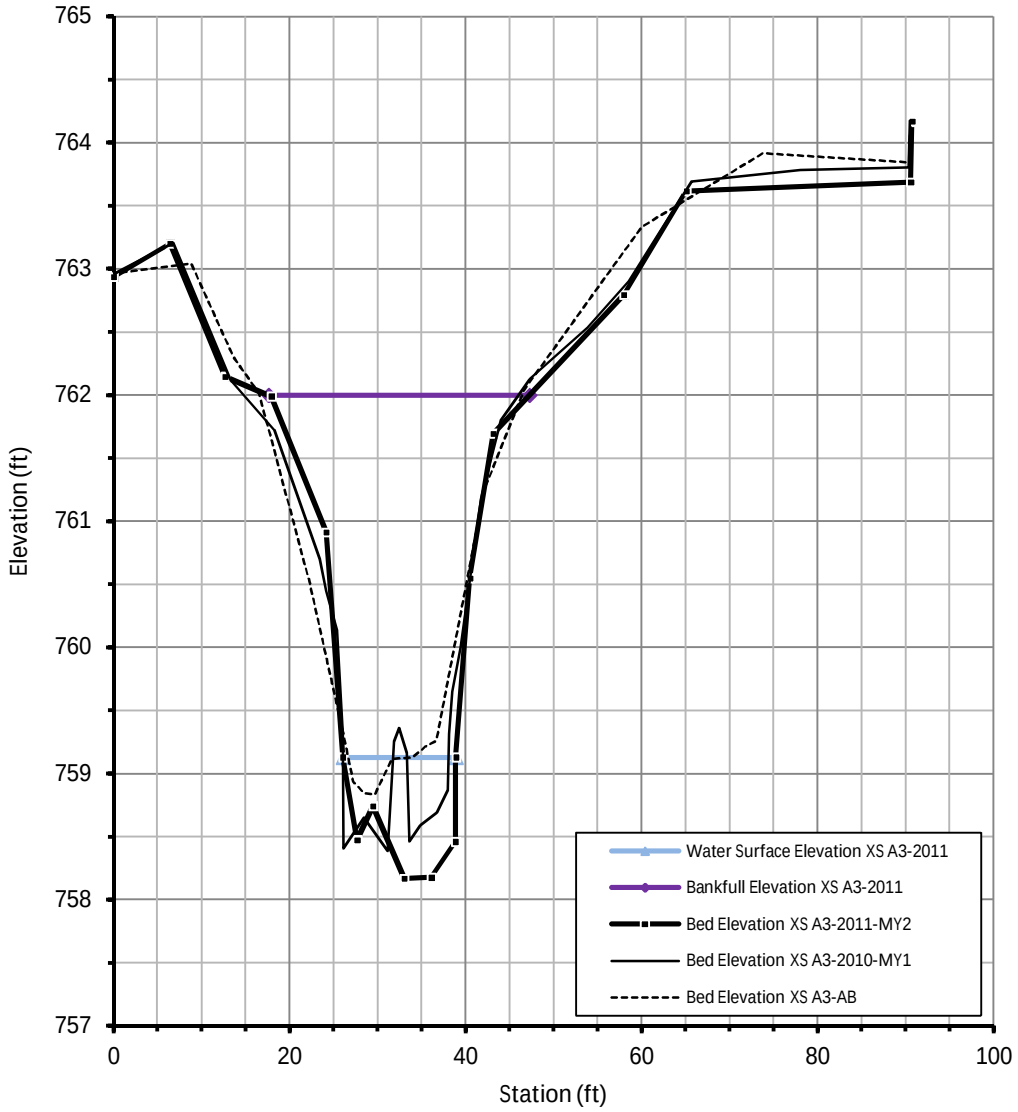


Kimley-Horn and Associates, Inc.



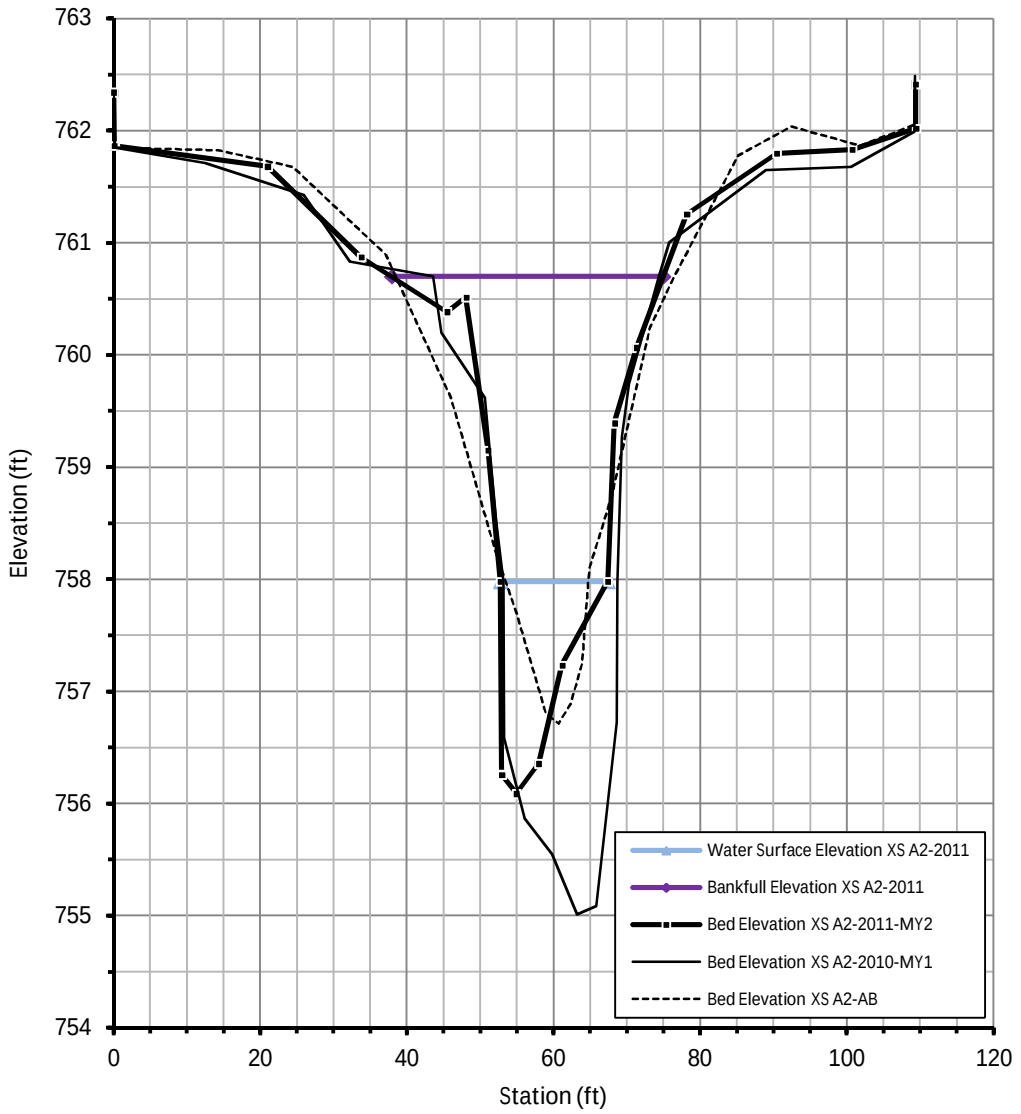
ID	YEAR	PHASE	FACET TYPE	Wbkf	Abkf	Dbkf
XS A4	2008	AB	RIFFLE	31.1	69.0	4.0
XS A4	2010	MY1	RIFFLE	27.5	75.9	5.2
XS A4	2011	MY2	RIFFLE	32.0	78.2	5.1

NOTES:



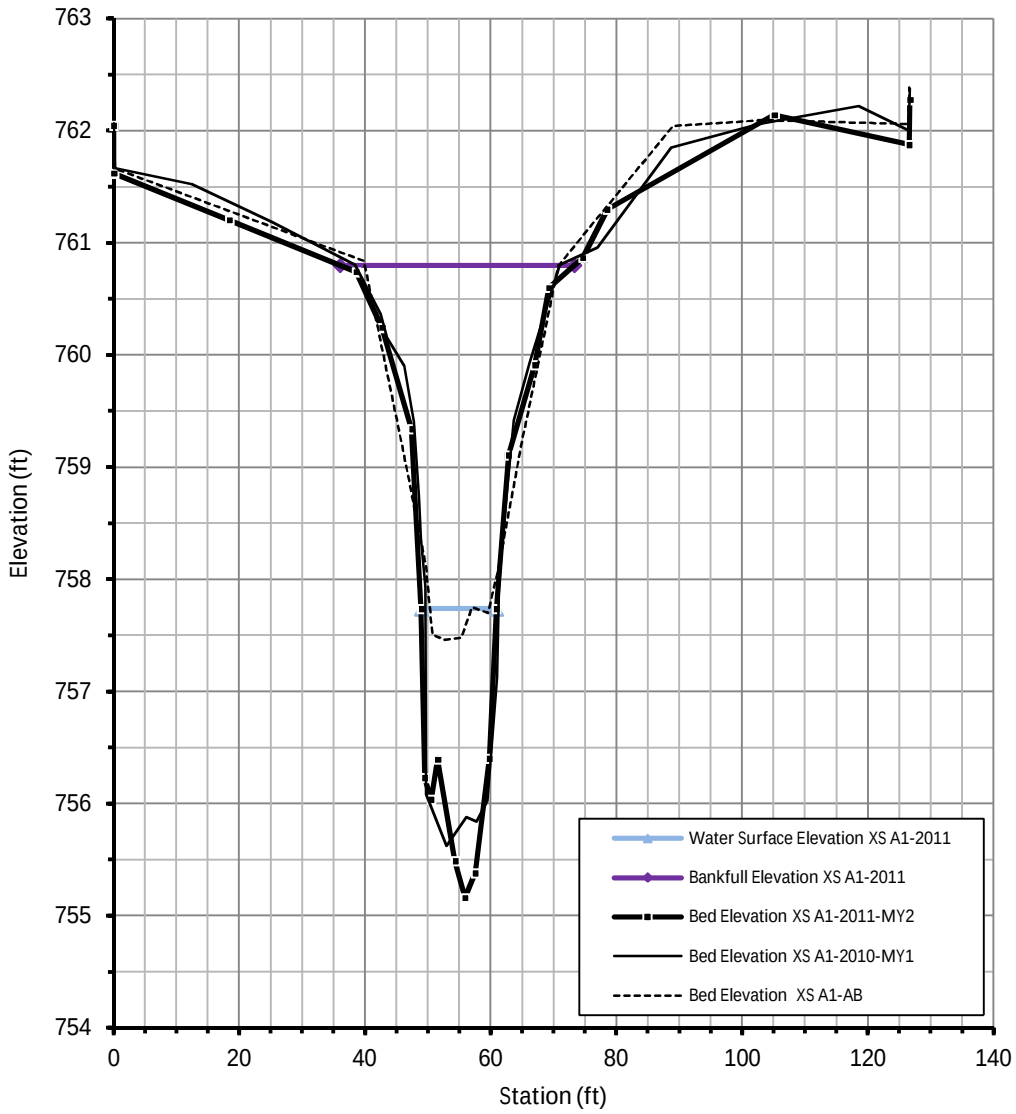
ID	YEAR	PHASE	FACET TYPE	Wbkf	Abkf	Dbkf
XS A3	2008	AB	RIFFLE	30.1	55.2	3.2
XS A3	2010	MY1	RIFFLE	33.4	57.4	3.6
XS A3	2011	MY2	RIFFLE	29.7	59.5	3.8

NOTES:



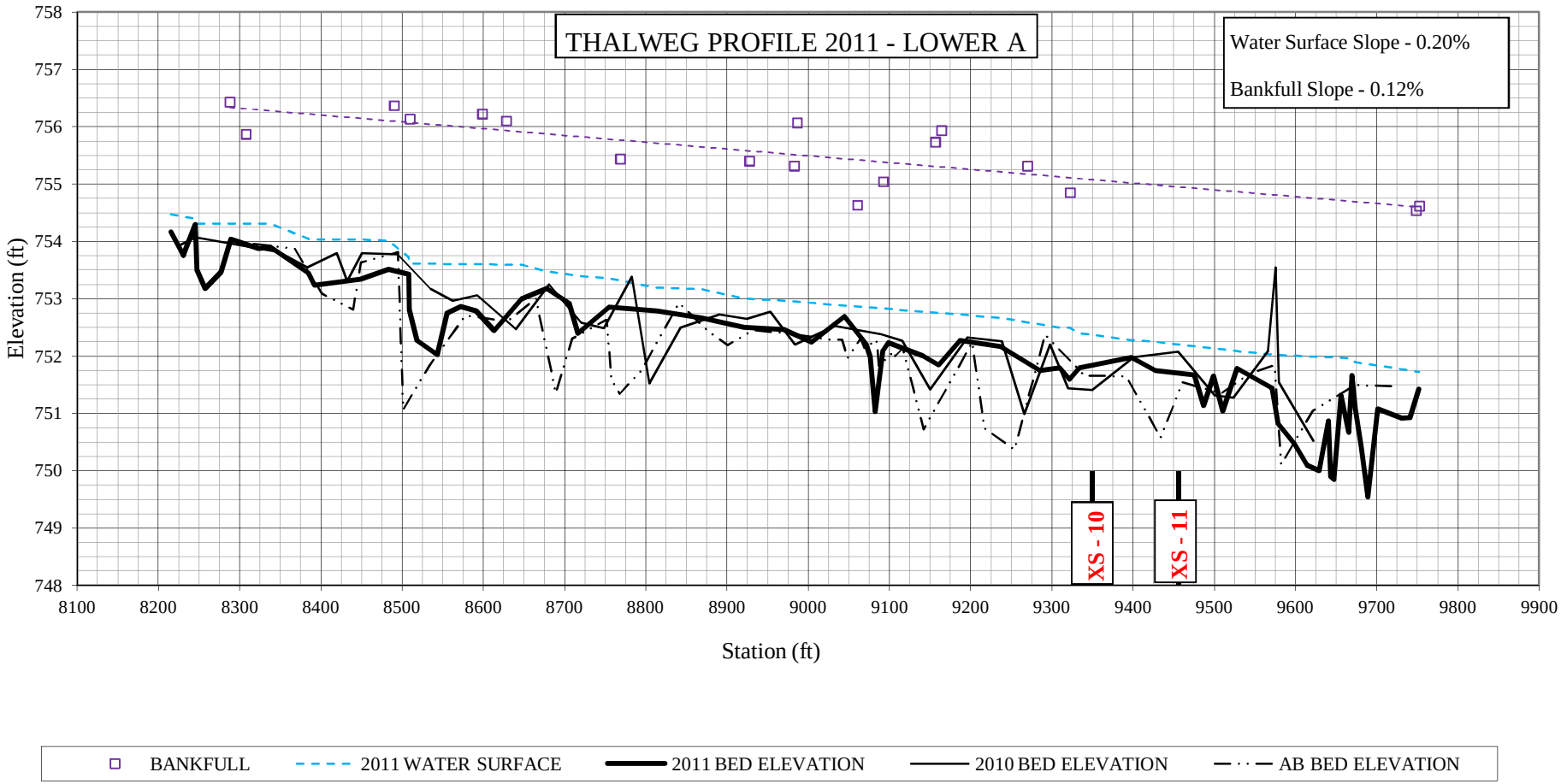
ID	YEAR	PHASE	FACET TYPE	Wbkf	Abkf	Dbkf
XS A2	2008	AB	POOL	40.9	79.9	4.2
XS A2	2010	MY1	POOL	30.8	92.8	5.7
XS A2	2011	MY2	POOL	37.1	69.1	4.6

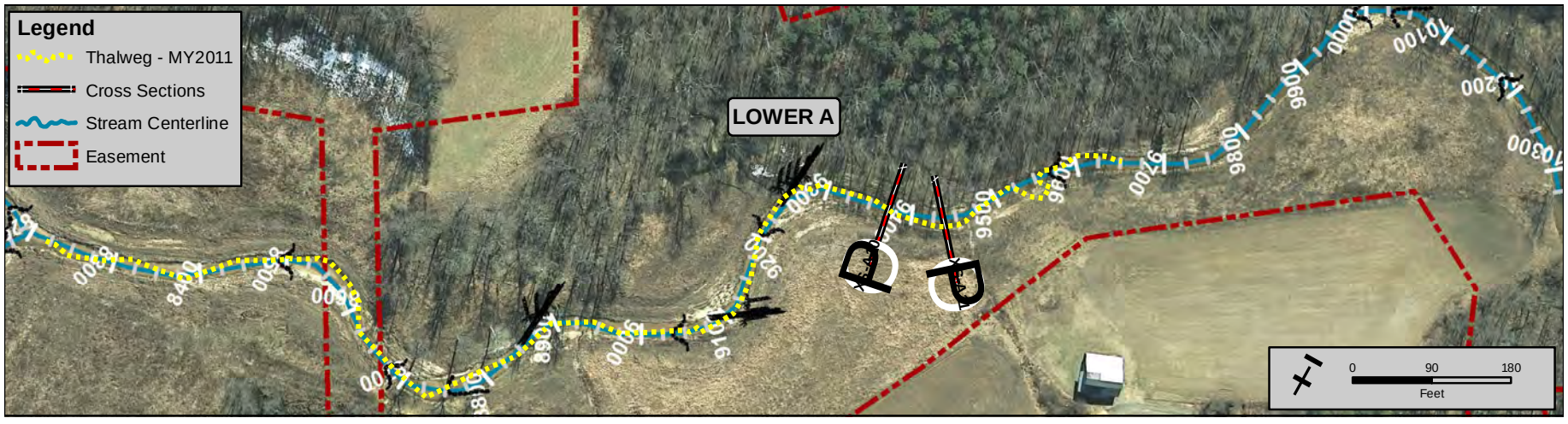
NOTES:

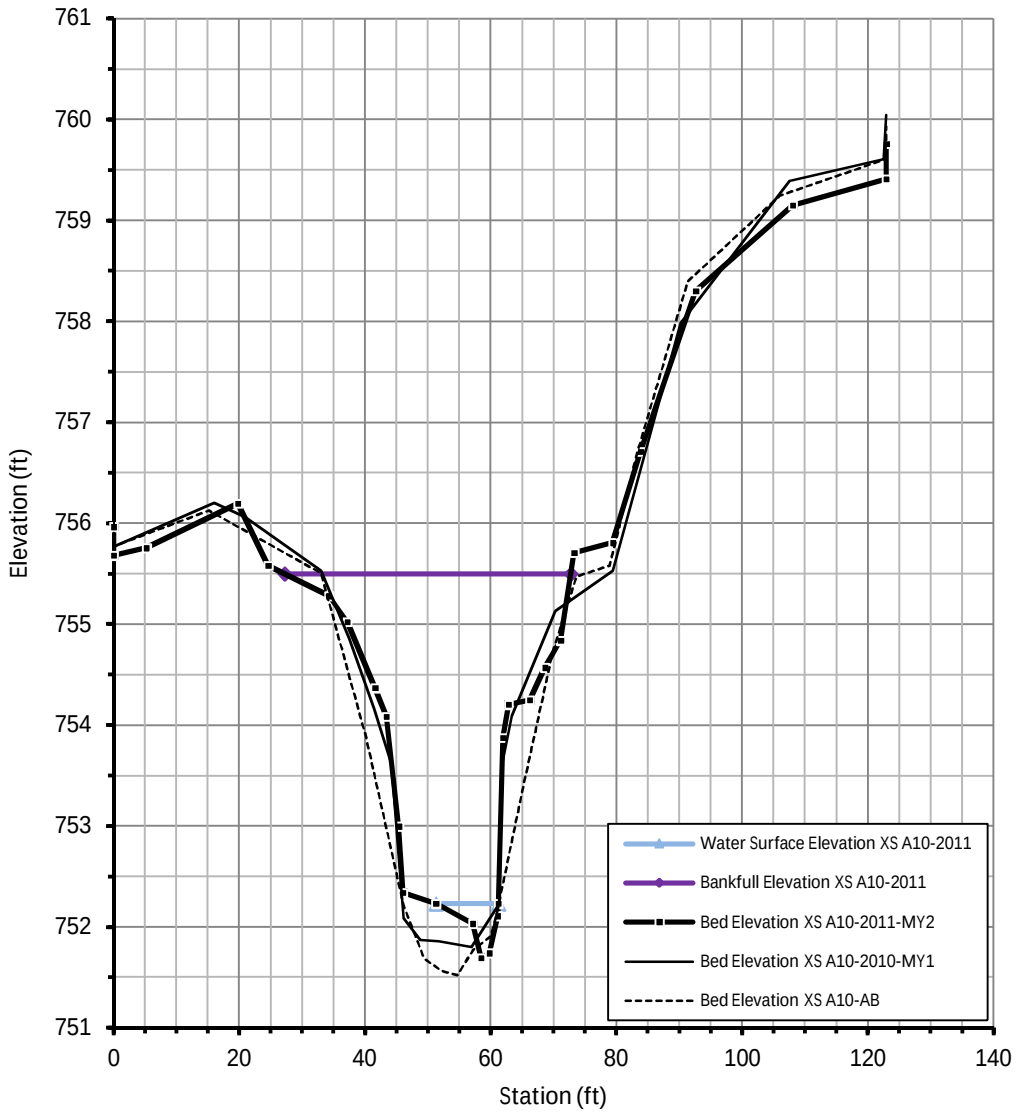


ID	YEAR	PHASE	FACET TYPE	Wbkf	Abkf	Dbkf
XS A1	2008	AB	RIFFLE	31.1	62.5	3.4
XS A1	2010	MY1	RIFFLE	33.3	76.4	5.2
XS A1	2011	MY1	RIFFLE	37.3	79.1	5.6

NOTES:

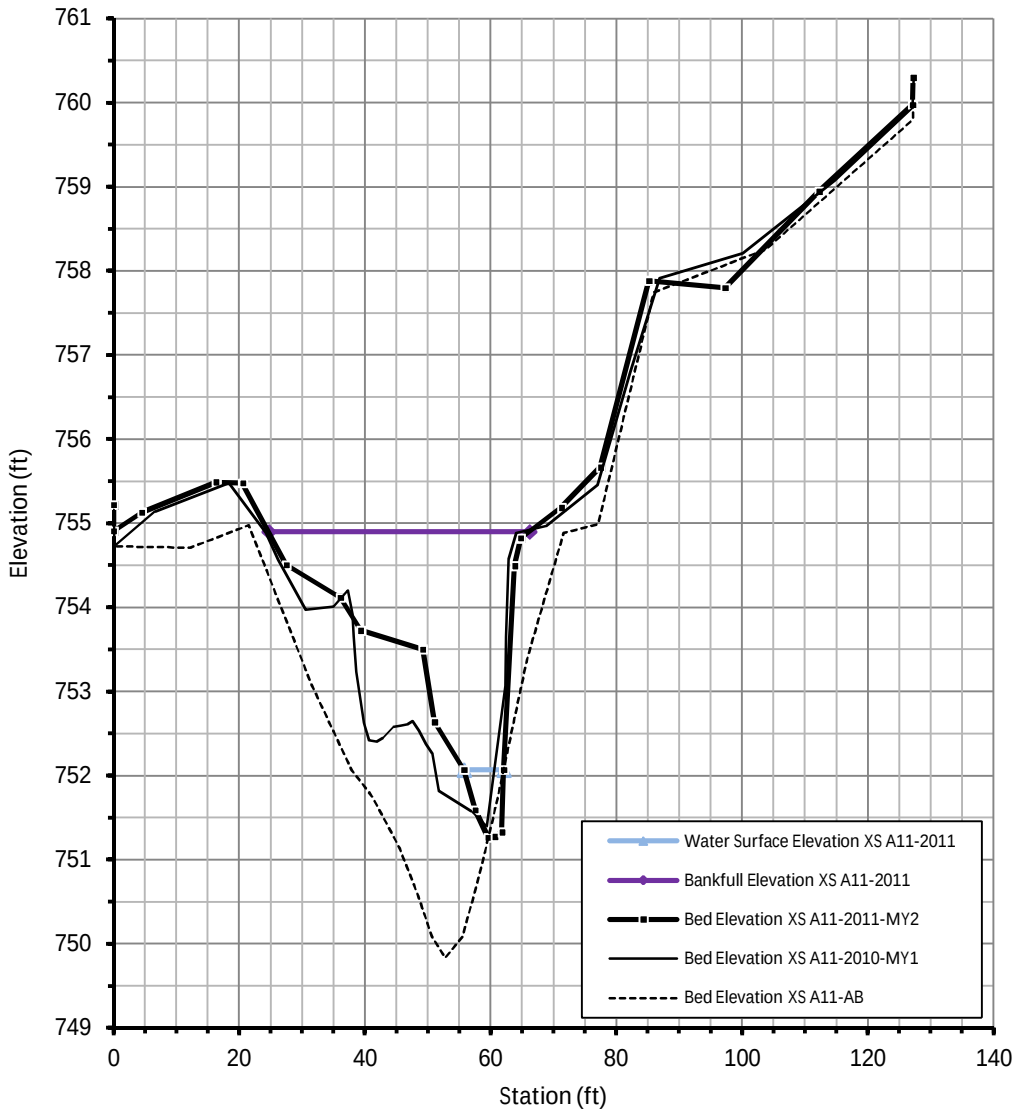

THALWEG PROFILE 2011 - LOWER A
Water Surface Slope - 0.20%
Bankfull Slope - 0.12%
Elevation (ft)
Station (ft)
XS - 10
XS - 11
BANKFULL
2011 WATER SURFACE
2011 BED ELEVATION
2010 BED ELEVATION
AB BED ELEVATION


