

WHITELACE CREEK STREAM AND WETLAND ENHANCEMENT
AND BUFFER RESTORATION SITE
2011 MONITORING REPORT (YEAR 6 OF 6)

Lenoir County, North Carolina
EEP Project No. 420
Constructed 2005



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



Status of Plan: Final
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Monitoring Firm:



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1.0 Executive Summary

The North Carolina Ecosystem Enhancement Program (EEP) enhanced 5,182 linear feet of the Whitelace Creek stream channel located west of Kinston, in Lenoir County, North Carolina. Additionally, 2.77 and 8.01 acres of wetland area were enhanced and preserved, respectively. Also, 12.99 acres (565,734 square feet) of riparian buffer were restored. The site construction was completed in August of 2005, and planting occurred in March of 2006. This report provides the monitoring information for year six (6) of the stream enhancement and wetland restoration project.

Previous dredging and straightening of Whitelace Creek had lowered the streambed elevation, thereby causing a reduction in the acreage of riverine wetlands due to a lowered water table. Restoration and enhancement objectives for this project included the restoration of historic stream and wetland functions that existed on-site prior to dredging and vegetation removal. Site alterations at Whitelace Creek included the excavation or re-establishment of the floodplain and in-situ stream channel modification to the existing stream. The goals of these activities are as follows:

- to introduce surface water flood hydrodynamics from a 10.1 square mile watershed along the restored length of stream and floodplain
- to restore wetland hydrology
- to reforest the site with streamside and riparian forest communities.

The Year 6 vegetative monitoring was performed on October 5, 2011, using the Carolina Vegetation Survey Level 2 methodology on 9 of the original 15 plots, as requested by NCEEP. Refer to Table 7 and the Current Condition Plan View (CCPV) Map in the appendices for the vegetation results. Monitoring revealed that only 2 of the 9 plots (22%) met the 5-year vegetative success criteria of 260 planted stems or greater per acre for streams and wetlands. When volunteer stems are included, all of the vegetation plots meet or exceed the required density of 260 stems or greater per acre, with the average vegetation density across the site being 2,788 stems per acre (planted and volunteer). Located within the Neuse River Basin, this project was instituted prior to October 11, 2007 and is therefore eligible for riparian buffer restoration credit up to 200 feet from the top of bank of all perennial and intermittent waterways within the conservation easement. As such, applicable vegetation plots have been assessed for the vegetation success criteria for buffers (320 planted trees or greater per acre). Vegetation Plots 4 and 6 lie within the riparian buffer restoration areas of the project site (refer to the CCPV Map). Only Vegetation Plot 4 is currently meeting the vegetation success criteria of 320 planted trees or greater per acre. When volunteer trees are also included, both Vegetation Plot 4 and Vegetation Plot 6 meet or exceed the required density of 320 trees or greater per acre.

Many factors have contributed to the loss of planted species and include drought (2007), direct beaver damage and excessive flooding due to beaver activity. Mowing has occurred along both sides of the main farm road in the area around the bridge. As of the monitoring visit, beavers had not rebuilt any dams in the project area and there are no signs of new beaver activity. However, previous beaver activity,

flooding, and deer browsing affected many of the planted trees in vegetation plots. It should be noted that vigorous woody volunteer recruitment (especially *Betula nigra*) is present in the upper section of the reach near Vegetation Plots 1 and 2.

Other problems continue to include the presence of invasive or exotic species such as *Typha latifolia* and *Lespedeza cuneata*. Existing areas of *Typha* are located in small pockets along the middle to lower end of the project with the densest areas at the downstream end of the site. Currently *Typha* does not appear to be negatively impacting the planted woody vegetation. *Lespedeza* is present along the drier slopes near Vegetation Plots 1 and 2 and does not appear to be spreading into the floodplain. *Murdannia keisak* observed in past years was not observed in significant amounts in MY6.

As in previous years, a general assessment of stream stability was conducted. Results were the same as in the past in that the stream is stable and is well connected to the floodplain. Stream channels bars are still present which could lead to lateral migration and bank instability; however, migration and instability were not observed during current monitoring.

Groundwater data collected through October of 2011 was used to assess the compliance of the site with wetland hydrology criteria. Seven groundwater monitoring gauges are currently active on the project site. A site is considered to meet the requirements for wetland hydrology if the groundwater level is within 12 inches of the ground surface for 12.5% of the growing season consecutively. All 7 of the gauges met the criteria during the growing season of 2011. Three reference gauges are also currently active. All three of the reference gauges met the success criteria in 2011.

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

2.0 Methodology

2.1 VEGETATION ASSESSMENT

Fifteen vegetative sample plots were quantitatively monitored during the first growing season. Species composition, density, and survival were monitored during Year 0 and Year 1. The number of plots was reduced to nine for monitoring in the second year, as requested by NCEEP. These plots include the original plots named VP1, VP2, VP4, VP6, VP8, VP9, VP11, VP14, and VP15. The Carolina Vegetation Survey (CVS) methodology Version 2.2.7 was utilized for vegetative monitoring in Years 2, 3, 4, 5 and 6. Level 2 (planted and natural stems) methodology was completed on all monitored plots.

The vegetative success criteria are based on the US Army Corps of Engineers Stream Mitigation Guidelines (USACE, 2003). In the stream and wetland restoration areas, the final vegetative success criteria are the survival of 260 5-year old planted woody stems per acre at the end of the Year 5 monitoring period. An interim measure of vegetation planting success was the survival of at least 320 3-year old planted woody stems per acre at the end of year 3 of the monitoring period. A ten percent mortality rate was accepted in year four (288 stems/acre) and another ten percent in year five resulting in a required survival rate of 260 trees/acre through year five. Located within the Neuse River Basin, this project was instituted prior to October 11, 2007 and is therefore eligible for riparian buffer restoration credit up to 200 feet from the top of bank of all perennial and intermittent waterways within the conservation easement. The vegetative success criteria for the riparian buffer restoration areas is 320 planted trees per acre at the end of Monitoring Year 5.

The Year 6 stem counts within each of the nine vegetative monitoring plots are included in Exhibit Table 7 in Appendix C. Photos of the vegetative monitoring plots are also included in Appendix C.

2.2 STREAM ASSESSMENT

Changes in stream profile and pattern were not included in the stream enhancement project for Whitelace Creek. As such, cross-section and longitudinal profile surveys and pebble counts were not performed for the Year 6 monitoring, as directed by NCEEP. However, a general assessment of stream stability and problem areas was performed during field reconnaissance.

2.3 WETLAND ASSESSMENT

A site is considered to meet the requirements for wetland hydrology if the groundwater saturation is within 12 inches of the ground surface consecutively for 12.5% of the growing season (30 Days). The growing season in this area is from March 18th to November 8th for a total of 234 days (NRCS 2002). Seven groundwater monitoring gauges are currently active on the project site. Data from these gauges were collected and analyzed to assess their success. Three reference gauges are located northwest of the project site. Reference gauges 1 & 2 are located near the intersection of Sutton Road with Moseley Creek. Reference gauge 3 is located between Hillcrest Road and Moseley Creek, approximately 5,500 feet north of Route 70. Please refer to the project Vicinity Map (Figure 1) in Appendix A for locations of the reference groundwater monitoring gauges. Graphs of precipitation and water level plots are included in Appendix E.

3.0 References

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

NC CRONOS. 2011. NC CRONOS Database – Cunningham Research Station (KINS). North Carolina State University State, Climate Office of North Carolina. <http://www.nc-climate.ncsu.edu/cronos>

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

NRCS. 2002. WETS Table for Lenoir County, NC. Natural Resource Conservation Service, National Water and Climate Center.

