

**Buffalo Flats Restoration Site
Monitoring Report MY02
EEP Project # 94647
EEP Contract # 003273**



Submitted to:



NCEEP, 1652 Mail Service Center, Raleigh, NC 27699-1652

**Construction Completed: October 2011
Data Collection: October 2013
Submitted: January 2014**

Monitoring and Design Firm



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TABLE OF CONTENTS

Table of Contents

1.0 EXECUTIVE SUMMARY / PROJECT ABSTRACT	3
1.1 Vegetation Success Criteria	3
1.2 Hydrology Success Criteria.....	4
1.3 Soil Success Criteria	5
2.0 METHODOLOGY.....	5
3.0 REFERENCES.....	5

Appendix A – Project Vicinity Map and Background Tables

Figure 1. Project Site Vicinity Map	7
Figure 2. Project Site Mitigation Plan View	8
Table 1 – Project Components	9
Table 2 – Project Activity and Reporting History	10
Table 3 – Project Contacts	10
Table 4 – Project Attributes	10

Appendix B – Visual Assessment Data

Current Condition Plan View.....	13
Table 5 – Vegetation Condition Assessment	14
Photo Point Photos	15
Vegetation Plot Photos.....	19

Appendix C – Vegetation Plot Data

Table 6 – Vegetation Plot Criteria Attainment	27
Table 7 – CVS Vegetation Plot Metadata.....	28
Table 8 – CVS Stem Count Total and Planted by Plot and Species	29

Appendix D – Hydrologic Data

30-70 Percentile Graph	32
Precipitation and Water Level Plots.....	33
Table 9 – Wetland Hydrology Criteria Attainment.....	43

Appendix E – Soil Data

Soil Profile Descriptions	45
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1.0 EXECUTIVE SUMMARY / PROJECT ABSTRACT

The Buffalo Flats Restoration Site (BFRS) is a full-delivery project that was developed for the North Carolina Ecosystem Enhancement Program (EEP). Construction was completed in October 2011. The site is within the 03040105 Watershed Cataloging Unit (8-digit HUC) and the Local Watershed Unit (14-digit HUC) 03040105020050. In EEP's most recent publication of excluded and Targeted Local Watersheds/Hydrologic Units, this 14-digit HUC has been identified as a Targeted Local Watershed.

The project goals and objectives are listed below.

Project Goals

- Create diverse bottomland hardwood and low elevation seep communities that are integrated into the Dutch Buffalo Creek Corridor.
- Buffer nutrient and sediment impacts to Dutch Buffalo Creek from adjacent grazing practices.

Project Objectives

- Fill field ditches and ponds to slow the removal of hydrology from the site.
- Redevelop wetland microtopography to capture surface hydrology and slow subsurface drainage.
- Plant the mitigation area with species native to bottomland riparian forest and low elevation seep communities.
- Install livestock exclusion fencing.

The project site, which is protected by a 20.2-acre permanent conservation easement held by the State of North Carolina, is situated in Cabarrus County in the Southern Outer Piedmont ecoregion of the Piedmont physiographic province. The site is located on a single parcel located off of Gold Hill Road approximately six miles northeast of Concord, North Carolina.

The BFRS provided mitigation for wetland impacts within Hydrologic Unit 03040105 by restoring, preserving, and creating 20.2 acres of wetland, generating 11.6 riparian wetland mitigation units (WMU's) and 3.4 non-riparian WMU's.

The BFRS will be monitored to determine if the project is on-track to meeting jurisdictional wetland status. In the restoration areas, the wetland site will be deemed successful once hydrology is established and vegetation success criteria are met. In the creation area, success will be achieved if wetland hydrology and vegetation are present along with indicators of hydric soils.

Three exotic invasive species have been found within the project site are Chinese privet (*Ligustrum sinense*), multiflora rose (*Rosa multiflora*), and Japanese honeysuckle (*Lonicera japonica*), with the privet and multiflora rose being most prominent in certain areas. These areas of invasives are found scattered throughout the project site. In August 2013, these areas were chemically treated with glyphosate. KCI will continue to monitor these areas.

1.1 Vegetation Success Criteria

The wetland mitigation is comprised of four areas that combine preservation, creation, and restoration. The site will be monitored for at least seven years or until the success criteria are achieved. The success criteria for the planted species in mitigation areas will be based on survival and growth. The site will demonstrate the re-establishment of targeted vegetative communities based on survival and growth of planted species and volunteer colonization, with an average stem density of 320 stems/acre after three years, 288 stems/acre after four years, 260 stems/acre after five years, and 210 stems/acre after 7 years. To determine the success of the planted mitigation area, thirteen permanent vegetation monitoring plots

(10 by 10 meters) have been established in the wetland restoration and creation areas at a density that statistically represents the total mitigation acreage. Three of these plots are located in Wetland Area 1, nine of these plots are located in Wetland Area 2, and one plot is located in Wetland Area 3. The average density of these plots will determine whether the site meets the success criterion. Non-target species must not constitute more than 20% of the woody vegetation based on permanent monitoring plots.

The second-year vegetation monitoring was based on the Level 2 CVS-EEP vegetation monitoring protocol. The site's average density for this monitoring period was 442 planted stems/acre. Ten of the thirteen plots had greater than 320 planted stems/acre. Including volunteers, the site averaged 1,276 total stems/acre. The site was supplementally planted in January 2013. During the second-year vegetation monitoring, some of the supplemental planted species may have been recorded as volunteers. During the 2014 monitoring season, KCI will map the location of these species and record them as planted stems.

1.2 Hydrology Success Criteria

Due to the inherent variability in the site's features and its geomorphic position, it is unlikely that the project will homogeneously exhibit common hydrologic conditions across the site, making a single hydrologic performance criterion unrepresentative of the sites performance. As such, the gauge data will be evaluated as a spatial average with each gauge representing the area half the distance to adjacent gauges or wetland type boundaries. The spatial average by wetland type will be the calculated value for comparison with the performance standard for credit validation. Gauges not achieving a minimum of 5% saturation will be considered non-attaining even if the spatial average exceeds the credit validation performance standard (5% for non-riparian and 10% for riparian).

The water table of the restored wetlands must be within 12" of the soils surface continuously for at least 5% (12 days) in the non-riparian wetland area (3.4 acres) and 10% (23 days) in the riparian wetland area (11.6 acres), (50% probability of reoccurrence) of the growing season during normal weather conditions. A "normal" year is based on NRCS climatological data for Cabarrus County, and using the 30th to 70th percentile thresholds as the range of normal, as documented in the USACE Technical Report "Assessing and Using Meteorological Data to Evaluate Wetland Hydrology" (Sprecher, 2000). The growing season for Cabarrus County extends from March 23 to November 11 for a total of 233 days (NRCS 1995). Beginning in Monitoring Year 3, KCI will also monitor soil temperature with an automatic recording gauge to determine if the 233 day growing season is accurate for the site.

The daily rainfall data was obtained from a local weather station in Kannapolis, NC; provided by the NC State Climate Office. For the 2013-year, the months of June, July, and August experienced above average rainfall, while February, March, April, May, and November experienced average rainfall. The months of January, September, and October recorded below average rainfall for the site. Overall, the area experienced an average rainfall during the 2013 growing season.

During the site's second growing season, all seven wells in the riparian areas met the success criterion of having saturated soil conditions occurring within 12 inches of the ground surface for a minimum continuous period of 10% (23 days) of the 233 day growing season (March 10 to November 28) during average climatic conditions. Two of the three wells in the non-riparian areas met the success criterion of 5% (12 days) of the growing season. Gauge 10 experienced a malfunction during the growing season. The date was reset and did not correlate with the onsite barologger for absolute pressure data comparison. The well will be closely monitored during the 2014 growing season. Overall, wetland hydrology was achieved at nine of the ten groundwater monitoring gauges in the riparian and non-riparian restoration areas.

1.3 Soil Success Criteria

Beginning in Monitoring Year 2, the 1.2 acre wetland creation area was monitored to document the development of redoximorphic features in the soil by evidence of two or more indicators i.e. changes in chroma, organic matter content, oxidized root channels, concretions, mottles and other indications that the soil is subject to low oxygen conditions etc. within the seven-year monitoring period. Two permanent monitoring plots were established adjacent to Well 6 and Well 7. Soil profiles will be monitored yearly for development of redoximorphic conditions by a licensed soil scientist. Profiles will be compared from year to year and changes will be documented in the yearly monitoring reports.

A detailed soils profile description was conducted at two permanent monitoring plots by a licensed soil scientist (# 187) on September 17, 2013. Both soil plots demonstrated at least two hydric soil indicators of redoximorphic conditions showing redox depressions (F8) and iron-manganese masses (F12). See Appendix E for both soil profile descriptions.

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

2.0 METHODOLOGY

The CVS-EEP protocol, Level 2 (<http://cvs.bio.unc.edu/methods.htm>) was used to collect vegetation data from the site. The vegetation monitoring was completed on October 17, 2013.

3.0 REFERENCES

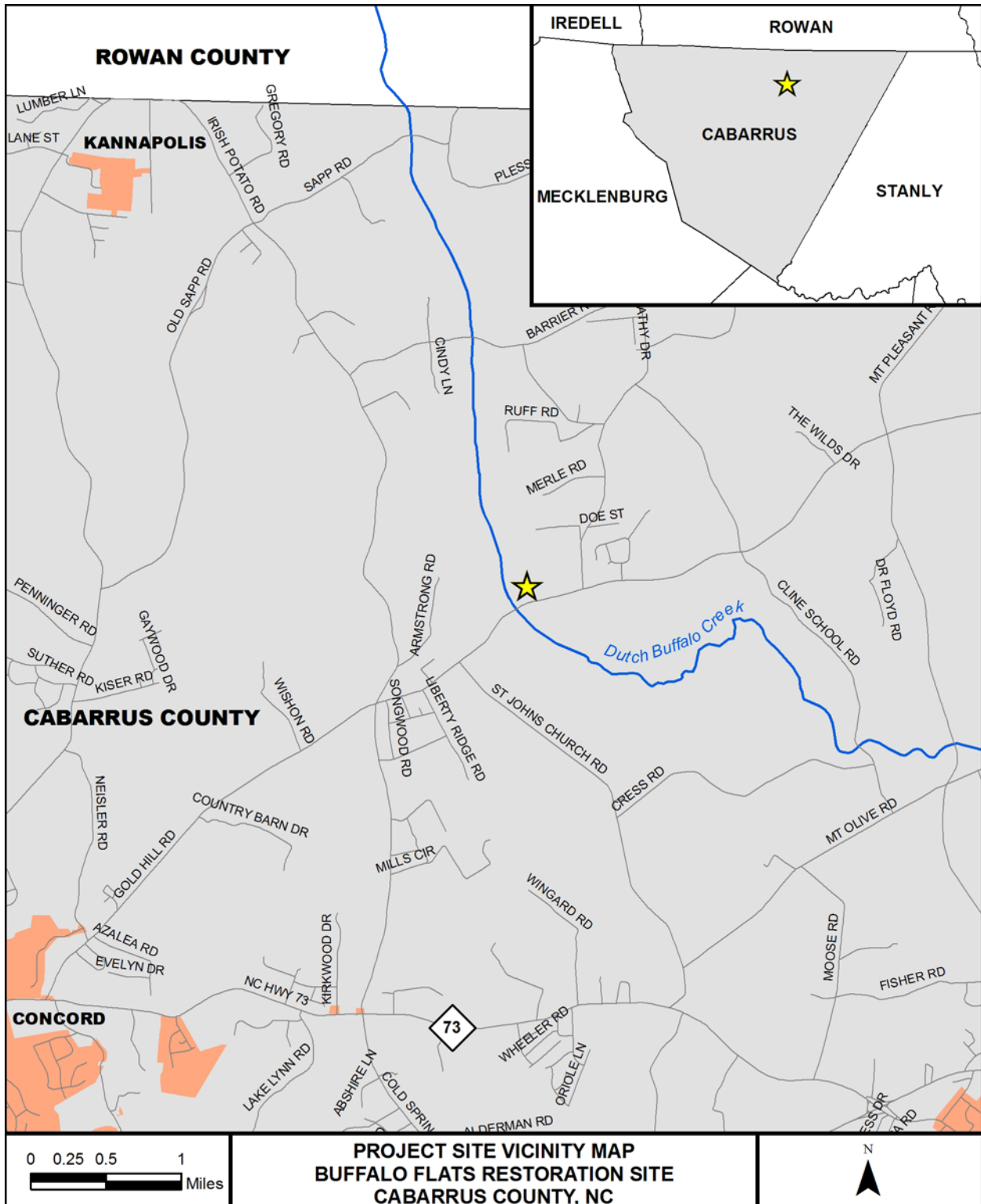
Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2006. CVS-EEP Protocol for Recording Vegetation, Version 4.0 (<http://cvs.bio.unc.edu/methods.htm>)

USACE. 2003. Stream Mitigation Guidelines. USACE, NCDENR-DWQ, USEPA, NCWRC.