Legend
Thalweg - MY2011
Cross Sections
Stream Centerline
Easement
LOWER A
0
90
180
Feet



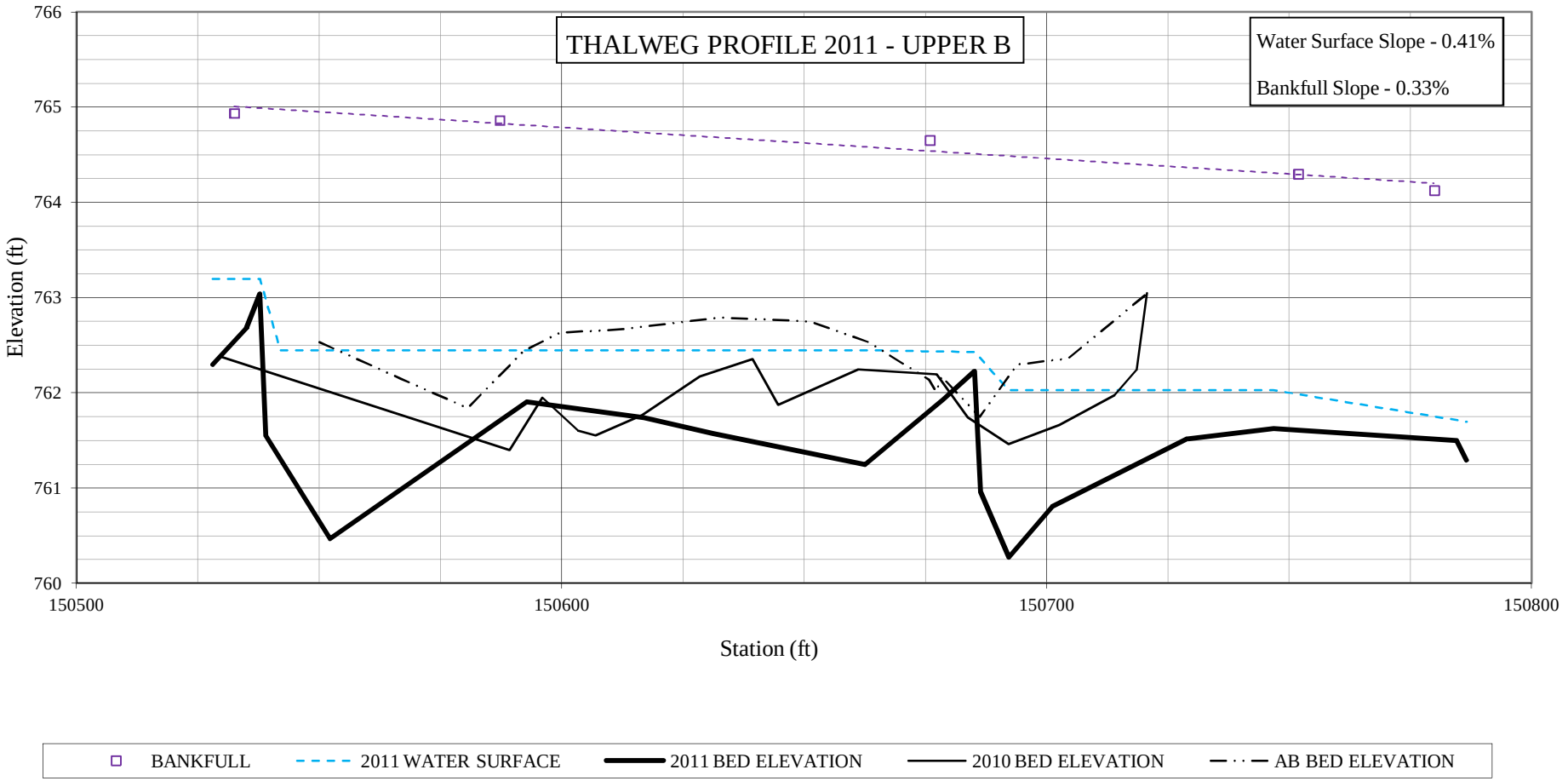
ID	YEAR	PHASE	FACET TYPE	Wbkf	Abkf	Dbkf
XS A10	2008	AB	RIFFLE	41.3	95.5	4.0
XS A10	2010	MY1	RIFFLE	47.1	85.4	3.8
XS A10	2011	MY2	RIFFLE	42.9	74.0	3.8

NOTES: Impacted by beaver dam on downstream end of profile.

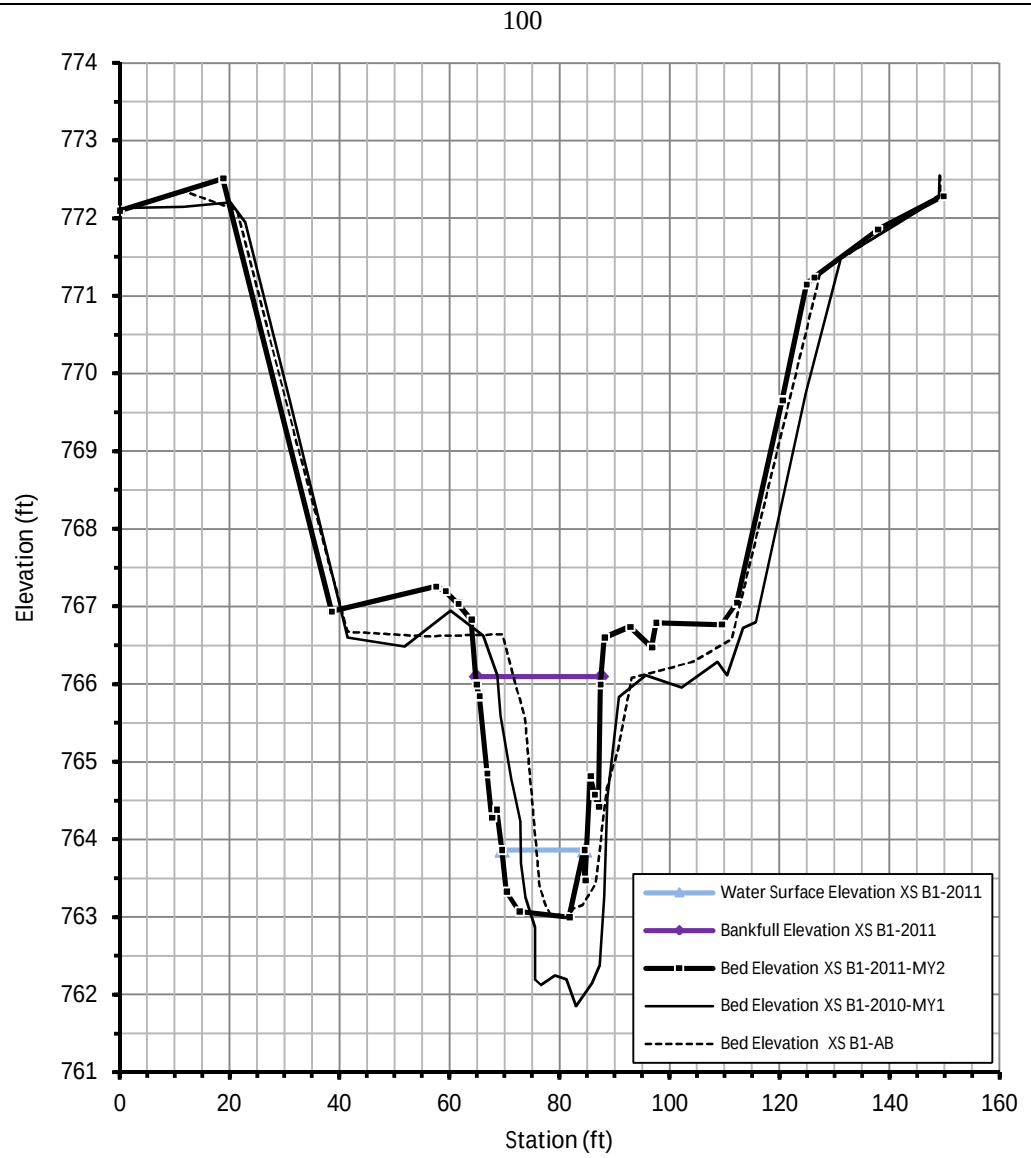


ID	YEAR	PHASE	FACET TYPE	Wbkf	Abkf	Dbkf
XS A11	2008	AB	POOL	49.9	133.9	5.1
XS A11	2010	MY1	POOL	41.6	74.6	3.5
XS A11	2011	MY2	POOL	41.5	61.4	3.6

NOTES: Impacted by beaver dam on downstream end of profile. Beaver dam also appears to be preventing the transport of bed material out of the pools.

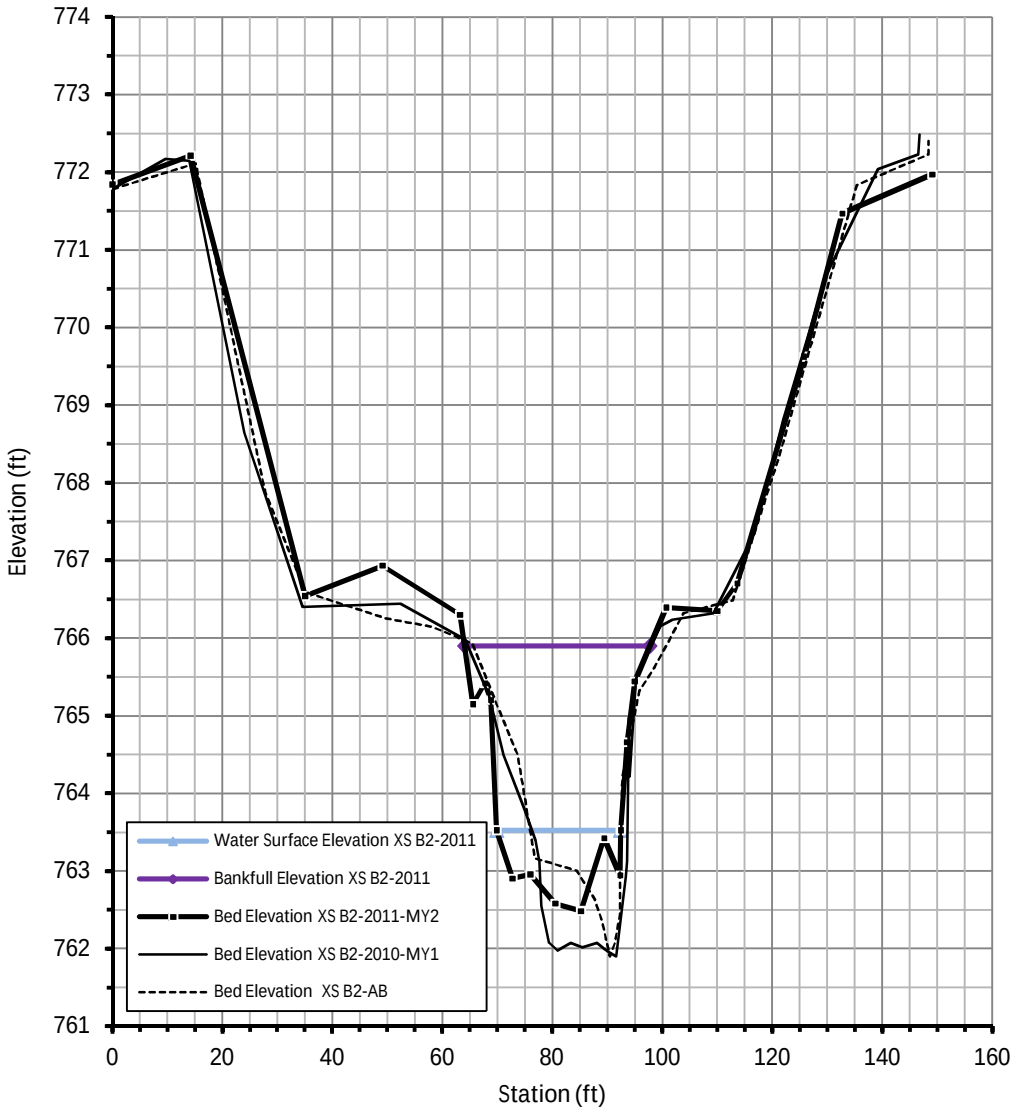

THALWEG PROFILE 2011 - UPPER B
Water Surface Slope - 0.41%
Bankfull Slope - 0.33%
Elevation (ft)
766
765
764
763
762
761
760
150500
150600
150700
150800
Station (ft)
BANKFULL
2011 WATER SURFACE
2011 BED ELEVATION
2010 BED ELEVATION
AB BED ELEVATION


UPPER B
Legend
Thalweg - MY2011
Cross Sections
Stream Centerline
Easement
0
40
80
Feet



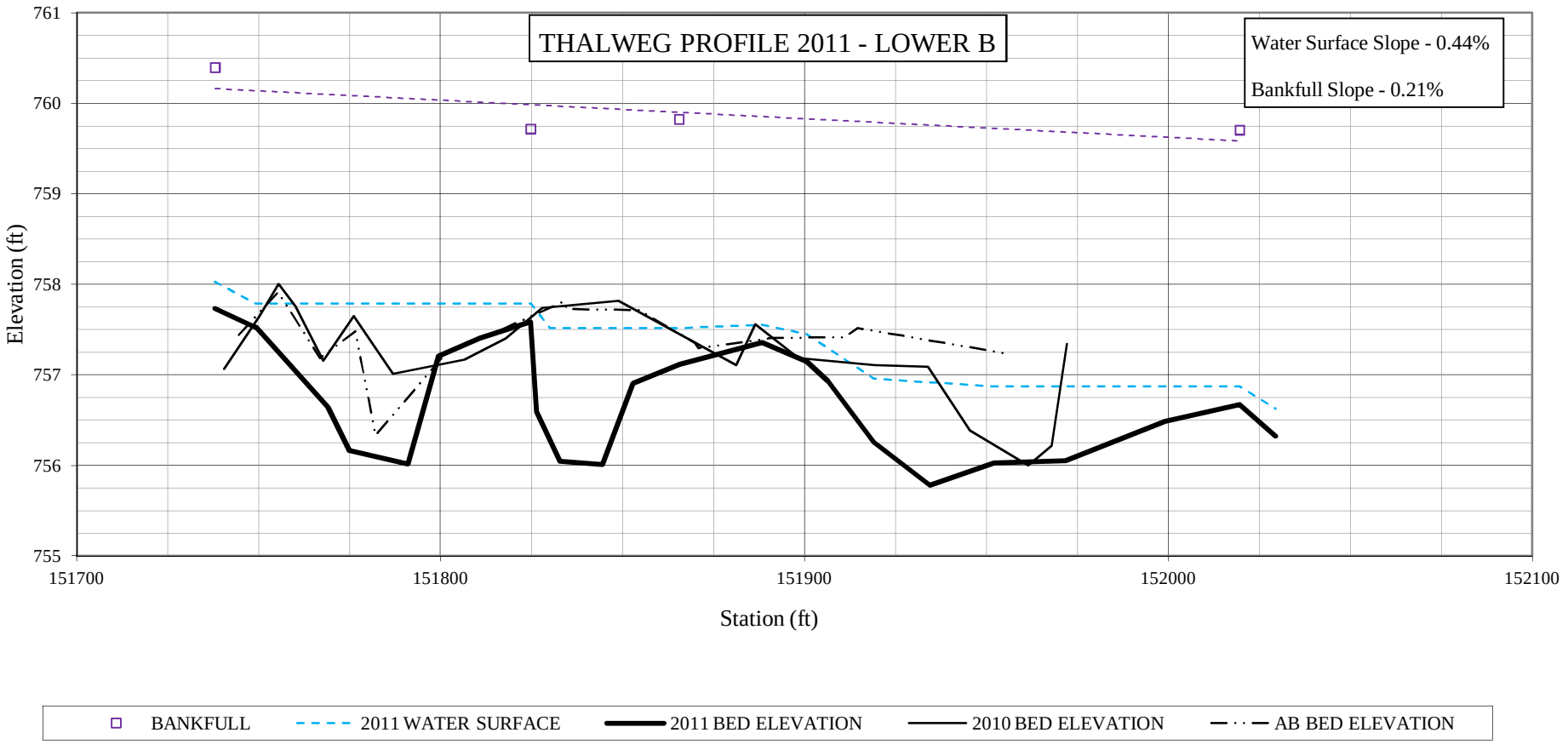
ID	YEAR	PHASE	FACET TYPE	Wbkf	Abkf	Dbkf
XS B1	2009	AB	RIFFLE	21.4	42.4	3.1
XS B1	2010	MY1	RIFFLE	36.4	66.6	4.3
XS B1	2011	MY2	RIFFLE	22.8	54.7	3.1

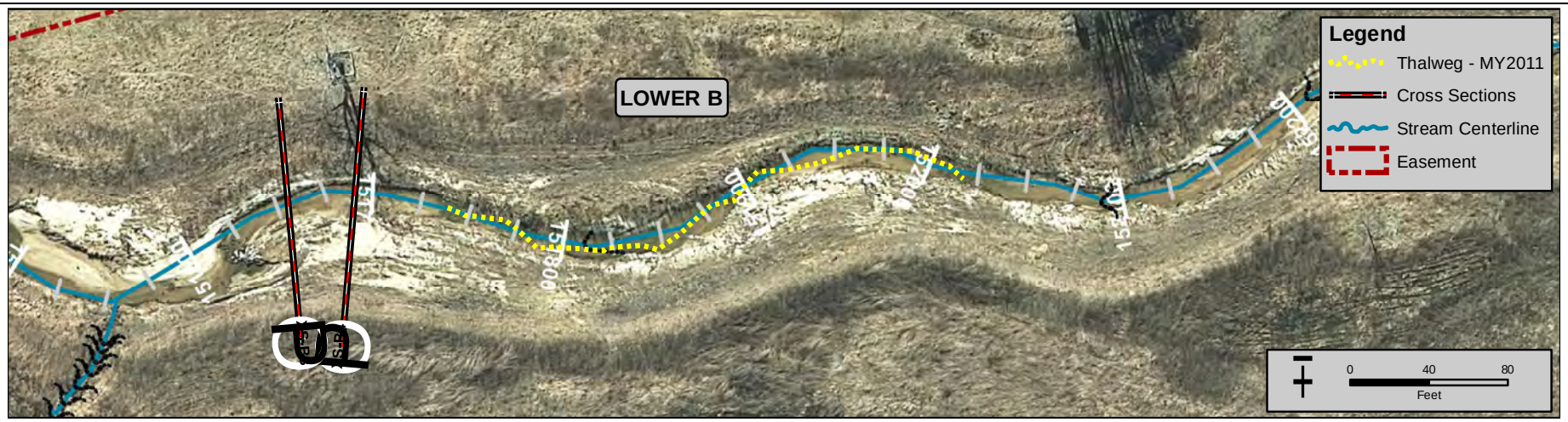
NOTES: The cross sections on reach B are not located within the longitudinal profile sections.

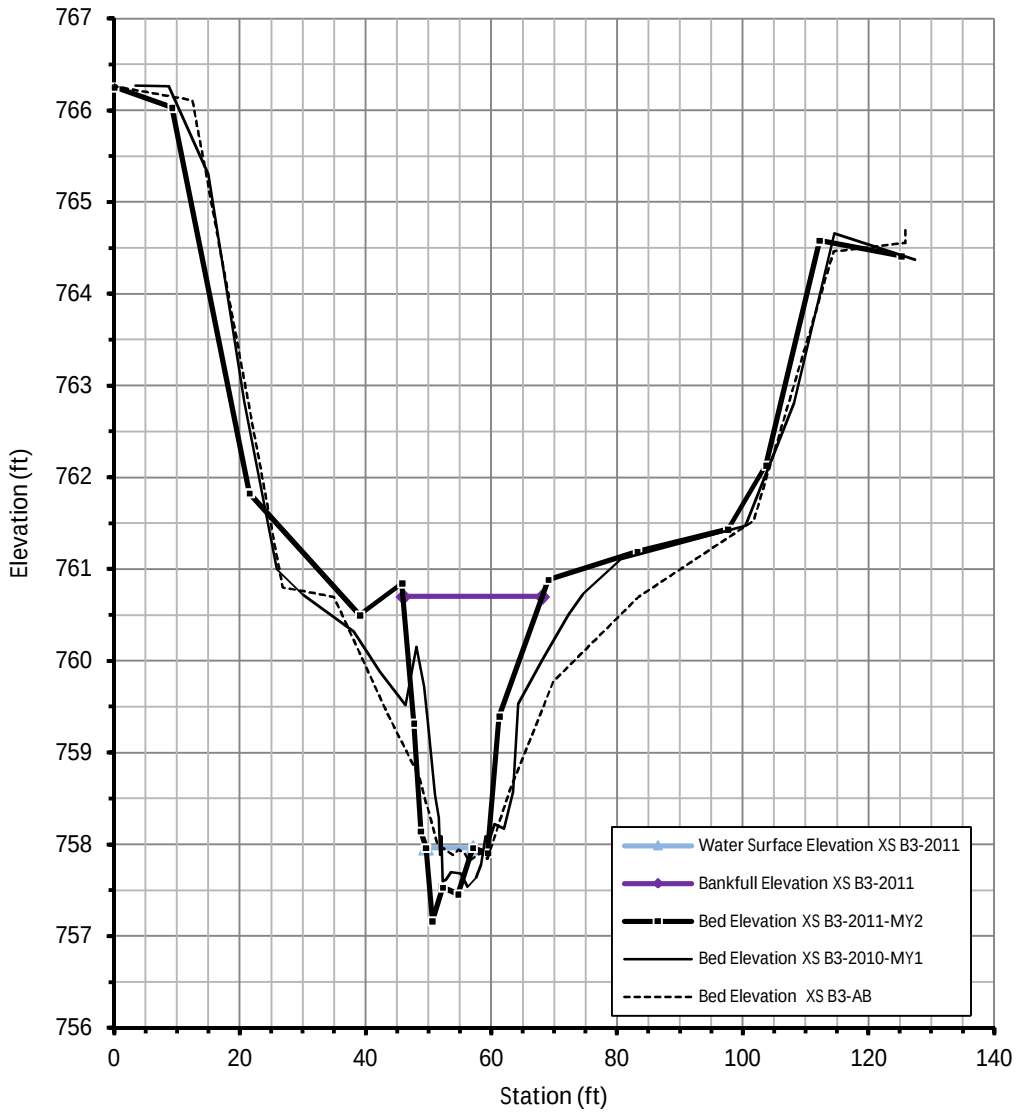


ID	YEAR	PHASE	FACET TYPE	Wbkf	Abkf	Dbkf
XS B2	2009	AB	POOL	35.7	67.7	4.0
XS B2	2010	MY1	POOL	34.3	81.5	4.0
XS B2	2011	MY2	POOL	33.7	75.9	3.4

NOTES: The cross sections on reach B are not located within the longitudinal profile sections.