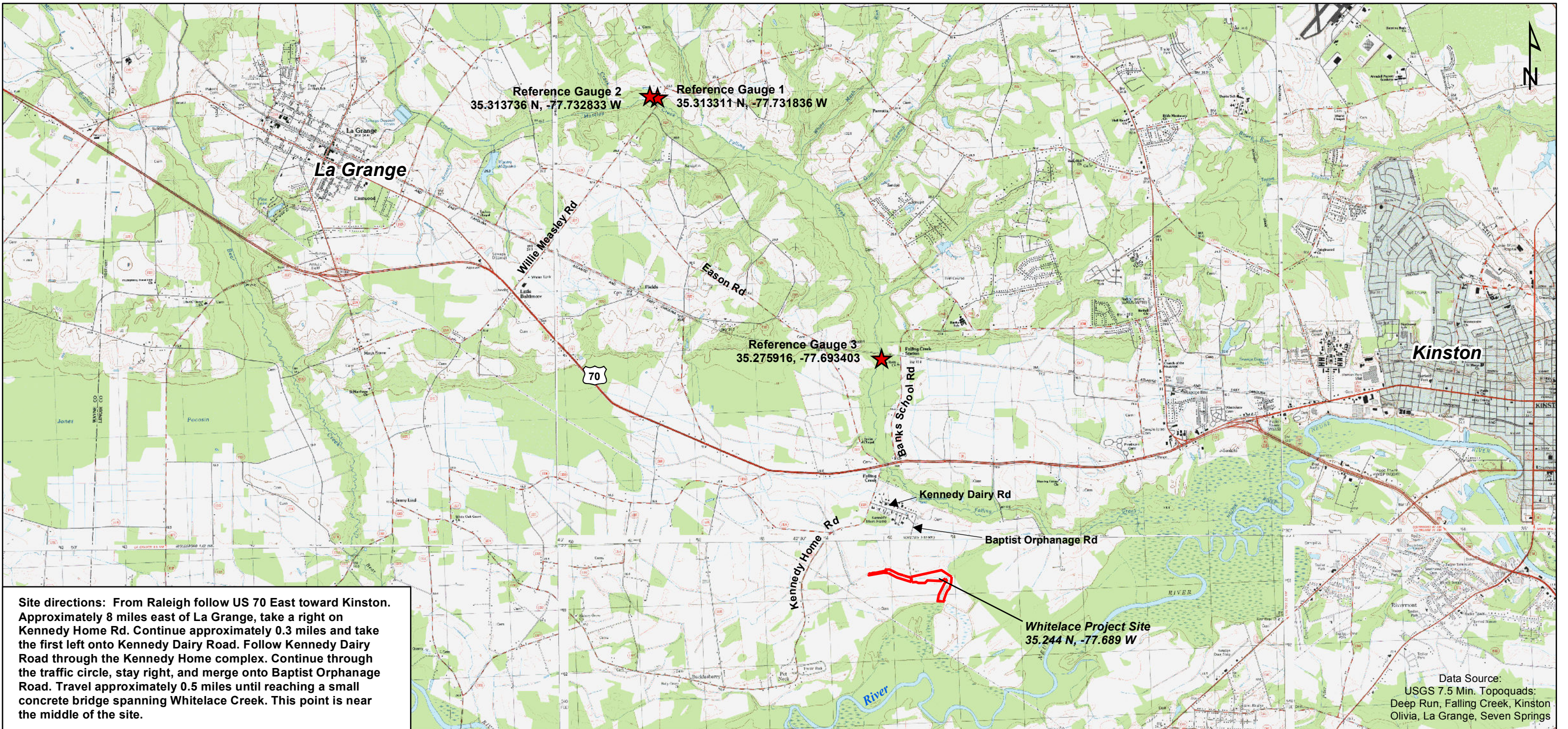
USACE, EPA, NCWRC, NCDWQ. 2003 Stream Mitigation Guidelines

Weakley, Alan S. 2007. Flora of the Carolinas, Virginia, Georgia, and surrounding areas. University of North Carolina Herbarium. Chapel Hill, NC. Working draft as of January 11, 2007.

Project Condition and Monitoring Data Appendices

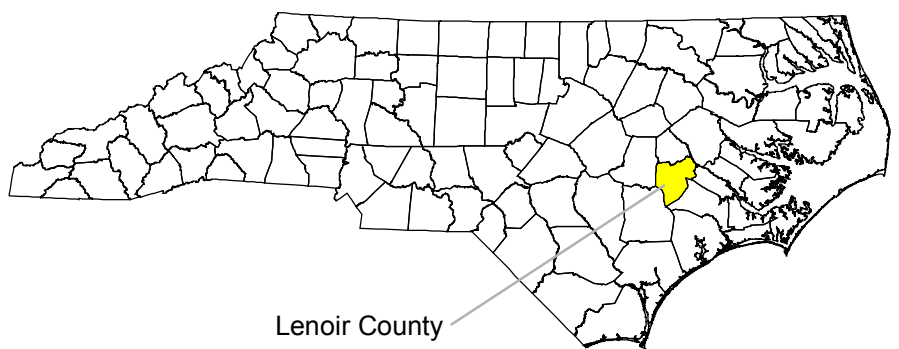
APPENDIX A. GENERAL FIGURES AND PLAN VIEWS

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Site directions: From Raleigh follow US 70 East toward Kinston. Approximately 8 miles east of La Grange, take a right on Kennedy Home Rd. Continue approximately 0.3 miles and take the first left onto Kennedy Dairy Road. Follow Kennedy Dairy Road through the Kennedy Home complex. Continue through the traffic circle, stay right, and merge onto Baptist Orphanage Road. Travel approximately 0.5 miles until reaching a small concrete bridge spanning Whitelace Creek. This point is near the middle of the site.

Data Source:
USGS 7.5 Min. Topoquads:
Deep Run, Falling Creek, Kinston
Olivia, La Grange, Seven Springs



Lenoir County

- Reference Gauges
- Conservation Easement

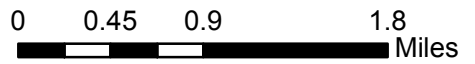


Figure 1 - Vicinity Map
Whitelace Creek Stream and Wetland Enhancement
and Buffer Restoration, EEP #420
Lenoir County, North Carolina
November, 2011



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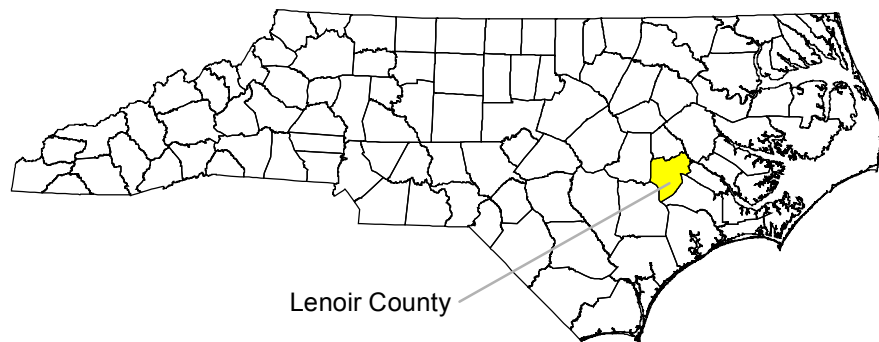


Vegetation Plot #	Latitude	Longitude
VP1	35.245374	-77.695706
VP2	35.245693	-77.693525
VP3	35.245816	-77.692543
VP4	35.245045	-77.691214
VP5	35.244686	-77.689734
VP6	35.244803	-77.689366
VP7	35.244762	-77.687896
VP8	35.244473	-77.687036
VP9	35.245153	-77.685003
VP10	35.244632	-77.684773
VP11	35.244641	-77.683601
VP12	35.245354	-77.683628
VP13	35.244934	-77.682950
VP14	35.243818	-77.682330
VP15	35.241601	-77.684023

*highlighted veg plots were monitored 2007-2011

Vegetation Plot	Planted		Planted + Volunteer	
	Stems/acre	Trees/acre	Stems/acre	Trees/acre
VP1	202	202	850	809
VP2	81	81	16,268	16,268
VP4	364	364	1,740	1,538
VP6	162	162	688	486
VP8	243	243	1,821	1,740
VP9	283	283	1,538	1,334
VP11	40	40	1,335	1,335
VP14	243	243	283	283
VP15	162	162	607	607

Groundwater Monitoring Gauges	Latitude	Longitude
GW1	35.245458	-77.695119
GW2	35.245309	-77.691928
GW3	35.244697	-77.689966
GW4	35.245743	-77.692231
GW5	35.245104	-77.690508
GW6	35.244809	-77.687952
GW7	35.244874	-77.686651



Lenoir County

Assets

- Stream Enhancement I (3,293 lf)
 - Stream Enhancement II (1,889 lf)
 - Wetland Enhancement (2.77 ac)
 - Wetland Preservation (8.01 ac)
 - Buffer Restoration (565,734 sq ft)
- Vegetation Plots**
- Not Monitored (6)
 - Monitored (9)
 - Photo Points (V=Veg, S=Stream)
- Monitoring Gauges**
- Successful for MY6 (7)

- Crest Gauge
- Conservation Easement
- Major Vegetation Problem Areas**
- Weak
- Minor Vegetation Problem Areas**
- Lespedeza
- Typha
- Possible Encroachment



Figure 2 - Current Condition Plan View Map MY6
 Whitelace Creek Stream and Wetland Enhancement
 and Buffer Restoration, EEP #420
 Lenoir County, North Carolina
 November 2011



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APPENDIX B. GENERAL PROJECT TABLES

Reach ID	Existing Feet/Acres	Type	Approach	Footage or Acreage	Stationing	Comment
Reach 1	3,293	E1	P2	3,293	7+84 - 40+77	Total accounts for 30 l.f. gap in easement at road crossing.
Reach 2	1,889	E2	SS	1,889	40+77 - 59+66	
Riverine Wetland Enhancement		E	NA	2.77 ac	NA	
Riverine Wetland Preservation		P	NA	8.01 ac	NA	
Neuse River Buffer Restoration		R	NA	12.99 ac	NA	

R = Restoration

P2 = Priority 2

E1 = Stream Enhancement 1

SS = Streambank Stabilization

E2 = Stream Enhancement 2

E = Wetland Enhancement

P = Preservation

Activity or Report	Scheduled Completion	Data Collection Complete	Actual Completion or Delivery
Restoration Plan	NA	NA	Feb 2004
Final Design - 90%	NA	NA	Nov 2004
Construction	Aug 2005	NA	Aug 2005
Temporary S&E mix applied to entire project area	NA	NA	Jul 2005
Permanent seed mix applied to entire project area	NA	NA	Aug 2005
Bare Root Seedling Installation	Mar 2006	NA	Mar 2005
Mitigation Plan / As-built (Year 0 Monitoring - baseline)	NA	NA	Apr 2005
Final Report	NA	NA	Apr 2005
Year 1 Monitoring	Nov 2006	Nov 2006	Nov 2006
Year 2 Monitoring	Nov 2007	Nov 2007	Dec 2007
Year 3 Monitoring	Nov 2008	Nov 2008	Nov 2008
Year 4 Monitoring	Nov 2009	Nov 2009	Nov 2009
Year 5 Monitoring	Nov 2010	Nov 2010	Nov 2010
Year 6 Monitoring	Nov 2011	Nov 2011	Nov 2011