Sprecher, S. W. and Warne, A. G. 2000. "Assessing and Using Meteorological Data to Evaluate Wetland Hydrology," ERDC/EL TR-WRAP-00-01, U.S. Army Engineer Research and Development Center, Vicksburg, MS.

Appendix A

Project Vicinity Map and Background Tables



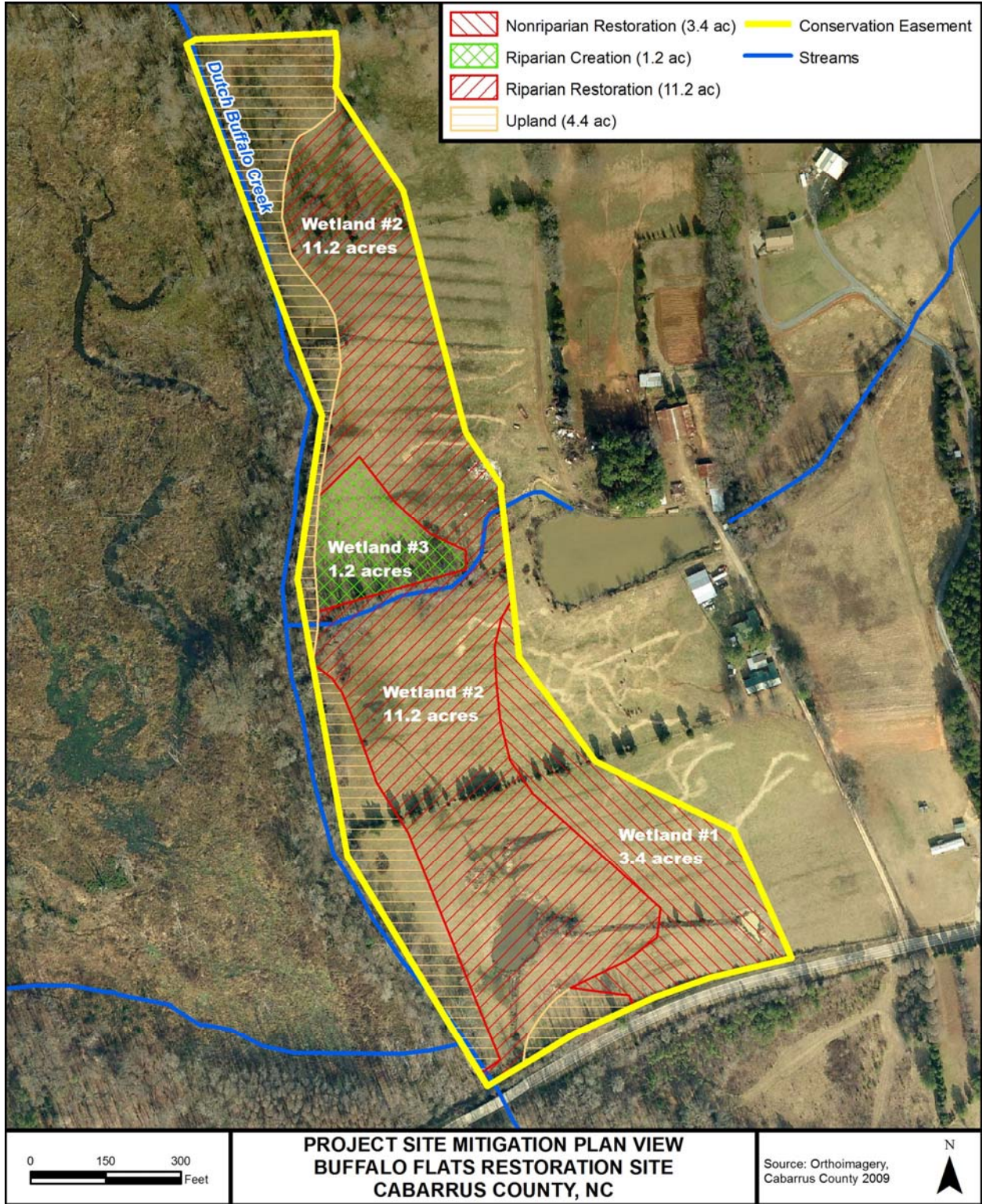


Table 1. Project Components									
Project Number and Name: 94647 - Buffalo Flats Restoration Site									
Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Acres	-	-	11.2	1.2	3.4	-			
Credits	-	-	11.2	0.4	3.4	-	-	-	-
TOTAL CREDITS			11.6		3.4				
Project Components									
Project Component -or- Reach ID	Stationing/ Location		Existing Footage/ Acreage		Approach (PI, PII etc.)		Restoration -or- Restoration Equivalent	Restoration Footage or Acreage	Mitigation Ratio
Wetland Area 1	Southeastern corner of project		3.4 acres		-		Restoration	3.4 acres	1:1
Wetland Area 2	North to south throughout the center of project		11.2 acres		-		Restoration	11.2 acres	1:1
Wetland Area 3	West-central portion of the project		1.2 acres		-		Creation	1.2 acres	3:1
Component Summation									
Restoration Level	Stream (linear feet)		Riparian Wetland (acres)		Non-riparian Wetland (acres)		Buffer (square feet)	Upland (acres)	
			Riverine	Non-Riverine					
Restoration	-		11.2 acres	-	3.4 acres		-	-	
Enhancement			-	-			-	-	
Enhancement I	-								
Enhancement II	-								
Creation			1.2 acres	-	-			-	
Preservation	-		-	-	-			4.4 acres	
High Quality Preservation	-		-	-	-			-	
TOTAL			12.4 acres	-	3.4 acres			4.4 acres	

Table 2. Project Activity & Reporting History		
Project Number and Name: 94647 - Buffalo Flats Restoration Site		
Elapsed Time Since Grading Complete: 2 yr 2 months		
Elapsed Time Since Planting Complete: 1 yr 9 months		
Number of Reporting Years: 2		
Activity or Report	Data Collection Complete	Actual Completion or Delivery
Mitigation Plan		Dec 10
Final Design - Construction Plans		Dec 10
Construction		Oct 11
Planting		Feb 12
Baseline Monitoring/Report	Feb/March 12	July 12
Year 1 Monitoring	Oct 12	Dec 12
Year 2 Monitoring	Oct 13	Dec 13
Supplemental Planting		Jan13
Installed soil temperature gauge		March13
Invasive Species Maintenance		Aug13

Table 3. Project Contacts	
Project Number and Name: 94647 - Buffalo Flats Restoration Site	
Design Firm	KCI Associates of North Carolina, PA Landmark Center II, Suite 220 4601 Six Forks Rd. Raleigh, NC 27609 Contact: Mr. Tim Morris Phone: (919) 278-2512 Fax: (919) 783-9266
Construction Contractor	KCI Environmental Technologies and Construction, Inc. Landmark Center II, Suite 220 4601 Six Forks Rd. Raleigh, NC 27609 Contact: Mr. Tim Morris Phone: (919) 278-2512 Fax: (919) 783-9266
Planting Contractor	Bruton Nurseries and Landscapes PO Box 1197 Freemont, NC 27830 Contact: Mr. Charlie Bruton Phone: (919) 242-6555
Monitoring Performers	
MY00-MY02	KCI Associates of North Carolina, PA Landmark Center II, Suite 220 4601 Six Forks Rd. Raleigh, NC 27609 Contact: Mr. Adam Spiller Phone: (919) 278-2514 Fax: (919) 783-9266

Table 4. Project Attribute Table			
Project Number and Name: 94647 – Buffalo Flats Restoration Site			
County	Cabarrus County		
Project Area (acres)	20.20 acres		
Project Coordinates (lat. and long.)	35.456988 N , -80.496325 W		
Project Watershed Summary Information			
Physiographic Province	Piedmont		
River Basin	Yadkin-Pee Dee		
USGS Hydrologic Unit 8-digit	03040105	USGS Hydrologic Unit 14-digit	03040105020050
DWQ Sub-basin	03-07-12		
Project Drainage Area (acres)	106 acres		
Project Drainage Area Percentage of Impervious Area	1%		
CGIA Land Use Classification	3.6% Cultivated, 54.1% Managed Herbaceous Cover, 32.5% Mixed Upland Hardwoods, 5.2% Southern Yellow Pine, and 4.6% Water Bodies		
Wetland Summary Information			
Parameters	Wetland Area 1	Wetland Area 2	Wetland Area 3
Size of Wetland (acres)	3.4 acres	11.2 acres	1.2 acres
Wetland Type (non-riparian, riparian riverine or riparian non-riverine)	Non-riparian	Riparian non-riverine	Riparian non-riverine
Mapped Soil Series	Chewacla (Wehadkee and Armenia by detailed soil investigation)	Chewacla (Wehadkee and Armenia by detailed soil investigation)	Chewacla
Drainage class	Poorly drained	Poorly drained	Somewhat poorly drained
Soil Hydric Status	Drained Hydric	Drained Hydric	Non hydric
Source of Hydrology	Hillside seepage	Surface/Overbank Flow	Surface/Overbank Flow
Hydrologic Impairment	Ditching and Pasture	Ditching and Pasture	Ditching and Pasture
Native vegetation community	Pasture	Pasture	Pasture

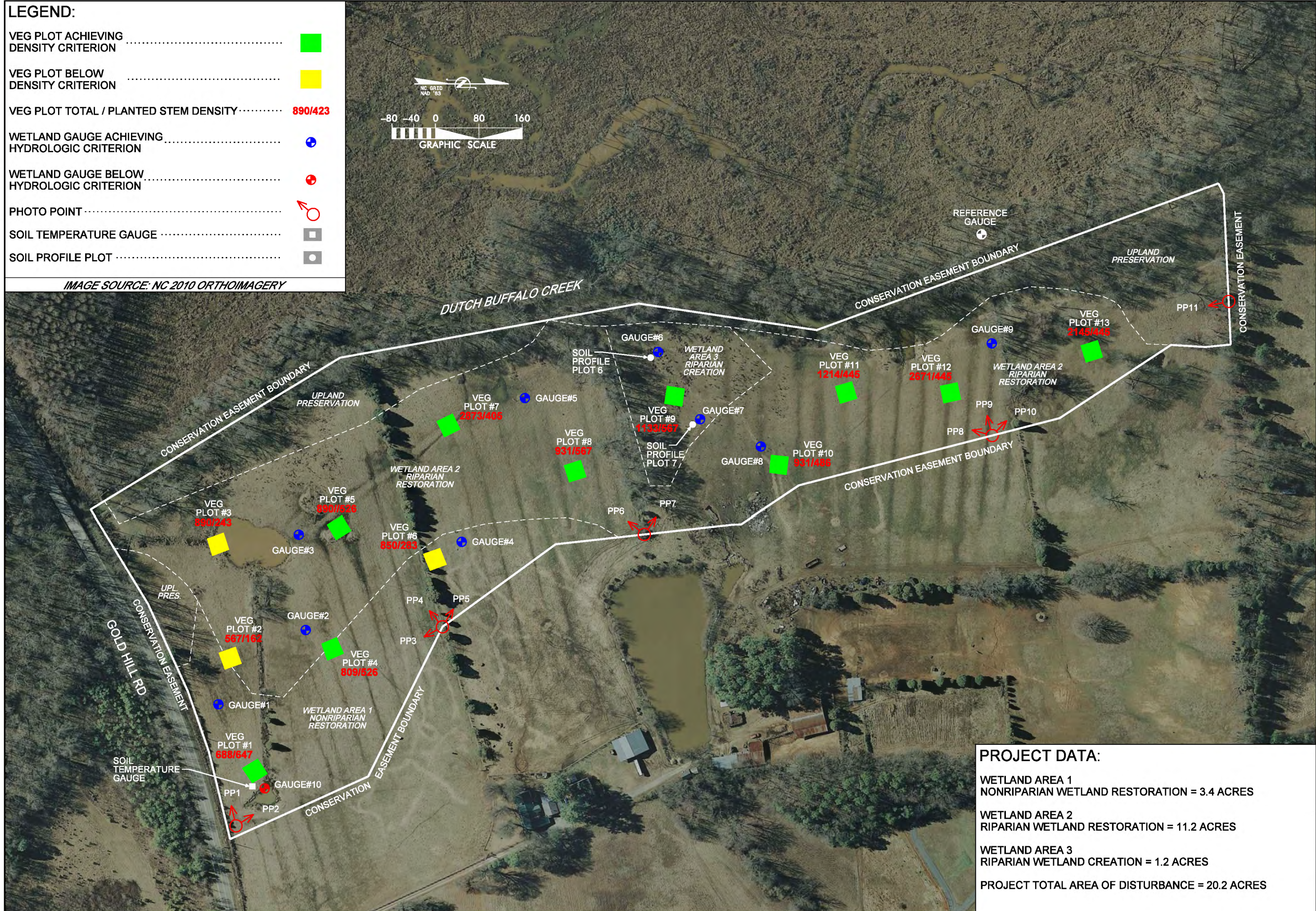
Appendix B

Visual Assessment Data

LEGEND:

- VEG PLOT ACHIEVING DENSITY CRITERION ■
- VEG PLOT BELOW DENSITY CRITERION ■
- VEG PLOT TOTAL / PLANTED STEM DENSITY 890/423
- WETLAND GAUGE ACHIEVING HYDROLOGIC CRITERION ⊕
- WETLAND GAUGE BELOW HYDROLOGIC CRITERION ⊕
- PHOTO POINT ♂
- SOIL TEMPERATURE GAUGE
- SOIL PROFILE PLOT

IMAGE SOURCE: NC 2010 ORTHOIMAGERY



PROJECT DATA:

WETLAND AREA 1
NONRIPARIAN WETLAND RESTORATION = 3.4 ACRES

WETLAND AREA 2
RIPARIAN WETLAND RESTORATION = 11.2 ACRES

WETLAND AREA 3
RIPARIAN WETLAND CREATION = 1.2 ACRES

PROJECT TOTAL AREA OF DISTURBANCE = 20.2 ACRES

REV	DESCRIPTION	DATE	APPROVED



KCI
ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4801 SIX FORKS ROAD
RALEIGH, NORTH CAROLINA 27609

BUFFALO FLATS RESTORATION SITE
EEP PROJECT #94647
CABARRUS COUNTY, NORTH CAROLINA
MONITORING YEAR 02

DATE: DEC 2013
SCALE: 1" = 160'
CURRENT CONDITION PLAN VIEW
SHEET 1 OF 1

Table 5. Vegetation Condition Assessment						
Project Number and Name: 94647 – Buffalo Flats Restoration Site						
Planted Acreage 15.8			Easement Acreage 20.2			
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	0	0.00	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Not Depicted, Covers Most of Restoration Area	0	0.00	0.0%
Total				0	0.00	0.0%
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	0	0.00	0.0%
Cumulative Total				0	0.00	0.0%
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	1000 SF	Pattern and Color	0	0.00	0.0%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	none	Pattern and Color	0	0.00	0.0%

Photo Point Photos



Photo Point 1: View looking west, from the southeastern corner of the project site. 3/1/2012– Baseline



Photo Point 1: View looking west, from the southeastern corner of the project site. 10/17/2013 – MY02



Photo Point 2: View looking north, from the southeastern corner of the project site. 3/1/2012– Baseline



Photo Point 2: View looking north, from the southeastern corner of the project site. 10/17/2013 – MY02



Photo Point 3: View looking south, from the eastern easement boundary. 3/1/2012– Baseline



Photo Point 3: View looking south, from the eastern easement boundary. 10/17/2013 – MY02



Photo Point 4: View looking west, from the eastern easement boundary. 3/1/2012– Baseline



Photo Point 4: View looking west, from the eastern easement boundary. 10/17/2013 – MY02



Photo Point 5: View looking north, from the eastern easement boundary. 3/1/2012– Baseline



Photo Point 5: View looking north, from the eastern easement boundary. 10/17/2013 – MY02



Photo Point 6: View looking southwest, from the eastern easement boundary. 3/1/2012– Baseline



Photo Point 6: View looking southwest, from the eastern easement boundary. 10/17/2013 – MY02



Photo Point 7: View looking northwest, from the eastern easement boundary. 3/1/2012– Baseline



Photo Point 7: View looking northwest, from the eastern easement boundary. 10/17/2013 – MY02



Photo Point 8: View looking southwest, from the eastern easement boundary. 3/1/2012– Baseline



Photo Point 8: View looking southwest, from the eastern easement boundary. 10/17/2013 – MY02



Photo Point 9: View looking west, from the eastern easement boundary. 3/1/2012– Baseline



Photo Point 9: View looking west, from the eastern easement boundary. 10/17/2013 – MY02



Photo Point 10: View looking north, from the eastern easement boundary. 3/1/2012– Baseline



Photo Point 10: View looking north, from the eastern easement boundary. 10/17/2013 – MY02

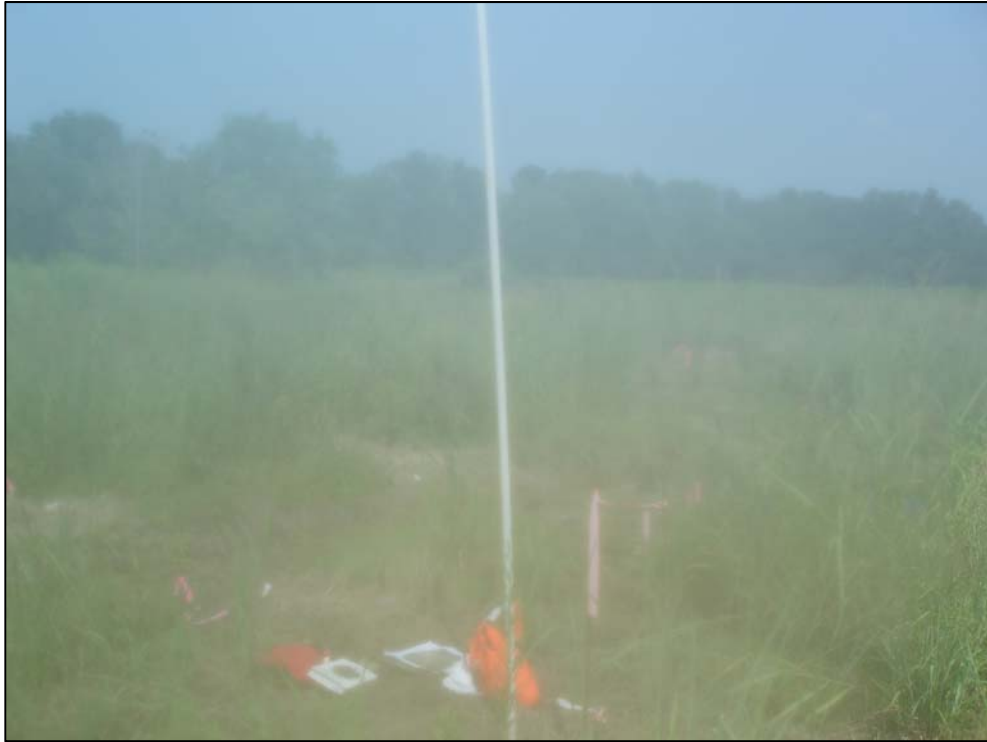


Photo Point 11: View looking south, from the north eastern corner of the project site. 3/1/2012– Baseline



Photo Point 11: View looking south, from the north eastern corner of the project site. 10/17/2013 – MY02

Vegetation Plot Photos



Vegetation Plot 1: 7/18/13 – MY-02



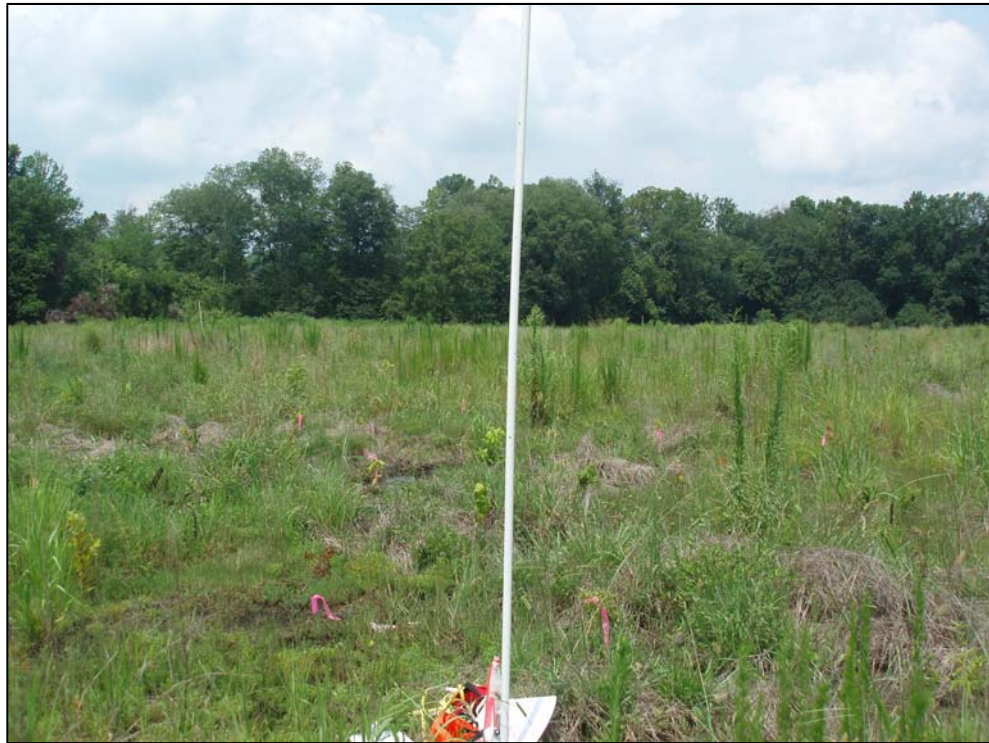
Vegetation Plot 2: 7/18/13 – MY-02



Vegetation Plot 3: 7/18/13 – MY-02



Vegetation Plot 4: 7/18/13 – MY-02



Vegetation Plot 5: 7/18/13 – MY-02



Vegetation Plot 6: 7/18/13 – MY-02



Vegetation Plot 7: 10/17/13 – MY-02



Vegetation Plot 8: 10/17/13 – MY-02



Vegetation Plot 9: 10/17/13 – MY-02



Vegetation Plot 10: 10/17/13 – MY-02



Vegetation Plot 11: 10/17/13 – MY-02



Vegetation Plot 12: 10/17/13 – MY-02



Vegetation Plot 13: 10/17/13 – MY-02

Appendix C

Vegetation Plot Data

Table 6. Vegetation Plot Criteria Attainment			
Project Number and Name: 94647 - Buffalo Flats Restoration Site			
Vegetation Plot ID	Vegetation Survival Threshold Met? (320 planted stems/acre)	Monitoring Year 02 Planted Stem Density (stems/acre)	Monitoring Year 02 Total Stem Density (stems/acre)
1	Yes	647	688
2	No	162	567
3	No	243	890
4	Yes	526	809
5	Yes	526	890
6	No	283	850
7	Yes	405	2,873
8	Yes	567	931
9	Yes	567	1,133
10	Yes	486	931
11	Yes	445	1,214
12	Yes	445	2,671
13	Yes	445	2,145

