EXECUTIVE SUMMARY

The Daniels Farm Wetland Restoration Project is located on the Clyde Daniels Farm, south-southeast of Louisburg in Franklin County, North Carolina. The restoration of 31.72 acres of non-riverine wetlands was completed following construction in March 2004. The site will be monitored for five years or until the success criteria are met.

This monitoring report presents the data and findings developed following the third growing season. Activities in 2006 reflect the third year of monitoring 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 nine locations, monitoring groundwater elevations at eight locations and documenting general site conditions at five permanent photo-documentation points within the wetland restoration area. In addition, project site daily precipitation was recorded. These data were evaluated and verified using the North Carolina climatic data for Louisburg, North Carolina. Field investigations were conducted in October 2006. Supporting data and site photographs are included in the report appendices.

The 31.72-acre wetland restoration site was initially planted at a density of 436 trees per acre. Supplemental planting occurred during the winter of 2004-2005. There were nine vegetation monitoring plots established throughout the planting areas, instead of the eight originally discussed in the as-built. The additional plot was established to monitor the survival and growth of the bald cypress and water tupelo area. Vegetation survival rates are above the minimum success criteria on the site. The 2006 vegetation monitoring of the planted areas revealed an average density of 627 trees per acre, which is well above the minimum requirement of 260 trees per acre needed to meet the success criteria at the end of the five year monitoring period. The average density for the Low Elevation Seep species (Zone 1) was 540 trees per acre after three years and the Non-Riverine Wet Hardwood Forest species (Zone 2) was 651 trees per acre.

During the 2006 monitoring year, wetland hydrology was achieved at all eight wells on the site. Groundwater was within 12 inches of the soil surface in excess of 12 days (5 % of the growing season) at each well. The hydrologic monitoring also showed that the water table was within 12 inches of the soil surface for greater than 12.5 percent of the growing season.

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. Daily rainfall data from the project site were compared to historic precipitation data for Louisburg, North Carolina in order to determine whether the monitoring year experienced below average, average, or above average rainfall. This analysis showed that 2006 was an average year.

Soils in the restoration portion of the site have been determined to be Roanoke and Toisnot. Since these soils are already considered hydric, no success criteria or monitoring is required.

Site photographs were taken from five (5) permanent photo documentation points established along the property boundary. Photo documentation is intended to facilitate 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.

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1.0 SUMMARY

1.1 Vegetation

The 31.72-acre wetland restoration site was originally planted at a density of 436 trees per acre. Supplemental planting occurred during the winter of 2004-2005. Originally there were eight vegetation monitoring plots established throughout the planting areas covering both vegetative communities. However, a ninth plot was established in 2004 to monitor the bald cypress and water tupelo community. The 2006 vegetation monitoring of the planted areas revealed an average density of 627 trees per acre, which is well above the minimum requirement of 260 trees per acre (Appendix A). The average density for the Low Elevation Seep species (Zone 1) was 540 trees per acre after three years and the Non-Riverine Wet Hardwood Forest species (Zone 2) had 627 trees per acre. A total of 6.5 trees per vegetation monitoring plot are needed to meet the 260 trees per acre minimum requirement and the average number of trees per plot in 2006 is 16.

Table 1: Vegetation Monitoring Results

Planting Zone	Plot #	Willow Oak	Swamp Chestnut Oak	Laurel Oak	Yellow Poplar	Swamp Blackgum	Water Tupelo	Bald Cypress	Overcup Oak	Green Ash	Cherrybark Oak	Total (Year 3)	Total (at planting)	Density-Year 3 (Trees/Acres)
1	1	3	7	1							2	13	15	520
	8	3	6	4	1							14	16	560
												Zone 1 Average		540
2	2	1	5	2					6	2	1	17	22	680
	3		3				5		3	5	1	17	17	680
	4	1	5				3		2		2	13	12	520
	5		3			5			4	5	3	20	20	800
	6	4	4	1		4			4	1	2	20	21	800
	7		10						3		3	16	18	640
	9						3	7	1			11	11	440
												Zone 2 Average		651
												Total Average		627

Table 2: Vegetation History (Trees/Acre)

Plot #	Year 1	Year 2	Year 3	Year 4	Year 5
1	360	520	520		
2	360	720	680		
3	320	640	680*		
4	320	480	520*		
5	320	760	800*		
6	520	760	800*		
7	560	560	640*		
8	520	560	560		
9	360	440	440		

* More trees/acre recorded in Year 3 because of either a resprout from a tree that was previously counted as dead or a missed tree from previous monitoring.

1.2 Hydrology

Climatic data for the 2006 growing season were analyzed in comparison to historical data to determine whether 2006 was a normal year in terms of climate conditions. This step is as 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 2006 was a normal year for rainfall during the growing season. Rainfall was within the 30th to 70th percentile thresholds for the months of May, July, and October. Rainfall was less than the 30th percentile threshold in February, March, and August and greater than the 70th percentile threshold in April, June, September, and November (Appendix B).

Wetland hydrology was achieved at all eight wells on the site. Groundwater was within 12 inches of the soil surface in excess of 12 days (5 % of the growing season) at each well (Table 3). Based upon these data, the site has exceeded the minimum duration of near surface saturation of 12 days with the water table within 12 inches of the soil surface for the 2006 growing season (Appendix B). The results of this monitoring also indicate that the water table was within 12 inches of the soil surface for greater than 12.5 percent of the growing season. 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 235-day growing season. Table 3 presents the hydrological monitoring results for 2006 and Table 4 presents the hydroperiod history of each well over the course of the monitoring.

Table 3: 2006 Hydrologic Monitoring Results

	Hydroperiod					
Well #	**<5%**	**5% - 8%**	**8% -12.5%**	**>12.5%**	**Maximum Number of Consecutive Days**	**Dates Meeting Success**
1				X	139	3/20-8/5; 8/16-8/28; 8/31-11/11
2				X	237	3/20-11/11
3				X	73	3/20-5/25; 6/2-7/22; 8/31-11/11
4				X	50	3/20-4/11; 4/25-5/22; 6/3-7/21; 8/31-10/4; 10/6-11/11
5				X	38	6/11-7/18; 8/30-9/27; 10/6-11/11
6				X	73	3/20-5/23; 6/3-6/23; 6/24-7/20; 8/31-11/11
7				X	37	3/20-4/20; 4/22-5/22; 6/2-6/21; 6/23-7/13; 8/30-9/24; 10/6-11/11
8				X	40	3/20-4/16; 6/11-7/20; 9/14-10/4; 10/6-11/11

Table 4. Hydroperiod History

Well #	**Pre-Restoration**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
1	<5%	>12.5%	>12.5%	>12.5%		
2	<5%	>12.5%	>12.5%	>12.5%		
3	<5%	>12.5%	>12.5%	>12.5%		
4	<5%	>12.5%	>12.5%	>12.5%		
5	<5%	>12.5%	>12.5%	>12.5%		
6	<5%	>12.5%	>12.5%	>12.5%		
7	<5%	>12.5%	>12.5%	>12.5%		
8	<5%	>12.5%	>12.5%	>12.5%		

2.0 DATA ANALYSIS

2.1 Vegetation

Many areas on the site were vegetated with herbaceous species at a density that competed with tree growth, but the additional trees planted in the winter of 2004/2005 have allowed tree densities to remain high. A small increase in planted trees was seen in 2006 from either the resprouting of trees that appeared dead in the year before or went previously uncounted.

