



Daniels Farm #2  
Wetland Restoration Site  
Franklin County, North Carolina

Tar-Pam 03020101  
Contract # D05025

**Monitoring Report  
Year 5**

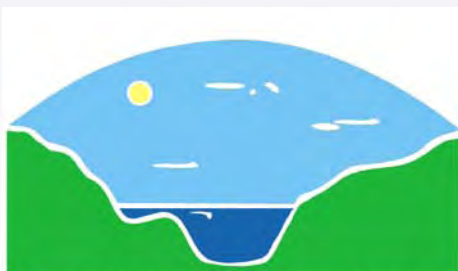
Submitted to:

North Carolina  
Department of Environment and  
Natural Resources  
Ecosystem Enhancement Program

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December 2010



ENVIRONMENTAL TECHNOLOGIES  
AND CONSTRUCTION, INC.

## **EXECUTIVE SUMMARY**

The Daniels Farm #2 Wetland Restoration Project has restored, enhanced, and preserved a Piedmont Bottomland Hardwood wetland community along the Tar River in central Franklin County. This project hopes to improve water quality and protect aquatic habitat in a predominantly agricultural area with the restoration and enhancement of 19.7 acres of wetland and the preservation of 10.4 acres of wetland. The restoration site had undergone severe degradation from unrestricted agricultural activities and human-induced disturbances.

This monitoring report presents the data and findings from the fifth growing season following construction. Included in this report are analyses of both hydrologic and vegetation monitoring results as well as local climatic conditions throughout the growing season. Monitoring activities included sampling vegetation survivability at eleven locations, monitoring groundwater elevations at five locations, and documenting general site conditions at seven permanent photograph points within the wetland restoration area. In addition, daily precipitation was recorded. These data were evaluated and verified using the climatic data for Louisburg, North Carolina. Field investigations were conducted in May and November 2010. Supporting data and site photographs are included in the report appendices.

The 14.4 acres of wetland restoration were planted at a density of 680 trees per acre and the 5.2 acres of wetland enhancement were planted at a density ranging from 100 to 200 trees per acre. There were eleven vegetation monitoring plots established throughout the restoration area and one monitoring plot in the enhancement area. The 2010 vegetation monitoring of the restoration areas revealed an average density of 370 trees per acre, which is above the minimum requirement of 320 trees per acre needed to meet the success criteria at the end of the five-year monitoring period.

During the 2010 monitoring year, wetland hydrology was achieved at all four wells in the restoration area, the well in the preservation area, and the well in the reference wetland. Groundwater was within 12 inches of the soil surface in excess of 12 consecutive days (5% of the growing season) at each well.

The daily rainfall data depicted on the gauge data graphs were obtained from the on-site precipitation gauge. The precipitation gauge was installed on the site in 2003 prior to project implementation. The daily rainfall data obtained for Louisburg, North Carolina shows that Louisburg had average rainfall during the growing season in 2010 and correlated to the precipitation data recorded on-site.

Soils in the restoration portion of the site have been determined to be predominately Roanoke. Since this soil is already considered hydric, no success criteria or monitoring is required.

Site photographs were taken from seven permanent photo documentation points established along the property boundary. Photo documentation facilitates the qualitative evaluation of the conditions or changes in the restored wetland. The photo point locations were selected in order to document representative site conditions.

The results of the 2010 monitoring of the Daniels Farm #2 Wetland Restoration Project indicate that the site is on track to meeting the project success criteria.

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## 1.0 SUMMARY

### 1.1 Mitigation Summary

**Table 1: Project Components**

Segment/ Reach ID	Existing Linear Feet	Restoration Level	Approach	Linear Feet / Acreage	Stationing	Mitigation Ratio	Mitigation Units	BMP Elements	Comment
Riverine Restoration	-	R	-	13.8 ac	-	1:1	13.80	-	Filled ditches and planted all new trees in former agricultural field.
Riverine Enhancement	-	E	-	4.5 ac	-	2:1	2.25	-	Enhanced hydrology by filling adjacent ditches, supplementally planted trees, selectively removed red maple and sweetgum to promote vegetative diversity.
Riverine Preservation	-	P	-	10.3 ac	-	5:1	2.06	-	Preserved existing wetlands in conservation easement.
Nonriverine Restoration	-	R	-	0.7 ac	-	1:1	0.70	-	Filled ditches and planted all new trees in former agricultural field.
Nonriverine Enhancement	-	E	-	0.7 ac	-	2:1	0.35	-	Enhanced hydrology by filling adjacent ditches, supplementally planted trees, selectively removed red maple and sweetgum to promote vegetative diversity.
Nonriverine Preservation	-	P	-	0.1 ac	-	5:1	0.02	-	Preserved existing wetlands in conservation easement.

R = Restoration E = Enhancement P = Preservation

**Table 2: Project Component Summations**

Restoration Level	Stream (lf)	Riparian Wetland (Ac)		Non-Ripar (Ac)	Upland (Ac)	Buffer (Ac)	BMP
		Riverine	Non-Riverine				
Restoration		13.8	0.7				
Enhancement		4.5	0.7				
Enhancement I							
Enhancement II							
Creation							
Preservation		10.3	0.1				
HQ Preservation							
		28.6	1.5				
<b>Totals (Feet/Acres)</b>	<b>0</b>	<b>30.1</b>		<b>0</b>	<b>0</b>		
<b>MU Totals</b>	<b>0</b>	<b>19.18</b>		<b>0</b>	<b>0</b>		

Non-Applicable

## 1.2 Vegetation

The 14.4 acres of wetland restoration were planted at a density of 680 trees per acre and the 5.2 acres of wetland enhancement were planted at a density ranging from 100 to 200 trees per acre. Eleven vegetation plots were established in order to encompass 2% coverage of the restored wetland acreage. The 2010 vegetation monitoring of the planted areas revealed an average density of 370 trees per acre, which is above the minimum requirement of 320 trees per acre (Appendix A). While there are four plots that have a density less than 320 trees/acre, overall the site is well vegetated with both herbaceous and woody species. Qualitatively the woody species are growing vigorously and are well distributed throughout the site.

**Table 3: Vegetation Monitoring Results**

Plot Number	Willow Oak	Swamp Chestnut Oak	Laurel Oak	Yellow Poplar	Bald Cypress	Overcup Oak	Green Ash	Cherrybark Oak	Unknown	Total - Year 5	Density - Year 5 (Trees/Acres)
1	3	7				1		2		13	520
2					4		11			15	600
3		2					1			3	120
4	1	1		1			1	2		6	240
5		1			2		3			6	240
6		3	1		1	4	4	1		14	560
7	1	7						4		12	480
8		4				3	3			10	400
9		1			4	2	7		1	15	600
10		4				2	2	2		10	400
11						3	3		1	7	280
<b>Total Average Density</b>											370

**Table 4: Vegetation History (Trees/Acre)**

Plot #	Year 1	Year 2	Year 3	Year 4	Year 5
1	680	520	520	520	520
2	680	600	600	600	600
3	400	320	200	200	120
4	600	400	280	280	240
5	360	320	240	240	240
6	640	520	560	560	560
7	600	520	480	480	480
8	680	440	400	400	400
9	600	600	600	600	600
10	720	560	440	400	400
11	520	520	320	320	280

### 1.3 Hydrology

The wetland wells used to monitor site hydrology were installed in early May 2006. The maximum number of consecutive days that the groundwater was within 12 inches of the surface was determined for each groundwater gauge. This number was converted into a percentage of the 236-day growing season. Table 3 presents the hydrological monitoring results for 2010. Wetland hydrology was achieved at all of the wells on the site; groundwater was within 12 inches of the soil surface in excess of 12 consecutive days (5% of the growing season) at each well (Tables 3 and 4). Based on these data, the site has exceeded the minimum duration of near surface saturation for the 2010 growing season from March 20<sup>th</sup> to November 11<sup>th</sup> (Appendix B). Climatic data for the 2010 growing season were analyzed in comparison to historical data to determine whether 2010 was a normal year in terms of climatic conditions; this is a precursor to validating the results of the wetland monitoring. The historical data were collected from the NRCS, Water and Climate Center, "Climate Analysis for Wetlands by County" website. This evaluation concluded that 2010 was an average year for rainfall during the growing season. Rainfall was within the 30<sup>th</sup> to 70<sup>th</sup> percentiles for the months of January, February, March, July, August, and October. Rainfall was less than the 30<sup>th</sup> percentile threshold in April, June, and November. May and September rainfall was greater than the 70<sup>th</sup> percentile threshold (Appendix B).

A stream gauge was installed on the unnamed tributary to the Tar River (UTTR) in order to evaluate the influence of flooding on the site. During the 2010 growing season there were six flood events flooding the wetland recorded in 2010.

