CLOSEOUT REPORT

Monitoring Year 09 (MY-09) 5th Year Post-Repair
Final Report
Sandy Creek Wetland Restoration and Stream Enhancement Site
EEP Project #322
Contract # 5713

Site Constructed 2003/Repaired 2008-2009/Replanted 2011

USACE 404 Certification Issued September 18, 2002
(Action ID #SAW-20021391)

Durham County
MY-09 Collection Period: March 2014 – November 2014
Submission Date: January 29, 2015

Prepared for: NCDENR-Ecosystem Enhancement Program
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Raleigh, NC 27604

Ecosystem Enhancement PROGRAM

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1.0 PROJECT SETTING AND BACKGROUND SUMMARY

The Sandy Creek Stream Enhancement and Wetland Restoration Site (Site) is located in the City of Durham approximately 3.5 miles (mi) southwest of downtown Durham County, North Carolina (Appendix A, Figure 1). The project lies in the Cape Fear River Basin within North Carolina Division of Water Quality sub-basin 03-06-05 (Table 1, 4, & 6). The Site was selected to mitigate impacts to Section 404 jurisdictional areas associated with the extension of Martin Luther King, Jr. Parkway (Parkway) between Cook Road and Hope Valley Road. The impacts of the Parkway on jurisdictional wetlands and non-wetland jurisdictional waters totaled 1.73 acres near Third Fork Creek. The Site was proposed by the Ecosystem Enhancement Program (EEP) to provide 3.6 acres of wetland restoration and creation as mitigation for the impacts. The remaining 1.87 acres was proposed as mitigation for other impacts within the Cape Fear River Basin. In addition to the wetland restoration, Sandy Creek has been enhanced with the installation of log vanes. The log vanes are intended to create pool features that enhance habitat and water quality along 2,461 linear feet of stream. Stream stationing begins at the downstream end of the project and increases upstream (Appendix B).

Land use in the vicinity of the Site consists of a mix of residential, commercial, and forested areas. The streams within the project area are bordered by a forested buffer of varying widths with a greenway trail running along the east side of the stream. The project is protected by a 22.6 acre (ac) permanent conservation easement held by the North Carolina Ecosystem Enhancement Program. Sandy Creek flows from north to south and has a total drainage area of 7.3 square mi. at the culvert at US 15-501.

Site construction and planting was completed in June 2003 (Table 2). The Site was partially replanted in January 2004 in areas of low stem densities. Wetlands restoration consisted of grading activities and planting wetland vegetation. Stream enhancement consisted of the installation of log vanes to create pool features to enhance habitat and water quality along 2,461 linear feet of stream. The wetland restoration area was re-graded between December 2009 and February 2010 to correct final grade elevations to establish proper wetland hydrology. Topsoil was added to improve soil fertility for plant growth and the graded areas were replanted with native plant species. This close-out report represents the 5th year of wetland monitoring after site maintenance and re-grading. Stream monitoring has been conducted annually since original restoration activities completed in 2003. The Site must demonstrate both hydrologic and vegetation success for a minimum of five years or until the Site is deemed successful (Table 3).

Currently the vegetation is meeting the success criterion with 1093 total woody stems/acre. The success criterion for vegetation is 260 total woody stems/acre at the end of the monitoring period with a diversity of at least six species of trees. Based on the vegetation plot data, the Site has at least 25 different species of trees (Appendix C,Table 7). Based on the CVS vegetation data there are 313 planted woody stems /acre and 1093 total woody stems/acre. As a result of the wetland re-grading in December 2009, the vegetation in monitoring plots 2, 3, and 4 were removed, leaving only vegetation monitoring plot 1 intact. The site was replanted and plots 2, 3, and 4, were re-established in February 2010. Warranty planting was conducted in February 2011 to replace trees that did not survive initial replanting after the wetland was re-graded. Level II of

the CVS-EEP protocol was administered for plots 1, 2, 3, and 4, which accounts for natural and planted woody stems. Vegetation problem areas consist of invasive exotic species presence. Chinese lespedeza (*Lespedeza cuneata*), continues to thrive in patches along the adjacent forest margin and within the wetland in the vicinity of plots 3 and 4 (Appendix A, Figure 4). These areas along the woodland margin have remained undisturbed throughout the monitoring period. Alligator weed (*Alternanthera philoxeroides*) and bigleaf periwinkle (Vinca major) were also observed within the vicinity of plot 1 along the wetland margin. Other invasive exotics observed sparsely scattered within the conservation easement beyond the wetland restoration area include Chinese privet (*Ligustrum sinense*), Gill over the ground (*Glechoma hederacea*), Japanese honeysuckle (*Lonicera japonica*), Japanese stiltgrass (*Microstegium vimineum*), and multiflora rose (*Rosa multiflora*). Chinese Privet, Japanese honeysuckle, and multiflora rose are a species of "High Concern" and bigleaf periwinkle and Japanese stiltgrass are species of "Low/Moderate Concern" according to EEP invasive species of concern list. Although these species have been given different ranks of severity, the functionality of the project is not expected to be impaired significantly by these species.

Groundwater gauges were installed in the spring of 2010, post re-grading activities, at three locations – the reference wetland gauge, gauge A, and gauge C. The reference gauge was installed in its original location and Gauge B remained undisturbed in its original location. On May 23, 2013 four addition gauges (D, E, F, &G) were installed. Gauges D, E, F were installed within the wetland restoration area to capture a more accurate depiction of the groundwater levels. Gauge G was installed within the adjacent alluvial forest along Sandy Creek as supplemental reference gauge. All groundwater gauges exhibited saturation within 12 inches of the ground surface for more than 12.5% of the growing season (Appendix E,Table 8). The average annual growing season for Durham County is 222 days (March 24 to November 1).

Wetland delineations were conducted in October 2014 to determine the Site assets. A total of 2.23 acres of wetland restoration and 6.73 of wetland preservation were identified (Table 5). According to the mitigation plan, the site includes wetland mitigation components of wetland restoration and preservation. Often when investigating graded mitigation sites, it is typically unfeasible to identify hydric soils based upon the NRCS Field Indicators of Hydric Soils in the United States. According to The Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Regions (Version 2.0), recently developed mitigation sites where hydrophytic vegetation and wetland hydrology are present, but lack hydric soil indicators are referred to as "problematic" hydric soils. It also lists the following procedure for classifying problematic hydric soils as hydric by:

> e. Using gauge data, water-table monitoring data, or repeated direct hydrologic observations, determine whether the soil is ponded or flooded, or the water table is 12 in. (30 cm) or less from the surface, for 14 or more consectutive days during the growing season in most years (at least 5 years in 10, or 50 percent or higher probability) (U.S. Army Corps of Engineers 2005). If so, then the soil is hydric. Furthermore, any soil that meets the NTCHS hydric soil technical standard (NRCS Hydric Soils Technical note 11) is hydric (p. 134)

By understanding a site's soil characteristics and utilizing the above criteria, alternative soil parameters can be identified, that are supported with groundwater monitoring data, to serve as site specific hydric soil indicators. As such, soil borings were performed adjacent to groundwater monitoring gauges A, B, and C to establish the below site specific hydric soil indicators used in delineating the restored wetland area.

- Presence of at least 10% redox concentrations and depletions with a chroma 3 or less within 2 inches of the soil surface AND at least 2% oxidized rhizospheres within 12 inches of the soil surface
- Dominance of hydrophytic vegetation

The following secondary indicators were also used, but were not as reliable or consistent as the primary.

- Fine, faint soil depletions within the top 1-2 inches of the soil surface.
- At least 5% hemic materials on the soil surface.

A profile description of the soil at gauge C depicts typical soil characteristics observed within the restored wetland area (Appendix F). It is important to note that as with all indicators, their development hinges on a multitude of soil factors, ranging from soil texture to soil fertility to site development methodologies. As such, these indicators were not always easily identifiable. In these instances, the primary methodology was to perform a relative comparison of the soils within the site in order to determine whether a specific boring should be considered hydric.

The log vanes are stable and are providing bank protection as intended, and are generating pools for aquatic habitat (Appendix B). The cross section shows little change in stream dimension as compared to previous monitoring years (Appendix D). Areas of streambank erosion were observed within the stream enhancement throughout the reach but did not appear to exceed natural levels. The upstream face of the US 15-501 culverts have been conducive to creating log jams throughout the monitoring period.

2.0 PROJECT GOALS AND OBJECTIVES

The goals and objectives of the restoration project are as follows:

Goals:

- Improving water quality
- Improving wetland hydrology
- Improving in-stream habitat
- Restore function

Objectives:

- Level II stream enhancement of 2,461 linear feet of Sandy Creek
- Restoration of 3.13 acres of wetlands
- Establish 22.6 acres conservation easement

3.0 SUCCESS CRITERIA

3.1 Wetland Hydrology

Wetland hydrology success for the wetland restoration is met if the soils exhibit saturated within 12-inches of the surface for 12.5% of the growing season during years with normal precipitation. Eight groundwater gauges have been established within the conservation easement during the monitoring period.

3.2 Wetland Vegetation

The vegetation success criteria are based on the progressive growth over the monitoring period. Vegetative success is determined by the survival of target species within the sample plots. The minimum survival rate is 260 stems/acre at end of the five year monitoring period. Included in the required survival criteria are planted seedlings and natural recruitment of the same species. At least six different representative species should be present on the entire site. Five 10x10m vegetation plots, (VP1-5) are established within the wetland restoration site.

3.3 Stream Enhancement

Profile

The profile should continue to show the development of bed form pool features on the downstream side of the constructed log vane structures.

Structures

The structures should not show any breaching. The water should flow over the log vane or the rocks placed at the end of the vane. The structures should not show any erosion along the arms or evidence of water bypassing the structure. The stream banks should show evidence of vegetation stabilization. The banks disturbed by the installation of the log vane should not show any signs of erosion.

Stream Cross Section & Log Vane Photo Reference Points

Photographs should show no change in physical location of channel. Log vanes shall show no evidence of breaching. The photograph for the permanent cross section was taken upstream of the section looking downstream.

4.0 EEP RECOMMENDATIONS AND CONCLUSIONS

The vegetation has met the success criterion of maintaining more than 260 total woody stems per acre as well as the species diversity requirement of at least six species of woody stems. There remain problem areas with invasive exotic species, which compete with native plant species. The stream assessment found the stream to be generally stable, with no significant changes over the course of the monitoring period. The monitored cross-section and in stream structures on Sandy Creek are stable. The stream has met the success criterion of stability being exhibited at the stream cross section and within the vicinity of the log vanes. MY-09 found the majority of the project to be functioning as designed. The wetlands have met

the success criterion of having saturation within 12 inches of the ground surface for more than12.5% of the growing season. EEP recommends the successful closeout of the assets listed with this report as a part of the Sandy Creek Project.

5.0 CONTINGENCIES

It is recommended that this site be closed out without contingencies.

Appendix A

Project Background Data and Maps

Table 1. Project Setting and Classifications

Sandy Creek Wetland Restoration and Stream Enhancement Site	
County	Durham
General Location	Sandy Creek Park
Basin	Cape Fear
Physiographic Region	Central Piedmont
USGS Hydro Unit	03030002060110
NCDWQ Sub-basin	03-06-05 (Sandy Creek)
Wetland Classification	Non-tidal freshwater marsh
Trout Water	No
Thermal Regime	Warm
Project Performers:	
Source Agency	EEP (WRP initially)
Provider	City of Durham
Designer	Ward Consulting Engineers
Monitoring Firm(s)	EcoScience Corp. MY-01-04; The Catena Group MY-05-09
Supplemental Planting	2010&2011: Bruton Natural Systems, Inc.
Property Interest Holder	EEP
Invasive Treatment	N/A

Table 2. Project Activities and Timeline

Milestone	**Month/Year**
Project Instituted	2002
Permitted	September 2002
Restoration Plan	August 2002
Final Design (90%)	December 2002
Construction	June 2003
Permanent Seed Mix Applied	June 2003
Live Stake Planting	N/A
Bare Root Planting	June 2003
As-Built Survey	August 22, 2003
Supplemental Planting	January 2004
Year 1 Monitoring	December 2004
Year 2 Monitoring	December 2005
Year 3 Monitoring	December 2006
Year 4 Monitoring	December 2007
Supplemental Planting	December 2009
Year 5 Monitoring	November 2010
Year 6 Monitoring	December 2011
Year 7 Monitoring	November 2012
Year 8 Monitoring	November 2013
Year 9 Monitoring	November 2014
Supplemental Planting	2004, 2009, 2011

Table 3. Success Criteria

Sandy Creek Stream Restoration Site	
Feature	**Success Criteria**
Stream	Success is measured with minimal changes to the permanent cross-section, demonstrating system stability. Monitoring is conducted annually for a period of five years or more.
Vegetation	Average of 260 stems/acre, as indicated by permanent vegetation plots after 5 years of monitoring. At least six species of trees must be present.
Wetland	Exhibit saturation within 12 inches of the ground surface for more than 12.5% of the growing season, which is 222 days in Durham County (March 23 to November 1).