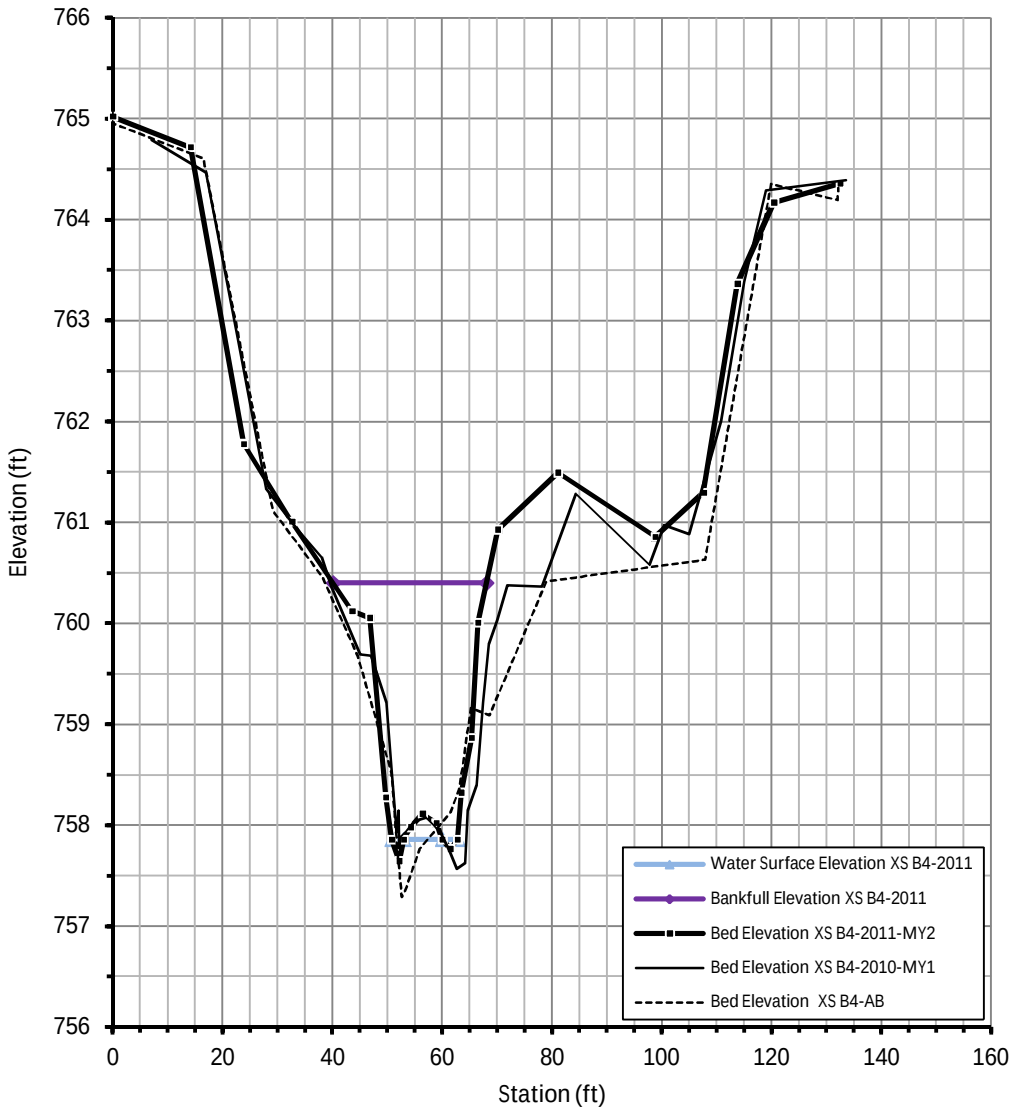

THALWEG PROFILE 2011 - LOWER B
Water Surface Slope - 0.44%
Bankfull Slope - 0.21%
Elevation (ft)
761
760
759
758
757
756
755
151700
151800
151900
152000
152100
Station (ft)
BANKFULL
2011 WATER SURFACE
2011 BED ELEVATION
2010 BED ELEVATION
AB BED ELEVATION


LOWER B
Legend
Thalweg - MY2011
Cross Sections
Stream Centerline
Easement
0
40
80
Feet



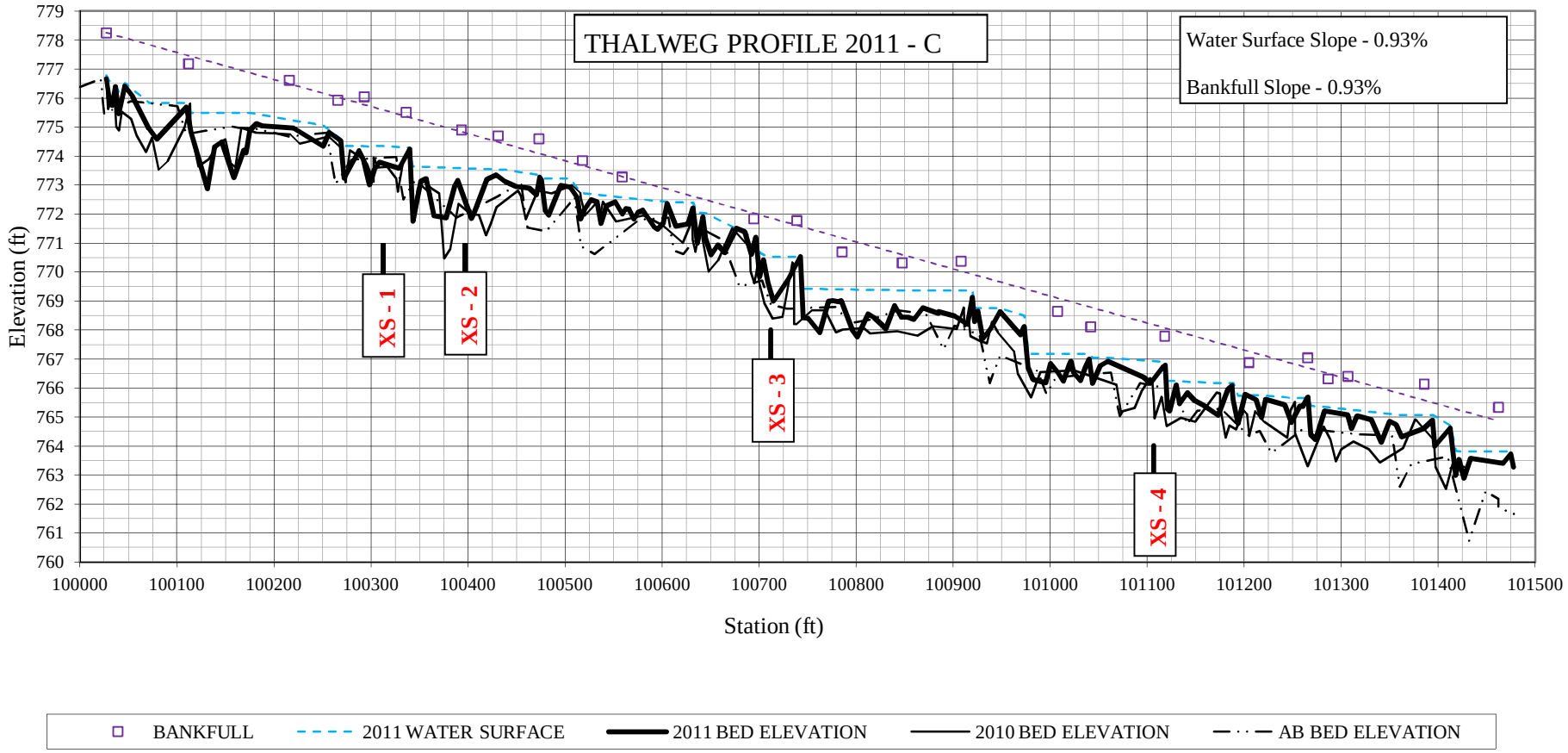
ID	YEAR	PHASE	FACET TYPE	Wbkf	Abkf	Dbkf
XS B3	2009	AB	RIFFLE	48.4	67.8	2.9
XS B3	2010	MY1	RIFFLE	44.4	55.3	3.2
XS B3	2011	MY2	RIFFLE	22.1	44.0	3.5

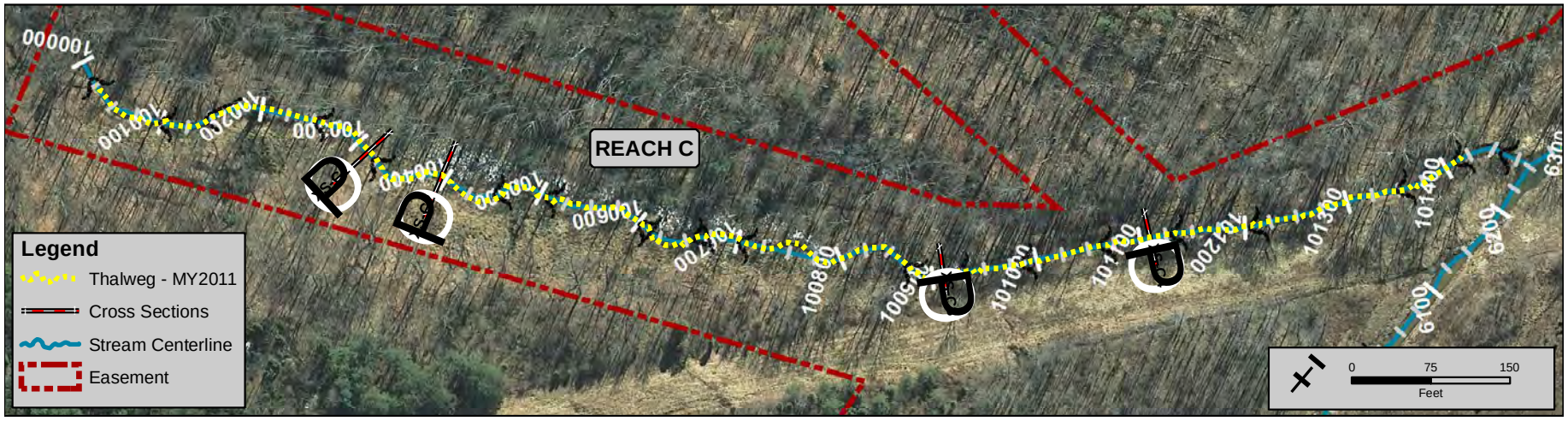
NOTES: The cross sections on reach B are not located within the longitudinal profile sections.

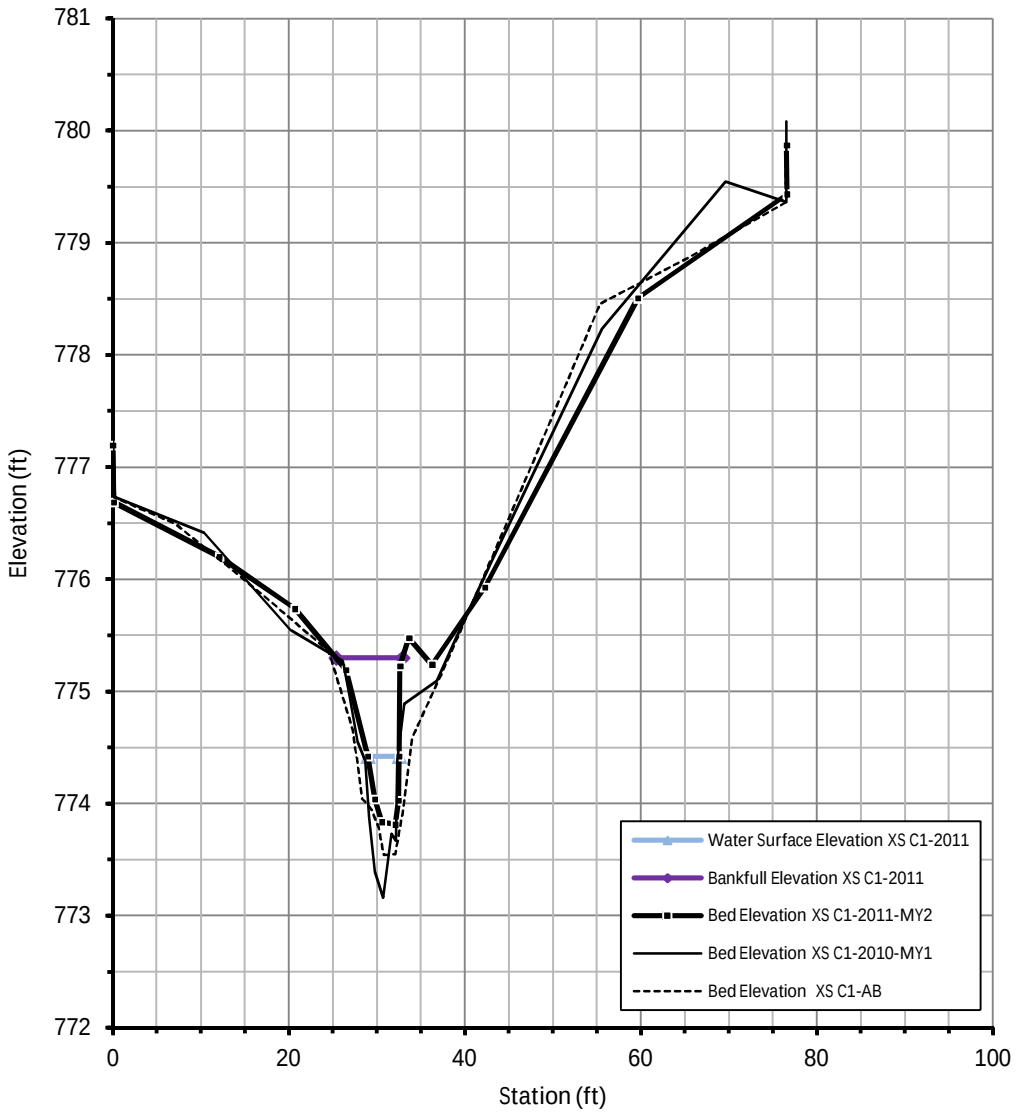


ID	YEAR	PHASE	FACET TYPE	Wbkf	Abkf	Dbkf
XS B4	2009	AB	POOL	44.1	57.7	3.2
XS B4	2010	MY1	POOL	38.3	49.1	2.8
XS B4	2011	MY2	POOL	27.9	43.8	2.8

NOTES: The cross sections on reach B are not located within the longitudinal profile sections.

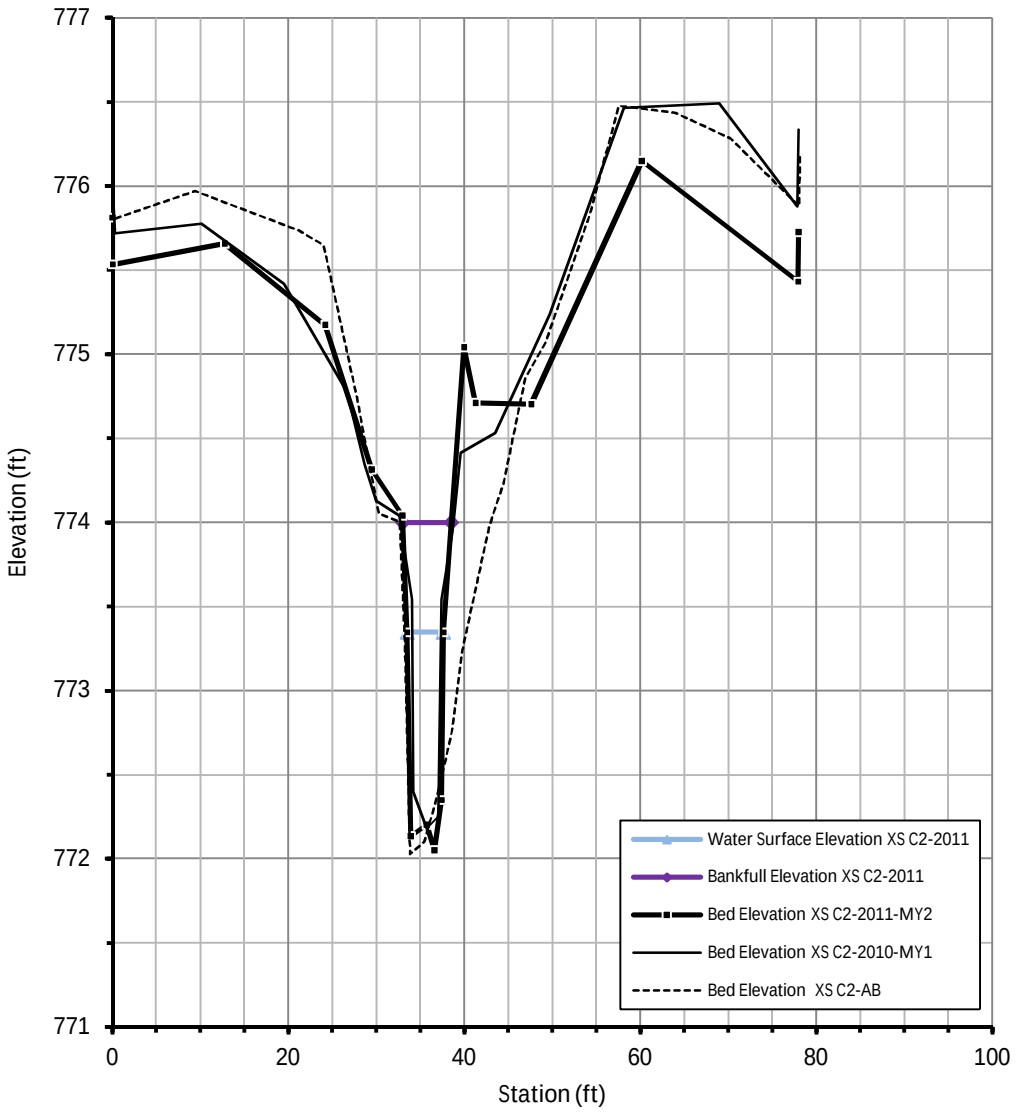

THALWEG PROFILE 2011 - C
Water Surface Slope - 0.93%
Bankfull Slope - 0.93%
Elevation (ft)
Station (ft)
XS - 1
XS - 2
XS - 3
XS - 4
BANKFULL
2011 WATER SURFACE
2011 BED ELEVATION
2010 BED ELEVATION
AB BED ELEVATION


REACH C
Legend
Thalweg - MY2011
Cross Sections
Stream Centerline
Easement
0
75
150
Feet



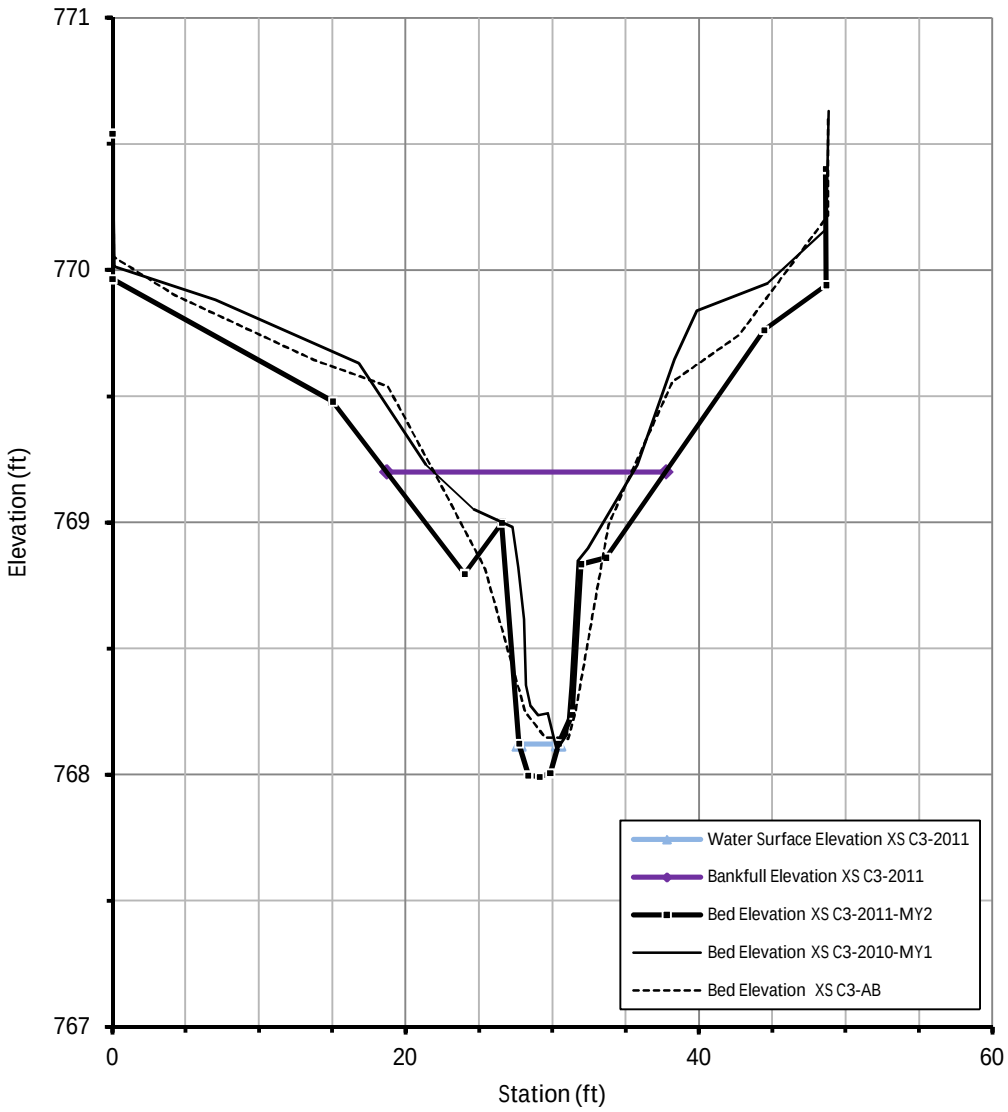
ID	YEAR	PHASE	FACET TYPE	Wbkf	Abkf	Dbkf
XS C1	2008	AB	RIFFLE	14.0	12.4	1.8
XS C1	2010	MY1	RIFFLE	11.7	9.1	2.1
XS C1	2011	MY2	RIFFLE	7.6	6.1	1.5

NOTES:



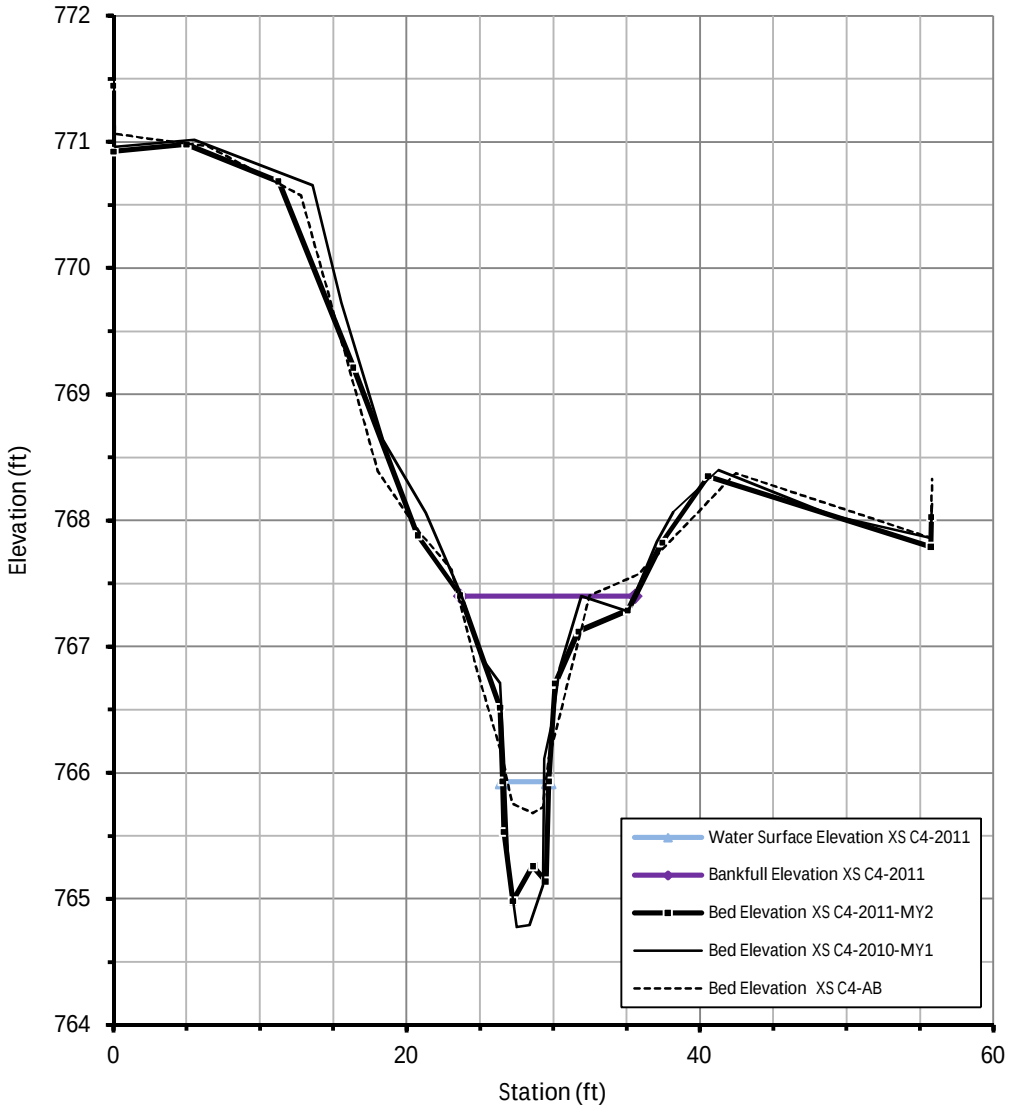
ID	YEAR	PHASE	FACET TYPE	Wbkf	Abkf	Dbkf
XS C2	2008	AB	POOL	12.9	12.0	2.0
XS C2	2010	MY1	POOL	5.9	6.3	1.9
XS C2	2011	MY2	POOL	5.5	7.6	2.0

NOTES:



ID	YEAR	PHASE	FACET TYPE	Wbkf	Abkf	Dbkf
XS C3	2008	AB	RIFFLE	13.5	7.5	1.1
XS C3	2010	MY1	RIFFLE	14.1	5.7	1.2
XS C3	2011	MY2	RIFFLE	19.0	8.4	1.2

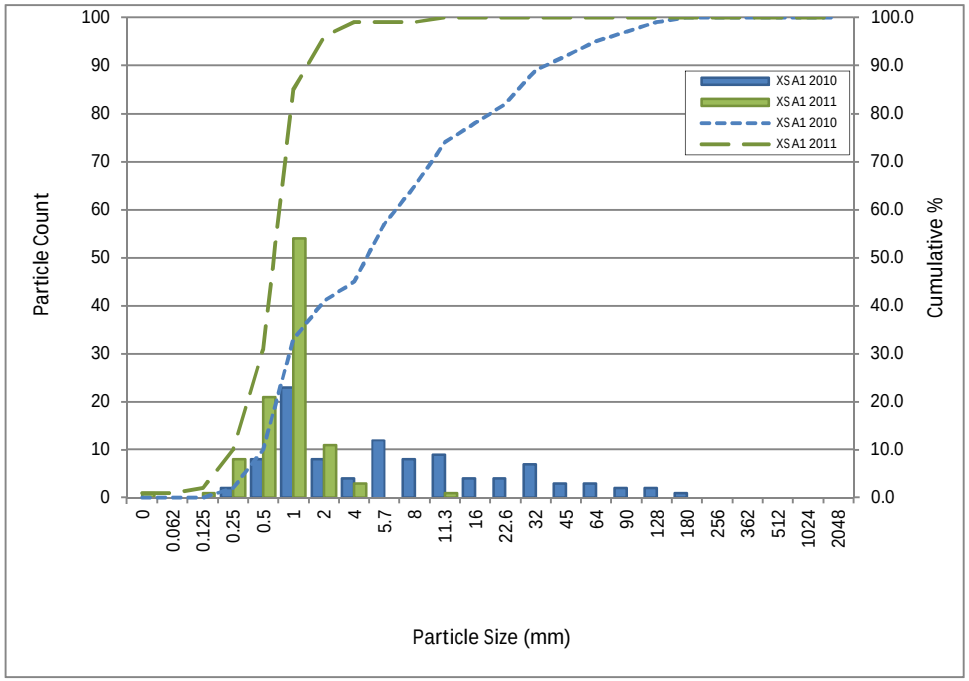
NOTES:



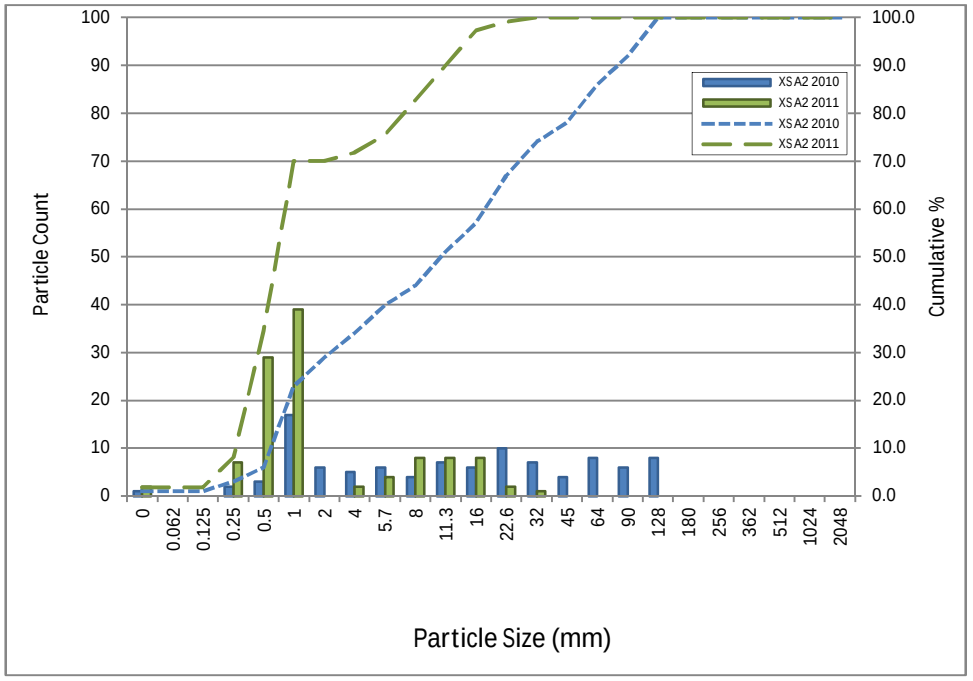
ID	YEAR	PHASE	FACET TYPE	Wbkf	Abkf	Dbkf
XS C4	2008	AB	RIFFLE	8.9	8.9	1.7
XS C4	2010	MY1	RIFFLE	11.2	9.4	2.6
XS C4	2011	MY2	RIFFLE	11.9	10.2	2.4

NOTES:

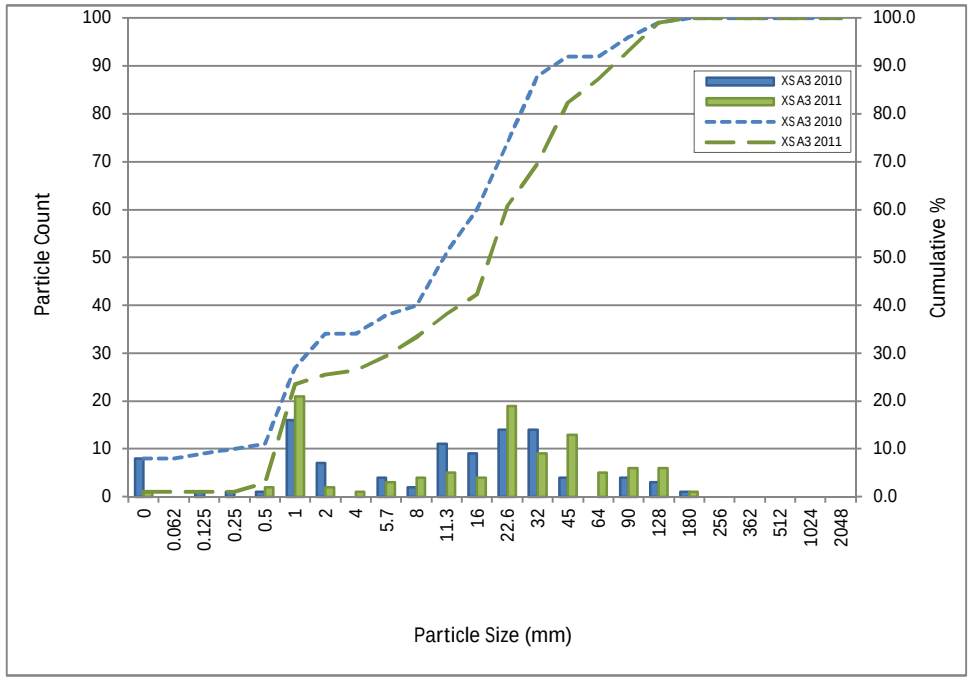
XSA1 Pebble Count



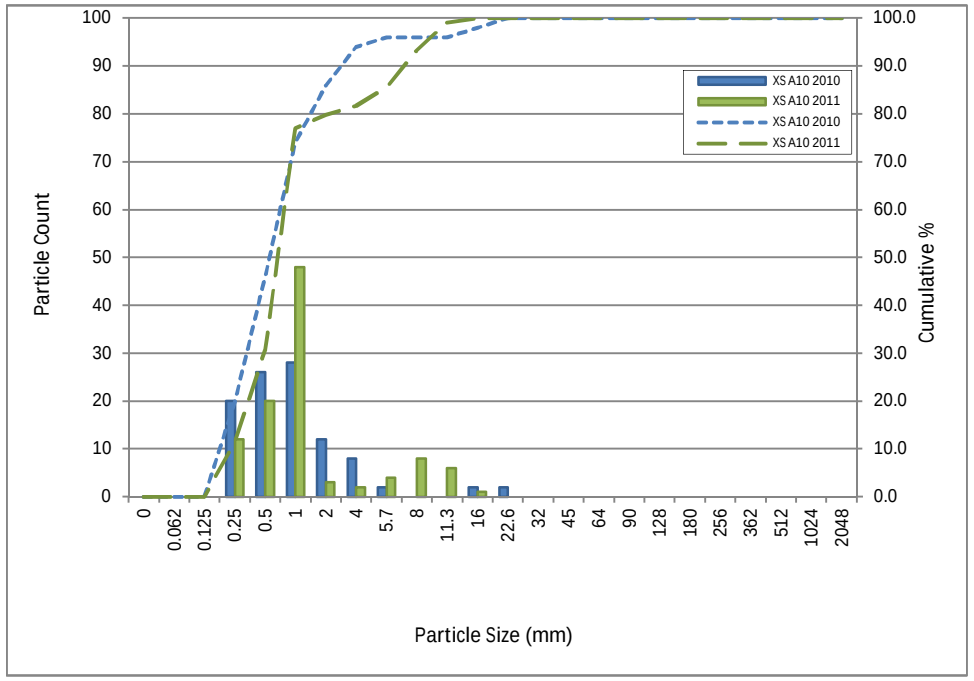
XSA2 Pebble Count

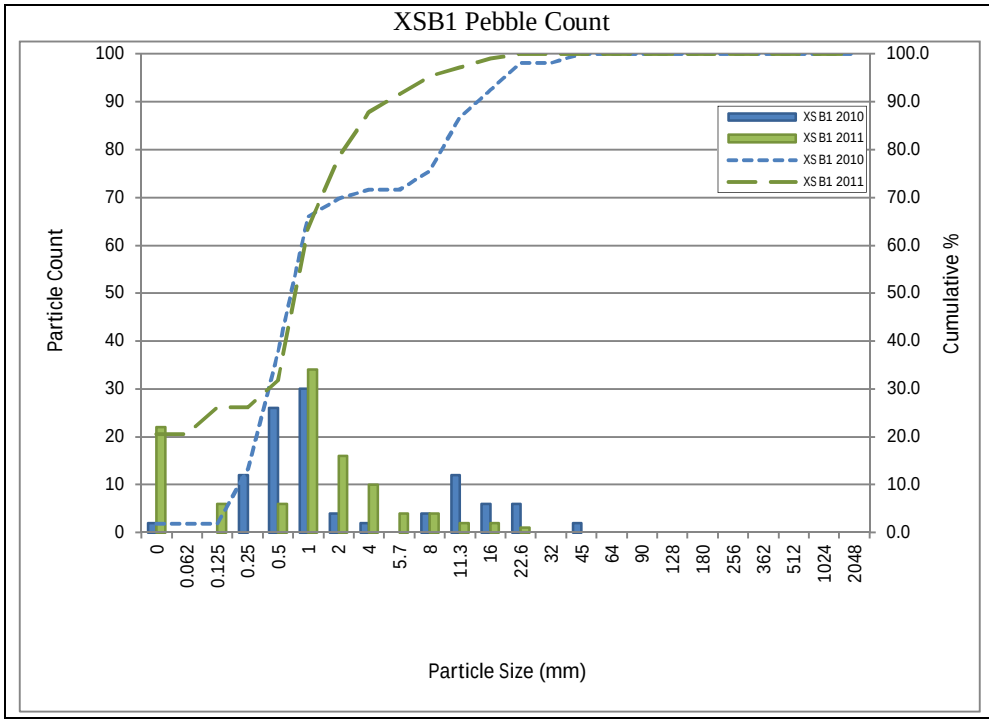


XSA3 Pebble Count



XSA10 Pebble Count




XSB1 Pebble Count
Particle Count
Cumulative %
Particle Size (mm)
XSB1 2010
XSB1 2011
XSB1 2010
XSB1 2011
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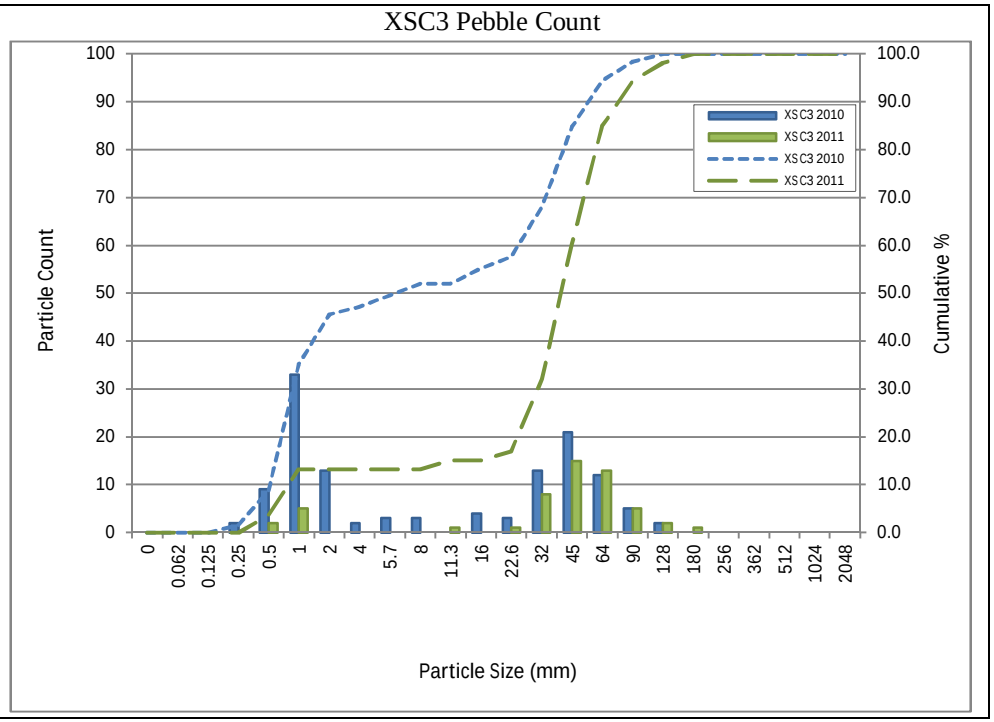
0.062
0.125
0.25
0.5
1
2
4
5.7
8
11.3
16
22.6
32
45
64
90
128
180
256
362
512
1024
2048


XSC3 Pebble Count
Particle Count
Cumulative %
Particle Size (mm)
XSC3 2010
XSC3 2011
XSC3 2010
XSC3 2011
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0.062
0.125
0.25
0.5
1
2
4
5.7
8
11.3
16
22.6
32
45
64
90
128
180
256
362
512
1024
2048

Table 10a.1 Baseline Stream Data Summary
Valley Fields Farm/407 - Upper A: 800 feet

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)		20.5	22.66	21.58			18.2			1	5.7	10.1	9.4	15.2		3		30		29.1	30.05		31		2
Floodprone Width (ft)							20.8			1	23.3	53.03	49.9	85.9		3		66		90	90.7		91.4		2
Bankfull Mean Depth (ft)		2.221	2.454	2.337			1.7			1	0.5	0.9	1	1.2		3		1.9		1.6	1.85		2.1		2
[1]Bankfull Max Depth (ft)							1.9			1	1.2	1.533	1.5	1.9		3		2.9		2.8	3		3.2		2
Bankfull Cross Sectional Area (ft^2)		52.26	57.76	55.01			30.9			1	2.7	10.2	8.9	19		3		57.5		50.1	55.1		60.1		2
Width/Depth Ratio							10.7			1	9.4	11.17	11.4	12.7		3		15.8		14.2	16.65		19.1		2
Entrenchment Ratio							1.1			1	1.5	6.467	8.8	9.1		3		2.2		3	3		3		2
[1]Bank Height Ratio							**2.8**			**1**	**1.1**	**1.333**	**1.4**	**1.5**		**3**		**1**		**1**	**1**		**1**		**2**
Profile																									
Riffle Length (ft)																				56.5	88.5		120.4		1
Riffle Slope (ft/ft)					0.003	0.003		0.003		2	0.006	0.034	0.017	0.096	0.036	6	0.003	0.003	0.006	0.003	0.003		0.003		1
Pool Length (ft)																				38.5	74.1		98.5		3
Pool Max depth (ft)					2.6	2.6		2.6		1	0.9	1.9	1.4	3.9	1.13	6	2.5	3.8	4.8	3.72	4.21		5.1		3
Pool Spacing (ft)					30	42		77		2	15.3	31.7	31.6	52.4	13.8	6	120	120	150	155.7	248.2		340.6		2
Pattern																									
Channel Beltwidth (ft)					36		59	79		3	43.2	79.2	84.3	105.1	26.1	4	201	229	256	22.1	118.1	126	197.2	71.91	4
Radius of Curvature (ft)					17		72	248		3	16.4	29.5	22	51	14.7	5	60	90	120	10.1	45.7	49.2	79.8	28.53	5
Rc:Bankfull width (ft/ft)					**0.934**		**3.956**	**13.63**		**3**	**1.7**	**4.1**	**3.7**	**6.8**	**1.7**	**6**	**2**	**3**	**4**	**0.3**	**1.5**		**2.6**	1.114	**6**
Meander Wavelength (ft)					76		143	196		3	44.7	141.3	114	320.6	106.5	6	240	300	360	117	302.2	292..4	613.9	251.1	6
Meander Width Ratio					4.176		7.857	10.77		3	7.6	10.9	11.2	15.5	3.1	5	8	10	12	4.0	10.1		19.8	7.964	5
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2					0.31824												0.560976			0.386724					
Max part size (mm) mobilized at bankfull					23.64698193												42.68793974			28.97191657					
Stream Power (transport capacity) W/m^2					45.2088												46.71576			50.48316					
Additional Reach Parameters																									
Rosgen Classification					G5c/F5						B4/E5/C4						B5c/C5			C5					
Bankfull Velocity (fps)		4.172	4.611	4.392	6.9												4.2			4.382940109					
Bankfull Discharge (cfs)		229.5	253.7	241.6	213.1																				
Valley length (ft)																									
Channel Thalweg length (ft)																									
Sinuosity (ft)					1.1						1.1-1.3						1.2								
Water Surface Slope (Channel) (ft/ft)					0.003						0.0080-0.0215						0.0028			0.0029					
BF slope (ft/ft)					**0.003**						**0.0082-0.0522**						**0.0031**			**0.0024**					
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Shaded cells indicate that these will typically not be filled in.

1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

3. Utilizing survey data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.

4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 10a.2 Baseline Stream Data Summary
Valley Fields Farm/407 - Upper A2: 1,850 feet

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)		20.5	22.66	21.58	14.6	16.55		18.5		2	5.7	10.1	9.4	15.2		3		30		30.1	30.8		31.1		3
Floodprone Width (ft)					23.7	75.25		126.8		2	23.3	53.03	49.9	85.9		3		66		78.6	98.6		126.6		3
Bankfull Mean Depth (ft)		2.221	2.454	2.337	2.7	2.75		2.8		2	0.5	0.9	1	1.2		3		1.9		1.8	2		2.2		3
[1]Bankfull Max Depth (ft)					3.4	3.45		3.5		2	1.2	1.533	1.5	1.9		3		2.9		3.2	3.5		4		3
Bankfull Cross Sectional Area (ft^2)		52.26	57.76	55.01	40.4	45		49.6		2	2.7	10.2	8.9	19		3		57.5		55.2	62.2		69		3
Width/Depth Ratio					5.2	6.05		6.9		2	9.4	11.17	11.4	12.7		3		15.8		14	15.3		16.4		3
Entrenchment Ratio					1.6	4.25		6.9		2	1.5	6.467	8.8	9.1		3		2.2		2.5	3.2		4.1		3
[1]Bank Height Ratio					**1.5**	**1.8**		**2.1**		**2**	**1.1**	**1.333**	**1.4**	**1.5**		**3**		**1**		**1**	**1**		**1**		**3**
Profile																									
Riffle Length (ft)																				33.3	52		86.3		3
Riffle Slope (ft/ft)					0.003	0.003	0.004	0.003	8E-04	4	0.006	0.034	0.017	0.096	0.036	6	0.003	0.003	0.006	0.002	0.009		0.014		5
Pool Length (ft)																				60.8	110.4		238.6		3
Pool Max depth (ft)					2.5	2.8	2.6	3.2		3	0.9	1.9	1.4	3.9	1.13	6	2.5	3.8	4.8	4.15	5.03		5.94		11
Pool Spacing (ft)					30	42	53.7	77		3	15.3	31.7	31.6	52.4	13.8	6	120	120	150	142.7	238		300.6		5
Pattern																									
Channel Beltwidth (ft)					36	60	59.2	79	16	6	43.2	79.2	84.3	105.1	26.1	4	201	229	256	22.1	118.1	126	197.2	71.91	
Radius of Curvature (ft)					14	87.4	58.5	248	87.4	6	16.4	29.5	22	51	14.7	5	60	90	120	10.1	45.7	49.2	79.8	28.53	
Rc:Bankfull width (ft/ft)					**0.846**	**5.3**	**3.7**	**17**	**6**	**6**	**1.7**	**4.1**	**3.7**	**6.8**	**1.7**	**6**	**2**	**3**	**4**	**0.3**	**1.5**		**2.6**	1.115	
Meander Wavelength (ft)					58	139.8	58.5	228	65.9	6	44.7	141.3	114	320.6	106.5	6	240	300	360	117	302.2	292..4	613.9	251.1	
Meander Width Ratio					2.5	3.6	3.6	5.4	1.1	6	7.6	10.9	11.2	15.5	3.1	5	8	10	12	3.9	9.8		19.7	8.01	
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2					0.5148												0.560976			1.07328					
Max part size (mm) mobilized at bankfull					39.03306101												42.68793974			83.92826353					
Stream Power (transport capacity) W/m^2					45.2088												46.71576			129.59856					
Additional Reach Parameters																									
Rosgen Classification					G5/Incised E5						B4/E5/C4						B5c/C5			C5					
Bankfull Velocity (fps)		4.172	4.611	4.392	4.9-5.7												4.2			3.882636656					
Bankfull Discharge (cfs)		229.5	253.7	241.6	241.1																				
Valley length (ft)																									
Channel Thalweg length (ft)																									
Sinuosity (ft)					1.0-1.1						1.1-1.3						1.2								
Water Surface Slope (Channel) (ft/ft)					0.0025-0.0040						0.0080-0.0215						0.0028			0.0036					
BF slope (ft/ft)					**0.0030-0.0035**						**0.0082-0.0522**						**0.0031**			**0.0036**					
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Shaded cells indicate that these will typically not be filled in.

1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

3. Utilizing survey data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.

4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 10a.3 Baseline Stream Data Summary
Valley Fields Farm/407 - Lower A: 1,400 feet

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)		25.26	27.92	26.59			45.1			1	5.7	10.1	9.4	15.2		3		30		30.1	30.8		31.1		3
Floodprone Width (ft)							63.3			1	23.3	53.03	49.9	85.9		3		66		78.6	98.6		126.6		3
Bankfull Mean Depth (ft)		2.594	2.867	2.73			2			1	0.5	0.9	1	1.2		3		1.9		1.8	2		2.2		3
[1]Bankfull Max Depth (ft)							3.5			1	1.2	1.533	1.5	1.9		3		2.9		3.2	3.5		4		3
Bankfull Cross Sectional Area (ft^2)		72.7	80.35	76.52			91.3			1	2.7	10.2	8.9	19		3		57.5		55.2	62.2		69		3
Width/Depth Ratio							22.6			1	9.4	11.17	11.4	12.7		3		15.8		14	15.3		16.4		3
Entrenchment Ratio							1.4			1	1.5	6.467	8.8	9.1		3		2.2		2.5	3.2		4.1		3
[1]Bank Height Ratio							**1.7**			**1**	**1.1**	**1.333**	**1.4**	**1.5**		**3**		**1**		**1**	**1**		**1**		**3**
Profile																									
Riffle Length (ft)																				36.8	44.4		51.6		3
Riffle Slope (ft/ft)					0.008	0.009		0.01		2	0.006	0.034	0.017	0.096	0.036	6	0.003	0.003	0.006	0.002	0.009		0.014		5
Pool Length (ft)																				89.6	119.8		152.8		3
Pool Max depth (ft)					4	4.6		5.3		2	0.9	1.9	1.4	3.9	1.13	6	2.5	3.8	4.8	4.15	5.03		5.94		11
Pool Spacing (ft)					53	104		156		2	15.3	31.7	31.6	52.4	13.8	6	120	120	150	142.7	238		300.6		5
Pattern																									
Channel Beltwidth (ft)					36	60	59.2	79	16	6	43.2	79.2	84.3	105.1	26.1	4	201	229	256	22.1	118.1	126	197.2	71.91	
Radius of Curvature (ft)					14	87.4	58.5	248	87.4	6	16.4	29.5	22	51	14.7	5	60	90	120	10.1	45.7	49.2	79.8	28.53	
Rc:Bankfull width (ft/ft)					**2**	**5.3**	**3.7**	**17**	**6**	**6**	**1.7**	**4.1**	**3.7**	**6.8**	**1.7**	**6**	**2**	**3**	**4**	**0.3**	**1.5**		**2.6**	1.115	
Meander Wavelength (ft)					58	139.8	58.5	228	65.9	6	44.7	141.3	114	320.6	106.5	6	240	300	360	117	302.2	292..4	613.9	251.1	
Meander Width Ratio					2.5	3.6	3.6	5.4	1.1	6	7.6	10.9	11.2	15.5	3.1	5	8	10	12	3.9	9.8		19.7	8.01	
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2							1.11072										0.560976				1.07328				
Max part size (mm) mobilized at bankfull							86.98116865										42.68793974				83.92826353				
Stream Power (transport capacity) W/m^2							134.11944										46.71576				129.59856				
Additional Reach Parameters																									
Rosgen Classification							G5/Incised E5						B4/E5/C4				B5c/C5				C5				
Bankfull Velocity (fps)		4.254	4.702	4.478			4.9-5.7										4.2				3.882636656				
Bankfull Discharge (cfs)		325.5	359.8	342.7			241.1																		
Valley length (ft)																									
Channel Thalweg length (ft)																									
Sinuosity (ft)							1.0-1.1						1.1-1.3				1.2								
Water Surface Slope (Channel) (ft/ft)							0.0025-0.0040						0.0080-0.0215				0.0028				0.0015				
BF slope (ft/ft)							**0.0030-0.0035**						**0.0082-0.0522**				**0.0031**				**0.002**				
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Shaded cells indicate that these will typically not be filled in.

