

**Modlin Property Wetland Mitigation Project
Martin County, NC**

**2011 Annual Monitoring Report
Year 5**



**NCEEP Project Number D050241
Roanoke River Basin**

Submitted to
NCDENR/Ecosystem Enhancement Program
2728 Capital Blvd.
Raleigh, NC 27604

Date: October, 2011

Monitoring:
Albemarle Restorations, LLC
P. O. Box 176
Fairfield, NC 27826



Table of Contents

Executive Summary	1
I. Project Background	2
1.0 Project Objectives	2
2.0 Project Structure, Restoration Type and Approach	2
3.0 Location and Setting	3
4.0 Project History and Background	3
5.0 Monitoring Plan View	7
II. Project Condition and Monitoring Results	10
1.0 Vegetation Assessment	10
1.1 Vegetation Discussion	11
1.2 Vegetation Monitoring Plan View (Integrated)	11
2.0 Wetland Assessment	11
2.1 Wetland Discussion	11
2.2 Wetland Monitoring Plan View (Integrated)	12
3.0 Project Success Discussion	12
III. Methodology Section	12

List of Tables

Table ES-1. Project Success Summary	1
Table I. Project Restoration Components	3
Table II. Project Activity and Reporting History	4
Table III. Project Contacts	6
Table IV. Project Background	6
Table V. Species for Each Community Type	10
Table VI. Hydrology and Vegetation Success by Plot	12
Table C-1 Hydrologic Monitoring Results	Appendix C

List of Figures

Figure 1. Composite Vicinity Map	5
Figure 2. Monitoring Plan View: Gauges and Vegetation Plots	8
Figure 3. Monitoring Plan View: Soils, Contours and Plant Communities	9
Figure 4. Monitoring Plan View (Integrated)	Appendix D

Appendices

Appendix A.	Vegetation Data and Site Photos
Appendix B.	Geomorphologic Raw Data – N/A
Appendix C	Hydrologic Data Tables
Appendix D.	Monitoring Plan View (Integrated)

Executive Summary

The Modlin Property Wetland Mitigation Site is a riverine wetland project located on Poplar Chapel Road near Jamesville, in Martin County, North Carolina. It was constructed by Albemarle Restorations, LLC, under contract with EEP to provide compensatory wetland mitigation credits in the Roanoke River Basin. Construction activities, in accordance with the approved restoration plan, began October 13, 2006, and were completed on March 12, 2007. Tree and shrub planting on the project site occurred between April 1st and 4th, 2007.

In this, the fifth year of monitoring, hydrology has been successfully restored to the site, including the previously problematic area around Gauge 1 that was subsoiled in 2010. The planted stems are well established and growing at an acceptable rate now that they have crowns above the heavy herbaceous layer.

Hydrologic monitoring began in 2007 with the installation of six water level monitoring gauges at varying elevations throughout the site to measure subsurface water elevations. In 2010 it was determined that the soils around Gauge 1 were compacted and prohibiting successful hydrology so the area (approximately 5 acres) was subsoiled and replanted. Gauges 1A and 1B were added to the area to determine the success of the treatment. Evidence from those 3 gauges shows that subsoiling did correct the soil compaction and drastically improved hydrology. All three gauges, 1, 1A and 1B showed a successful 5% hydroperiod in 2010, but not until after that year's monitoring report was submitted. The charts in this report have been updated to reflect the successful 2010 hydroperiods for those three gauges. All 8 gauges recorded two successful hydroperiods during the 2011 growing season which indicates that the site's hydrology has been successfully restored. Albemarle Restorations intends to monitor the hydrology for an additional year to confirm these results.

Four vegetative monitoring plots were installed and permanently monumented, one coincident with monitoring gauges 1-4, such that both forested and shrub/scrub vegetative communities are represented. Each plot is a 10m X 10m square, as recommended by the CVS-EEP Protocol for recording vegetation sampling. All four plots met the year 5 success criterion of 260 living planted stems per acre this year, a success rate of 100%. Table ES-1 shows the levels of success attained by each of the water level monitoring gauges and the vegetation plots since monitoring began. Success criterion for hydrology is 8% of the growing season (21 days). Table C-1 in Appendix C has the actual number of days of hydrologic success. Success criterion for the vegetation plots is 260 live stems per acre (the year 5 level of survival).

Gauge (longest hydro-period as a percent of the growing season)										Percent Success	Veg. Plot				Percent Success
	1	1A	1B	2	3	4	5	6	7 REF		1	2	3	4	
Yr 1 (2007) Success	1.2			2.4	0	2	0	1	N/A	0%	Y	N	N	N	25%
Yr 2 (2008) Success	2.4			38	5.9	6.3	23.9	7.1	14.5	33%	Y	Y	Y	Y	100%
Yr 3 (2009) Success	3.6	4.7		20.4	18.8	9.8	19.6	18.8	23.9	71%	Y	Y	Y	Y	100%
Yr 4 (2010) Success	6.7	5	5	16.1	10.6	4.7	12.2	13.7	15.3	57%	Y	Y	Y	Y	100%
Yr 5 (2011) Success	8.6	7.5	8.2	24	15.3	8.6	18	16.1	24	88%	Y	Y	Y	Y	100%

Percentage of the growing season gauge showed continuous hydrology: **Green: met 8%, Red: met 5%.**

* Gauge 7 is a reference gauge and is not included in the Percent Success

I. Project Background

1.0 Project Objectives

The goal of the Modlin Property Mitigation Project was to create a riverine wetland system typically found in the middle to upper reaches of first or zero order tributary systems. The project is to serve as compensation for wetland loss in the Roanoke River Basin. The mitigation plan was developed and implemented to eliminate pattern drainage and restore topography and hydrology that more closely resembled that of similar undisturbed land. Construction resulted in the development of a broad, frequently flooded swamp run following the historical path as evidenced by aerial photographs and signature topography. Subsequent planting was designed to restore a wetland forest ecosystem that is typically found in the immediate area characteristic of similar soils, topography and hydrology.

The specific project goals and objectives include:

- 1) Provide floodflow attenuation.
- 2) Water quality improvement through sediment, toxicant, and nutrient retention and reduction.
- 3) Slow over bank flow rates and provide storage and desynchronization of flood waters.
- 4) Alleviate downstream flooding issues by lessening the effect of pulse or flashy flows.
- 5) Provide shading through forest cover to reduce algae growth and associated low dissolved oxygen levels in surface water moving through the site.
- 6) The production and export of food sources.
- 7) The creation of wildlife habitat and recreational opportunities.

2.0 Project Structure, Restoration Type, and Approach

Table I lists the estimated wetland acreage to be restored on the Modlin Property. The mitigation plan provides for the restoration of 40.0 acres of riverine wetlands. Prior to construction, the 40.0 acre easement area was used entirely for row crop agriculture, primarily soy beans and cotton. A drainage ditch, built in the 1970's, divided the project area and provided drainage of the seasonally high water table to allow the agricultural uses. Construction activities, in accordance with the approved restoration plan, began in October, 2006 with the removal of existing hedgerows from within the project area. Some of the whole trees found in the hedgerows were placed along the length of the restored swamp run to facilitate water retention and to provide wildlife habitat. Also included as part of the water retention strategy is a low berm, approximately three quarters of the way down the swamp run that functions like a natural ridge within a swamp by creating a "pinch-point", which helps create back-flooding across the restored floodplain. In its entirety, the project functions as a broad hardwood flat that is subject to seasonal periodic flooding. The lower end of the swamp run retains water for longer periods which contributes to the vegetation diversity, as does the increase in site elevation moving laterally away from the run. Other topographical features include irregular depressions that remain flooded or wet for most of the year.

Table I. Project Restoration Components				
Modlin Property Wetland Mitigation Site/EEP #D050241				
Restoration Type	Pre-Existing Acreage	Post Construction Acreage	Credit Ratio WMU	Wetland Mitigation Units
Riverine Wetland	0.0	40.0	1:1	40.0
			Total	40.0

3.0 Location and Setting

The Modlin Property Mitigation Site is located in Martin County, approximately 4.5 miles southeast of Jamesville, NC on Poplar Chapel Road. The easement area is situated in the middle of the Modlin property, also known locally as the Cooper Swamp Farm and lies along the mid and upper reaches of an unnamed tributary to Cooper Swamp. Downstream from this site, the tributary flows almost exclusively through wooded areas containing extensive wetland communities before emptying into the main run of Cooper Swamp. The surrounding area is primarily forest and agricultural land with residential properties as a minor component.

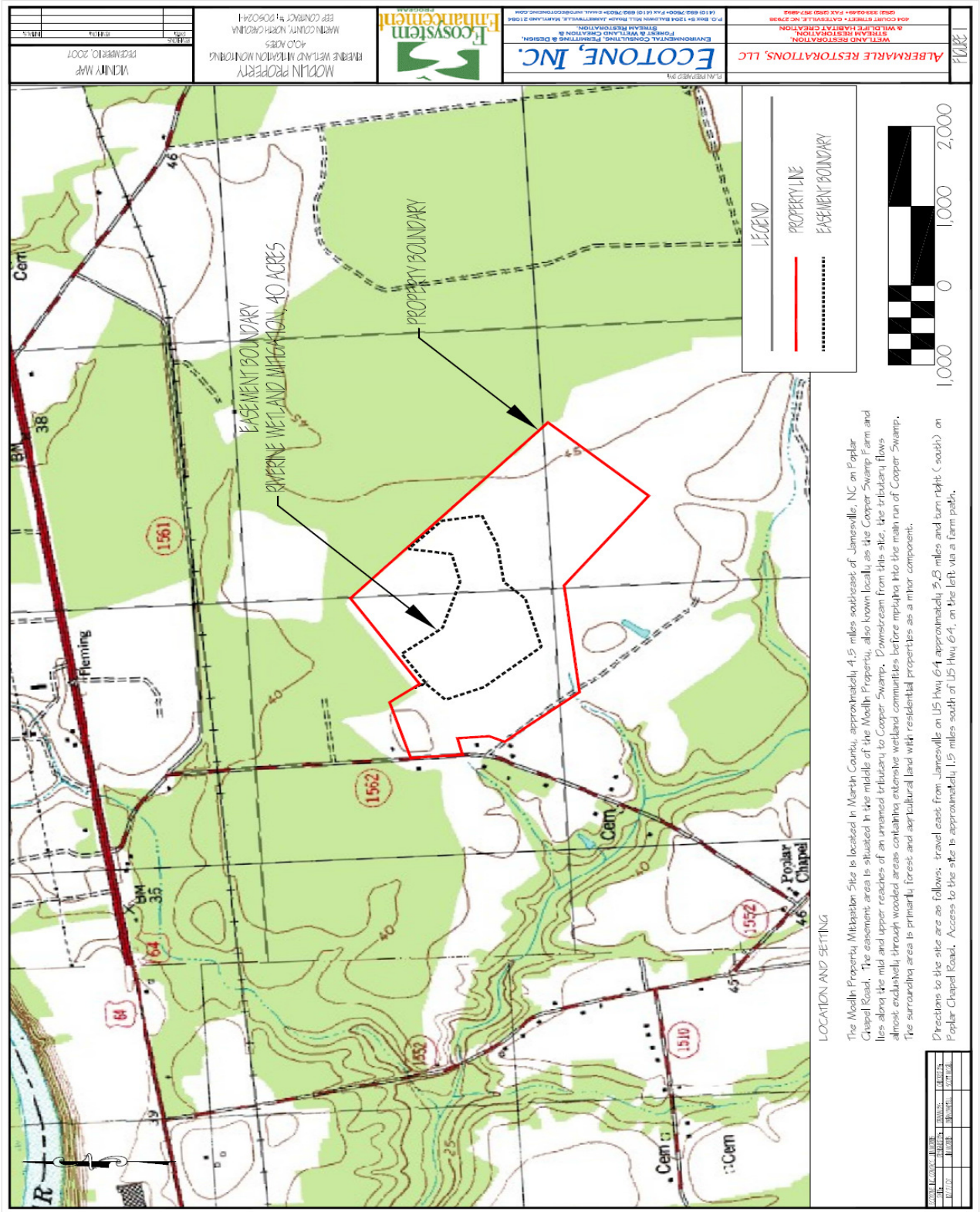
Figure 1 is a location map for the project site. Directions to the site are as follows: travel east from Jamesville on US Hwy 64 approximately 3.8 miles and turn right (south) on Poplar Chapel Rd. Access to the site is approximately 1.5 miles south of US Hwy 64, on the left via a farm path.

