



Stantec Consulting Services Inc.
801 Jones Franklin Road, Suite 300
Raleigh NC 27606-3394
Tel: (919) 851-6866
Fax: (919) 851-7024

December 12, 2013
File: 171300316

Attention: Heather Smith
NC Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

Dear Ms. Smith,

**Reference: Response to EEP Comments for Overhills Stream and Wetland Restoration MY7
Monitoring Report**

General Report

- Submit CVS data to eepveg@ncdenr.gov if not already completed
 - CVS data has been submitted to eepveg@ncdenr.gov
- Include Table for Vegetation Condition, see UTJR Table 6
 - A Vegetation Condition Table has been added, and can be found as Table 6B on Page 22.

Executive Summary

- Page 2 – Discuss bankfull events in the stream success paragraph
 - A sentence discussing bankfull events has been added in the third paragraph on Page 2 of the Executive Summary.
- Page 2 – Remove narrative regarding collecting data after the growing season is over in the last paragraph
 - The above mentioned text has been removed from the Executive Summary on Page 3.

CCPV

- Remove “Improperly Constructed Log Vane” from the map
 - “Improperly Constructed Log Vane” text has been removed from the map.



December 12, 2013
Page 2 of 2

Reference: Response to EEP Comments for Overhills Stream and Wetland Restoration MY7 Monitoring Report

Table 7

- Remove highlighting from cells or add legend to explain
 - Legend was added to explain highlighting

Regards,

STANTEC CONSULTING SERVICES INC.

Alex Baldwin, LSS PWS
Scientist
Phone: (919) 865-7583
Fax: (919) 851-7024
Alexander.Baldwin@stantec.com

Attachment: Overhills Stream and Wetland Restoration Monitoring Report Year 7 – 2 hard copies and 1 compact disc

OVERHILLS STREAM AND WETLAND RESTORATION MONITORING REPORT (YEAR 7)

Harnett County, North Carolina

EEP Project No. 199

Monitoring Contract #004448



Prepared for:
North Carolina Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652



Status of Plan: FINAL
Submission Date: November 2013

Monitoring Firm:



Stantec Consulting Services Inc
801 Jones Franklin Road, Suite 300
Raleigh, NC 27606

Table of Contents

1.0	Executive Summary	1
2.0	Methodology	4
2.1	Vegetation Assessment	4
2.2	Stream Assessment	4
2.3	Wetland Assessment	4
3.0	References.....	6
	Project Condition and Monitoring Data Appendices.....	7
	Appendix A. General Figures and Plan Views	7
	Appendix B. General Project Tables.....	15
	Appendix C. Vegetation Assessment Data	19
	Appendix D. Stream Assessment Data	25
	Appendix E. Wetland Assessment.....	39

Project Condition and Monitoring Data Appendices

Appendix A. General Figures and Plan Views	7
Figure 1 – Location Map	9
Figure 2 – Asset Map	11
Figure 3 – Current Condition Plan View	13
Appendix B. General Project Tables	
Table 1 – Project Restoration Components	15
Table 2 – Project History and Reporting Activity	15
Table 3 – Project Contacts Table	16
Table 4 – Project Background Table	18
Appendix C. Vegetation Assessment Data	
Table 5 – Vegetation Plot Mitigation Success Summary Table	19
Photos – Vegetation Monitoring Plot Photos	20
Table 6 – Vegetation Metadata Table	21
Table 7 – Stem Count Total of Planted Vegetation by Plot and Species	23
<i>Vegetation Problem Area Photos (electronic submission only)</i>	
<i>Vegetation Problem Area Inventory Table (electronic submission only)</i>	
Appendix D. Stream Assessment Data	
Photos – Stream Station Photos	25
Table 8 – Visual Morphological Stability Assessment	27
Table 9 – Verification of Bankfull Events	27
Figures – Cross-Sections	29
Figures – Longitudinal Profiles	37
<i>Baseline Stream Data Summary Table (electronic submission only)</i>	
<i>Morphology and Hydraulic Summary (Reach and XS Parameters) (electronic submission only)</i>	
<i>Stream Problem Area Photos (electronic submission only)</i>	
<i>Stream Problem Area Inventory Table (electronic submission only)</i>	
Appendix E. Wetland Assessment Data	
Figures – Water Level and Precipitation Plots	39
Table 10 – Wetland Hydrology Criteria Attainment	51

This page is intentionally left blank for two-sided printing.

1.0 Executive Summary

The North Carolina Ecosystem Enhancement Program (EEP) restored 4,270 linear feet of Jumping Run Creek and 59.7 acres of adjacent riparian wetlands located on the Fort Bragg Overhills tract, north of Spring Lake, in Harnett County, North Carolina. Construction of the project began on July 12, 2004 and the restoration was completed on May 30, 2006. The restoration project is located on the north side of Nursery Road (SR 1120) and has a total drainage area of 15.9 square miles. The site had been significantly altered from its natural state. Prior to 1955, the stream was straightened and moved to the west to provide more room for agricultural practices. Previous to restoration activities, the stream was deeply incised with only the largest rain events resulting in overbank flow. The associated wetlands had been drained and cultivated in various row crops for many years. Priority 1 stream restoration was carried out on the project resulting in a restored C type channel which was expected to naturally evolve in some areas to an E5 channel type. The entire restoration area including streambanks and riparian wetlands were planted with vegetation to stabilize the channel and provide shading, food, and habitat. Berms were installed across the site perpendicular to the valley to promote wetland hydrology and create microtopography beneficial for wildlife habitat.

Project goals and objectives for the Overhills stream and wetland restoration project include:

- Restoration of stream dimension, pattern and profile
- Restoration of riverine wetland hydrology and vegetation
- Improvement of current water quality
- Protection of future water quality

Major repair work on the lower reach took place over the winter of 2011. The repair was designed by Wildlands Engineering, Inc. and built by River Works. Construction was completed by mid-February 2011 and planting was completed in early March 2011. According to the construction plans, 1,025 linear feet of stream was relocated to the east of the existing failing stream channel. Seven of the floodplain berms onsite were notched to provide better flow across the wetlands. Some existing vegetation was salvaged and replanted within the limits of disturbance. The remaining area (11.7 acres) was seeded and planted with bareroot seedlings.

Vegetation Plot 6 was moved in 2011 since it was a 5x20m streambank plot on the older failing section of stream. A new 10x10m plot, "6R", was installed on the floodplain of the newly repaired reach in 2011. Due to the plot's location within the repair area it is the only plot that has continued to be monitored throughout the remainder of the monitoring period. Plot 6R is exceeding the success criteria of 260 stems per acre and more details can be found on Table 7 in Appendix C. Problem areas are referred to as VPA 1 through 22 on the Current Condition Plan View (CCPV) located in Appendix A. In VPA 1, 2, 4, 12, 14, and 22 persistent flooding has occurred and has caused the majority of the planted woody vegetation to die in those areas. Standing water continues to be present in these areas. As previously noted, even though these areas are not supporting the planted woody vegetation, they do and will continue to provide excellent habitat diversity for the site. Other wet areas are present onsite, but woody vegetation is present and viable in these areas and is currently not a cause for concern. Some minor beaver foraging was observed in VPA 18 and 19. There is potential for beaver to recreate dams in previous locations,

specifically near STA 3+50 and STA 9+00; however there was no evidence of a dam during this past monitoring year.

Lespedeza is still present in some drier areas onsite, and has reestablished along the right bank and lower left bank in the newly repaired floodplain and has grown in area enough to be added to the CCPV as VPA 23 and 24. A few areas of *Typha* have also been observed onsite and are growing in size from previous assessments. Areas of *Typha* were observed near the wetter areas and are shown on the map as VPA 10, 15 and 20. VPA-10 and VPA-20 (*Typha*) have expanded. As previously noted, the remainder of the wetland is exhibiting excellent vegetation growth, particularly in the cypress trees.

The lower end of the repair reach continues to exhibit weak herbaceous vegetation growth on both the banks and lower floodplain (VPA-21). However, numerous viable bare root trees were found on the floodplain. Possible causes for the stunted herbaceous growth may include topsoil replacement or compaction during construction. This may be assisting in maintaining populations of *Lespedeza* in this area.

The lower four cross sections that were located in the failing section of stream (Cross sections 6, 7, 8 and 9) were moved to the repaired reach, and are now called R1, R2, R3 and R4. The profile adjustments noted in 2012 between STA 37+50 and STA 42+50 appear to be stabilizing as there were only minor adjustments observed this year. Overall the riffles and pools were slightly deeper relative to 2012 throughout the channel which is likely a result of above average rainfalls during the months of April – July (see Appendix E). The increased volume of water transported minor amounts of sediment and associated vegetation from the riffles noted in the 2012 monitoring report. Bank instability was observed at STA 34+00, 35+25, 38+50, 39+50 and 40+75, and is primarily the result of concentrated flow over the banks due to wetlands above hydrological capacity. These problem areas appear to be confined to their current location and are not expected to compromise the integrity of the stream. These areas will likely stabilize if vegetation matures and the stream adjusts to the hydrological fluxes of the site. Bankfull events were visually observed on July 2 and October 21 in 2013, as the stream is effectively accessing the floodplain.

This year the site experienced a tremendous amount of rainfall late in the spring and early summer, and the wetlands and stream performed extremely well in attenuating potential floodwater while maintaining wildlife habitat. The notching of the berms is allowing water to spread throughout the site and maximizing habitat diversity associated with microtopography within the site. Beaver activity has been curbed and the vegetation is benefiting as a direct result. Areas previously impacted by beaver activity are resprouting and should minimize the need for supplemental planting. However, continued beaver management will be beneficial to the stability of the site.

The reference well met the hydrology success criteria, with at least one period (still awaiting data to be extracted) of consecutive days of saturation within 12 inches of the ground surface during the growing season. The duration was 83 days which comprises approximately 35% of the growing season. Additionally, eight of the nine groundwater monitoring wells currently monitored met the hydrology success criteria, with 5 of the wells being within 12 inches of the ground surface for more than 75% of the growing season. Two of the remaining wells met the success criteria for more than 40% of the growing season, further indication of the inundation present throughout the floodplain. The last successful well met the success criteria for 16% of the growing season. The only well (JR-9) that remains unknown, has a large amount of data that still needs to be extracted, and this well will likely meet success once the data is

attained. Monthly precipitation averages for 2013 were above the 70th percentile from April – July, and below the 30th percentile in March and from August – November during the entire growing season.

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

2.0 Methodology

2.1 VEGETATION ASSESSMENT

The Carolina Vegetation Survey (CVS) Level 2 methodology was utilized to sample vegetation in September 2013. One 100m² plot has been established along the right bank of the repair section of the Lower Reach. In the plot, two plot corners have been permanently located with conduit or rebar. Vegetation Plot 6 was moved in 2011 since it was a 5x20m streambank plot on the older failing section of stream. A new 10x10m plot, “6R”, was installed on the floodplain of the repaired reach. As per the mitigation plan, the vegetative success criteria are based on the US Army Corps of Engineers Stream Mitigation Guidelines (USACE, 2003). In the repair area, the vegetative success criteria will be the survival of 260 5-year old trees per acre for Monitoring Years 5 and 6, and the final Monitoring Year 7. Currently plot 6R is meeting success criteria with 486 stems per acre.

2.2 STREAM ASSESSMENT

The Upper Reach, classified as a Rosgen C5 stream, flows from the beginning of the project at Station 0+00 to Station 30+77. The Lower Reach, a Priority 2 reach with constructed riffles, flows from 30+77 to the end of the project at Station 42+70. This reach break is approximately 200 feet upstream of the old reach break, to correspond with the upstream end of the 2011 repair. Pattern and profile, as well as dimension were monitored only on the Lower Reach. The Upper Reach is no longer being surveyed after 2011, the fifth year of monitoring.

A longitudinal profile survey of the entire length of the Lower Reach repair section of the project was completed in October 2012. Additional data collected included riffle length, riffle slope, pool length and pool spacing. During the longitudinal survey, additional pattern data was collected including channel beltwidth, radius of curvature, meander wavelength and meander width ratio. Stability was also visually assessed.

The lower four cross sections that were located in the failing section of stream (Cross sections 6, 7, 8 and 9) were moved to the repaired reach, and are now called R1, R2, R3 and R4. Data collected included, at a minimum, cross-sectional area, bankfull width, bankfull mean depth, bankfull max depth, floodprone width, width to depth ratio, and entrenchment ratio. Stream type was determined in riffle cross-sections only. Success was measured based on whether the channel features stayed within the natural variability of the dimensionless ratios of the reference reaches.

2.3 WETLAND ASSESSMENT

This site is considered to meet the success criteria for wetland hydrology if the groundwater saturation is within 12 inches of the ground surface consecutively for 12.5% of the growing season. Fifteen groundwater monitoring wells were initially installed on the project site. Following Monitoring Year 5 (2011), the Upper Reach area is no longer being monitored. Only the nine groundwater monitoring wells associated with the Lower Reach and the berm cuts are currently monitored on the project site. Of the

nine wells, all nine met the success criteria during the 2013 growing season (Appendix E). The growing season in this area is from March 18th to November 8th for a total of 234 days (NRCS 2002).

A reference well was installed within the reference site on October 2, 2007. Data has been collected since its installation. More specific details regarding the physical and biological characteristics of the reference site can be found in the Overhills Stream and Wetland Restoration Plan.

3.0 References

Harrelson, C.C., C.L. Rawlins and J.P. Potyondy. 1994. Stream Channel Reference Sites: An Illustrated Guide to Field Technique. United States Department of Agriculture, Fort Collins, CO.

Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation, Version 4.2 (<http://cvs.bio.unc.edu/methods.htm>)

NC CRONOS. 2012. NC CRONOS Database – Dunn 4 Nw (312500). North Carolina State University State, Climate Office of North Carolina. <http://www.nc-climate.ncsu.edu/cronos>

NCEEP. 2009. Revised Table of Contents for 2009 Monitoring Report Submissions. North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program. Raleigh, NC. Version 1.2.1 June 1, 2009.

NRCS. 2002. WETS Table for Pope Air Force Base, NC6891 . Natural Resource Conservation Service, National Water and Climate Center.

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

Weakley, Alan S. 2010. Flora of the Carolinas, Virginia, Georgia, and surrounding areas. University of North Carolina Herbarium. Chapel Hill, NC.

Project Condition and Monitoring Data Appendices

APPENDIX A. GENERAL FIGURES AND PLAN VIEWS

This page intentionally left blank for two-sided printing.