NA = Not Applicable

Table 3. Project Contacts Whitelace Creek Wetland Restoration Site/EEP Project No. 420	
Designer	EcoScience Corporation 1101 Haynes Street Suite 101 Raleigh, NC 27604
Construction Contractor	Shamrock Environmental Corporation PO Box 14987 Greensboro, NC 27415
Planting Contractor	Emerald Forest Incorporated 4651 Backwoods Road Chesapeake, VA 23322-2456
Seeding Contractor	Wheat Swamp Landscaping 4675 Ben Dail Road LaGrange, NC 28551-8038
Seed Mix Sources	IKEX, Inc. PO Box 250 Middlesex, NC 27557
Nursery Stock Suppliers	Warren County Nursery 6492 Beersheba Highway McMinnville, TN 37110 Pinelands Nursery and Supply 323 Island Road Columbus, NJ 08022 Coastal Plain Conservation Nursery 3067 Connors Drive Edenton, NC 27932
Monitoring Performers (Year 0-1)	EcoScience Corporation 1101 Haynes Street, Suite 101 Raleigh NC 27604 (919)828-3433
Monitoring Performers (Year 2-6)	Stantec Consulting Services, Inc. 801 Jones Franklin Road, Ste 300 Raleigh, NC 27606
Stream Monitoring POC Vegetation Monitoring POC Wetland Monitoring POC	David Bidelspach (919)851-6866 Amber Coleman (919)851-6866 Amber Coleman (919)851-6866

**Table 4 - Project Attribute Table
Whitlace Creek Wetland Restoration Site/EEP Project No. 420**

Project County	Lenoir
Drainage Area	10.1 sq mi
Drainage impervious cover estimate (%)	< 1 percent
Stream Order	2 nd order
Physiographic Region	Coastal Plain
Ecoregion	Southeastern Floodplains and Low Terraces
Rosgen Classification of As-built	C/E
Cowardin Classification	R2UB23Cb (Riverine, Lower Perennial, Unconsolidated Bottom, Sand/Mud, Seasonally Flooded, Beaver)
Dominant soil types	
Riverine Wetland Restoration	Johnston, stream channels, 80% of Site
Riverine Wetland Enhancement	Johnston, stream channels, 80% of Site
Reference site ID	01-05471-01A
USGS HUC for Project	03020202040020
USGS HUC for Reference	03020202040020
NCDWQ Subbasin for Project	03-04-05
NCDWQ Subbasin for Reference	03-04-05
NCDWQ Classification for Project	C SW NSW
NCDWQ Classification for Reference	C SW NSW
Any portion of any project segment 303d listed?	No
Any portion of any project segment upstream of a 303d listed segment?	No
Reasons for 303d listing or stressor	No
Percent of project easement fenced	No

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Appendix C. Vegetation Assessment Data

Table 5 - Vegetation Plot Mitigation Success Summary		
Whitelace Creek Wetland Restoration Site / EEP Project No. 420		
Vegetation	Stream/Wetland Vegetation Density Met	Buffer Vegetation Density Met
Plot ID	(260 planted stems/acre)	(320 planted trees/acre)
VP1	N (202)	n/a
VP2	N (81)	n/a
VP4	Y (364)	Y (364)
VP6	N (162)	N (162)
VP8	N (242)	n/a
VP9	Y (283)	n/a
VP11	N (40)	n/a
VP14	N (243)	n/a
VP15	N (162)	n/a
Tract Mean	22% (198 planted stems/acre)	50% (263 planted trees/acre)

Vegetation Monitoring Plot Photos



Photo Station 1: Vegetation Plot 1 (10/05/11)



Photo Station 2: Vegetation Plot 2 (10/05/11).



Photo Station 3: Vegetation Plot 4 (10/05/11)



Photo Station 4: Vegetation Plot 6 (10/05/11)



Photo Station 5: Vegetation Plot 8 (10/05/11)



Photo Station 6: Vegetation Plot 9 (12/14/2011)



Photo Station 7: Vegetation Plot 11 (10/05/11)



Photo Station 8: Vegetation Plot 14 (12/14/2011)



Photo Station 9: Vegetation Plot 15 (10/05/11)

Table 6. Vegetation Metadata	
Report Prepared By	Alex Baldwin
Date Prepared	10/7/2011 10:52
database name	Stantec_Whitelace2011_A.mdb
database location	U:\175613003\Whitelace\project\site_data\cvs
computer name	BALDWINA
file size	28180480
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	420
project Name	Whitelace Creek
Description	Wetland restoration and enhancement
River Basin	Neuse
length(ft)	5900
stream-to-edge width (ft)	100
area (sq m)	80,937
Sampled Plots	9

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Table 7 - Stem Count Total by Plot and Species Whitelace Creek Stream Enhancement and Wetland Restoration Site EEP Project #420

		Current Plot Data (MY6 2011)																		Annual Means																								
Scientific Name	Common Name	Species Type	E420-Amber-0001			E420-Amber-0002			E420-Amber-0004			E420-Amber-0006			E420-Amber-0008			E420-Amber-0009			E420-Amber-0011			E420-Amber-0014			E420-Amber-0015			MY6 (2011)			MY5 (2010)			MY4 (2009)			MY3 (2008)			MY2 (2007)		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T			
Acer rubrum	red maple	Tree			9						3						34			23			13			1						83			84			87			19			4
Acer saccharinum	silver maple	Tree																														24			23									
Baccharis	baccharis	Shrub			1						5			5			2			5									18									22			6			
Baccharis halimifolia	eastern baccharis	Shrub																														81												
Betula nigra	river birch	Tree	1	1	1			400			1						1						16							1	1	418	1	1	12	2	2	6	2	2	3.58	1	1	3.5
Carpinus caroliniana var. ca	Coastal American Horn	Tree				1	1	1	1	1	1																			2	2	2	2	2	2	2	2	2	2	2	2			
Carya	hickory	Tree																														1						1						
Carya aquatica	water hickory	Tree													1	1	1										1	1	1	2	2	2	2	2	2	2	2	2	2	2	3			
Chamaecyparis thyoides	Atlantic white cedar	Tree							1	1	1																1	1	1	1	1	1	2	2	2	2	2	2	2	2	3			
Diospyros	diospyros	Tree																																				3						
Diospyros virginiana	common persimmon	Tree			1																								10			11			4			4						
Fraxinus	ash	Tree	1	1	1																						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
Fraxinus pennsylvanica	green ash	Tree				1	1	1	1	1	1																			2	2	2	2	2	2	4	4	4	4	4	4			
Ilex opaca	American holly	Tree															1															1												
Ligustrum sinense	Chinese privet	Exotic																														1												
Liquidambar styraciflua	sweetgum	Tree			4															2									1			7			7			38			18			7
Liriodendron tulipifera var.	Tulip-tree, Yellow Popl	Tree																																							2			
Nyssa biflora	swamp tupelo	Tree							2	2	2							2	2	2							4	4	4	6	6	6	6	6	6	6	6	6	5	5	5			
Nyssa sylvatica	blackgum	Tree			1																											1												
Pinus taeda	loblolly pine	Tree																																				8			8			
Platanus occidentalis var. o	Sycamore, Plane-tree	Tree																															1	1	1						1			
Prunus serotina	black cherry	Tree																														1												
Quercus	oak	Tree																						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2			
Quercus laurifolia	laurel oak	Tree	1	1	1							1	1	1	1	1	1										1	1	1	4	4	4	4	4	4	4	4	4	3	3	3			
Quercus lyrata	overcup oak	Tree							2	2	2																2	2	2	3	3	3	2	2	2	2	2	2	2	2	2			
Quercus michauxii	swamp chestnut oak	Tree													1	1	1	1	1	1							2	2	2	2	2	2	3	3	3	3	3	3	3	3	3			
Quercus nigra	water oak	Tree																						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1						
Quercus pagoda	cherrybark oak	Tree										1	1	1													2	2	2	2	2	2	3	3	3	3	3	3	3	3	3			
Quercus phellos	willow oak	Tree							1	1	1				1	1	1										2	2	2	2	2	2	3	3	3	2	2	2	2	2	2			
Salix nigra	black willow	Tree									25			8			2									3						38			28			38			18			
Taxodium distichum	bald cypress	Tree	2	2	2				1	1	1	1	1	1	3	3	3	3	3	3	1	1	1	6	6	6				17	17	17	16	16	16	18	18	18	16	16	16	15	15	15
Toxicodendron radicans	eastern poison ivy	Vine																																	4									
Ulmus americana var. amer	American Elm, White E	Tree																												1	1	1	1	1	1	1	1	1	1	1	1			
Ulmus rubra	slippery elm	Tree										1	1	1																1	1	1	1	1	1	1	1	1						
Unknown	unknown	unknown																																	1									
Vitis	grape	Vine																																	1									
	Stem count		5	5	21	2	2	402	9	9	43	4	4	17	6	6	45	7	7	38	1	1	33	6	6	7	4	4	15	44	44	620	48	48	219	57	57	345	50	50	163.6	53	53	77.5
	Tree count		5	5	20	2	2	402	9	9	38	4	4	12	6	6	43	7	7	33	1	1	33	6	6	7	4	4	15	44	44	602	48	48	185	57	57	263	50	50	142	53	53	71
	size (ares)		1			1			1			1			1			1			1			1			1			9			9			9			9			9		
	size (ACRES)		0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.22			0.22			0.22			0.22			0.22		
	Species count		4	4	9	2	2	3	7	7	11	4	4	6	4	4	8	4	4	8	1	1	4	1	1	2	4	4	6	16	16	23	17	17	29	18	18	28	15	15	23	16	16	20
	Trees per ACRE		202.3	202.3	809.4	81	81	16268.4	364.2	364.2	1538	161.9	161.9	485.6	242.8	242.8	1740	283.3	283.3	1335	40	40	1335	242.8	242.8	283.3	161.9	161.9	607	197.8	197.8	2707	215.8	215.8	831.9	256.3	256.3	1183	224.8	224.8	636.6	238.3	238.3	317
	Stems per ACRE		202.3	202.3	849.8	81	81	16268.4	364.2	364.2	1740	161.9	161.9	688	242.8	242.8	1821	283.3	283.3	1538	40	40	1335	242.8	242.8	283.3	161.9	161.9	607	197.8	197.8	2788	215.8	215.8	984.7	256.3	256.3	1551	224.8	224.8	735.5	238.3	238.3	348.5