Table 4. Project Baseline Information and Attributes

Sandy Creek Stream Enhancement and Wetland Restoration Site / EEP Project No. 322	
Project County	Durham
Drainage Area	7.3 square miles to culvert at Bypass 15-501
Impervious cover estimate (%)	10 percent
Stream Order	3rd order
Physiographic Region	Piedmont
Ecoregion (Griffith and Omernik)	Triassic Basin
Rosgen Classification of As-built	NA (Enhancement only)
Cowardin Classification	Stream (R3UB2)
	Wetlands (PFO1)
Dominant soil types	Stream - Chewacla and Wehadkee soils (Ch)
	Wetlands - Urban Land (Ur)
SCO #ID	10542301
USGS HUC for Project and Reference	03030002060110 / N/A
NCDWQ Sub-basin for Project and Reference	03-06-05 / N/A
NCDWQ classification for Project and Reference	C, NSW / N/A
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	N/A
Percent of project easement fenced	None

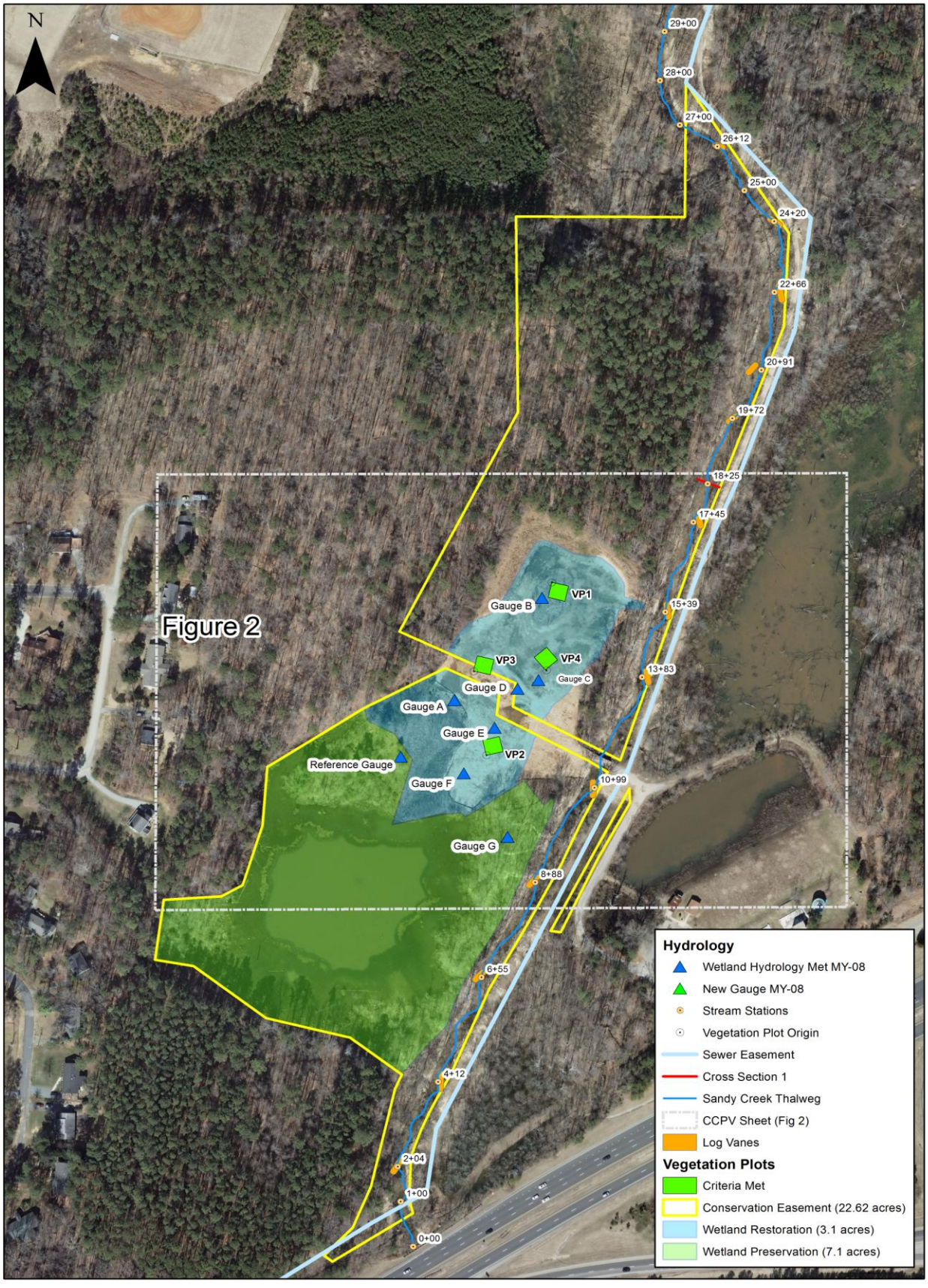
Table 5. Project Assets

Stream Reach	Existing Linear Footage/Acreage	Type	Watershed Area (mi^2)	Mitigation Linear Footage/Acreage	Credit Ratio	Stream and Wetland Mitigation Units
Streams						
Sandy Creek	2,461 lf	EII	7.3	2,461 lf	2.5:1	984.4
Wetlands						
Wetland A	2.23ac	R	-	2.23ac	1:1	2.23
Wetland B	0.55ac	P	-	0.55ac	5:1	0.11
Wetland C	0.29ac	P	-	0.29ac	5:1	0.06
Wetland D	5.83ac	P	-	5.83ac	5:1	1.17
Wetland E	0.06ac	P	-	0.06ac	5:1	0.01
Mitigation Unit Summations						
Stream Restoration						
2461 lf						
984.4 SMUs						
Wetland Mitigation Units						
2.23 ac Restoration						
6.73ac Preservation						
3.58 WMUs						

R = Restoration, EII=Enhancement Level II, P=Preservation

Table 6. Project Contacts Table

Sandy Creek Stream Enhancement and Wetland Restoration Site / EEP Project No. 322	
Designer: Ward Consulting Engineers, P.C.	8368 Six Forks Road, Suite 104 Raleigh, NC 27615-5083 (919) 870-0526 email: bward@wce-corp.com
Construction Contractor: Shamrock Environmental, Inc.	Mr. Greg Kiser 6106 Corporate Park Drive Browns Summit, NC 27214 (336) 375-1989
Planting Contractor: Shamrock Environmental, Inc.	Mr. Greg Kiser 6106 Corporate Park Drive Browns Summit, NC 27214 (336) 375-1989
Seeding Contactor: Shamrock Environmental, Inc.	Mr. Greg Kiser 6106 Corporate Park Drive Browns Summit, NC 27214 (336) 375-1989
Seed Mix Sources	N/A*
Nursery Stock Suppliers	N/A*
Monitoring Performers (MY-01-04): EcoScience Corporation	1101 Haynes Street, Ste. 101 Raleigh, NC 27604 (919) 828-3433
Re-Designer: Ward Consulting Engineers, P.C.	8368 Six Forks Road, Suite 104 Raleigh, NC 27615-5083 (919) 870-0526 email: bward@wce-corp.com
Re-Construction: Environmental Quality Resources, LLC	1405 Benson Court, Suite C Arbutus, MD 21227 Tel: (443) 304-3310
Re-Planting: Bruton Natural Systems, Inc.	P.O. Box 1197 Freemont, NC 27830 (919) 242-6555
Re-Seeding: Erosion Supply Company	P.O. Box 91208 Raleigh, NC 27675 (919) 787-0334
Monitoring Performers (MY-05-09): The Catena Group	410B Millstone Drive Hillsborough, NC 27278 (919)732-1300