1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

3. Utilizing survey data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.

4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 10a.4 Baseline Stream Data Summary
Valley Fields Farm/407 - Upper B: 200 feet

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)		15.54	17.18	16.36	14.3	15.4		16.4		2	5.7	10.1	9.4	15.2		3		27.5				21.4			1
Floodprone Width (ft)					20	20.8		21.6		2	23.3	53.03	49.9	85.9		3		60.5				88.1			1
Bankfull Mean Depth (ft)		1.807	1.997	1.902	1.9	2.1		2.2		2	0.5	0.9	1	1.2		3		1.6				2			1
[1]Bankfull Max Depth (ft)					2.5	2.7		2.8		2	1.2	1.533	1.5	1.9		3		2.3				3.1			1
Bankfull Cross Sectional Area (ft^2)		33.72	37.27	35.49	27.1	31.7		36.2		2	2.7	10.2	8.9	19		3		43.1				42.4			1
Width/Depth Ratio					7.3	7.4		7.5		2	9.4	11.17	11.4	12.7		3		17.5				10.8			1
Entrenchment Ratio					1.3	1.4		1.4		2	1.5	6.467	8.8	9.1		3		2.2				4.1			1
[1]Bank Height Ratio					**2.6**	**2.8**		**3**		**2**	**1.1**	**1.333**	**1.4**	**1.5**		**3**		**1**				**1**			**1**
Profile																									
Riffle Length (ft)																						18.4			1
Riffle Slope (ft/ft)					0.005	0.013		0.018		2	0.006	0.034	0.017	0.096	0.036	6		0.004				5E-04			1
Pool Length (ft)																				41.1	41.6		42.2		2
Pool Max depth (ft)					2.8	3		3.2		2	0.9	1.9	1.4	3.9	1.13	6	2	3.2	3.9	3.23	3.24		3.24		2
Pool Spacing (ft)					31	42		61		2	15.3	31.7	31.6	52.4	13.8	6	110	110	138			107.5			1
Pattern																									
Channel Beltwidth (ft)					29	50	46	75		3	43.2	79.2	84.3	105.1	26.1	4	101	109	120	108.7	170.8	164.6	261..6	34.2	4
Radius of Curvature (ft)					15	105.7	76	226		3	16.4	29.5	22	51	14.7	5	55	83	110	23.8	55.4	50.5	110.1	36.2	5
Rc:Bankfull width (ft/ft)					**1**	**6.867**	**4.9**	**14.7**		**3**	**1.7**	**4.1**	**3.7**	**6.8**	**1.7**	**6**	**2**	**3.018**	**4**			**2.4**			**6**
Meander Wavelength (ft)					108	358.7	296	672		3	44.7	141.3	114	320.6	106.5	6	220	275	330	148.2	327.6	266.7	621	201.1	6
Meander Width Ratio					7	23.27	19.2	43.6		3	7.6	10.9	11.2	15.5	3.1	5	8	10	12			12.5			5
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2					1.716624												0.559728			0.067392					
Max part size (mm) mobilized at bankfull					136.9105109												42.58898812			4.691537038					
Stream Power (transport capacity) W/m^2					197.41176												58.77144			8.137584					
Additional Reach Parameters																									
Rosgen Classification					G5/Incised E5						B4/E5/C4						B5c/C5			E5					
Bankfull Velocity (fps)		4.066	4.494	4.28	4.5-5.6												4.2			3.837264151					
Bankfull Discharge (cfs)		144.3	159.5	151.9	162.7																				
Valley length (ft)																									
Channel Thalweg length (ft)																									
Sinuosity (ft)					1.1						1.1-1.3						1.1								
Water Surface Slope (Channel) (ft/ft)					0.0046						0.0080-0.0215						0.0039			Flat					
BF slope (ft/ft)					**0.0131**						**0.0082-0.0522**						**0.0047**			**0.0047**					
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Shaded cells indicate that these will typically not be filled in.

1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

3. Utilizing survey data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.

4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 10a.5 Baseline Stream Data Summary
Valley Fields Farm/407 - Lower B: 230 feet

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)		16.16	17.86	17.01	14.3	15.4		16.4		2	5.7	10.1	9.4	15.2		3		27.5				48.4			1
Floodprone Width (ft)					20	20.8		21.6		2	23.3	53.03	49.9	85.9		3		60.5				91.3			1
Bankfull Mean Depth (ft)		1.86	2.056	1.958	1.9	2.1		2.2		2	0.5	0.9	1	1.2		3		1.6				1.4			1
[1]Bankfull Max Depth (ft)					2.5	2.7		2.8		2	1.2	1.533	1.5	1.9		3		2.3				2.9			1
Bankfull Cross Sectional Area (ft^2)		35.87	39.64	37.76	27.1	31.7		36.2		2	2.7	10.2	8.9	19		3		43.1				67.8			1
Width/Depth Ratio					7.3	7.4		7.5		2	9.4	11.17	11.4	12.7		3		17.5				34.5			1
Entrenchment Ratio					1.3	1.4		1.4		2	1.5	6.467	8.8	9.1		3		2.2				1.9			1
[1]Bank Height Ratio					**2.6**	**2.8**		**3**		**2**	**1.1**	**1.333**	**1.4**	**1.5**		**3**		**1**				**1**			**1**
Profile																									
Riffle Length (ft)																				14	25.5		40.2		2
Riffle Slope (ft/ft)					0.005	0.013		0.018		2	0.006	0.034	0.017	0.096	0.036	6		0.004		0.003	0.007		0.009		2
Pool Length (ft)																				19.1	20.3		21.5		2
Pool Max depth (ft)					2.8	3		3.2		2	0.9	1.9	1.4	3.9	1.13	6	2	3.2	3.9			4.1			1
Pool Spacing (ft)					31	42		61		2	15.3	31.7	31.6	52.4	13.8	6	110	110	138			88.9			1
Pattern																									
Channel Beltwidth (ft)					29	50	46	75		3	43.2	79.2	84.3	105.1	26.1	4	97	106	122	108.7	170.8	164.6	261..6	34.2044	4
Radius of Curvature (ft)					15	105.7	76	226		3	16.4	29.5	22	51	14.7	5	57	85	114	23.8	55.4	50.5	110.1	36.2024	5
Rc:Bankfull width (ft/ft)					**1**	**6.867**	**4.9**	**14.7**		**3**	**1.7**	**4.1**	**3.7**	**6.8**	**1.7**	**6**	**2.073**	**3.091**	**4.145**			**1.0**			**6**
Meander Wavelength (ft)					108	358.7	296	672		3	44.7	141.3	114	320.6	106.5	6	227	284	341	148.2	327.6	266.7	621	201.057	6
Meander Width Ratio					7	23.27	19.2	43.6		3	7.6	10.9	11.2	15.5	3.1	5	8.255	10.33	12.4			5.5			5
Transport parameters																									
Reach Shear Stress (competency) lb/f^2					1.716624												0.559728			0.5826912					
Max part size (mm) mobilized at bankfull					136.9105109												42.58898812			44.41116115					
Stream Power (transport capacity) W/m^2					197.41176												58.77144			100.514232					
Additional Reach Parameters																									
Rosgen Classification					G5/Incised E5						B4/E5/C4						B5c/C5			B5					
Bankfull Velocity (fps)		4.081	4.51	4.296	4.5-5.6												4.2			2.399705015					
Bankfull Discharge (cfs)		154.1	170.3	162.2	162.7																				
Valley length (ft)																									
Channel Thalweg length (ft)																									
Sinuosity (ft)					1.1						1.1-1.3						1.1								
Water Surface Slope (Channel) (ft/ft)					0.0046						0.0080-0.0215						0.0039			0.0035					
BF slope (ft/ft)					**0.0131**						**0.0082-0.0522**						**0.0047**			**0.0047**					
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Shaded cells indicate that these will typically not be filled in.

1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

3. Utilizing survey data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.

4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 10a.6 Baseline Stream Data Summary
Valley Fields Farm/407 - Reach C: 1,400 feet

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)		5.137	5.677	5.407			7			1	5.7	10.1	9.4	15.2		3		11.5		8.9	12.13	13.5	14		3
Floodprone Width (ft)							14.1			1	23.3	53.03	49.9	85.9		3		25.3		39.6	45.6	48.5	48.7		3
Bankfull Mean Depth (ft)		0.793	0.876	0.834			0.6			1	0.5	0.9	1	1.2		3		0.7		0.6	0.833	0.9	1		3
[1]Bankfull Max Depth (ft)							0.9			1	1.2	1.533	1.5	1.9		3		1.2		1.1	1.533	1.7	1.8		3
Bankfull Cross Sectional Area (ft^2)		5.855	6.472	6.163			3.3			1	2.7	10.2	8.9	19		3		7.8		7.5	9.6	8.9	12.4		3
Width/Depth Ratio							11.7			1	9.4	11.17	11.4	12.7		3		17.2		8.9	16.27	15.9	24		3
Entrenchment Ratio							2			1	1.5	6.467	8.8	9.1		3		2.2		3.5	3.833	3.6	4.4		3
[1]Bank Height Ratio							**1**			**1**	**1.1**	**1.333**	**1.4**	**1.5**		**3**		**1**		**1**	**1**	**1**	**1**		**3**
Profile																									
Riffle Length (ft)																				21.7	41.6	36.7	90.8	23.5	7
Riffle Slope (ft/ft)											0.006	0.034	0.017	0.096	0.036	6		0.009		0.002	0.007	0.008	0.01	0.004	7
Pool Length (ft)																				25.8	50.2	56.4	66.7	16.7	6
Pool Max depth (ft)											0.9	1.9	1.4	3.9	1.13	6	0.9	1.5	1.7	2.18	2.52	2.58	2.78	0.25	7
Pool Spacing (ft)											15.3	31.7	31.6	52.4	13.8	6	45	69	92	46	92.5	91.9	152.2	37.9	9
Pattern																									
Channel Beltwidth (ft)											43.2	79.2	84.3	105.1	26.1	4	33	46	58	84.1	97.4	96.4	112	11.42	4
Radius of Curvature (ft)											16.4	29.5	22	51	14.7	5	23	35	46	20.8	32.5	30.7	59.4	16.52	5
Rc:Bankfull width (ft/ft)											**1.7**	**4.1**	**3.7**	**6.8**	**1.7**	**6**	**2**	**3.043**	**4**	**2.3**	**2.7**	**2.3**	**4.2**	0.924	**6**
Meander Wavelength (ft)											44.7	141.3	114	320.6	106.5	6	92	115	138	72.5	187.8	131.2	595.1	237	6
Meander Width Ratio											7.6	10.9	11.2	15.5	3.1	5	8	10	12	8.1	15.5	9.7	42.5	16.01	5
Transport parameters																									
Reach Shear Stress (competency) lb/ft^2																	0.643968			0.370656					
Max part size (mm) mobilized at bankfull																	49.28807318			27.71871363					
Stream Power (transport capacity) W/m^2																	129.59856			123.57072					
Additional Reach Parameters																									
Rosgen Classification							Incised B5						B4/E5/C4				C5/E5					E5			
Bankfull Velocity (fps)		3.668	4.054	3.861			6.5										3.1					18.28089888			
Bankfull Discharge (cfs)		22.61	24.99	23.8			21.6																		
Valley length (ft)																									
Channel Thalweg length (ft)																									
Sinuosity (ft)													1.1-1.3				1.1								
Water Surface Slope (Channel) (ft/ft)													0.0080-0.0215				0.0066					0.0099			
BF slope (ft/ft)													**0.0082-0.0522**				**0.0086**					**0.0095**			
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Shaded cells indicate that these will typically not be filled in.

1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile. 2 = For projects with a proximal USGS gauge in-line with the project reach (added bankfull verification - rare).

3. Utilizing survey data produce an estimate of the bankfull floodplain area in acres, which should be the area from the top of bank to the toe of the terrace riser/slope.

4 = Proportion of reach exhibiting banks that are eroding based on the visual survey for comparison to monitoring data; 5. Of value/needed only if the n exceeds 3

Table 10b. Baseline Stream Data Summary (Substrate, Bed, Bank, and Hydrologic Containment Parameter Distributions)
Valley Fields Farm/407

	Parameter	Pre-Existing Condition							Reference Reach(es) Data							Design							As-built/Baseline						
Upper A (800 feet)	[1]Ri% / Ru% / P% / G% / S%	10	20	30	40	0										30	10	40	20	0			30	10	40	20	0		
	[1]SC% / Sa% / G% / C% / B% / Be%	16	1.18	69.41	29.41	0	0		2.85	31.7	59.76	4.06	0.82	0.81															
	[1]d16 / d35 / d50 / d84 / d95 / di^{p} / di^{sp} (mm)	0.6	0.93	1.35	6.49	9.96			0.43	2.25	12.08	39.69	71.35																
	[2]Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10	800	0	0	0	0						X	X										0	0	0	300	500		
	[3]Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0	0	0	200	600				X														800	0	0	0			
	Parameter	**Pre-Existing Condition**							**Reference Reach(es) Data**							**Design**							**As-built/Baseline**						
Upper A2 (1,850 feet)	[1]Ri% / Ru% / P% / G% / S%	10	10	20	60	0										30	10	40	20	0			30	10	40	20	0		
	[1]SC% / Sa% / G% / C% / B% / Be%	14	60	26	0	0	0		2.85	31.7	59.76	4.06	0.82	0.81															
	[1]d16 / d35 / d50 / d84 / d95 / di^{p} / di^{sp} (mm)	0.09	0.65	1.25	6.16	11.3			0.43	2.25	12.08	39.69	71.35																
	[2]Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10	1500	350	0	0	0						X	X										0	0	0	0	1850		
	[3]Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0	0	0	1000	850				X														1850	0	0	0			
	Parameter	**Pre-Existing Condition**							**Reference Reach(es) Data**							**Design**							**As-built/Baseline**						
Lower A (1,400 feet)	[1]Ri% / Ru% / P% / G% / S%	5	10	5	80	0										30	10	40	20	0			30	10	40	20	0		
	[1]SC% / Sa% / G% / C% / B% / Be%	8.33	33.3	58.3	0	0	0		2.85	31.7	59.76	4.06	0.82	0.81															
	[1]d16 / d35 / d50 / d84 / d95 / di^{p} / di^{sp} (mm)	0.19	1.5	2.62	8.88	11.3			0.43	2.25	12.08	39.69	71.35																
	[2]Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10	100	900	400	0	0						X	X										0	0	1400	0	0		
	[3]Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0	0	0	1200	200				X														1400	0	0	0			
	Parameter	**Pre-Existing Condition**							**Reference Reach(es) Data**							**Design**							**As-built/Baseline**						
Reach B (430 feet)	[1]Ri% / Ru% / P% / G% / S%	10	10	30	50	0										30	10	40	20	0			30	10	40	20	0		
	[1]SC% / Sa% / G% / C% / B% / Be%	0	19	81	0	0	0		2.85	31.7	59.76	4.06	0.82	0.81															
	[1]d16 / d35 / d50 / d84 / d95 / di^{p} / di^{sp} (mm)	1.81	4	7.01	22.23	29.83			0.43	2.25	12.08	39.69	71.35																
	[2]Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10	430	0	0	0	0						X	X										0	0	430	0	0		
	[3]Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0	0	0	0	430				X														430	0	0	0			
	Parameter	**Pre-Existing Condition**							**Reference Reach(es) Data**							**Design**							**As-built/Baseline**						
Reach C (1,400 feet)	[1]Ri% / Ru% / P% / G% / S%															30	10	40	20	0			30	10	40	20	0		
	[1]SC% / Sa% / G% / C% / B% / Be%	18.63	34.31	47.06	0	0	0		2.85	31.7	59.76	4.06	0.82	0.81															
	[1]d16 / d35 / d50 / d84 / d95 / di^{p} / di^{sp} (mm)	0.05	1.17	1.86	5.67	7.49			0.43	2.25	12.08	39.69	71.35																
	[2]Entrenchment Class <1.5 / 1.5-1.99 / 2.0-4.9 / 5.0-9.9 / >10	600	800	0	0	0						X	X										0	0	1000	400	0		
	[3]Incision Class <1.2 / 1.2-1.49 / 1.5-1.99 / >2.0	1000	400	0	0				X														1400	0	0	0			

Shaded cells indicate that these will typically not be filled in.

1 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave

2 = Entrenchment Class - Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as visual estimates

3 = Assign/bin the reach footage into the classes indicated and provide the percentage of the total reach footage in each class in the table. This will result from the measured cross-sections as well as the longitudinal profile

Footnotes 2,3 - These classes are loosley built around the Rosgen classification and hazard ranking breaks, but were adjusted slightly to make for easier assignment to somewhat coarser bins based on visual estimates in the field such that measurement of every segment for ER would not be necessary.

The intent here is to provide the reader/consumer of design and monitoring information with a good general sense of the extent of hydrologic containment in the pre-existing and the rehabilitated states as well as comparisons to the reference distributions.

ER and BHR have been addressed in prior submissions as a subsample (cross-sections as part of the design survey), however, these subsamples have often focused entirely on facilitating design without providing a thorough pre-construtions distribution of these parameters, leaving the reader/consumer with a sample that is weighted heavily on the stable sections of the reach. This means that the distributions for these parameters should include data from both the cross-section surveys and the longitudinal profile and in the case of ER, visual estimates. For example, the typical longitudinal profile permits sampling of the BHR at riffles beyond those subject to cross-sections and therefore can be readily integrated and provide a more complete sample distribution for these parameters, thereby providing the distribution/coverage necessary to provide meaningful comparisons.

Table 11a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)

Valley Fields Farm/407

	Cross Section A1 (Riffle)							Cross Section A2 (Riffle)							Cross Section A3 (Riffle)							Cross Section A4 (Pool)							Cross Section A5 (Riffle)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	760.8	760.8	760.8					760.7	760.7	760.7					762.0	762.0	762.0					764.0	764.0	764.0					765.7	765.7	765.7				
Bankfull Width (ft)	31.1	33.3	37.3					38.2	30.8	37.1					30.1	33.4	29.7					31.1	27.5	32.0					31.0	29.9	23.2				
Floodprone Width (ft)	126.6	126.7	126.7					109.3	109.3	109.4					90.6	90.5	90.8					78.6	78.6	78.6					91.4	94.5	91.5				
Bankfull Mean Depth (ft)	2.0	2.3	2.1					1.9	3.0	1.9					1.8	1.7	2.0					2.2	2.8	2.4					1.6	1.2	1.5				
Bankfull Max Depth (ft)	3.4	5.2	5.6					4.0	5.7	4.6					3.2	3.6	3.8					4.0	5.2	5.1					2.8	3.1	2.9				
Bankfull Cross Sectional Area (ft^2)	62.5	76.4	79.1					72.8	92.8	69.1					55.2	57.4	59.5					69.0	75.9	78.2					50.1	35.5	35.3				
Bankfull Width/Depth Ratio	15.5	14.6	17.6					20.1	10.2	19.9					16.4	19.4	14.8					14.0	10.0	13.1					19.1	25.1	15.2				
Bankfull Entrenchment Ratio	4.1	3.8	3.4					2.9	3.6	3.0					3.0	2.7	3.1					2.5	2.9	2.5					3.0	3.1	4.0				
Bankfull Bank Height Ratio	1.0	1.0	1.0					1.0	1.0	1.0					1.0	1.0	1.0					1.0	1.0	1.0					1.0	1.0	1.0				
Cross Sectional Area between end pins (ft^2)	147.0	156.0	199.5					154.0	176.0	193.1					149.0	154.0	189.6					165.0	184.0	215.4					133.0	114.0	125.7				
d50 (mm)		6.7	1.4						15.3	1.4						15.6	26.6																		

	Cross Section A6 (Riffle)							Cross Section A7 (Pool)							Cross Section A10 (Riffle)							Cross Section A11 (Riffle)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	766.9	766.9	766.9					767.0	767.0	767.0					755.5	755.5	755.5					754.9	754.9	754.9				
Bankfull Width (ft)	38.3	34.7	26.2					29.1	27.2	27.4					41.3	47.1	42.9					72.2	41.6	41.5				
Floodprone Width (ft)	83.2	83.3	83.2					87.7	87.7	87.8					115.9	109.3	122.9					127.3	102.7	107.0				
Bankfull Mean Depth (ft)	1.9	2.2	2.6					2.1	2.0	2.0					2.3	2.3	1.7					1.9	1.8	1.5				
Bankfull Max Depth (ft)	3.7	4.7	4.7					3.2	3.9	4.0					4.0	3.8	3.8					5.1	3.5	3.6				
Bankfull Cross Sectional Area (ft^2)	71.0	75.6	68.7					60.1	54.8	54.7					95.5	85.4	74.0					137.4	74.6	61.4				
Bankfull Width/Depth Ratio	20.6	16.0	10.0					14.2	13.6	13.7					17.9	26.0	24.8					38.0	23.1	28.0				
Bankfull Entrenchment Ratio	2.2	2.4	3.2					3.0	3.2	3.2					2.8	2.3	2.9					1.8	2.5	2.6				
Bankfull Bank Height Ratio	1.0	1.0	1.0					1.0	1.0	1.0					1.0	1.0	1.0					1.0	1.0	1.0				
Cross Sectional Area between end pins (ft^2)	166.0	172.0	200.0					168.0	162.0	189.1					448.0	440.0	456.7					596.0	539.0	565.0				
d50 (mm)																												

	Cross Section B1 (Riffle)							Cross Section B2 (Riffle)							Cross Section B3 (Riffle)							Cross Section B4 (Pool)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	766.1	766.1	766.1					765.9	765.9	765.9					760.7	760.7	760.7					760.4	760.4	760.4				
Bankfull Width (ft)	21.4	36.4	22.8					35.7	34.3	33.7					48.4	44.4	22.1					44.1	38.3	27.9				
Floodprone Width (ft)	88.1	98.7	88.6					106.1	106.7	99.6					91.3	93.7	96.5					97.2	93.1	93.9				
Bankfull Mean Depth (ft)	2.0	1.8	2.4					1.9	2.4	2.3					1.4	1.2	2.0					1.3	1.3	1.6				
Bankfull Max Depth (ft)	3.1	4.3	3.1					4.0	4.0	3.4					2.9	3.2	3.5					3.2	2.8	2.8				
Bankfull Cross Sectional Area (ft^2)	42.4	66.6	54.7					67.7	81.5	75.9					67.8	55.3	44.0					57.7	49.1	43.8				
Bankfull Width/Depth Ratio	10.8	19.9	9.5					18.8	14.4	15.0					34.5	35.8	11.1					33.7	29.9	17.8				
Bankfull Entrenchment Ratio	4.1	2.7	3.9					3.0	3.1	3.0					1.9	2.1	4.4					2.2	2.4	3.4				
Bankfull Bank Height Ratio	1.0	1.0	1.2					1.0	1.0	1.1					1.0	1.0	1.0					1.0	1.0	1.0				
Cross Sectional Area between end pins (ft^2)	586.0	619.0	574.2					690.0	718.0	638.3					582.0	571.0	549.2					479.0	431.0	444.3				
d50 (mm)		1.4	1.6																									

	Cross Section C1 (Riffle)							Cross Section C2 (Pool)							Cross Section C3 (Riffle)							Cross Section C4 (Riffle)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used	775.3	775.3	775.3					774.0	774.0	774.0					769.2	769.2	769.2					767.4	767.4	767.4				
Bankfull Width (ft)	14.0	11.7	7.6					12.9	5.9	5.5					13.5	14.1	19.0					8.9	11.2	11.9				
Floodprone Width (ft)	48.5	50.4	48.0					59.2	54.5	71.3					48.7	48.7	48.7					39.6	40.8	41.5				
Bankfull Mean Depth (ft)	0.9	0.8	0.8					0.9	1.1	1.4					0.6	0.4	0.4					1.0	0.8	0.9				
Bankfull Max Depth (ft)	1.8	2.1	1.5					2.0	1.9	2.0					1.1	1.2	1.2					1.7	2.6	2.4				
Bankfull Cross Sectional Area (ft^2)	12.4	9.1	6.1					12.0	6.3	7.6					7.5	5.7	8.4					8.9	9.4	10.2				
Bankfull Width/Depth Ratio	15.9	14.9	9.4					13.9	5.5	4.0					24.0	34.4	43.3					8.9	13.3	13.8				
Bankfull Entrenchment Ratio	3.5	4.3	6.3					4.6	9.3	12.9					3.6	3.5	2.6					4.4	3.7	3.5				
Bankfull Bank Height Ratio	1.0	1.0	1.0					1.0	1.1	1.0					1.0	1.0	1.0					1.0	1.0	1.0				
Cross Sectional Area between end pins (ft^2)	199.0	199.0	238.1					53.0	52.0	53.5					39.0	33.0	60.7					142.0	133.0	165.1				
d50 (mm)																8.6	57.0											

1 = Widths and depths for monitoring resurvey will be based on the baseline bankfull datum regardless of dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannot acquire the datum used for prior years this must be discussed with EEP. If this cannot be resolved in time for a given years report submission a footnote in this should be included that states: "It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in a future submission based on a consistent datum if determined to be necessary."