Table 7. CVS Vegetation Plot Metadata	
Project Number and Name: 94647 - Buffalo Flats Restoration Site	
Report Prepared By	April Helms
Date Prepared	10/28/2013 10:36
database name	cvs-eeep-entrytool-v2.3.1 - Copy.mdb
database location	M:\2007\12071067_2007 EEP OPEN END\Veg_database
computer name	12-J1V5CX1
file size	58859520
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	94647
project Name	Buffalo Flats Restoration Site
Description	Wetland Restoration Site
River Basin	Yadkin River Basin
Sampled Plots	13

Table 8. CVS Stem Count Total and Planted by Plot and Species
Project Number and Name: 94647 - Buffalo Flats Restoration Site

		Current Plot Data (MY2-2013)																								
Scientific Name	Common Name	Species Type	E94647-EEP-1			E94647-EEP-2			E94647-EEP-3			E94647-EEP-4			E94647-EEP-5			E94647-EEP-6			E94647-EEP-7			E94647-EEP-8		
			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
<i>Acer negundo</i>	boxelder	Tree										2			6			1			6			1		
<i>Acer rubrum</i>	red maple	Tree													1								41			
<i>Betula nigra</i>	river birch	Tree				1	1	1	3	3	3								1	1	1	4	4	4		
<i>Diospyros virginiana</i>	common persimmon	Tree													1											
<i>Fraxinus pennsylvanica</i>	green ash	Tree						2															1			
<i>Liquidambar styraciflua</i>	sweetgum	Tree									7		4			1			1				5		2	
<i>Liriodendron tulipifera</i>	tuliptree	Tree									1									2	2	2				
<i>Nyssa aquatica</i>	water tupelo	Tree												2	2	2				1	1	1				
<i>Platanus occidentalis</i>	American sycamore	Tree	2	2	2								1				1	1	12				7			
<i>Populus deltoides</i>	eastern cottonwood	Tree									2															
<i>Quercus</i>	oak	Tree						2			1			1	1	1				2	2	3				
<i>Quercus laurifolia</i>	laurel oak	Tree	4	4	4								1	1	1				2	2	2					
<i>Quercus lyrata</i>	overcup oak	Tree																								
<i>Quercus michauxii</i>	swamp chestnut oak	Tree			1			5			5								1						3	
<i>Quercus pagoda</i>	cherrybark oak	Tree	6	6	6	2	2	2	2	2	2	1	1	1	4	4	4	3	3	3	2	2	2	3	3	4
<i>Quercus palustris</i>	pin oak	Tree	4	4	4							2	2	2									1	1	1	
<i>Quercus phellos</i>	willow oak	Tree				1	1	2	1	1	1	9	9	9	6	6	6				1	1	1	5	5	7
Unknown																		1	1	1	1	1	1	1	1	
Stem count			16	16	17	4	4	14	6	6	22	13	13	20	13	13	22	7	7	21	10	10	71	14	14	23
size (ares)			1			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			4	4	5	3	3	6	3	3	8	4	4	7	4	4	8	4	4	7	7	7	12	5	5	8
Stems per ACRE			647	647	688	162	162	567	243	243	890	526	526	809	526	526	890	283	283	850	405	405	2,873	567	567	931

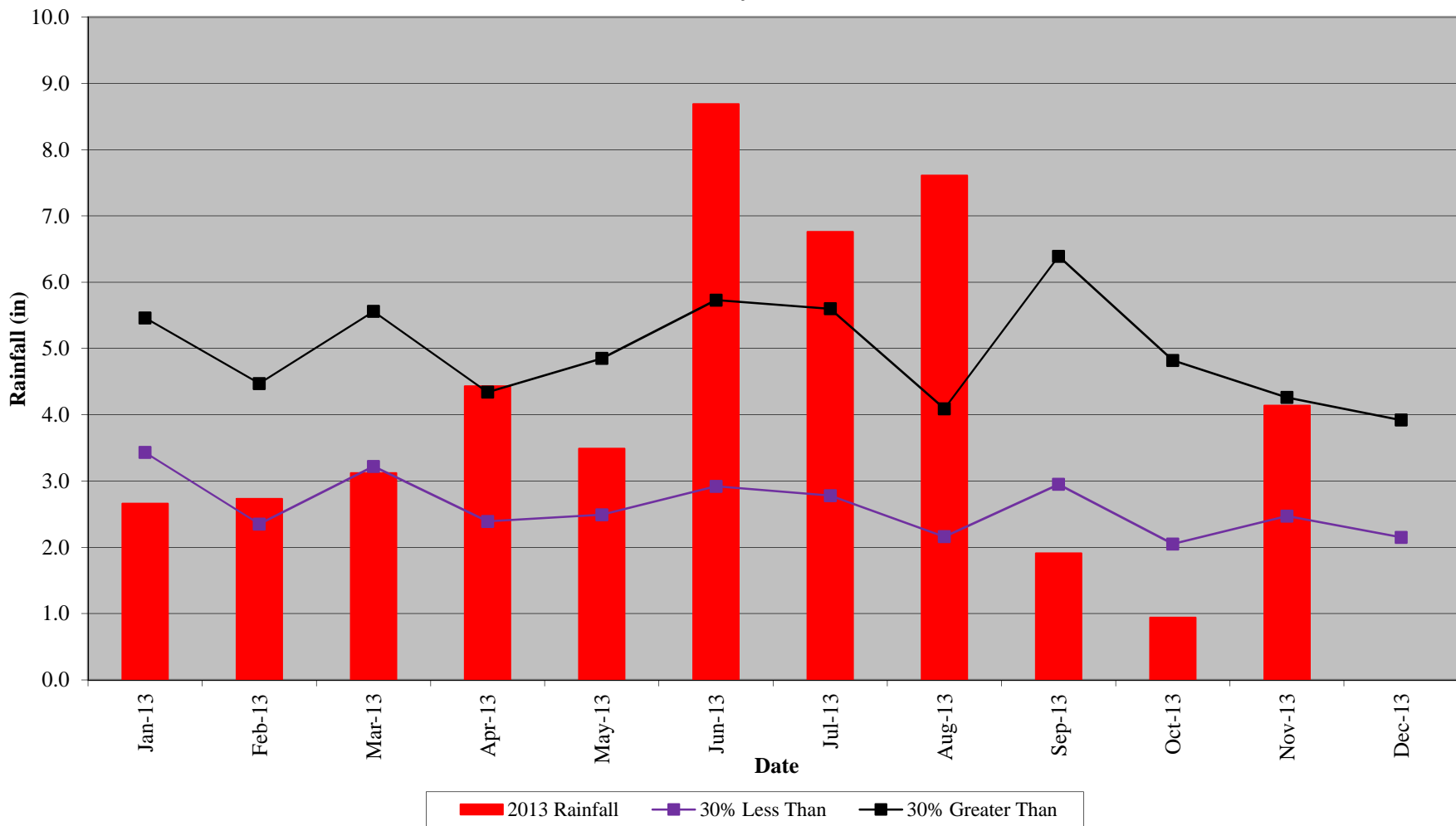
Table 8. CVS Stem Count Total and Planted by Plot and Species Cont.
Project Number and Name: 94647 - Buffalo Flats Restoration Site

			Current Plot Data (MY2-2013)															Annual Means								
Scientific Name	Common Name	Species Type	E94647-EEP-9			E94647-EEP-10			E94647-EEP-11			E94647-EEP-12			E94647-EEP-13			MY2 (2013)			MY1 (2012)			MY0 (2012)		
			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
<i>Acer negundo</i>	boxelder	Tree								6			7			12			41			16				
<i>Acer rubrum</i>	red maple	Tree			5			3			1			1		1			53			5				
<i>Betula nigra</i>	river birch	Tree	3	3	3	2	2	2	3	3	3	7	7	7	1	1	1	25	25	25	27	27	27	47	47	47
<i>Diospyros virginiana</i>	common persimmon	Tree			1									2		1			5			4				
<i>Fraxinus pennsylvanica</i>	green ash	Tree			3						1			6		17			30			14				
<i>Liquidambar styraciflua</i>	sweetgum	Tree												5					25			7				
<i>Liriodendron tulipifera</i>	tuliptree	Tree				1	1	1	1	1	2					1	4	4	7	4	4	4				
<i>Nyssa aquatica</i>	water tupelo	Tree	2	2	2	4	4	4	1	1	1	3	3	3	5	5	5	18	18	18	16	16	16	6	6	6
<i>Platanus occidentalis</i>	American sycamore	Tree			5			4			10			33		10	3	3	84	3	3	33				
<i>Populus deltoides</i>	eastern cottonwood	Tree																	2			2				
<i>Quercus</i>	oak	Tree	1	1	1			3									4	4	11	1	1	1	3	3	3	
<i>Quercus laurifolia</i>	laurel oak	Tree															7	7	7	10	10	10	19	19	19	
<i>Quercus lyrata</i>	overcup oak	Tree													1	1	1	1	1	1	1					
<i>Quercus michauxii</i>	swamp chestnut oak	Tree																	15							
<i>Quercus pagoda</i>	cherrybark oak	Tree	4	4	4	3	3	4	5	5	5	1	1	2				36	36	39	42	42	43	24	24	24
<i>Quercus palustris</i>	pin oak	Tree															7	7	7	8	8	8				
<i>Quercus phellos</i>	willow oak	Tree	4	4	4	2	2	2	1	1	1				4	4	4	34	34	37	29	29	29	14	14	14
Unknown																	3	3	3	11	11	11	124	124	124	
Stem count			14	14	28	12	12	23	11	11	30	11	11	66	11	11	53	142	142	410	152	152	231	237	237	237
size (ares)			1			1			1			1			1			13			13			13		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.32			0.32			0.32		
Species count			5	5	9	5	5	8	5	5	9	3	3	9	4	4	10	11	11	18	11	11	17	7	7	7
Stems per ACRE			567	567	1,133	486	486	931	445	445	1,214	445	445	2,671	445	445	2,145	442	442	1,276	473	473	719	738	738	738

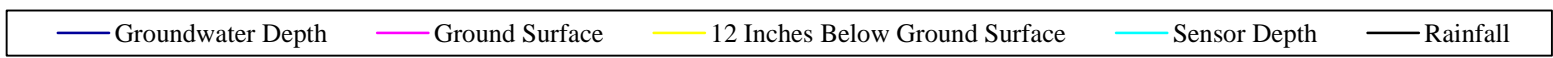
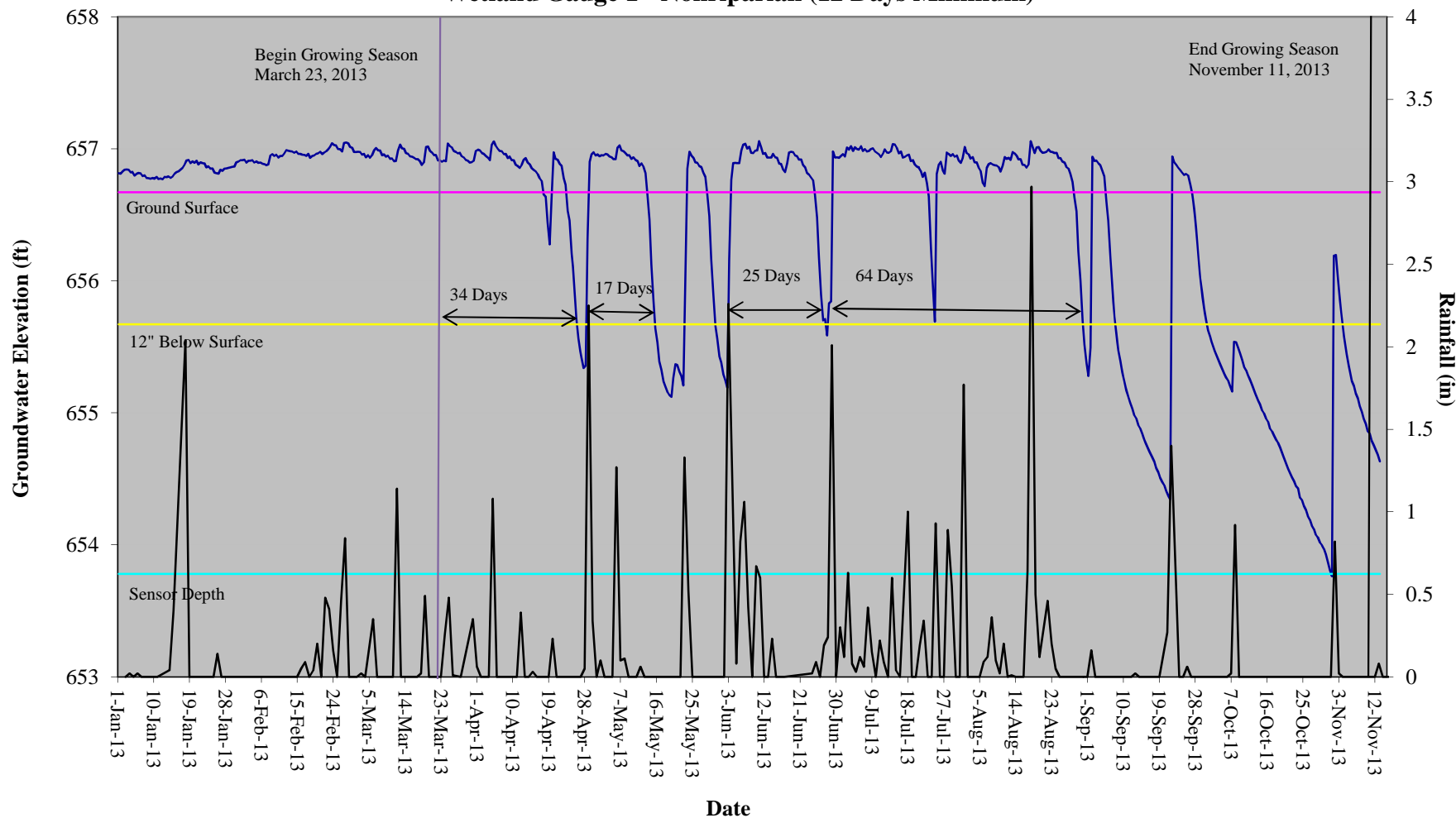
Appendix D