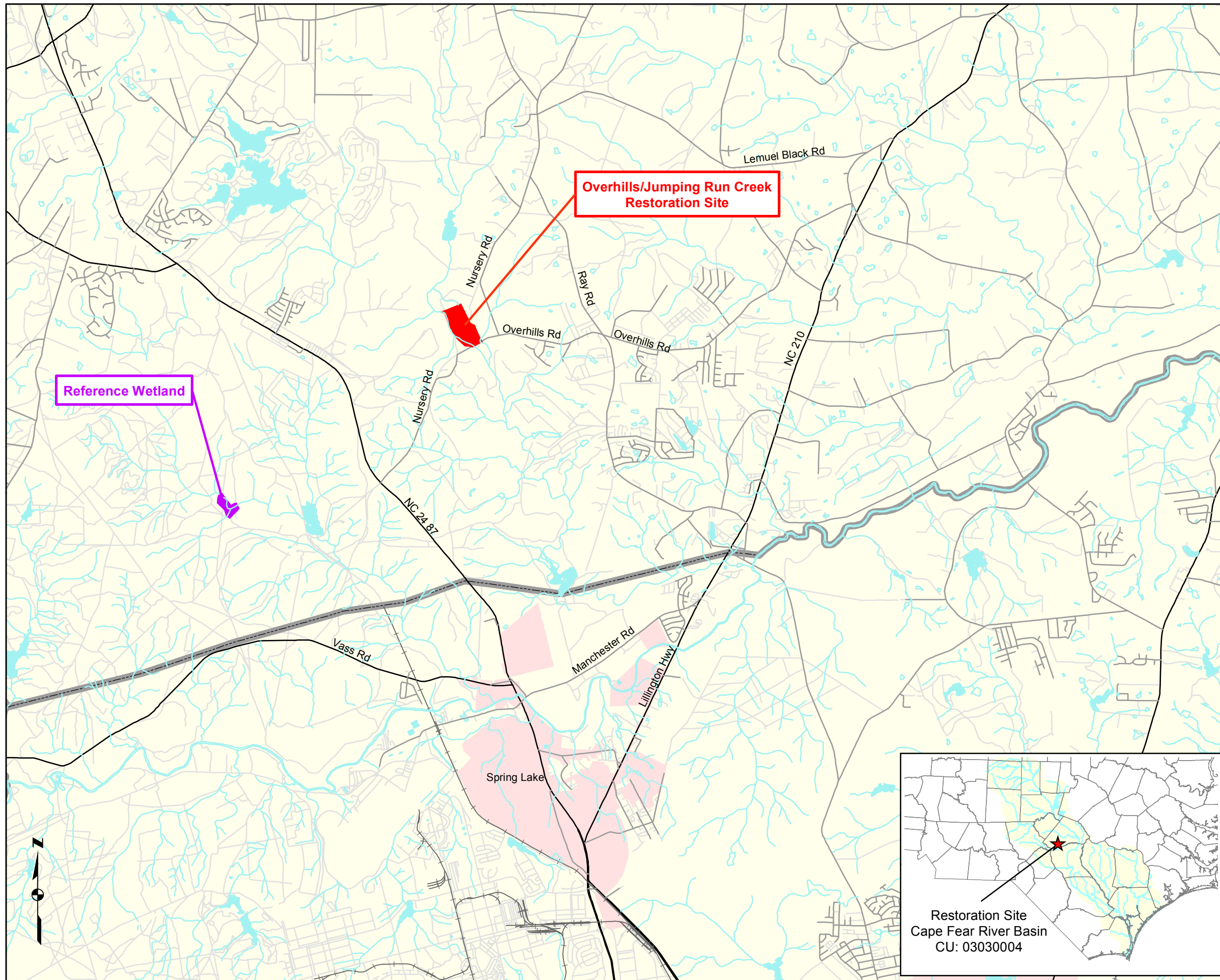


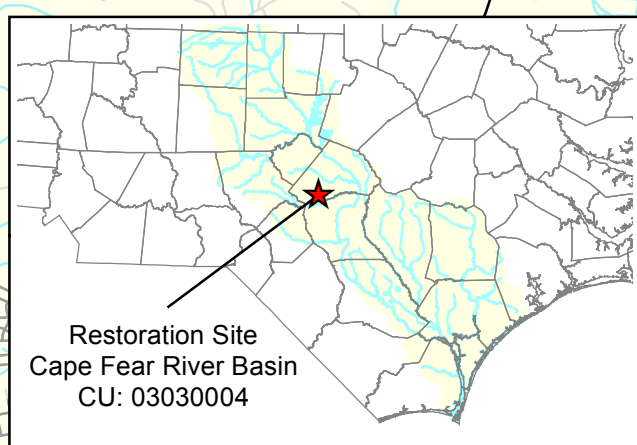
Figure 1 - Vicinity Map

Overhills/Jumping Run Creek Stream
and Wetland Restoration Project
EEP #: 0199
Harnett County, North Carolina

Monitoring Report
November 2013



- 1:24000 Hydrography
- Railroads
- NCDOT Secondary Roads
- NCDOT Primary Roads
- Overhills/Jumping Run Creek
35.258N, 79.000W
- Reference Wetland
35.227N, 79.050W







Directions to Overhills/Jumping Run Creek Restoration Site: From Raleigh, take US401 South following signs through Fuquay-Varina and into downtown Lillington. Turn right onto NC 27 and follow for about 9 miles, then turn left onto Nursery Rd. After 6.5 miles, Nursery Rd will come to a T, turn right to stay on Nursery Rd. The restoration site is half a mile from the T on the right hand side. To get to the reference site from the restoration site: Continue travelling east on Nursery Rd for 2 miles, then turn left onto NC24/NC87 for 3 miles. Turn right onto Vass Rd/NC 690. Continue for 3.5 miles, then turn right at sign that states "NO POVs" (this is part of Fort Bragg, need permission to enter). Follow the dirt road straight, at least 1.7 miles (do not turn or veer). The reference well is in the woods, about 100 feet from the end of the road.

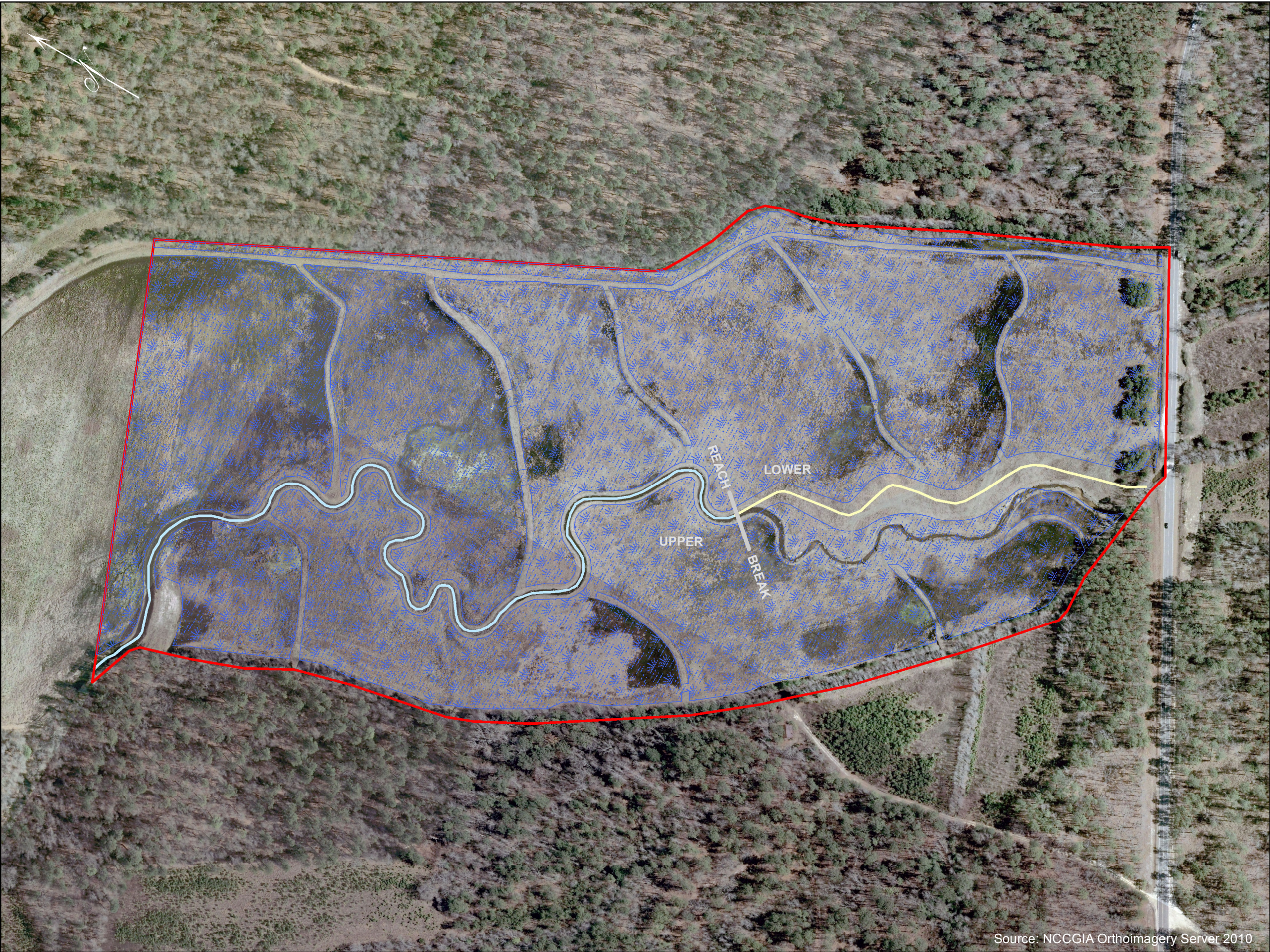
This page blank for two sided printing.

Figure 2 - Asset Map

Overhills Stream and Wetland
Restoration Site
EEP Project #: 0199
Harnett County, North Carolina

Monitoring Year 7
November 2013

-  Wetland Restoration (59.7 ac)
-  Project Boundary
-  Priority I Stream Restoration (3077 lf)
-  Priority II Stream Restoration (1193 lf)



0 125 250 500 Feet



Source: NCCGIA Orthoimagery Server 2010

This page intentionally left blank for two-sided printing.

LEGEND

	REPAIR THALWEG (2011)		DESIGN LOG CROSS VEIN		MAJOR VEG. PROBLEM AREA		MINOR BANK EROSION
	BANKFULL		DESIGN ROOT WAD		MINOR VEG. PROBLEM AREA		MAJOR BANK EROSION
	ANNUAL PHOTO POINTS		DESIGN TOE PROTECTION		VEG PLOT PINS		MINOR AGGRADATION
	MONITORING WELLS (SUCCESSFUL)		CONSTRUCTED RIFFLE		CURRENT VEG. PLOT (SUCCESSFUL)		VEG. PLOTS (Prior 2012)
	MONITORING WELLS/RAIN GAUGE (No Data)		CROSS SECTIONS		2011 REPAIR PLANTING AREA 11.7 acres		BERM REMOVAL AREA

CURRENT CONDITION PLAN VIEW

OVERHILLS STREAM AND WETLAND RESTORATION
HARNETT COUNTY, NORTH CAROLINA

EOP PROJECT NUMBER 199
MONITORING YEAR 7

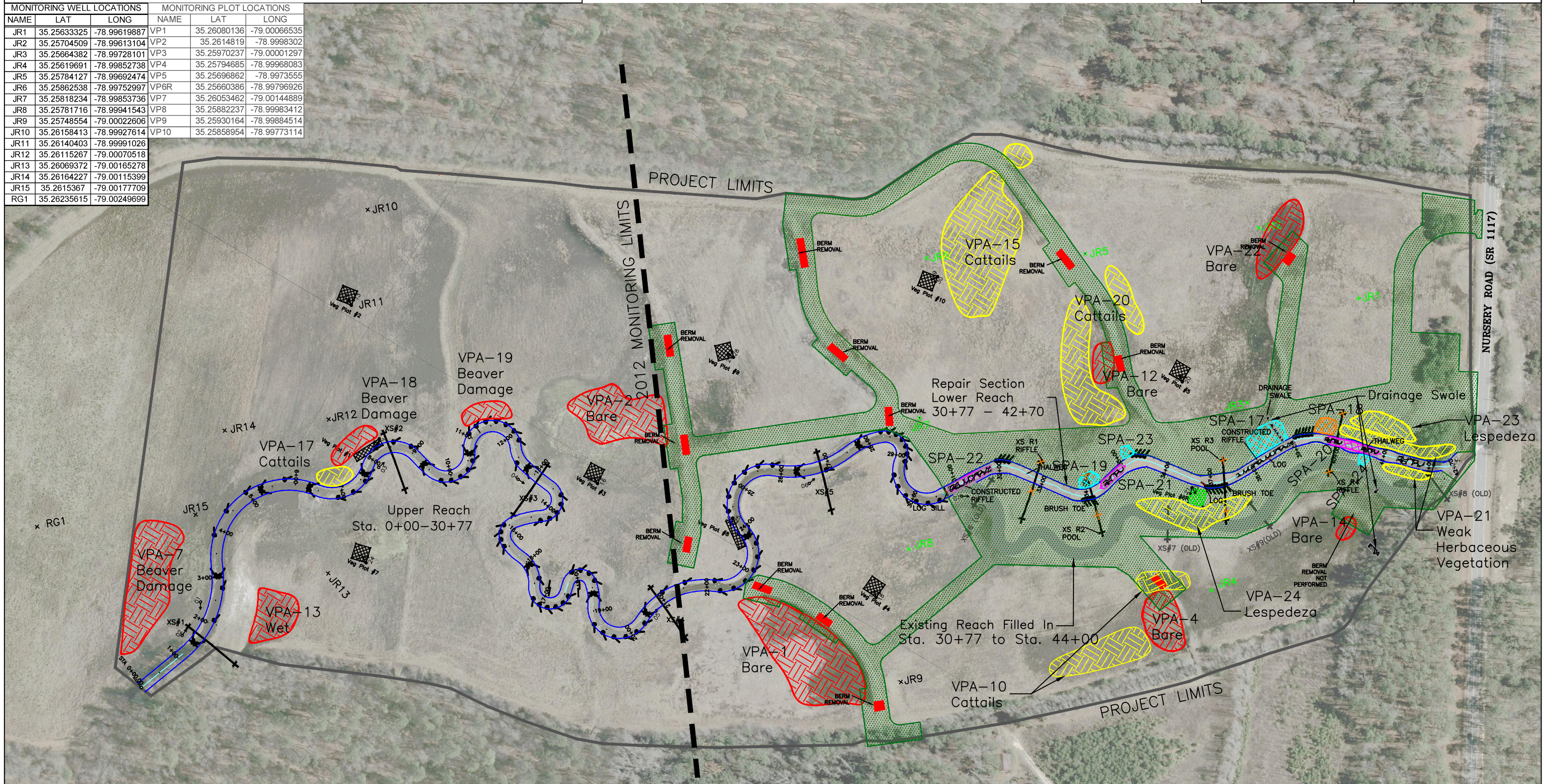
THIS MAP DEPICTS MY7 CONDITIONS AS OF 10/2013



Stantec Consulting Services Inc.
Suite 300, 801 Jones Franklin Rd
Raleigh, NC 27606
Tel. 919.851.6866
Fax. 919.851.7024
www.stantec.com

PROJECT NO.	SHEET NO.
SCO#070695701	
11/13/2013	
DATA SOURCE: HARNETT COUNTY 2008 AERIALS	

MONITORING WELL LOCATIONS			MONITORING PLOT LOCATIONS		
NAME	LAT	LONG	NAME	LAT	LONG
JR1	35.25633325	-78.99619887	VP1	35.26080136	-79.00066535
JR2	35.25704509	-78.99613104	VP2	35.2614819	-78.9998302
JR3	35.25664382	-78.99728101	VP3	35.25970237	-79.00001297
JR4	35.25619691	-78.99852738	VP4	35.25794685	-78.99968083
JR5	35.25784127	-78.99692474	VP5	35.25696862	-78.9973555
JR6	35.25862538	-78.99752997	VP6R	35.25660386	-78.99796926
JR7	35.25818234	-78.99853736	VP7	35.26053462	-79.00144889
JR8	35.25781716	-78.99941543	VP8	35.25882237	-78.99983412
JR9	35.25748554	-79.00022606	VP9	35.25930164	-78.99884514
JR10	35.26158413	-78.99927614	VP10	35.25858954	-78.99773114
JR11	35.26140403	-78.99991026			
JR12	35.26115267	-79.00070518			
JR13	35.26069372	-79.00165278			
JR14	35.26164227	-79.00115399			
JR15	35.2615367	-79.00177709			
RG1	35.26235615	-79.00249699			



This page blank for two sided printing.