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Appendix D. Stream Assessment Data



Photo Station 1 (S1) – Overview of Project (looking downstream from Sta.10+00 (10/05/11))



Photo Station 2 (S2) - Overview of upstream portion of reach (looking upstream from Sta.10+00 (10/05/11))

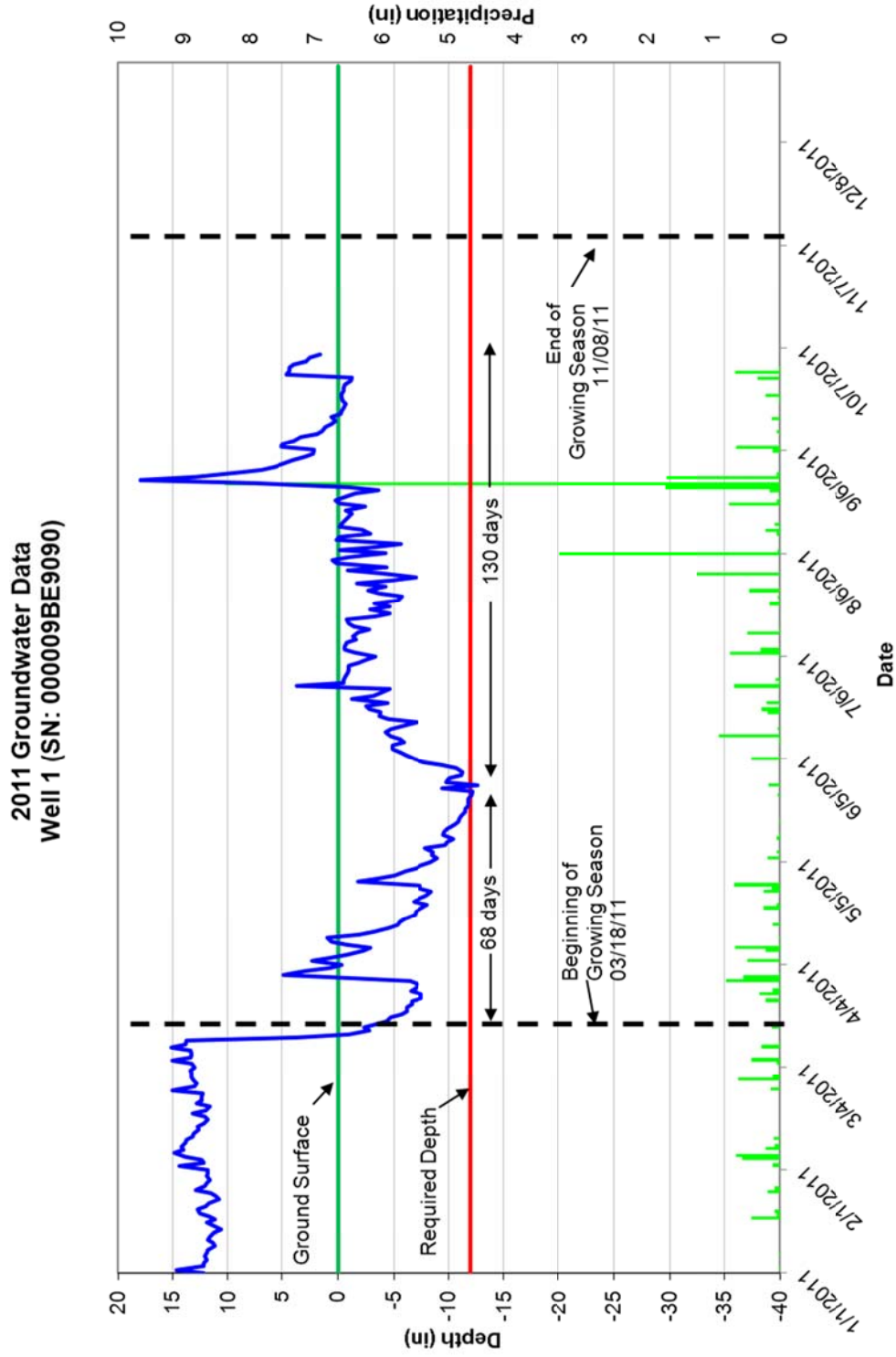


Photo Station 3 (S3) – Looking downstream from bridge (06/15/11)

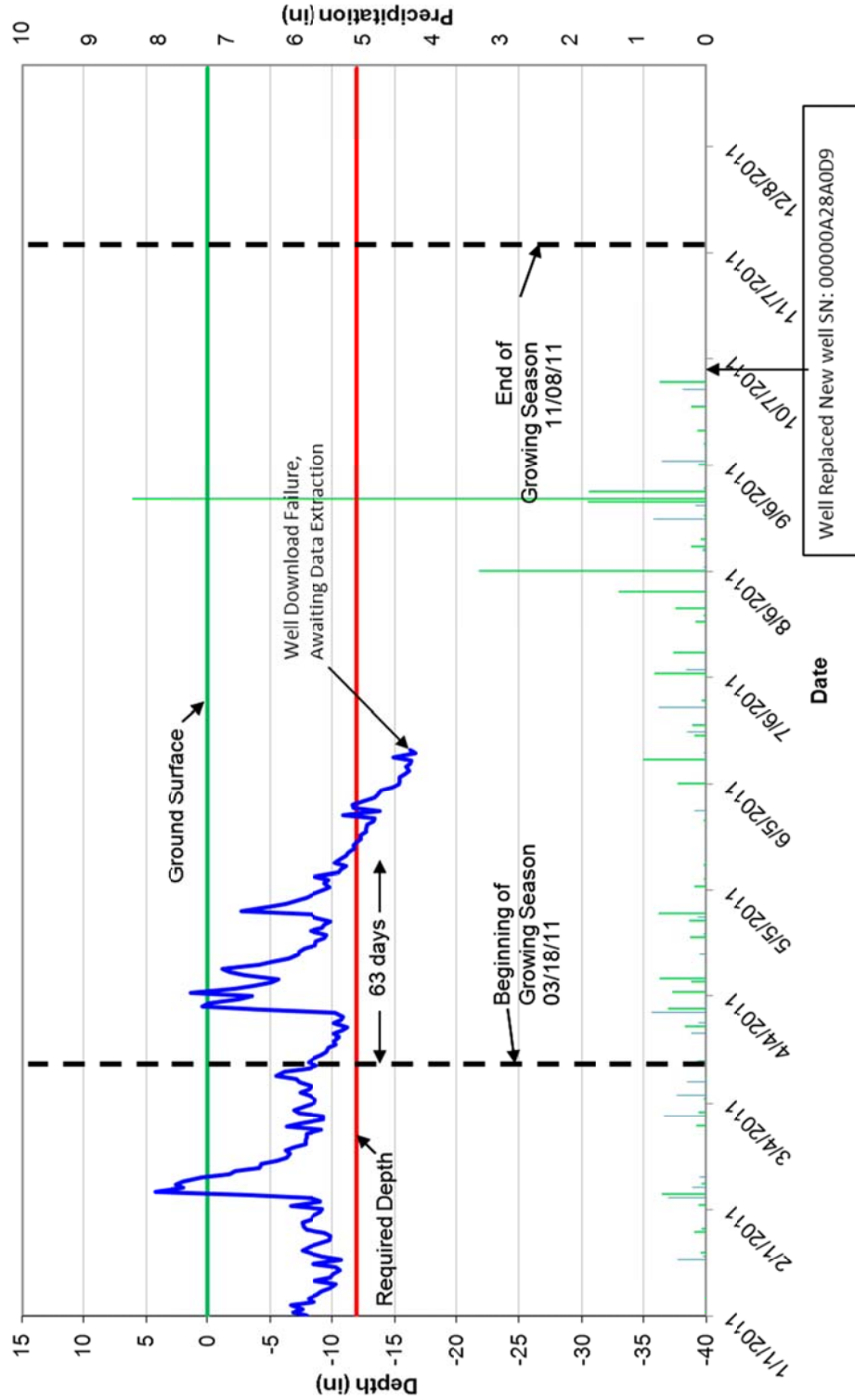


Photo Station 4 (S4) – Looking upstream from crest gauge (10/05/11)