4.0 Project History and Background

Table II provides the history of data collection and actual completion of various milestones of the Modlin Property Wetland Mitigation Site.

**Table II. Project Activity and Reporting History
Modlin Property Wetland Mitigation Project/EEP D050241**

Activity or Report	Data Collection Complete	Actual Completion or Delivery
Restoration Plan	Feb. 2006	June 2006
Final Design -90%	Feb. 2006	June 2006
Construction	N/A	March 2007
Temporary S & E mix applied to entire project area	N/A	April 2007
Permanent seed mix applied to entire project area	N/A	April 2007
Containerized and Bare Root Planting	N/A	April 2007
Mitigation Plan/As-built (Year 1 monitoring - baseline)	Oct. 2007	December 2007
Year 2 monitoring	September 2008	December 2008
Year 3 monitoring	September 2009	December 2009
Year 4 monitoring	September 2010	October 2010
Year 5 monitoring	September 2011	October 2011



Points of contact for the various phases of the MPWMS are provided in Table III.

Table III. Project Contacts Modlin Property Wetland Mitigation Site/EEP #D050241	
Designer Primary Project design POC	Ecotone, Inc. 1204 Baldwin Mill Road Jarrettsville, MD 21804 Scott McGill (410-692-7500)
Construction Contractor Construction contractor POC	Armstrong, Inc. P. O. Box 96 25852 US Hwy 64 Pantego, NC 27860 Tink Armstrong (252-943-2082)
Planting Contractor Planting contractor POC	Williams Forestry Service, Inc. P. O. Box 189 Millville, PA 17846 Christian Duffy (570-458-0766)
Seeding Contractor Seed planting contractor POC	Carolina Silvics, Inc. 908 Indian Trail Road Edenton, NC 27932 Mary-Margaret McKinney (252-482-8491)
Seed mix sources	Earnst Conservation Seeds, LLP, Meadville, PA
Nursery stock suppliers	Williams Forestry Service, Inc., International Paper, Inc.
Monitoring Consultants Wetland and Vegetation POC	Woods, Water and Wildlife, Inc. P. O. Box 176 Fairfield, NC 27826 Ashby Brown (800-509-0190)

Project background information for the MPWMS is provided in Table IV.

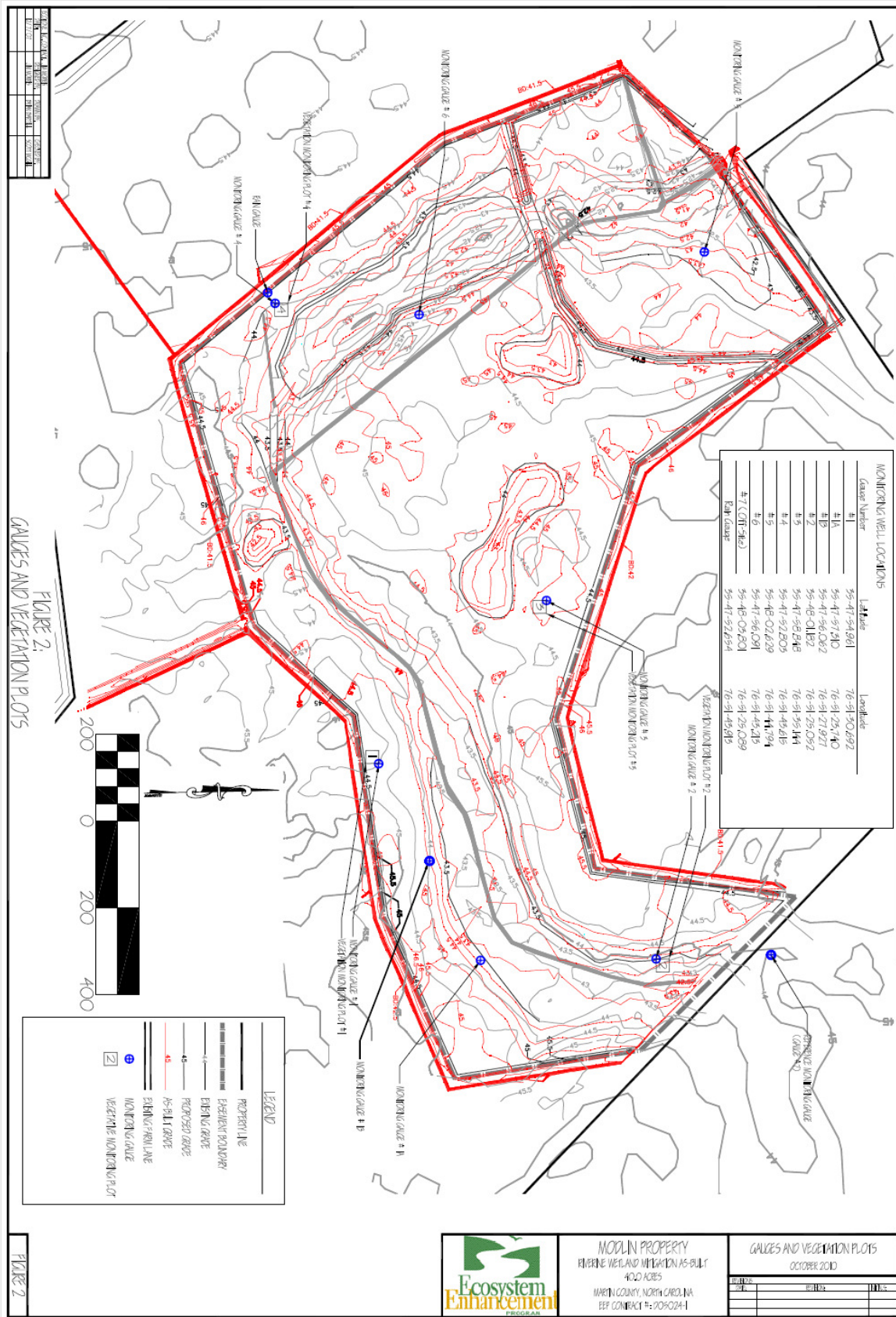
Table IV. Project Background Modlin Property Wetland Mitigation Site/EEP #D050241	
Project County	Martin County
Drainage Area	40.0 acres within easement boundary.
Drainage impervious cover estimate (%)	0
Physiographic Region	Coastal Plain
Ecoregion	8.5.1 Middle Atlantic Coastal Plain
Rosgen Classification of As-built	N/A
Cowardin Classification	PEM, PSS, PFO
Dominant Soil Types	Bethera loam, Lenoir loam
Reference site ID	Cooper Swamp, Martin County, NC
USGS HUC for Project and Reference	03010107
NCDWQ Sub-basin for Project and Reference	03-02-09
NCDWQ classification for Project and Reference	C
Any portion of any project segment 303d listed?	No
Any portion of any project segment upstream of a 303d listed segment?	No
Reasons for 303d listing or stressor?	N/A
% of project easement fenced	Gate at access path

5.0 Monitoring Plan View

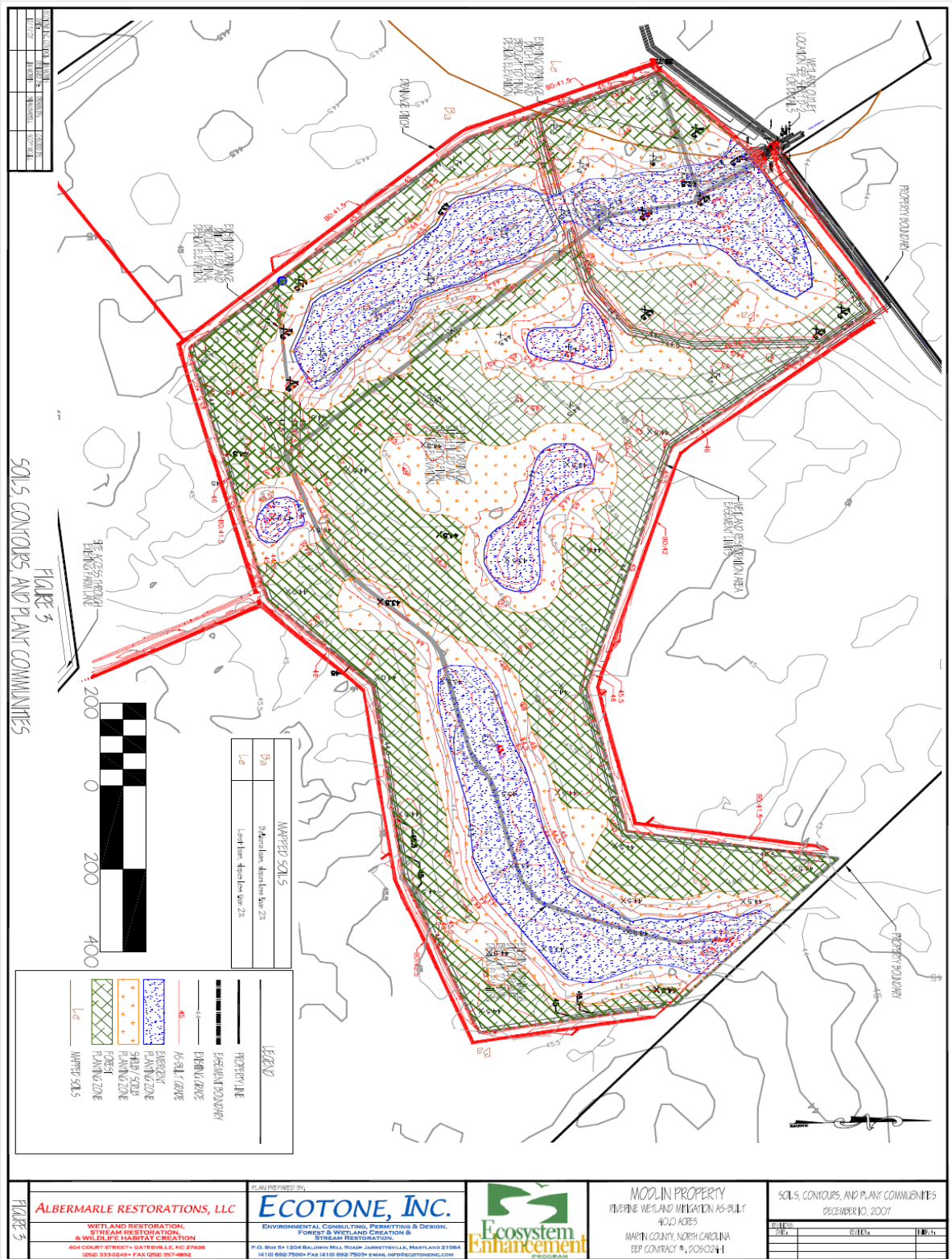
This year there were are eight water level monitors (gauges) installed at key locations across the property. These loggers are suspended in two-inch pvc pipe that is set approximately two to four feet vertically into the ground. The loggers have been located to assess the groundwater levels throughout the year at various elevations and topographies within the site. In addition, there is a rain gauge on site to capture and record onsite precipitation.