APPENDIX B. GENERAL PROJECT TABLES

	Existing Feet/Acres	Type	Approach	Footage or Acreage	Stationing	Comment
Upper Reach	3064	R	P1	3077	0+00 to 30+77	Includes log structures and root wads
Lower Reach		R	P2	1193	30+77 to 42+70	Includes log structures and root wads; step-down to existing channel. Begins at 2011 repair.
Riparian Wetlands	NA	R	-	59.7		Floodplain of restored stream. Area was determined subtracting the berm and stream area from the total easement area

R = Restoration

P1 = Priority 1, P2 = Priority 2

Reach break location and total length changed due to repair of lower reach on new location.

Activity or Report	Data Collection Complete	Actual Completion or Delivery
Restoration Plan	NA	March 2003
Final Design - 90%	NA	Dec 2003
Construction	NA	June 2006
Temporary S&E mix applied to entire project area	NA	2004
Permanent seed mix applied to entire project area	NA	Nov 2004
Bare root, containers, and live stakes for majority of site	NA	Dec 2004
Water released into new channel	NA	Oct 2005
Permanent seed mix applied to entire project area	NA	Nov 2005
Bare root, containers, and live stakes for remainder of site	NA	Dec 2005
Mitigation Plan / As-built (Year 0 Monitoring - baseline)	July 2007	Nov 2007
Year 1 Monitoring	Nov 2007	Nov 2007
Year 2 Monitoring	Nov 2008	Nov 2008
Year 3 Monitoring	Nov 2009	Nov 2009
Year 4 Monitoring	Nov 2010	Nov 2010
Repair of Lower Reach	March 2011	March 2011
Mitigation Plan Addendum	May 2011	May 2011
Year 5 Monitoring	Nov 2011	Nov 2011
Year 6 Monitoring (Repair)	Oct 2012	Nov 2012
Year 7 Monitoring (Repair)	Oct 2013	Nov 2013

NA = Not Applicable

Table 3A. Contacts	
Overhills/Jumping Run Creek Restoration Project - EEP Project No. 199	
Designer	BLUE: Land Water Infrastructure 1271 Old US Highway #1 South Southern Pines, NC 28387 Phone: 910-692-6461
Construction Contractor	Vaughn Contracting, Inc P.O. Box 796 Wadesboro, NC 28170 Phone: 704-694-6450
Surveying Subcontractor	Barbara H. Mulkey Engineers, Inc 7516 E. Independence Blvd, Suite 100 Charlotte, NC 28227 Phone: 704-537-7300
Site Preparation Subcontractor	Herndon, Inc P.O. Box 36 Lugoff, SC 29078 Phone: 803-513-8002
Erosion Control Subcontractor	Carolina Environmental Contractors, Inc P.O. Box 1905 Monut Airy, NC 27030 Phone: 336-320-3849
Vegetation Planting Contractor & Nursery Stock Supplier for livestakes and potted plants	North State Environmental, Inc 2889 Lowery Street Winston-Salem, NC 27101 Phone: 339-725-2010
Nursery Stock Supplier for bare roots	International Paper
Seed Mix Sources	Unknown
Monitoring Performers	Stantec Consulting Services, Inc 801 Jones Franklin Rd, Ste 300 Raleigh, NC 27606
Stream Monitoring POC Vegetation Monitoring POC Wetland Monitoring POC	Tim Taylor, PE 704-329-0900 Amber Coleman 919-851-6866 Alex Baldwin 919-851-6866

Table 3B. Contacts - 2011 Repair Overhills/Jumping Run Creek Restoration Project - EEP Project No. 199	
Designer	Wildlands Engineering, Inc. 5605 Chapel Hill Road, Suite 122 Raleigh, NC 27607
Primary Project Design POC	Daniel Taylor 919-851-9986, ext 105
Construction Contractor	River Works, Inc. 8000 Regency Parkway, Suite 200 Cary, NC 27518
Construction Contractor POC	Will Pedersen 919-459-9001
Surveying Contractor	Turner Land Surveying, PLLC P.O. Box 41023 Raleigh, NC 27629
Survey Contractor POC	David Turner, PLS, 919-875-1378
Planting Contractor	Winstead's Reforestation 536 Jackson Road Nashville, NC 27856
Planting Contractor POC	David Winstead 252-462-0305
Bare Root Trees	Mellow Marsh Farm, Inc. 1312 Woody Store Road, Siler City, NC 27344 Sharon Day 919-742-1200 ArborGen (SuperTree Seedlings) 5594 Highway 38 South, Blenheim, SC 29616 800-222-1290 Superior Trees, Inc. PO Drawer 9400, Lee, FL 32059 850-971-5159
Brush Material/Live Stakes	Foggy Mountain Nursery LLC 2251 Ed Little Road, Creston, NC 28615 Glen Sullivan 336-384-5323
Seed Mix Sources	Green Resources PO Box 429, Colfax, NC 27235 Rodney Montgomery 336-855-6363

Table 4. Project Background Table	
Overhills/Jumping Run Creek Restoration Project - EEP Project No. 199	
Project County	Harnett County
Drainage Area	15.9 square miles
Drainage impervious cover estimate (%)	5%
Stream Order	3rd
Physiographic Region	Sandhills
Ecoregion	Sandhills
Rosgen Classification of As-built	C5
Cowardin Classification	Palustrine
Dominant soil types	Roanoke
	Bibb
	Wehadkee
	Augusta
Reference site ID	Gum Swamp
USGS HUC for Project	03030004
USGS HUC for Reference	03030004
NCDWQ Subbasin for Project	03-16-14
NCDWQ Subbasin for Reference	03-16-13
NCDWQ Classification for Project	C
NCDWQ Classification for Reference	C
Any portion of any project segment 303d listed?	No
Any portion of any project segment upstream of a 303d listed segment?	No
Reasons for 303d listing or stressor	No
Percent of project easement fenced	0%

APPENDIX C. VEGETATION ASSESSMENT DATA

Table 5 - Vegetation Plot Mitigation Success Summary			
Overhills/Jumping Run Creek Restoration Project / EEP Project No. 199			
	Vegetation	Vegetation Density Met	
	Plot ID	(260 stems/acre)	Tract Mean
MY5 2011	VP1	Y (283)	78% (324 stems/acre)
	VP2	Y(283)	
	VP3	N (202)	
	VP4	Y (324)	
	VP5	N (121)	
	VP7	Y (364)	
	VP8	Y (567)	
	VP9	Y (324)	
	VP10	Y (445)	
MY7 2013	VP6R*	Y (486)	n/a

*Relocated due to lower reach repair

VEGETATION MONITORING PLOT PHOTOS



Photo Station 21 Vegetation Plot 6R looking northwest (9/16/13)



Photo Station 22 Vegetation Plot 6R looking north (9/16/13)

Table 6. Vegetation Metadata

Report Prepared By	Alex Baldwin
Date Prepared	11/13/2013 22:18
database name	Stantec_Overhills2013_cvs-eep-entrytool-v2.3.1.mdb
database location	U:\171300316\project\1-Overhills\site_data\cvs
computer name	BALDWINA-SP1
file size	37593088
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT-----	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY-----	
Project Code	199
project Name	Jumping Run Creek
Description	Informally referred to as "Overhills Stream and Wetland Restoration" to distinguish it from other Jumping Run Creeks.
River Basin	Cape Fear
length(ft)	
stream-to-edge width (ft)	
area (sq m)	
Required Plots (calculated)	
Sampled Plots	1

Table 6B. Vegetation Condition Assessment						
UT Jumping Run Creek Restoration Project / EEP Project No. 92345						
Planted acreage	59.7					
Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas (wet/ponded areas)	Very limited cover of both woody and herbaceous material	0.1 acres	Red hatching	12	2.78	4.7%
2. Low Stem Density Areas	Woody stem densities below target levels based on MY3, 4, or 5 stem count criteria	0.1 acres	None	0	0	0.0%
				Total	12	4.7%
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	None	0	0	0.0%
				Total	12	4.7%
Easement acreage	70.7					
Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Invasive areas of concern	<i>Typha latifolia</i> , <i>Lespedeza cuneata</i>	1000 SF	Yellow hatching	9	2.19	3.1%
5. Easement encroachment areas		none	None	0	0	0.0%

Table 7 - CVS Stem Count Total and Planted by Plot and Species
Overhills/Jumping Run Creek Restoration Project / EEP Project No. 199

Scientific Name	Common Name	Species Type	Current Plot Data (MY7 2013)			Annual Means																									
			E199-01-0006R			MY7 (2013)			MY6 (2012)			MY5 (2011)			MY4 (2010)			MY3 (2009)			MY2 (2008)			MY1 (2007)			MY0 (2007)				
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T		
Acer rubrum	red maple	Tree											52			32			14			10									
Cephalanthus occidentalis	common buttonbush	Shrub											4	6	1	10	10	1	11	11	1	11	11	1	11	11	1	11	11		
Cornus amomum	silky dogwood	Shrub											1	6	8	1	12	12	1	12	12	1	12	12	1	12	12	1	13	13	
Cyrilla racemiflora	swamp titi	Shrub											1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Diospyros virginiana	common persimmon	Tree											4	4	4	4	4	4	3	3	3										
Fraxinus pennsylvanica	green ash	Tree	1	1	1	1	1	1	1	1	1	1	9	9	9	8	8	8	7	7	7	7	7	7	7	7	7	7	7	7	
Ilex decidua	possumhaw	shrub																													
Liquidambar styraciflua	sweetgum	Tree																													
Liriodendron tulipifera	tuliptree	Tree																													
Magnolia grandiflora	southern magnolia	Tree														2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3
Morella cerifera	wax myrtle	shrub	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Nyssa	tupelo	Tree																													
Nyssa biflora	swamp tupelo	Tree	3	3	3	3	3	3	3	3	3	18	18	28	21	21	28	19	19	20	24	24	24	23	23	23	21	21	21		
Pinus taeda	loblolly pine	Tree				10				10																					
Quercus nigra	water oak	Tree												1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Quercus phellos	willow oak	Tree	2	2	2	2	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4	3	3	3	4	4	4	4	4	4	
Salix nigra	black willow	Tree														2	5		5	5		4	4		6	7		6	6		
Sambucus	elderberry	Shrub	1	1	1	1	1	1	1	1	1	2	2	2																	
Sambucus canadensis	Common Elderberry	Shrub														1	1	1	2	6	6	2	6	7	1	8	8	1	8	8	
Sambucus nigra	European black elderbe	Shrub																													
Taxodium distichum	bald cypress	Tree	4	4	4	4	4	4	4	4	4	31	31	31	29	29	29	29	29	29	27	27	27	27	27	27	27	27	27		
Toxicodendron radicans	eastern poison ivy	Vine																													
Unknown		Shrub or Tree																													
Stem count			12	12	22	12	12	22	11	11	11	71	82	318	76	105	201	72	101	193	73	107	159	74	108	108	73	112	112		
size (ares)			1			1			1			10			10			10			10			10			10				
size (ACRES)			0.02			0.02			0.02			0.25			0.25			0.25			0.25			0.25			0.25				
Species count			6	6	7	6	6	7	6	6	6	11	13	18	12	13	17	12	13	16	13	14	18	13	14	14	13	14	14		
Stems per ACRE			485.6	485.6	890.3084124	485.6	485.6	890.3	445.2	445.2	445.2	287.3	331.8	1287	307.6	424.9	813.4	291.4	408.7	781	295.4	433	643.5	299.5	437.1	437.1	295.4	453.2	453.2		

Color for Density
Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%

This page is intentionally left blank for two-sided printing.

APPENDIX D. STREAM ASSESSMENT DATA



Photo Station 7 – Cross Section R1 – looking downstream (10/21/2013)



Photo Station 8 – Cross Section R2 – looking downstream (10/21/2013)



Photo Station 9 – Cross Section R3 – looking downstream (10/21/2013)



Photo Station 10 – Cross Section R4 – looking downstream (10/21/2013)



Photo S1 – Bankfull event looking upstream from the bridge on Nursery Road (7/2/2013)



Photo S2 – Bankfull event looking upstream from the bridge on Nursery Road (10/21/2013)

Exhibit Table 8 - Visual Morphological Stability Assessment - Lower Reach Overhills/Jumping Run Creek - EEP Project No. 199						
Feature Category	Metric (per As-built and reference baselines)	(# Stable) Number Performing as Intended	Total Number per As-built	Total Number/Feet in Unstable State	% Perform in Stable Condition	Feature Perform. Mean or Total
A. Riffles	1. Present?	8	8		100%	
	2. Armor stable (eg no displacement?)	8	8		100%	
	3. Facet grade appears stable?	8	8		100%	
	4. Minimal evidence of embedding/fining?	4	8		50%	
	5. Length appropriate?	6	8		75%	85%
B. Pools	1. Present? (e.g. not subject to severe aggrad. or migrat.?)	8	8		100%	
	2. Sufficiently deep (Max Pool D:Mean Bkf > 1.6?)	4	8		50%	
	3. Length appropriate?	8	8		100%	83%
C. Thalweg	1. Upstream of meander bend (run/inflection) centering?	6	6		100%	
	2. Downstream of meander (glide/inflection) centering?	6	6		100%	100%
D. Meanders	1. Outer bend in state of limited/controlled erosion?	6	6		100%	
	2. Of those eroding, # w/concomitant point bar formation?	0	0		100%	
	3. Apparent Rc within spec?	6	6		100%	
	4. Sufficient floodplain access and relief?	6	6		100%	100%
E. Bed General	1. General channel bed aggradation areas (bar formation)		1200	0	100%	
	2. Channel bed degradation - areas of increasing down-cutting or head-cutting?		1200	100	92%	96%
F. Bank	1. Actively eroding, wasting, or slumping bank?		1200	53	96%	96%
G. Vanes	1. Free of back or arm scour?	0	1		0%	
	2. Height appropriate?	0	1		0%	
	3. Angle and geometry appear appropriate?	0	1		0%	
	4. Free of piping or other structural failures?	0	1		0%	0%
H. Wads/Boulders	1. Free of scour?	5	5		100%	
	2. Footing stable?	5	5		100%	100%

Table 9 - Verification of Bankfull Events Overhills/Jumping Run Creek Restoration Project - EEP Project No. 199			
Date of Data Collection	Date of Occurrence	Method	Photo
2013	July 2 and October 21, 2013	Direct visual observation	S1 and S2