2.2 Hydrology

Wetland restoration on the site focused on the removal of hydrologic alterations including filling the primary ditches and grassed waterways, plugging the lateral ditches, removing ditch spoil to restore natural seepage areas, placing water diversion features to redistribute the surface hydrology, installing 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 wetlands restoration plan. Ditch plugging, filling and the other hydrologic 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 Roanoke and Toisnot, both hydric soils on the state and federal hydric soils lists. NRCS verified the limits of hydric soils and confirmed their status as Prior Converted wetland. As the soils are already considered hydric, no success criteria or monitoring are required.

3.0 MAINTENANCE/MANAGEMENT ACTIONS

In 2006, herbicide was sprayed around each tree to decrease competition with herbaceous vegetation. Herbicide was also used to control cattails (*Typha latifolia*) in the wetter portions of the wetland.

4.0 CONCLUSIONS

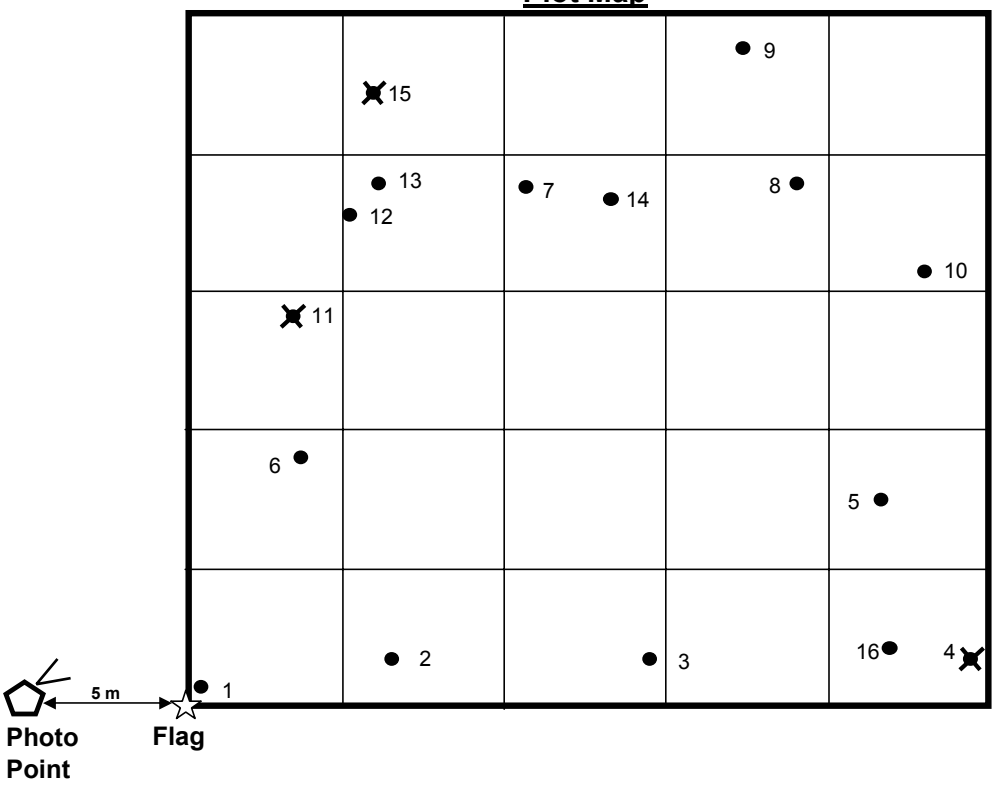
Findings from this monitoring year indicate that the project is meeting the success criteria set for the site. The criterion for the survival of the planted species is 260 stems/acre at the end of five years of monitoring. The 2006 vegetation monitoring of the planted areas revealed an average density of 627 trees per acre, which is well above the minimum requirement of 260 trees per acre. Non-target species do not constitute more than 20 percent of the woody vegetation based on permanent monitoring plots. Supplementing the planted trees in the winter of 2004/2005 with additional seedlings has ensured the density stays high across the site and herbicide treatment has protected the trees from herbaceous competition. For the 2006 monitoring year, all eight gauges met the hydrologic success criteria of at least 5% and were saturated for more than 12.5% of the growing season.

Appendix A
Vegetation Monitoring Plot Data Sheets

Vegetation Monitoring Worksheet

Site: Daniels **Plot:** 1 **Date:** 10/12/2006

Plot Map



ID	Species	Height (m)	Collar Diameter (cm)	Comments (insect damage, disease, browsing)
1	Swamp Chestnut Oak (*Quercus michauxii*)	0.7	0.7	healthy
2	Willow Oak (*Quercus phellos*)	0.6	0.9	healthy
3	Swamp Chestnut Oak (*Quercus michauxii*)	0.8	1.2	healthy
4	Swamp Chestnut Oak (*Quercus michauxii*)			dead
5	Swamp Chestnut Oak (*Quercus michauxii*)	0.8	1.2	healthy
6	Swamp Chestnut Oak (*Quercus michauxii*)	0.9	1.8	healthy
7	Swamp Chestnut Oak (*Quercus michauxii*)	1.7	2.4	healthy
8	Swamp Chestnut Oak (*Quercus michauxii*)	1.1	1.8	healthy
9	Willow Oak (*Quercus phellos*)	0.8	1.5	healthy
10	Cherrybark Oak (*Quercus pagoda*)	0.5	0.7	healthy
11	Willow Oak (*Quercus phellos*)			dead
12	Swamp Chestnut Oak (*Quercus michauxii*)	0.5	0.9	healthy
13	Laurel Oak (*Quercus laurifolia*)	0.3	1.3	healthy
14	Cherrybark Oak (*Quercus pagoda*)	1.2	1.2	healthy
15	Cherrybark Oak (*Quercus pagoda*)			dead
16	Willow Oak (*Quercus phellos*)	0.9	1.0	healthy

Species	Percent of Total
Swamp Chestnut Oak (*Quercus michauxii*)	54%
Willow Oak (*Quercus phellos*)	23%
Cherrybark Oak (*Quercus pagoda*)	15%
Laurel Oak (*Quercus laurifolia*)	8%

Density:

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

Survivability:

Total Number of Trees **13** / **16 trees** x **100** = **81** **% survivability**