**Table 5: 2010 Hydrologic Monitoring Results**

Well #	Hydroperiod				Maximum Number of Consecutive Days	Dates Meeting Success
	<5%	5% - 8%	8% - 12.5%	>12.5%		
1				X	45	March 20 – June 25
2			X		19	March 20 – April 8
3			X		19	March 20 – April 8
4				X	46	Sept 27 – Nov 11
Preservation Wetland				X	236	March 20 – Nov 11
Ref. Wetland				X	97	March 20 – June 25

**Table 6. Hydroperiod History**

Well #	Pre-Restoration	Year 1	Year 2	Year 3	Year 4	Year 5
1	<5%	31%	25%	34%	48%	19%
2	<5%	11%	9%	8%	13%	8%
3	<5%	31%	29%	19%	22%	8%
4	<5%	31%	24%	34%	25%	19
Preservation Wetland		100%	100%	100%	100%	100%
Ref. Wetland		31%	19%	32%	49%	41%

## **2.0 DATA ANALYSIS**

### **2.1 Vegetation**

Vegetation on the site has remained stable during this past year. The herbaceous vegetation has not caused excessive stress on the planted stems, and many trees have grown above the herbaceous layer. This year there were three plots that each lost a single tree. This made one more plot than last year with planted stem densities less than 320 trees per acre. The baseline data from Plots 3 and 5 indicate that these two plots were planted at lower than average densities. Considering that three of the plots below 320 planted stems per acre are in the same area, it is likely that across the entire site, this area was the most detrimentally affected by the drought in 2007. Plot 11 is in a different location and has experienced the opposite problem; during wet times of the year it has more standing water than other parts of the site. The planted trees on the rest of the site have had less mortality than these two areas and are surviving at higher densities. It should also be noted that all of the plots, including these three, have increasing numbers of desirable volunteers including oaks, green ash, bald cypress, and elm. If all of the volunteers were counted, almost all of the plots would have a sufficient density of desirable trees.

### **2.2 Hydrology**

Wetland restoration on the site focused on the removal of hydrologic alterations, which included filling the primary ditches, plugging the lateral ditches, removing ditch spoil to restore natural drainage, installing water diversion features to redistribute the surface hydrology, placing restrictive berms to reduce runoff and enhance infiltration, and recreating microtopography across the site to enhance surface water retention and storage. Based on the hydrological results, this site has met and exceeded the criteria outlined in the wetland restoration plan. Plugging and filling ditches combined with the other hydrological restoration methods have resulted in increased short-term surface and subsurface water storage and subsequent increase in the duration and elevation of the seasonally high water table.

### **2.3 Soils**

Soils in the restoration portion of the site have been determined to be predominantly Roanoke with small inclusions of Altavista and Wahee. Roanoke is listed as a hydric soil on the state and federal hydric soils lists. As this soil is already considered hydric, no success criteria or monitoring are required.

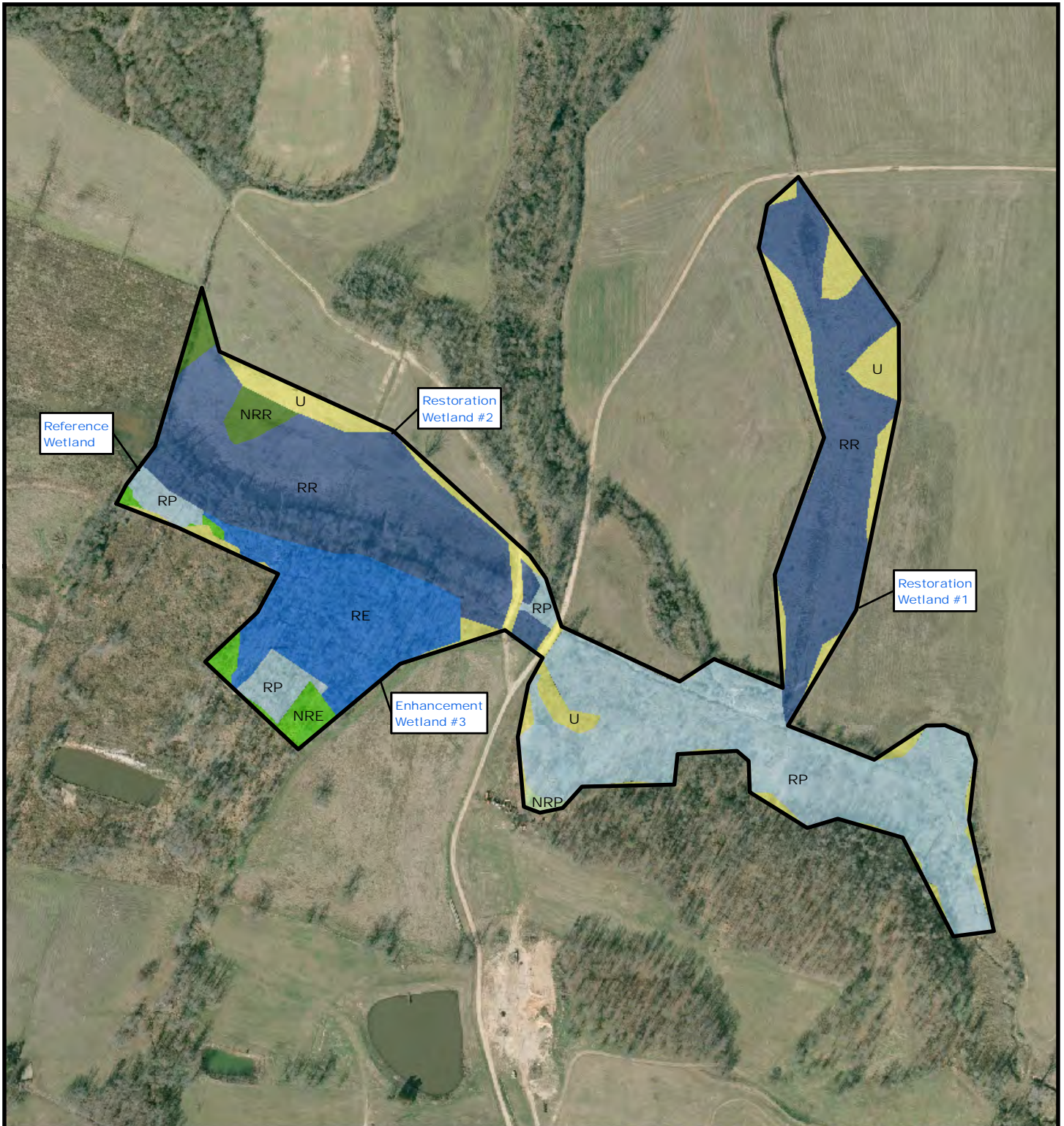
## **3.0 MAINTENANCE/MANAGEMENT ACTIONS**

There were no maintenance/management actions taken during 2010.









## **4.0 CONCLUSIONS**

Findings from this monitoring year indicate that the site is on track to meet the success criteria developed for the project. The success criteria for vegetation states that there must be an average of 320 trees per acre of planted vegetation at the end of five years of monitoring and that non-target species must not constitute more than 20% of the woody vegetation based on permanent plots. The 2010 vegetation monitoring of the planted areas revealed an average density of 370 trees per acre, which is above the minimum requirement of 320 trees per acre. Non-target species did not constitute more than 20 percent of the woody vegetation based on the permanent vegetation monitoring plots.

For the 2010 monitoring year, the site's gauges showed that the project is meeting the hydrologic success criteria of saturation within 12 inches of the surface continuously for at least 5% of the growing season. Two of the restoration gauges exceeded the hydrological success criteria for more than 12.5% of the growing season, while two gauges met the hydrological success criteria for 8% of the growing season.



**Figure 1. Site Map**

- |   |  |
|---|--|
|  Riverine Restoration (RR) - 13.8 acres  |  Nonriverine Restoration (NRR) - 0.7 acres  |
|  Riverine Enhancement (RE) - 4.5 acres   |  Nonriverine Enhancement (NRE) - 0.7 acres  |
|  Riverine Preservation (RP) - 10.3 acres |  Nonriverine Preservation (NRP) - 0.1 acres |
|  Upland Inclusions (U) - 4.0 acres       |  |
|  Project Site Boundary                   |  |



1:4,800

1 inch = 400 feet

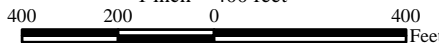


Image Source: Franklin County Orthoimagery, 2007.