Exhibit Table 11b.1 Monitoring Data - Stream Reach Data Summary
Valley Fields Farm/407 - Upper A: 800 feet

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	29.1	30.1		31.0		2	33.3	33.3		33.4		2	23.2	25.6		27.4		3																		
Floodprone Width (ft)	90.0	90.7		91.4		2	90.5	108.6		126.7		2	83.2	87.5		91.5		3																		
Bankfull Mean Depth (ft)	1.6	1.9		2.1		2	1.7	2.0		2.3		2	1.5	2.0		2.6		3																		
[1]Bankfull Max Depth (ft)	2.8	3.0		3.2		2	3.6	4.4		5.2		2	2.9	3.9		4.7		3																		
Bankfull Cross Sectional Area (ft^2)	50.1	55.1		60.1		2	57.4	66.9		76.4		2	35.3	52.9		68.7		3																		
Width/Depth Ratio	14.2	16.7		19.1		2	14.6	17.0		19.4		2	10.0	13.0		15.2		3																		
Entrenchment Ratio	3.0	3.0		3.0		2	2.7	3.3		3.8		2	3.2	3.4		4.0		3																		
[1]Bank Height Ratio	**1.0**	**1.0**		**1.0**		**2**	**1.0**	**1.0**		**1.0**		**2**	**1.0**	**1.0**		**1.0**		**3**																		
Profile																																				
Riffle Length (ft)	56.5	88.5		120.4		1	21.7	63.7		105.7		2	14.9	30.0		52.1																				
Riffle Slope (ft/ft)	0.0034	0.0034		0.0034		1	0.0032	0.0038		0.0043		2	0.0064	0.0109		0.0137																				
Pool Length (ft)	38.5	74.1		98.5		3	36.9	72.0		95.9		2	47.5	103.2		164.8																				
Pool Max depth (ft)	3.7	4.2		5.1		3	3.3	4.0		4.5		3	2.1	2.6		3.2																				
Pool Spacing (ft)	155.7	248.2		340.6		2	80.2	102.9		134.0		3	48.4	122.4		179.7																				
Pattern																																				
Channel Beltwidth (ft)	22.1	118.1	126.0	197.2	71.9	4																														
Radius of Curvature (ft)	10.1	45.7	49.2	79.8	28.5	5																														
Rc:Bankfull width (ft/ft)	**0.3**	**1.5**		**2.6**	1.1	**6**																														
Meander Wavelength (ft)	117.0	302.2	4	613.9	251.1	6																														
Meander Width Ratio	4.0	10.1		19.8	8.0	5																														

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Additional Reach Parameters																																				
Rosgen Classification	C5						C5						C5																								
Channel Thalweg length (ft)																																				
Sinuosity (ft)	1.1						1.1						1.1																								
Water Surface Slope (Channel) (ft/ft)	0.0029						0.0025						0.0002																								
BF slope (ft/ft)	**0.0024**						**0.002**						**0.001**																								
[3]Ri% / Ru% / P% / G% / S%							**30**	**10**	**40**	**20**	**0**																										
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Exhibit Table 11b.2 Monitoring Data - Stream Reach Data Summary
Valley Fields Farm/407 - Upper A2: 1,850 feet

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	30.1	30.8		31.1		3	27.2	28.6		29.9		2	29.7	34.0		37.3	3.8	4																		
Floodprone Width (ft)	78.6	98.6		126.6		3	87.7	89.6		91.5		2	78.6	101.4		126.7	21.1	4																		
Bankfull Mean Depth (ft)	1.8	2.0		2.2		3	1.2	1.6		2.0		2	1.9	2.1		2.4	0.2	4																		
[1]Bankfull Max Depth (ft)	3.2	3.5		4.0		3	3.1	3.5		3.9		2	3.8	4.8		5.6	0.8	4																		
Bankfull Cross Sectional Area (ft^2)	55.2	62.2		69.0		3	35.5	45.2		54.8		2	59.5	71.5		79.1	9.2	4																		
Width/Depth Ratio	14.0	15.3		16.4		3	13.6	19.3		25.1		2	13.1	16.4		19.9	3.0	4																		
Entrenchment Ratio	2.5	3.2		4.1		3	3.1	3.1		3.2		2	2.5	3.0		3.4	0.4	4																		
[1]Bank Height Ratio	**1.0**	**1.0**		**1.0**		**3**	**1.0**	**1.0**		**1.0**		**2**	**1.0**	**1.0**		**1.0**	**0.0**	**4**																		
Profile																																				
Riffle Length (ft)	33.3	52.0		86.3		3	18.8	35.8		52.8		3	5.5	19.2		45.6																				
Riffle Slope (ft/ft)	0.0016	0.0086		0.0135		5	0.0020	0.0040		0.0050		5	0.0061	0.0739		0.2300																				
Pool Length (ft)	60.8	110.4		238.6		3	77.4	141.2		405.4		3	14.0	50.9		84.7																				
Pool Max depth (ft)	4.2	5.0		5.9		11	4.6	4.9		5.4		11	1.9	3.1		4.7																				
Pool Spacing (ft)	142.7	238.0		300.6		5	50.7	142.4		244.4		5	38.2	122.3		249.5																				
Pattern																																				
Channel Beltwidth (ft)	22.1	118.1	126.0	197.2	71.9	4																														
Radius of Curvature (ft)	10.1	45.7	49.2	79.8	28.5	5																														
Rc:Bankfull width (ft/ft)	**0.3**	**1.5**		**2.6**	1.1	**6**																														
Meander Wavelength (ft)	117.0	302.2	4	613.9	251.1	6																														
Meander Width Ratio	3.9	9.8		19.7	8.0	5																														
Additional Reach Parameters																																				
Rosgen Classification	C5						C5						C5																							
Channel Thalweg length (ft)																																				
Sinuosity (ft)	1.18						1.18						1.18																							
Water Surface Slope (Channel) (ft/ft)	0.0036						0.004						0.0035																							
BF slope (ft/ft)	**0.0036**						**0.004**						**0.0036**																							
[3]Ri% / Ru% / P% / G% / S%							**30**	**10**	**40**	**20**	**0**																									
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Exhibit Table 11b.3 Monitoring Data - Stream Reach Data Summary
Valley Fields Farm/447 - Lower A: 1,400 feet

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	30.1	30.8	31.1	31.1		3			47.1			1	27.4	35.1		42.9		2																		
Floodprone Width (ft)	78.6	98.6	90.6	126.6		3			109.3			1	87.8	105.4		122.9		2																		
Bankfull Mean Depth (ft)	1.8	2.0	2.0	2.2		3			1.8			1	1.7	1.9		2.0		2																		
[1]Bankfull Max Depth (ft)	3.2	3.5	3.4	4.0		3			3.8			1	3.8	3.9		4.0		2																		
Bankfull Cross Sectional Area (ft^2)	55.2	62.2	62.5	69.0		3			85.4			1	54.7	64.4		74.0		2																		
Width/Depth Ratio	14.0	15.3	15.5	16.4		3			26.0			1	13.7	19.2		24.8		2																		
Entrenchment Ratio	2.5	3.2	3.0	4.1		3			2.3			1	2.9	3.0		3.2		2																		
[1]Bank Height Ratio	**1.0**	**1.0**	**1.0**	**1.0**		**3**			**1.0**			**1**	**1.0**	**1.0**		**1.0**		**2**																		
Profile																																				
Riffle Length (ft)	36.8	44.4		51.6		3							25.1	63.2		118.2																				
Riffle Slope (ft/ft)	0.0016	0.0086		0.0135		5							0.0017	0.0063		0.0172																				
Pool Length (ft)	89.6	119.8		152.8		3							30.7	58.4		97.7																				
Pool Max depth (ft)	4.2	5.0		5.9		11							0.9	1.2		2.1																				
Pool Spacing (ft)	142.7	238.0		300.6		5							54.0	126.7		288.6																				
Pattern																																				
Channel Beltwidth (ft)	22.1	118.1	126.0	197.2	71.9	4																														
Radius of Curvature (ft)	10.1	45.7	49.2	79.8	28.5	5																														
Rc:Bankfull width (ft/ft)	**0.3**	**1.5**		**2.6**	1.1	**6**																														
Meander Wavelength (ft)	117.0	302.2	4	613.9	251.1	6																														
Meander Width Ratio	3.9	9.8		19.7	8.0	5																														

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Additional Reach Parameters																																				
Rosgen Classification	C5						C5						C5																								
Channel Thalweg length (ft)																																				
Sinuosity (ft)	1.14						1.14						1.14																								
Water Surface Slope (Channel) (ft/ft)	0.0015						0.0004						0.002																								
BF slope (ft/ft)	**0.002**						**0.002**						**0.0012**																								
[3]Ri% / Ru% / P% / G% / S%							**0**	**0**	**100**	**0**	**0**																										
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Exhibit Table 11b.4 Monitoring Data - Stream Reach Data Summary
Valley Fields Farm/407 - Upper B: 200 feet

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)			21.4			1			36.36			1	22.77	28.25		33.73		2																		
Floodprone Width (ft)			88.1			1			98.67			1	88.56	94.09		99.62		2																		
Bankfull Mean Depth (ft)			2			1			1.83			1	2.25	2.325		2.4		2																		
[1]Bankfull Max Depth (ft)			3.1			1			4.26			1	3.1	3.255		3.41		2																		
Bankfull Cross Sectional Area (ft[2])			42.4			1			66.57			1	54.67	65.27		75.87		2																		
Width/Depth Ratio			10.8			1			19.87			1	9.49	12.24		14.99		2																		
Entrenchment Ratio			4.1			1			2.71			1	2.95	3.42		3.89		2																		
[1]Bank Height Ratio			**1**			**1**			**1**			**1**	**1.12**	**1.14**		**1.16**		**2**																		
Profile																																				
Riffle Length (ft)			18.4			1																														
Riffle Slope (ft/ft)			5E-04			1																														
Pool Length (ft)	41.1	41.6		42.2		2			79.3			1	44.25	49.4		136.6																				
Pool Max depth (ft)	3.23	3.24		3.24		2			3.3				1.5	1.7		1.89																				
Pool Spacing (ft)			107.5			1								136.64																						
Pattern																																				
Channel Beltwidth (ft)	108.7	170.8	164.6	261..6	34.2	4																														
Radius of Curvature (ft)	23.8	55.4	50.5	110.1	36.2	5																														
Rc:Bankfull width (ft/ft)			**2.4**			**6**																														
Meander Wavelength (ft)	148.2	327.6	266.7	621	201.1	6																														
Meander Width Ratio			12.5			5																														

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Additional Reach Parameters																																				
Rosgen Classification			E5						C5						C5																						
Channel Thalweg length (ft)																																				
Sinuosity (ft)			1.13						1.13						1.13																						
Water Surface Slope (Channel) (ft/ft)			Flat						0.00004						0.0041																						
BF slope (ft/ft)			**0.0047**						**0.0047**						**0.0033**																						
[3]Ri% / Ru% / P% / G% / S%							**0**	**0**	**100**	**0**	**0**																										
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Exhibit Table 11b.5 Monitoring Data - Stream Reach Data Summary
Valley Fields Farm/407 -Lower B: 230 feet

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)			48.4			1			44.41			1	22.12	25.02		27.92		2																		
Floodprone Width (ft)			91.3			1			93.68			1	93.89	95.21		96.52		2																		
Bankfull Mean Depth (ft)			1.4			1			1.24			1	1.57	1.78		1.99		2																		
[1]Bankfull Max Depth (ft)			2.9			1			3.17			1	2.75	3.145		3.54		2																		
Bankfull Cross Sectional Area (ft^2)			67.8			1			55.25			1	43.81	43.89		43.96		2																		
Width/Depth Ratio			34.5			1			35.81			1	11.12	14.45		17.78		2																		
Entrenchment Ratio			1.9			1			2.11			1	3.36	3.86		4.36		2																		
[1]Bank Height Ratio			**1**			**1**			**1**			**1**	**1**	**1**		**1**		**2**																		
Profile																																				
Riffle Length (ft)	14	25.5		40.2		2			23			1	10.85	19.41		29.78																				
Riffle Slope (ft/ft)	0.003	0.007		0.009		2			0.005			1	0.014	0.027		0.0353																				
Pool Length (ft)	19.1	20.3		21.5		2	40.2	47.1		54.1		2	27.55	59.27		99.9																				
Pool Max depth (ft)			4.1			1	3.9	4.2		4.4		2	1.18	1.47		1.66																				
Pool Spacing (ft)			88.9			1	82.4	87.8		93.1		2	54.24	99.77		145.26																				
Pattern																																				
Channel Beltwidth (ft)	108.7	170.8	164.6	261..6	34.2	4																														
Radius of Curvature (ft)	23.8	55.4	50.5	110.1	36.2	5																														
Rc:Bankfull width (ft/ft)			**1.0**			**6**																														
Meander Wavelength (ft)	148.2	327.6	266.7	621	201.1	6																														
Meander Width Ratio			5.5			5																														

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Additional Reach Parameters																																				
Rosgen Classification			B5						B5						B5																						
Channel Thalweg length (ft)																																				
Sinuosity (ft)			1.17						1.17						1.17																						
Water Surface Slope (Channel) (ft/ft)			0.0035						0.0027						0.0044																						
BF slope (ft/ft)			**0.0047**						**0.0047**						**0.0021**																						
[3]Ri% / Ru% / P% / G% / S%							**30**	**10**	**40**	**20**	**0**																										
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Exhibit Table 11b.6 Monitoring Data - Stream Reach Data Summary
Valley Fields Farm/407 - Reach C: 1,400 feet

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	8.9	12.13	13.5	14		3	11.2	12.31	11.7	14.1		3	5.52	11.01	9.74	19	5.97	4																		
Floodprone Width (ft)	39.6	45.6	48.5	48.7		3	40.8	46.65	48.7	50.4		3	41.5	52.36	48.3	71.3	13	4																		
Bankfull Mean Depth (ft)	0.6	0.833	0.9	1		3	0.41	0.677	0.78	0.84		3	0.44	0.873	0.84	1.38	0.39	4																		
[1]Bankfull Max Depth (ft)	1.1	1.533	1.7	1.8		3	1.15	1.953	2.11	2.6		3	1.21	1.768	1.72	2.42	0.53	4																		
Bankfull Cross Sectional Area (ft^2)	7.5	9.6	8.9	12.4		3	5.74	8.073	9.12	9.36		3	6.12	8.09	8.01	10.2	1.71	4																		
Width/Depth Ratio	8.9	16.27	15.9	24		3	13.3	20.88	14.9	34.4		3	4	17.61	11.6	43.3	17.6	4																		
Entrenchment Ratio	3.5	3.833	3.6	4.4		3	3.46	3.813	3.65	4.33		3	2.56	6.323	4.91	12.9	4.68	4																		
[1]Bank Height Ratio	**1**	**1**	**1**	**1**		**3**	**1**	**1**	**1**	**1**		**3**	**1**	**1.005**	**1**	**1.02**	**0.01**	**4**																		
Profile																																				
Riffle Length (ft)	21.7	41.6	36.7	90.8	23.5	7	18.8	31.3		50.4		3	2.33	22.15		51.5																				
Riffle Slope (ft/ft)	0	0.007	0.01	0.01	0	7	0.01	0.009		0.01		3	0.0049	0.037		0.33																				
Pool Length (ft)	25.8	50.2	56.4	66.7	16.7	6	9.4	74.9		166		3	11.64	23.99		38.6																				
Pool Max depth (ft)	2.18	2.52	2.58	2.78	0.25	7	2.5	2.8		3.1		3	0.69	1.1		1.61																				
Pool Spacing (ft)	46	92.5	91.9	152	37.9	9	22.8	88.5		196		3	11.17	39.31		88.6																				
Pattern																																				
Channel Beltwidth (ft)	84.1	97.4	96.4	112	11.4	4																														
Radius of Curvature (ft)	20.8	32.5	30.7	59.4	16.5	5																														
Rc:Bankfull width (ft/ft)	**2.3**	**2.7**	**2.3**	**4.2**	0.92	**6**																														
Meander Wavelength (ft)	72.5	187.8	131	595	237	6																														
Meander Width Ratio	8.1	15.5	9.7	42.5	16	5																														

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Additional Reach Parameters																																				
Rosgen Classification							C5						C5																								
Channel Thalweg length (ft)																																				
Sinuosity (ft)			1.09						1.09						1.09																					
Water Surface Slope (Channel) (ft/ft)			0.0099						0.0086						0.0093																					
BF slope (ft/ft)			**0.0095**						**0.0094**						**0.0093**																					
[3]Ri% / Ru% / P% / G% / S%							**30**	**10**	**40**	**20**	**0**																										
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

APPENDIX E:

HYDROLOGIC DATA

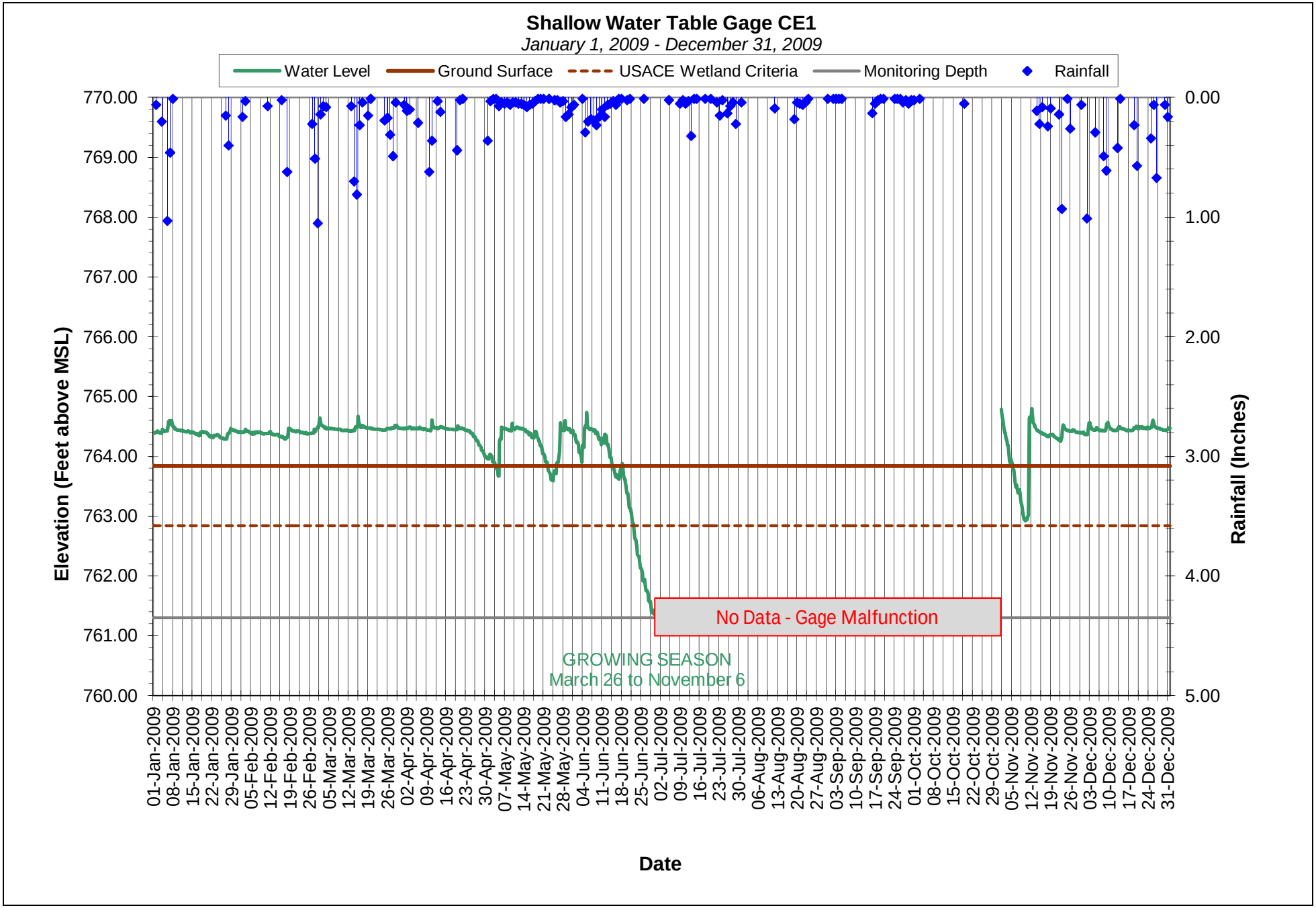
Table 12. Verification of Bankfull Events			
Valley Fields Farm/407			
Date of Data Collection	Date of Occurrence	Method	Photo # (if available)
7/8/2010	N/A	Rackline observed in floodplain	SP1
11/4/2010	N/A	Rackline observed at bankfull	PB05
4/10/2011	N/A	Rackline observed at bankfull	SP08/SP09
11/2/2011	N/A	Rackline observed at bankfull	

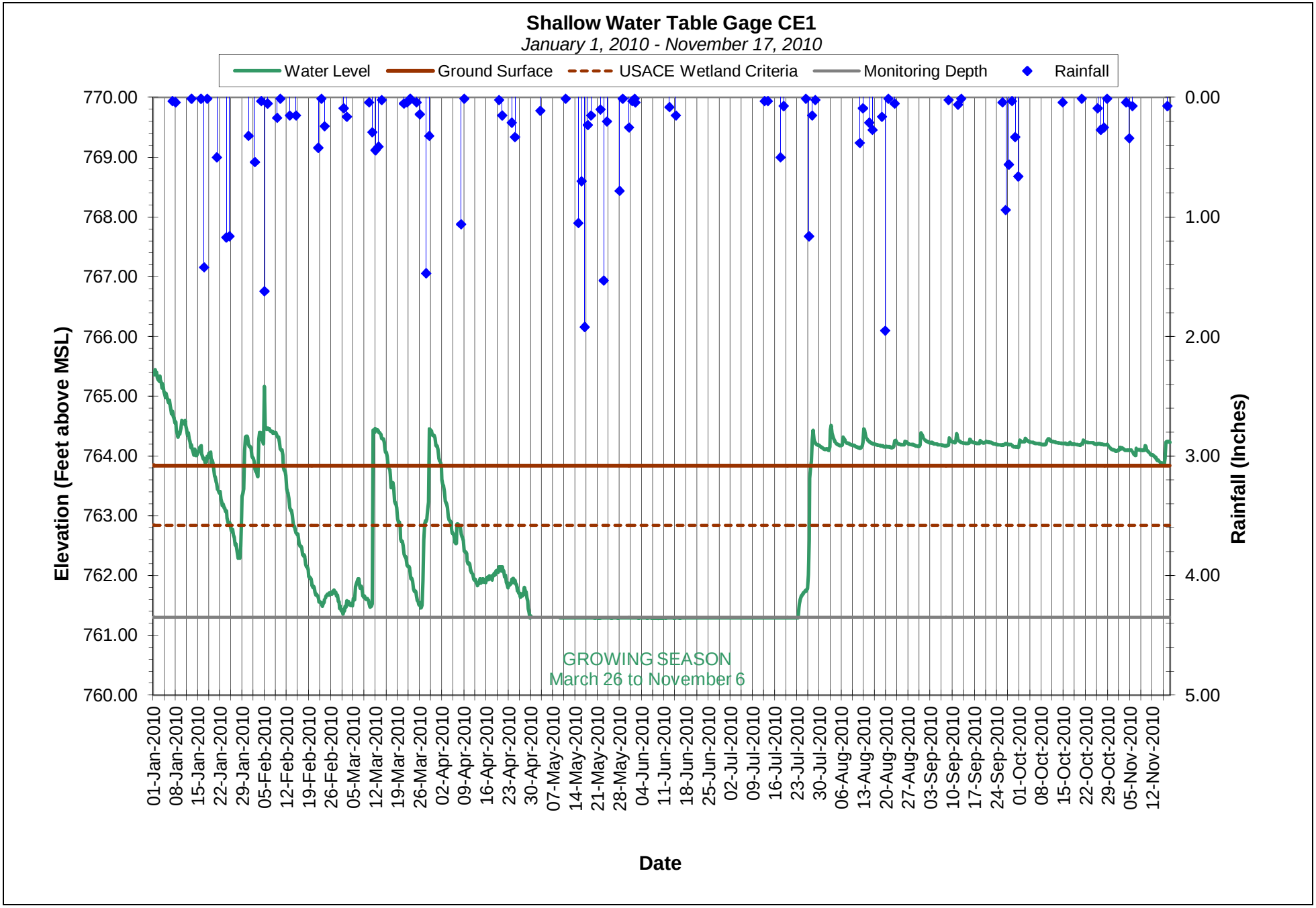
Table 13. Groundwater Well Summary Valley Fields Farm/407						
	Baseline	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
Groundwater Well CE1						
Consecutive days within range[1]	88	103	67			
% of growing season[2]	38.9%	45.6%	29.6%			
Criteria met[3]?	Y	Y	Y			
Groundwater Well CE3						
Consecutive days within range	90	109	68			
% of growing season	39.8%	48.2%	30.0%			
Criteria met?	Y	Y	Y			
Groundwater Well CE4						
Consecutive days within range	12	86	21			
% of growing season	5.3%	38.1%	9.3%			
Criteria met?	Y	Y	Y			
Groundwater Well CE6						
Consecutive days within range	95	97	38			
% of growing season	42.0%	42.9%	16.8%			
Criteria met?	Y	Y	Y			