Number of New Recruits : 0

Note : Flag located AZ. 72°, 16 feet from monitoring well

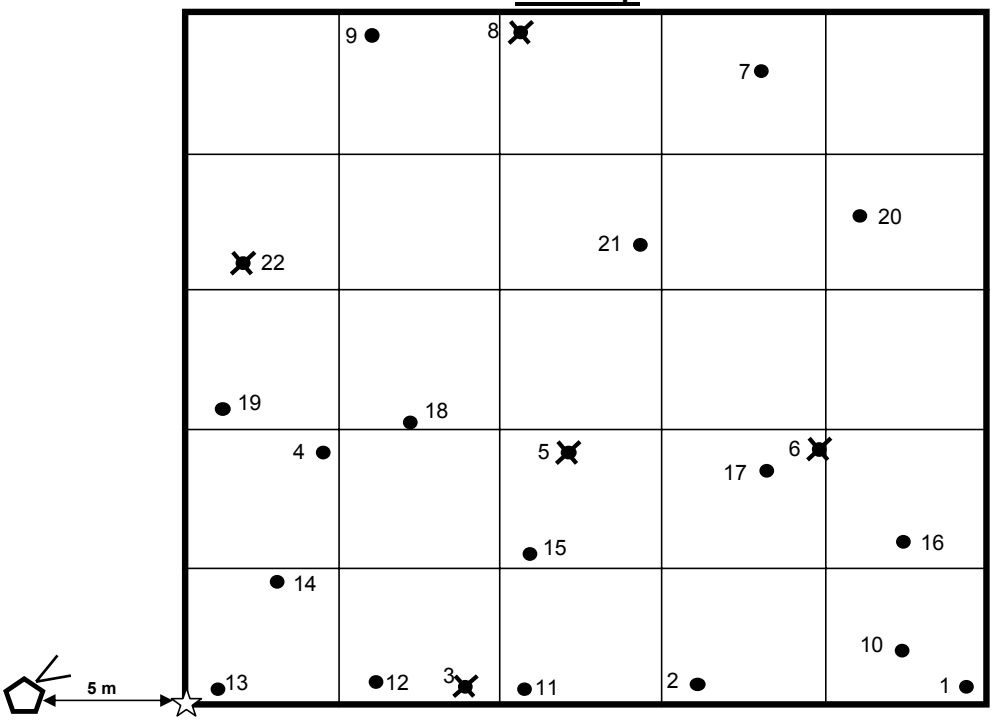
2nd Year Monitoring

3rd Year Monitoring

Vegetation Monitoring Worksheet

Site: Daniels **Plot:** 2 **Date:** 10/12/2006

Plot Map



ID	Species	Height (m)	Collar Diameter (cm)	Comments (insect damage, disease, browsing)
1	Laurel Oak (*Quercus laurifolia*)	1.2	1.8	healthy
2	Swamp Chestnut Oak (*Quercus michauxii*)	1.3	3.5	healthy
3	Swamp Black Gum (*Nyssa sylvatica*)			dead
4	Swamp Chestnut Oak (*Quercus michauxii*)	1.7	2.7	healthy
5	Swamp Black Gum (*Nyssa sylvatica*)			dead
6	Swamp Chestnut Oak (*Quercus michauxii*)			dead
7	Laurel Oak (*Quercus laurifolia*)	1.2	1.5	healthy
8	Laurel Oak (*Quercus laurifolia*)			dead
9	Laurel Oak (*Quercus laurifolia*)	0.8	0.9	healthy
10	Green Ash (*Fraxinus pennsylvanica*)	1.5	1.6	healthy
11	Swamp Chestnut Oak (*Quercus michauxii*)	1.2	1.0	healthy
12	Swamp Chestnut Oak (*Quercus michauxii*)	1.3	1.8	healthy
13	Cherrybark Oak (*Quercus pagoda*)	1.3	1.5	healthy
14	Overcup Oak (*Quercus lyrata*)	1.3	2.1	healthy
15	Overcup Oak (*Quercus lyrata*)	1.5	2.4	healthy
16	Green Ash (*Fraxinus pennsylvanica*)	1.5	2.0	healthy
17	Overcup Oak (*Quercus lyrata*)	1.6	3.7	healthy
18	Overcup Oak (*Quercus lyrata*)	1.4	1.2	healthy
19	Swamp Chestnut Oak (*Quercus michauxii*)	0.8	0.9	healthy
20	Overcup Oak (*Quercus lyrata*)	1.6	3.0	healthy
21	Overcup Oak (*Quercus lyrata*)	1.9	2.6	healthy
22	Overcup Oak (*Quercus lyrata*)			dead

Species	Percent of Total
Swamp Chestnut Oak (*Quercus michauxii*)	29%
Laurel Oak (*Quercus laurifolia*)	12%
Swamp Black Gum (*Nyssa sylvatica*)	0%
Green Ash (*Fraxinus pennsylvanica*)	12%
Overcup Oak (*Quercus lyrata*)	35%
Cherrybark Oak (*Quercus pagoda*)	6%
Willow Oak (*Quercus phellos*)	6%

Density:

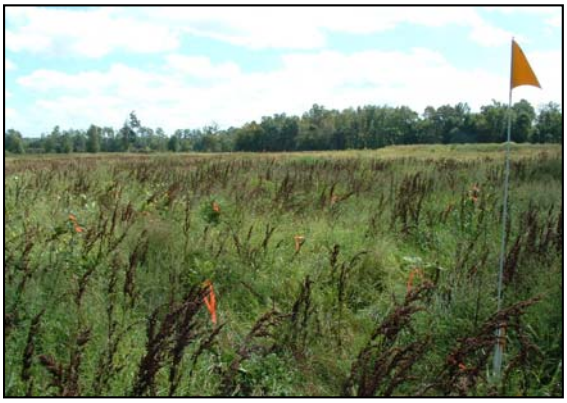
Total Number of Trees **17** / **0.025 acres** = **680** **trees / acre**

Survivability:

Total Number of Trees **17** / **22 trees** x **100** = **77.3** **% survivability**