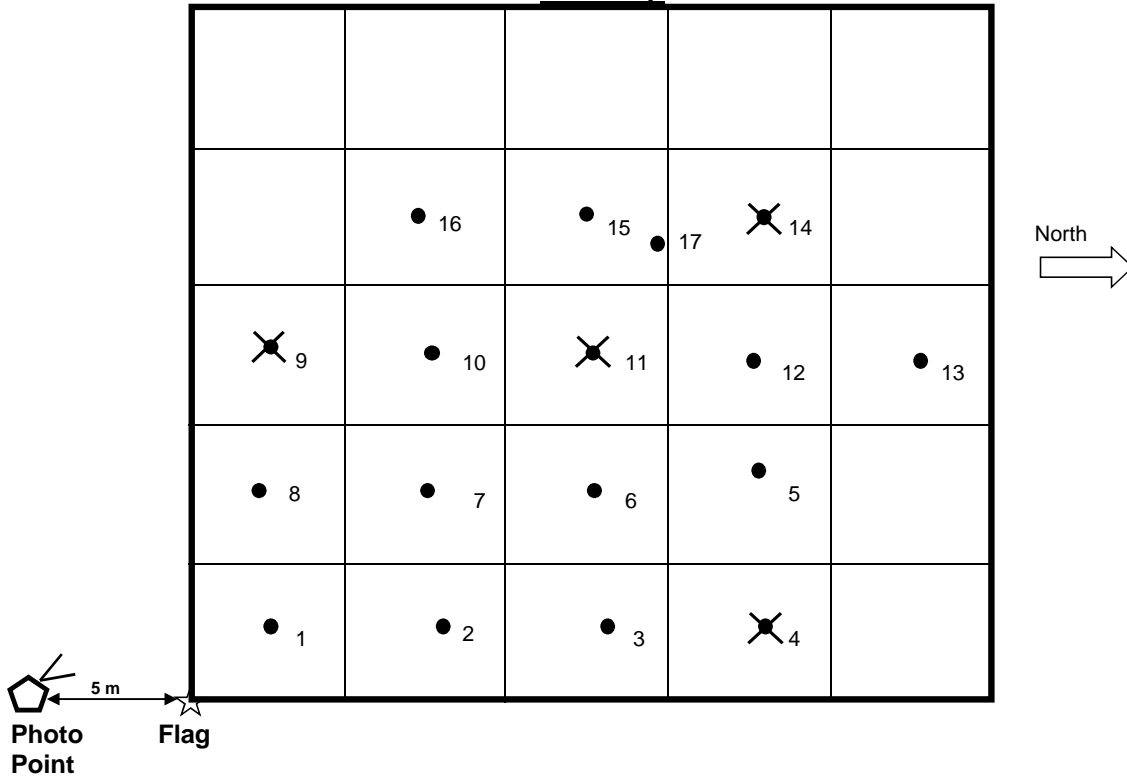


**Appendix A**  
**Vegetation Monitoring Plot Data Sheets**

# Vegetation Monitoring Worksheet

Site: Daniels II Plot: 1 Date: 5/27/2010

**Plot Map**



ID	Species	Height (m)	Vigor	Comment
1	Swamp chestnut oak ( <i>Quercus michauxii</i> )	1.01	3	
2	Cherrybark oak ( <i>Quercus pagoda</i> )	0.90	3	
3	Swamp chestnut oak ( <i>Quercus michauxii</i> )	0.50	3	
4	Swamp chestnut oak ( <i>Quercus michauxii</i> )			Dead
5	Willow oak ( <i>Quercus phellos</i> )	1.17	4	
6	Cherrybark oak ( <i>Quercus pagoda</i> )	0.32	2	
7	Willow oak ( <i>Quercus phellos</i> )	0.88	3	
8	Swamp chestnut oak ( <i>Quercus michauxii</i> )	0.42	3	Top has died back
9	Swamp chestnut oak ( <i>Quercus michauxii</i> )			Dead
10	Willow oak ( <i>Quercus phellos</i> )	0.12	2	Resprout from base
11	Unknown species			Dead
12	Swamp chestnut oak ( <i>Quercus michauxii</i> )	0.68	3	
13	Swamp chestnut oak ( <i>Quercus michauxii</i> )	1.60	4	
14	Unknown species			Dead
15	Swamp chestnut oak ( <i>Quercus michauxii</i> )	1.50	4	
16	Swamp chestnut oak ( <i>Quercus michauxii</i> )	1.32	4	
17	Overcup oak ( <i>Quercus lyrata</i> )	1.62	4	

Note : Willow Oak, Laurel Oak, Green Ash, Red Maple, Elm, and Loblolly volunteers present  
 Vigor: 4=excellent, 3=good, 2=weak, 1=unlikely to survive year

Species	Percent of Total
Overcup oak ( <i>Quercus lyrata</i> )	7.7%
Swamp chestnut oak ( <i>Quercus michauxii</i> )	53.8%
Willow oak ( <i>Quercus phellos</i> )	23.1%
Cherrybark oak ( <i>Quercus pagoda</i> )	15.4%

**Density:**

Total Number of Trees **13** / 0.025 acres = **520** trees / acre

**Survivability:**

Total Number of Trees **13** / 17 trees x 100 = **76** % survivability



**4th Year  
Monitoring**

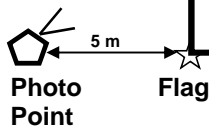
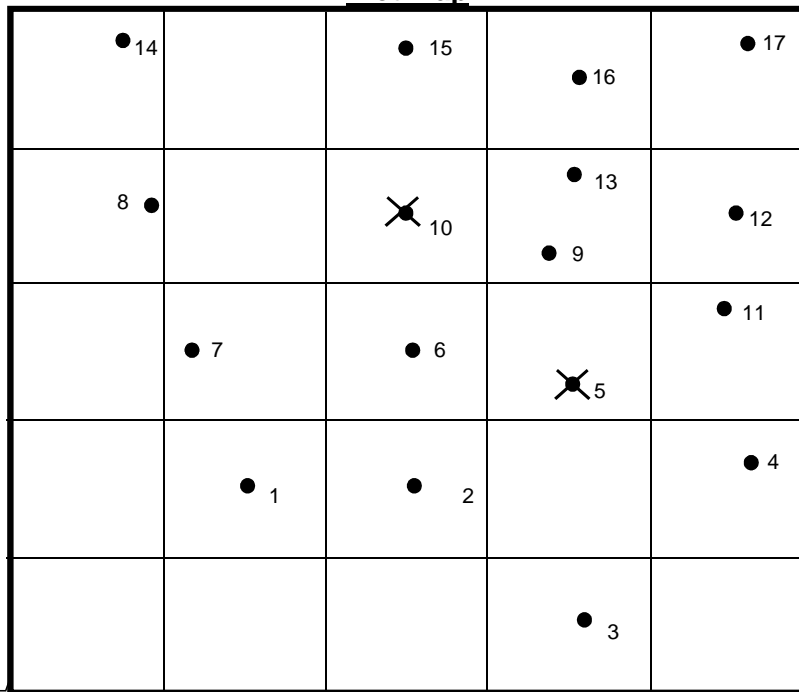


**5th Year  
Monitoring**

# Vegetation Monitoring Worksheet

Site: Daniels II Plot: 2 Date: 5/27/2010

**Plot Map**



ID	Species	Height (m)	Vigor	Comment
1	Bald cypress ( <i>Taxodium distichum</i> )	1.70	4	
2	Green ash ( <i>Fraxinus pennsylvanica</i> )	2.50	4	
3	Green ash ( <i>Fraxinus pennsylvanica</i> )	0.65	3	Resprout from base
4	Green ash ( <i>Fraxinus pennsylvanica</i> )	1.20	4	
5	Bald cypress ( <i>Taxodium distichum</i> )			Dead
6	Green ash ( <i>Fraxinus pennsylvanica</i> )	3.00	4	
7	Green ash ( <i>Fraxinus pennsylvanica</i> )	0.92	3	
8	Green ash ( <i>Fraxinus pennsylvanica</i> )	1.20	3	
9	Green ash ( <i>Fraxinus pennsylvanica</i> )	1.94	4	
10	Bald cypress ( <i>Taxodium distichum</i> )			Dead
11	Bald cypress ( <i>Taxodium distichum</i> )	1.40	4	
12	Green ash ( <i>Fraxinus pennsylvanica</i> )	0.87	3	Deer Browse
13	Bald cypress ( <i>Taxodium distichum</i> )	1.52	3	
14	Green ash ( <i>Fraxinus pennsylvanica</i> )	2.20	4	
15	Green ash ( <i>Fraxinus pennsylvanica</i> )	1.65	3	
16	Green ash ( <i>Fraxinus pennsylvanica</i> )	1.96	4	
17	Bald cypress ( <i>Taxodium distichum</i> )	1.48	3	