The Catena Group

Sandy Creek: Wetland Restoration and Stream Enhancement Site

MY-09 CCPV Sheet Index

EEP Project No. 322
2010 Aerial Photography

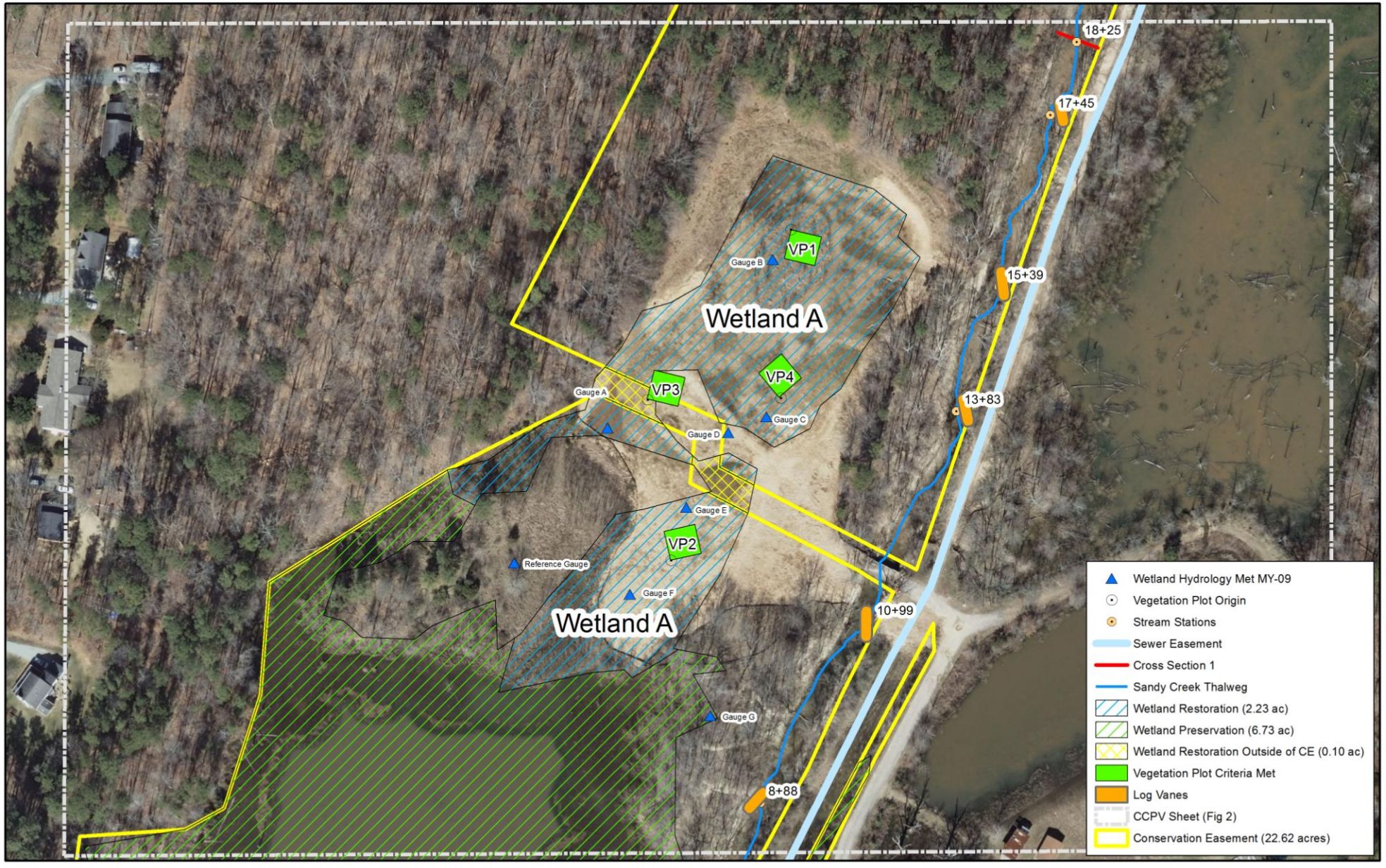
Durham County, North Carolina

Date: January 2015

Scale: 0 50 100 200 Feet

Job No: 4134

Figure 1



The Catena Group

Client: Ecosystem Enhancement Program

Sandy Creek Wetland Restoration and Stream Enhancement Site

MY-09 and CCPV Assett Map

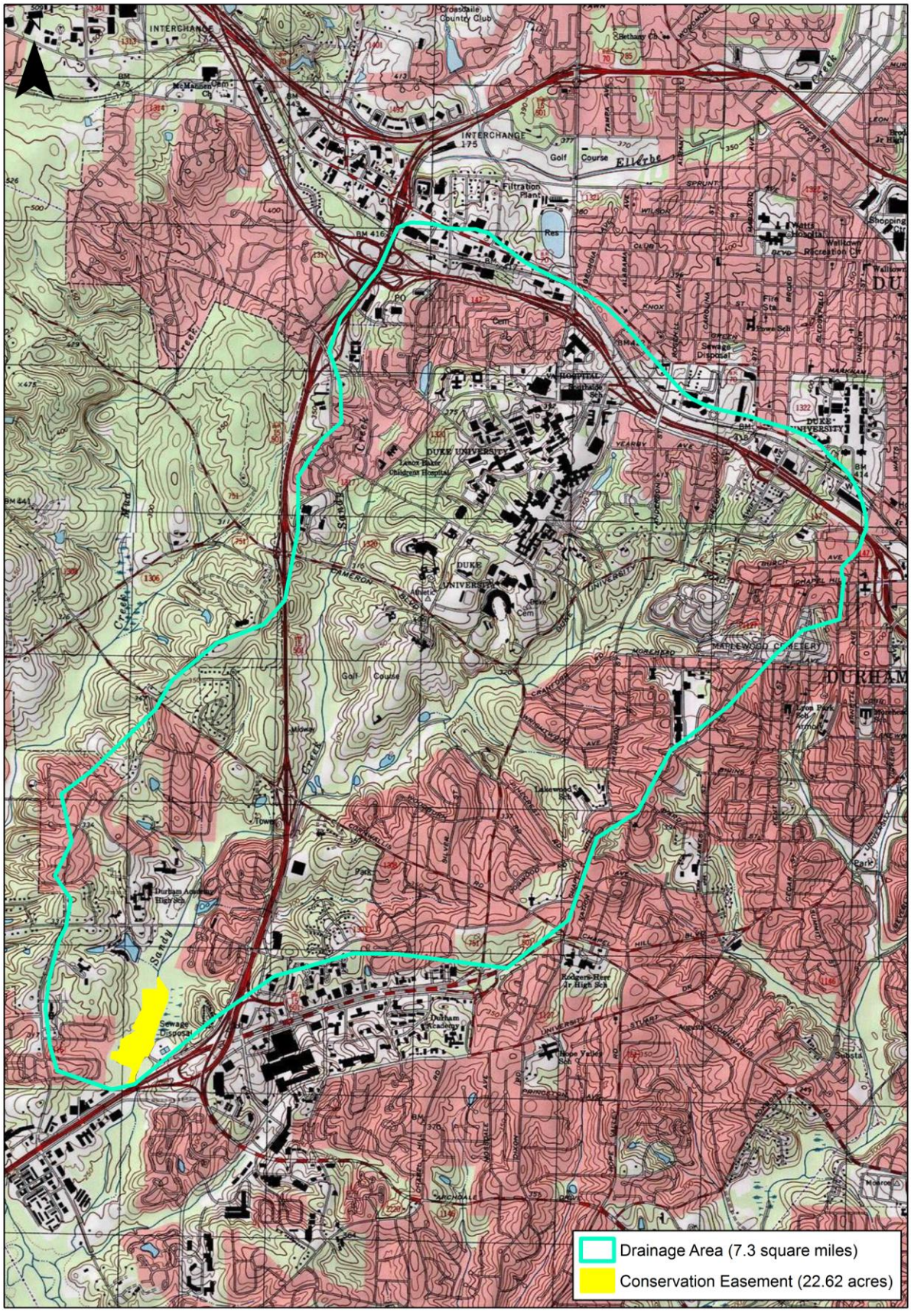
EEP Project # 322
2010 Aerial Photography
Durham County, North Carolina

Date: January 2015

Scale: 0 25 50 100 Feet

Job No.: 4134

Figure 1a



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Sandy Creek: Wetland Restoration and Stream Enhancement Site

Watershed and Site Location

EEP Project No. 322
2009 Topographic Map

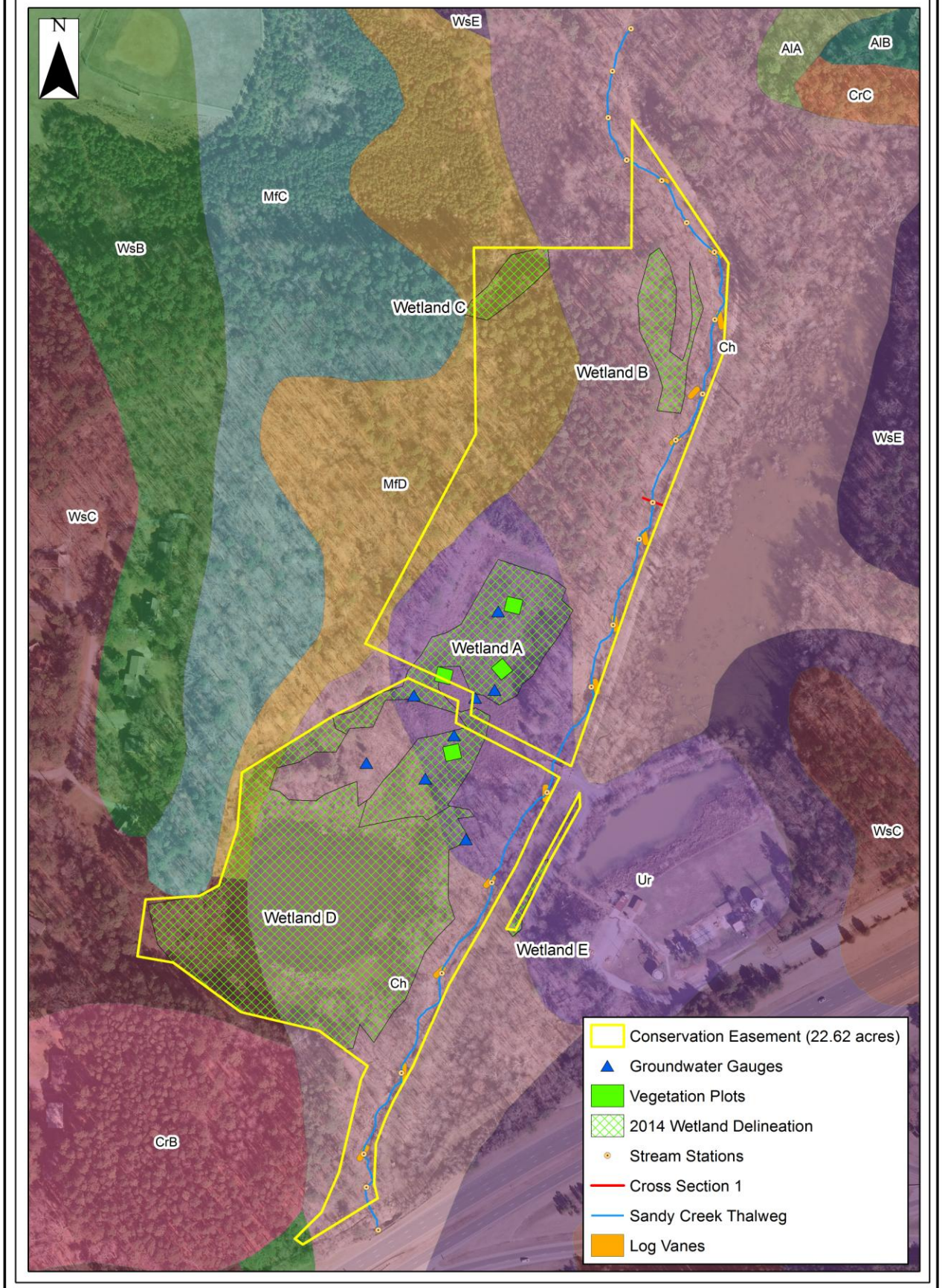
Durham County, North Carolina

Date: January 2015

Scale: 0 500 1,000 2,000 Feet

Job No: 4134

Figure 2



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Sandy Creek: Wetland Restoration and Stream Enhancement Site

USDA-NRCS Soils

EEP Project No. 322
NC One Map Aerial Photography

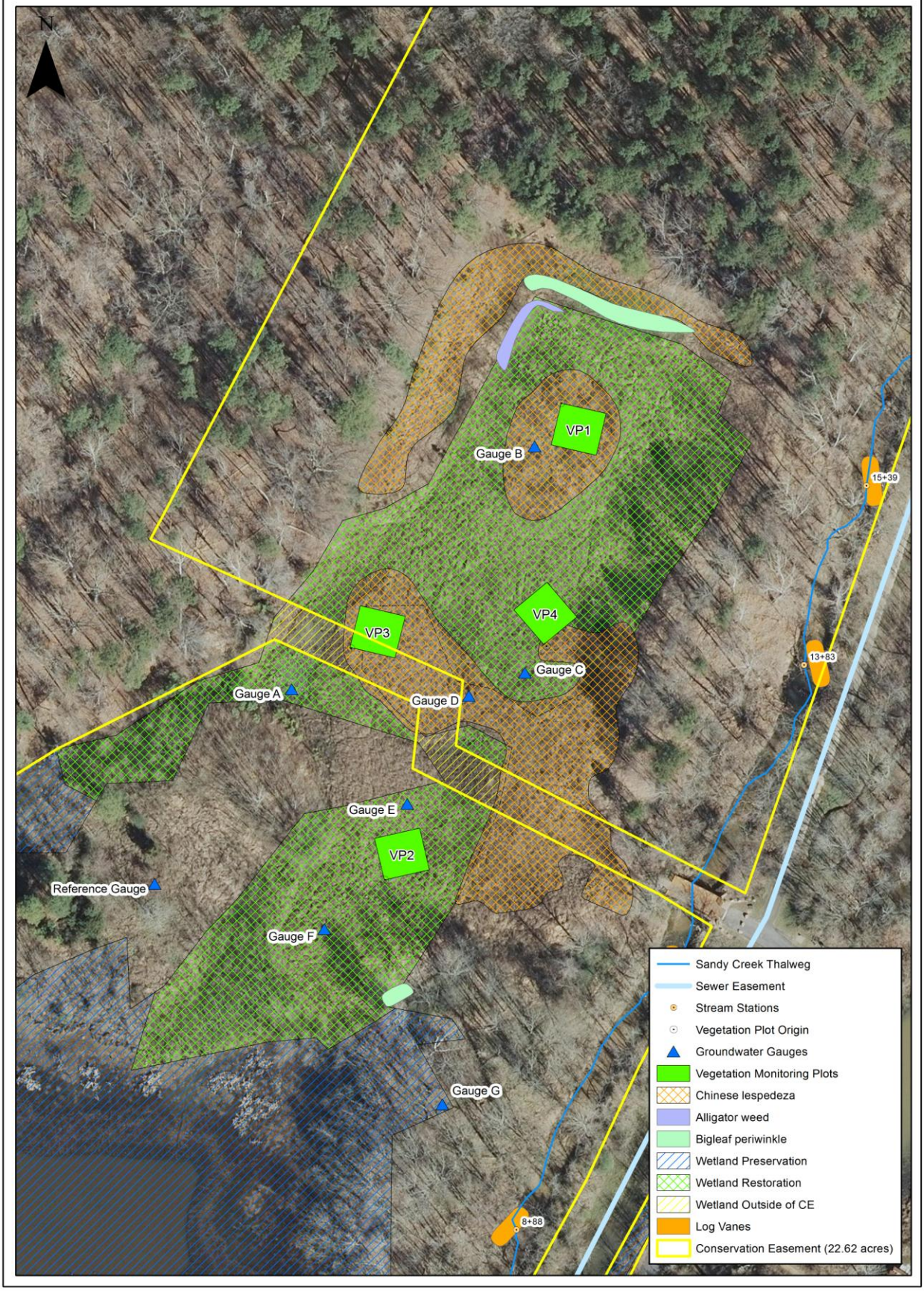
Durham County, North Carolina

Date: January 2015

Scale: 0 50 100 200 Feet

Job No: 4134

Figure 3



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Sandy Creek: Wetland Restoration and Stream Enhancement Site

Site Maintenance Map

EEP Project No. 322
2013 Aerial Photography

Durham County, North Carolina

Date: January 2015

Scale: 0 15 30 60 Feet

Job No: 4134

Figure 4

Appendix B

Visual Assessment Data

Post Construction Veg Plot Photos
(Baseline MY-05 February 2010)

No Photo Available. Plot 1was not disturbed during construction.

Plot 1.

Plot 3. February 2010

Plot 2. February 2010

Plot 4. February 2010

Vegetation Monitoring Plot Photos

MY-05 Veg Monitoring Plots (August 2010)

Plot 1. August 2010

Plot 2. August 2010

Plot 3. August 2010

MY-09 Veg Monitoring Plots (August 2014)

Plot 1. August 2014

Plot 2. August 2014

Plot 3. August 2014

Plot 4. August 2010

Plot 4. August 2014

MY-09 Photos (March 2014)

Station 0+00. View of 15-501 culvert from the left descending side.

Station 0+00. Upstream facing view from 15-501 culvert.

Station 2+04. Upstream facing view of log vane from the left descending bank.

Station 4+12. Upstream facing view of log vane from left descending bank.

Stion 6+55. Downstream facing view of log vane from descending bank.

Station 8+88. Downstream facing view of log vane from left descending bank.

Station 10+99. Downstream facing view from footbridge.

Station 13+83. Downstream facing view of log vane from left descending bank.

Station 15+39. Downstream facing view of log vane from left descending bank.

Station 17+45. Downstream facing view of log vane from left descending bank.

Station 19+72. Upstream facing view of log vane from left descending bank.

Station 20+91. Upstream facing view of log vane from left descending bank.

Station 22+66. Upstream facing view of log vane from left descending bank.

Station 24+20. Upstream facing view of log vane from left descending bank.

Station 26+12. Upstream facing view of log vane from left descending bank.