Vegetation monitoring is accomplished by resurveying the four permanent sampling plots. Each plot is referenced by a monitoring gauge (1 through 4) which serves as the plot origin and as a photo station for that plot. The plots are ten meters square and are situated to give an accurate sample of the planted and natural woody vegetation. For each site, the data recorded matches that required of the *CVS-EEP Protocol for Recording Vegetation, v 4.0, 2006*, level 1-2.

Figures 2 and 3 provide plan views of the site showing all monitoring features including gauges, sampling plots and the rain gauge.



	MODLIN PROPERTY FRESHWATER WETLAND MITIGATION AS-BUILT 400 ACRES MARTIN COUNTY, NORTH CAROLINA EEP CONTRACT # 2006024-1	GAUGES AND VEGETATION PLOTS OCTOBER 2010
	DATE: _____ BY: _____ CHECKED BY: _____	DATE: _____ BY: _____ CHECKED BY: _____



ALBERMARLE RESTORATIONS, LLC WETLAND RESTORATION, & WILDLIFE HABITAT CREATION <small>484 COLBY STREET • FAYETTEVILLE, NC 27804 (919) 533-0249 • FAX (919) 567-4892</small>	PLAN PREPARED BY: ECOTONE, INC. <small>ENVIRONMENTAL CONSULTING, PERMITTING & DESIGN, FOREST & WETLAND CREATION & STREAM RESTORATION P.O. BOX 91 1304 MILLCREEK HILL ROAD, JARRAMATOWNA, MARYLAND 21084 (410) 892-7500 • FAX (410) 892-7503 • EMAIL: INFO@ECOTONEINC.COM</small>	 MODLIN PROPERTY RIVERINE WETLAND MITIGATION AS-BUILT 40.0 ACRES MARTIN COUNTY, NORTH CAROLINA EEP CONTRACT # 209-0241	SOILS, CONTOURS AND PLANT COMMUNITIES DECEMBER 10, 2007	
			<table border="1"> <tr> <td>DATE:</td> <td>BY:</td> </tr> <tr> <td> </td> <td> </td> </tr> </table>	DATE:
DATE:	BY:			

II. Project Condition and Monitoring Results

1.0 Vegetation Assessment

The vegetation success criterion was developed in accordance with the CVS-EEP protocol. The Modlin project was planned to include various plant communities. The Palustrine emergent (PEM) wetland zone immediately adjacent to the drainage course and other isolated depressions are populated by vegetation consisting primarily of herbaceous material, grasses, sedges and other hydrophytic plants. Beyond the emergent zone is the Palustrine shrub/scrub (PSS) community consisting of a mixture of woody shrubs interspersed with trees. The emphasis in this zone is on the shorter, scrubby vegetation typical of lower areas of native branch bottoms and poorly drained, broad hardwood flats. The outer, largest Palustrine forested (PFO) zone was planted to a mixture of trees and shrubs, but with the emphasis on trees. The species mix was based on the vegetation noted at the two reference sites and all species are classified from FAC to OBL (Table V). The site was planted at a rate of 350 stems per acre in the spring of 2007. Due to poor survival attributed to the drought conditions experienced during the first growing season, replacement planting and supplemental planting took place in the winter of 2008. The species used were chosen from Table V. Approximately 5 acres around Gauges 1, 1A and 1B were replanted in the winter of 2011 after subsoiling that area to improve hydrology.

Table V. Species by Community Type		
Modlin Property Wetland Mitigation Project/EEP #D050241		
Forested Wetland 18.5 Acres		
Common Name	Scientific Name	Wetland Indicator Status
Bald Cypress	Taxodium distichum	OBL
Red Maple	Acer rubrum	FACW-
Water tupelo	Nyssa aquatica	OBL
Swamp Black Gum	Nyssa biflora	FAC
Willow Oak	Quercus phellos	FACW-
Swamp White Oak	Quercus bicolor	FACW+
Water Oak	Quercus nigra	FAC
Highbush Blueberry	Vaccinium corymbosum	FACW
Swamp Cyrilla	Cyrilla racemiflora	FACW
Sweet Pepperbush	Clethra alnifolia	FACW
Virginia Sweetspire	Itea virginica	FACW+
Button Bush	Cephalanthus occidentalis	OBL
Shrub/Scrub 11.85 Acres		
Common Name	Scientific Name	Wetland Indicator Status
Button Bush	Cephalanthus occidentalis	OBL
Tag Alder	Alnus serrulata	FACW
Wax Myrtle	Myrica cerifera	FAC+
Black Willow	Salix nigra	OBL
Gallberry	Ilex glabra	FACW
Swamp Cyrilla	Cyrilla racemiflora	FACW
Highbush Blueberry	Vaccinium corymbosum	FACW
Sweetbay	Magnolia virginiana	FACW+

1.1 Vegetation Discussion

All four plots met the Year 5 success criterion of a minimum of 260 stems per acre. Over the entire project, the survival rate averaged 516 live stems per acre. A total of 8 different species were tallied in September of 2011. Willow oak (*Q. phellos*) and bald cypress (*T. distichum*) are the most frequently found species.

Rainfall data collected on site show total precipitation for January through the middle of October 2011 to be very close to normal with a 2.87" cumulative surplus. The growth data will indicate what the photos in Appendix C attempt to show in that the planted stems are well developed and growing at a faster rate now that they have larger, taller tops. Many of the shrubs are bearing fruit and some of the trees are showing substantial gains in height.

1.2 Vegetation Monitoring Plan View (Integrated)

Figure 4 in Appendix D illustrates an area of the site where the hydrology was causing some concern. The problem was corrected with subsoiling and that area was replanted in the winter of 2011.

2.0 Wetland Assessment

The hydrologic success criterion is to achieve a minimum of 21 consecutive days where the groundwater level is within 12 inches of the soil surface during the growing season. The growing season for this site is from March 10 to November 20, a period of 255 days (WETS Table for Williamston, Martin County, NC). Success for any particular monitoring location is to show soil saturation to within 12 inches of the surface for 21 consecutive days during that period.

There are eight continuous water level monitoring devices deployed across the site (Gauges 1-6, 1A and 1B) to monitor fluctuations in the water table within the project area. A rain gauge is also kept onsite and its data are compared to that collected at the NOAA cooperator site in Williamston, NC. To further gauge the affect of seasonal and annual variations in precipitation in restored wetlands, hydrologic success of the site was assessed in relation to the reference wetland site (Gauge 7).

2.1 Wetland Discussion

Rainfall patterns in 2011 were close to normal in total from January through October, but as of the end of May, there was a slightly larger rainfall deficit in 2011 than in previous years of monitoring. Yet hydrology patterns this year indicate much better penetration and recharge rates than in previous years which might indicate that soil porosity is steadily improving. Evidence of this might be inferred from the greatly improved hydrology around Gauges 1, 1A and 1B after subsoiling in 2010.

Of particular interest is the fact that all 8 gauges showed two successful hydroperiods during the 2011 growing season. Only Gauge 1A failed to show a hydroperiod of 21 days or more (8% of

the growing season). Its longest hydroperiod was 19 days (7.5% of the growing season). Gauge 1 had a 22-day hydroperiod in 2011. Prior to the corrective subsoiling, its longest hydroperiod was 9 days. It is clear that wetland hydrology has been restored and will continue to improve as the soil structure improves with vegetation growth and root development. As such, AR will monitor the hydrology for an additional year in order to confirm the success.

2.2 Wetland Monitoring Plan View (Integrated)

Figure 4 in Appendix D provides an overview of the site. The area shaded in green on the plan view indicates where subsoiling took place in the fall of 2010. Hydrologic problems in that area have been corrected and it is functioning as well as the remainder of the site. Table VI shows that at the 5% level, hydrology across the site was entirely successful.

Table VI. Hydrology and Vegetation Criteria Success by Plot Modlin Property Wetland Mitigation Project/EEP #D050241						
Gauge	8% Hydrology Success Met	Hydrology Success @ 8% level	Hydrology Success @ 5% level	Vegetation Plot	Vegetation Success Met	Vegetation Mean
1	Y (8.6%)	88%	100%	1	Y	100%
1A	N (7.5%)			No Plot		
1B	Y (8.2%)			No Plot		
2	Y (23.9%)			2	Y	
3	Y (15.3%)			3	Y	
4	Y (8.6%)			4	Y	
5	Y (18.0%)			No Plot	N/A	
6	Y (16.1%)			No Plot	N/A	
7	Y (23.9%)			No Plot	N/A	

3.0 Project Success Discussion

In this, the fifth year of monitoring, the Modlin project has shown its best hydrologic record to date. Cumulative rainfall from January through October was very close to normal with a 2.87” surplus and the entire project area showed two successful hydroperiods. The swamp run held water for most of the year and there was some evidence of flow across the internal berm near the outfall of the project.

The planted stems appear to be well established and developing well, with many of the herbaceous plants bearing fruit. Growth should continue to accelerate now that many of the stems have crowns above the highly competitive herbaceous layer.

III. Methodology Section

Year 5 monitoring for the Modlin project occurred in 2011. Monitoring and vegetation sampling procedures were established in the mitigation plan for this project and no deviations were made.

Appendix A

Vegetation Data Tables

Site Photos

1. Vegetation Data Tables

Table 1. Project Metadata

Report Prepared By	Ashby B. Brown
Date Prepared	10/14/2011 11:31
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT-----	
Metadata	This worksheet, which is a summary of the project and the project data.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
ALL Stems by Plot and spp	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	D050241
Project Name	Modlin Riverine
Description	Modlin property Riverine Wetland mitigation project, Martin county, NC
River Basin	Roanoke
Sampled Plots	4

Table 2. Vegetation vigor by Species

	Species	4	3	2	1	0	Missing
	<i>Alnus serrulata</i>						1
	<i>Cephalanthus occidentalis</i>		2				
	<i>Clethra alnifolia</i>		1				
	<i>Cyrilla racemiflora</i>						1
	<i>Ilex glabra</i>						3
	<i>Nyssa biflora</i>						1
	<i>Quercus bicolor</i>	1	1				4
	<i>Quercus phellos</i>	4	8				9
	<i>Taxodium distichum</i>	2	17	2			3
	<i>Vaccinium corymbosum</i>		5				1
	<i>Magnolia virginiana</i>		4				2
	<i>Acer rubrum</i>						3
	<i>Myrica cerifera</i>	3					
TOT:	13	10	38	2			28

Table 3. Vegetation Damage by Species

	Species	All Damage Categories	(no damage)
	<i>Acer rubrum</i>	3	3
	<i>Alnus serrulata</i>	1	1
	<i>Cephalanthus occidentalis</i>	2	2
	<i>Clethra alnifolia</i>	1	1
	<i>Cyrilla racemiflora</i>	1	1
	<i>Ilex glabra</i>	3	3
	<i>Magnolia virginiana</i>	6	6
	<i>Myrica cerifera</i>	3	3
	<i>Nyssa biflora</i>	1	1
	<i>Quercus bicolor</i>	6	6
	<i>Quercus phellos</i>	21	21
	<i>Taxodium distichum</i>	24	24
	<i>Vaccinium corymbosum</i>	6	6
TOT:	13	78	78

Table 4. Vegetation Damage by Plot

	plot	All Damage Categories	(no damage)
	D050241-ABET-0001-year:5	24	24
	D050241-ABET-0002-year:5	14	14
	D050241-ABET-0003-year:5	19	19
	D050241-ABET-0004-year:5	21	21
TOT:	4	78	78

Table 5. Planted Stem Count by Plot and Species

	Species	Total Planted Stems	# plots	avg# stems	plot 1-year:5	plot 2-year:5	plot 3-year:5	plot 4-year:5
	Cephalanthus occidentalis	2	1	2	2			
	Clethra alnifolia	1	1	1		1		
	Magnolia virginiana	4	2	2		1	3	
	Myrica cerifera	3	1	3				3
	Quercus bicolor	2	2	1	1	1		
	Quercus phellos	12	3	4	1		6	5
	Taxodium distichum	21	4	5.25	5	7	4	5
	Vaccinium corymbosum	5	4	1.25	1	1	1	2
TOT:	8	50	8		10	11	14	15
Stems Per Acre					412	454	577	619
Average SPA for the site		516						

2. Site Photos



Swamp run in March, 2011



Pinch point at downstream end of swamp run shows evidence of flow in March, 2011



Button bush (*C. occidentalis*) in July, 2011. Many plants are bearing fruit.