Number of New Recruits : 0

Note : Flag located AZ. 104°, 43 feet from monitoring well



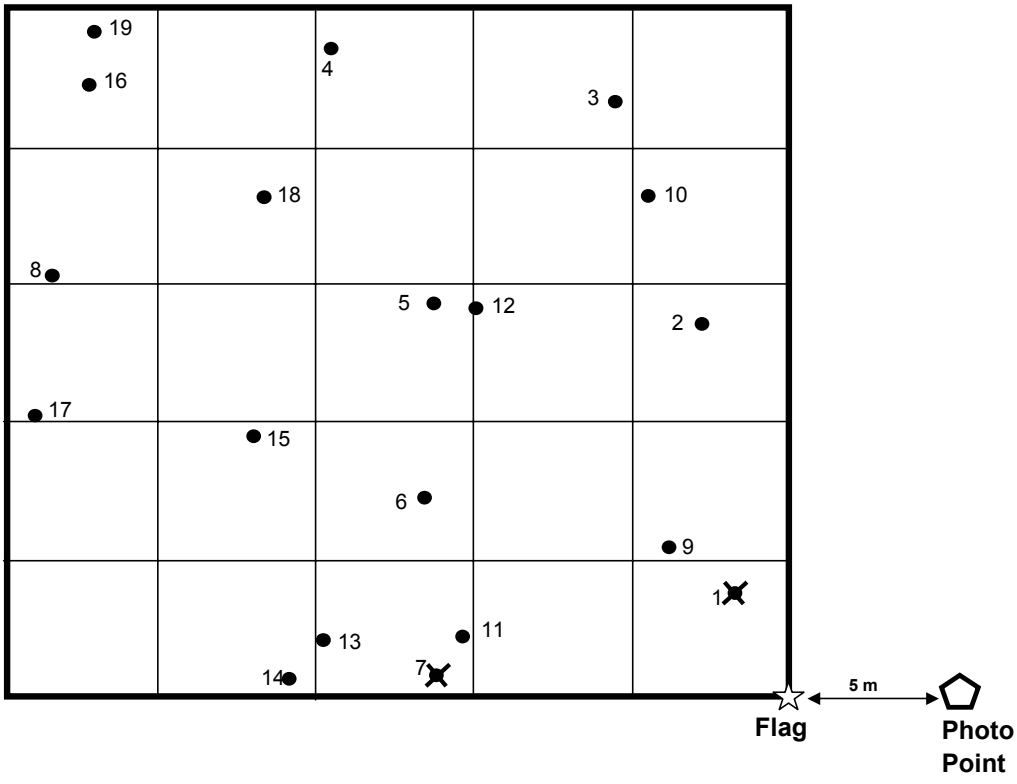
2nd Year Monitoring

3rd Year Monitoring

Vegetation Monitoring Worksheet

Site: Daniels **Plot:** 3 **Date:** 10/12/2006

Plot Map



ID	Species	Height (m)	Collar Diameter (cm)	Comments (insect damage, disease, browsing)
1	Water Tupelo (*Nyssa sylvatica* var. *biflora*)			dead
2	Water Tupelo (*Nyssa sylvatica* var. *biflora*)	0.9	0.9	healthy
3	Swamp Chestnut Oak (*Quercus michauxii*)	1.2	1.7	healthy
4	Water Tupelo (*Nyssa sylvatica* var. *biflora*)	1.6	3.0	no leaves, still alive
5	Water Tupelo (*Nyssa sylvatica* var. *biflora*)	0.6	1.5	healthy
6	Water Tupelo (*Nyssa sylvatica* var. *biflora*)	0.9	2.8	healthy
7	Water Tupelo (*Nyssa sylvatica* var. *biflora*)			dead
8	Swamp Chestnut Oak (*Quercus michauxii*)	1.3	2.1	healthy
9	Overcup Oak (*Quercus lyrata*)	1.6	2.8	healthy
10	Green Ash (*Fraxinus pennsylvanica*)	1.8	3.1	healthy
11	Overcup Oak (*Quercus lyrata*)	1.9	2.1	healthy
12	Green Ash (*Fraxinus pennsylvanica*)	1.5	2.3	healthy
13	Overcup Oak (*Quercus lyrata*)	1.6	2.4	healthy
14	Swamp Chestnut Oak (*Quercus michauxii*)	0.6	1.2	healthy
15	Green Ash (*Fraxinus pennsylvanica*)	1.5	3.0	healthy
16	Cherrybark Oak (*Quercus pagoda*)	1.4	2.3	healthy
17	Green Ash (*Fraxinus pennsylvanica*)	1.5	2.0	healthy
18	Water Tupelo (*Nyssa sylvatica* var. *biflora*)	1.3	1.5	healthy
19	Green Ash (*Fraxinus pennsylvanica*)	1.6	3.0	healthy

Species	Percent of Total
Swamp Chestnut Oak (*Quercus michauxii*)	18%
Water Tupelo (*Nyssa sylvatica* var. *biflora*)	29%
Green Ash (*Fraxinus pennsylvanica*)	29%
Overcup Oak (*Quercus lyrata*)	18%
Cherrybark Oak (*Quercus pagoda*)	6%

Density:

Total Number of Trees **17** / **0.025 acres** = **680** **trees / acre**

Survivability:

Total Number of Trees **17** / **19 trees** x **100** = **89** **% survivability**