Hydrologic Data

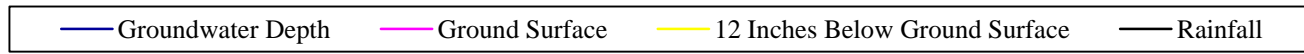
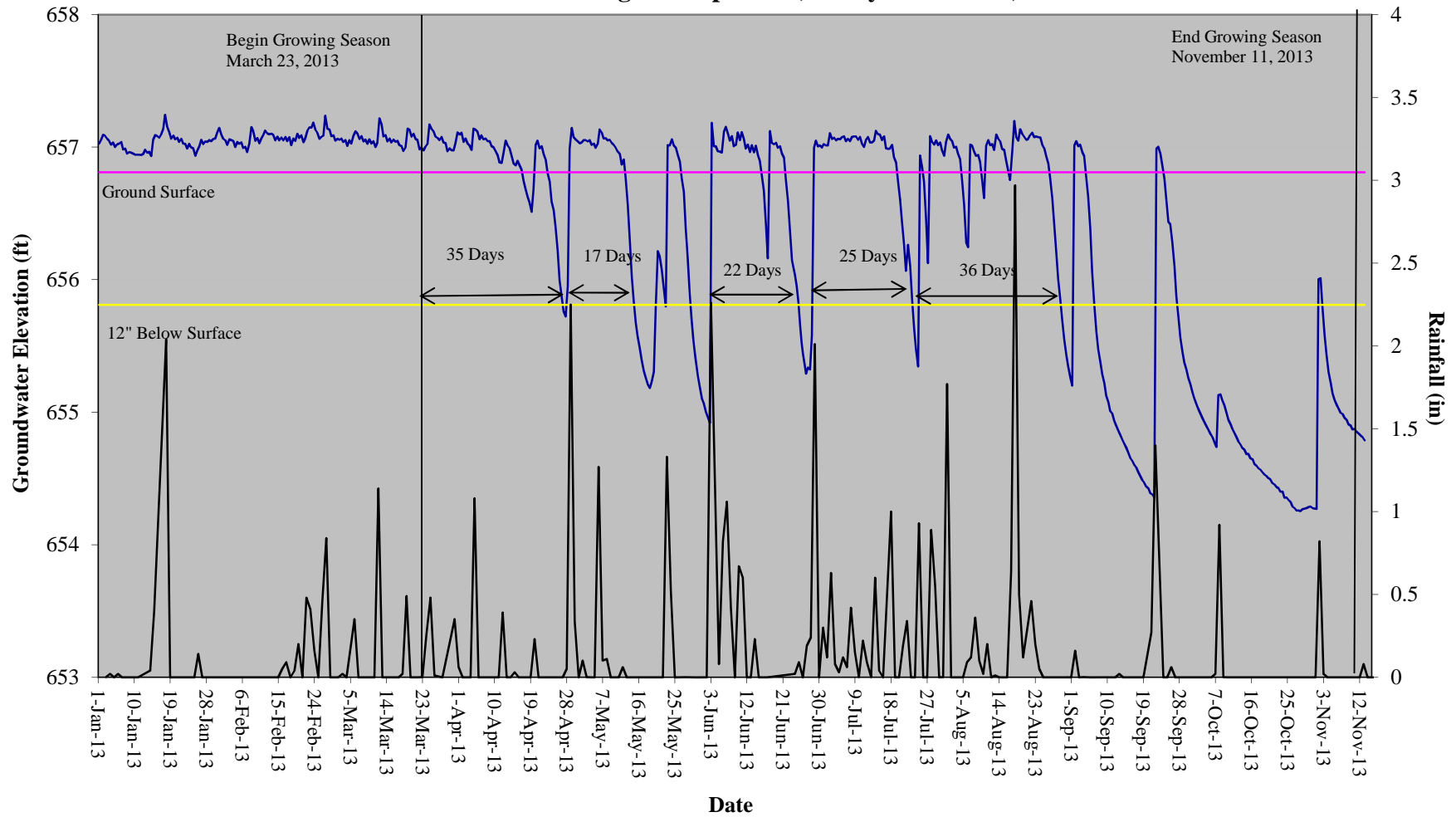
**Buffalo Flats Restoration Site
30-70 Percentile Graph
Kannapolis, NC
2013 Monthly Rainfall**



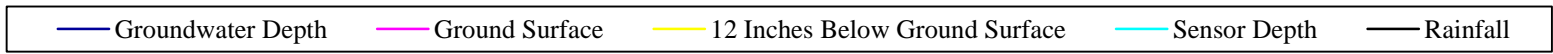
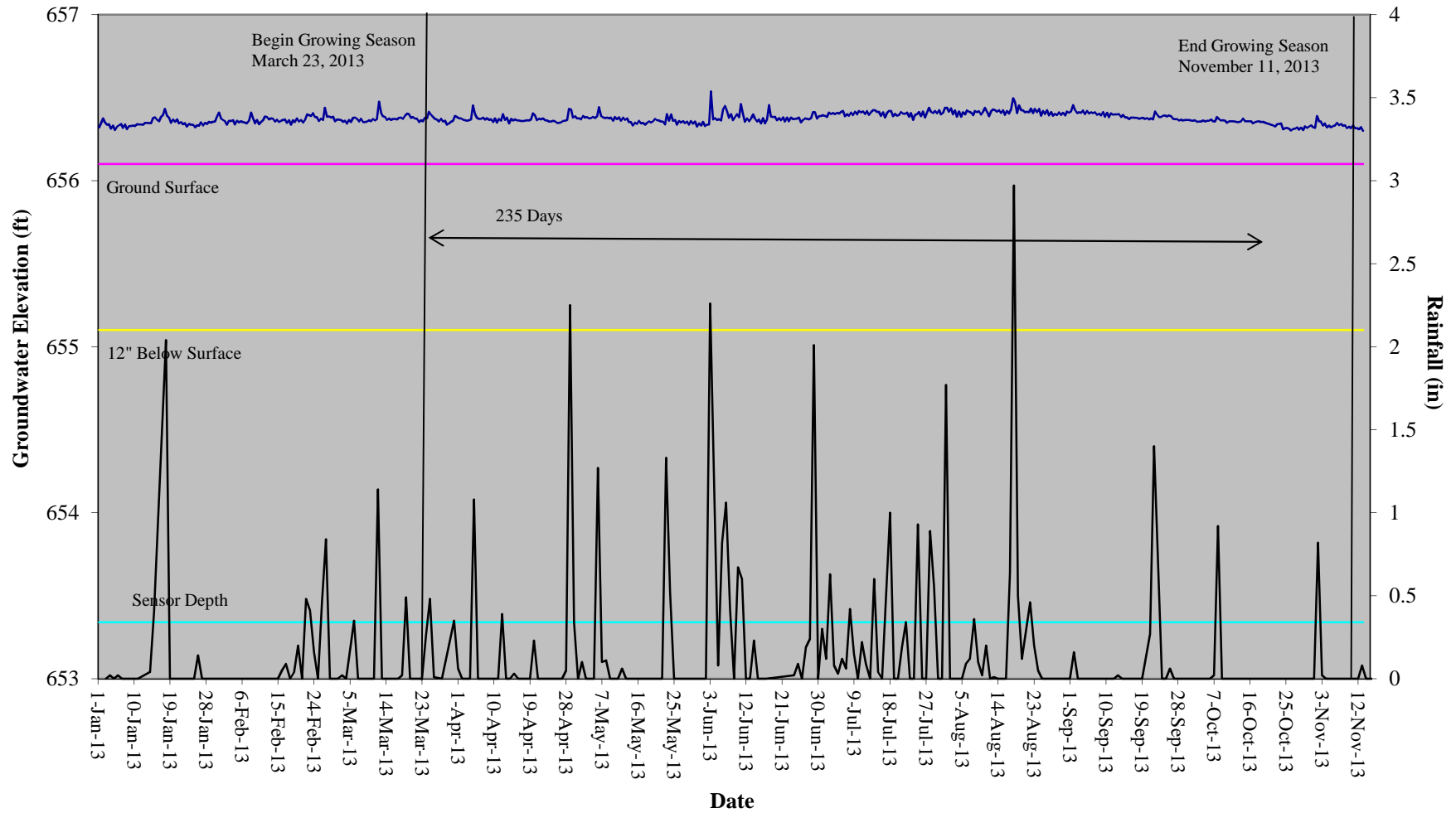
Buffalo Flats Restoration Site Hydrograph Wetland Gauge 1 - Nonriparian (12 Days Minimum)