Large Gallberry (*I. glabra*) in October, 2011 bearing fruit.



Button bush (*C. occidentalis*) and cypress (*T. distichum*) growing well around area of standing water, 2011



A group of willow oaks (*Q. phellos*) doing very well near Plot 3. The tree in the foreground is nearly 15 feet tall.



Cypress (*T. distichum*) doing well near standing water



Cypress (*T. distichum*) growing in frequently flooded area

Appendix B

Geomorphologic Raw Data

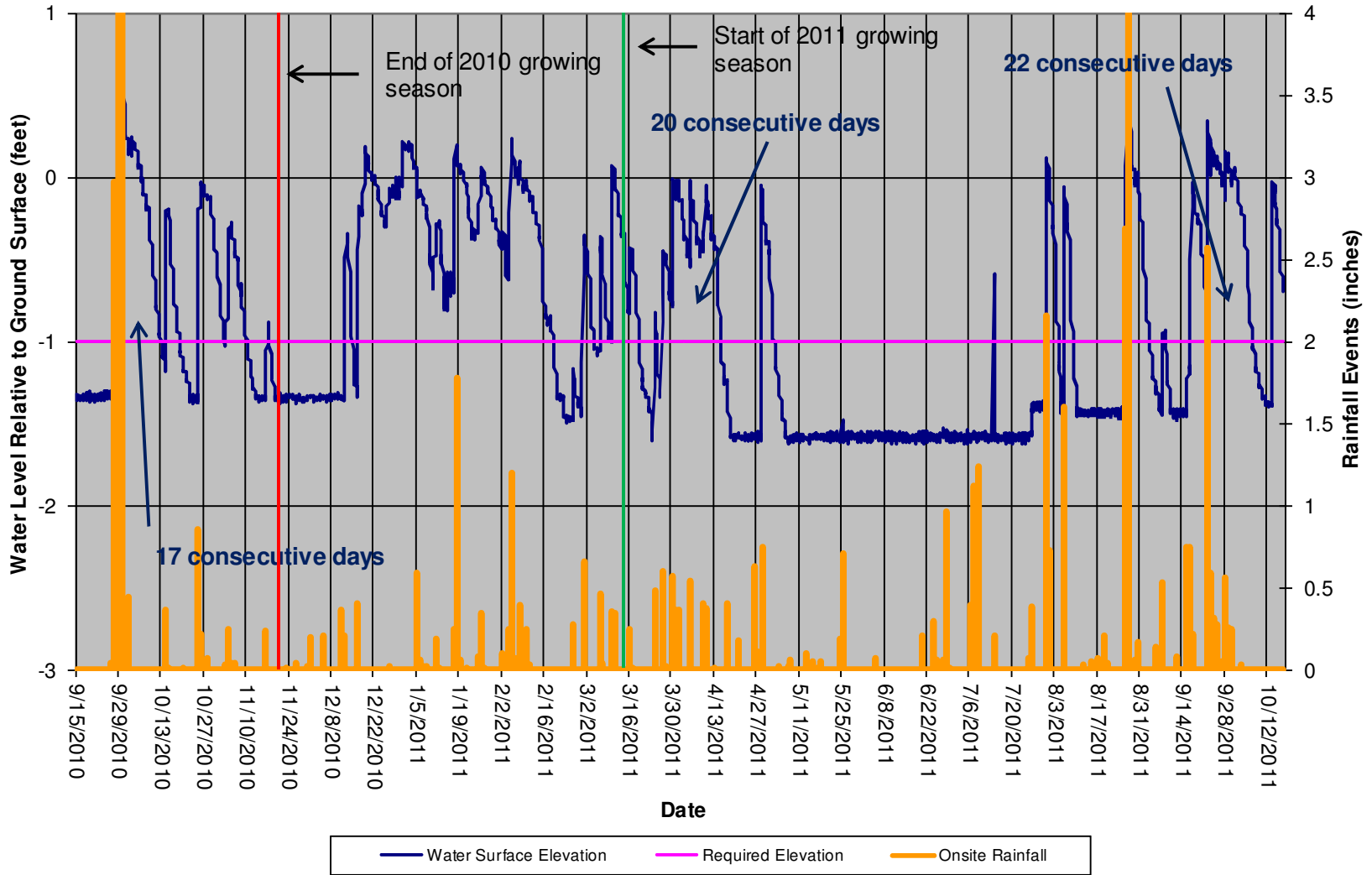
Not used in this report

Appendix C

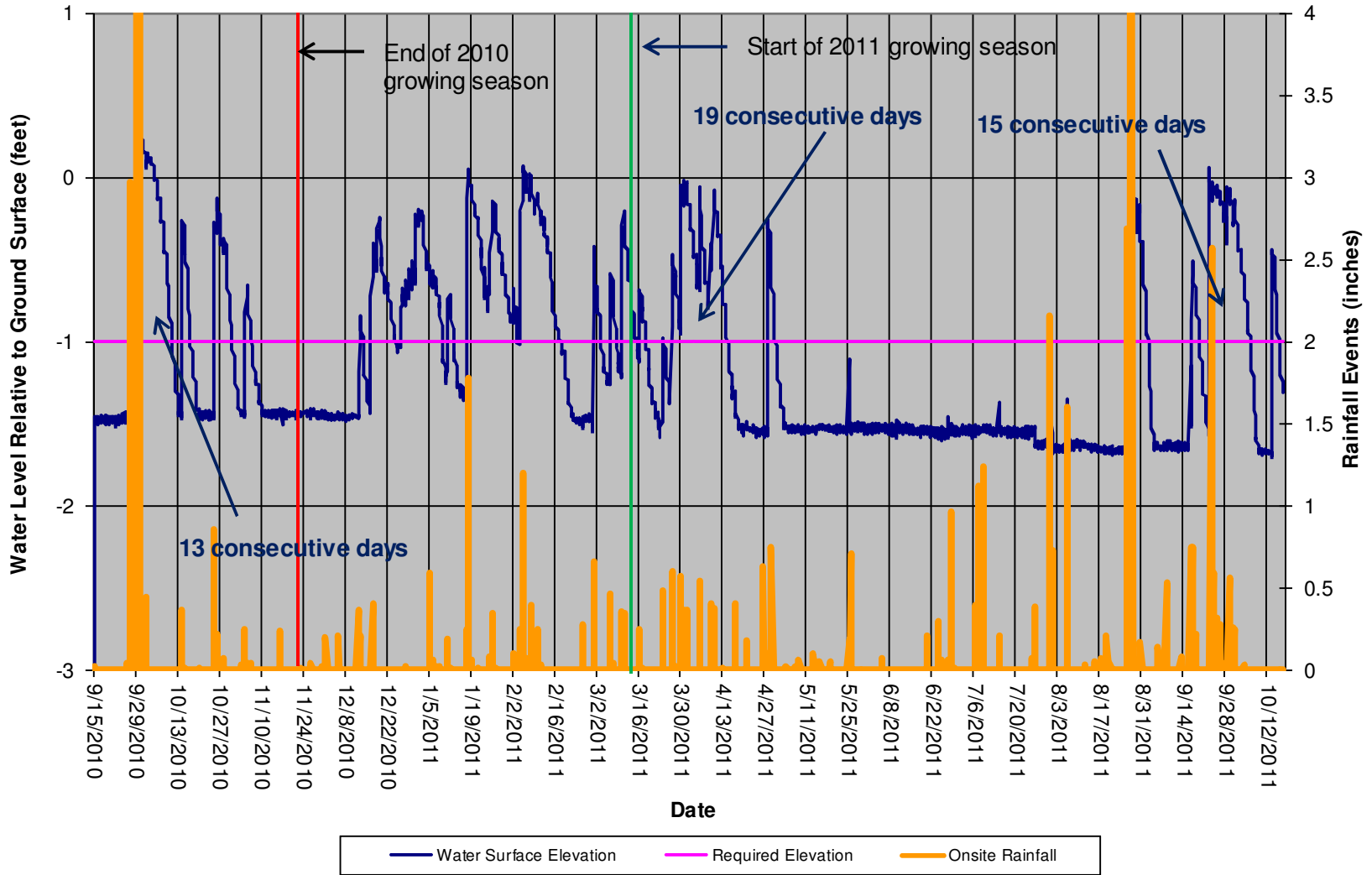
Hydrologic Data Tables

Note: Gauge 1B was installed after subsoiling in September of 2010 and its location is shown in Figures 2 and 4 of this report. The addition of this gauge was to more accurately determine the potential problem or success of the area adjacent to Gauge 1.