Number of New Recruits : 0

Note : Flag located AZ. 220°, 63 feet from monitoring well

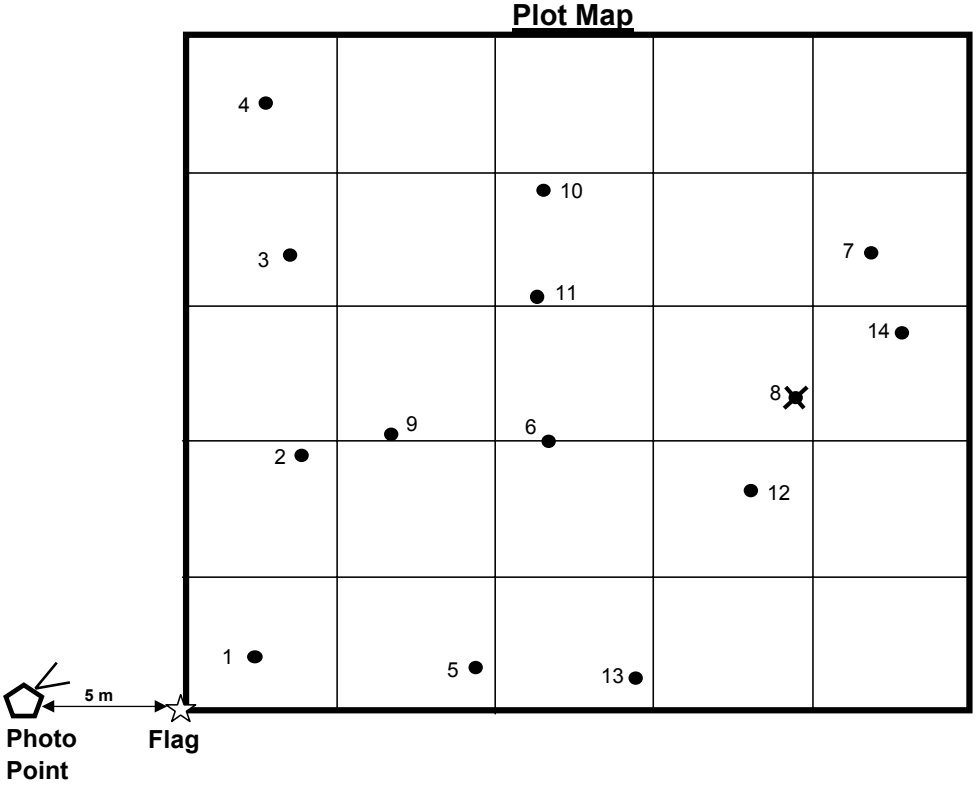
2nd Year Monitoring

3rd Year Monitoring

Vegetation Monitoring Worksheet

Site: Daniels **Plot:** 4 **Date:** 10/12/2006

Plot Map



ID	Species	Height (m)	Collar Diameter (cm)	Comments (insect damage, disease, browsing)
1	Swamp Chestnut Oak (*Quercus michauxii*)	1.0	1.2	healthy
2	Water Tupelo (*Nyssa sylvatica* var. *biflora*)	0.9	1.5	healthy
3	Swamp Chestnut Oak (*Quercus michauxii*)	0.6	0.8	healthy
4	Willow Oak (*Quercus phellos*)	1.2	1.8	healthy
5	Water Tupelo (*Nyssa sylvatica* var. *biflora*)	0.9	1.4	healthy
6	Swamp Chestnut Oak (*Quercus michauxii*)	0.9	1.0	healthy
7	Water Tupelo (*Nyssa sylvatica* var. *biflora*)	0.9	2.0	healthy
8	Water Tupelo (*Nyssa sylvatica* var. *biflora*)			dead
9	Overcup Oak (*Quercus lyrata*)	1.2	1.4	healthy
10	Overcup Oak (*Quercus lyrata*)	1.2	2.7	healthy
11	Swamp Chestnut Oak (*Quercus michauxii*)	0.8	1.0	healthy
12	Swamp Chestnut Oak (*Quercus michauxii*)	1.1	1.4	healthy
13	Cherrybark Oak (*Quercus pagoda*)	0.9	1.5	healthy
14	Cherrybark Oak (*Quercus pagoda*)	0.9	1.1	healthy

Species	Percent of Total
Swamp Chestnut Oak (*Quercus michauxii*)	38%
Willow Oak (*Quercus phellos*)	8%
Water Tupelo (*Nyssa sylvatica* var. *biflora*)	23%
Overcup Oak (*Quercus lyrata*)	15%
Cherrybark Oak (*Quercus pagoda*)	15%

Density:

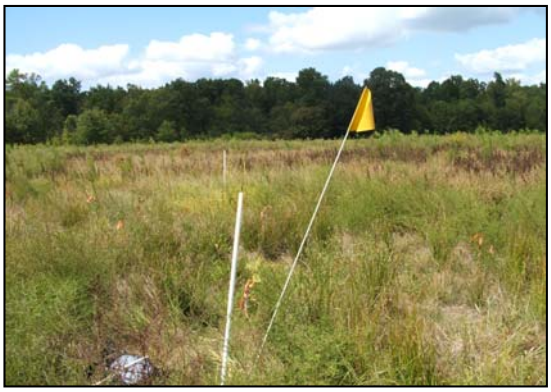
Total Number of Trees **13** / **0.025 acres** = **520** **trees / acre**

Survivability:

Total Number of Trees **13** / **14 trees** **x** **100** = **93** **% survivability**

Number of New Recruits : 0

Note : Flag located AZ. 45°, 99' feet from monitoring well



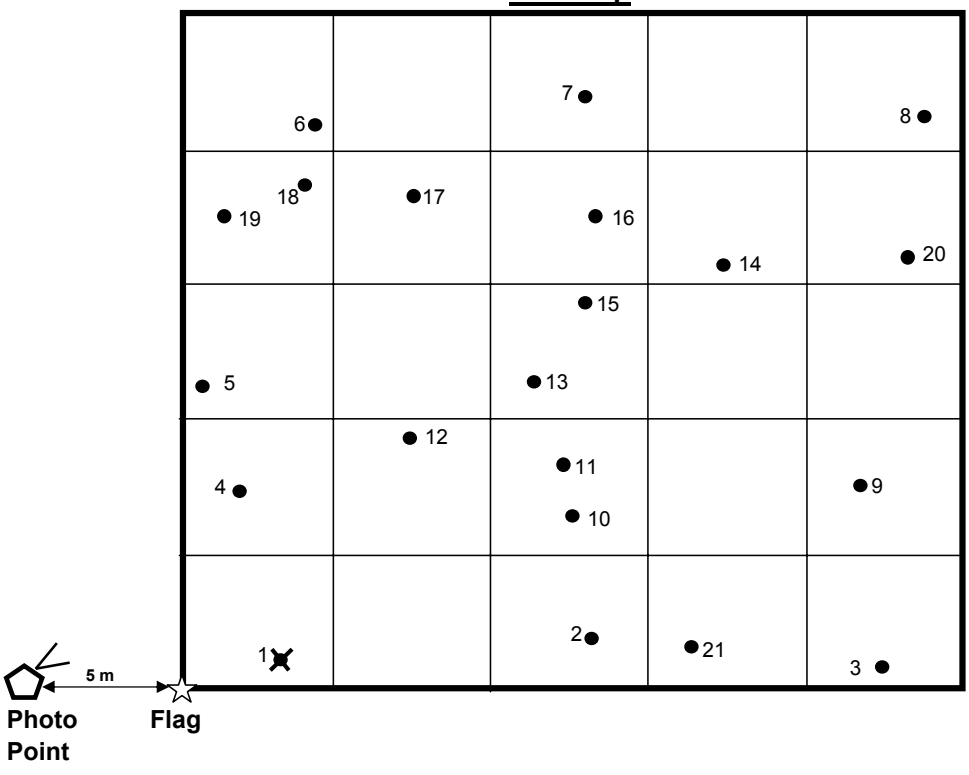
2nd Year Monitoring

3rd Year Monitoring

Vegetation Monitoring Worksheet

Site: Daniels **Plot:** 5 **Date:** 10/12/2006

Plot Map



ID	Species	Height (m)	Collar Diameter (cm)	Comments (insect damage, disease, browsing)
1	Swamp Black Gum (*Nyssa sylvatica*)			dead
2	Swamp Black Gum (*Nyssa sylvatica*)	0.7	1.3	healthy
3	Swamp Black Gum (*Nyssa sylvatica*)	1.3	1.6	healthy
4	Swamp Chestnut Oak (*Quercus michauxii*)	1.0	1.2	healthy
5	Swamp Black Gum (*Nyssa sylvatica*)	0.6	1.1	healthy
6	Swamp Chestnut Oak (*Quercus michauxii*)	0.9	1.2	healthy
7	Swamp Black Gum (*Nyssa sylvatica*)	0.6	1.5	healthy
8	Swamp Chestnut Oak (*Quercus michauxii*)	0.9	2.3	healthy
9	Green Ash (*Fraxinus pennsylvanica*)	1.7	3.1	healthy
10	Green Ash (*Fraxinus pennsylvanica*)	1.3	2.2	healthy
11	Green Ash (*Fraxinus pennsylvanica*)	1.5	1.8	healthy
12	Cherrybark Oak (*Quercus pagoda*)	0.7	1.1	healthy
13	Swamp Black Gum (*Nyssa sylvatica*)	0.5	1.1	healthy
14	Green Ash (*Fraxinus pennsylvanica*)	0.9	1.6	healthy
15	Overcup Oak (*Quercus lyrata*)	0.7	1.2	healthy
16	Cherrybark Oak (*Quercus pagoda*)	0.6	0.9	healthy
17	Green Ash (*Fraxinus pennsylvanica*)	1.2	2.2	healthy
18	Cherrybark Oak (*Quercus pagoda*)	0.3	0.8	resprout from root
19	Overcup Oak (*Quercus lyrata*)	0.9	1.5	healthy
20	Overcup Oak (*Quercus lyrata*)	0.8	1.1	healthy
21	Overcup Oak (*Quercus lyrata*)	1.0	1.2	healthy