Note: Oak, Green Ash, Elm, and Maple volunteers present      Vigor: 4=excellent, 3=good, 2=weak, 1=unlikely to survive year

Species	Percent of Total
Green ash ( <i>Fraxinus pennsylvanica</i> )	73.3%
Bald cypress ( <i>Taxodium distichum</i> )	26.7%

**Density:**

Total Number of Trees 15 / 0.025 acres = 600 trees / acre

**Survivability:**

Total Number of Trees 15 / 17 trees x 100 = 88 % survivability



**4th Year  
Monitoring**



**5th Year  
Monitoring**



Species	Percent of Total
Green ash ( <i>Fraxinus pennsylvanica</i> )	33.3%
Swamp chestnut oak ( <i>Quercus michauxii</i> )	66.7%

**Density:**

Total Number of Trees 3 / 0.025 acres = 120 trees / acre

**Survivability:**

Total Number of Trees 3 / 10 trees x 100 = 30 % survivability



**4th Year  
Monitoring**



**5th Year  
Monitoring**





Species	Percent of Total
Green ash ( <i>Fraxinus pennsylvanica</i> )	16.7%
Tulip poplar ( <i>Liriodendron tulipifera</i> )	16.7%
Swamp chestnut oak ( <i>Quercus michauxii</i> )	16.7%
Willow oak ( <i>Quercus phellos</i> )	16.7%
Cherrybark oak ( <i>Quercus pagoda</i> )	33.3%

**Density:**

$$\begin{array}{r} \text{Total Number of} \\ \text{Trees} \end{array} \quad \underline{6} \quad / \quad 0.025 \text{ acres} \quad = \quad \underline{240} \quad \text{trees / acre}$$

**Survivability:**

$$\begin{array}{r} \text{Total Number of} \\ \text{Trees} \end{array} \quad \underline{6} \quad / \quad 15 \text{ trees} \quad \times \quad 100 \quad = \quad \underline{40} \quad \% \text{ survivability}$$



**4th Year  
Monitoring**



**5th Year  
Monitoring**



Species	Percent of Total
Green ash ( <i>Fraxinus pennsylvanica</i> )	50.0%
Swamp chestnut oak ( <i>Quercus michauxii</i> )	16.7%
Bald cypress ( <i>Taxodium distichum</i> )	33.3%

**Density:**

Total Number of Trees 6 / 0.025 acres = 240 trees / acre

**Survivability:**

Total Number of Trees 6 / 9 trees x 100 = 67 % survivability



**4th Year  
Monitoring**



**5th Year  
Monitoring**



Species	Percent of Total
Green ash ( <i>Fraxinus pennsylvanica</i> )	28.6%
Overcup oak ( <i>Quercus lyrata</i> )	28.6%
Swamp chestnut oak ( <i>Quercus michauxii</i> )	21.4%
Cherrybark oak ( <i>Quercus pagoda</i> )	7.1%
Bald cypress ( <i>Taxodium distichum</i> )	7.1%
Laurel oak ( <i>Quercus laurifolia</i> )	7.1%

**Density:**

Total Number of Trees 14 / 0.025 acres = 560 trees / acre

**Survivability:**

Total Number of Trees 14 / 16 trees x 100 = 88 % survivability



**4th Year  
Monitoring**



**5th Year  
Monitoring**



Species	Percent of Total
Swamp chestnut oak ( <i>Quercus michauxii</i> )	58.3%
Cherrybark oak ( <i>Quercus pagoda</i> )	33.3%
Willow oak ( <i>Quercus phellos</i> )	8.3%

**Density:**

$$\text{Total Number of Trees } \underline{12} \quad / \quad 0.025 \text{ acres} \quad = \quad \underline{480} \quad \text{trees / acre}$$

**Survivability:**

$$\text{Total Number of Trees } \underline{12} \quad / \quad 15 \text{ trees} \quad \times \quad 100 \quad = \quad \underline{80} \quad \% \text{ survivability}$$



**4th Year  
Monitoring**



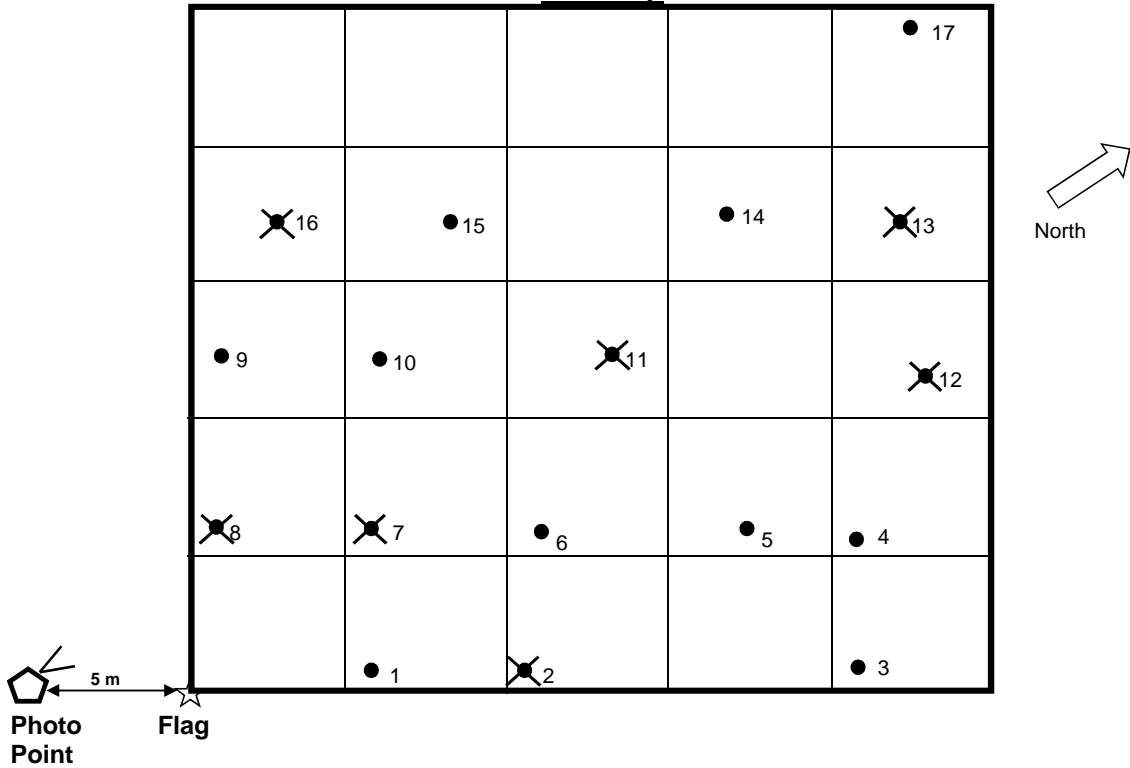
**5th Year  
Monitoring**



# Vegetation Monitoring Worksheet

Site: Daniels II Plot: 8 Date: 5/27/2010

**Plot Map**



ID	Species	Height (m)	Vigor	Comment
1	Swamp chestnut oak ( <i>Quercus michauxii</i> )	1.10	3	
2	Unknown species			Dead
3	Green ash ( <i>Fraxinus pennsylvanica</i> )	1.90	3	
4	Green ash ( <i>Fraxinus pennsylvanica</i> )	1.95	4	
5	Swamp chestnut oak ( <i>Quercus michauxii</i> )	1.30	4	
6	Green ash ( <i>Fraxinus pennsylvanica</i> )	1.30	4	
7	Unknown species			Dead
8	Unknown species			Dead
9	Overcup oak ( <i>Quercus lyrata</i> )	1.34	3	
10	Overcup oak ( <i>Quercus lyrata</i> )	1.43	4	
11	Swamp chestnut oak ( <i>Quercus michauxii</i> )			Dead
12	Unknown species			Dead
13	Unknown species			Dead
14	Swamp chestnut oak ( <i>Quercus michauxii</i> )	1.70	4	
15	Swamp chestnut oak ( <i>Quercus michauxii</i> )	1.20	3	
16	Unknown species			Dead
17	Overcup oak ( <i>Quercus lyrata</i> )	1.05	4	

Note: Overcup Oak, Swamp Chestnut Oak, and Bald Cypress volunteers present  
 Vigor: 4=excellent, 3=good, 2=weak, 1=unlikely to survive year

Species	Percent of Total
Green ash ( <i>Fraxinus pennsylvanica</i> )	30.0%
Overcup oak ( <i>Quercus lyrata</i> )	30.0%
Swamp chestnut oak ( <i>Quercus michauxii</i> )	40.0%