Appendix C

Vegetation Plot Data

Table 7. Vegetation Monitoring Plots

EEP Project Code 322. Project Name: Sandy Creek

			Current Plot Data (MY9 2014)												Annual Means													
			E322-01-0001			E322-01-0002			E322-01-0003			E322-01-0004			MY9 (2014)			MY8 (2013)			MY7 (2012)			MY6 (2011)			MY5 (2009)		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	Tree			1												1								1			
Acer negundo var. negundo	boxelder	Tree																										2
Acer rubrum	red maple	Tree						2									2											
Alnus serrulata	hazel alder	Shrub																								1	1	1
Amorpha fruticosa	desert false indigo	Shrub																		1								
Baccharis halimifolia	eastern baccharis	Shrub						1			1						2			3			1			1		
Betula nigra	river birch	Tree				1	1	3				4	4	5	5	5	8	5	5	5	6	6	6	4	4	5	1	1	1
Carpinus caroliniana	American hornbeam	Tree																									5	5	5
Carpinus caroliniana var. caroliniana	Coastal American Hornbeam	Tree				1	1	1				1	1	1	2	2	2	2	2	2	2	2	2	2	2	2			
Cephalanthus occidentalis	common buttonbush	Shrub							1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2
Cornus amomum	silky dogwood	Shrub							1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	1	1	1	2	2	2
Fraxinus pennsylvanica	green ash	Tree				5	5	21			2			8	5	5	31	5	5	9	5	5	11	5	5	8	4	4	4
Gleditsia triacanthos	honeylocust	Tree																								1			
Liquidambar styraciflua	sweetgum	Tree									1						1												
Liriodendron tulipifera var. tulipifera	Tulip-tree, Yellow Poplar, Whitewood	Tree																						1	1	1			
Nyssa sylvatica	blackgum	Tree																									3	3	3
Pinus taeda	loblolly pine	Tree									2						2			1									
Platanus occidentalis	American sycamore	Tree																									6	6	6
Platanus occidentalis var. occidentalis	Sycamore, Plane-tree	Tree																						1	1	1			
Quercus	oak	Tree																									7	7	8
Quercus lyrata	overcup oak	Tree																			1	1	1	1	1	1			
Quercus michauxii	swamp chestnut oak	Tree				1	1	1				1	1	1	2	2	2	2	2	2	2	2	2	2	2	2			
Quercus phellos	willow oak	Tree							7	7	7			1	7	7	8	7	7	7	6	6	6	7	7	7			
Robinia pseudoacacia	black locust	Tree																					1						2
Rosa palustris	swamp rose	Shrub																									1	1	1
Salix nigra	black willow	Tree	4	4	4			9			25	2	2	3	6	6	41	6	6	30	5	5	35	5	5	32	7	7	7
Ulmus	elm	Tree																											4
Ulmus rubra	slippery elm	Tree			4												4			3			5			4			
		Stem count	4	4	9	8	8	38	9	9	40	10	10	21	31	31	108	31	31	67	31	31	75	30	30	68	39	39	48
		size (ares)	1			1			1			1			4			4			4			4			4		
		size (ACRES)	0.02			0.02			0.02			0.02			0.10			0.10			0.10			0.10			0.10		
		Species count	1	1	3	4	4	7	3	3	8	6	6	8	8	8	14	8	8	12	9	9	13	11	11	15	11	11	14
		Stems per ACRE	161.9	161.9	364.2	323.7	323.7	1538	364.2	364.2	1619	404.7	404.7	849.8	313.6	313.6	1093	313.6	313.6	677.8	313.6	313.6	758.8	303.5	303.5	688	394.6	394.6	485.6

Appendix D

Stream Geomorphology

Project:	Sandy Creek/Project No. 322
Cross Section:	Cross Section 1
Feature	Riffle
Station:	18+25
Date:	7/28/12
Crew:	ZP, SV

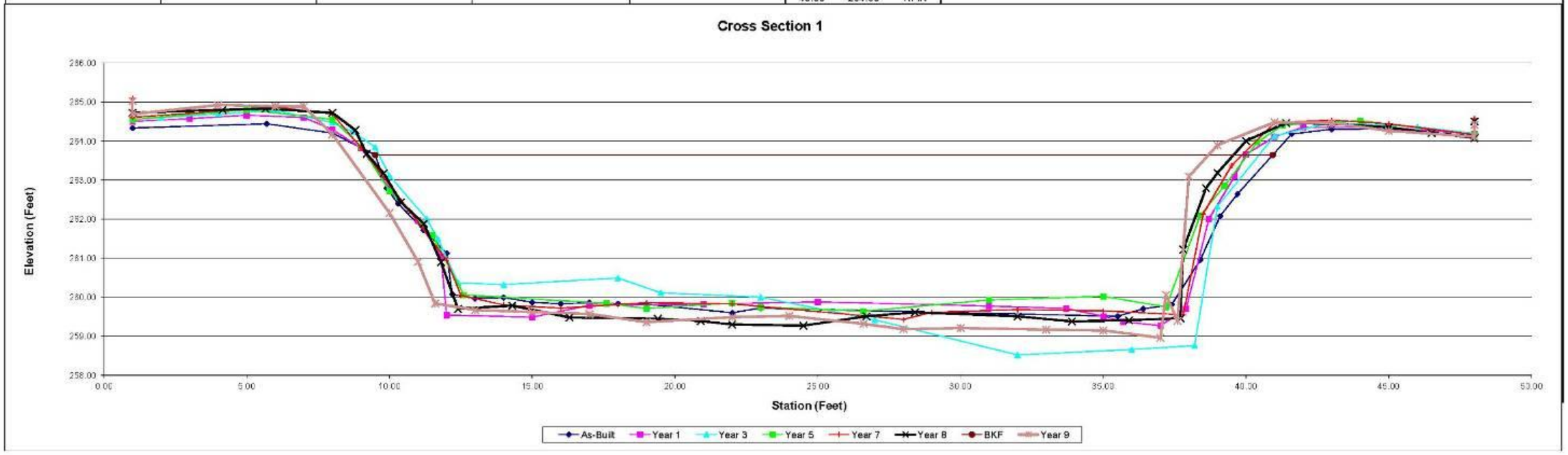
Summary (bankfull)

	MY0	MY1	MY3	MY5	MY7	MY8
A (BKF)	109.6	114.7	119.7	110.5	107.9	112.6
W (BKF)	31.4	31.4	31.2	31.3	30.7	30.3
Max d	4.1	4.6	5.3	4.2	4.2	4.4
Mean d	3.5	3.7	3.8	3.5	3.5	3.3
W/D	9.0	8.6	8.1	8.9	8.7	8.2

MY00-2003			MY01-2005			MY03-2006			MY05-2010			MY07-2012			MY08-2013			MY09-2014				
Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	Elevation	Notes	Station	ROD	diff	Elevation	Notes
1.00	264.33		1.00	264.50		1.00	264.55	LPIN	1.00	264.55	LEFT PIN	1.00	265.09	LPIN	1	265.02	LPIN	1.00	4.24		265.02	L pin
5.70	264.44		3.00	264.57		2.00	264.60		5.00	264.80		1.00	264.60		1	264.72		1.00	4.57	0.33	264.69	ground
8.00	264.20		5.00	264.66		4.00	264.69		8.00	264.55	TOBL	6.00	264.87		4.15	264.80		4.00	4.34	0.10	264.92	
9.50	263.64	BL Bankfull	7.00	264.60	TOBL	6.00	264.78		9.00	263.86	Bankfull Lef	8.00	264.69	TOBL	5.65	264.83		6.00	4.37	0.13	264.89	
9.90	262.79		8.00	264.29		8.00	264.47	TOBL	10.00	262.72		9.00	263.83		8	264.72	TOBL	7.00	4.38	0.14	264.88	top of bank
10.30	262.40		9.00	263.82	Bankfull Lef	8.70	264.24		11.50	261.58		10.70	262.21		8.8	264.28		8.00	5.09	0.85	264.17	
11.20	261.72		10.00	262.78		9.50	263.84	Bankfull Lef	12.60	260.06	TOE L	12.00	260.95		9.2	263.67		10.00	7.10	2.86	262.16	
12.00	261.12		11.00	261.96		10.00	263.11		17.60	259.84		12.50	260.05	TOE L	9.8	263.17		11.00	8.35	4.11	260.91	
12.20	260.07	Toe L	11.80	261.04		11.30	262.01		19.00	259.71		14.00	259.80		10.4	262.43		11.60	9.42	5.18	259.84	TOE L
13.00	259.97		12.00	259.54	Toe L	11.70	261.48		22.00	259.85		16.00	259.72		11.2	261.88		13.00	9.59	5.35	259.67	
14.00	259.99		15.00	259.49		12.40	260.37		23.00	259.75		19.00	259.86		11.8	260.90		15.00	9.64	5.40	259.62	
15.00	259.87		17.00	259.79		14.00	260.32		26.60	259.64	(WS = 259	22.00	259.83		12.4	259.70	TOE L	17.00	9.69	5.45	259.57	
16.00	259.83		21.00	259.82		18.00	260.49		31.00	259.93		28.00	259.43	TW	14.3	259.79		19.00	9.90	5.66	259.36	
17.00	259.86		25.00	259.88		19.50	260.11		35.00	260.02		29.00	259.61		16.3	259.48		22.00	9.77	5.53	259.49	
18.00	259.83		31.00	259.77		23.00	260.00		37.20	259.75	TOE R	32.00	259.68		19.4	259.45		24.00	9.74	5.50	259.52	
19.00	259.82		33.70	259.71		27.00	259.42		38.40	262.10		35.00	259.65		20.9	259.39		26.60	9.94	5.70	259.32	LEW
22.00	259.60		35.00	259.51		32.00	258.52	TW	39.25	262.85	Bankfull righ	37.80	259.55	TOE R	22	259.30	(WS= 259	28.00	10.08	5.84	259.18	
23.00	259.72		35.70	259.37		36.00	258.66		40.40	263.97		38.50	262.13		24.5	259.27		30.00	10.05	5.81	259.21	
35.50	259.51	VS = elev 2	37.00	259.27	TW	38.20	258.76	Toe R	41.30	264.41	TOBR	39.50	263.38		26.7	259.51		33.00	10.09	5.85	259.17	
36.40	259.70		37.90	259.70	Toe R	39.00	262.32		44.00	264.52		41.00	264.47	TOBR	28.4	259.61		35.00	10.11	5.87	259.15	
37.40	259.81	Toe R	38.70	262.01		41.00	264.13	TOBR	48.00	264.16	RIGHT PIN	43.00	264.53		32	259.51		37.00	10.30	6.06	258.96	
38.40	260.96		39.60	263.09		43.00	264.47					45.00	264.44		33.9	259.38		37.20	9.20	4.96	260.06	
39.10	262.08		40.00	263.66		46.00	264.36					48.00	264.16		35.9	259.41		37.60	9.87	5.63	259.39	REW
39.70	262.64		41.00	264.11		48.00	264.19	RPIN				48.00	264.57	RPIN	37.7	259.46	TOE R	38.00	6.17	1.93	263.09	
41.60	264.18	TOBR	42.00	264.35	TOBR										37.8	261.22		39.00	5.37	1.13	263.89	
43.00	264.30		45.00	264.35											38.6	262.79		41.00	4.78	0.54	264.48	
45.00	264.31		48.00	264.18											39	263.18		43.00	4.80	0.56	264.46	
48.00	264.13														40	264.00		45.00	5.00	0.76	264.26	
															41.4	264.46	TOBR	48.00	5.15	0.91	264.11	ground
															43	264.44		48.00	4.85	0.61	264.41	RPIN
															45	264.35						
															46.5	264.20						
															48.00	264.08						
															48.00	264.50	RPIN					