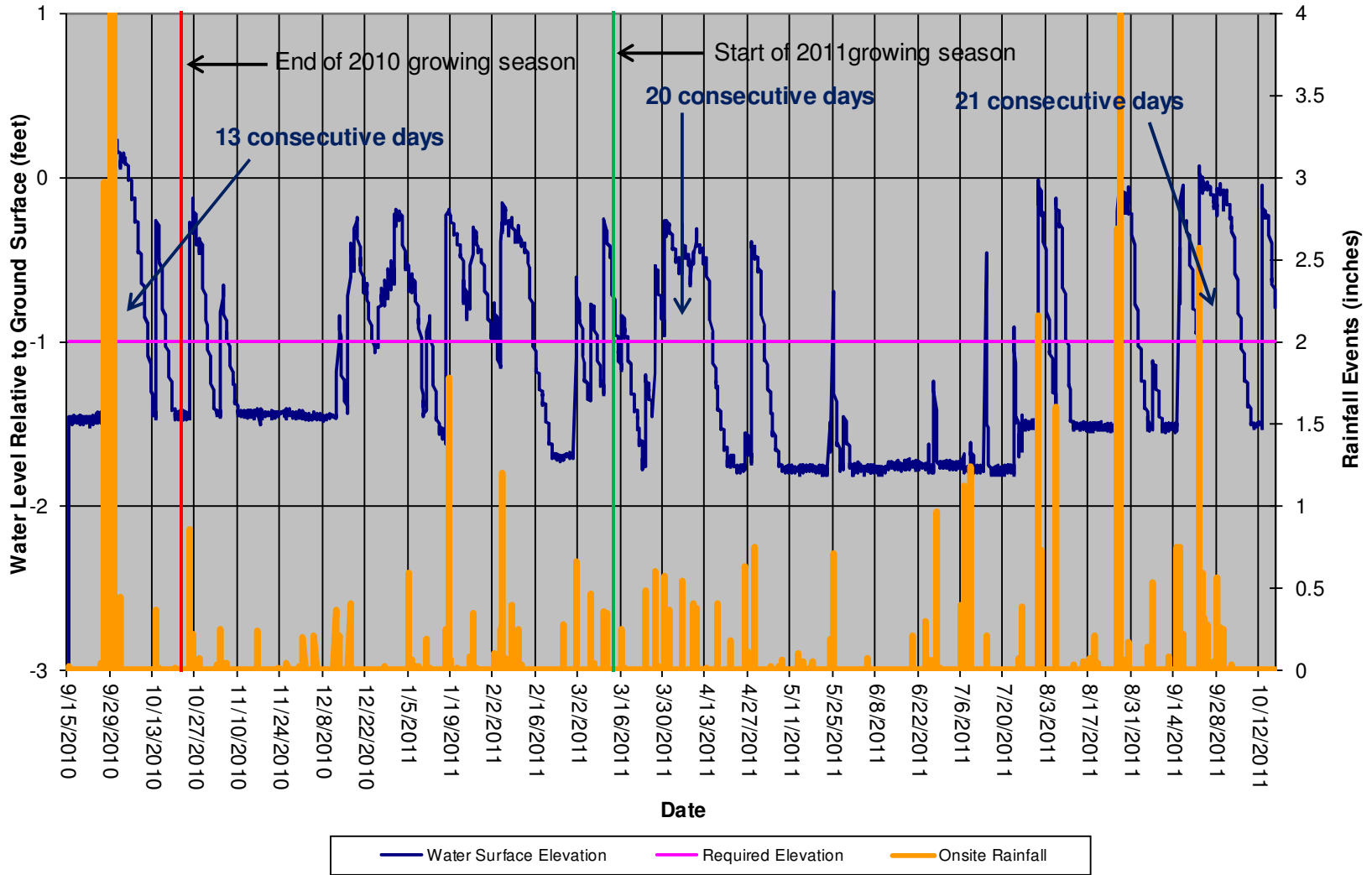
Modlin Monitoring Gauge #1 (9669818)



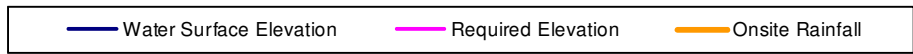
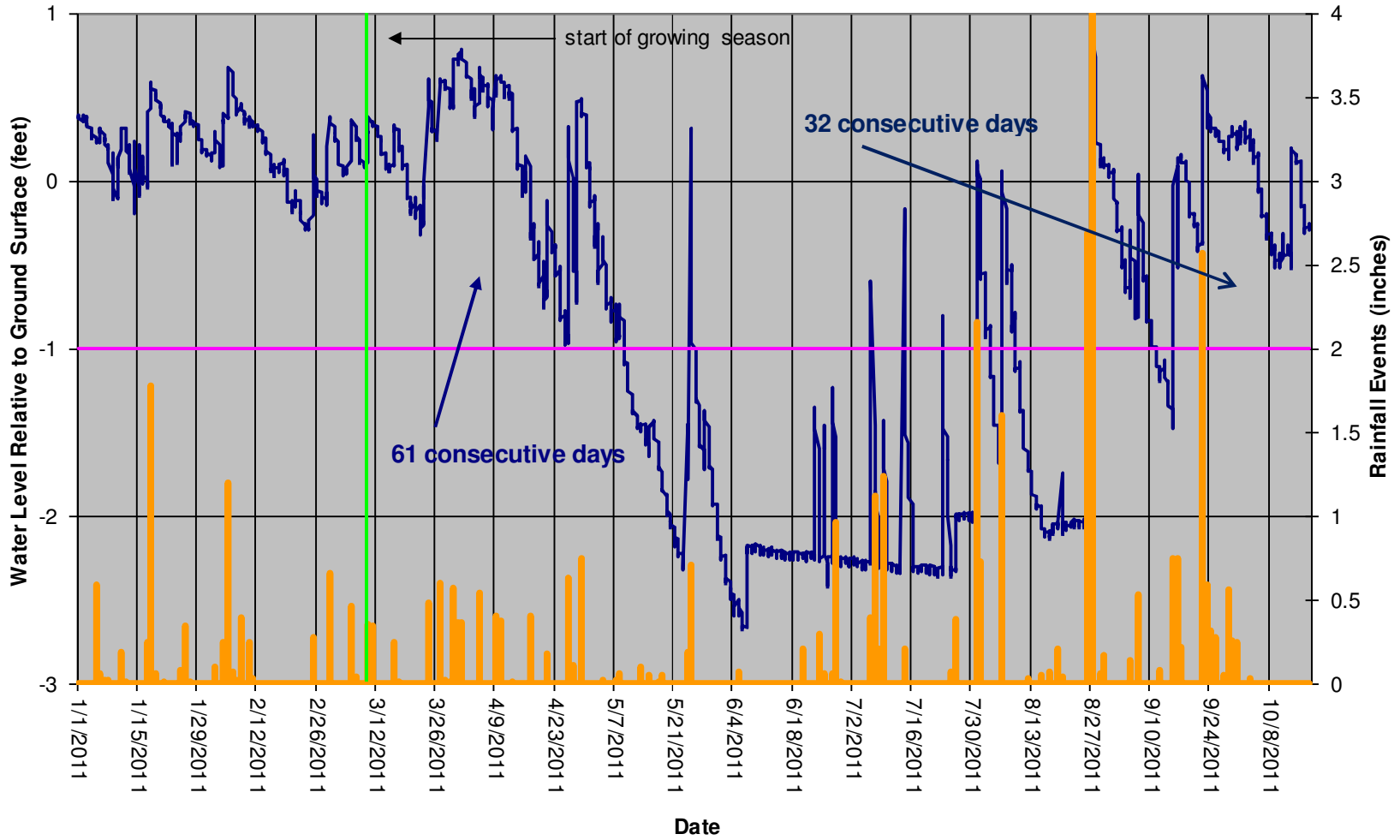
Modlin Monitoring Gauge #1A (2342650)



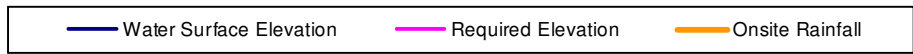
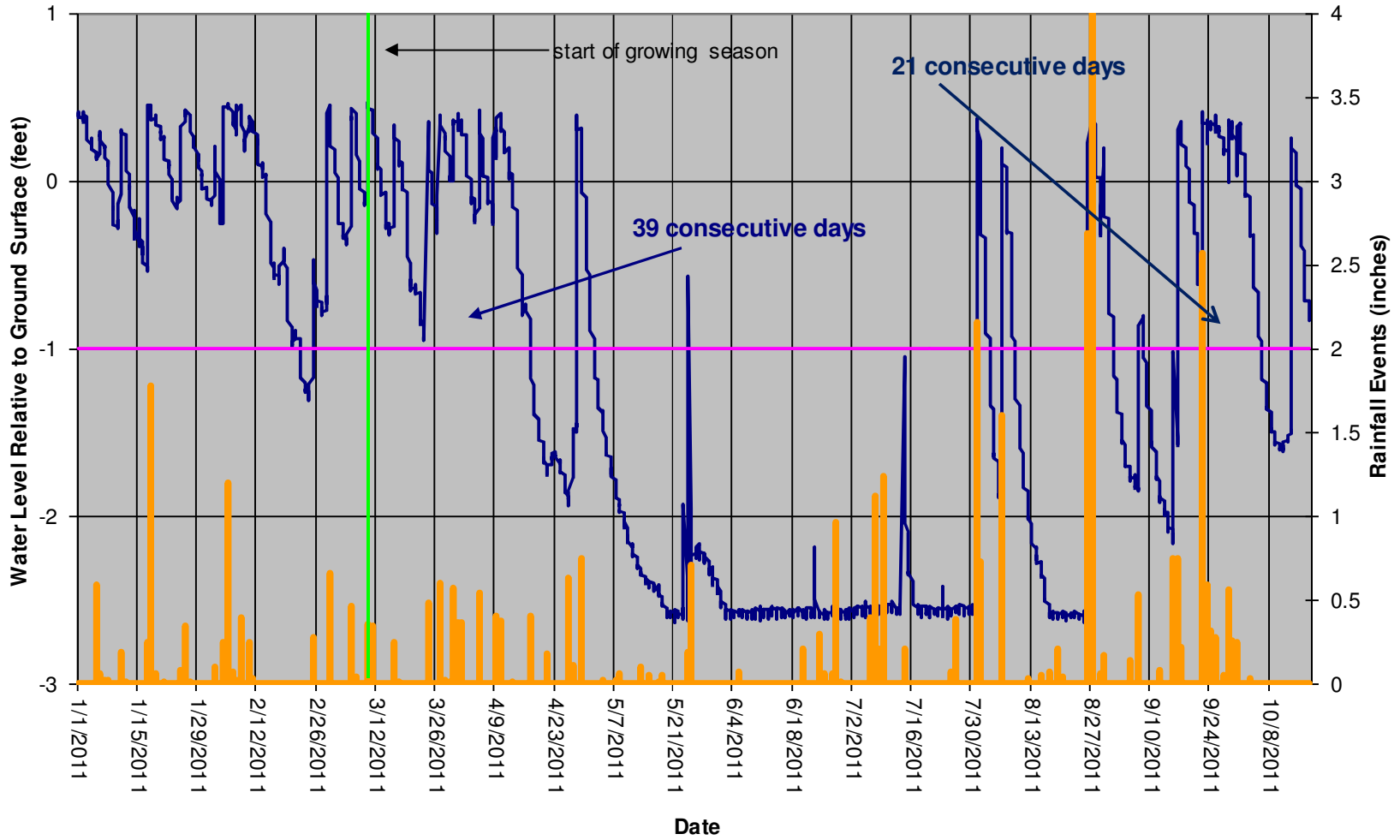
Modlin Monitoring Gauge #1B (9669815)