**Density:**

Total Number of Trees 10 / 0.025 acres = 400 trees / acre

**Survivability:**

Total Number of Trees 10 / 17 trees x 100 = 59 % survivability



**4th Year  
Monitoring**



**5th Year  
Monitoring**



Species	Percent of Total
Green ash ( <i>Fraxinus pennsylvanica</i> )	46.7%
Swamp chestnut oak ( <i>Quercus michauxii</i> )	6.7%
Overcup oak ( <i>Quercus lyrata</i> )	13.3%
Bald cypress ( <i>Taxodium distichum</i> )	26.7%
Unknown	6.7%

**Density:**

Total Number of Trees 15 / 0.025 acres = 600 trees / acre

**Survivability:**

Total Number of Trees 15 / 15 trees x 100 = 100 % survivability



**4th Year  
Monitoring**



**5th Year  
Monitoring**



Species	Percent of Total
Green ash ( <i>Fraxinus pennsylvanica</i> )	20.0%
Overcup oak ( <i>Quercus lyrata</i> )	20.0%
Swamp chestnut oak ( <i>Quercus michauxii</i> )	40.0%
Cherrybark oak ( <i>Quercus pagoda</i> )	20.0%

**Density:**

$$\text{Total Number of Trees } \underline{10} \quad / \quad 0.025 \text{ acres} \quad = \quad \underline{400} \quad \text{trees / acre}$$

**Survivability:**

$$\text{Total Number of Trees } \underline{10} \quad / \quad 18 \text{ trees} \quad \times \quad 100 \quad = \quad \underline{56} \quad \% \text{ survivability}$$



**4th Year  
Monitoring**



**5th Year  
Monitoring**



Species	Percent of Total
Green ash ( <i>Fraxinus pennsylvanica</i> )	42.9%
Overcup oak ( <i>Quercus lyrata</i> )	42.9%
Unknown	14.3%