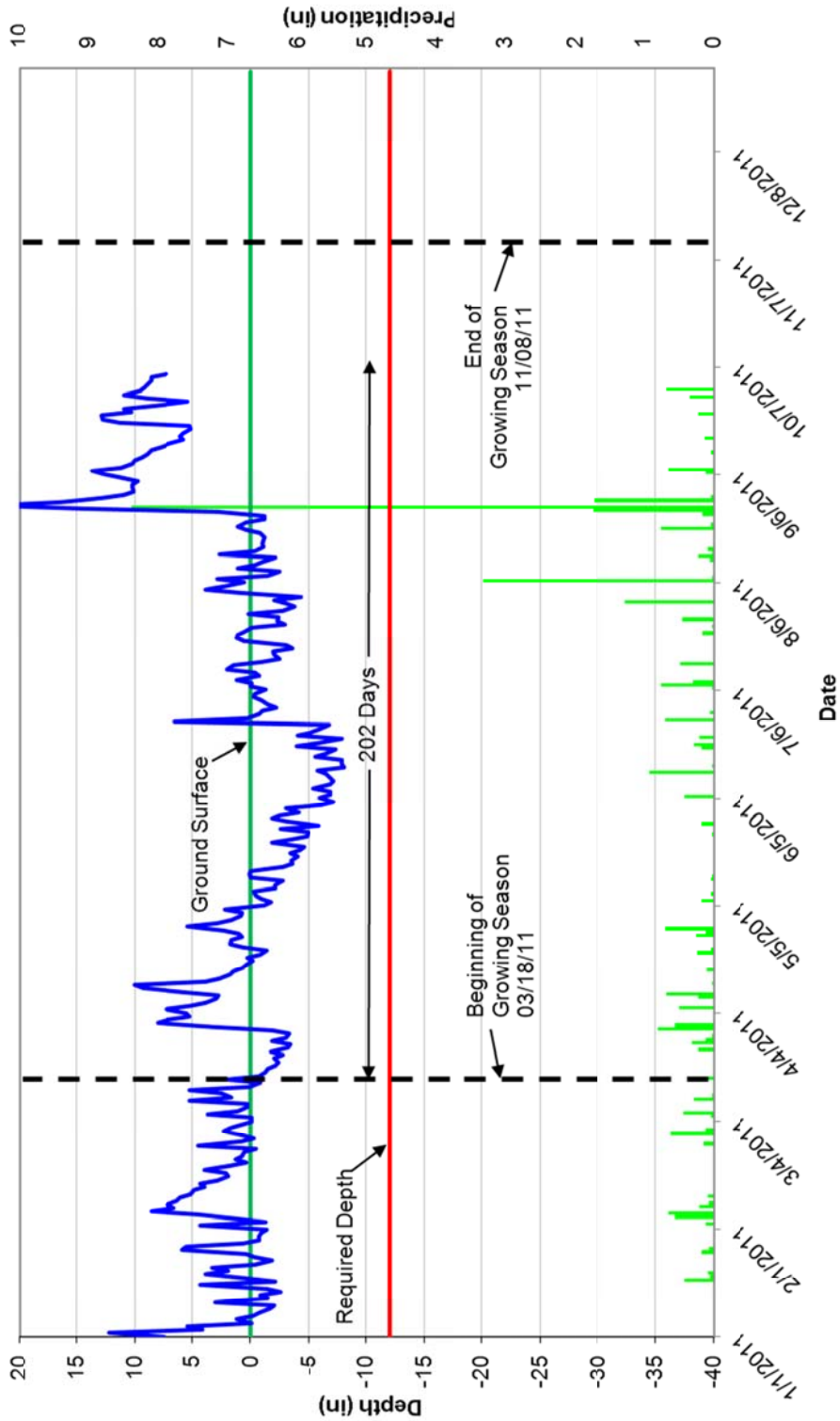
Appendix E. Wetland Assessment



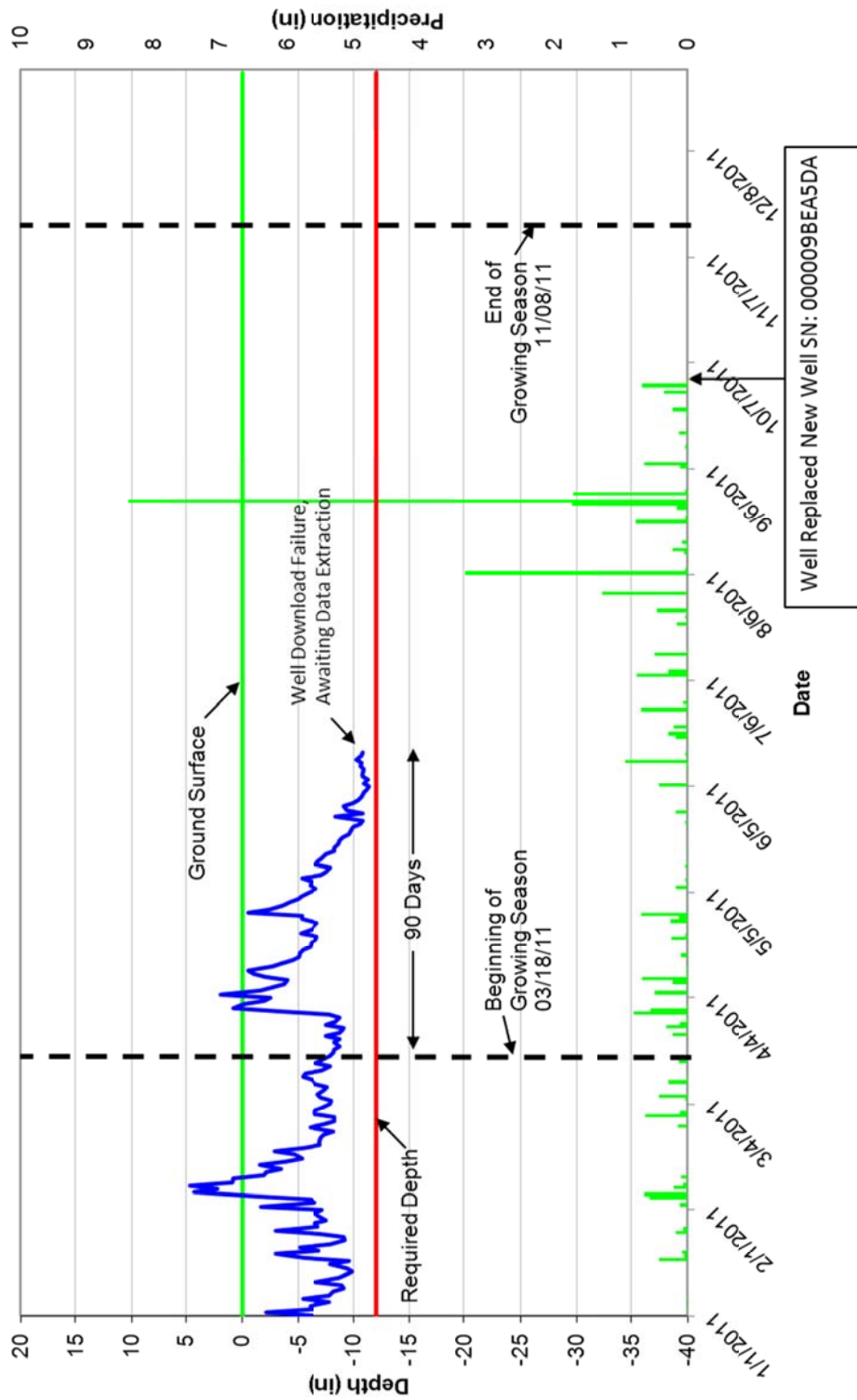
2011 Groundwater Data
Well 2 (SN: 00000EBD106E)