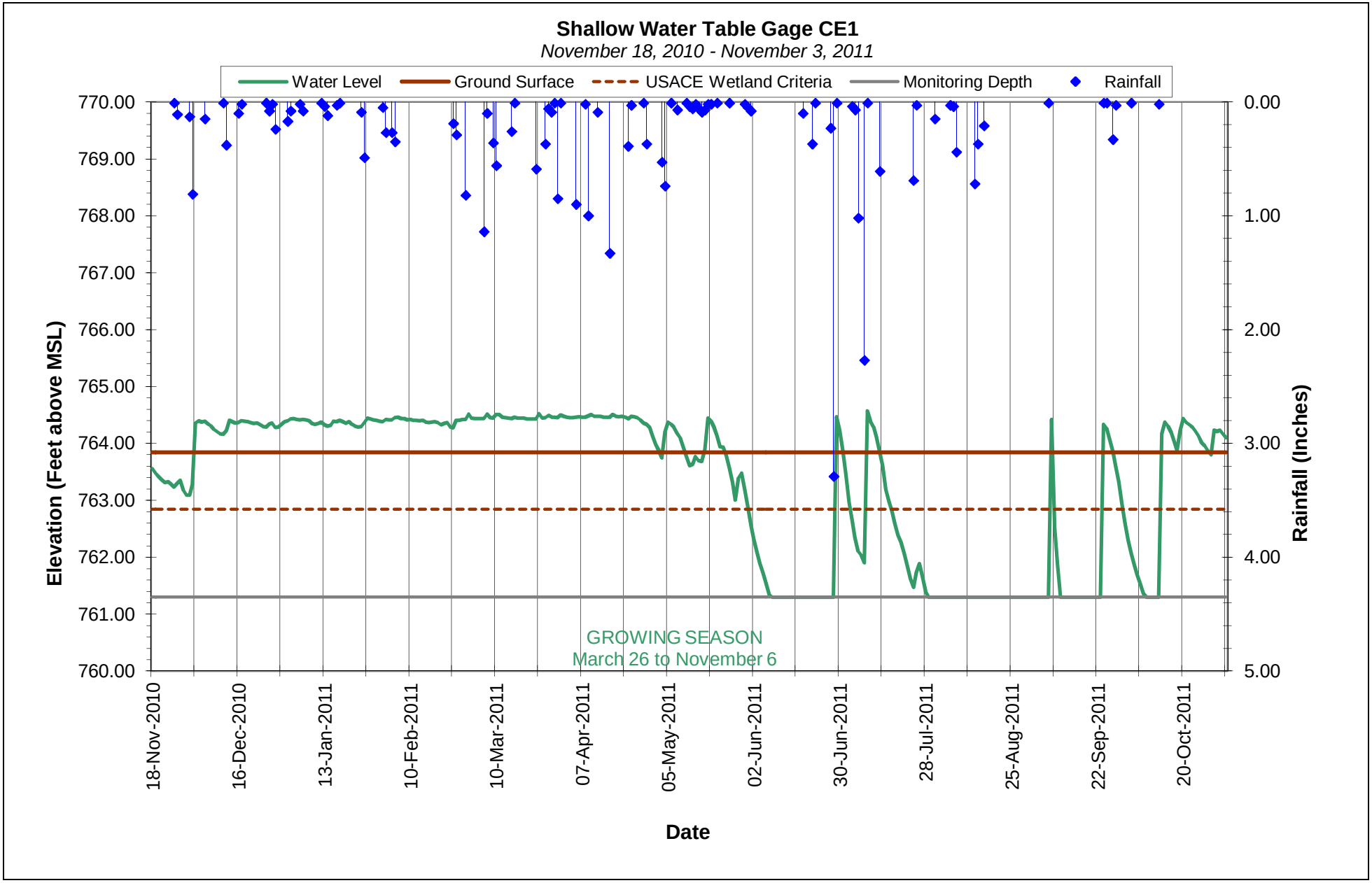
1- The Army Corps of Engineers states that the range is within 12 inches of the ground surface

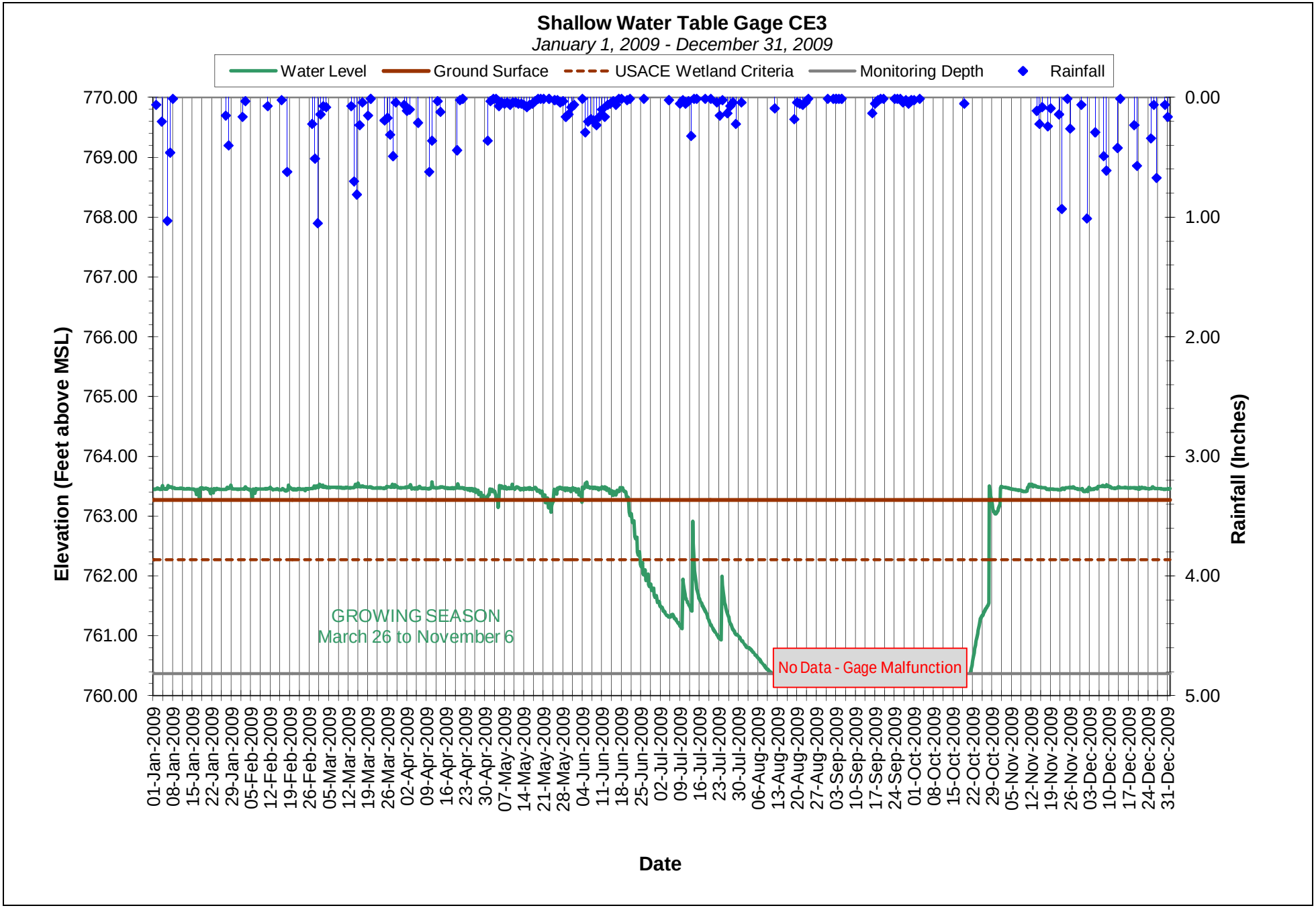
2- The growing season for the site is 226 days long.

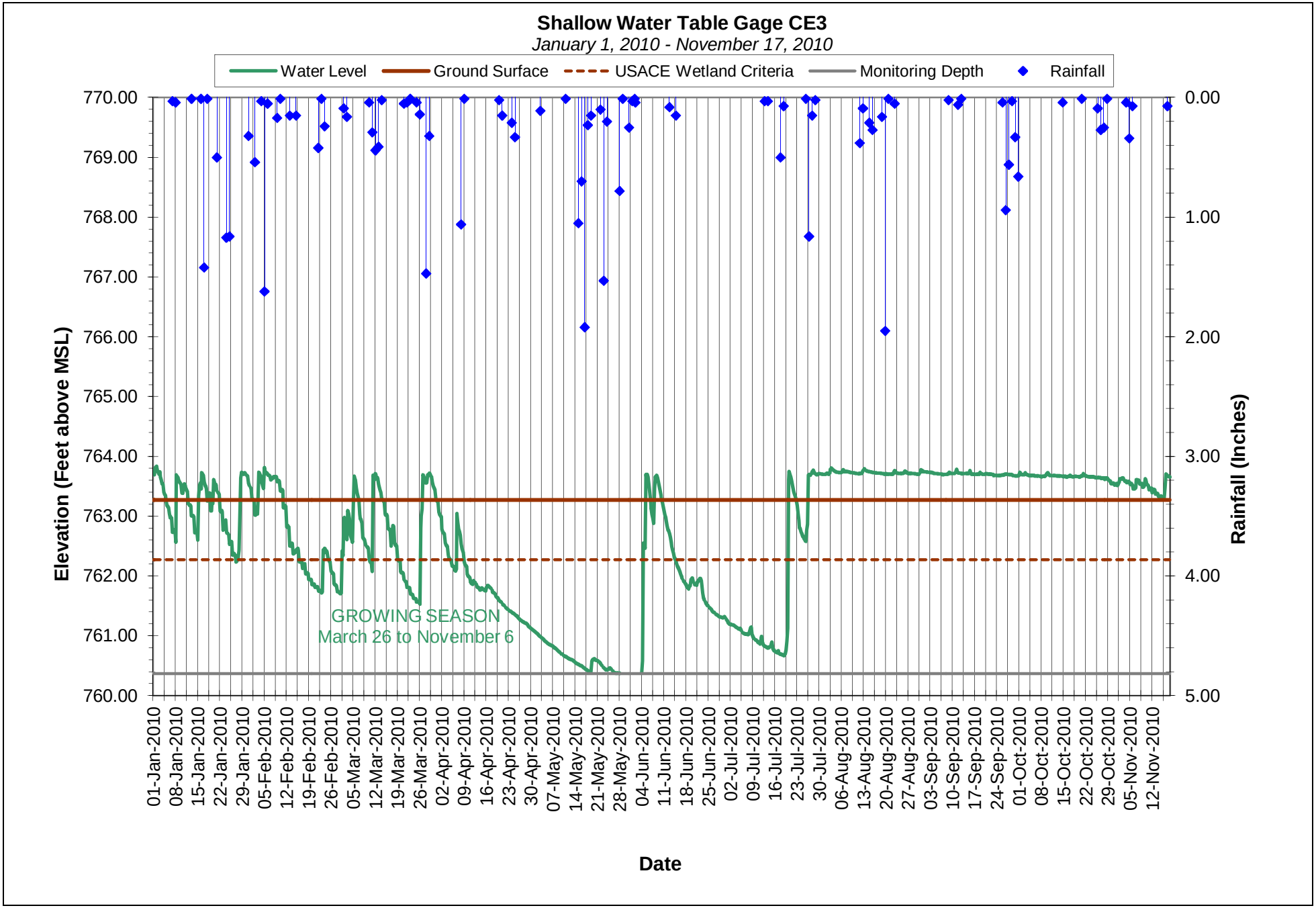
3- The Army Corps of Engineers states that the success criteria is being within range for at least 7.5% of the growing season consecutively.


Shallow Water Table Gage CE1
January 1, 2009 - December 31, 2009
Water Level
Ground Surface
USACE Wetland Criteria
Monitoring Depth
Rainfall
Elevation (Feet above MSL)
Rainfall (Inches)
770.00
769.00
768.00
767.00
766.00
765.00
764.00
763.00
762.00
761.00
760.00
0.00
1.00
2.00
3.00
4.00
5.00
No Data - Gage Malfunction
GROWING SEASON
March 26 to November 6
01-Jan-2009
08-Jan-2009
15-Jan-2009
22-Jan-2009
29-Jan-2009
05-Feb-2009
12-Feb-2009
19-Feb-2009
26-Feb-2009
05-Mar-2009
12-Mar-2009
19-Mar-2009
26-Mar-2009
02-Apr-2009
09-Apr-2009
16-Apr-2009
23-Apr-2009
30-Apr-2009
07-May-2009
14-May-2009
21-May-2009
28-May-2009
04-Jun-2009
11-Jun-2009
18-Jun-2009
25-Jun-2009
02-Jul-2009
09-Jul-2009
16-Jul-2009
23-Jul-2009
30-Jul-2009
06-Aug-2009
13-Aug-2009
20-Aug-2009
27-Aug-2009
03-Sep-2009
10-Sep-2009
17-Sep-2009
24-Sep-2009
01-Oct-2009
08-Oct-2009
15-Oct-2009
22-Oct-2009
29-Oct-2009
05-Nov-2009
12-Nov-2009
19-Nov-2009
26-Nov-2009
03-Dec-2009
10-Dec-2009
17-Dec-2009
24-Dec-2009
31-Dec-2009
Date


Shallow Water Table Gage CE1
January 1, 2010 - November 17, 2010
Water Level
Ground Surface
USACE Wetland Criteria
Monitoring Depth
Rainfall
Elevation (Feet above MSL)
Rainfall (Inches)
770.00
769.00
768.00
767.00
766.00
765.00
764.00
763.00
762.00
761.00
760.00
0.00
1.00
2.00
3.00
4.00
5.00
GROWING SEASON
March 26 to November 6
01-Jan-2010
08-Jan-2010
15-Jan-2010
22-Jan-2010
29-Jan-2010
05-Feb-2010
12-Feb-2010
19-Feb-2010
26-Feb-2010
05-Mar-2010
12-Mar-2010
19-Mar-2010
26-Mar-2010
02-Apr-2010
09-Apr-2010
16-Apr-2010
23-Apr-2010
30-Apr-2010
07-May-2010
14-May-2010
21-May-2010
28-May-2010
04-Jun-2010
11-Jun-2010
18-Jun-2010
25-Jun-2010
02-Jul-2010
09-Jul-2010
16-Jul-2010
23-Jul-2010
30-Jul-2010
06-Aug-2010
13-Aug-2010
20-Aug-2010
27-Aug-2010
03-Sep-2010
10-Sep-2010
17-Sep-2010
24-Sep-2010
01-Oct-2010
08-Oct-2010
15-Oct-2010
22-Oct-2010
29-Oct-2010
05-Nov-2010
12-Nov-2010
Date


Shallow Water Table Gage CE1
November 18, 2010 - November 3, 2011
Water Level
Ground Surface
USACE Wetland Criteria
Monitoring Depth
Rainfall
Elevation (Feet above MSL)
Rainfall (Inches)
770.00
769.00
768.00
767.00
766.00
765.00
764.00
763.00
762.00
761.00
760.00
0.00
1.00
2.00
3.00
4.00
5.00
GROWING SEASON
March 26 to November 6
18-Nov-2010
16-Dec-2010
13-Jan-2011
10-Feb-2011
10-Mar-2011
07-Apr-2011
05-May-2011
02-Jun-2011
30-Jun-2011
28-Jul-2011
25-Aug-2011
22-Sep-2011
20-Oct-2011
Date


Shallow Water Table Gage CE3
January 1, 2009 - December 31, 2009
Water Level
Ground Surface
USACE Wetland Criteria
Monitoring Depth
Rainfall
Elevation (Feet above MSL)
Rainfall (Inches)
770.00
769.00
768.00
767.00
766.00
765.00
764.00
763.00
762.00
761.00
760.00
0.00
1.00
2.00
3.00
4.00
5.00
GROWING SEASON
March 26 to November 6
No Data - Gage Malfunction
01-Jan-2009
08-Jan-2009
15-Jan-2009
22-Jan-2009
29-Jan-2009
05-Feb-2009
12-Feb-2009
19-Feb-2009
26-Feb-2009
05-Mar-2009
12-Mar-2009
19-Mar-2009
26-Mar-2009
02-Apr-2009
09-Apr-2009
16-Apr-2009
23-Apr-2009
30-Apr-2009
07-May-2009
14-May-2009
21-May-2009
28-May-2009
04-Jun-2009
11-Jun-2009
18-Jun-2009
25-Jun-2009
02-Jul-2009
09-Jul-2009
16-Jul-2009
23-Jul-2009
30-Jul-2009
06-Aug-2009
13-Aug-2009
20-Aug-2009
27-Aug-2009
03-Sep-2009
10-Sep-2009
17-Sep-2009
24-Sep-2009
01-Oct-2009
08-Oct-2009
15-Oct-2009
22-Oct-2009
29-Oct-2009
05-Nov-2009
12-Nov-2009
19-Nov-2009
26-Nov-2009
03-Dec-2009
10-Dec-2009
17-Dec-2009
24-Dec-2009
31-Dec-2009
Date


Shallow Water Table Gage CE3
January 1, 2010 - November 17, 2010
Water Level
Ground Surface
USACE Wetland Criteria
Monitoring Depth
Rainfall
Elevation (Feet above MSL)
Rainfall (Inches)
770.00
769.00
768.00
767.00
766.00
765.00
764.00
763.00
762.00
761.00
760.00
0.00
1.00
2.00
3.00
4.00
5.00
GROWING SEASON
March 26 to November 6
01-Jan-2010
08-Jan-2010
15-Jan-2010
22-Jan-2010
29-Jan-2010
05-Feb-2010
12-Feb-2010
19-Feb-2010
26-Feb-2010
05-Mar-2010
12-Mar-2010
19-Mar-2010
26-Mar-2010
02-Apr-2010
09-Apr-2010
16-Apr-2010
23-Apr-2010
30-Apr-2010
07-May-2010
14-May-2010
21-May-2010
28-May-2010
04-Jun-2010
11-Jun-2010
18-Jun-2010
25-Jun-2010
02-Jul-2010
09-Jul-2010
16-Jul-2010
23-Jul-2010
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06-Aug-2010
13-Aug-2010
20-Aug-2010
27-Aug-2010
03-Sep-2010
10-Sep-2010
17-Sep-2010
24-Sep-2010
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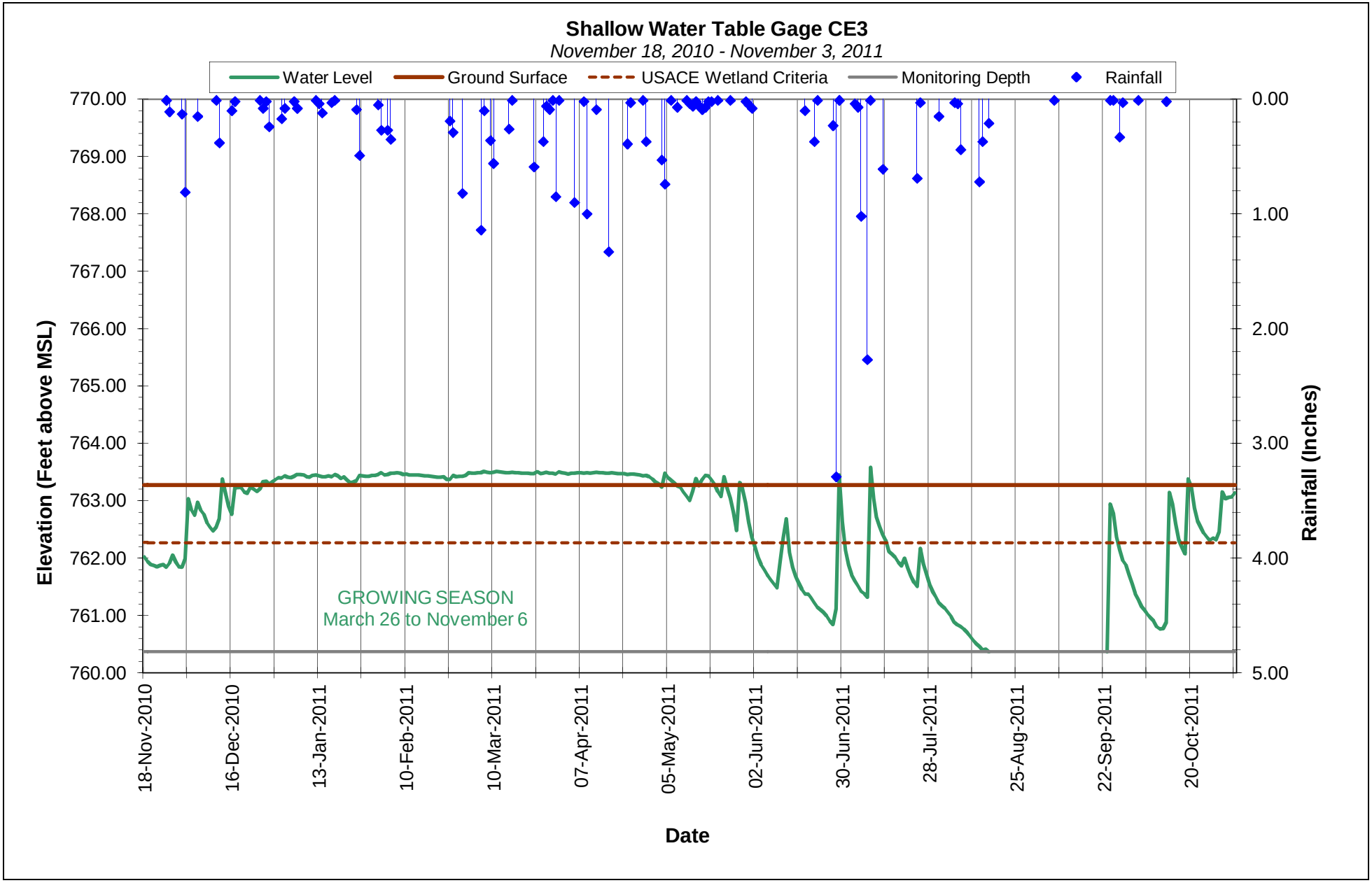
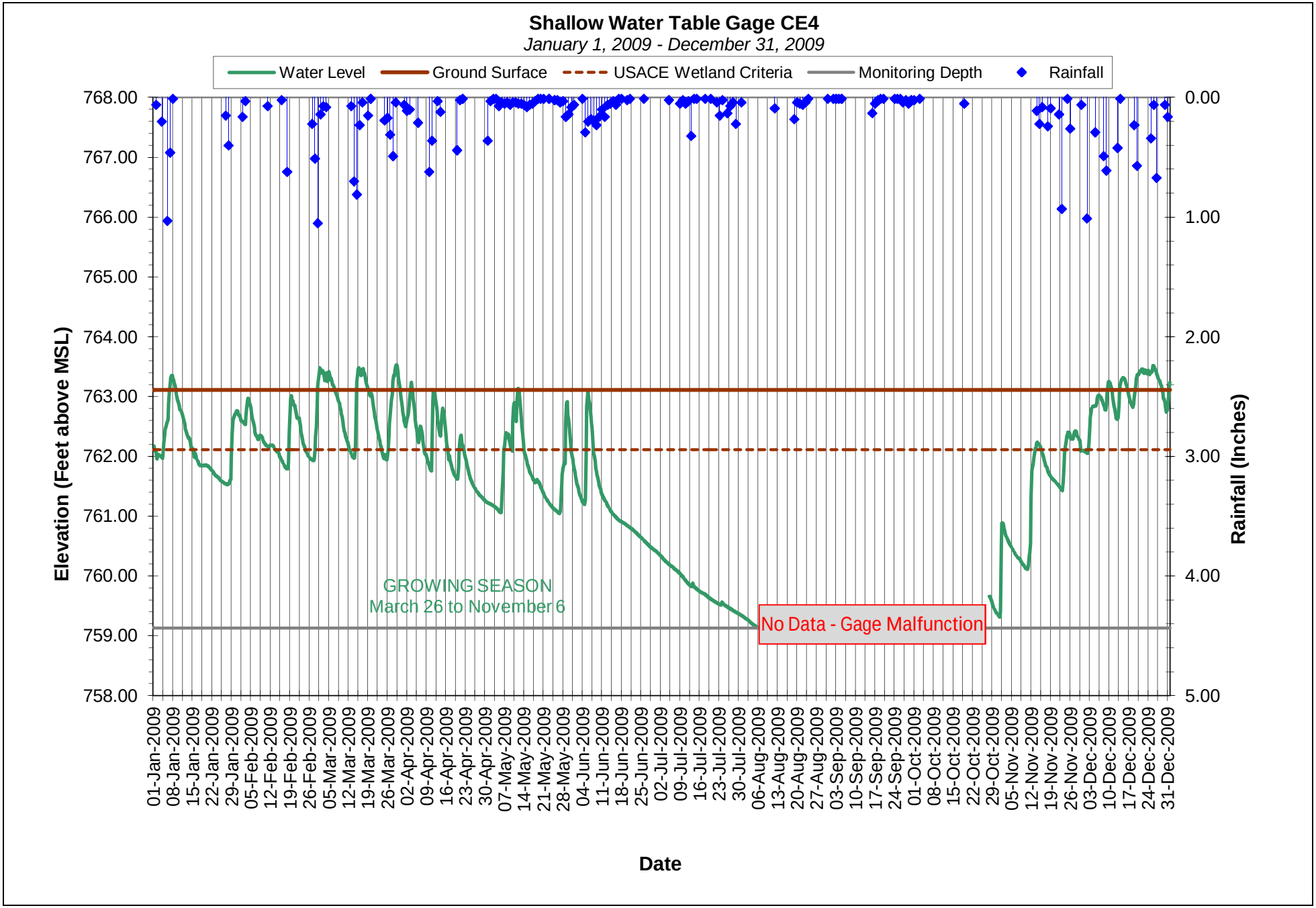
29-Oct-2010
05-Nov-2010
12-Nov-2010
Date


Shallow Water Table Gage CE3
November 18, 2010 - November 3, 2011
Water Level
Ground Surface
USACE Wetland Criteria
Monitoring Depth
Rainfall
Elevation (Feet above MSL)
Rainfall (Inches)
770.00
769.00
768.00
767.00
766.00
765.00
764.00
763.00
762.00
761.00
760.00
0.00
1.00
2.00
3.00
4.00
5.00
GROWING SEASON
March 26 to November 6
18-Nov-2010
16-Dec-2010
13-Jan-2011
10-Feb-2011
10-Mar-2011
07-Apr-2011
05-May-2011
02-Jun-2011
30-Jun-2011
28-Jul-2011
25-Aug-2011
22-Sep-2011
20-Oct-2011
Date