Project Name Overhills
Cross Section Cross Section R1 (Repair)
Feature Riffle
Date Baseline - 03/11, Year 5 - 09/11, Year 6 - 10/12, Year 7 - 10/13
Crew Baseline - Turner Land Surveying, Year 5 - Jean/Mazzochi/Baldwin, Year 6 - Taylor/Gilman/Baldwin, Year 7 - Taylor/Baldwin

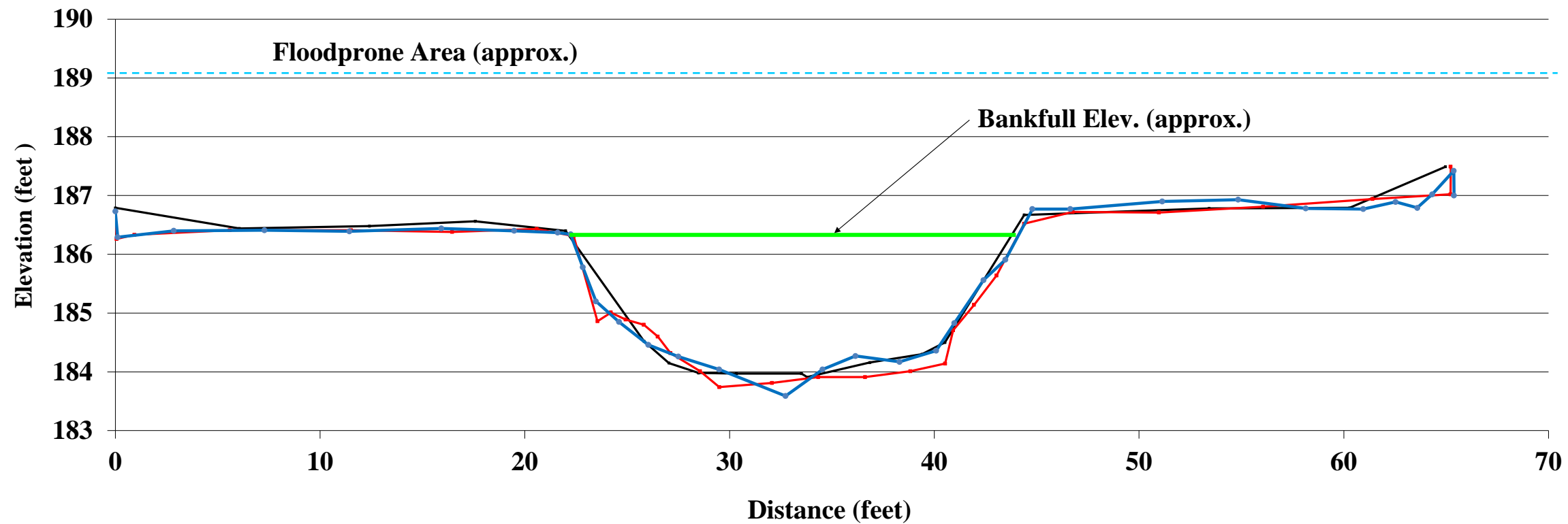
Baseline Survey Station	Baseline Survey Elevation	Baseline Survey Notes	Year 5 - 2011			Year 6 - 2012			Year 7 - 2013		
			Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
			0	186.79		0	186.73	PIN	0	186.73	XS1PIN
			6.06	186.44		0.06	186.26	XS01R	0.11	186.29	XS1
			12.41	186.48		0.93	186.33	XS01R	2.85	186.4	XS1
			17.57	186.56		5.59	186.41	XS01R	7.28	186.41	XS1
			21.99	186.4		11.51	186.41	XS01R	11.43	186.39	XS1
			25.82	184.52		16.45	186.38	XS01R	15.92	186.44	XS1
			27.04	184.15		20.58	186.43	bkf	19.48	186.4	XS1
			28.48	183.98		22.39	186.31	XS01R	21.6	186.37	XS1
			30.33	183.97		23.55	184.86	XS01R	22.24	186.34	XS1
			33.51	183.97		24.2	185.01	XS01R	22.83	185.78	XS1
			33.79	183.91		24.92	184.89	XS01R	23.47	185.2	XS1
			36.85	184.16		25.81	184.8	XS01R	24.6	184.85	XS1
			39.4	184.3		26.49	184.6	XS01R	26.03	184.46	XS1
			40.52	184.5		27.11	184.32	XS01R	27.5	184.26	XS1
			44.39	186.67		28.56	184.01	XS01R	29.49	184.04	XS1
			53.42	186.78		29.5	183.74	XS01R	32.73	183.59	XS1
			60.28	186.79		32.07	183.81	XS01R	34.54	184.04	XS1
			64.96	187.49		34.33	183.91	XS01R	36.15	184.27	XS1
						36.62	183.91	XS01R	38.3	184.17	XS1
						38.83	184.01	XS01R	40.09	184.36	XS1
						40.53	184.14	XS01R	40.98	184.83	XS1
						40.92	184.71	REW	42.4	185.56	XS1EW
						41.94	185.14	XS01R	43.47	185.91	XS1
						43.04	185.64	XS01R	44.79	186.77	XS1
						44.39	186.52	XS01R	46.64	186.77	XS1
						46.76	186.72	XS01R	51.13	186.9	XS1
						50.97	186.71	XS01R	54.84	186.93	XS1
						56.06	186.81	XS01R	58.14	186.78	XS1
						61.4	186.9	XS01R	61.0	186.8	XS1
						65.21	187.02	XS01R	62.53	186.89	XS1
						65.22	187.49	XS01R	63.59	186.79	XS1
									64.32	187.02	XS1
									65.37	187.42	XS1PIN



Photo of Cross-Section R1 - Looking Downstream @ STA 32+82

	Asbuilt - 2011	Year 5 - 2011	Year 6 - 2012	Year 7 - 2013
BKF Area		44.50	44.43	40.40
BKF Width		26.62	24.25	23.10
BKF Mean Depth		1.67	1.83	1.75
BKF Max Depth		2.65	2.69	2.75
W/D		15.94	13.25	13.20

Overhills Cross Section #R1



— Year 5 - 2011
 — Year 6 - 2012
 — Year 7 - 2013

Project Name Overhills
Cross Section Cross Section R2 (Repair)
Feature Pool
Date Baseline - 03/11, Year 5 - 09/11, Year 6 - 10/12, Year 7 - 10/13
Crew Baseline - Turner Land Surveying, Year 5 - Jean/Mazzochi/Baldwin, Year 6 - Taylor/Gilman/Baldwin, Year 7 - Taylor/Baldwin

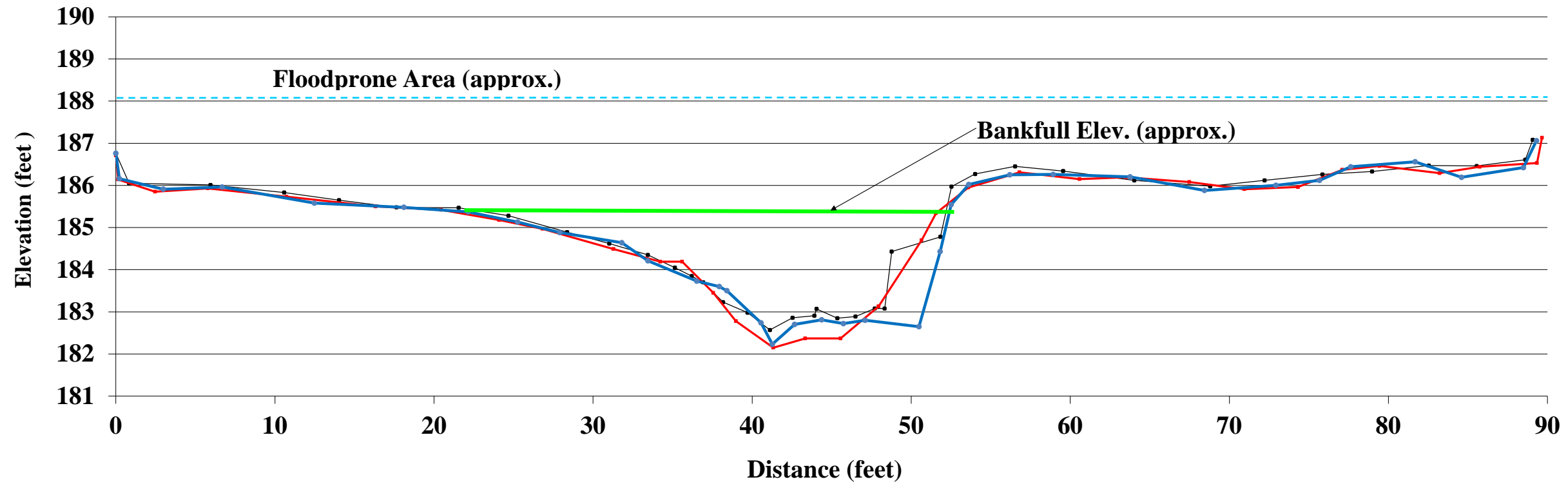
Baseline Survey			Year 5 - 2011 Survey			Year 6 - 2012 Survey			Year 7 - 2013 Survey		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
			0	186.76		0	186.71	PIN	0	186.76	XS2PIN
			0.83	186.05		0.14	186.14	XS02P	0.22	186.16	XS2
			5.95	186.01		2.47	185.85	XS02P	2.99	185.91	XS2
			10.58	185.83		5.78	185.93	XS02P	6.68	185.96	XS2
			14.03	185.65		10.73	185.73	XS02P	12.48	185.58	XS2
			17.64	185.48		16.33	185.5	XS02P	18.11	185.48	XS2
			21.55	185.47		20.45	185.42	bkf	22.15	185.37	XS2
			24.68	185.28		24.09	185.18	XS02P	25.26	185.13	XS2
			28.37	184.89		26.82	184.97	XS02P	27.91	184.88	XS2LEW
			31.02	184.62		31.29	184.49	XS02P	31.81	184.64	XS2
			33.44	184.35		34.23	184.19	XS02P	33.45	184.21	XS2
			35.14	184.05		35.6	184.19	lew	36.52	183.73	XS2
			36.2	183.85		37.56	183.45	XS02P	37.94	183.6	XS2
			36.92	183.7		38.98	182.78	XS02P	38.42	183.5	XS2
			38.17	183.23		41.33	182.15	XS02P	40.56	182.74	XS2
			39.71	182.98		43.34	182.37	XS02P	41.27	182.23	XS2
			41.12	182.57		45.56	182.37	XS02P	42.67	182.7	XS2
			42.54	182.86		47.95	183.13	XS02P	44.37	182.81	XS2
			43.91	182.91		50.65	184.7	XS02P	45.74	182.72	XS2
			44.05	183.07		51.56	185.34	XS02P	47.11	182.8	XS2
			45.36	182.85		53.59	185.95	XS02P	50.49	182.65	XS2
			46.5	182.89		56.81	186.31	XS02P	51.82	184.43	XS2
			47.71	183.08		60.58	186.15	XS02P	52.51	185.54	XS2
			48.33	183.08		63.51	186.19	XS02P	53.62	186.02	XS2
			48.77	184.43		67.49	186.08	XS02P	56.2	186.25	XS2
			51.83	184.78		70.95	185.91	XS02P	58.93	186.26	XS2
			52.53	185.97		74.32	185.96	XS02P	63.76	186.2	XS2
			54.02	186.27		77.1	186.37	XS02P	68.44	185.88	XS2
			56.5	186.5		79.4	186.5	XS02P	72.9	186.0	XS2
			59.55	186.34		83.22	186.29	XS02P	75.67	186.12	XS2
			64.02	186.12		85.74	186.44	XS02P	77.64	186.44	XS2
			68.79	185.98		89.34	186.53	XS02P	81.68	186.56	XS2
			72.21	186.12		89.66	187.13	XS02P	84.6	186.19	XS2



Photo of Cross-Section R2 - Looking Downstream @ STA 34+09

	Baseline	Year 5 - 2011	Year 6 - 2012	Year 7 - 2013
BKF Area		43.02	46.62	47.00
BKF Width		30.69	31.38	30.30
BKF Mean Depth		1.40	1.49	1.55
BKF Max Depth		2.90	3.27	3.14
W/D		21.92	21.06	19.55

Overhills Cross Section #R2



-●- Year 5 - 2011 -●- Year 6 - 2012 -●- Year 7 - 2013

Project Name Overhills
Cross Section Cross Section R3 (Repair)
Feature Pool
Date Baseline - 03/11, Year 5 - 09/11, Year 6 - 10/12, Year 7 - 10/13
Crew Baseline - Turner Land Surveying, Year 5 - Jean/Mazzochi/Baldwin, Year 6 - Taylor/Gilman/Baldwin, Year 7 - Taylor/Baldwin