**Density:**

Total Number of Trees 7 / 0.025 acres = 280 trees / acre

**Survivability:**

Total Number of Trees 7 / 13 trees x 100 = 54 % survivability



**4th Year Monitoring**

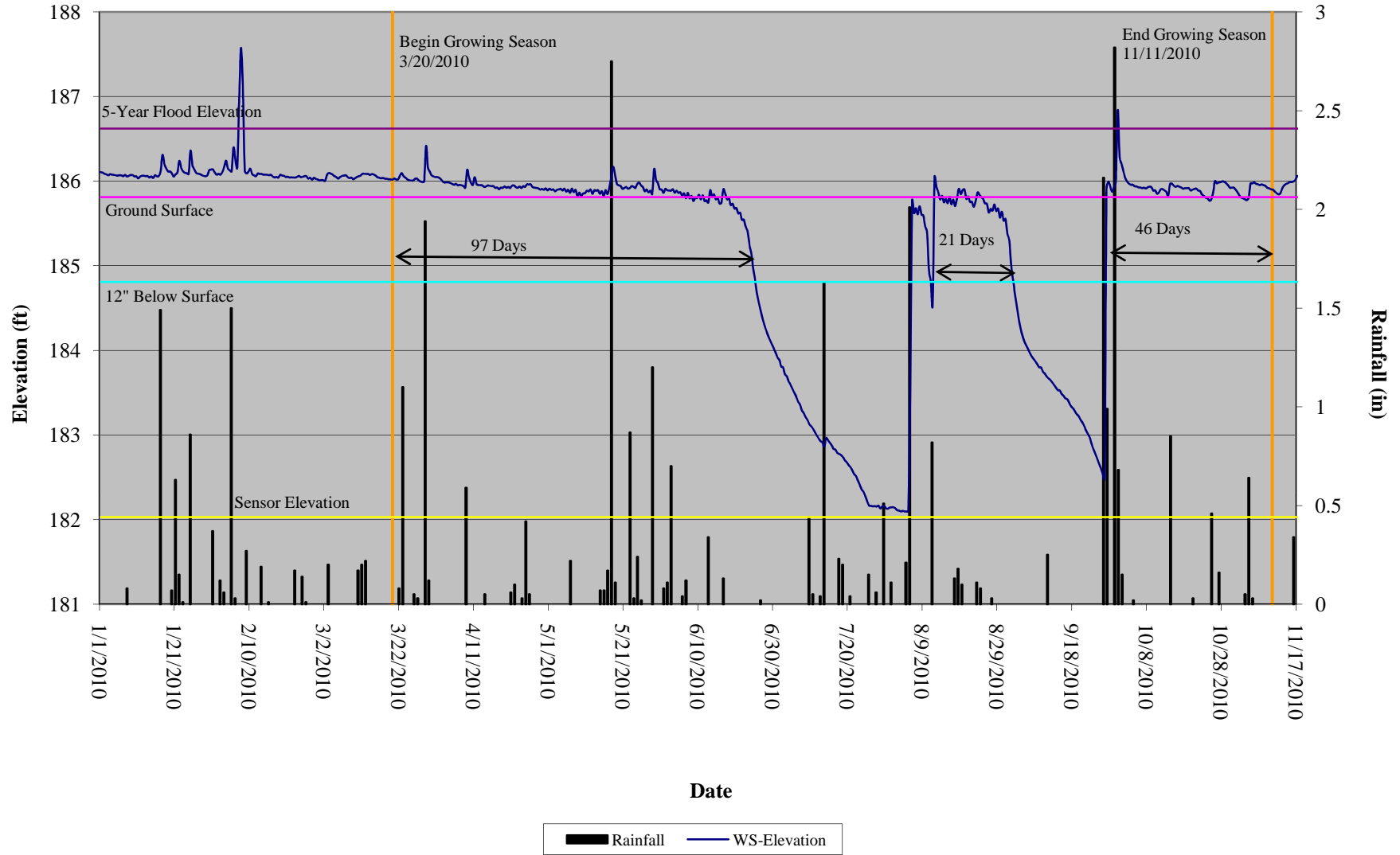


**5th Year Monitoring**

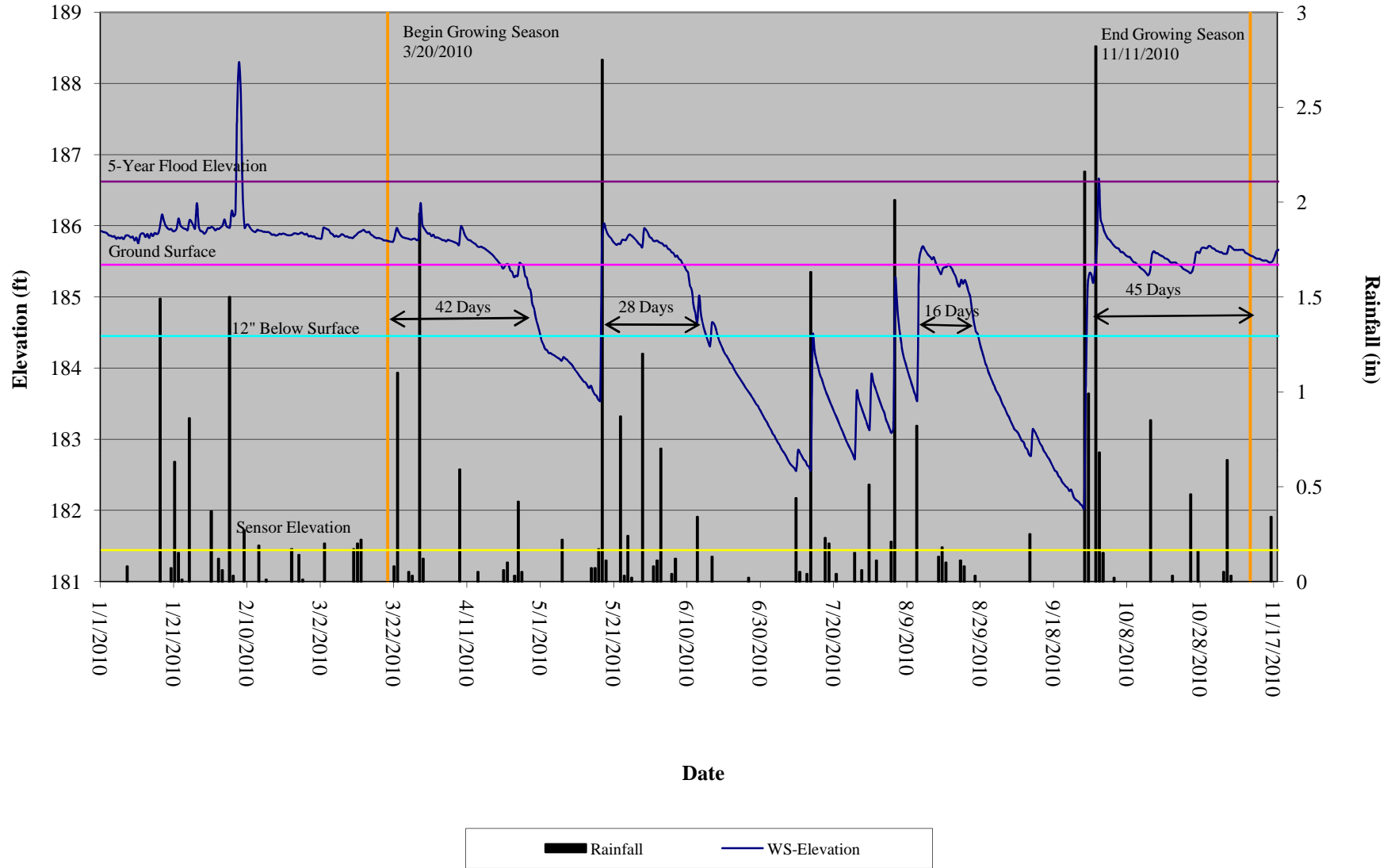


**Appendix B**  
**Hydrologic Monitoring and Hydroperiod**

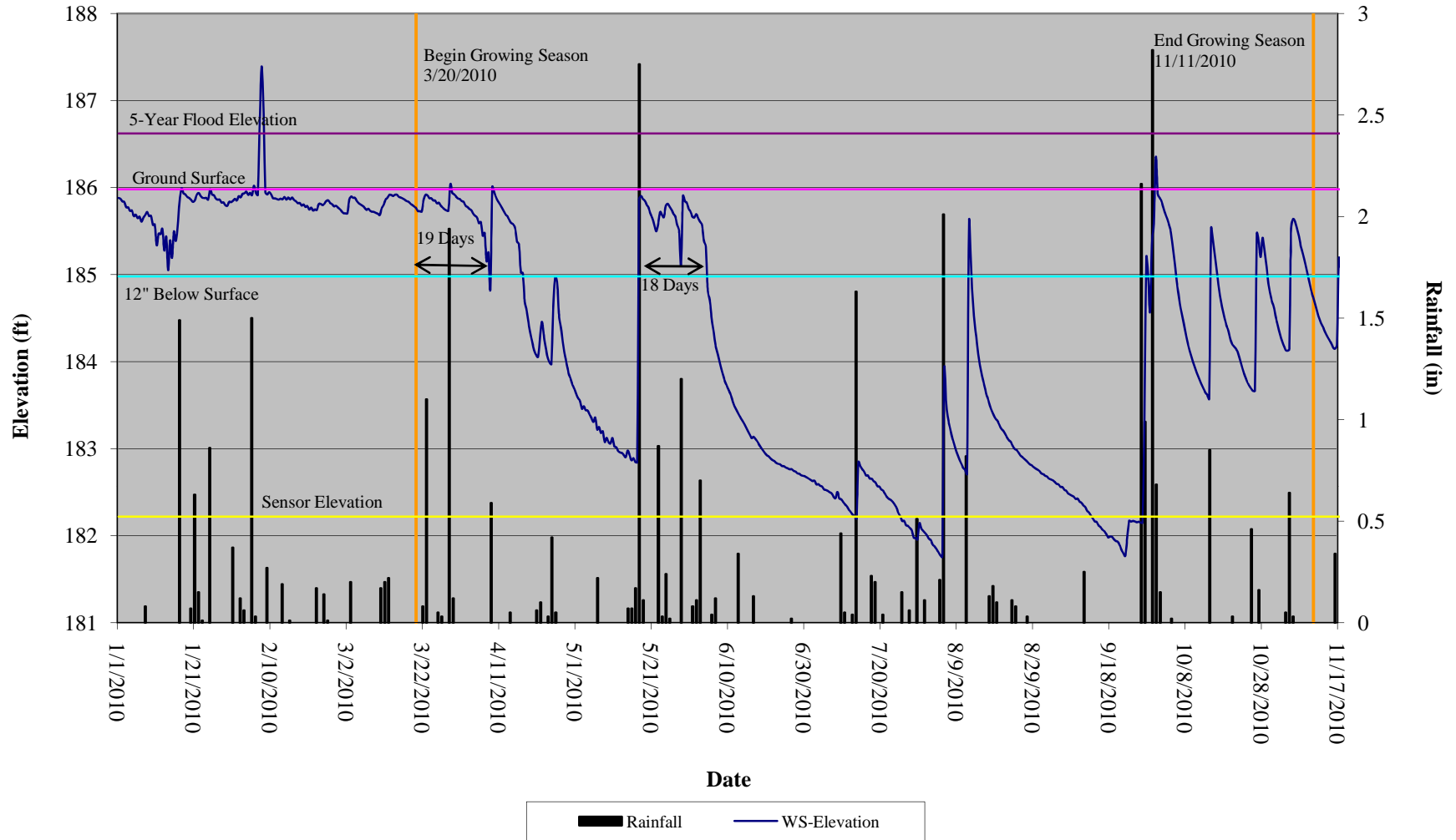
## Daniels II Reference Gauge Hydrograph 1/1/10 to 11/17/10



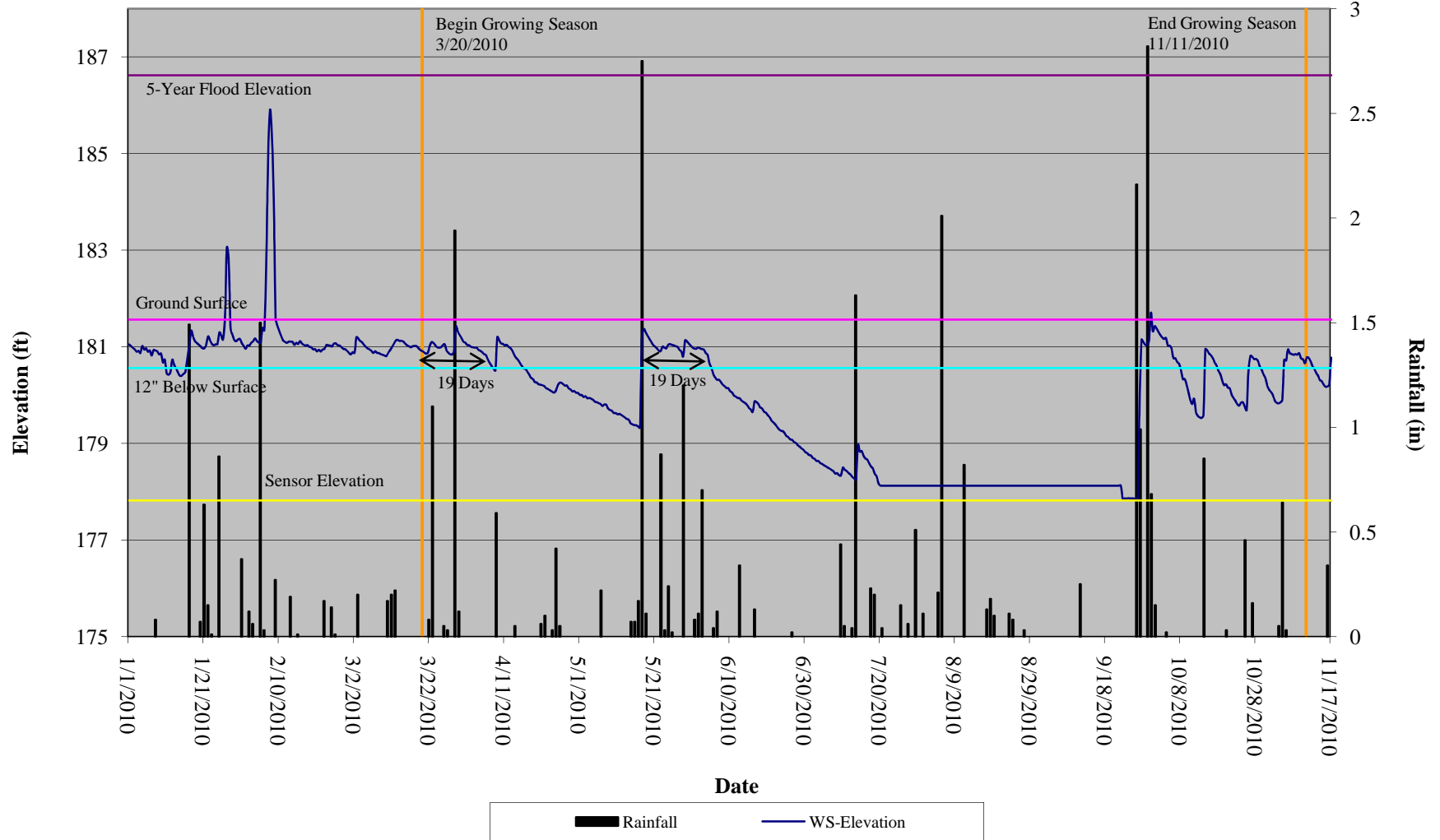
## Daniels II Gauge 1 Hydrograph 1/1/10 to 11/17/10