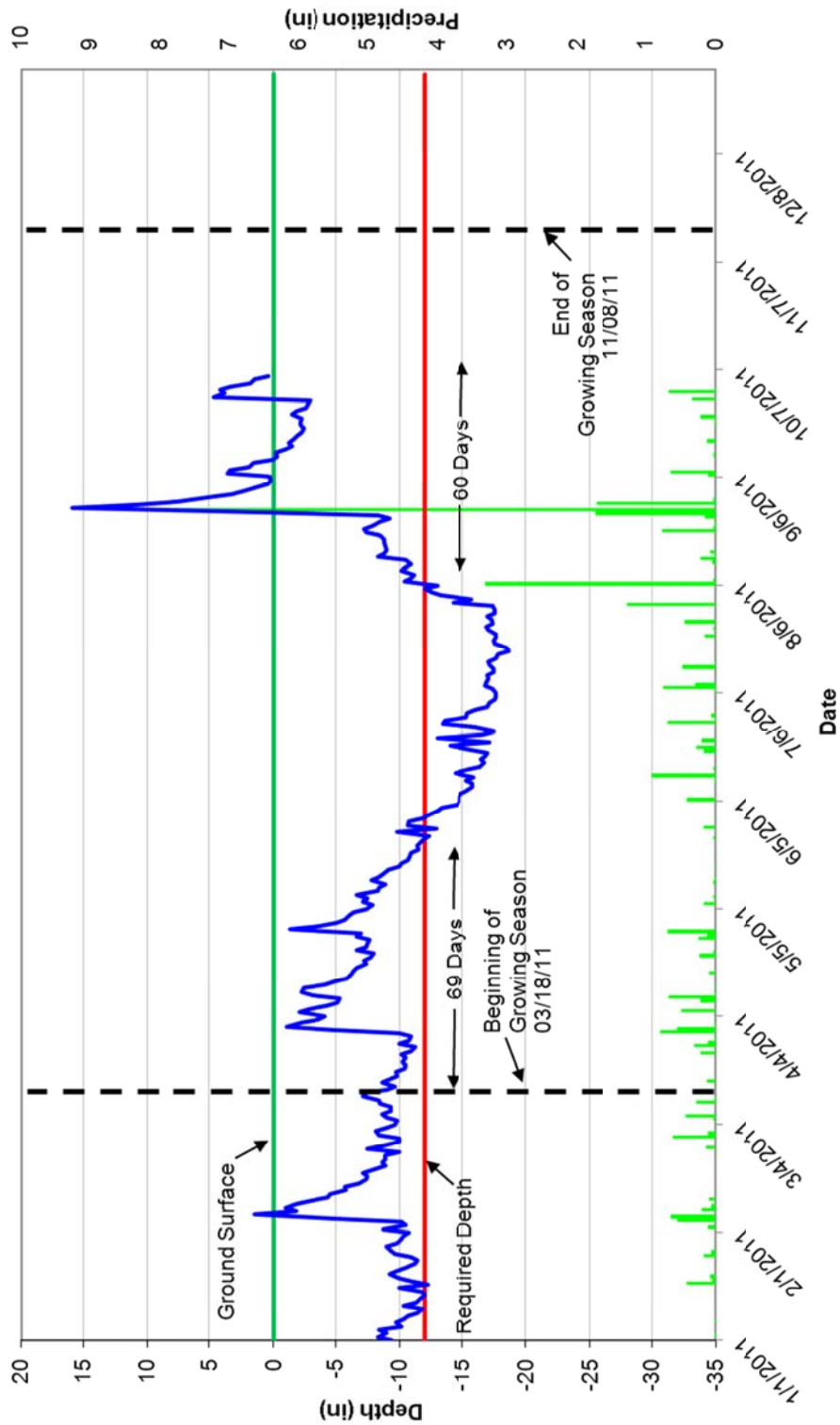
2011 Groundwater Data
Well 3 (SN: 00000A287A2A)



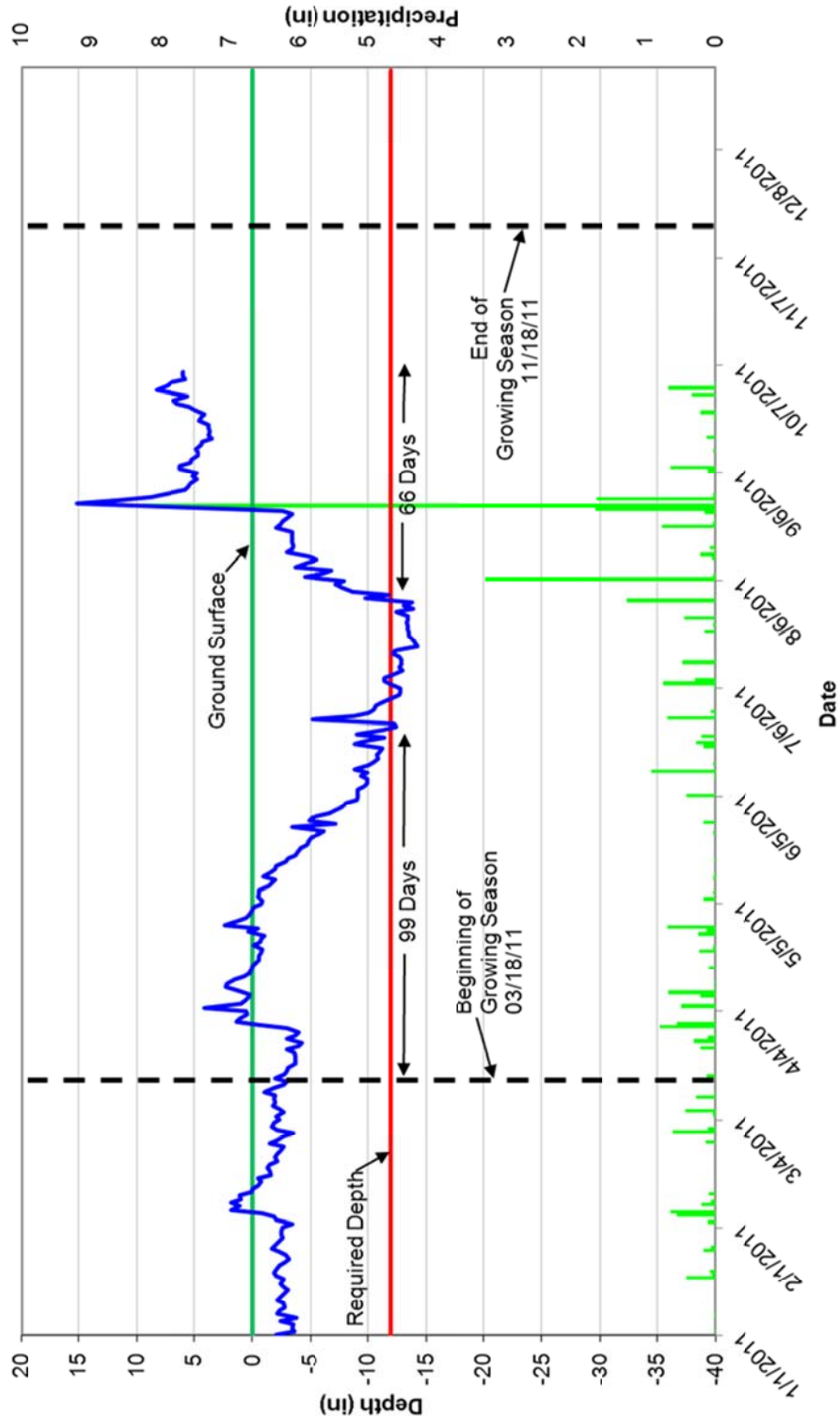
2011 Groundwater Data
Well 4 (SN: 00000EBDA66C)



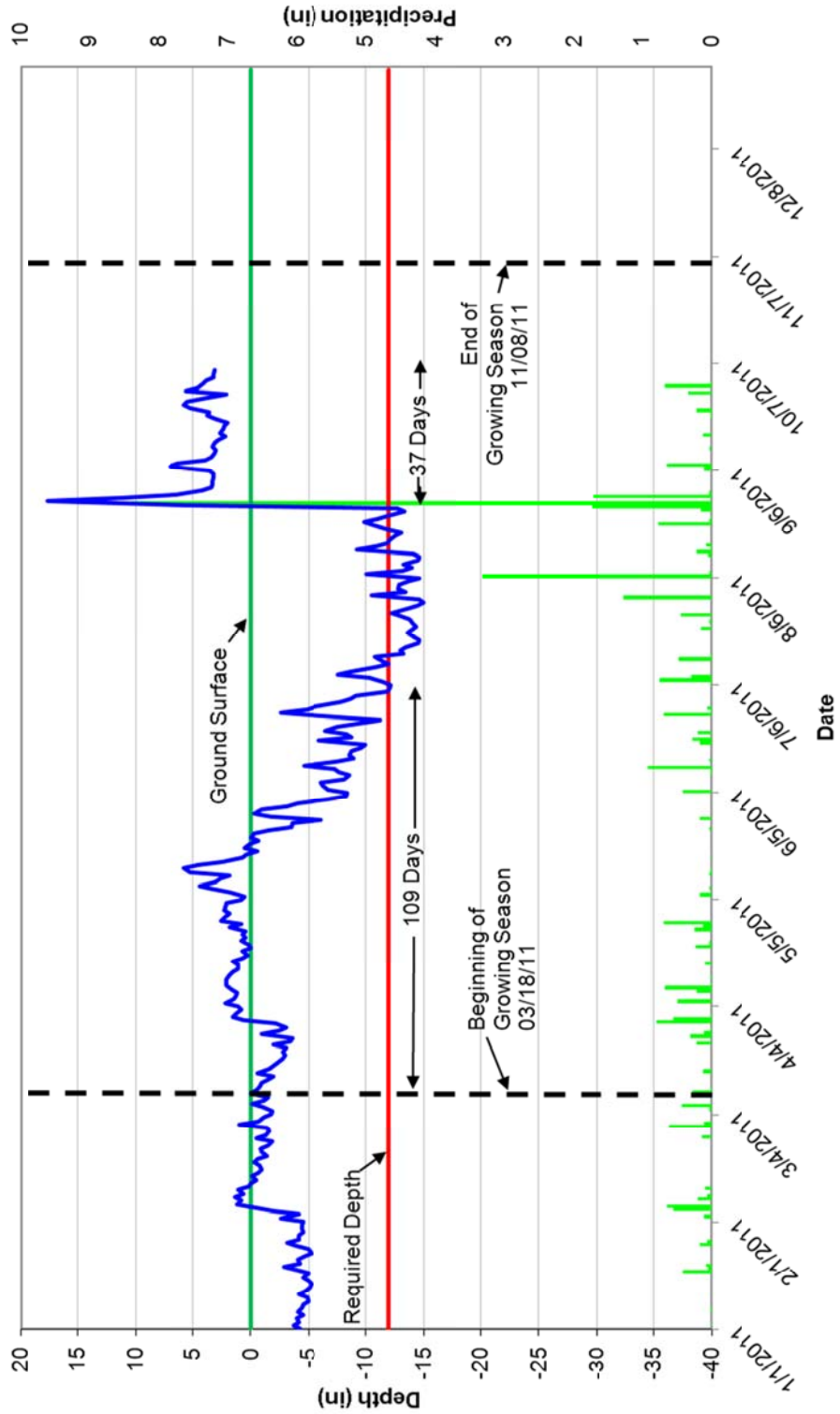
2011 Groundwater Data
Well 5 (SN: 00000EBCFF87)