Photo of XS-1, looking in the downstream direction

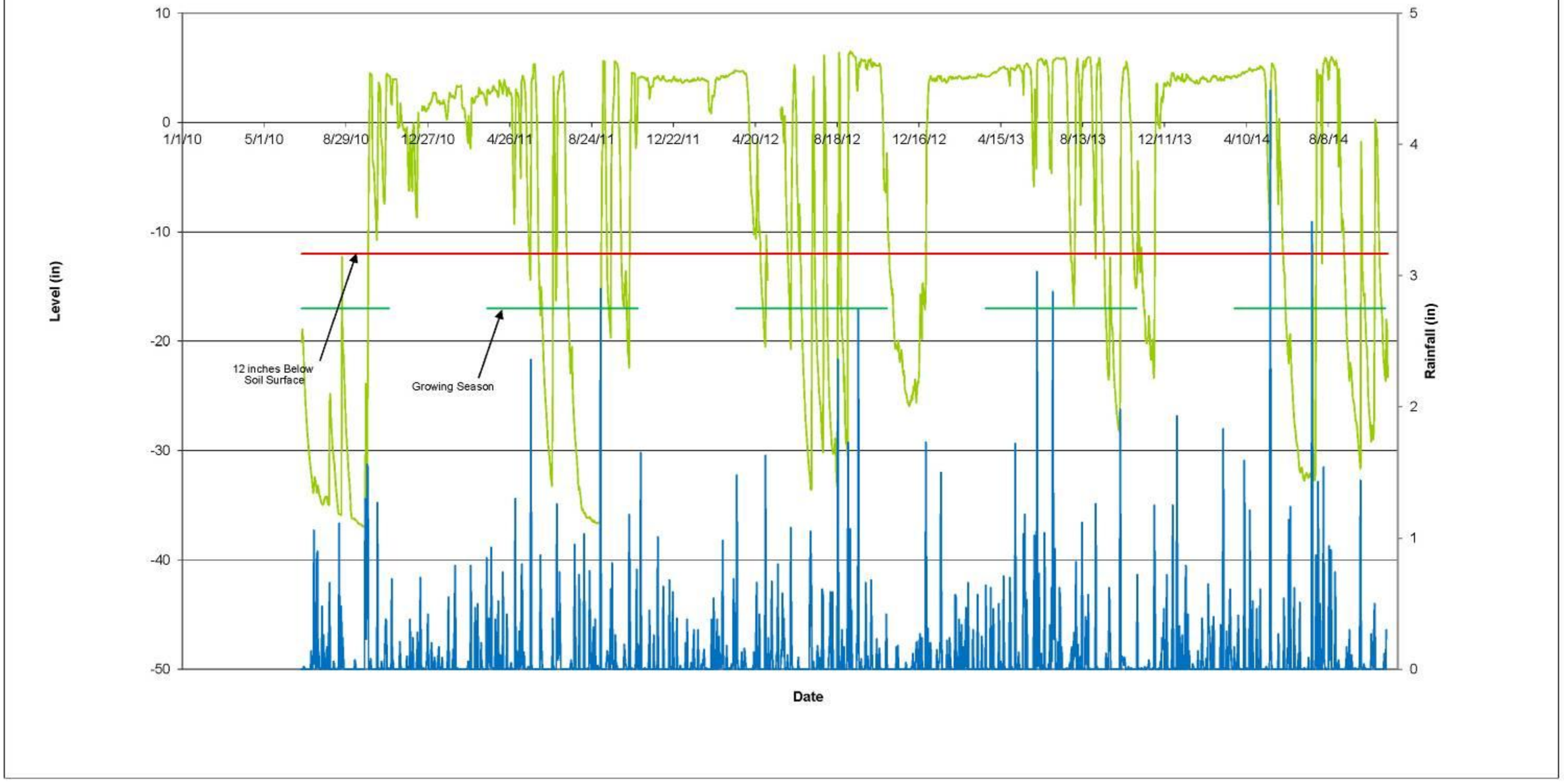
Bankfull	Same
Station	Elevation
9.5	263.64
40.93377	263.64



Appendix E

Hydrological Data

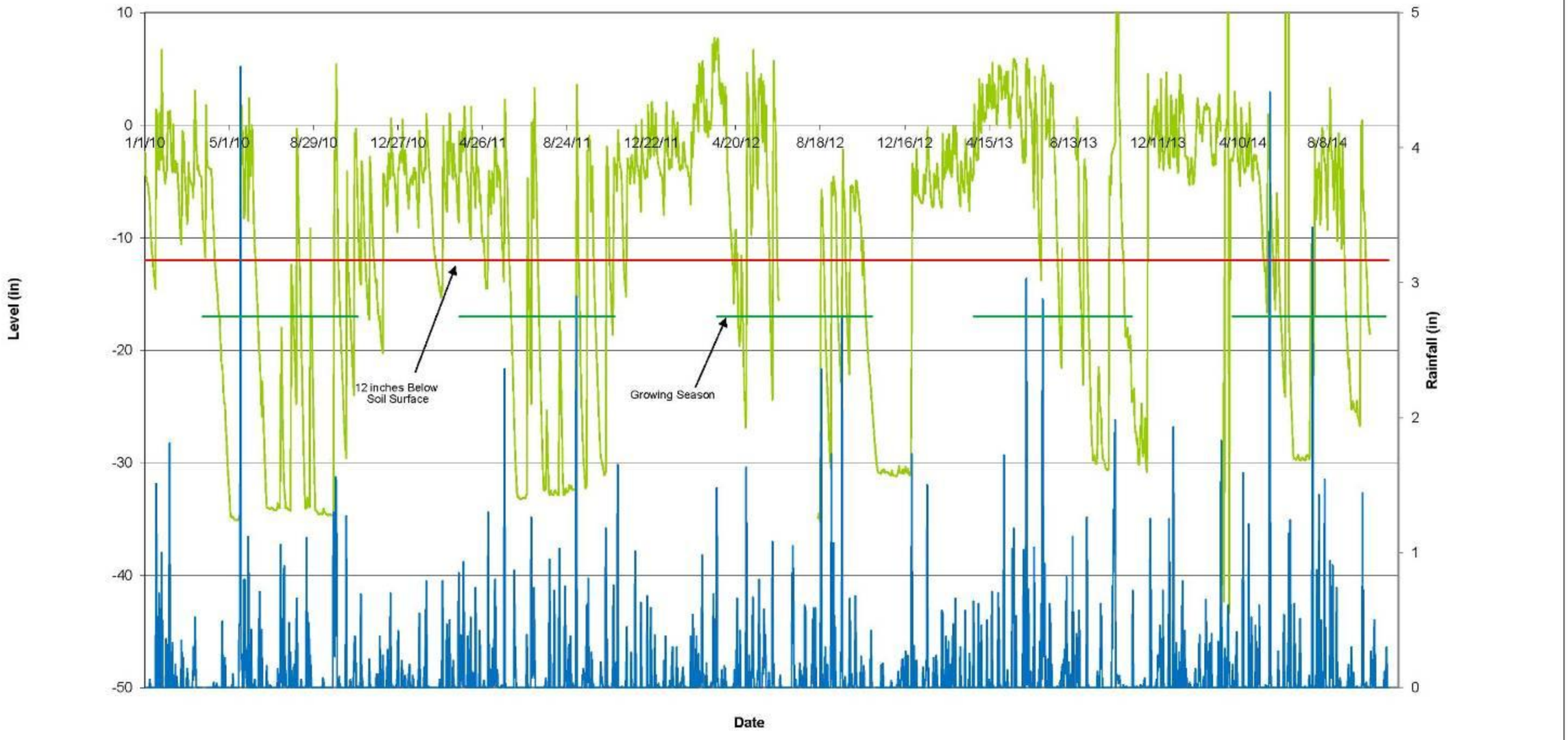
Sandy Creek Gauge A



Growing Season: March 24 to November 1 (222 days)
(http://www.wcc.nrcs.usda.gov/ftpref/support/climate/wetlands/nc/37063.txt)

Rain Data: Station DURH
(http://www.nc-climate.ncsu.edu/services/request.php)

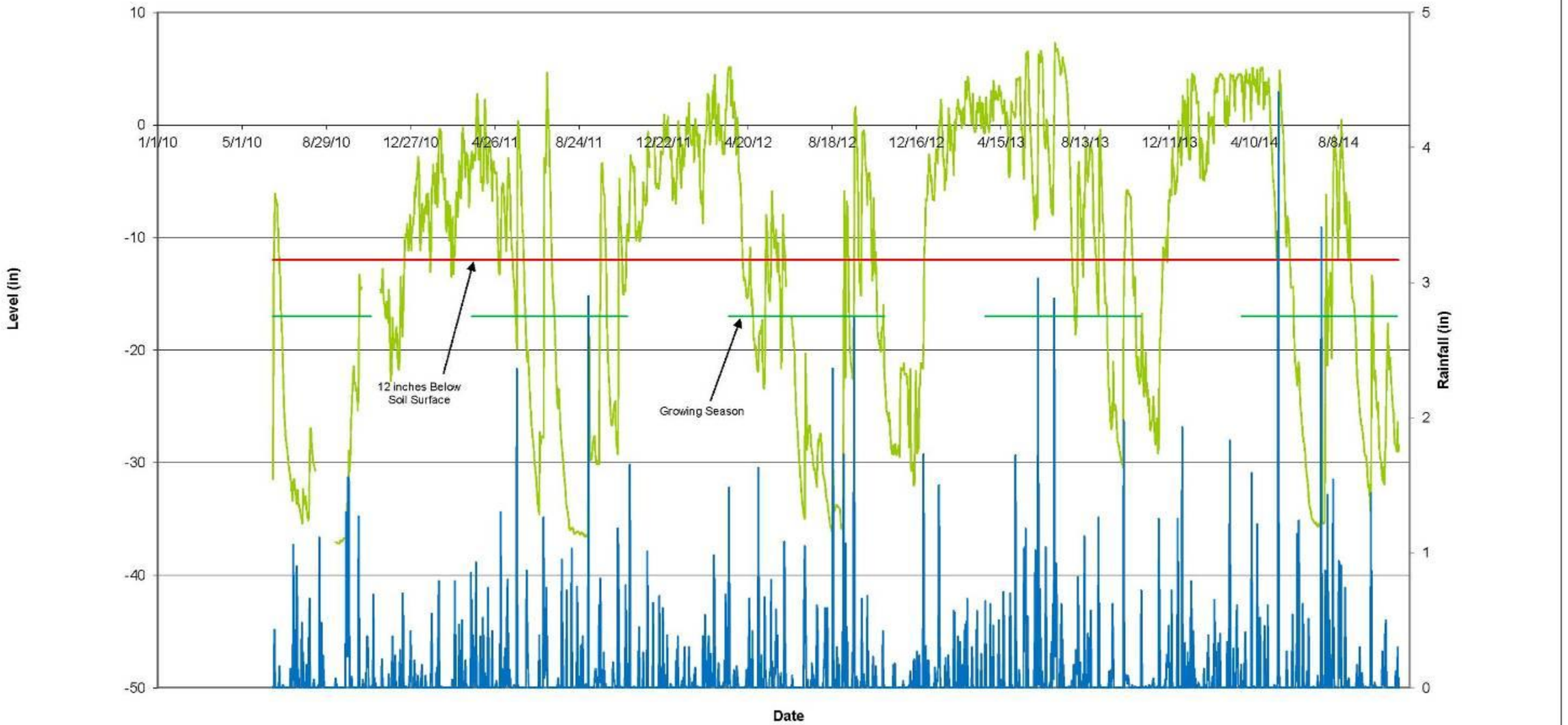
Sandy Creek Gauge B - Island



Growing Season: March 24 to November 1 (222 days)
(http://www.wcc.nrcs.usda.gov/ftpref/support/climate/wetlands/nc/37063.txt)

Rain Data: Station DURH
(http://www.nc-climate.ncsu.edu/services/request.php)