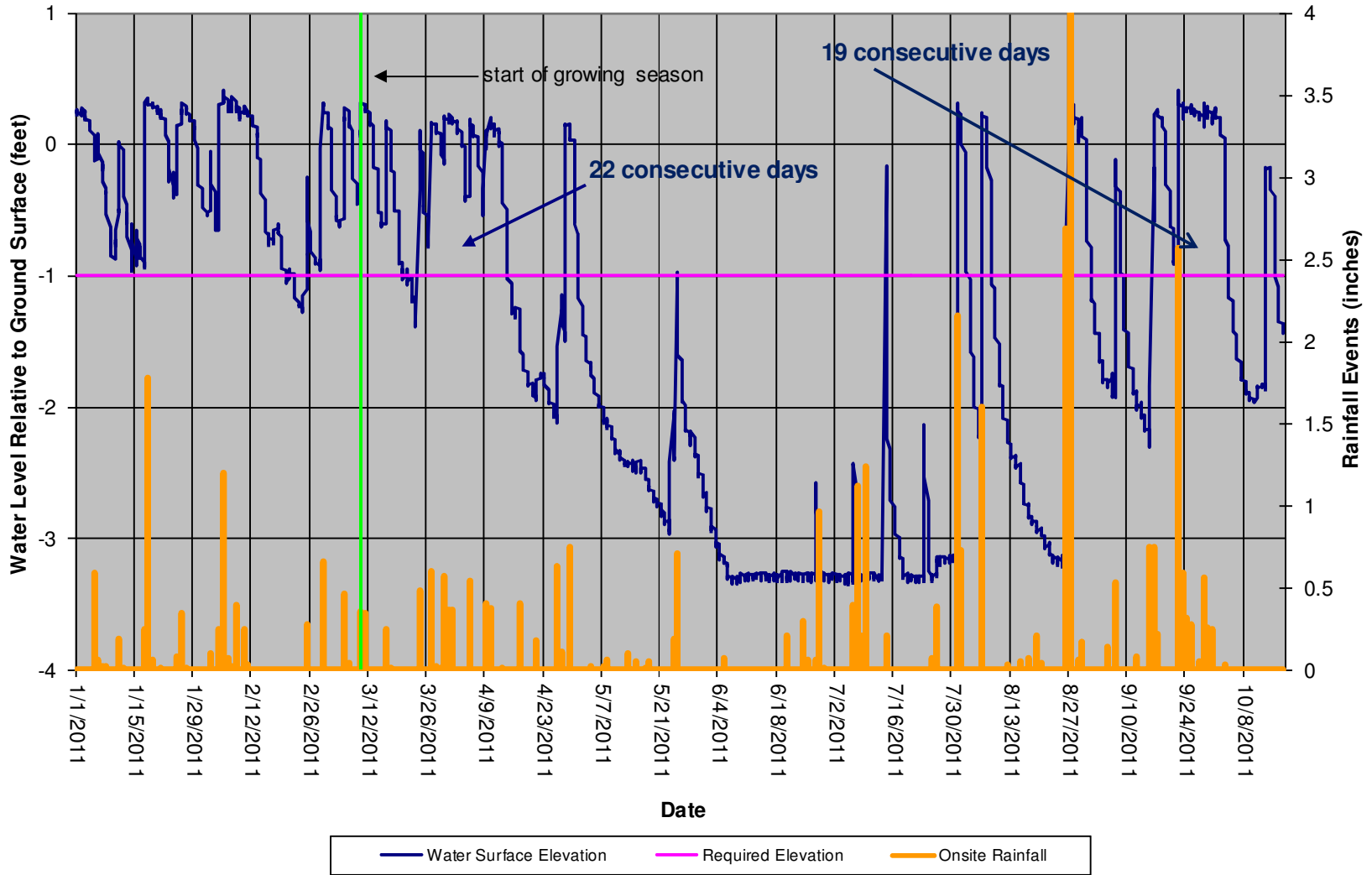
Modlin Monitoring Gauge #2 (1126653)



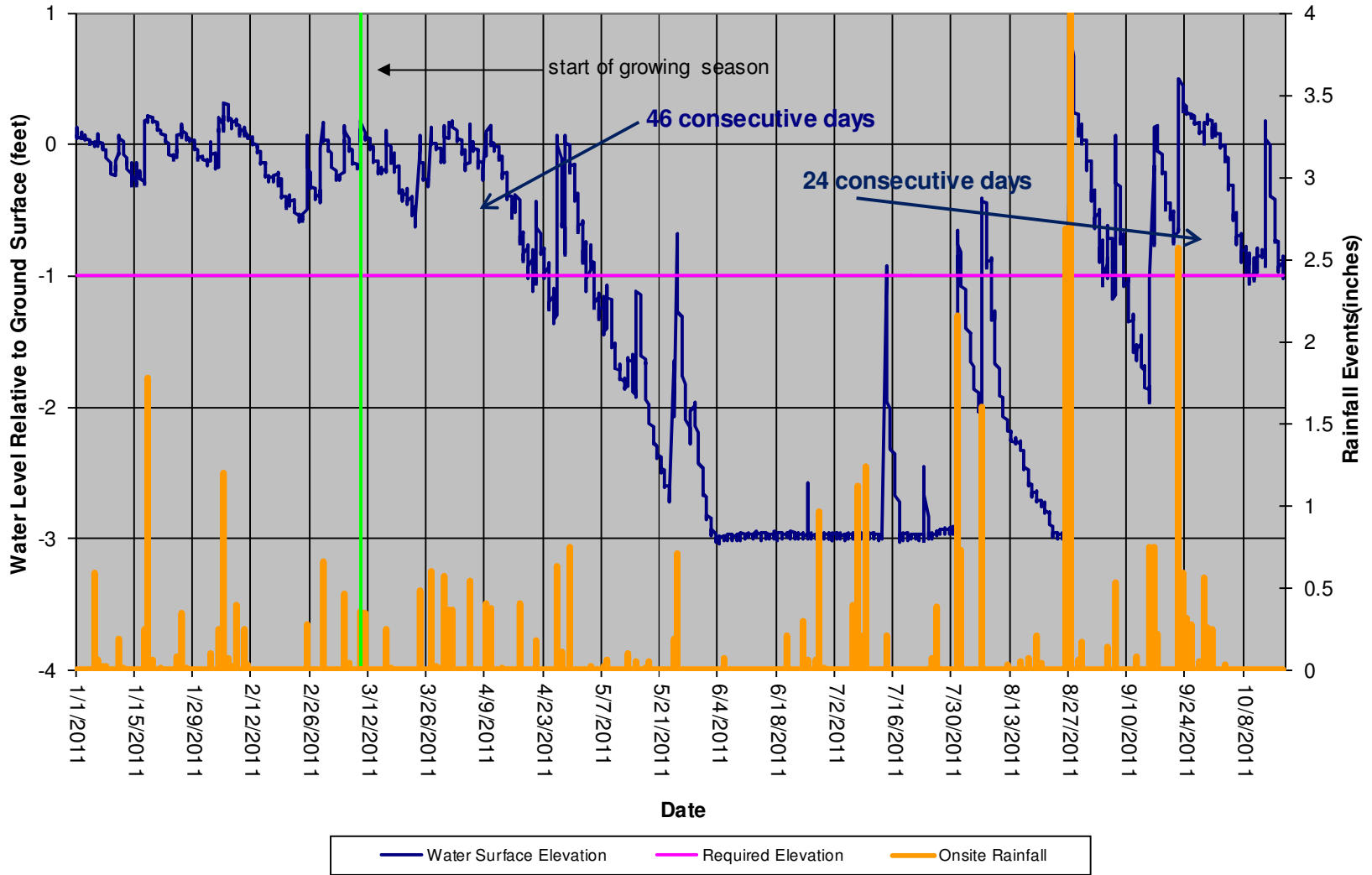
Modlin Monitoring Gauge #3 (1126651)



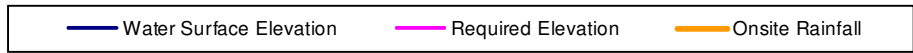
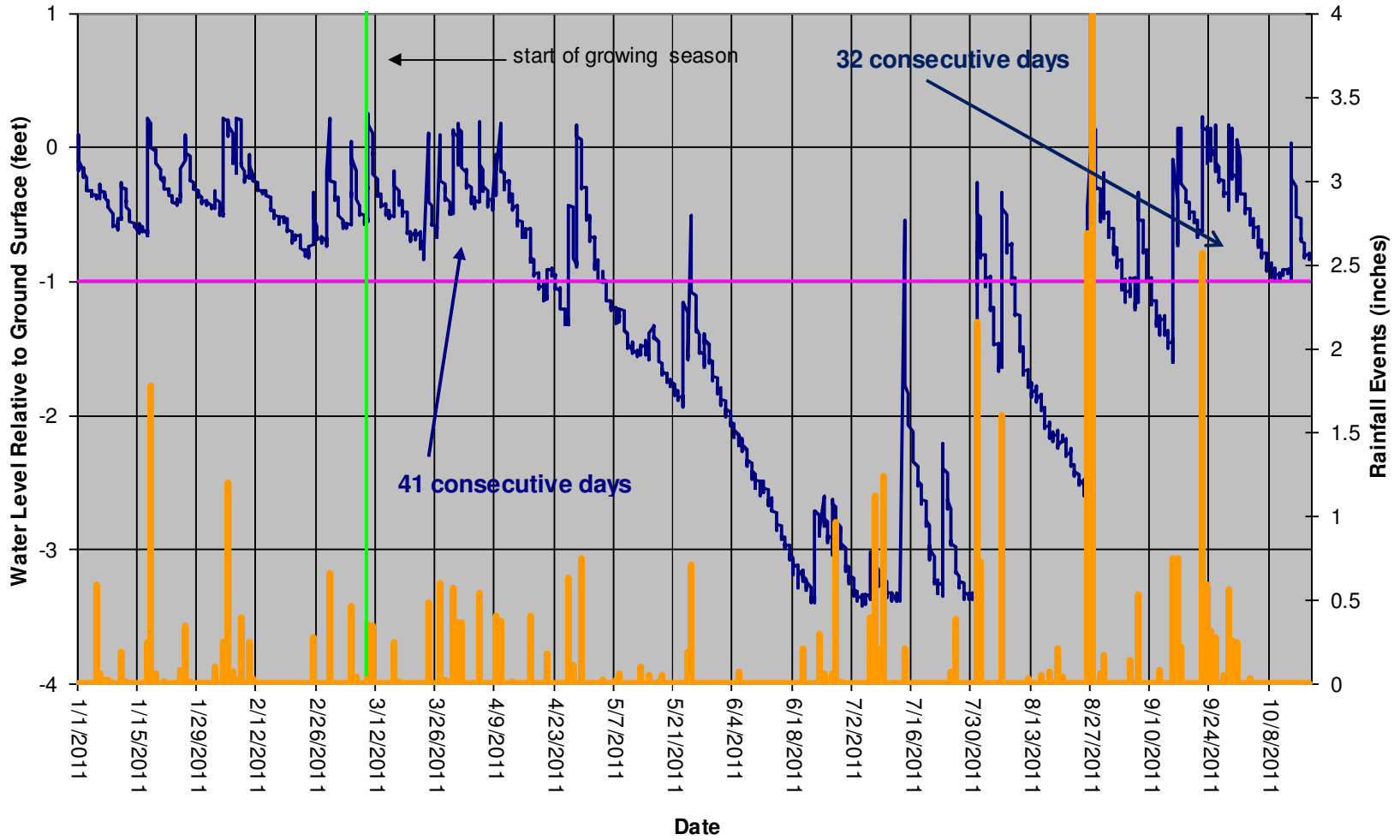
Modlin Monitoring Gauge #4 (1126650)



Modlin Monitoring Gauge #5 (1180987)



Modlin Monitoring Gauge #6 (1180994)