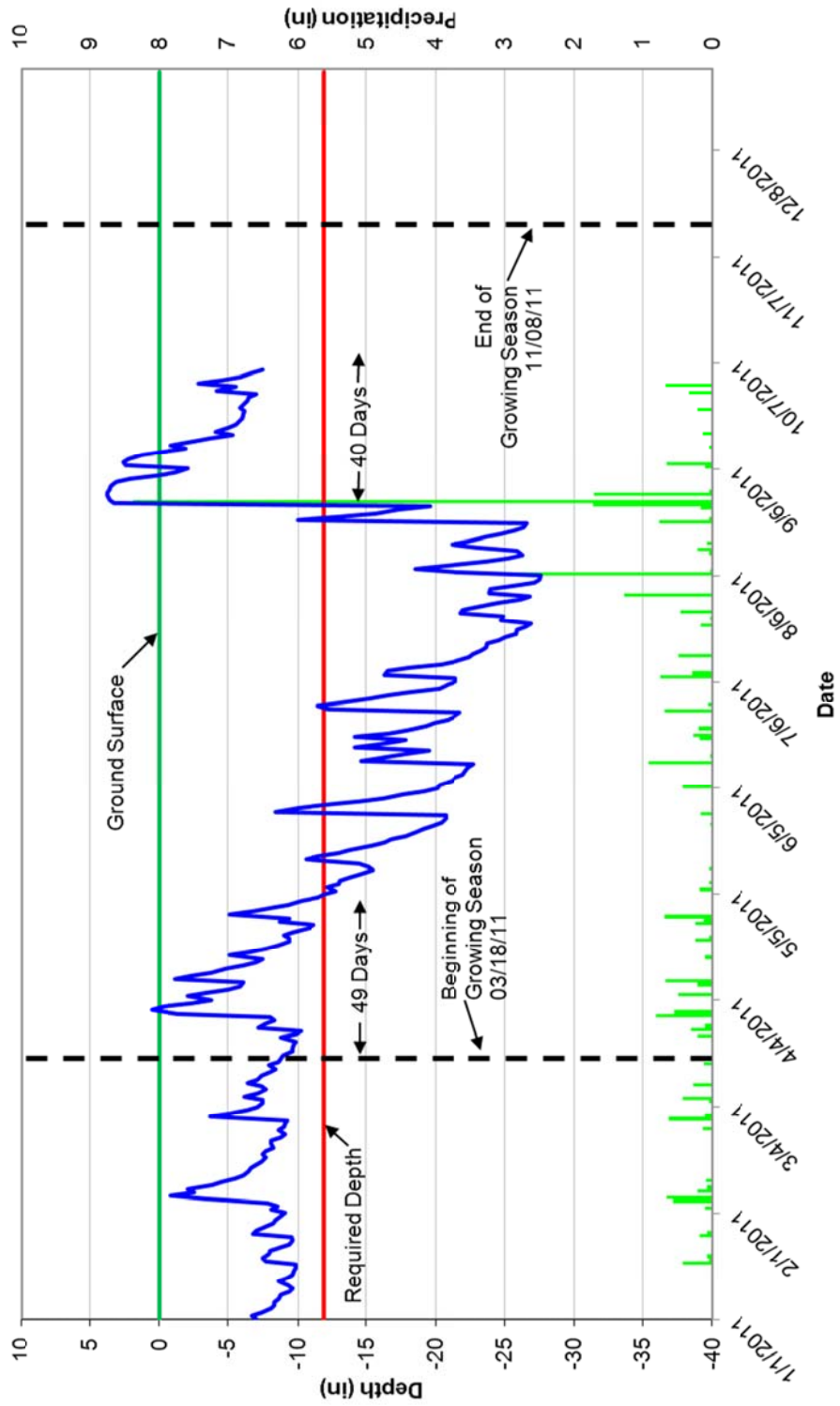
2011 Groundwater Data
Well 6 (SN: 00000A28C526)



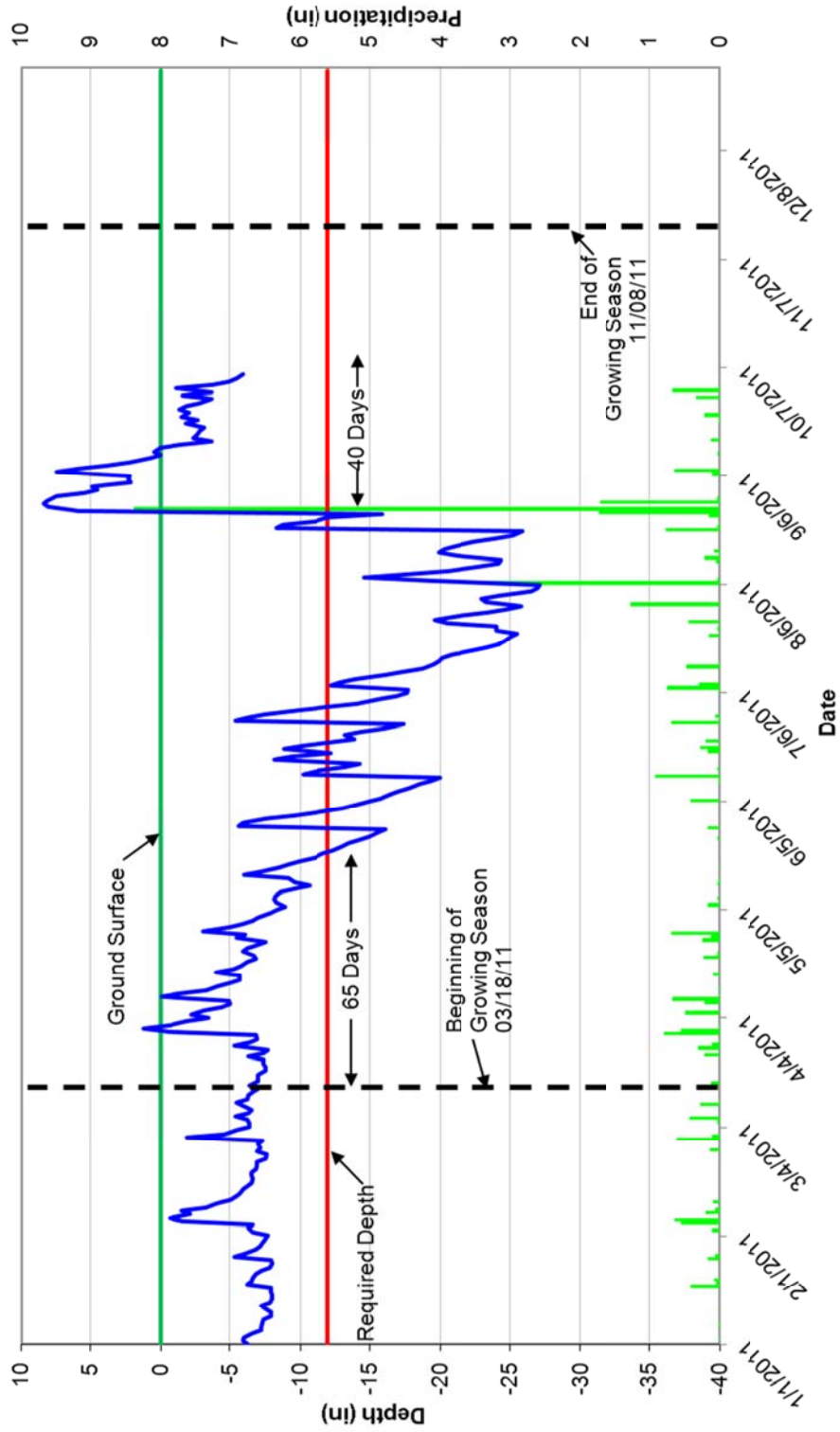
2011 Groundwater Data
Well 7 (SN: 00000EBD182C)