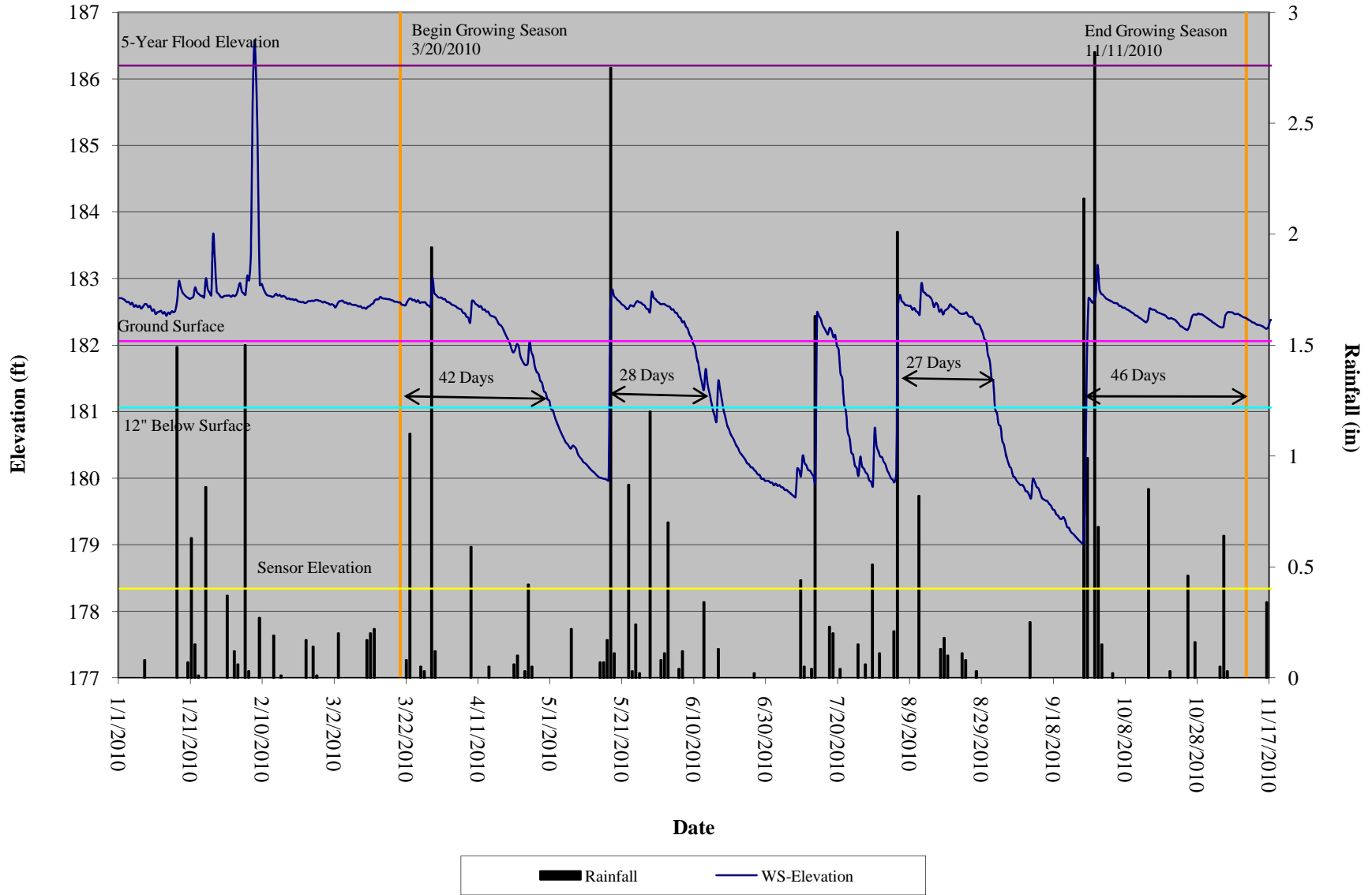
## Daniels II Gauge 2 Hydrograph 1/1/10 to 11/17/10



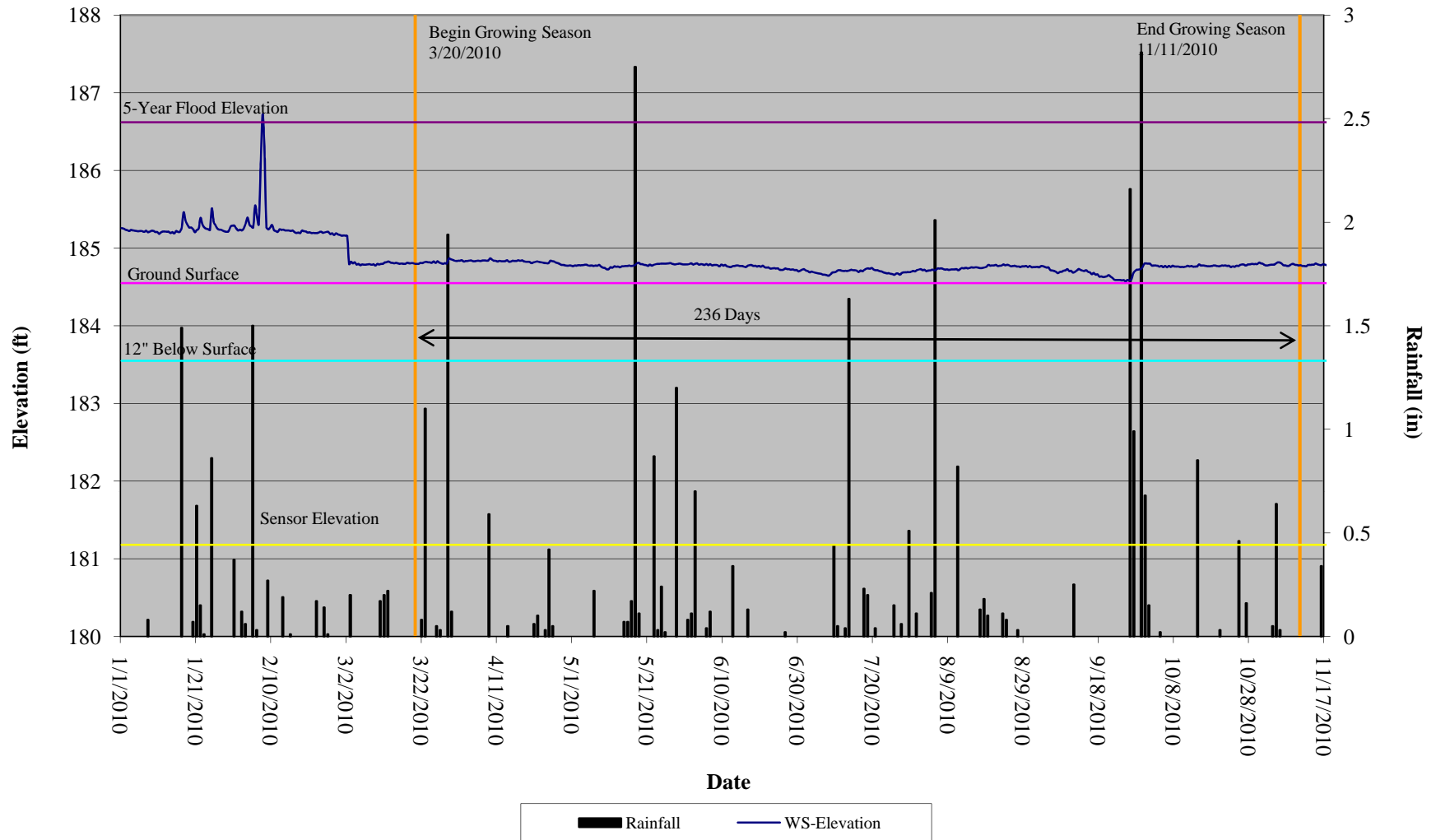
## Daniels II Gauge 3 Hydrograph 1/1/10 to 11/17/10