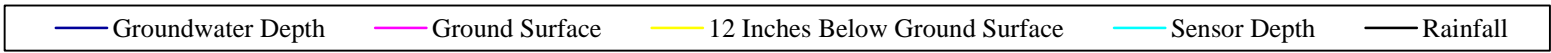
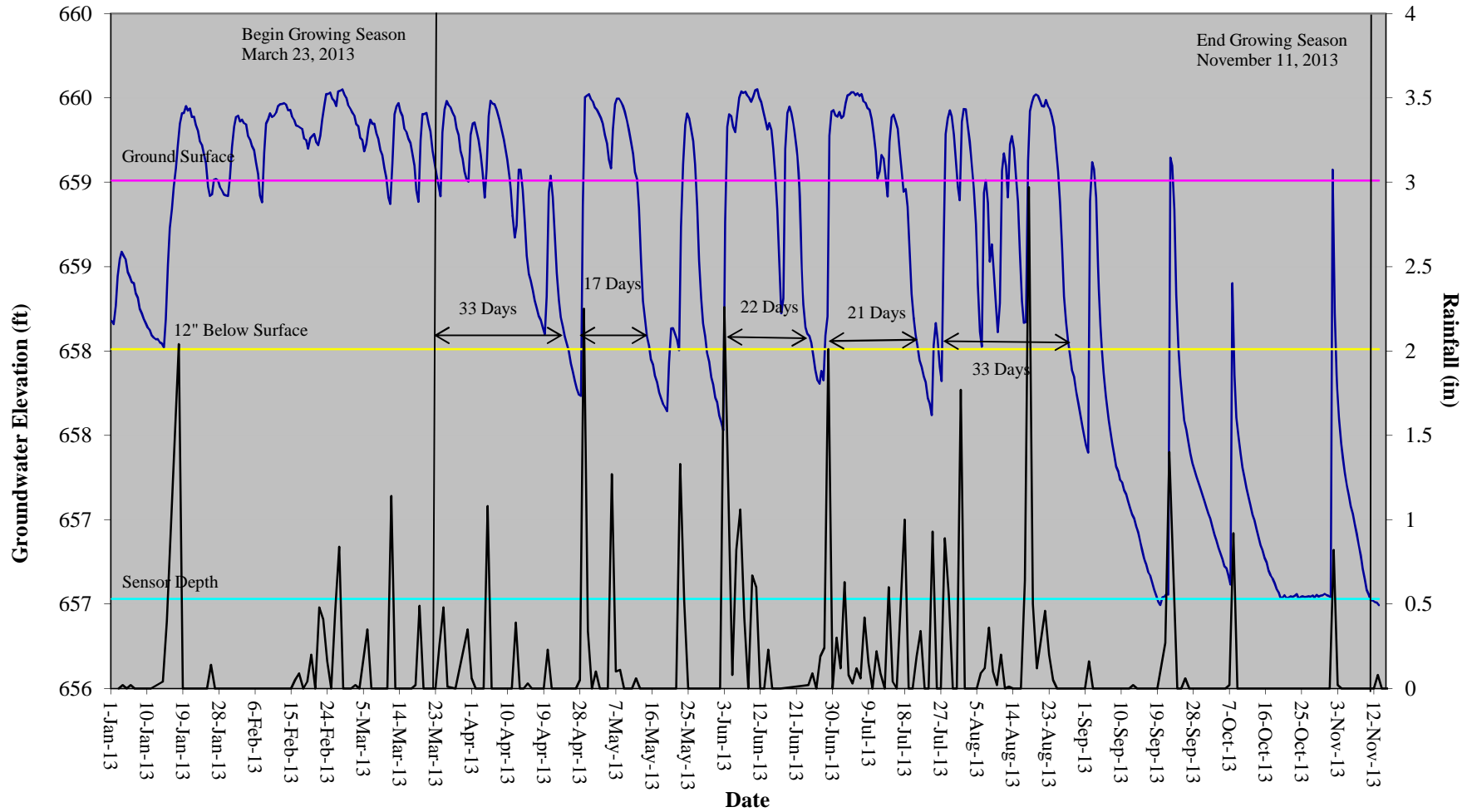
Buffalo Flats Restoration Site Hydrograph Wetland Gauge 2 - Riparian (23 Days Minimum)



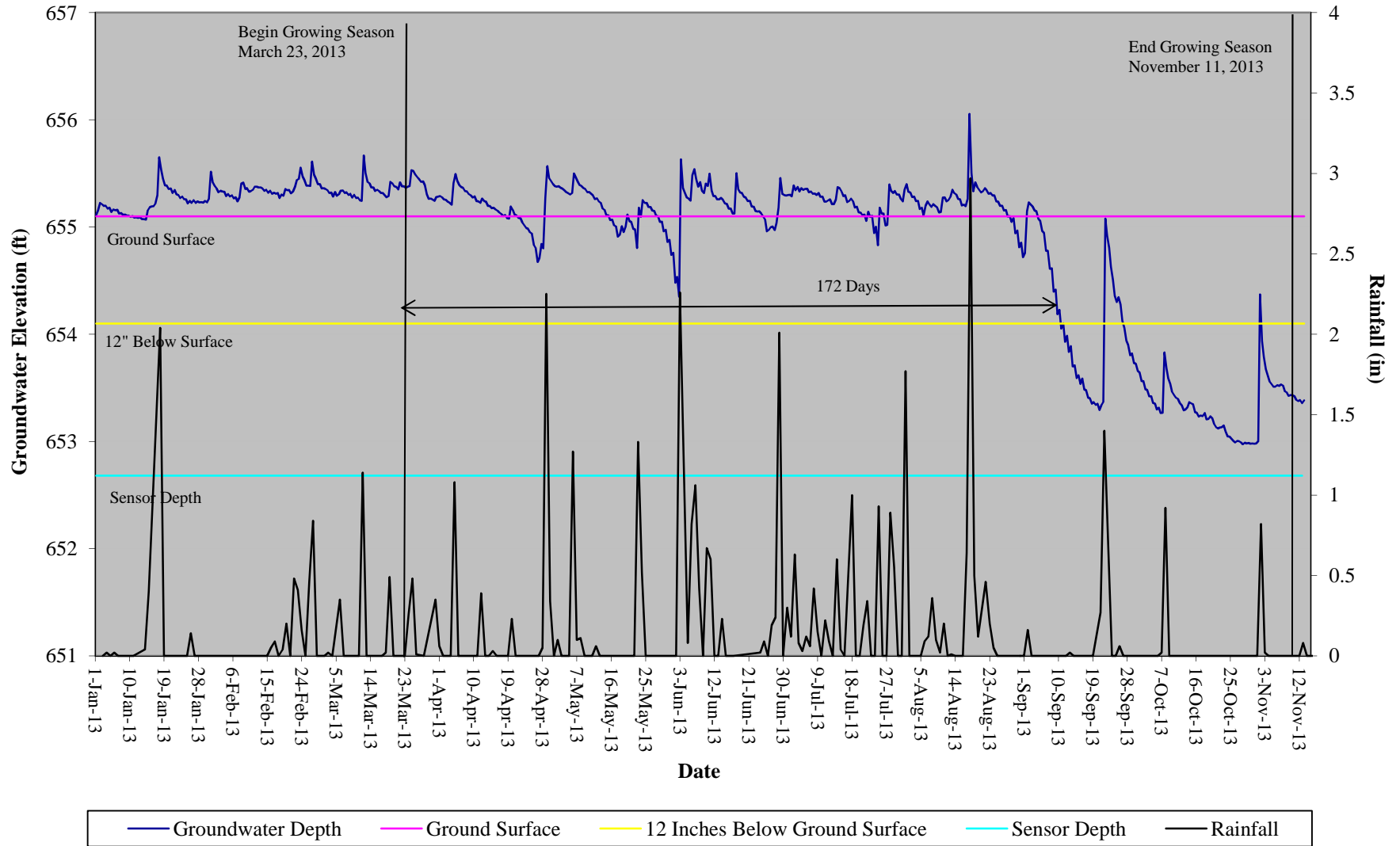
Buffalo Flats Restoration Site Hydrograph Wetland Gauge 3 - Riparian (23 Days Minimum)



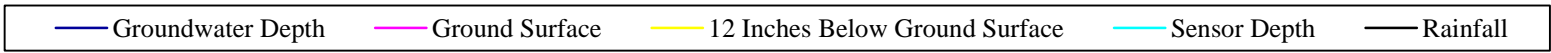
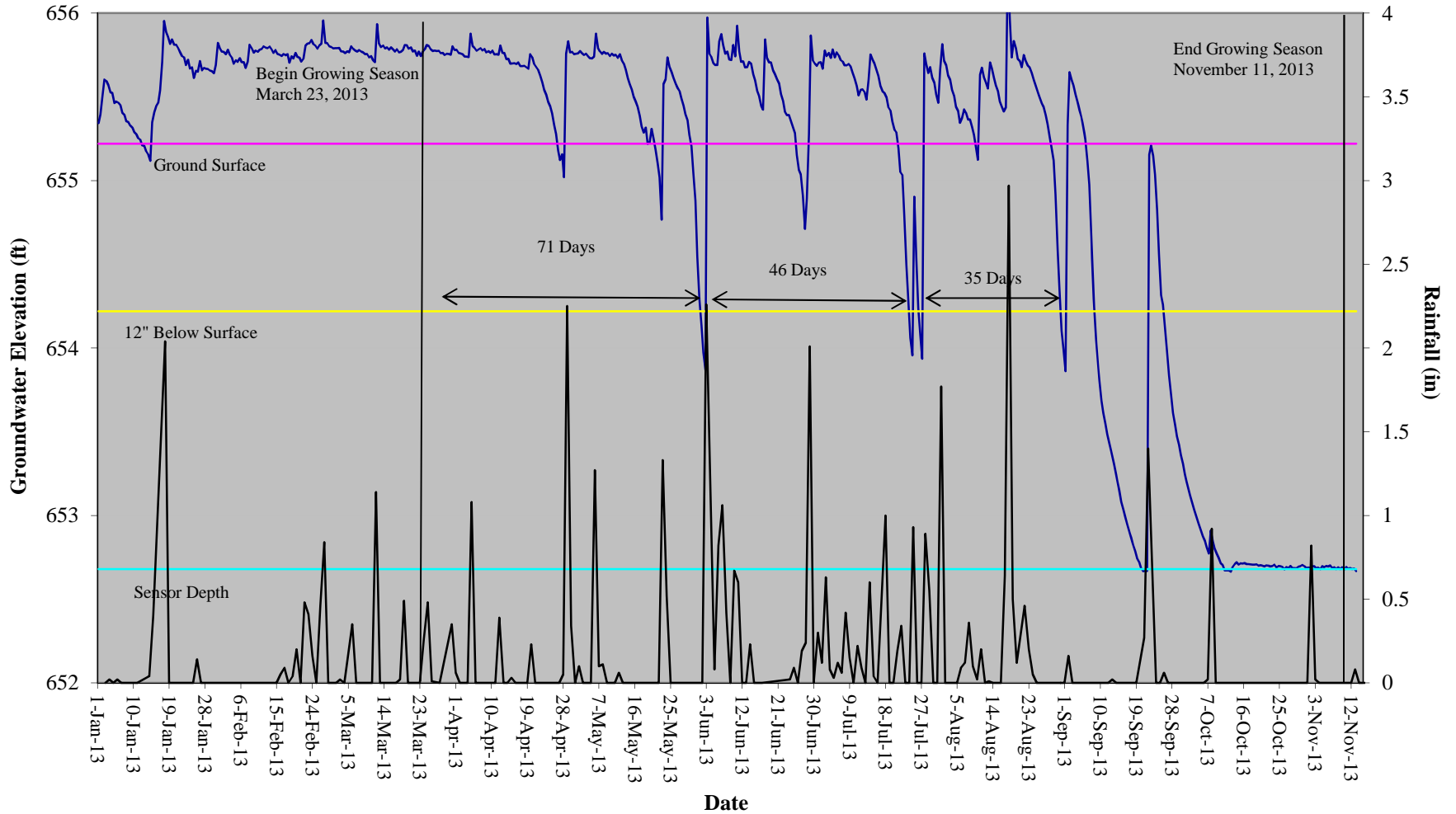
**Buffalo Flats Restoration Site
Hydrograph
Wetland Gauge 4 - Nonriparian (12 Days Minimum)**