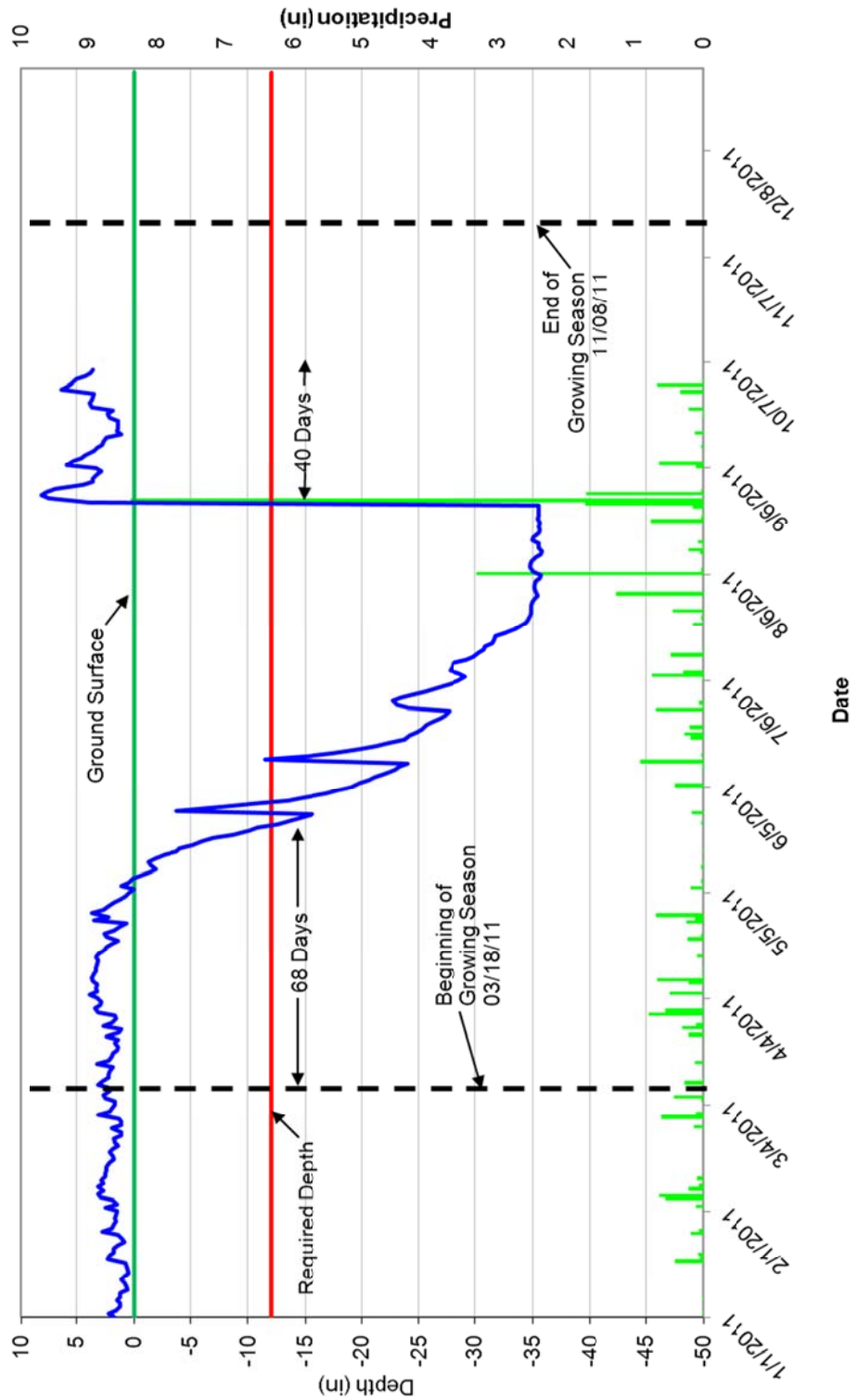
2011 Groundwater Data
 Well Ref-1 (SN: 000013152443)



2011 Groundwater Data
Well Ref-2 (SN: 000011310FE0)



2011 Groundwater Data
Well Ref-3 (SN:000009DE7694)



Whitlace Creek 2011 30-70 Percentile Graph
 Lenoir County, North Carolina

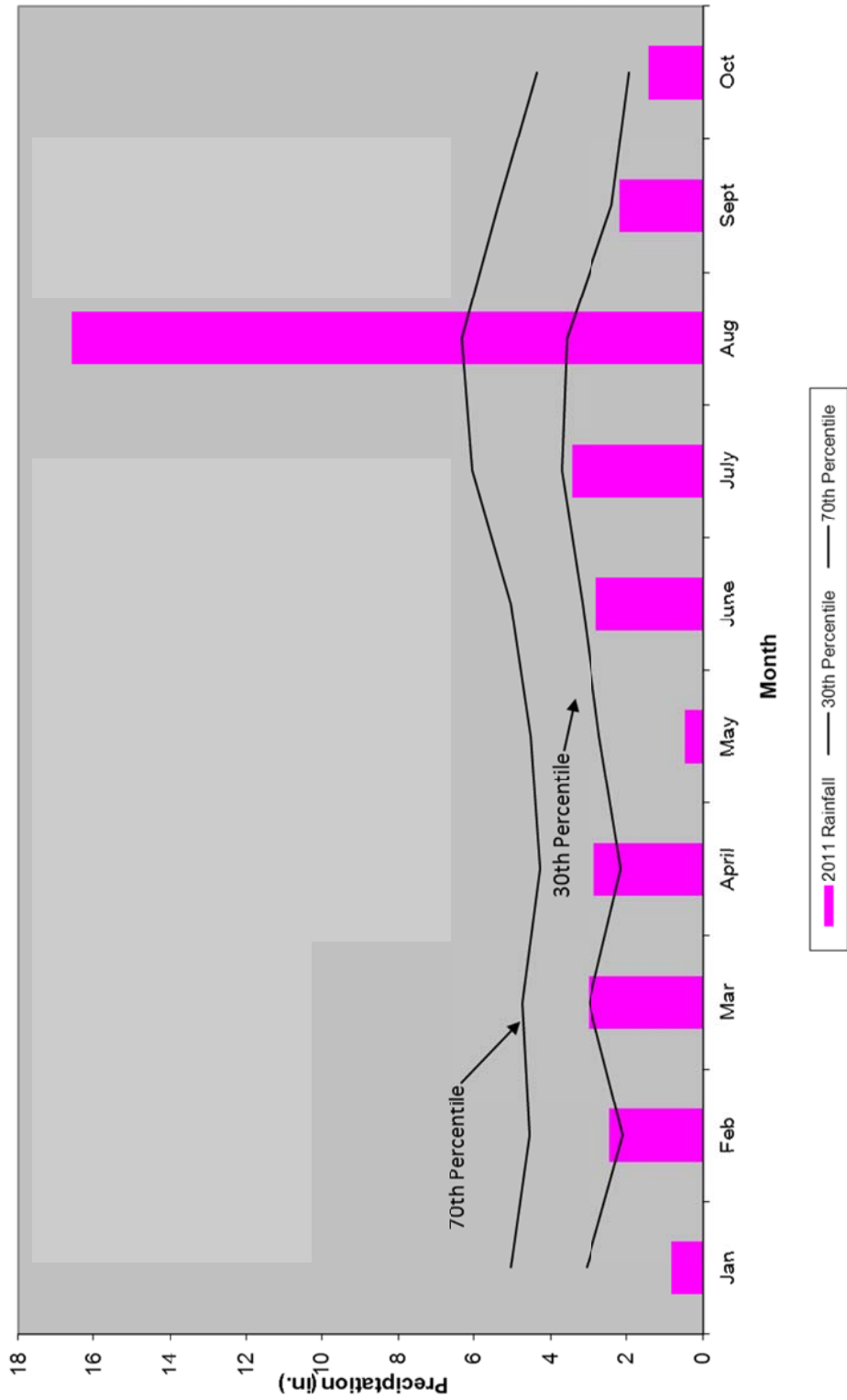


Table 10 - Summary of Groundwater Results for Years 1 - 6						
Whitelace Creek Stream Enhancement and Wetland Restoration Project / EEP Project No.						
Guage	Success Criteria Achieved/Max Consecutive Days During Growing Season (Percentage)					
	Year 1 (2006)	Year 2 (2007)	Year 3 (2008)	Year 4 (2009)	Year 5 (2010)	Year 6 (2011)
GW1	Yes/234 days (100%)	Yes/73 days (31%)	Yes/160 days (68 %)	Yes/234 days (100%)	Yes/234 days (100%)	Yes/130 days (56%)
GW2	Yes/140 days (60%)	No	Yes/93 days (40 %)	Yes/135 days (58%)	Yes/58 days (43%)	Yes/63 days (27%)
GW3	Yes/234 days (100%)	Yes/92 days (39 %)	Yes/106 days (45 %)	Yes/234 days (100%)	Yes/153 days (65%)	Yes/202 days (86%)
GW4	Yes/119 days (51 %)	No	Yes/38 days (16 %)	Yes/152 days (65%)	Yes/ 146 days (62%)	Yes/ 90 days (38%)
GW5	Yes/234 days (100%)	Yes/66 days (28 %)	Yes/94 days (40 %)	Yes/141 days (60%)	Yes/70 days (30%)	Yes/69 days (29%)
GW6	Yes/234 days (100%)	Yes/146 days (62 %)	Yes/118 days (50 %)	Yes/234 days (100%)	Yes/110 days (47%)	Yes/99 days (42%)
GW7	Yes/234 days (100%)	Yes/234 days (100 %)	Yes/107 days (46 %)	Yes/234 days (100%)	Yes/90 days (38%)	Yes/109 days (47%)
Reference Well 1	Yes/70 days (30 %)	Yes/450 days (19%)	Unknown	Yes/39 days (17%)	Yes/44 days (19%)	Yes/49 days (21%)
Reference Well 2	Yes/70 days (30 %)	Yes/93 days (40 %)	Unknown	Yes/45 days (19%)	Yes/83 days (35%)	Yes/65 days (28%)
Reference Well 3	Yes/70 days (30%)	Yes/159 days (68 %)	Yes/112 days (48 %)	Yes/125 days (53%)	Yes/82 days (35%)	Yes/68 days (29%)