## Daniels II Gauge 4 Hydrograph 1/1/10 to 11/17/10

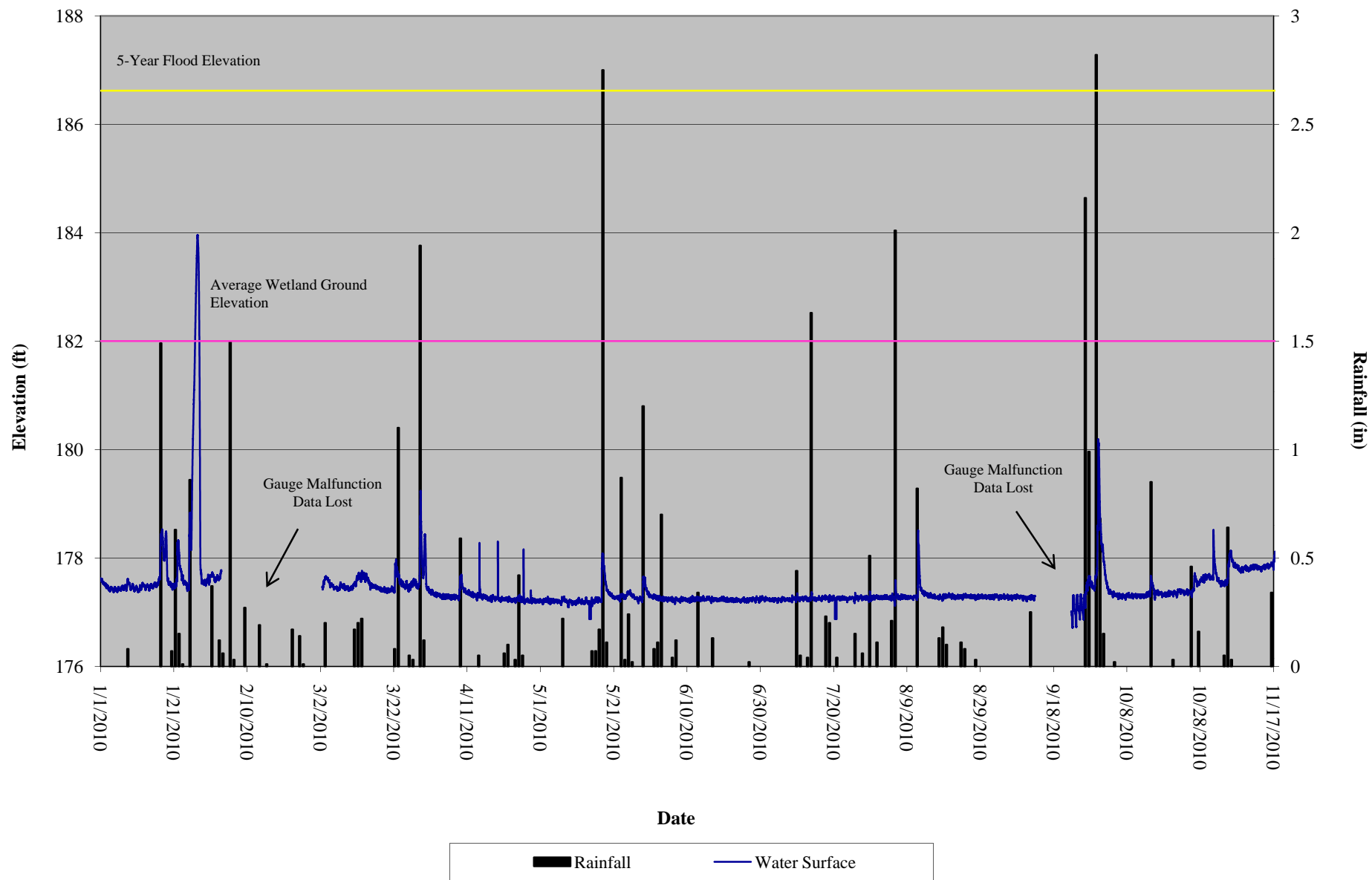


## Daniels II Gauge 5 (Preservation) Hydrograph 1/1/10 to 11/17/10



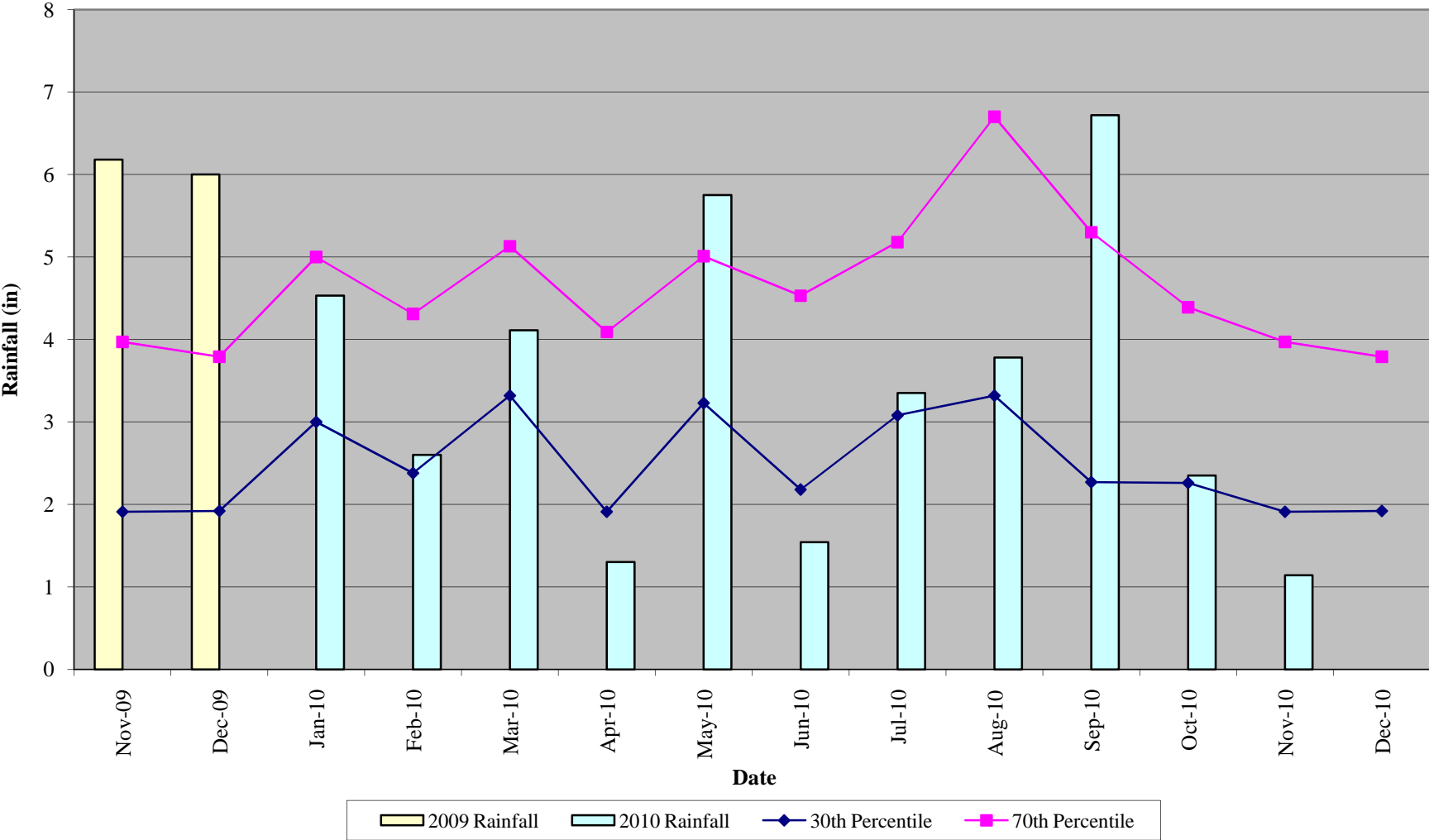
# Daniels II Stream Hydrograph

01/01/10 to 11/17/10





Daniels II 30-70 Percentile Graph 2009-2010  
Louisburg, NC Monthly Rainfall



**Appendix C**  
**Permanent Photograph Points**



Photo Point 1: View looking west with the enhancement wetland on the left. 12/6/10 – MY05



Photo Point 2: View looking south toward enhancement wetland. 12/6/10 – MY05



Photo Point 3A: View looking east toward Vegetation Plot # 5. 12/6/10 – MY05



Photo Point 3B: View looking south toward preservation wetland. 12/6/10 – MY05



Photo Point 4A: View looking east with enhancement wetland on the right. 12/6/10 – MY05



Photo Point 4B: View looking west with enhancement wetland on the left. 12/6/10 – MY05



Photo Point 5: View looking south. 12/6/10 – MY05



Photo Point 6A: View looking northwest toward Vegetation Plot #6. 12/6/10 – MY05



Photo Point 6B: View looking south. 12/6/10 – MY05



Photo Point 7: View looking north. 12/6/10 – MY05