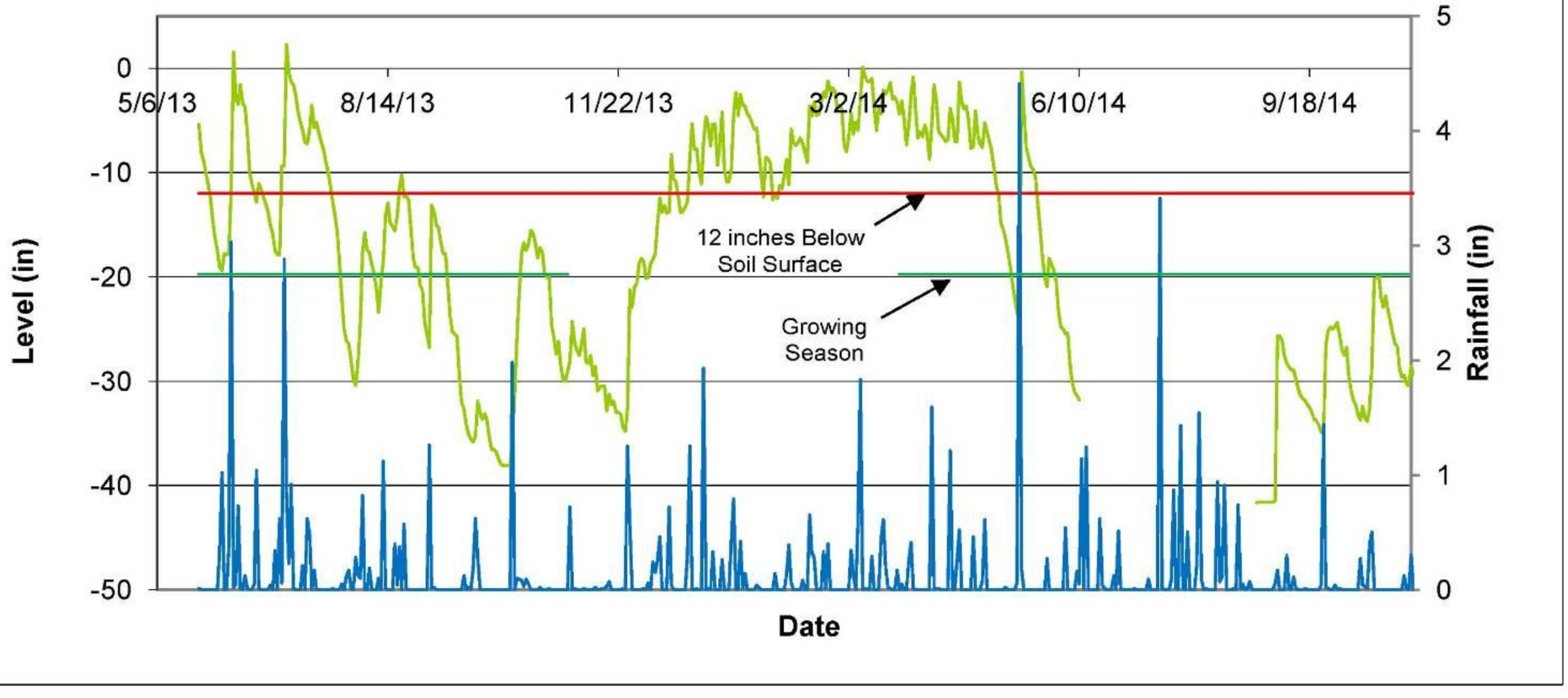
Sandy Creek Gauge C

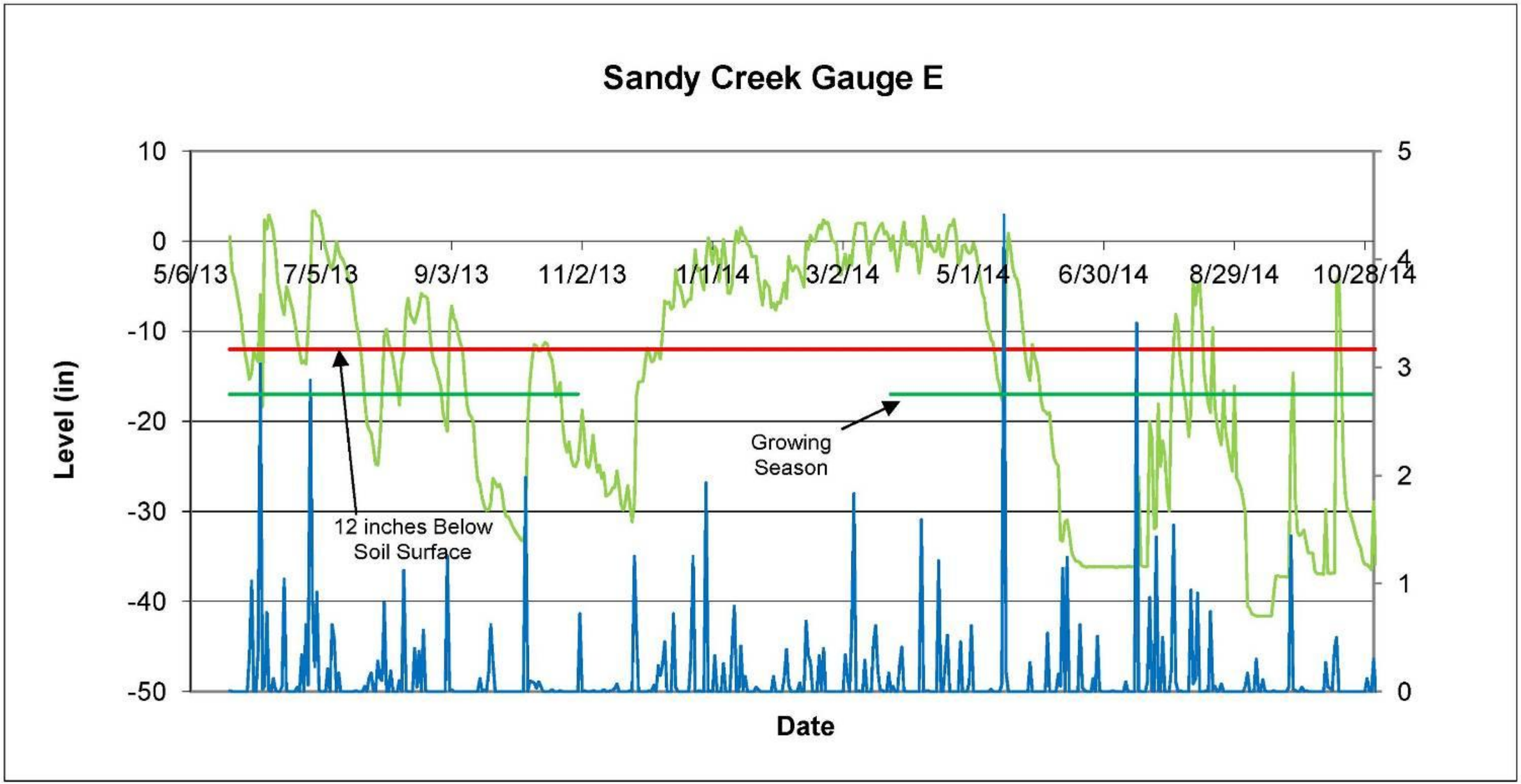


Growing Season: March 24 to November 1 (222 days)
(http://www.wcc.nrcs.usda.gov/ftpref/support/climate/wetlands/nc/37063.txt)

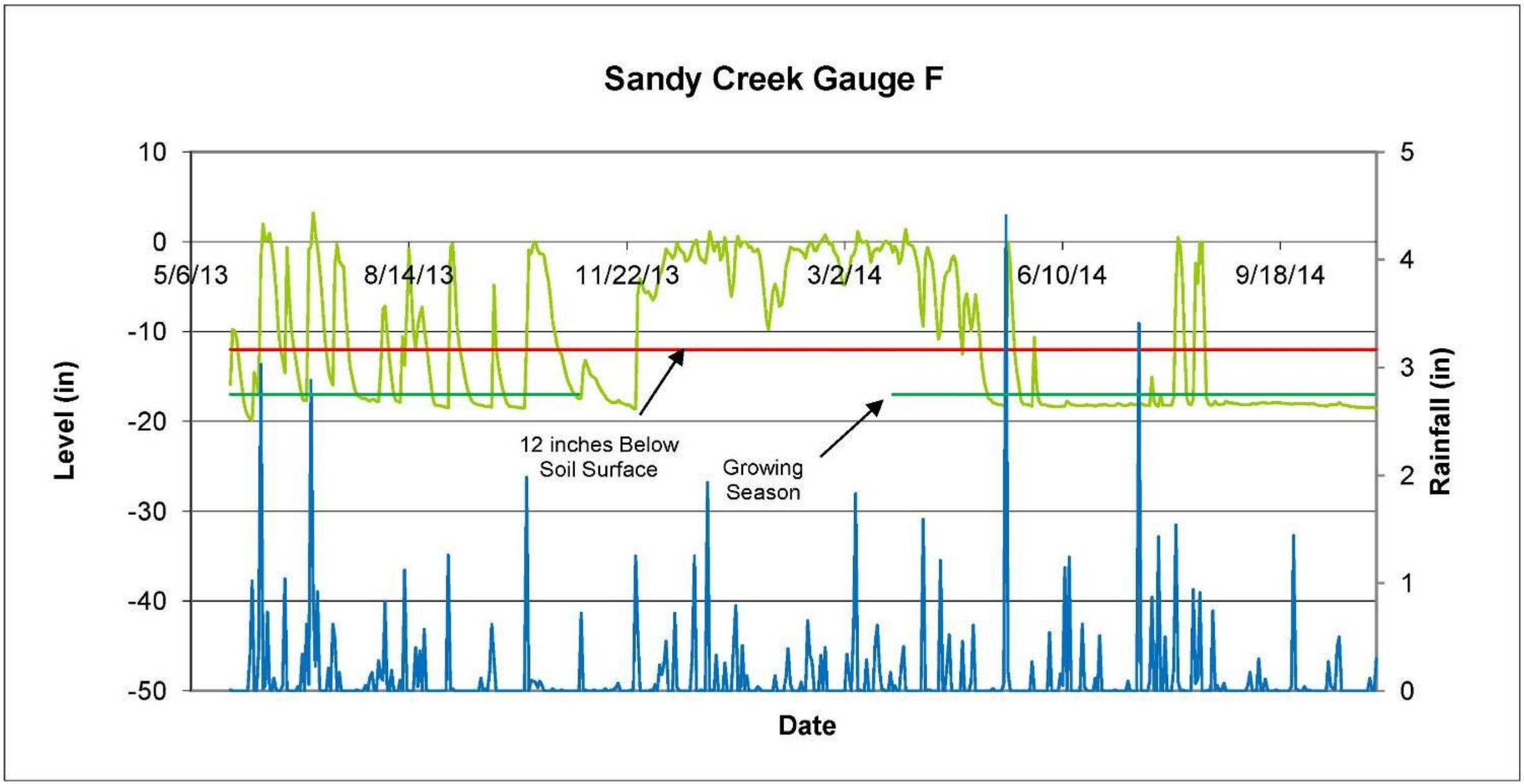
Rain Data: Station DURH
(http://www.nc-climate.ncsu.edu/services/request.php)