Species	Percent of Total
Swamp Chestnut Oak (*Quercus michauxii*)	15%
Swamp Black Gum (*Nyssa sylvatica*)	25%
Overcup Oak (*Quercus lyrata*)	20%
Green Ash (*Fraxinus pennsylvanica*)	25%
Cherrybark Oak (*Quercus pagoda*)	15%

Density:

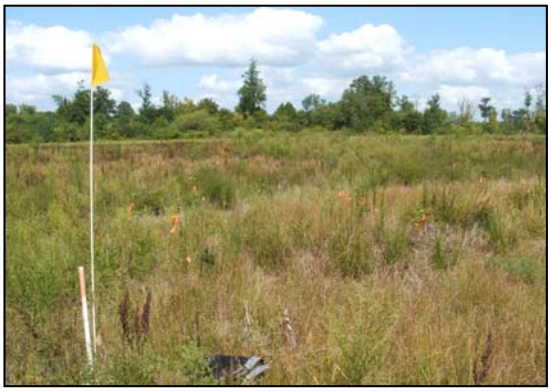
Total Number of Trees **20** / **0.025 acres** = **800** **trees / acre**

Survivability:

Total Number of Trees **20** / **21 trees** x **100** = **95.2** **% survivability**

Number of New Recruits : 0

Note : Flag located AZ. 38°, 27 feet from monitoring well



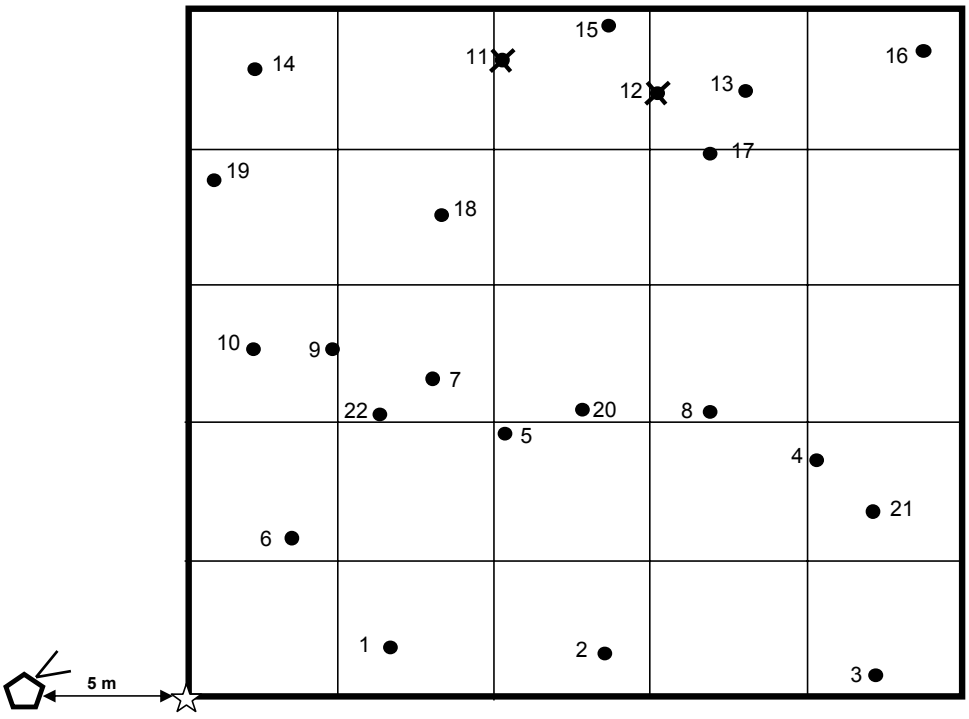
2nd Year Monitoring

3rd Year Monitoring

Vegetation Monitoring Worksheet

Site: Daniels **Plot:** 6 **Date:** 10/12/2006

Plot Map



ID	Species	Height (m)	Collar Diameter (cm)	Comments (insect damage, disease, browsing)
1	Willow Oak (*Quercus phellos*)	0.9	1.7	healthy
2	Willow Oak (*Quercus phellos*)	0.8	1.2	healthy
3	Willow Oak (*Quercus phellos*)	0.9	1.4	healthy
4	Swamp Black Gum (*Nyssa sylvatica*)	0.6	1.2	healthy
5	Swamp Chestnut Oak (*Quercus michauxii*)	0.7	0.8	healthy
6	Swamp Black Gum (*Nyssa sylvatica*)	0.7	1.3	healthy
7	Swamp Chestnut Oak (*Quercus michauxii*)	1.7	2.1	healthy
8	Willow Oak (*Quercus phellos*)	2.1	3.2	healthy
9	Swamp Chestnut Oak (*Quercus michauxii*)	1.7	2.4	healthy
10	Swamp Black Gum (*Nyssa sylvatica*)	0.7	2.1	healthy
11	Swamp Black Gum (*Nyssa sylvatica*)			dead
12	Swamp Chestnut Oak (*Quercus michauxii*)			dead
13	Swamp Black Gum (*Nyssa sylvatica*)	0.9	2.6	healthy
14	Laurel Oak (*Quercus laurifolia*)	0.4	0.7	healthy
15	Swamp Chestnut Oak (*Quercus michauxii*)	1.4	1.9	healthy
16	Overcup Oak (*Quercus lyrata*)	1.6	2.7	healthy
17	Green Ash (*Fraxinus pennsylvanica*)	1.3	3.1	healthy
18	Overcup Oak (*Quercus lyrata*)	1.8	4.2	healthy
19	Overcup Oak (*Quercus lyrata*)	1.2	1.9	healthy
20	Cherrybark Oak (*Quercus pagoda*)	0.8	1.0	healthy
21	Cherrybark Oak (*Quercus pagoda*)	0.3	0.6	healthy
22	Overcup Oak (*Quercus lyrata*)	0.8	1.1	healthy