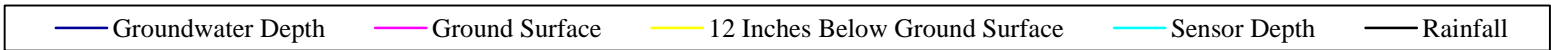
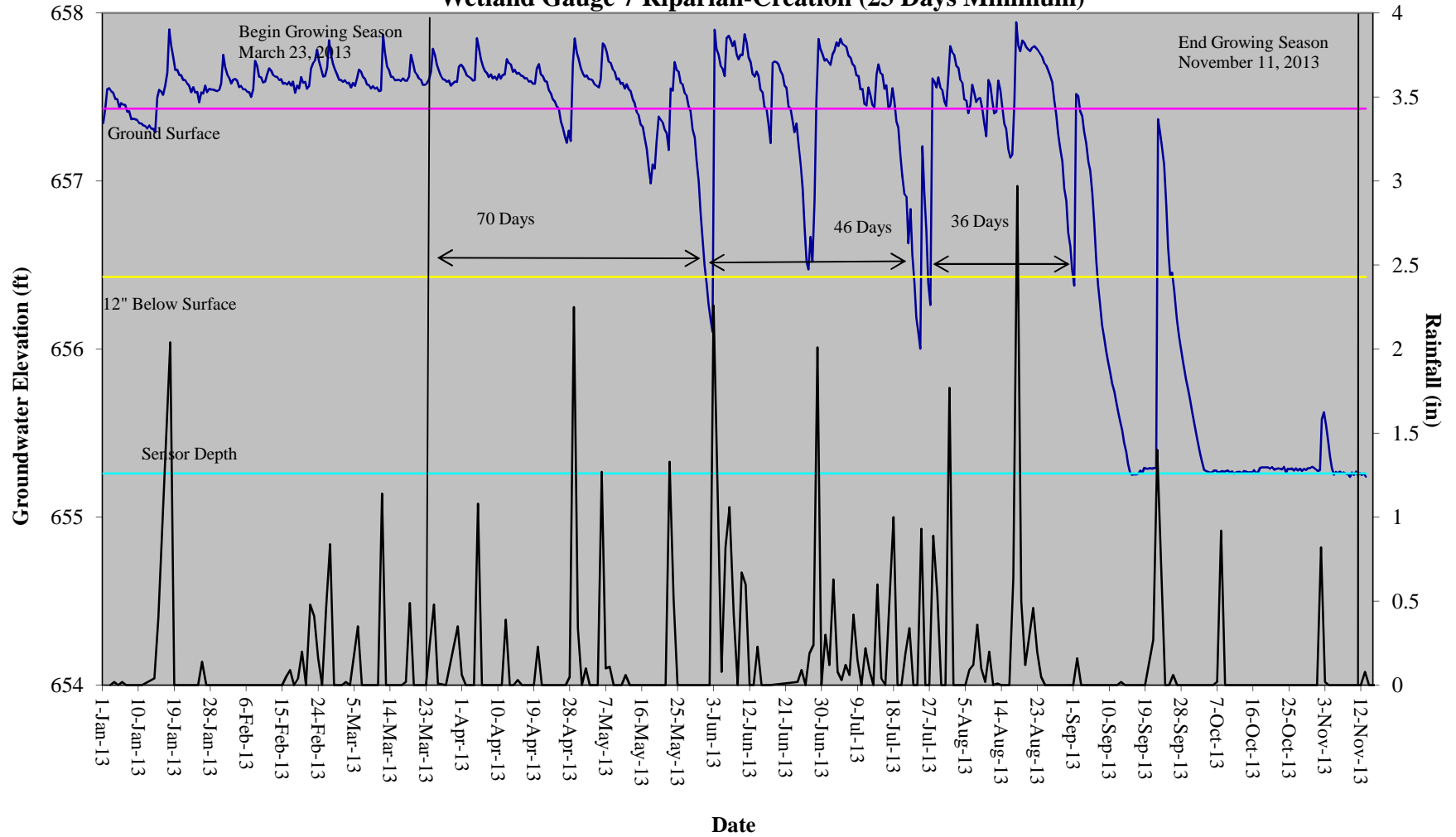
Buffalo Flats Restoration Site Hydrograph Wetland Gauge 5 - Riparian (23 Days Minimum)



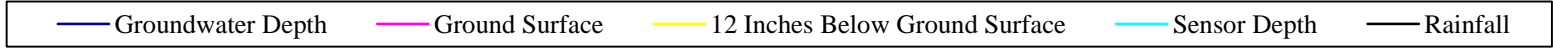
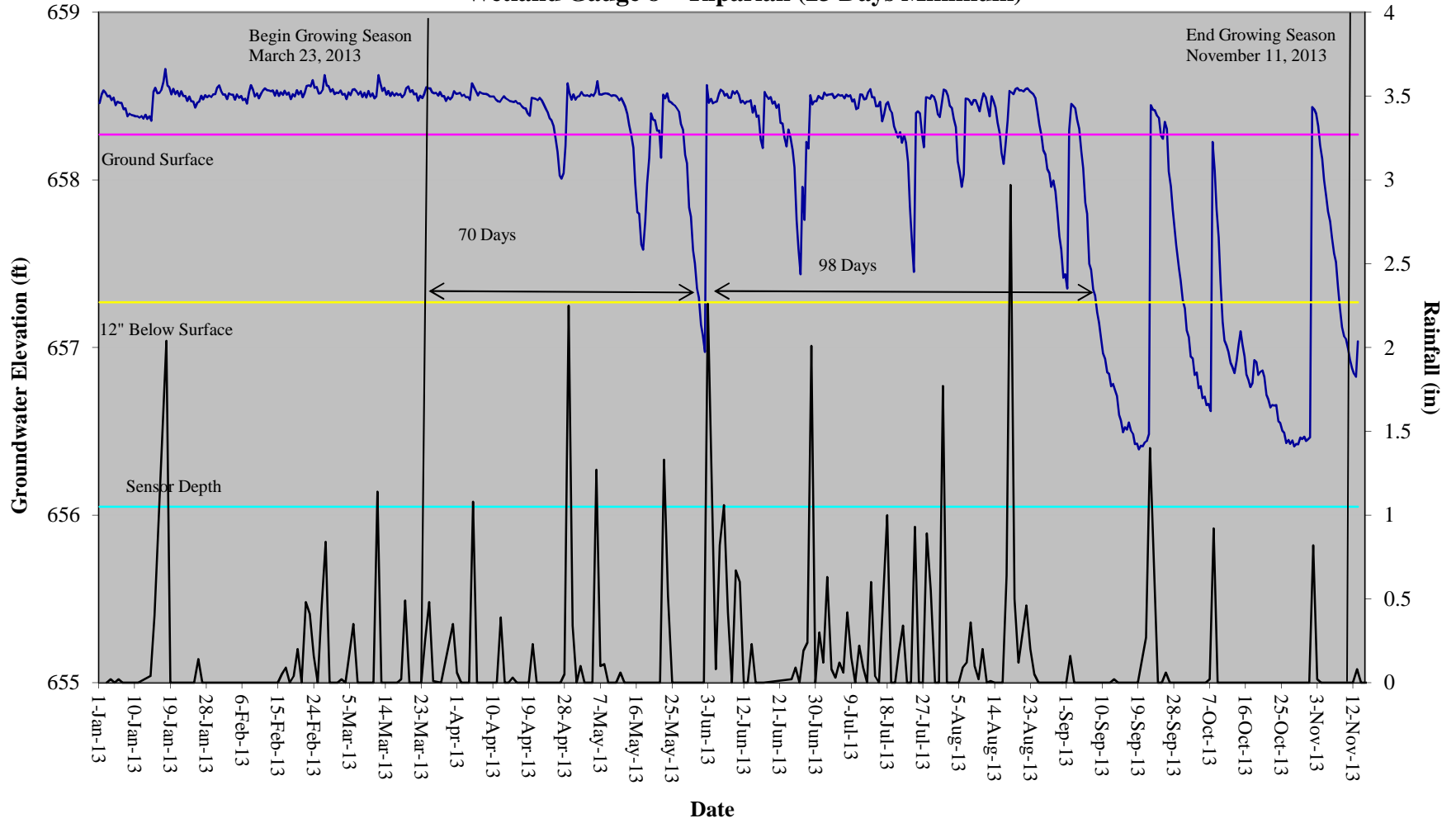
Buffalo Flats Restoration Site Hydrograph Wetland Gauge 6 - Riparian-Creation (23 Days Minimum)



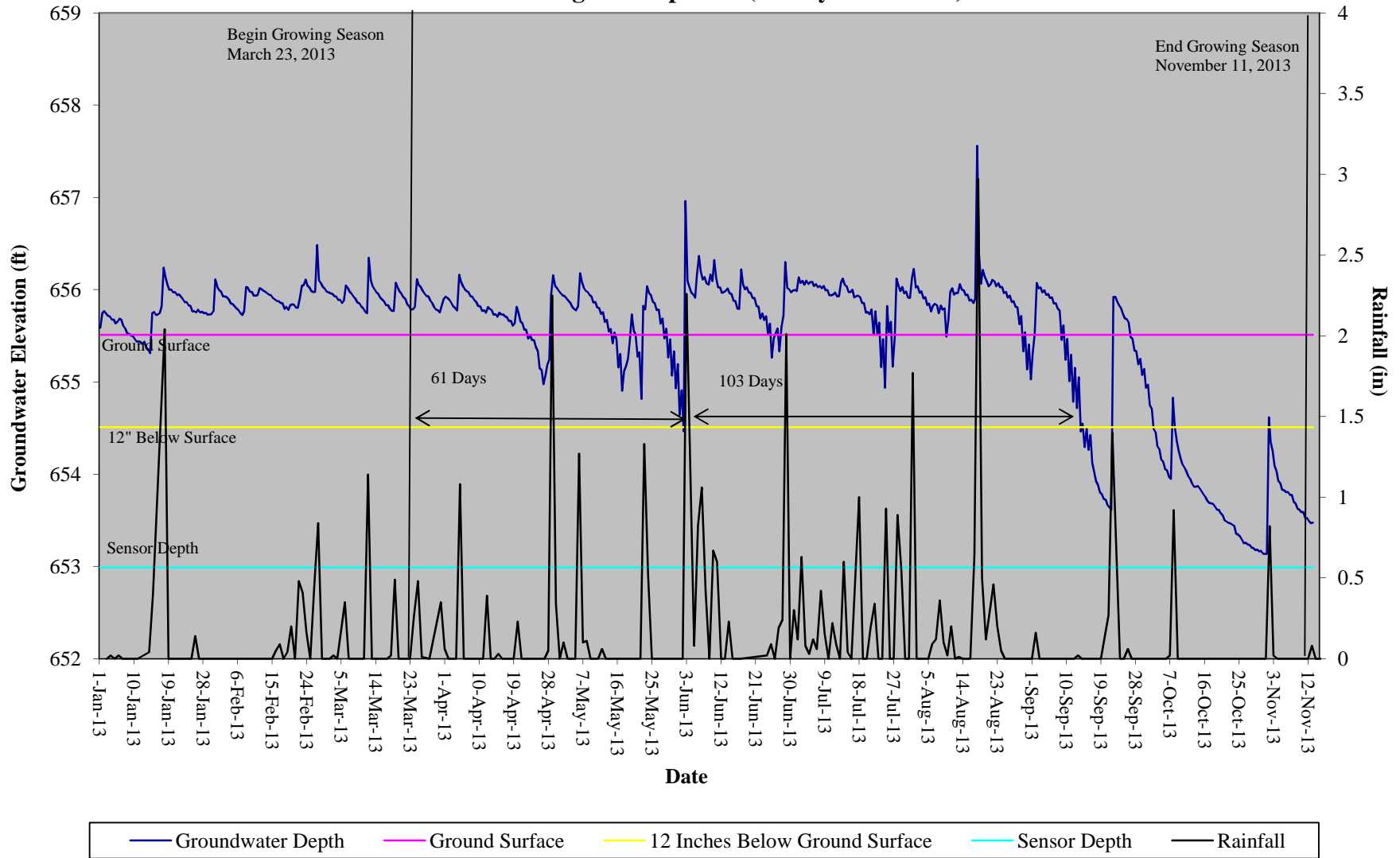
Buffalo Restoration Site Hydrograph Wetland Gauge 7 Riparian-Creation (23 Days Minimum)



Buffalo Flats Restoration Site Hydrograph Wetland Gauge 8 - Riparian (23 Days Minimum)



Buffalo Flats Restoration Site Hydrograph Wetland Gauge 9 - Riparian (23 Days Minimum)



Buffalo Flats Restoration Site Hydrograph Wetland Gauge 10 - Nonriparian (12 Days Minimum)