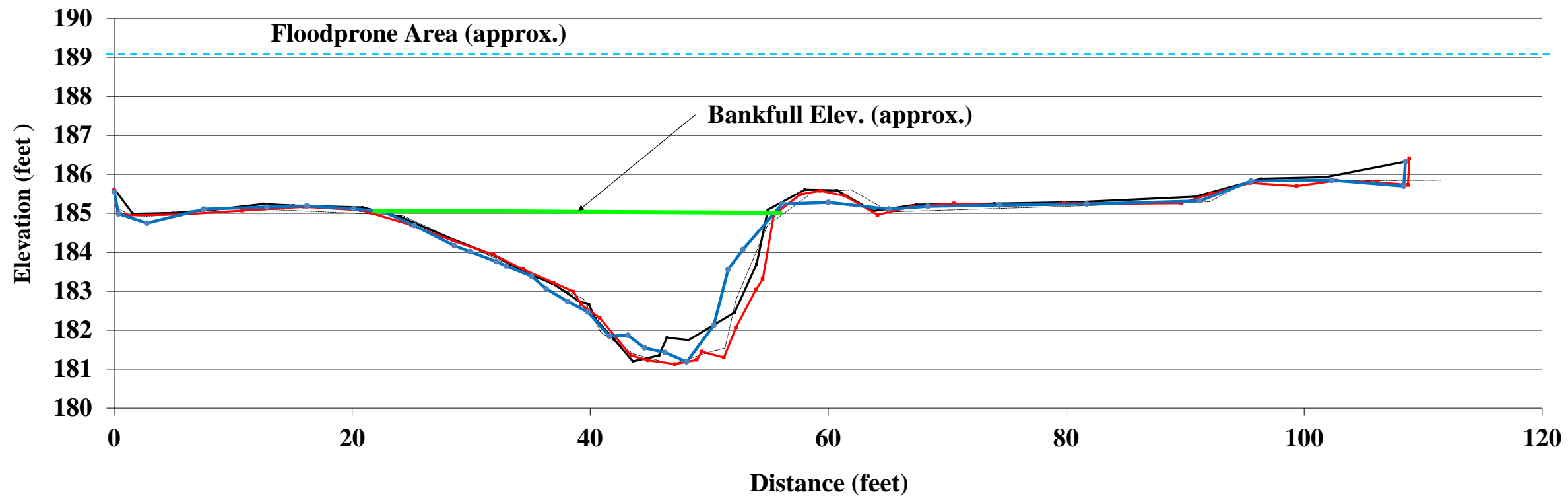
Baseline - 2011			Year 5 - 2011			Year 6 - 2012			Year 7 - 2013		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
-20.82	185.5		0	185.63		0	185.59	PIN	0	185.55	XS3PIN
-3.34	185.78		1.57	184.99		0.31	185.04	XS03P	0.36	184.99	XS3
1.57	184.91		4.91	185.01		1.02	184.95	XS03P	2.75	184.75	XS3
13.15	185.1		8.44	185.1		5.65	184.97	XS03P	7.53	185.11	XS3
24.19	184.95		12.52	185.24		10.74	185.07	XS03P	12.83	185.16	XS3
27.95	184.42		15.04	185.2		15.94	185.17	XS03P	16.19	185.19	XS3
39.44	182.8		20.87	185.15		20.73	185.08	bkf	20.11	185.12	XS3
40.89	181.95		24.07	184.91		24.97	184.7	XS03P	22.68	185.03	XS3
43.65	181.39		28.07	184.38		28.44	184.3	XS03P	25.21	184.69	XS3
46.93	181.13		32.01	183.91		31.88	183.94	XS03P	28.59	184.17	XS3LEW
50.02	181.44		34.88	183.43		34.36	183.56	XS03P	29.91	184.02	XS3
51.33	181.54		36.68	183.23		36.93	183.22	XS03P	32.11	183.76	XS3
52.26	182.8		38.18	182.93		38.6	182.99	XS03P	32.95	183.65	XS3
54.89	184.69		38.97	182.76		39.23	182.66	XS03P	35.07	183.39	XS3
58.71	185.54		39.9	182.66		40.81	182.32	lew	36.31	183.06	XS3
61.93	185.6		40.41	182.3		43.4	181.36	XS03P	38.09	182.74	XS3
65.16	185.04		42	181.77		44.86	181.23	XS03P	39.79	182.47	XS3
92.05	185.3		43.58	181.2		47.12	181.13	XS03P	41.62	181.85	XS3
95.24	185.82		45.78	181.35		48.96	181.24	XS03P	43.18	181.87	XS3
111.51	185.85		46.44	181.81		49.37	181.45	XS03P	44.57	181.55	XS3
			48.27	181.75		51.24	181.3	XS03P	46.28	181.43	XS3
			52.15	182.46		52.3	182.1	XS03P	48.1	181.2	XS3
			53.98	183.7		53.9	183.0	XS03P	50.4	182.1	XS3
			54.93	185.09		54.5	183.3	XS03P	51.6	183.6	XS3
			58.03	185.61		55.4	185.0	XS03P	52.8	184.1	XS3
			60.73	185.59		57.7	185.5	XS03P	56.1	185.2	XS3
			63.74	185.06		59.3	185.6	XS03P	60.0	185.3	XS3
			67.41	185.22		61.4	185.5	XS03P	65.1	185.1	XS3
			73.9	185.3		64.2	185.0	XS03P	68.4	185.2	XS3
			80.90	185.29		67.01	185.18	XS03P	74.4	185.21	XS3
			90.83	185.43		70.57	185.25	XS03P	81.72	185.24	XS3
			96.20	185.80		75.10	185.2	XS03P	91.32	185.22	XS3



Photo of Cross-Section R3 - Looking Downstream @ STA 37+28

	Baseline - 2011	Year 5 - 2011	Year 6 - 2012	Year 7 - 2013
BKF Area	63.05	66.57	70.23	61.40
BKF Width	31.87	34.41	35.05	32.80
BKF Mean Depth	1.98	1.93	2	1.87
BKF Max Depth	3.85	3.95	3.94	3.84
W/D	16.10	17.83	17.52	17.54

Overhills Cross Section #R3



— Baseline - 2011 — Year 5 - 2011 — Year 6 - 2012 — Year 7 - 2013

Project Name Overhills
Cross Section Cross Section R4 (Repair)
Feature Riffle
Date Baseline - 03/11, Year 5 - 09/11, Year 6 - 10/12, Year 7 - 10/13
Crew Baseline - Turner Land Surveying, Year 5 - Jean/Mazzochi/Baldwin, Year 6 - Taylor/Gilman/Baldwin, Year 7 - Taylor/Baldwin

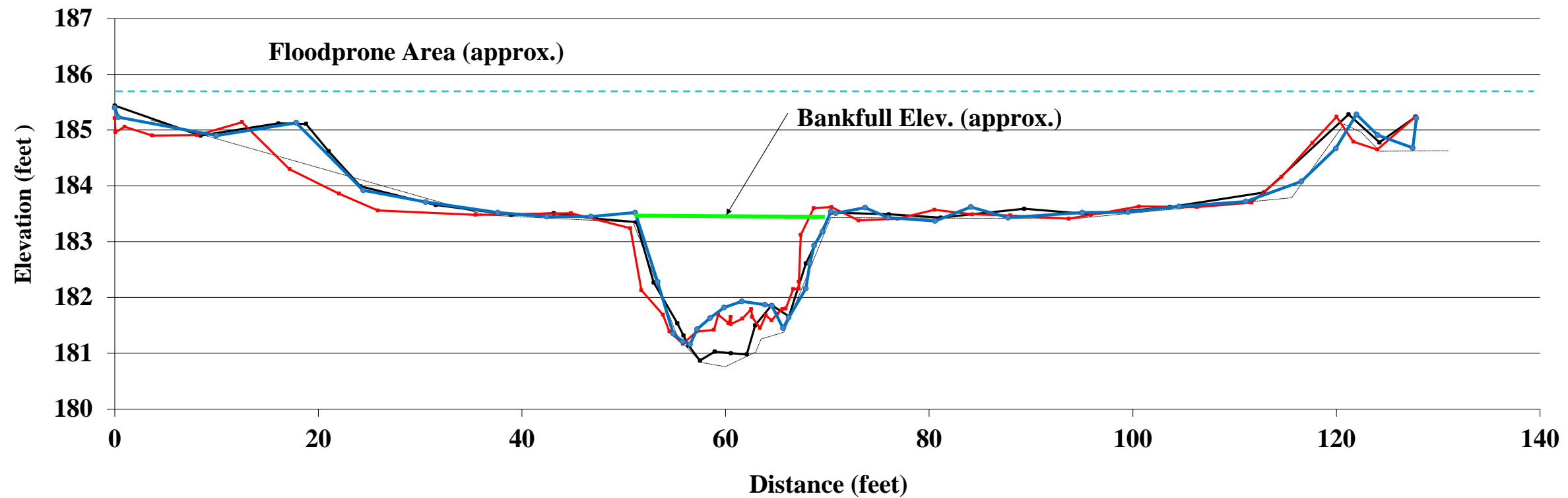
Baseline - 2011 Survey			Year 5 - 2011 Survey			Year 6 - 2012 Survey			Year 7 - 2013 Survey		
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes
3.62	185.175		0	185.44		0	185.21	XS04R	0	185.4	XS4PIN
36.43	183.476		8.42	184.9		0.07	184.96	XS04R	0.35	185.23	XS4
50.92	183.346		16.06	185.12		0.96	185.06	XS04R	9.99	184.9	XS4
55.14	181.366		18.79	185.11		3.68	184.9	XS04R	17.83	185.13	XS4
55.44	181.251		21.01	184.62		8.09	184.91	XS04R	24.41	183.92	XS4
57.6	180.836		24.14	183.99		12.51	185.14	XS04R	30.54	183.71	XS4
59.97	180.758		31.53	183.66		17.18	184.3	XS04R	37.63	183.52	XS4
62.96	181.021		38.93	183.48		22.04	183.86	XS04R	42.43	183.45	XS4
63.49	181.254		43.12	183.51		25.84	183.56	XS04R	46.76	183.45	XS4
65.72	181.375		47.26	183.41		35.44	183.48	XS04R	51.12	183.52	XS4
70.34	183.43		51.23	183.35		44.81	183.51	bkf	53.33	182.28	XS4
94.25	183.412		52.93	182.27		50.64	183.24	XS04R	54.86	181.35	XS4
115.6	183.787		55.26	181.54		51.72	182.13	XS04R	55.79	181.21	XS4
120.75	185.107		55.86	181.32		53.85	181.69	XS04R	56.51	181.16	XS4
122.4	184.965		56.35	181.14		54.49	181.39	XS04R	57.21	181.43	XS4
124.27	184.619		57.48	180.87		55.81	181.17	XS04R	58.47	181.63	XS4
130.96	184.63		58.92	181.03		57.15	181.39	XS04R	59.86	181.82	XS4
			60.5	181		58.86	181.42	XS04R	61.6	181.93	XS4
			62.08	180.98		59.28	181.69	XS04R	63.86	181.87	XS4
			62.9	181.5		60.29	181.54	XS04R	64.55	181.85	XS4
			64.53	181.86		60.5	181.65	XS04R	65.64	181.45	XS4
			66.23	181.66		60.51	181.52	XS04R	66.2	181.64	XS4
			67.88	182.61		61.64	181.62	XS04R	67.88	182.16	XS4
			70.34	183.52		62.52	181.79	XS04R	68.28	182.61	XS4
			76.02	183.49		62.61	181.65	XS04R	68.69	182.93	XS4REW
			81.12	183.43		63.38	181.45	XS04R	69.53	183.18	XS4
			89.33	183.59		63.97	181.68	XS04R	70.34	183.54	XS4
			95.85	183.49		64.52	181.59	XS04R	70.82	183.51	XS4
			103.6	183.6		65.1	181.7	XS04R	73.7	183.6	XS4
			112.87	183.88		65.57	181.79	XS04R	75.98	183.43	XS4
			121.19	185.28		65.91	181.8	XS04R	80.58	183.37	XS4
			124.22	184.78		66.65	182.15	REW	84.09	183.62	XS4



Photo of Cross-Section R4 - Looking Downstream @ STA 39+93

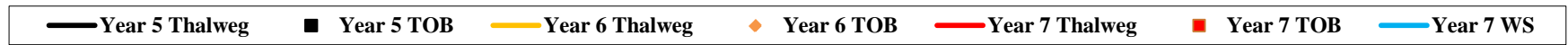
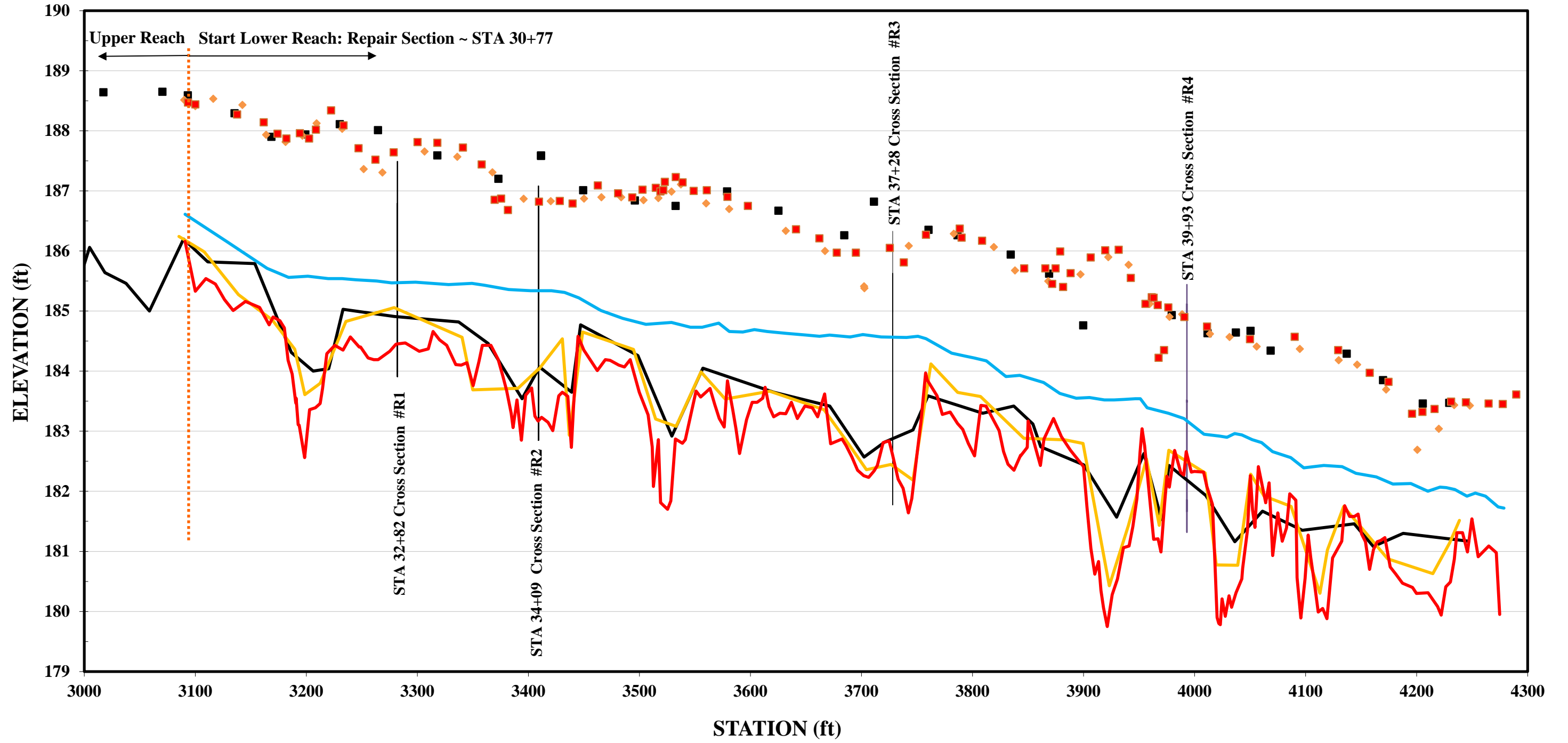
	Baseline - 2011	Year 5 - 2011	Year 6 - 2012	Year 7 - 2013		
BKF Area	33.29	29.90	29.08	29.12		
BKF Width	19.24	18.65	19.28	19.30		
BKF Mean Depth	1.73	1.60	1.51	1.51		
BKF Max Depth	2.59	2.48	2.32	2.36		
W/D	11.12	11.66	12.77	12.78		