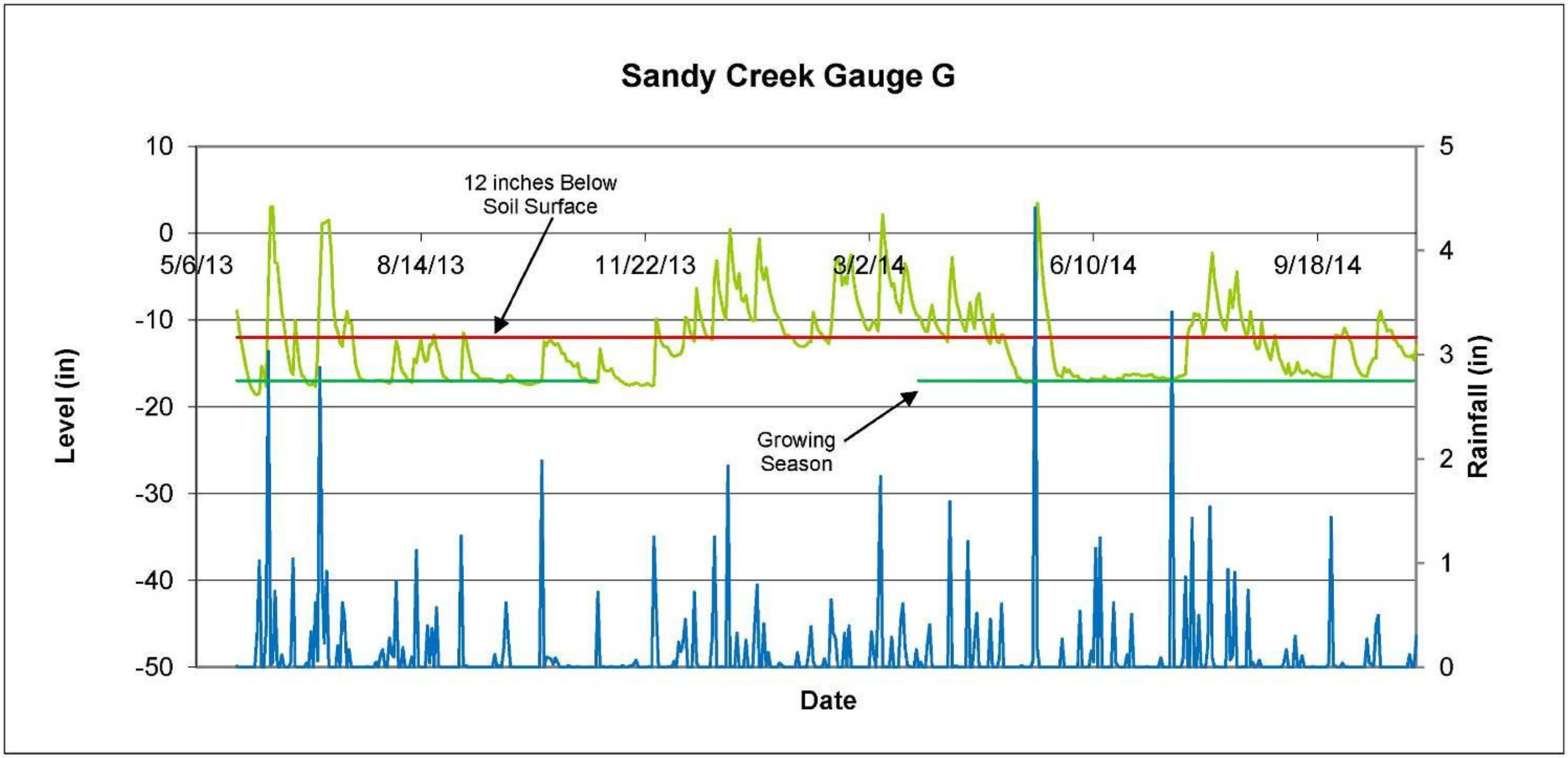
Sandy Creek Gauge D



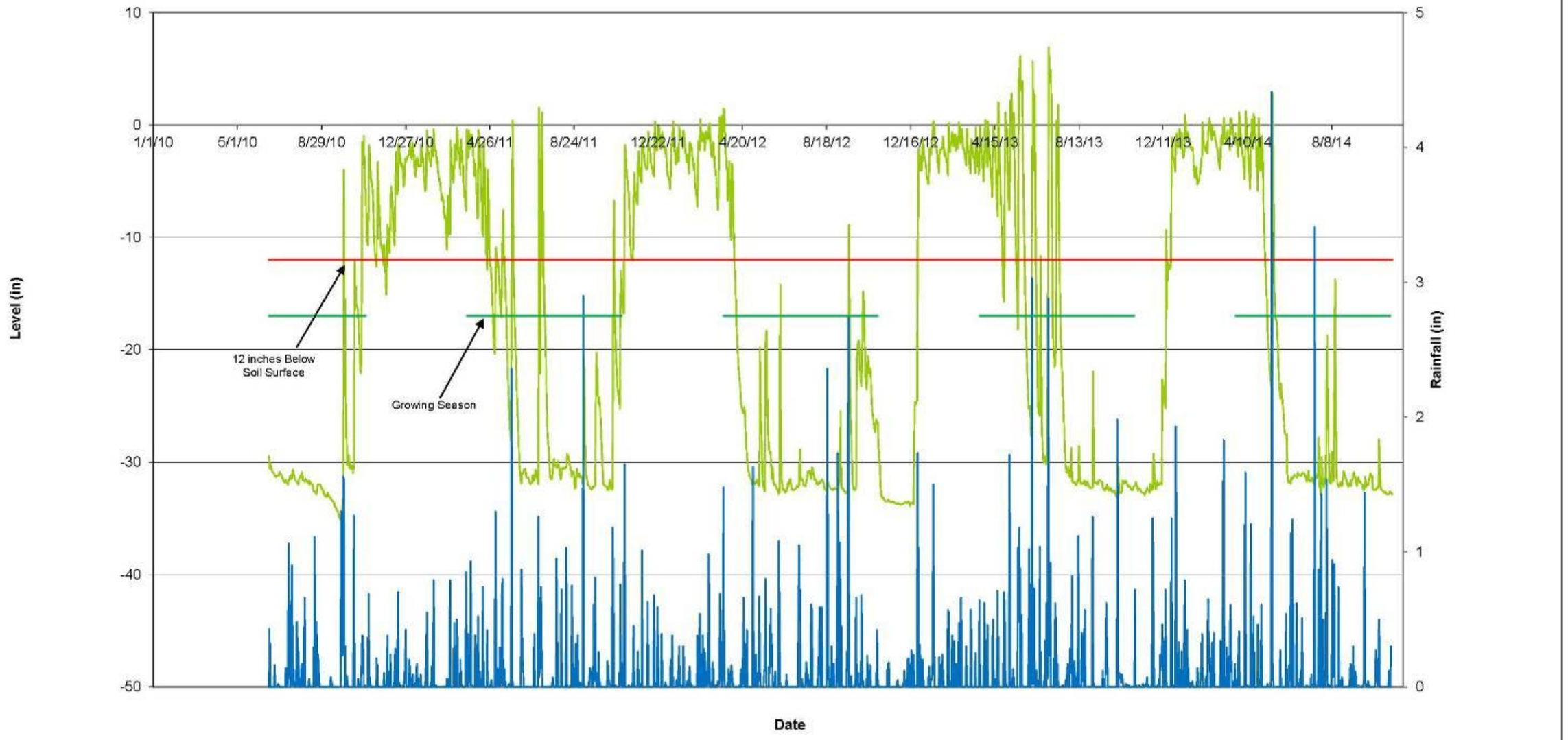

Sandy Creek Gauge E
10
0
-10
-20
-30
-40
-50
5
4
3
2
1
0
5/6/13
7/5/13
9/3/13
11/2/13
1/1/14
3/2/14
5/1/14
6/30/14
8/29/14
10/28/14
Level (in)
Date
12 inches Below Soil Surface
Growing Season

Sandy Creek Gauge F




Sandy Creek Gauge G
10
0
-10
-20
-30
-40
-50
5
4
3
2
1
0
5/6/13
8/14/13
11/22/13
3/2/14
6/10/14
9/18/14
12 inches Below
Soil Surface
Growing
Season
Level (in)
Rainfall (in)
Date

Sandy Creek Wetland Reference Gauge



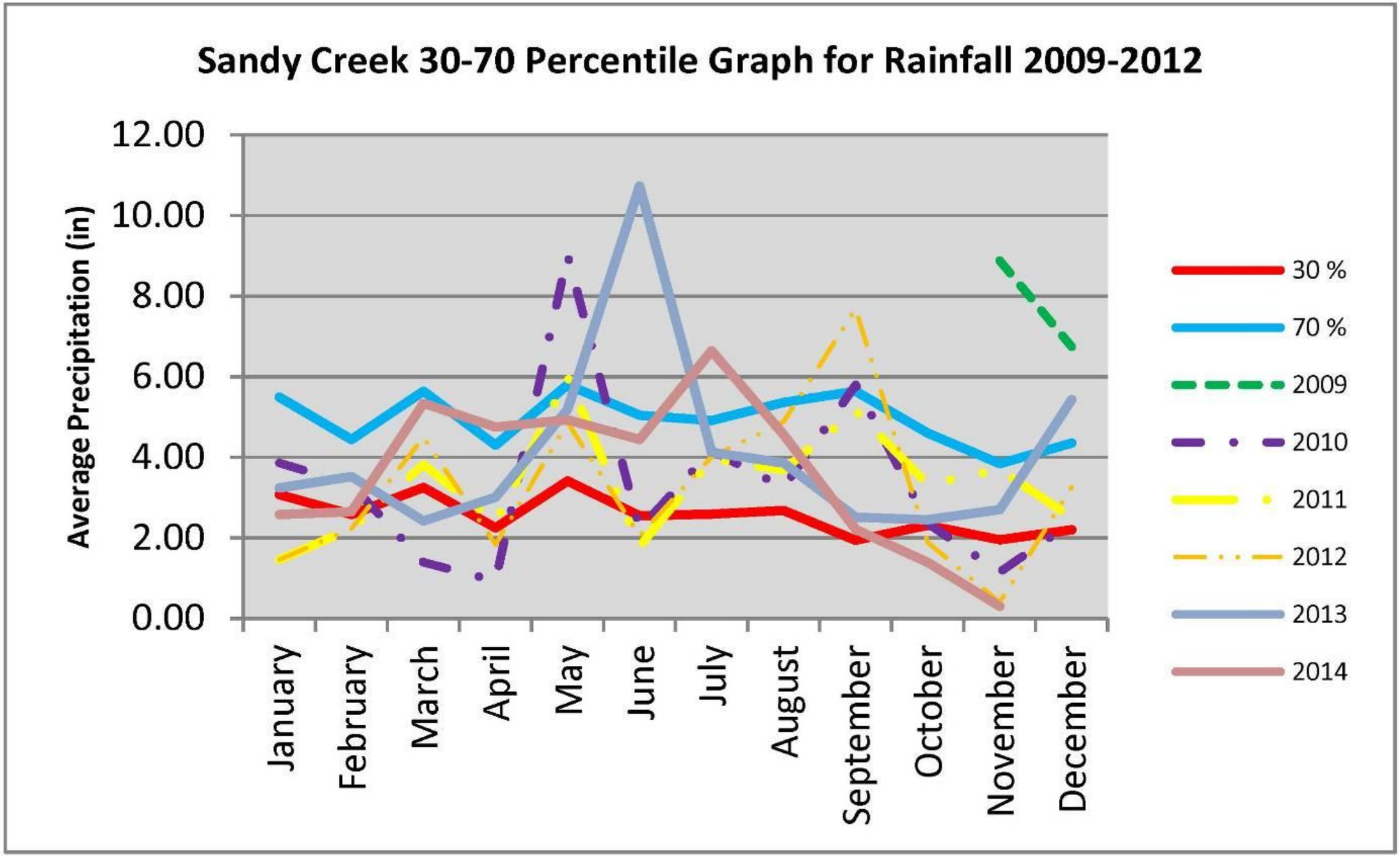
Growing Season: March 24 to November 1 (222 days)
(http://www.wcc.nrcs.usda.gov/ftpref/support/climate/wetlands/nc/37063.txt)

Rain Data: Station DURH
(http://www.nc-climate.ncsu.edu/services/request.php)

Table 8. Wetland Criteria Attainment Chart (2010-2014)

		2010			2011			2012			2013			2014	
Gauge #	**Max # Consecutive Days**	**%Growing Season**	**actual days monitored**	**Max # Consecutive Days**	**%Growing Season**	**actual days monitored**	**Max # Consecutive Days**	**%Growing Season**	**actual days monitored**	**Max # Consecutive Days**	**%Growing Season**	**actual days monitored**	**Max # Consecutive Days**	**%Growing Season**	**actual days monitored**
Reference Gauge	6	3%	139	29	13%	222	16	7%	222	33	15%	222	43	19%	222
A	31	14%	129	62	28%	222	58	26%	203	125	56%	222	71	32%	222
B	21	9%		36	16%	222	33	15%	167	96	43%	204	43	19%	196
C	7	3%	140	38	17%	222	20	9%	222	124	56%	222	51	23%	222
D	~	~	~	~	~	~	~	~	~	22	10%	161	43	19%	146
E	~	~	~	~	~	~	~	~	~	25	11%	161	48	22%	222
F	~	~	~	~	~	~	~	~	~	15	7%	161	32	14%	222
G	~	~	~	~	~	~	~	~	~	9	4%	161	30	14%	222

Sandy Creek 30-70 Percentile Graph for Rainfall 2009-2012



Appendix F

2014 Wetland Delineations

SOIL EVALUATION FORM

The Catena Group, Inc
410-B Millstone Drive
Hillsborough, NC 27278
919.732.1300

Catena Job: Sandy Creek
County: Durham
Date: 10-22-14
Sheet: 1 of 1

Profile #	Horizon	Horizon Depth (In)	Structure / Texture	Consistence / Mineralogy	Matrix Color	Mottle Colors (Quantity, Size, Contrast, Color)
Gauge	A1	2	1MGR/L	FR / SS.SP	10YR 4/3	1,C,D 10YR 5/6; common oxidized rhizospheres (O.R)
	A2	5	1MGR/CL	FR / SS.SP	10YR 4/4	2,C,D 10YR 5/6; Common O.R.; 1,F,D 10YR 6/3
C	Bw	12	1MSBK/ C	FI / SS.SP	10YR 5/4	2,C,D 10YR 5/[illegible]; 2,C,D 10YR 6/3
	C	18	0M /SC	FI / S,P	2.5Y 7/2	3,M,P 10YR 5/8; 2,C,F 2.5Y 6/3

Evaluated by: JCR

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region WET

Project/Site: Sandy Creek WB City/County: Pwtnam / Durham Sampling Date: 10-22-14

Applicant/Owner: NC EEP State: NC Sampling Point: WB-5

Investigator(s): C. Sheads ; J. Roberts Section, Township, Range:

Landform (hillslope, terrace, etc.): Drainageway Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR or MLRA): LRR-P Lat: 35.9710 Long: -78.9980 Datum: NAD83

Soil Map Unit Name: Mayodan NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation N, Soil N, or Hydrology N 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 ✓ No	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ✓ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ✓ 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 ✓	Depth (inches):
Water Table Present?	Yes ___ No ✓	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ___ No ✓	Depth (inches):

Wetland Hydrology Present? Yes ✓ No

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

Remarks:

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WET

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: WB-5

Tree Stratum (Plot size: 10m²)	Absolute % Cover	Dominant Species?	Indicator Status
1. U. rubra	25	Y	FAC
2. L. styraciflua	35	Y	FAC
3. A. rubrum	30	Y	FAC
4. A. negundo	10	N	FAC
5.			
6.			
7.			
8.			
	100 = Total Cover		
Sapling/Shrub Stratum (Plot size: 10m²)			
1. F. pennsylvanica	30	Y	FACW
2. I. decidua	10	Y	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	40 = Total Cover		
Herb Stratum (Plot size: 5m²)			
1. S. cervinus	35	Y	OBL
2. Smartweed	40	Y	
3. B. C. Indica	10	N	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	85 = Total Cover		
Woody Vine Stratum (Plot size: 5m²)			
1. Absent			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (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 ≤3.0[1]

__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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.)

US Army Corps of Engineers

Eastern Mountains and Piedmont – Version 2.0

WET

SOIL Sampling Point: WB-5

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
2	10YR 3/3	85	10YR 4/6	15	C	PL	L	
4	10YR 4/3	75	10YR 4/6	25	C	PL,M	L	
7	10YR 5/2	65	7.5YR 4/6	35	C	M	L	
12+	10YR 5/3	60	7.5YR 4/6	40	C	M	C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

- ___ 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)

[3]Indicators 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:

Depressional wetland subject to overbank flow

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WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region UP

Project/Site: Sandy Creek WB City/County: Durham / Durham Sampling Date: 10-22-14

Applicant/Owner: NC EEP State: NC Sampling Point: WB-5

Investigator(s): C. Sheats ; J. Roberts Section, Township, Range:

Landform (hillslope, terrace, etc.): Drainageway Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR or MLRA): LRR-P Lat: 35.9710 Long: -78.9680 Datum: NAD 83

Soil Map Unit Name: Mayodan NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation N, Soil N, or Hydrology N 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 ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ 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 ____	Depth (inches):	
Water Table Present?	Yes ____	No ____	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches):	**Wetland Hydrology Present?** Yes ____ No ✓

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

Remarks:

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Up

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: WB-5

Tree Stratum (Plot size: 5x20m)	Absolute % Cover	Dominant Species?	Indicator Status
1. P. acerifolia	50	Y	FACW
2. L. styraciflua	35	Y	FAC
3. L. tulipifera	15	N	FACU
4.			
5.			
6.			
7.			
8.			
	100	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5x20m)			
1. L. styraciflua	30	Y	FAC
2. O. virgatum	5	N	FACU
3. A. triloba	5	N	FAC
4. L. sinense	25	Y	FACU
5.			
6.			
7.			
8.			
9.			
10.			
	65	= Total Cover	
Herb Stratum (Plot size: 5m²)			
1. M. virginicum	70	Y	FAC
2. P. acrostichoides	10	N	FACU
3. G. hederacea	25	Y	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	105	= Total Cover	
Woody Vine Stratum (Plot size: 5m²)			
1. T. radicans	15	Y	FAC
2. L. japonica	25	Y	FAC
3. S. rotundifolia	10	Y	FAC
4.			
5.			
6.			
	40	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 78 (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 ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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.)