Species	Percent of Total
Swamp Chestnut Oak (*Quercus michauxii*)	20%
Willow Oak (*Quercus phellos*)	20%
Swamp Black Gum (*Nyssa sylvatica*)	20%
Cherrybark Oak (*Quercus pagoda*)	10%
Overcup Oak (*Quercus lyrata*)	20%
Green Ash (*Fraxinus pennsylvanica*)	5%
Laurel Oak (*Quercus laurifolia*)	5%

Density:

Total Number of Trees **20** / **0.025 acres** = **800** **trees / acre**

Survivability:

Total Number of Trees **20** / **22 trees** x **100** = **91** **% survivability**

Number of New Recruits : 0

Note : Flag located AZ. 174°, 150 feet from monitoring well

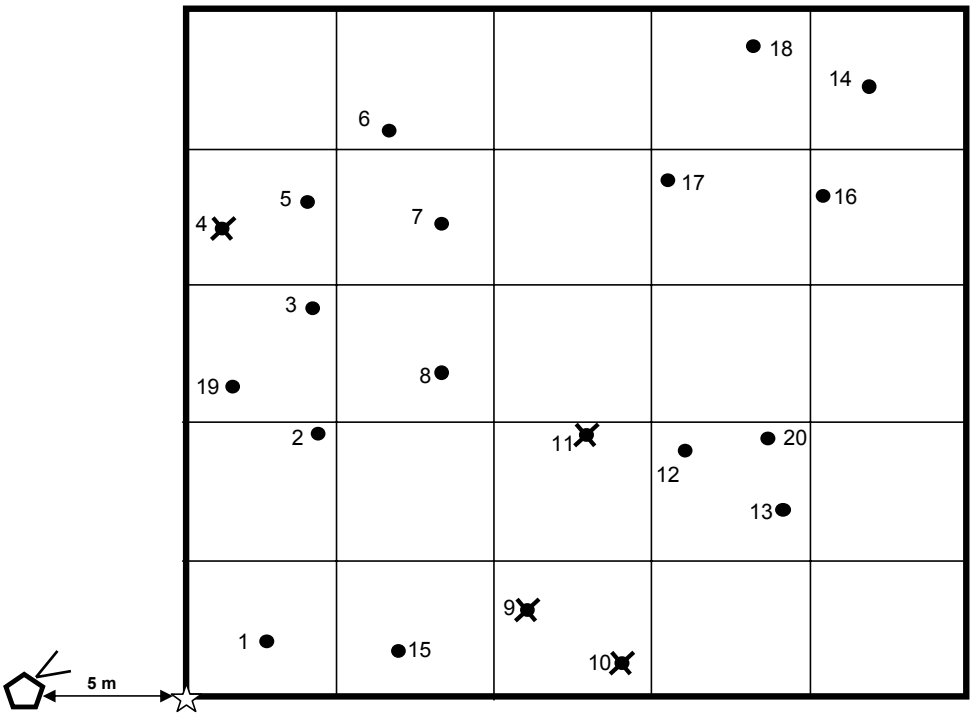
2nd Year Monitoring

3rd Year Monitoring

Vegetation Monitoring Worksheet

Site: Daniels **Plot:** 7 **Date:** 10/12/2006

Plot Map



ID	Species	Height (m)	Collar Diameter (cm)	Comments (insect damage, disease, browsing)
1	Swamp Chestnut Oak (*Quercus michauxii*)	1.4	2.1	healthy
2	Swamp Chestnut Oak (*Quercus michauxii*)	1.3	2.3	healthy
3	Swamp Chestnut Oak (*Quercus michauxii*)	0.5	0.8	healthy
4	Swamp Chestnut Oak (*Quercus michauxii*)			dead
5	Swamp Chestnut Oak (*Quercus michauxii*)	1.0	2.0	healthy
6	Swamp Chestnut Oak (*Quercus michauxii*)	1.0	1.6	healthy
7	Swamp Chestnut Oak (*Quercus michauxii*)	0.4	0.9	healthy
8	Swamp Chestnut Oak (*Quercus michauxii*)	1.2	1.9	healthy
9	Swamp Chestnut Oak (*Quercus michauxii*)			dead
10	Swamp Black Gum (*Nyssa sylvatica*)			dead
11	Swamp Black Gum (*Nyssa sylvatica*)			dead
12	Swamp Chestnut Oak (*Quercus michauxii*)	0.8	1.3	healthy
13	Swamp Chestnut Oak (*Quercus michauxii*)	1.0	1.4	healthy
14	Swamp Chestnut Oak (*Quercus michauxii*)	0.8	1.4	healthy
15	Cherrybark Oak (*Quercus pagoda*)	0.6	0.7	healthy
16	Overcup Oak (*Quercus lyrata*)	1.1	1.8	healthy
17	Cherrybark Oak (*Quercus pagoda*)	0.9	1.3	healthy
18	Cherrybark Oak (*Quercus pagoda*)	0.3	0.4	healthy
19	Overcup Oak (*Quercus lyrata*)	1.0	1.9	healthy
20	Overcup Oak (*Quercus lyrata*)	0.4	0.4	healthy

Species	Percent of Total
Swamp Chestnut Oak (*Quercus michauxii*)	63%
Swamp Black Gum (*Nyssa sylvatica*)	0%
Cherrybark Oak (*Quercus pagoda*)	19%
Overcup Oak (*Quercus lyrata*)	19%

Density:

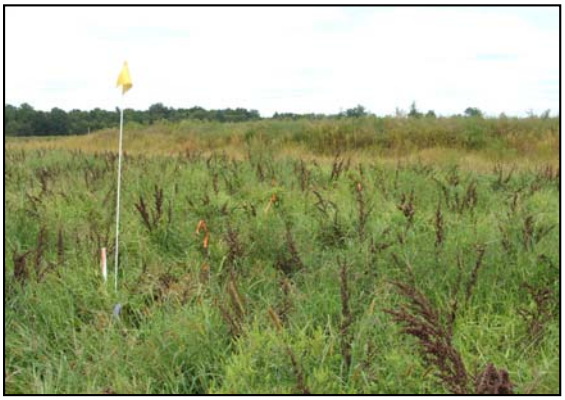
Total Number of Trees **16** / **0.025 acres** = **640** **trees / acre**

Survivability:

Total Number of Trees **16** / **20 trees** x **100** = **80** **% survivability**