Modlin Monitoring Gauge #7 (1180991) Reference Site Gauge

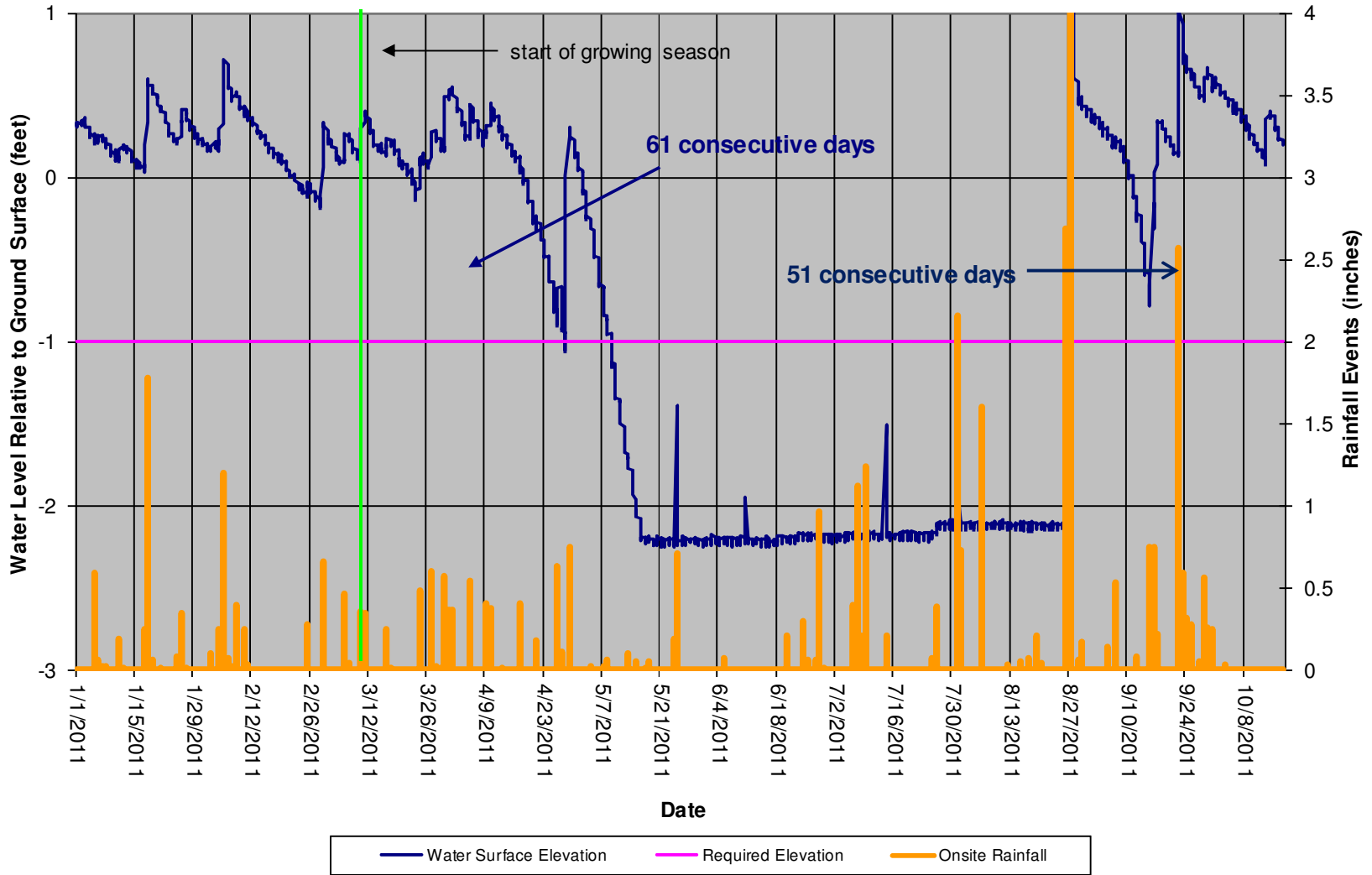


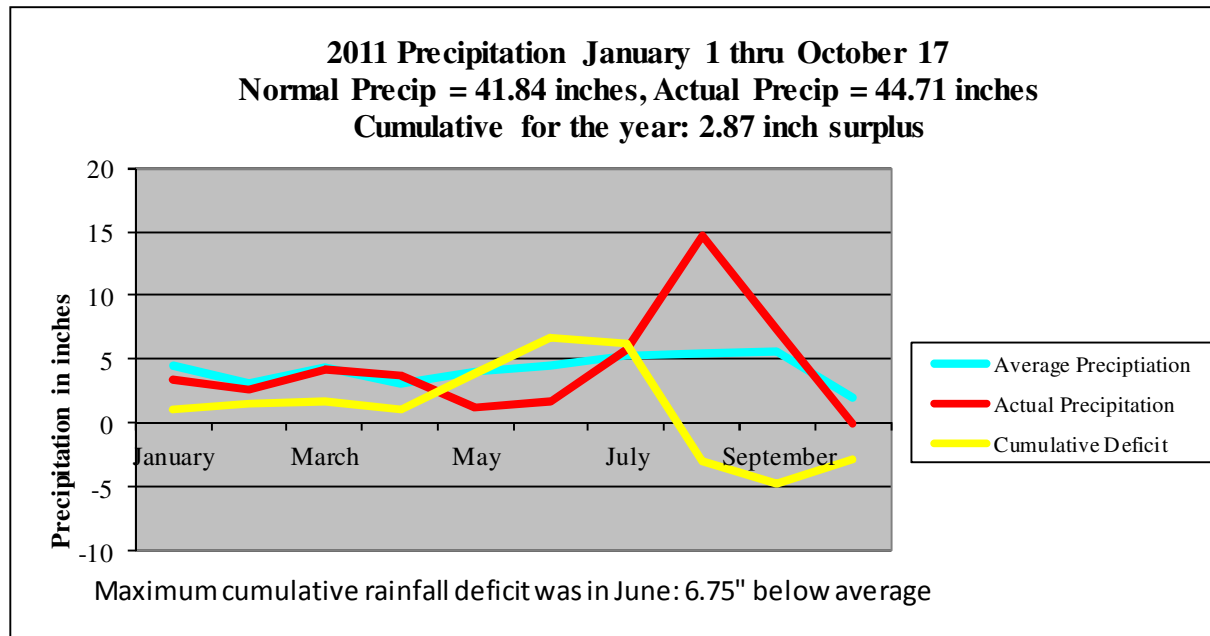
Table C-1

Longest consecutive successful hydrologic period in days (and % of Growing Season) and success at 5% and 8% of the growing season
 Living Stems Per Acre at the end of the growing season for plots 1-4

Gauge (Plot)	Year 1 (2007)					Year 2 (2008)					Year 3 (2009)					Year 4 (2010)					Current Year (2011)				
	Days	%	5%	8%	SPA	Days	%	5%	8%	SPA	Days	%	5%	8%	SPA	Days	%	5%	8%	SPA	Days	%	5%	8%	SPA
1	4	1	N	N	324	6	2	N	N	607	9	4	N	N	567	17	2	Y	Y	486	22	9	Y	Y	412
1A	N/A					N/A					12	5	N	N		13	7	Y	N		19	7	Y	N	
1B																13	7	Y	N		21	8	Y	Y	
2	7	2	N	N	81	97	38	Y	Y	607	52	20	Y	Y	526	41	16	Y	Y	445	61	24	Y	Y	454
3	1	0	N	N	283	15	6	Y	N	607	48	19	Y	Y	607	27	11	Y	Y	607	39	15	Y	Y	577
4	4	2	N	N	283	16	6	Y	N	607	25	10	Y	Y	567	12	5	N	N	405	22	9	Y	Y	619
5	2	0	N	N		61	24	Y	Y		59	20	Y	Y		31	12	Y	Y		46	18	Y	Y	
6	2	1	N	N		18	7	Y	Y		48	19	Y	Y		35	14	Y	Y		41	16	Y	Y	
7 (Ref)	N/A					37	15	Y	Y		61	24	Y	Y		39	15	Y	Y		61	24	Y	Y	

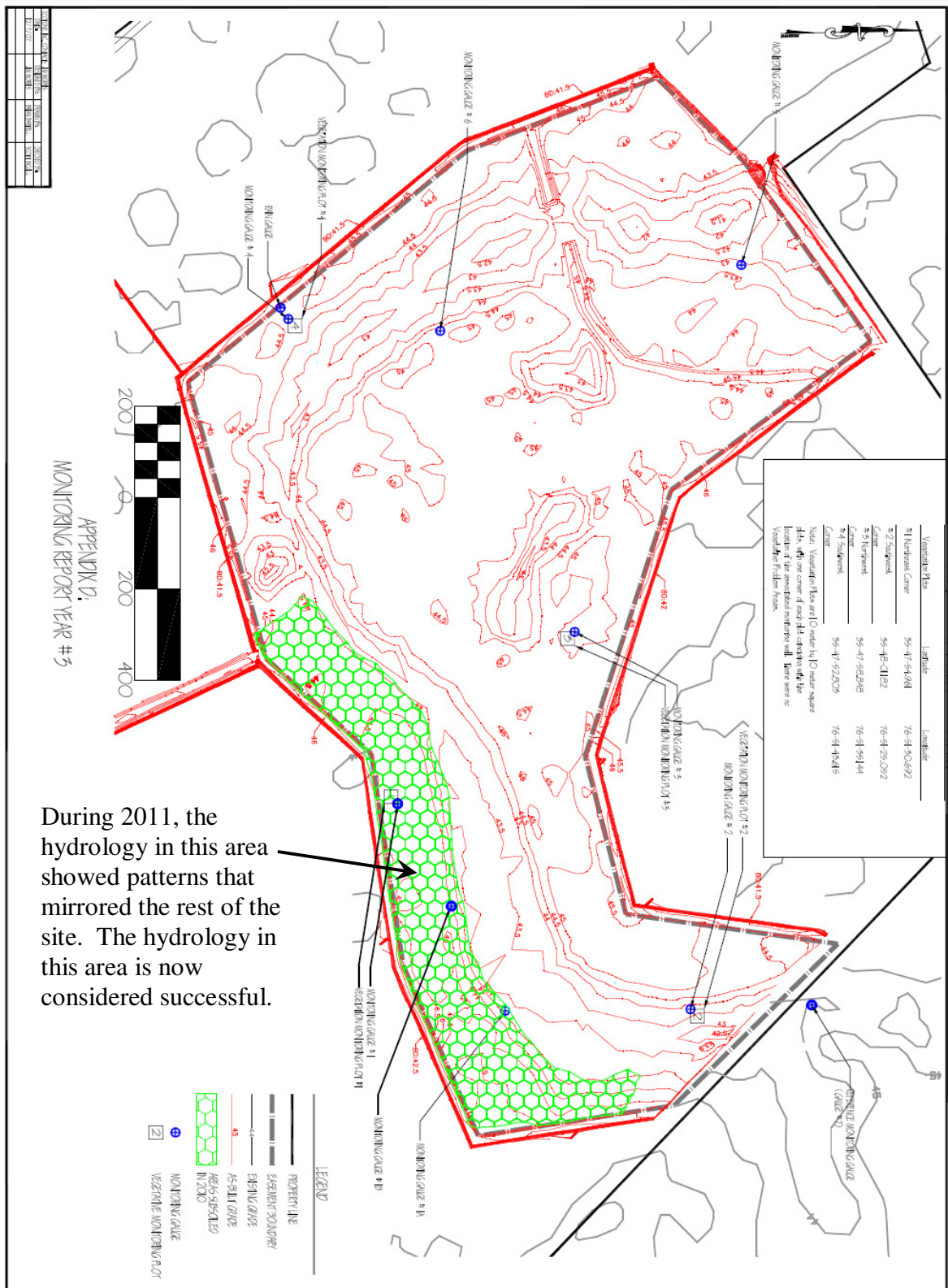
Growing season is 255 days. 5% is 13 days, 8% is 21 days.