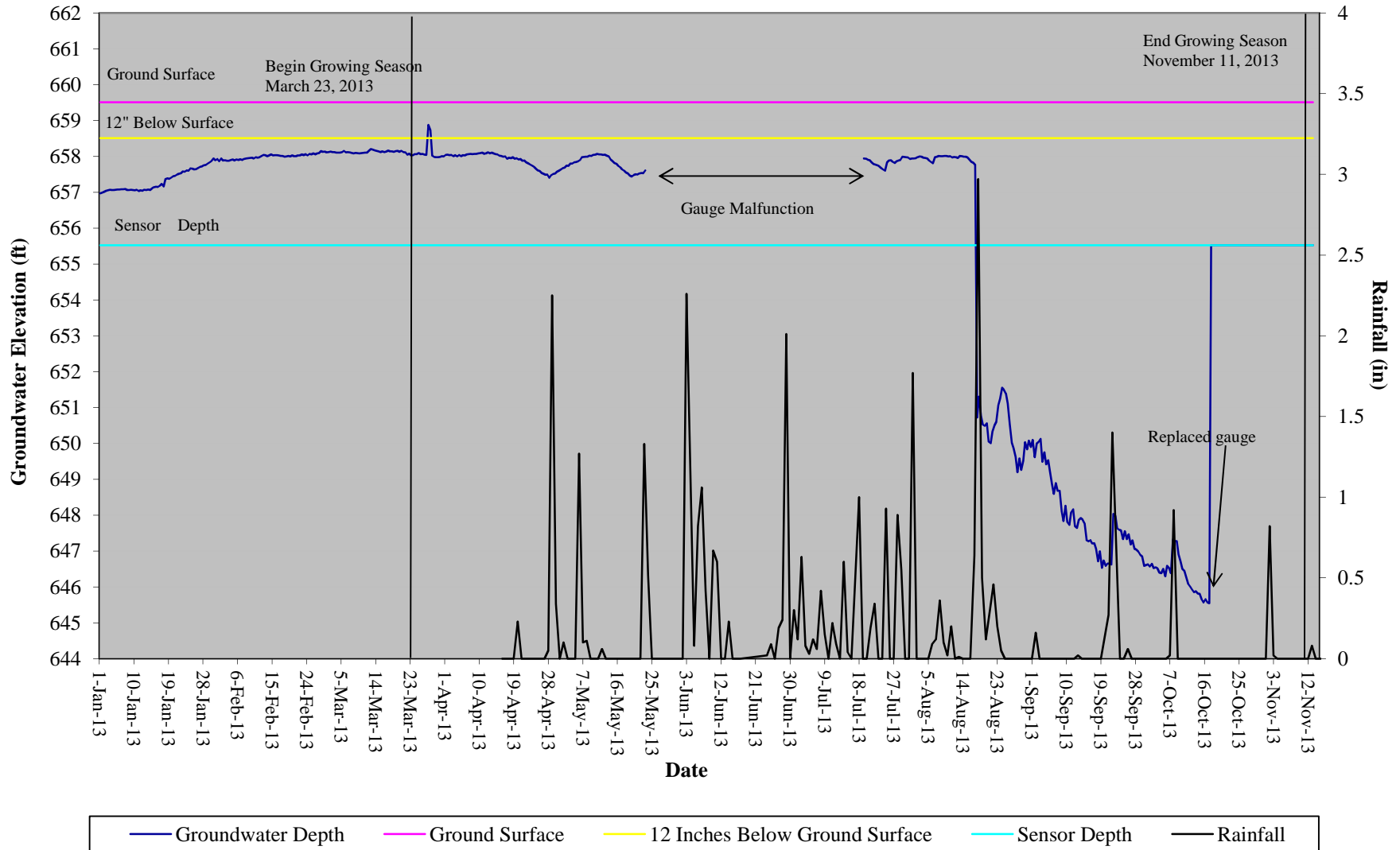


Table 9. Wetland Hydrology Criteria Attainment Table
Project Number and Name: 94647 - Buffalo Flats Restoration Site

	Success Criteria Achieved / Max Consecutive Days During Growing Season (Percentage)				
Wetland Area 1					
Non-Riparian Gauges Success Criteria (12 Days) (5%)	MY-01 2012	MY-02 2013	MY-03	MY-04	MY-05
Well 1	Yes/23 (9.7%)	Yes/64 (27.5%)			
Well 4	No/6 (2.4%)	Yes/33 (14.2%)			
Well 10 (Installed May 23, 2012)	No/0 (0%)	No/1 (0.4%)			
Wetland Area 2					
Riparian Gauges Success Criteria (23 Days) (10%)	MY-01 2012	MY-02 2013	MY-03	MY-04	MY-05
Well 2	No/20 (8.6%)	Yes/36 (15.2%)			
Well 3	Yes/134 (57.3%)	Yes/236 (100%)			
Well 5	Yes/28 (11.8%)	Yes/172 (73.6%)			
Well 8	No/19 (7.9%)	Yes/98 (42.0%)			
Well 9	Yes/23 (10.0%)	Yes/103 (44.2%)			
Wetland Area 3					
Riparian Gauges Success Criteria (23 Days) (10%)	MY-01 2012	MY-02 2013	MY-03	MY-04	MY-05
Well 6 (Creation Area)	Yes/25 (10.7%)	Yes/71 (30.5%)			
Well 7 (Creation Area)	No/18 (7.5%)	Yes/70 (30.0%)			

Appendix E

Soil Data

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Buffalo Flat City/County: Concord/Cabarrus Sampling Date: 9-17-13
 Applicant/Owner: RCE Associates of NC State: NC Sampling Point: MW#6
 Investigator(s): Stuart F. Stokes, Kevin O'Brian Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 0-1
 Subregion (LRR or MLRA): LRR P Lat: 35°27'26.2507" Long: -080°29'49.1797" Datum: NAD 83
 Soil Map Unit Name: Chewach Unimul NWI classification: PSS1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: <p style="font-style: italic; font-size: 1.2em;">Wetland Creation Site - 2nd year monitoring "Normal circumstances" present? YES, for a created wetland site.</p>	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> _____ Surface Water (A1) _____ True Aquatic Plants (B14) _____ High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) _____ Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) _____ Water Marks (B1) <input checked="" type="checkbox"/> Presence of Reduced Iron (C4) _____ Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Drift Deposits (B3) _____ Thin Muck Surface (C7) _____ Algal Mat or Crust (B4) _____ Other (Explain in Remarks) _____ Iron Deposits (B5) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input checked="" type="checkbox"/> Inundation Visible on Aerial Imagery (B7) _____ Shallow Aquitard (D3) _____ Water-Stained Leaves (B9) _____ Microtopographic Relief (D4) _____ Aquatic Fauna (B13) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)	Secondary Indicators (minimum of two required) _____ Surface Soil Cracks (B6) <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
--	--

Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No _____ Depth (inches): _____	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Surface water is not present although evidence of recent ponding is obvious as indicated by the absence of vegetation and depression topography.

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: MW#6

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

_____ = Total Cover
50% of total cover: _____ 20% of total cover: _____

Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____

_____ = Total Cover
50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Elymus virginicus (Virginia Wild Rye)</u>	<u>50</u>	<input checked="" type="checkbox"/>	<u>FAC</u>
2. <u>Betula nigra (River Birch)</u>	<u>10</u>	<input type="checkbox"/>	<u>FACW</u>
3. <u>Platanus occidentalis Amer. Sycamore</u>	<u>10</u>	<input type="checkbox"/>	<u>FACW</u>
4. <u>Fraxinus pennsylvanica (Green Ash)</u>	<u>10</u>	<input type="checkbox"/>	<u>FACW</u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____

_____ = Total Cover
50% of total cover: 40 20% of total cover: 16

Woody Vine Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____

_____ = Total Cover
50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____	(A) _____ (B) _____

Prevalence Index = B/A = _____

- Hydrophytic Vegetation Indicators:**
- 1 - Rapid Test for Hydrophytic Vegetation
 - 2 - Dominance Test is >50%
 - 3 - Prevalence Index is ≤3.0¹
 - 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 - Problematic Hydrophytic Vegetation¹ (Explain)
- ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: MAL46

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4	10YR 5/3	50	2.5YR 5/6	35			L	Redox concentrations surface 18%
			10YR 6/2	10				
			4/10Y	5				
4-9	10YR 5/3	60	2.5YR 4/6	20			L	Common Mn masses
			10YR 4/2	10				
			4/10Y	10				
9-11	10YR 4/3	60	10YR 5/2	33			SL	Mn masses
			5YR 6/2, 2.5Y 6/6	2				
11-17	10YR 4/3	60	10YR 4/2	10			L	Mn masses of 10YR 4/2, 5/6
			5YR 4/4 15%, 10YR 2/2.5%					

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10) (LRR N)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7)
- Polyvalue Below Surface (S8) (MLRA 147, 148)
- Thin Dark Surface (S9) (MLRA 147, 148)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- Umbric Surface (F13) (MLRA 136, 122)
- Piedmont Floodplain Soils (F19) (MLRA 148)
- Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Coast Prairie Redox (A16) (MLRA 147, 148)
- Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

Thick Redox Depressions (F8) & (F12).

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Buffalo Flats City/County: Concord, Cabarrus Sampling Date: 9-17-13
 Applicant/Owner: KEI Associates of NC State: NC Sampling Point: MW#7
 Investigator(s): Steven F. Stokes Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 0-1
 Subregion (LRR or MLRA): LRR P Lat: 35°27'27.0212" Long: -080°29'47.7051" Datum: NAD 83
 Soil Map Unit Name: Chewacla Variant NWI classification: PSSIA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: <p style="font-family: cursive; font-size: 1.2em;">Wetland Location Site - 2nd year monitoring. "Normal circumstances" present? yes, for a created wetland site</p>	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) <input checked="" type="checkbox"/> Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ ___ Inundation Visible on Aerial Imagery (B7) ___ ___ Water-Stained Leaves (B9) ___ ___ Aquatic Fauna (B13) ___	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-9</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks: <p style="font-family: cursive; font-size: 1.2em;">Surface water is not present although evidence of recent ponding is obvious as indicated by the absence of vegetation and depressioned topography.</p>	

VEGETATION (Four Strata) – Use scientific names of plants.

Sampling Point: NW09

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____

Dominance Test worksheet:
 Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
 Total Number of Dominant Species Across All Strata: 1 (B)
 Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

_____ = Total Cover
 50% of total cover: _____ 20% of total cover: _____

Prevalence Index worksheet:
 Total % Cover of: _____ Multiply by:
 OBL species _____ x 1 = _____
 FACW species _____ x 2 = _____
 FAC species _____ x 3 = _____
 FACU species _____ x 4 = _____
 UPL species _____ x 5 = _____
 Column Totals: _____ (A) _____ (B)
 Prevalence Index = B/A = _____

Sapling/Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____

Hydrophytic Vegetation Indicators:
 ___ 1 - Rapid Test for Hydrophytic Vegetation
 2 - Dominance Test is >50%
 ___ 3 - Prevalence Index is ≤3.0¹
 ___ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 ___ Problematic Hydrophytic Vegetation¹ (Explain)
¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

_____ = Total Cover
 50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Elmulus virginicus (Virginia wildoys)</u>	<u>70</u>	<input checked="" type="checkbox"/>	<u>FAC</u>
2. <u>Quercus labata (Cherry-bark Oak)</u>	<u>10</u>		<u>FAC+</u>
3. <u>Acer rubrum (Red Maple)</u>	<u>10</u>		<u>FAC</u>
4. <u>Eupatorium capillifolium (Dogfennel)</u>	<u>5</u>		<u>FACU</u>
5. <u>Lactuca sp. (Lettuce)</u>			<u>-</u>
6. <u>Alopecurus sp. (Foxtail)</u>			<u>OBL-FAC+</u>
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____

Definitions of Four Vegetation Strata:
Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vine – All woody vines greater than 3.28 ft in height.

_____ = Total Cover
 50% of total cover: 47.5 20% of total cover: 19

Woody Vine Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____

Hydrophytic Vegetation Present? Yes No _____

Remarks: (Include photo numbers here or on a separate sheet.)
Mixture of Hummocks & Tussocks
No vegetation in depressions. All vegetation is on Hummocks

SOIL

Sampling Point: M 007

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-5			4/10 ¹	40	C, D	M	l.	
			2.5 YR 4/6	20	C	PSM		Redox Ped Surface
			10 YR 5/3	40	C	M		
5-9	10 YR 4/3	50	10 YR 4/2	40	C	M	l.	Some Mn masses
			7.5 YR 3/4	10	C	M, PS		Common 5mm concretions
9-12	10 YR 5/3	80	7.5 YR 3/4	10	C	M, PS	sl	Common 5-15mm concretions
			10 YR 4/2	10	C	M		
12-15	10 YR 5/3		7.5 YR 3/4	20	C	M, PS	sl	Common 15mm concretions
			5 YR 3/2	20	C	PS, M		
15-17	10 YR 5/3	60	10 YR 4/2	20	C	M	sl	*includes 10 YR 5/3 matrix 20%

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)
<input type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Redox Depressions (F8)
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input checked="" type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:
Needs Redox Depressions (F8) & Iron-Manganese masses (F12)