Overhills Cross Section #R4



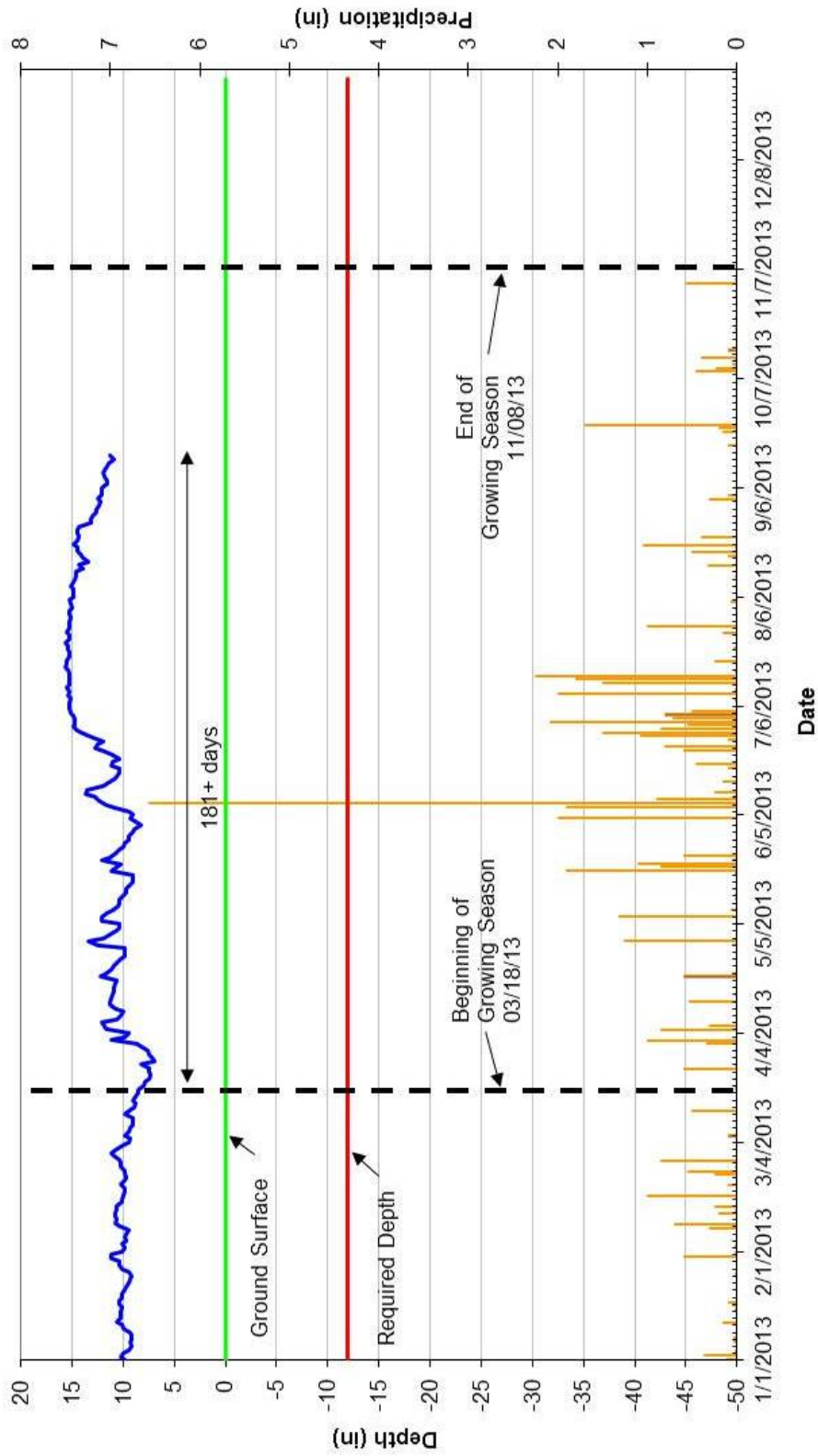
— Baseline - 2011
— Year 5 - 2011
— Year 6 - 2012
— Year 7 - 2013

Overhills Profile - Upper & Lower Reaches
 STA 30+00 - STA 40+00
 2013 MONITORING Year 05, Year 06, Year 07

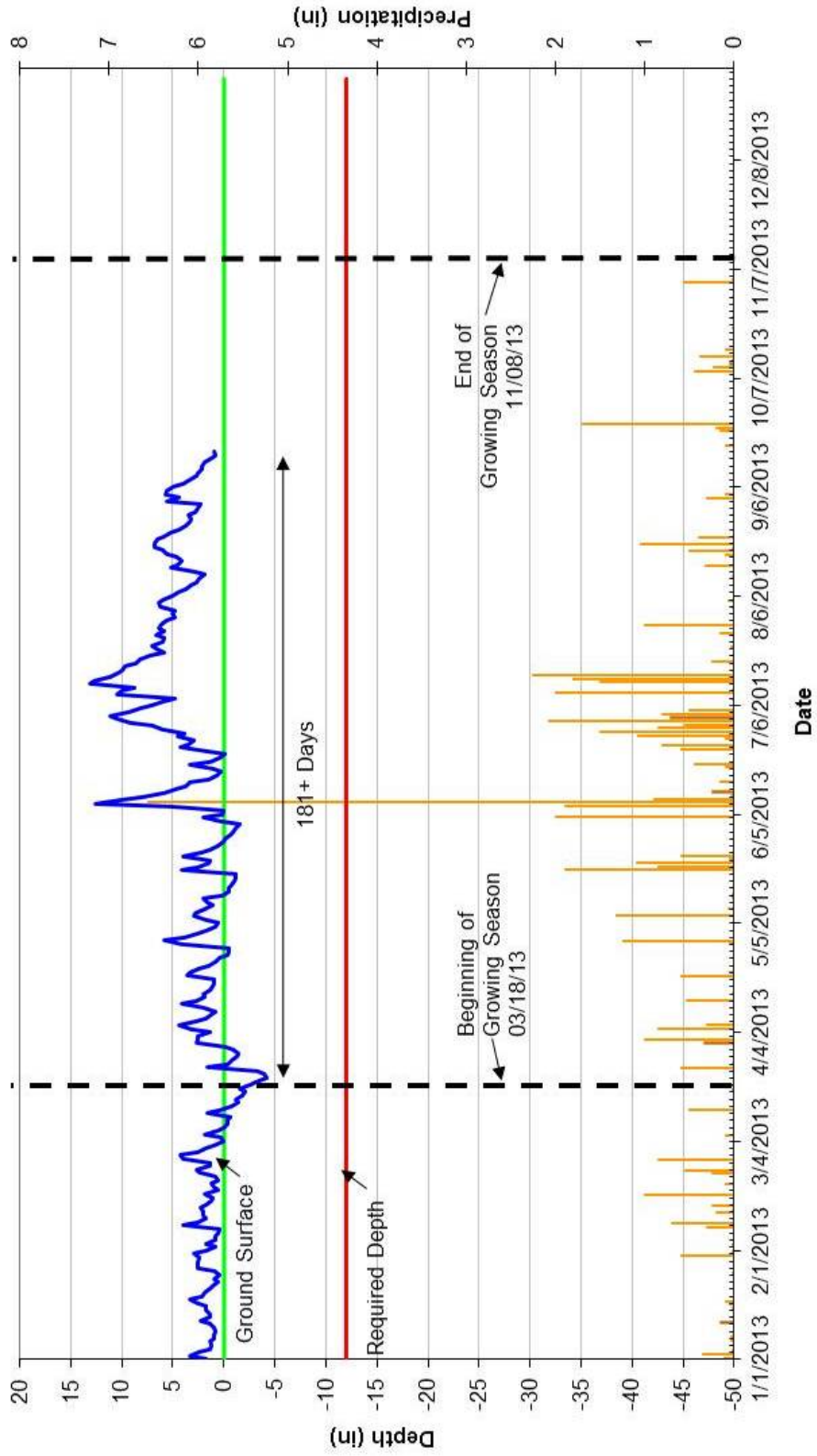


APPENDIX E. WETLAND ASSESSMENT

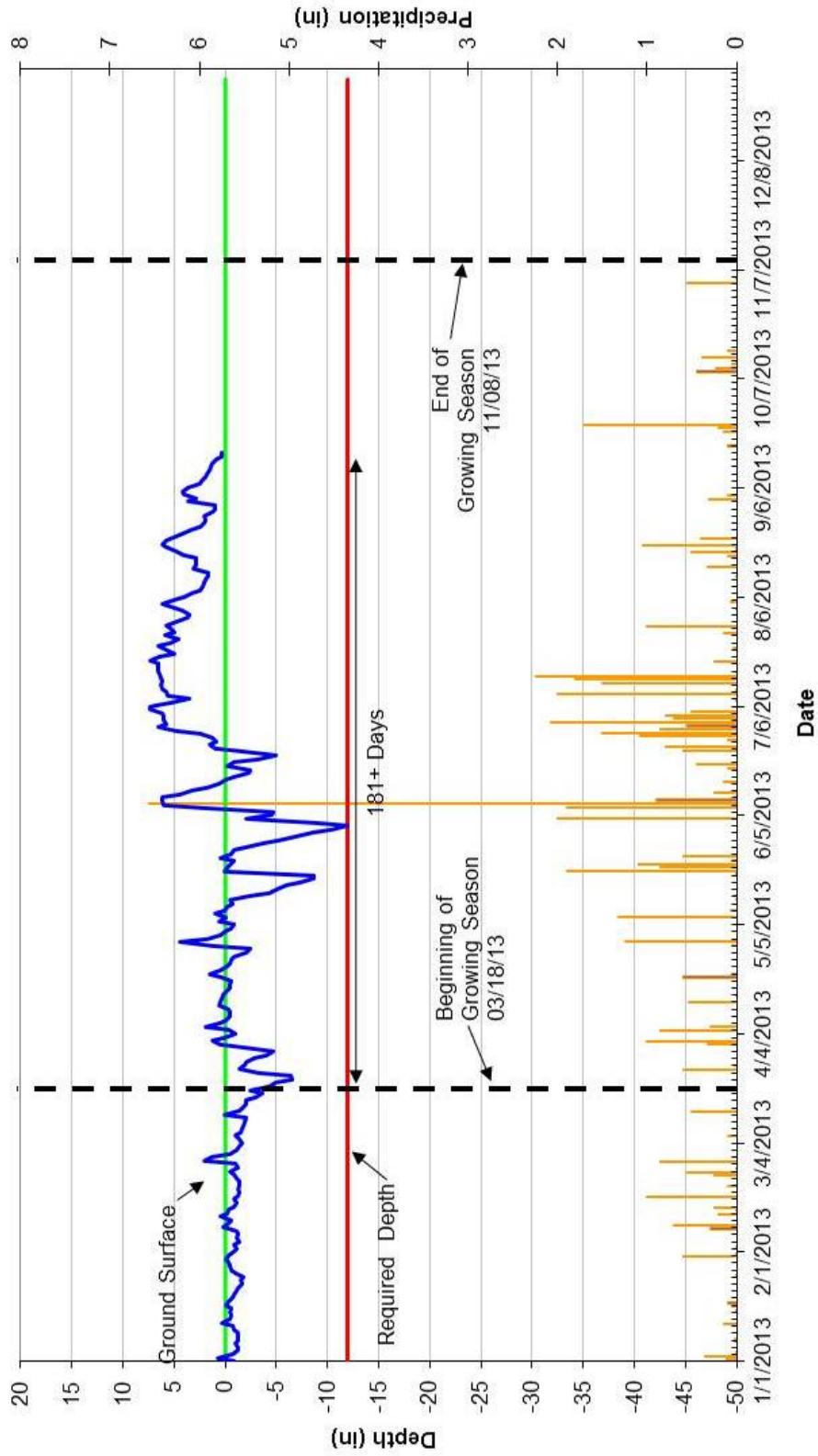
2013 Groundwater Data
Well JR-1 (SN: 000013D4CFCE)*
 Well Replaced 3/26/2013 Old Well SN:000011312CDF



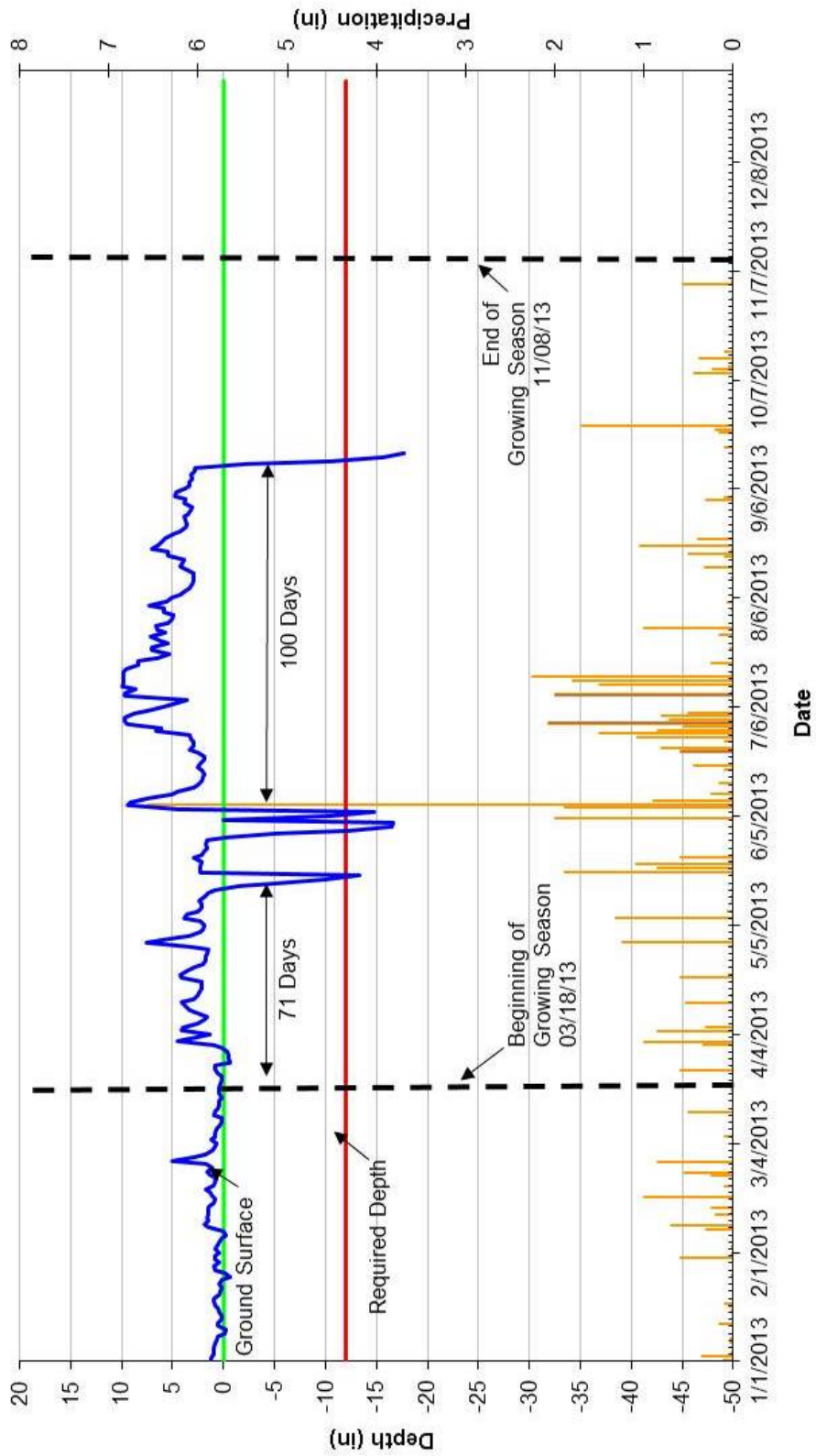
2013 Groundwater Data
Well JR-2 (SN: 000013D4A93B)