Vegetation on berm

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OP

SOIL Sampling Point: WB-5

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
6	10YR 5/4	100					SL	
16	10YR 5/6	70	10YR 7/2	20			SCL	
			10YR 5/8	10				

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

- ___ 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)

[3]Indicators 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:

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WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

WET

Project/Site: Sandy Creek NC City/County: Durham/Durham Sampling Date: 10-22-14

Applicant/Owner: NCEEP State: NC Sampling Point: WC-7

Investigator(s): C Shorts ; J. Roberts Section, Township, Range:

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR or MLRA): LRR-P Lat: 35.9714 Long: -78.9686 Datum: NAD83

Soil Map Unit Name: Mayodan NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation N Soil N or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation N Soil N or Hydrology N 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 ✓ No	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ✓ 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 ___	Depth (inches):
Water Table Present?	Yes ✓ No ___	Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes ✓ No ___	Depth (inches): 2

Wetland Hydrology Present? Yes ✓ No

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

Remarks:

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WET

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: WC-7

Tree Stratum (Plot size: 10 m²)	Absolute % Cover	Dominant Species?	Indicator Status
1. Acer rubrum	20	Y	FAC
2. Le Styracifl	20	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	40 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	= Total Cover		
Herb Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	= Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (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 ≤3.0[1]

__ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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.)

unvegetated depression; canopy trees around edge

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WET

SOIL Sampling Point: WC-7

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
10	10YR 3/1	80	10YR 6/1	20	D	M	L	
20	10YR 6/1	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

- ___ 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)

[3]Indicators 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:

US Army Corps of Engineers — Eastern Mountains and Piedmont – Version 2.0

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

UP

Project/Site: Sandy Creek WC City/County: Durham / Durham Sampling Date: 10-22-14

Applicant/Owner: NCEEP State: NC Sampling Point: WC-7

Investigator(s): C. Sheats ; J. Roberts Section, Township, Range:

Landform (hillslope, terrace, etc.): Drainageway Local relief (concave, convex, none): Concave Slope (%): 2

Subregion (LRR or MLRA): LRR-P Lat: 35.9914 Long: -78.9686 Datum: NAD83

Soil Map Unit Name: Mayodan NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation N, Soil N, or Hydrology N 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 ✓ No	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____ No ✓	
Wetland Hydrology Present?	Yes ____ No ✓	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ 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 ____	Depth (inches):
Water Table Present?	Yes ____ No ____	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ____ No ____	Depth (inches):

Wetland Hydrology Present? Yes ____ No ✓

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

Remarks:

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UP

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: WC-7

Tree Stratum (Plot size: 10m²)	Absolute % Cover	Dominant Species?	Indicator Status
1. Qu phellos	50	Y	FAC
2. L. styraciflua	20	Y	FAC
3. N. sylvatica	10	N	FAC
4.			
5.			
6.			
7.			
8.			
	80	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10m²)			
1. V. corymbosum	10	Y	FACW
2. C. alnifolia	5	Y	FACW
3. I. umbellata	5	Y	NI
4. O. virginiana	10	Y	FACU
5.			
6.			
7.			
8.			
9.			
10.			
	30	= Total Cover	
Herb Stratum (Plot size: 10m²)			
1. T. discolor	5	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size: 10m²)			
1. S. rotundifolia	20	Y	FAC
2. V. rotundifolia	25	Y	FAC
3.			
4.			
5.			
6.			
	45	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 62.5 (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 ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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.)

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UP

SOIL Sampling Point: 1 WC-7

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
5	10YR 5/2	100					SL	
12	2.5Y 7/3	85	10YR 5/6	15	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

- ___ 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)

[3]Indicators 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:

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WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

WET

Project/Site: Sandy Creek City/County: Durham / Durham Sampling Date: 9-18-14

Applicant/Owner: NC EEP State: NC Sampling Point: WD-6

Investigator(s): C Shearls ; J. Roberts Section, Township, Range:

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR or MLRA): LRR-P Lat: 35.9678 Long: -78.9694 Datum: NAD83

Soil Map Unit Name: Chewacla / Wehadkee NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation N, Soil N, or Hydrology N 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 ✓ No	Is the Sampled Area within a Wetland? Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	

Remarks: Wetland WD also includes the wetland restoration area.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ 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 ✓	Depth (inches):
Water Table Present?	Yes ___ No ✓	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ✓ No ___	Depth (inches): 3

Wetland Hydrology Present? Yes ___ No

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

Remarks:

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WET

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: WD-6

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 10m²)			
1. Acer rubrum	20	Y	FAC
2. Platanus occidentalis	15	N	FACW
3. Salix nigra	50	Y	OBL
4.			
5.			
6.			
7.			
8.			
	85 = Total Cover		
Sapling/Shrub Stratum (Plot size: 10m²)			
1. Platanus occidentalis	10	Y	FACW
2. Salix nigra	20	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	30 = Total Cover		
Herb Stratum (Plot size: 5m²)			
1. Microstegium vimineum	65	Y	FAC
2. Boehmeria cylindrica	10	N	FACW
3. Mecardonia Kellogii	25	Y	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: 5m²)			
1. Parthenocissus quinquefolia	10	Y	FACU
2. Lonicera japonica	15	Y	FAC
3.			
4.			
5.			
6.			
	25 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 87.5 (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 ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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.)

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WET

SOIL

Sampling Point: WD-6

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
4	10YR 4/1	75	7.5YR 4/4	25	C	M, PL	SiL	
8	10YR 5/2	65	10YR 6/3	35	C	M	FSiL	
14	10YR 5/2	60	10YR 6/3	40	C	M	FiSL	
18+	10YR 5/1	70	10YR 5/6	30	C	M	SiL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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)
- X 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 Soils[3]:

- ___ 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)

[3]Indicators 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:

A more detailed soil description of the restoration area is included in the close out report

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UP

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Sandy Creek City/County: Durham / Durham Sampling Date: 9-18-14
Applicant/Owner: NCEEP State: NC Sampling Point: WD-6
Investigator(s): C. Sheats ; J. Roberts Section, Township, Range:
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Linear Slope (%): 2
Subregion (LRR or MLRA): LRR-P Lat: 35.9678 Long: -78.9694 Datum: NAD 83
Soil Map Unit Name: Chewacla / Wehadkee NWI classification: PEMIG
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No
Are Vegetation N, Soil N, or Hydrology N 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 ____ No ✓	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____ No ✓	
Wetland Hydrology Present?	Yes ✓ No	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ 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 ____	Depth (inches):
Water Table Present?	Yes ____ No ____	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ____ No ____	Depth (inches):

Wetland Hydrology Present? Yes ____ No ✓

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

Remarks:

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UP

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: WD-6

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 10m²)			
1. Fraxinus pennsylvanica	60	Y	FACW
2. Acer rubrum	30	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	90	= Total Cover	
Sapling/Shrub Stratum (Plot size: 10m²)			
1. Acer negundo	35	Y	FAC
2. Celtis laevigata	5	N	FACW
3. Elaeagnus umbellata	10	N	N/I
4. Acer rubrum	15	Y	FAC
5.			
6.			
7.			
8.			
9.			
10.			
	65	= Total Cover	
Herb Stratum (Plot size: 5m²)			
1. Microstegium vimineum	55	Y	FAC
2. V. alternifolia	20	Y	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75	= Total Cover	
Woody Vine Stratum (Plot size: 5m²)			
1. Lonicera japonica	25	Y	FAC
2.			
3.			
4.			
5.			
6.			
	25	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 7 (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 ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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.)

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UP

SOIL Sampling Point: WD-6

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
5	10YR 4/3	100					SL	
9	10YR 5/4	100					S	
14	10YR 5/6	100					S	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

- ___ 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)

[3]Indicators 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:

US Army Corps of Engineers — Eastern Mountains and Piedmont – Version 2.0

WET

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Sandy Creek WE City/County: Durham / Durham Sampling Date: 10-22-14
Applicant/Owner: NC EEP State: NC Sampling Point: WE-5
Investigator(s): C. Shents; J. Roberts Section, Township, Range:
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 2
Subregion (LRR or MLRA): LRR-P Lat: 35.9620 Long: -78.9686 Datum: NAD83
Soil Map Unit Name: Chewacla / Wehadkee NWI classification: PSS3/1Ad
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No
Are Vegetation N, Soil N, or Hydrology N 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 ✓ No	**Is the Sampled Area within a Wetland?** Yes ✓ No
Hydric Soil Present?	Yes ✓ No	
Wetland Hydrology Present?	Yes ✓ No	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ 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 ✓	Depth (inches):
Water Table Present?	Yes ___ No ✓	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ___ No ✓	Depth (inches):

Wetland Hydrology Present? Yes ✓ No

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

Remarks:

Wetland within active floodplain of Sandy Creek.

US Army Corps of Engineers — Eastern Mountains and Piedmont – Version 2.0

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: VE-5

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 2m x 10m)			
1. S. nigra	55	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	55 = Total Cover		
Sapling/Shrub Stratum (Plot size: 2m x 10m)			
1. A. rubrum	10	Y	FAC
2. H. tinctoria	5	Y	FACW
3. F. pennsylvanica	10	Y	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	25 = Total Cover		
Herb Stratum (Plot size: 2m x 2m)			
1. M. viminalis	10	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10 = Total Cover		
Woody Vine Stratum (Plot size: 2m x 2m)			
1. L. japonica	45	Y	FAC
2. C. radicans	10	N	FAC
3.			
4.			
5.			
6.			
	55 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (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 ≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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.)

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Eastern Mountains and Piedmont – Version 2.0

WET

SOIL

Sampling Point: WE-5

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
4	10YR 4/2	70	10YR 4/6	30	C	M, PL	L	oxidized root channels
16+	10YR 5/2	65	10YR 4/6	35	C	M	SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

- ___ 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)

[3]Indicators 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:

US Army Corps of Engineers

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WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

UP

Project/Site: Sandy Creek WE City/County: Durham / Durham Sampling Date: 10-22-14

Applicant/Owner: NCEEP State: NC Sampling Point: WE-5

Investigator(s): C. Shows, J. Roberts Section, Township, Range:

Landform (hillslope, terrace, etc.): hillside / slope Local relief (concave, convex, none): Linear Slope (%): 10

Subregion (LRR or MLRA): LRR-P Lat: 35.9690 Long: -78.9696 Datum: NAD83

Soil Map Unit Name: Wehadkee / Chewacla NWI classification: —

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No

Are Vegetation N, Soil N, or Hydrology N 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 ____ No	**Is the Sampled Area within a Wetland?**	**Yes ____ No ✓**
Hydric Soil Present?	Yes ____ No ✓		
Wetland Hydrology Present?	Yes ____ No ✓		

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ 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 ____ Depth (inches):	
Water Table Present?	Yes ____ No ____ Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes ____ No ____ Depth (inches):	**Wetland Hydrology Present? Yes ____ No ✓**

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

Remarks:

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UP

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: VE-5

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 2m x 10m)			
1. P. virginiana	30	Y	FAC
2. A. rubrum	30	Y	FAC
3. L. styraciflua	30	Y	FAC
4.			
5.			
6.			
7.			
8.			
	90	= Total Cover	
Sapling/Shrub Stratum (Plot size: 2m x 10m)			
1. L. sinense	10	Y	FACU
2. A. negundo	20	Y	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	30	= Total Cover	
Herb Stratum (Plot size: 2m x 5m)			
1. M. viminium	15		FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	
Woody Vine Stratum (Plot size: 2m x 5m)			
1. T. radicans	10	N	FAC
2. C. japonica	35	Y	FAC
3. C. radicans	25	Y	FAC
4.			
5.			
6.			
	65	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 87.5 (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 ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators 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.)

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UP

SOIL Sampling Point: WC-5

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
7	10YR 4/3	100					SL	
14	10YR 5/4	95	10YR 4/3	5	D	M	SCL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: 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 Soils[3]:

- ___ 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)

[3]Indicators 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:

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Appendix G

Invasive Species Treatments

Appendix H

Watershed Planning Summary

Appendix I

Land Ownership and Protection

Appendix J

401/401 Permits and Related Correspondence

Appendix K

Debit Ledger