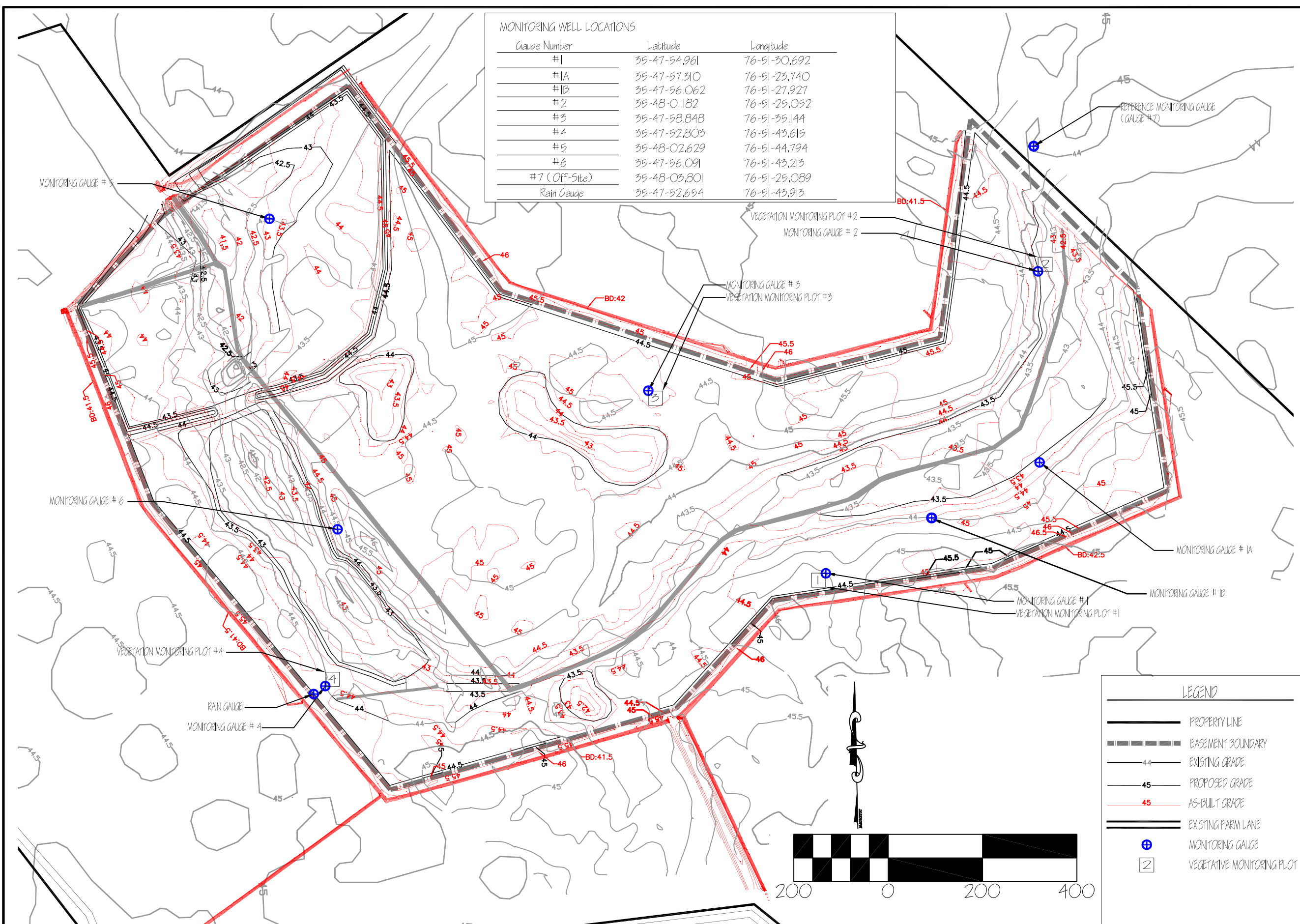
Days for Gauges 1, 1A and 1B in Year 4 were revised after submission of the 2010 monitoring report



Appendix D

Monitoring Plan View (Integrated)





MONITORING WELL LOCATIONS

Gauge Number	Latitude	Longitude
#1	35-47-54.961	76-51-30.692
#1A	35-47-57.310	76-51-23.740
#1B	35-47-56.062	76-51-27.927
#2	35-48-01.182	76-51-25.052
#3	35-47-58.848	76-51-35.144
#4	35-47-52.803	76-51-43.615
#5	35-48-02.629	76-51-44.794
#6	35-47-56.091	76-51-43.213
#7 (Off-Site)	35-48-03.801	76-51-25.089
Rain Gauge	35-47-52.654	76-51-43.913

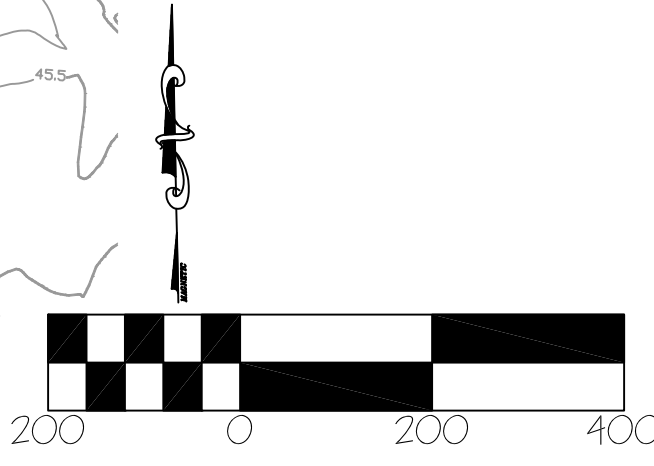
GAUGES AND VEGETATION PLOTS
OCTOBER 2010

MODLIN PROPERTY
RIVERINE WETLAND MITIGATION AS-BUILT
40.0 ACRES
MARTIN COUNTY, NORTH CAROLINA
EEP CONTRACT #: D050241



LEGEND

- PROPERTY LINE
- EASEMENT BOUNDARY
- 44 EXISTING GRADE
- 45 PROPOSED GRADE
- 45 AS-BUILT GRADE
- EXISTING FARM LANE
- ⊕ MONITORING GAUGE
- ☐ VEGETATIVE MONITORING PLOT



DATE	DESIGNED BY	DRAWN BY	CHECKED BY
12/7/07	JUNIOR	BRAND SHELL	SCOTTICAL

FIGURE 2:
GAUGES AND VEGETATION PLOTS

FIGURE 2

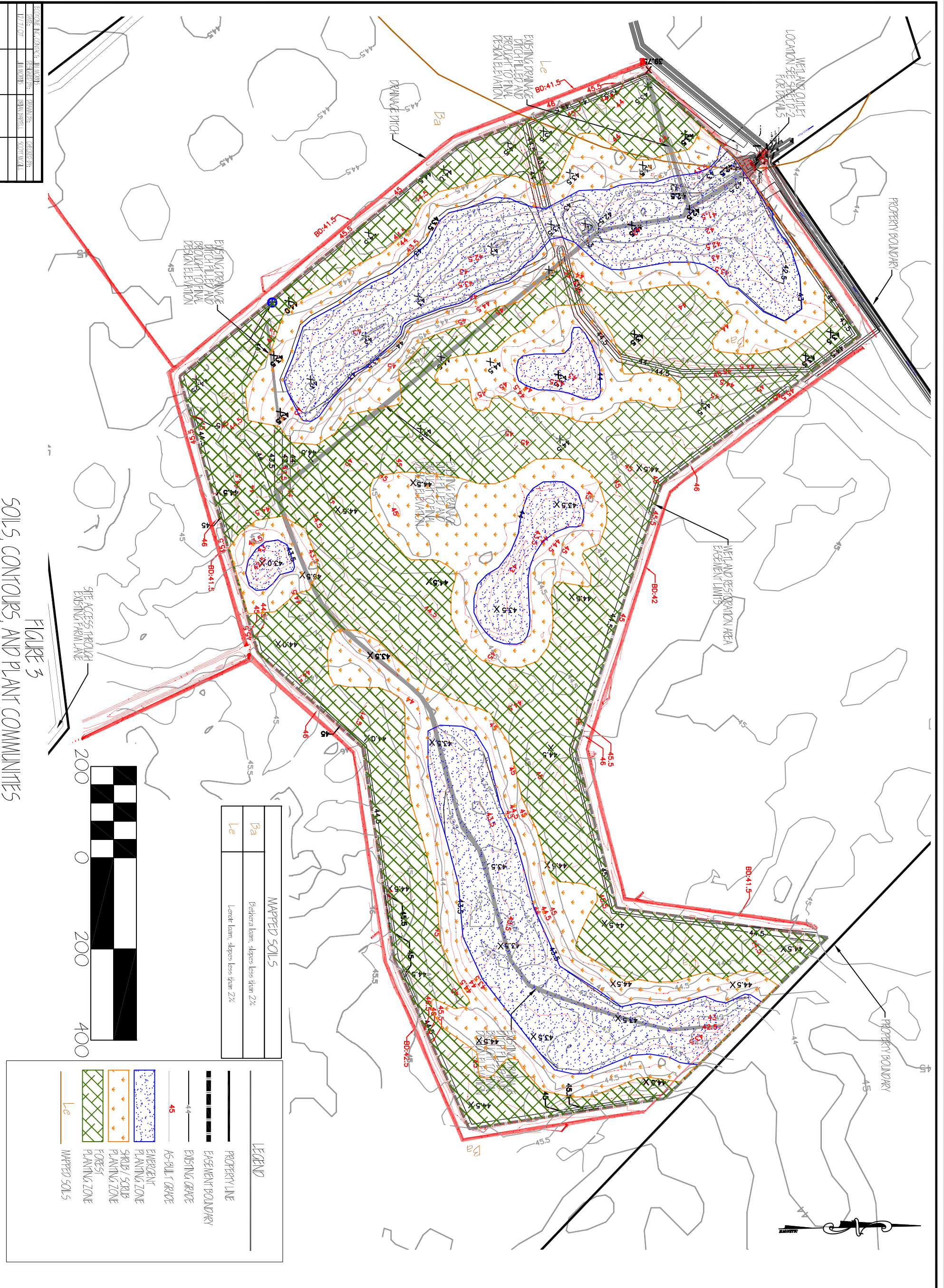
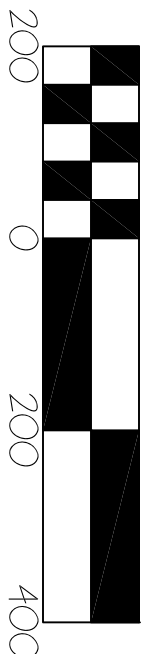


FIGURE 3
SOILS, CONTOURS, AND PLANT COMMUNITIES



MAPPED SOILS	
Ba	Bethera loam, slopes less than 2%
Le	Leach loam, slopes less than 2%

LEGEND	
	PROPERTY LINE
	EASEMENT GRADE
	AS-BUILT GRADE
	EMERGENT PLANNING ZONE
	SCRUB / SCRUB PLANNING ZONE
	FOREST PLANNING ZONE
	MAPPED SOILS

ALBERMARLE RESTORATIONS, LLC WETLAND RESTORATION, STREAM RESTORATION, & WILDLIFE HABITAT CREATION 404 COURT STREET • GATESVILLE, NC 27938 (252) 333-0249 • FAX (252) 357-4892	PLAN PREPARED BY: ECOTONE, INC. Environmental Consulting, Permitting & Design, Forest & Wetland Creation & Stream Restoration. P.O. Box 5 • 1204 Baldwin Mill Road • Jarrettsville, Maryland 21084 (410) 692-7500 • Fax (410) 692-7503 • e-mail info@ecotoneinc.com		MODLIN PROPERTY RIVERINE WETLAND MITIGATION AS-BUILT 40.0 ACRES MARTIN COUNTY, NORTH CAROLINA EEP CONTRACT #: D05024-1	SOILS, CONTOURS, AND PLANT COMMUNITIES NOVEMBER 2008				
	<table border="1"> <thead> <tr> <th>REVISIONS</th> <th>DATE</th> <th>REVISIONS</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		REVISIONS	DATE	REVISIONS	DATE		
REVISIONS	DATE	REVISIONS	DATE					