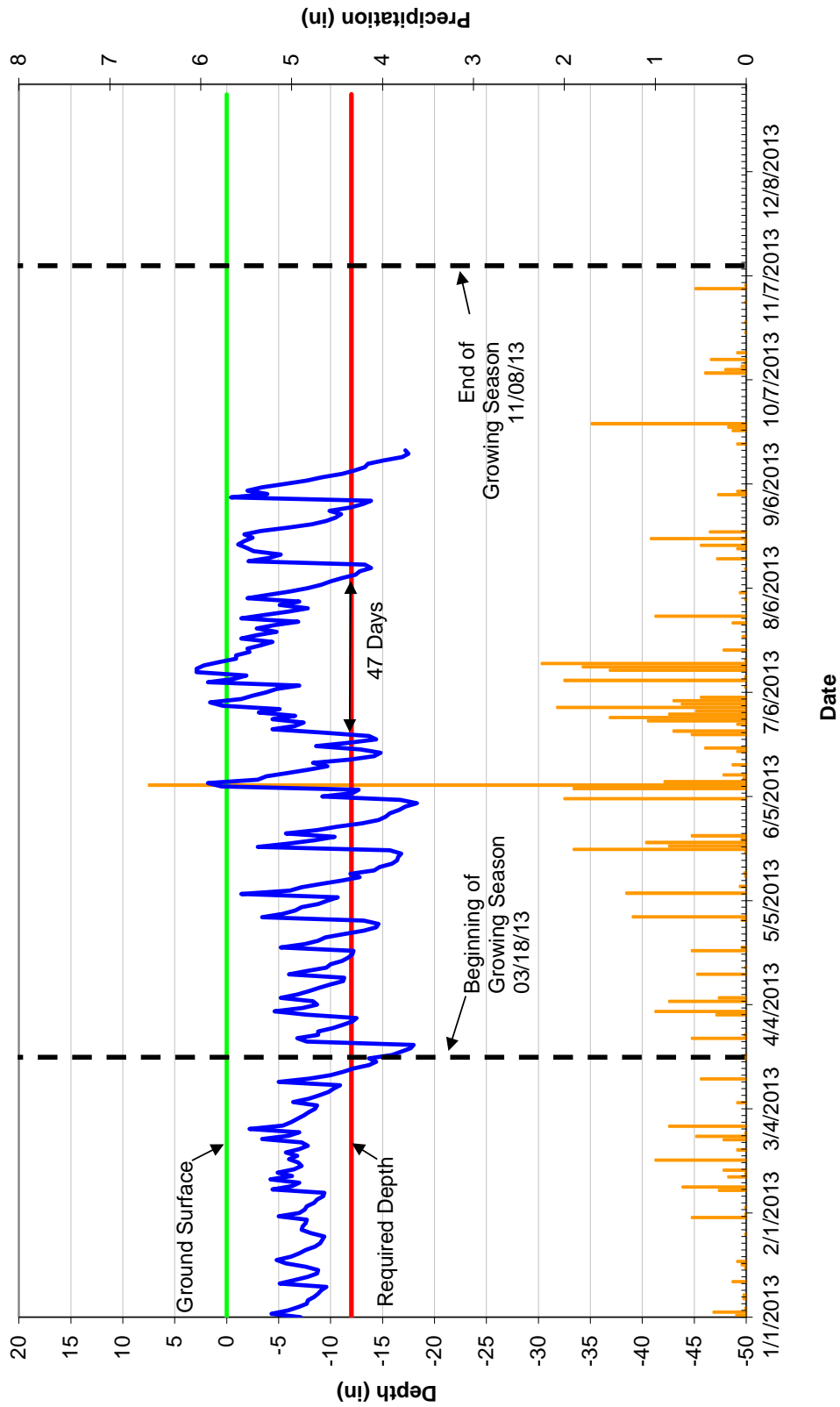
2013 Groundwater Data
Well JR-3 (SN: 0000011311060)



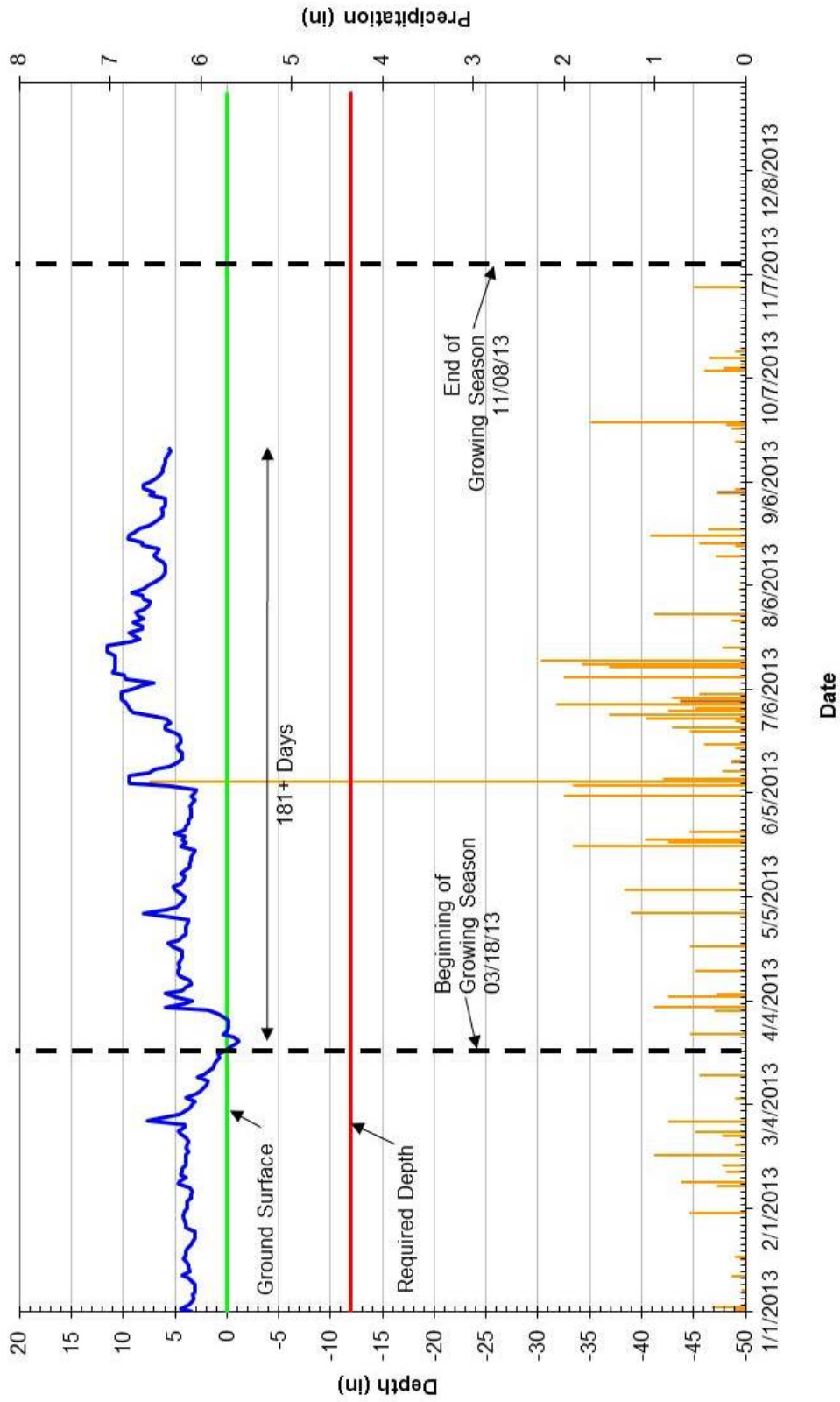
2013 Groundwater Data
 Well JR-4 (SN: 0000013D4CF4E)*
 Well Replaced 3/26/2013 Old Well SN: 00000A287154



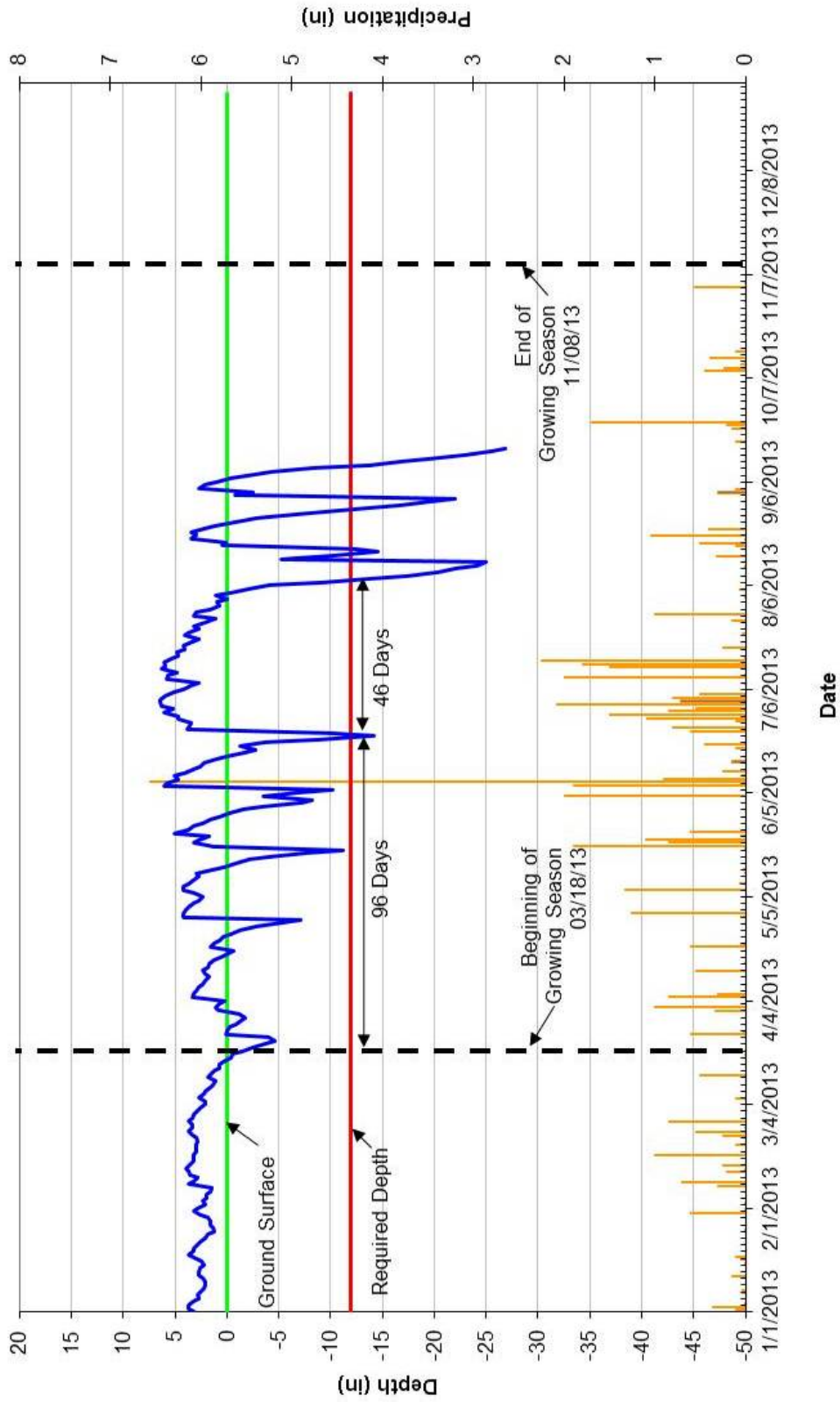
2013 Groundwater Data
Well JR-5 (SN: 000009DE63E2)
 Well Replaced 7/2/2013 Old Well SN: 000009DE619A



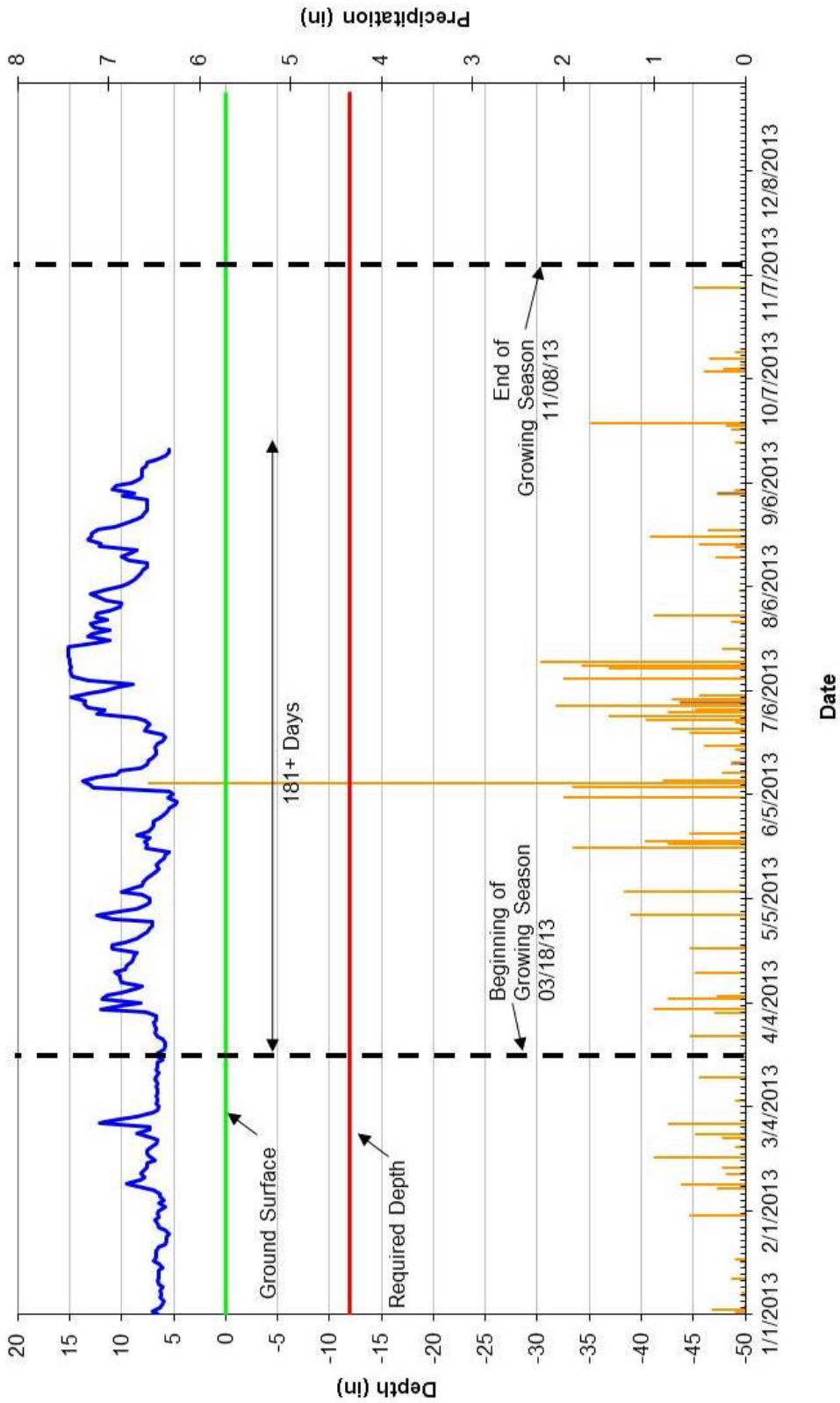
2013 Groundwater Data
Well JR-6 (SN: 000011313D14)