Shallow Water Table Gage CE4
January 1, 2009 - December 31, 2009
Water Level
Ground Surface
USACE Wetland Criteria
Monitoring Depth
Rainfall
Elevation (Feet above MSL)
Rainfall (Inches)
768.00
767.00
766.00
765.00
764.00
763.00
762.00
761.00
760.00
759.00
758.00
0.00
1.00
2.00
3.00
4.00
5.00
GROWING SEASON
March 26 to November 6
No Data - Gage Malfunction
01-Jan-2009
08-Jan-2009
15-Jan-2009
22-Jan-2009
29-Jan-2009
05-Feb-2009
12-Feb-2009
19-Feb-2009
26-Feb-2009
05-Mar-2009
12-Mar-2009
19-Mar-2009
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02-Apr-2009
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05-Nov-2009
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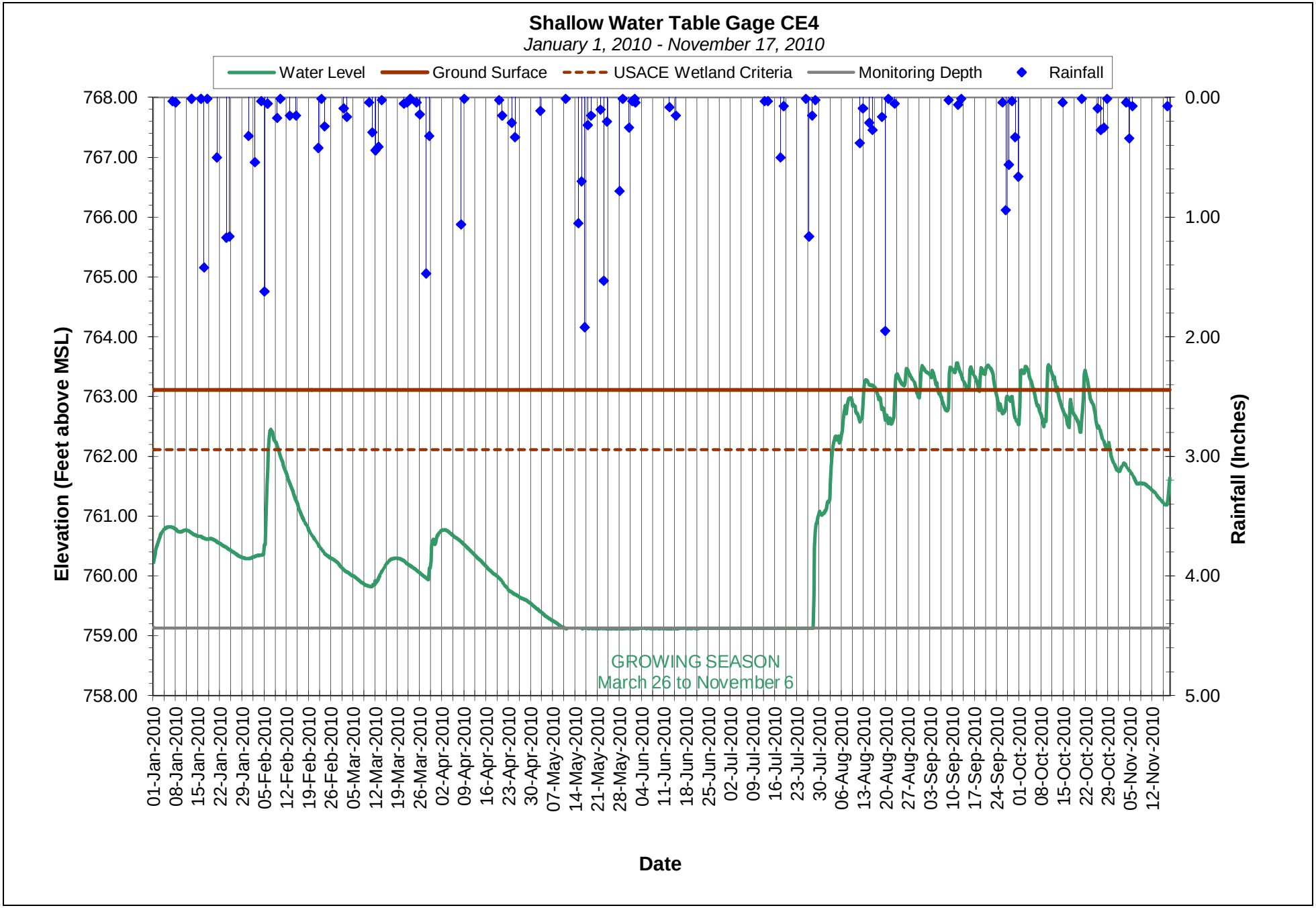
31-Dec-2009
Date


Shallow Water Table Gage CE4
January 1, 2010 - November 17, 2010
Water Level
Ground Surface
USACE Wetland Criteria
Monitoring Depth
Rainfall
Elevation (Feet above MSL)
Rainfall (Inches)
768.00
767.00
766.00
765.00
764.00
763.00
762.00
761.00
760.00
759.00
758.00
0.00
1.00
2.00
3.00
4.00
5.00
GROWING SEASON
March 26 to November 6
01-Jan-2010
08-Jan-2010
15-Jan-2010
22-Jan-2010
29-Jan-2010
05-Feb-2010
12-Feb-2010
19-Feb-2010
26-Feb-2010
05-Mar-2010
12-Mar-2010
19-Mar-2010
26-Mar-2010
02-Apr-2010
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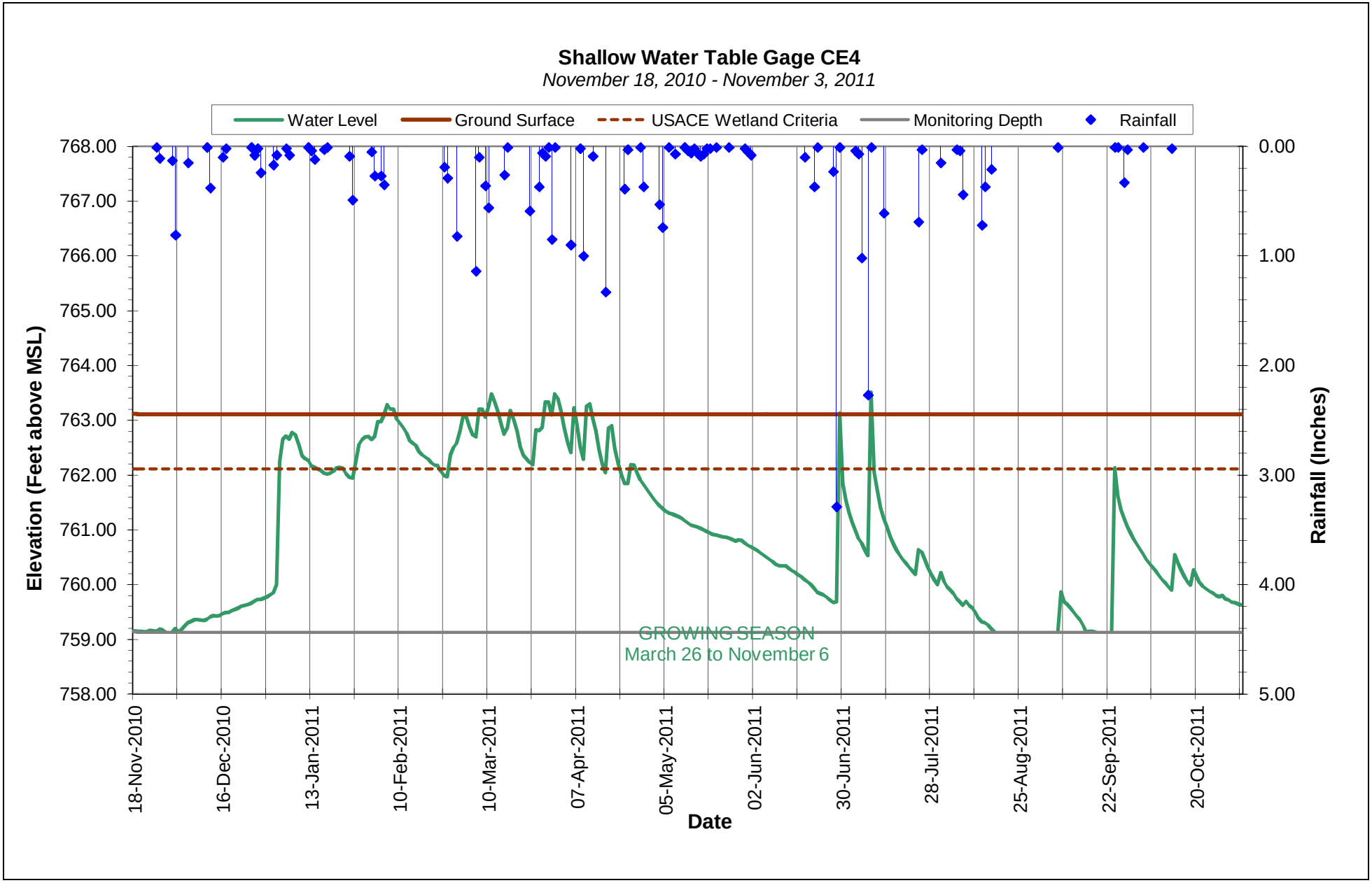
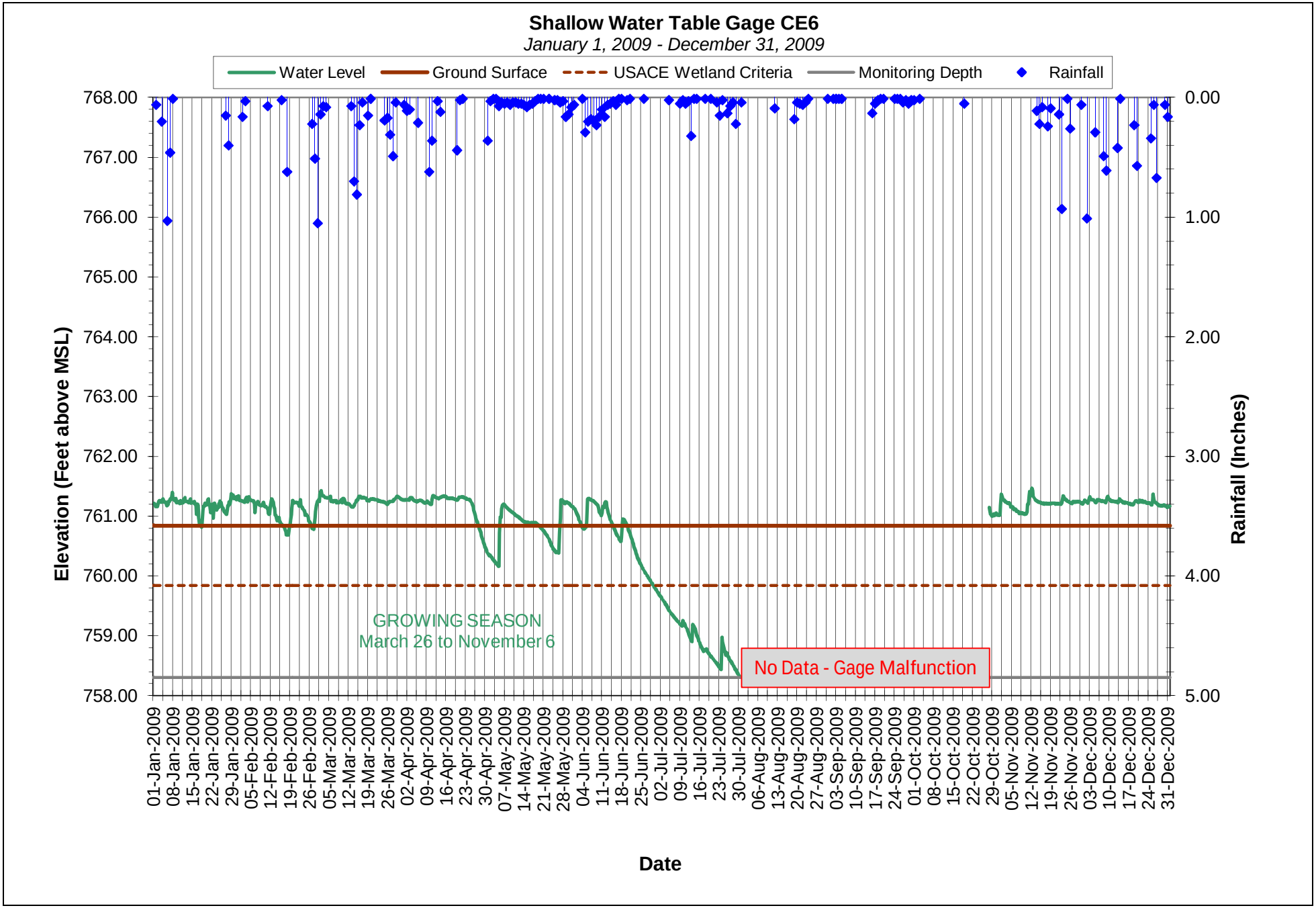
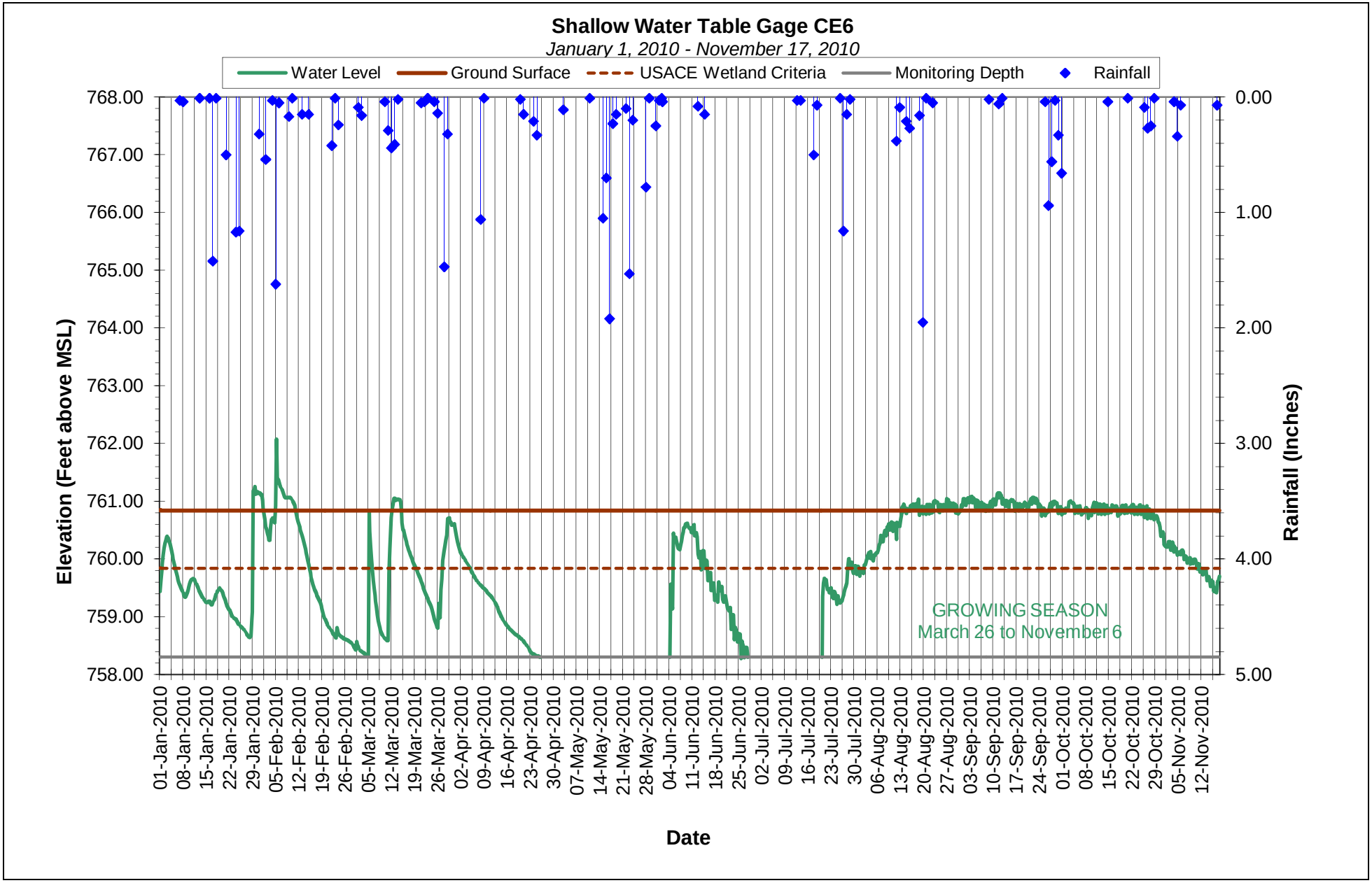
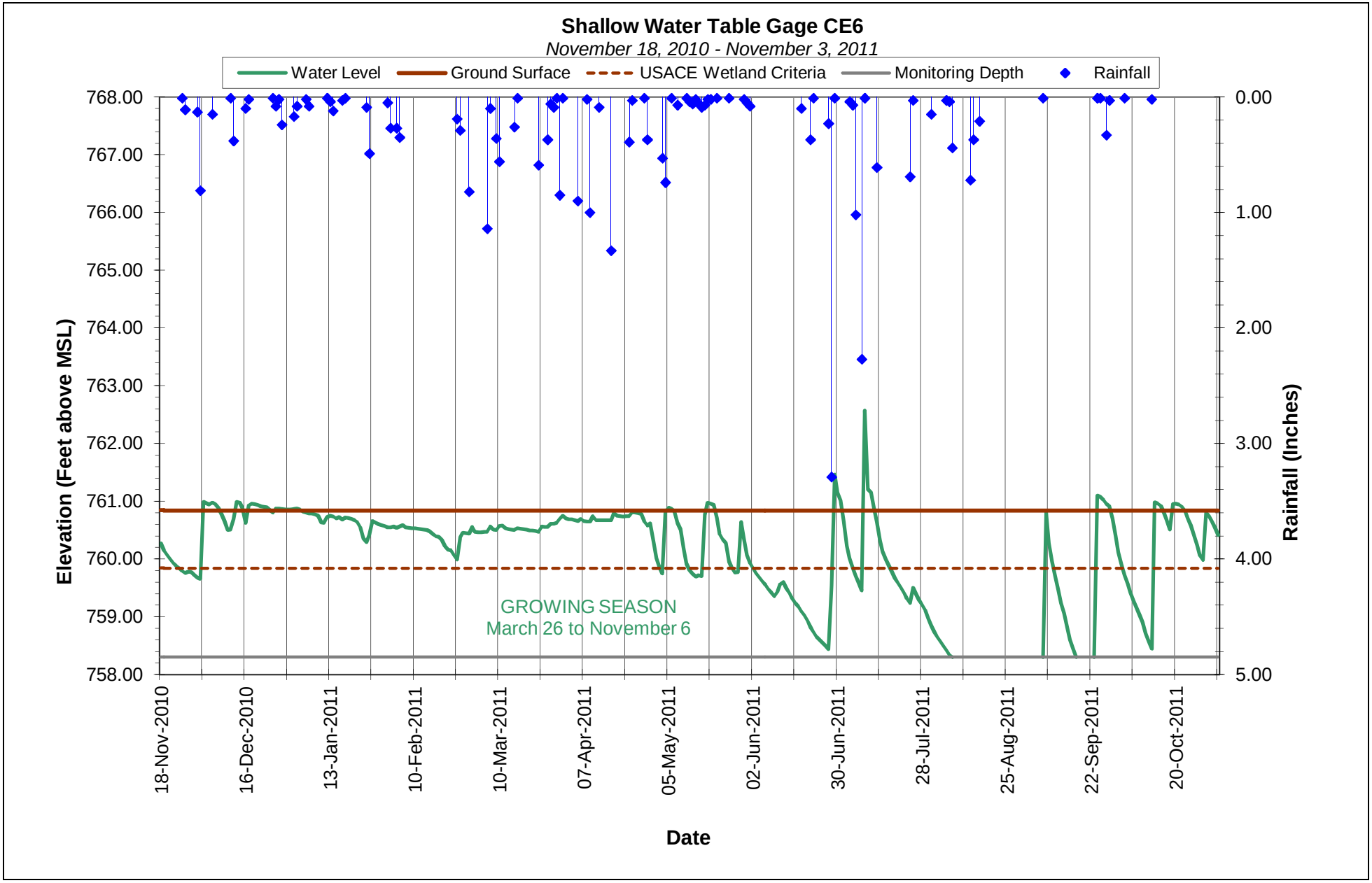
06-Aug-2010
13-Aug-2010
20-Aug-2010
27-Aug-2010
03-Sep-2010
10-Sep-2010
17-Sep-2010
24-Sep-2010
01-Oct-2010
08-Oct-2010
15-Oct-2010
22-Oct-2010
29-Oct-2010
05-Nov-2010
12-Nov-2010
Date


Shallow Water Table Gage CE4
November 18, 2010 - November 3, 2011
Water Level
Ground Surface
USACE Wetland Criteria
Monitoring Depth
Rainfall
Elevation (Feet above MSL)
Rainfall (Inches)
768.00
767.00
766.00
765.00
764.00
763.00
762.00
761.00
760.00
759.00
758.00
0.00
1.00
2.00
3.00
4.00
5.00
GROWING SEASON
March 26 to November 6
18-Nov-2010
16-Dec-2010
13-Jan-2011
10-Feb-2011
10-Mar-2011
07-Apr-2011
05-May-2011
02-Jun-2011
30-Jun-2011
28-Jul-2011
25-Aug-2011
22-Sep-2011
20-Oct-2011
Date


Shallow Water Table Gage CE6
January 1, 2009 - December 31, 2009
Water Level
Ground Surface
USACE Wetland Criteria
Monitoring Depth
Rainfall
Elevation (Feet above MSL)
Rainfall (Inches)
768.00
767.00
766.00
765.00
764.00
763.00
762.00
761.00
760.00
759.00
758.00
0.00
1.00
2.00
3.00
4.00
5.00
GROWING SEASON
March 26 to November 6
No Data - Gage Malfunction
01-Jan-2009
08-Jan-2009
15-Jan-2009
22-Jan-2009
29-Jan-2009
05-Feb-2009
12-Feb-2009
19-Feb-2009
26-Feb-2009
05-Mar-2009
12-Mar-2009
19-Mar-2009
26-Mar-2009
02-Apr-2009
09-Apr-2009
16-Apr-2009
23-Apr-2009
30-Apr-2009
07-May-2009
14-May-2009
21-May-2009
28-May-2009
04-Jun-2009
11-Jun-2009
18-Jun-2009
25-Jun-2009
02-Jul-2009
09-Jul-2009
16-Jul-2009
23-Jul-2009
30-Jul-2009
06-Aug-2009
13-Aug-2009
20-Aug-2009
27-Aug-2009
03-Sep-2009
10-Sep-2009
17-Sep-2009
24-Sep-2009
01-Oct-2009
08-Oct-2009
15-Oct-2009
22-Oct-2009
29-Oct-2009
05-Nov-2009
12-Nov-2009
19-Nov-2009
26-Nov-2009
03-Dec-2009
10-Dec-2009
17-Dec-2009
24-Dec-2009
31-Dec-2009
Date


Shallow Water Table Gage CE6
January 1, 2010 - November 17, 2010
Water Level
Ground Surface
USACE Wetland Criteria
Monitoring Depth
Rainfall
Elevation (Feet above MSL)
Rainfall (Inches)
768.00
767.00
766.00
765.00
764.00
763.00
762.00
761.00
760.00
759.00
758.00
0.00
1.00
2.00
3.00
4.00
5.00
GROWING SEASON
March 26 to November 6
01-Jan-2010
08-Jan-2010
15-Jan-2010
22-Jan-2010
29-Jan-2010
05-Feb-2010
12-Feb-2010
19-Feb-2010
26-Feb-2010
05-Mar-2010
12-Mar-2010
19-Mar-2010
26-Mar-2010
02-Apr-2010
09-Apr-2010
16-Apr-2010
23-Apr-2010
30-Apr-2010
07-May-2010
14-May-2010
21-May-2010
28-May-2010
04-Jun-2010
11-Jun-2010
18-Jun-2010
25-Jun-2010
02-Jul-2010
09-Jul-2010
16-Jul-2010
23-Jul-2010
30-Jul-2010
06-Aug-2010
13-Aug-2010
20-Aug-2010
27-Aug-2010
03-Sep-2010
10-Sep-2010
17-Sep-2010
24-Sep-2010
01-Oct-2010
08-Oct-2010
15-Oct-2010
22-Oct-2010
29-Oct-2010
05-Nov-2010
12-Nov-2010
Date


Shallow Water Table Gage CE6
November 18, 2010 - November 3, 2011
Water Level
Ground Surface
USACE Wetland Criteria
Monitoring Depth
Rainfall
Elevation (Feet above MSL)
Rainfall (Inches)
768.00
767.00
766.00
765.00
764.00
763.00
762.00
761.00
760.00
759.00
758.00
0.00
1.00
2.00
3.00
4.00
5.00
GROWING SEASON
March 26 to November 6
18-Nov-2010
16-Dec-2010
13-Jan-2011
10-Feb-2011
10-Mar-2011
07-Apr-2011
05-May-2011
02-Jun-2011
30-Jun-2011
28-Jul-2011
25-Aug-2011
22-Sep-2011
20-Oct-2011
Date