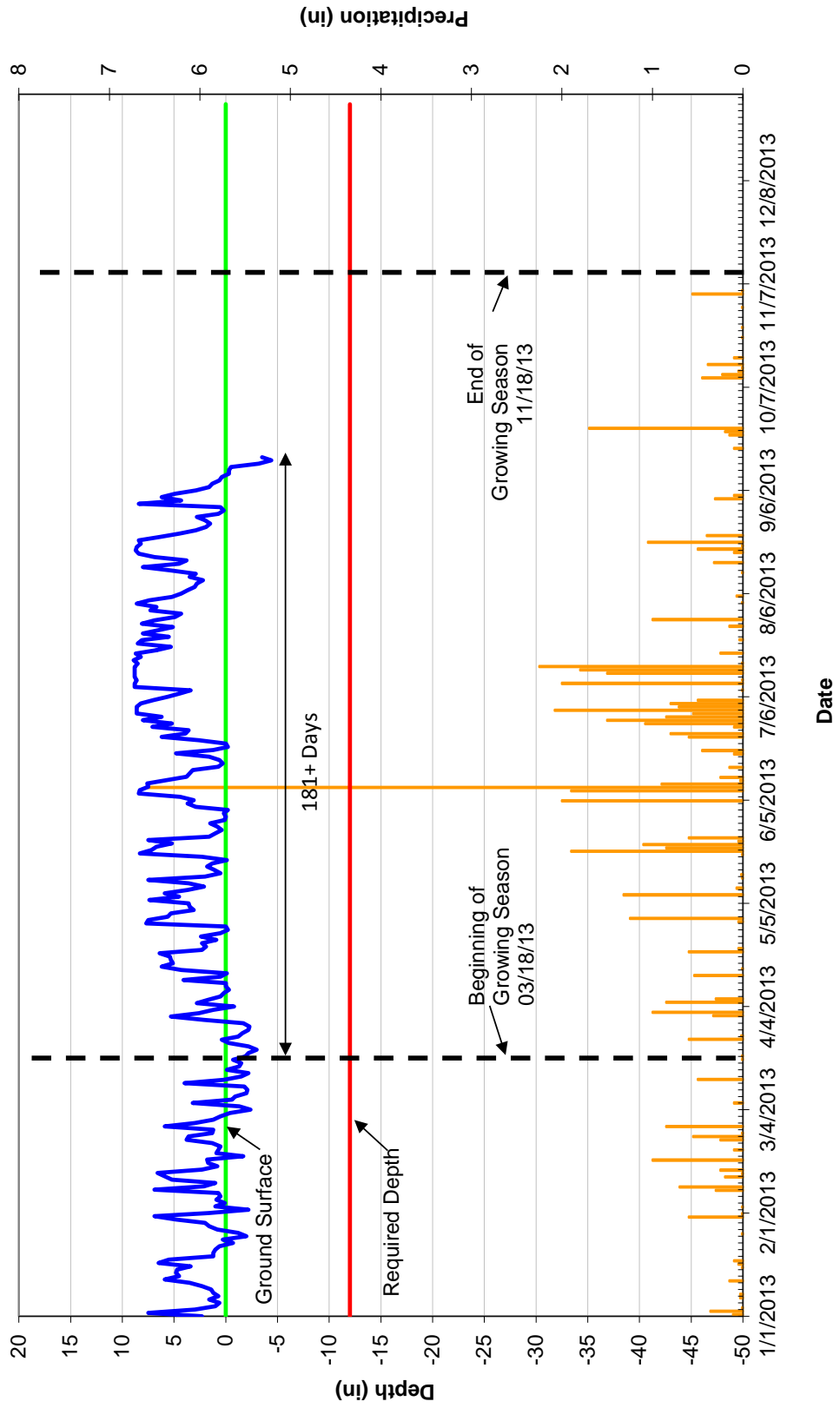
2013 Groundwater Data
Well JR-7 (SN: 00000A285DB5)



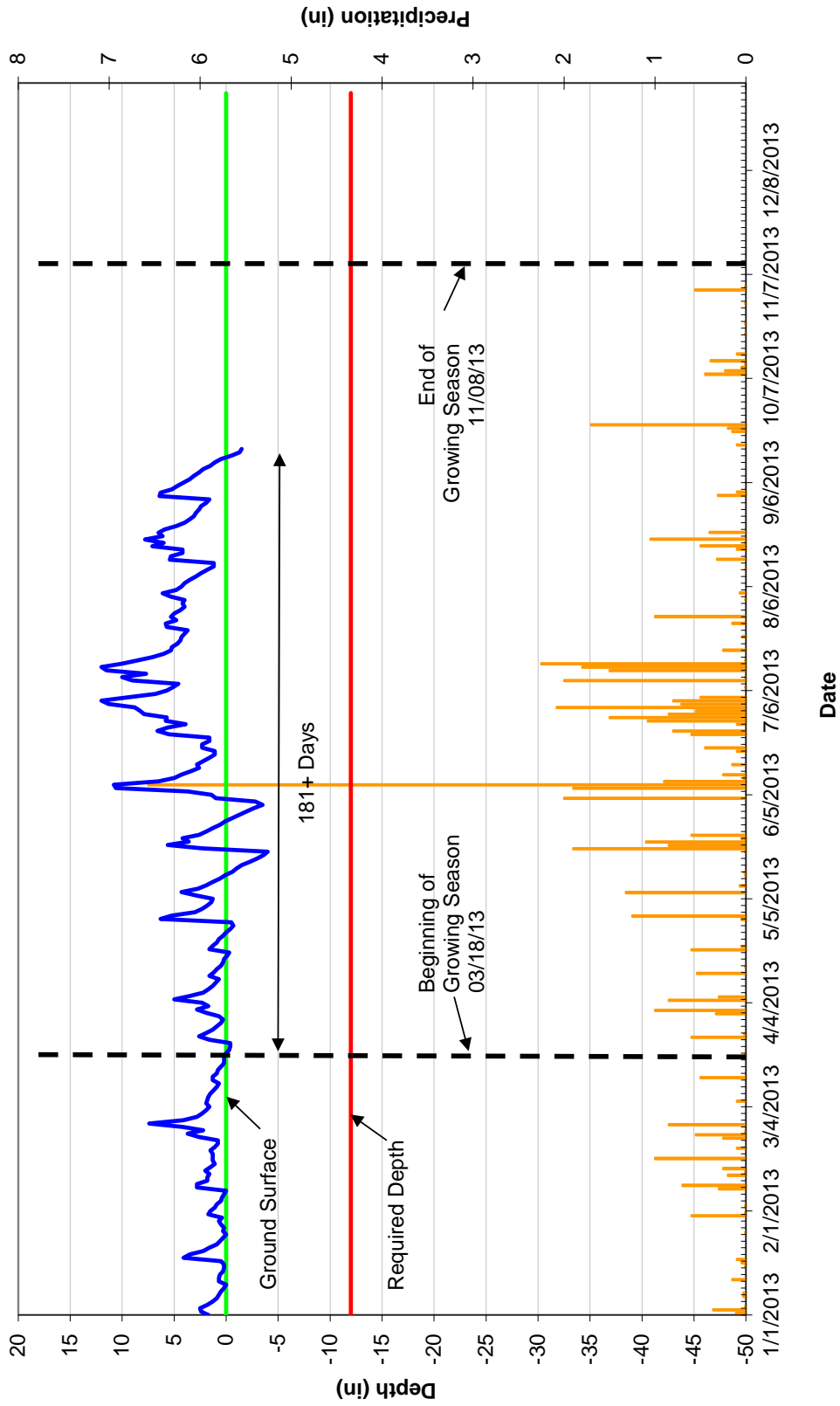
2013 Groundwater Data
Well JR-8 (SN: 00000EBDDA3C)



2013 Groundwater Data
Well JR-9 (SN: 000009BEBD18)*
 Well Replaced 9/17/2013 Old Well SN: 00000EBDAB32



2013 Groundwater Data
Reference Well 1 (SN: 00009DE73A8)



2013 Overhills 30-70 Percentile Graph
 Harnett County, North Carolina

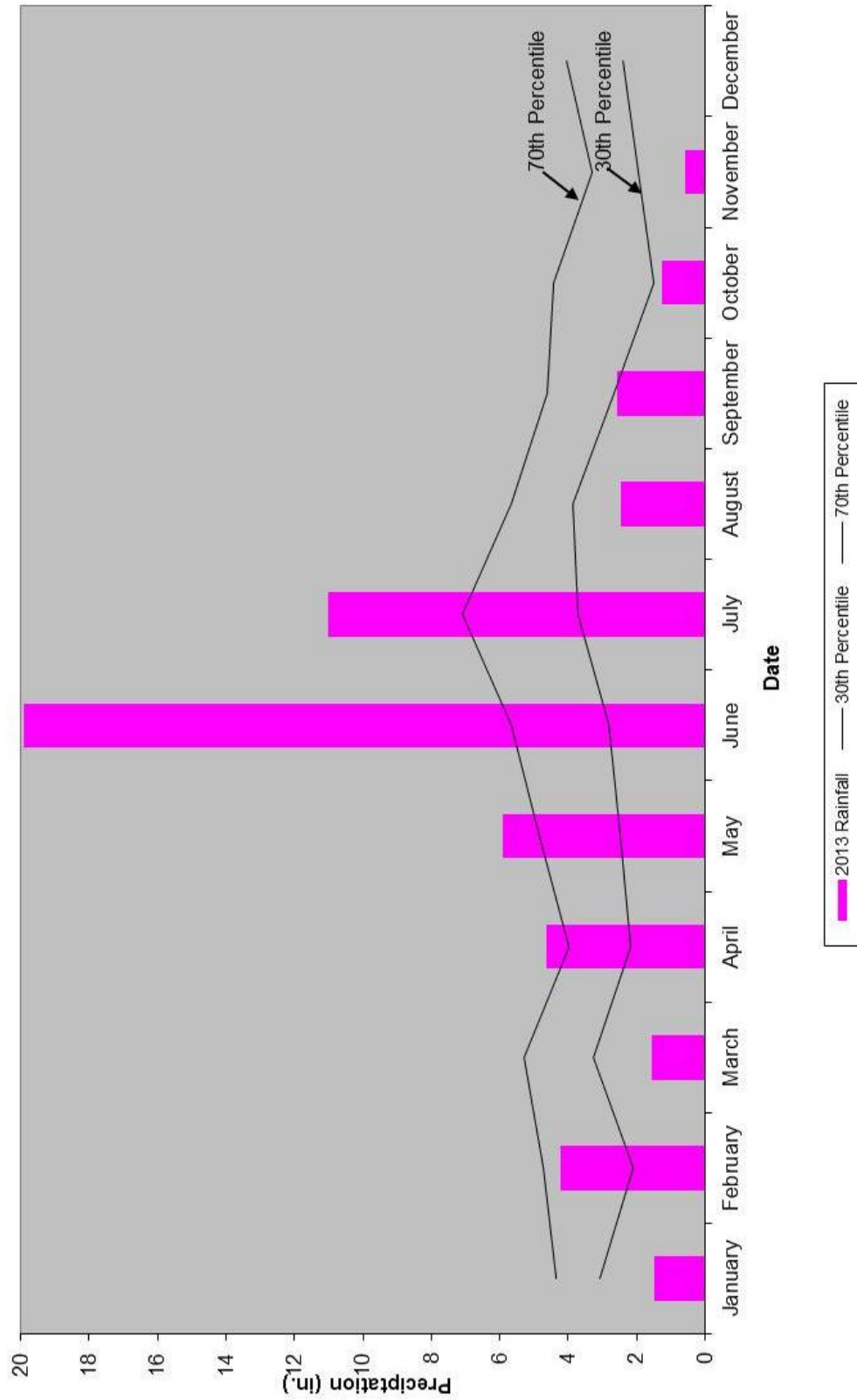


Table 10 - Summary of Groundwater Results for Years 1 - 7							
Overhills/Jumping Run Creek Restoration Project / EEP Project No. 199							
Guage	Success Criteria Achieved/Max Consecutive Days During Growing Season (Percentage)						
	Year 1 (2007)	Year 2 (2008)	Year 3 (2009)	Year 4 (2010)	Year 5 (2011)	Year 6 (2012)	Year 7 (2013)
GW1	Yes/57 days (24 percent)	Yes/77 days (33 percent)	Yes/121 days (52 percent)	Yes/100 days (43 percent)	Yes/85 days (36 percent)	Yes/234 days (100 percent)	Yes/181+ days (77 percent)
GW2	Yes/67 days (29 percent)	Yes/78 days (33 percent)	Yes/234 days (100 percent)	Yes/115 days (49 percent)	Yes/132 days (56 percent)	Yes/234 days (100 percent)	Yes/181+ days (77 percent)
GW3	Yes/63 days (27 percent)	Yes/78 days (33 percent)	Yes/234 days (100 percent)	Yes/105 days (45 percent)	Yes/125 days (53 percent)	Yes/228 days (97 percent)	Yes/181+ days (77 percent)
GW4	Yes/61 days (26 percent)	Yes/70 days (30 percent)	Yes/234 days (100 percent)	Yes/41 days (18 percent)	Yes/65 days (28 percent)	Yes/106 days (45 percent)	Yes/100 days (43 percent)
GW5	No	Yes/63 days (27 percent)	Yes/234 days (100 percent)	Yes/92 days (39 percent)	Yes/58 days (25 percent)	Yes/112 days (48 percent)	Yes/47 days (20 percent)
GW6	Yes/52 days (22 percent)	Yes/75 days (32 percent)	Yes/234 days (100 percent)	Yes/68 days (29 percent)	Yes/132 days (56 percent)	Yes/234 days (100 percent)	Yes/181+ days (77 percent)
GW7	Yes/56 days (24 percent)	Yes/61 days (26 percent)	Yes/57 days (24 percent)	Yes/32 days (14 percent)	Yes/45 days (19 percent)	No/17 days (7 percent)	Yes/96 days (41 percent)
GW8	Yes/65 days (28 percent)	Yes/121 days (52 percent)	Yes/234 days (100 percent)	Yes/43 days (18 percent)	Yes/81 days (35 percent)	Yes/234 days (100 percent)	Yes/181+ days (77 percent)
GW9	Yes/56 days (24 percent)	Yes/76 days (32 percent)	Yes/234 days (100 percent)	Yes/41 days (18 percent)	Yes/69 days (29 percent)	Yes/192 days (82 percent)	Yes/181+ days (77 percent)
GW10*	No	Yes/39 days (17 percent)	Yes/63 days (27 percent)	Yes/123 days (53 percent)	Yes/158 days (68 percent)		
GW11*	No	Yes/39 days (17 percent)	Yes/70 days (30 percent)	Yes/123 days (53 percent)	Yes/48 days (21 percent)		
GW12*	No	Yes/33 days (14 percent)	Yes/88 days (38 percent)	Yes/127 days (54 percent)	Yes/160 days (68 percent)		
GW13*	No	Yes/54 days (23 percent)	Yes/130 days (56 percent)	Yes/88 days (38 percent)	Yes/170 days (73 percent)		
GW14*	No	Yes/56 days (24 percent)	Yes/109 days (47 percent)	Yes/127 days (54 percent)	Yes/170 days (73 percent)		
GW15*	Yes/45 days (19 percent)	Yes/71 days (30 percent)	Yes/130 days (56 percent)	Yes/234 days (100 percent)	Yes/234 days (100 percent)		
Reference	N/A	Yes/88 days (38 percent)	Yes/109 days (47 percent)	Yes/103 days (44 percent)	Yes/48 days (21 percent)	Yes/92 days (39 percent)	Yes/181+ days (77 percent)

* Note: GW10 - GW15 are not within repair area and are therefore not being monitored beyond MY5.