Number of New Recruits : 0

Note : Flag located AZ. 12°, 42 feet from monitoring well



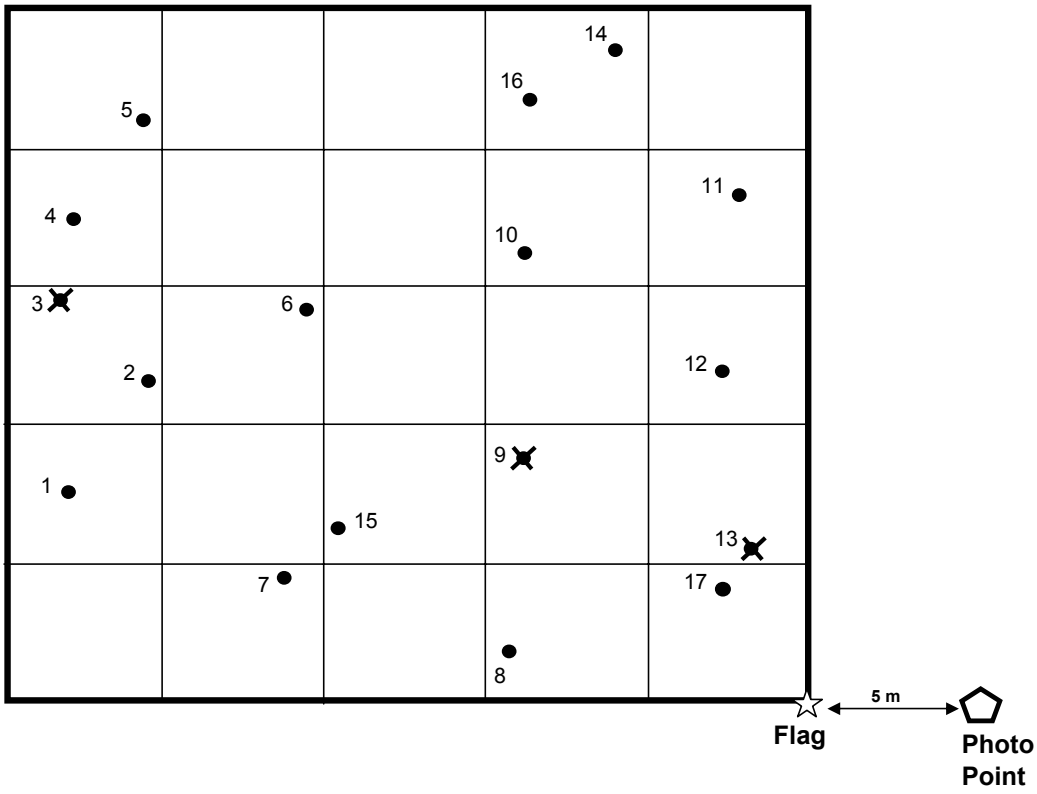
2nd Year Monitoring

3rd Year Monitoring

Vegetation Monitoring Worksheet

Site: Daniels **Plot:** 8 **Date:** 10/12/2006

Plot Map



ID	Species	Height (m)	Collar Diameter (cm)	Comments (insect damage, disease, browsing)
1	Willow Oak (*Quercus phellos*)	0.9	1.2	healthy
2	Swamp Chestnut Oak (*Quercus michauxii*)	1.4	3.0	healthy
3	Yellow Poplar (*Liriodendron tulipifera*)			dead
4	Yellow Poplar (*Liriodendron tulipifera*)	0.5	0.8	healthy
5	Laurel Oak (*Quercus laurifolia*)	1.8	2.8	healthy
6	Swamp Chestnut Oak (*Quercus michauxii*)	1.6	1.9	healthy
7	Swamp Chestnut Oak (*Quercus michauxii*)	1.6	2.0	healthy
8	Swamp Chestnut Oak (*Quercus michauxii*)	2.1	2.9	healthy
9	Yellow Poplar (*Liriodendron tulipifera*)			dead
10	Swamp Chestnut Oak (*Quercus michauxii*)	0.8	0.9	healthy
11	Laurel Oak (*Quercus laurifolia*)	2.0	3.2	healthy
12	Swamp Chestnut Oak (*Quercus michauxii*)	1.6	2.6	healthy
13	Yellow Poplar (*Liriodendron tulipifera*)			dead
14	Laurel Oak (*Quercus laurifolia*)	1.5	1.7	healthy
15	Laurel Oak (*Quercus laurifolia*)	1.2	1.4	healthy
16	Willow Oak (*Quercus phellos*)	1.2	1.5	healthy
17	Willow Oak (*Quercus phellos*)	1.4	1.5	healthy

Species	Percent of Total
Swamp Chestnut Oak (*Quercus michauxii*)	43%
Willow Oak (*Quercus phellos*)	21%
Laurel Oak (*Quercus laurifolia*)	29%
Yellow Poplar (*Liriodendron tulipifera*)	7%

Density:

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

Survivability:

Total Number of Trees **14** / **17 trees** x **100** = **82.4** **% survivability**

Number of New Recruits : 0

Note : Flag located AZ. 328°, 27 feet from monitoring well

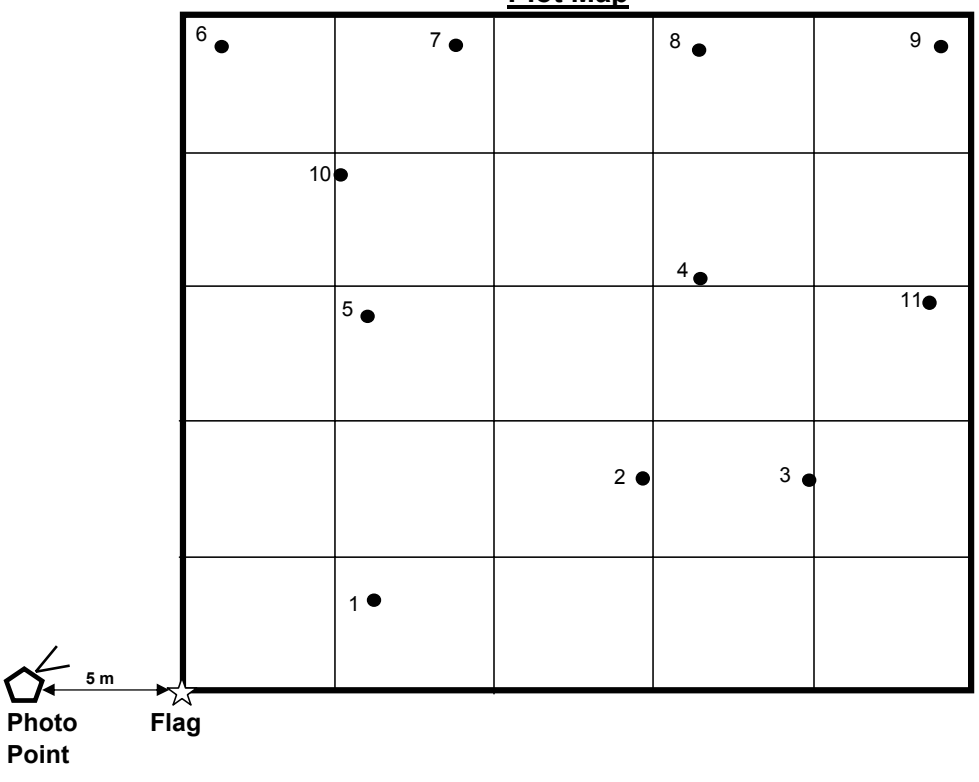
2nd Year Monitoring

3rd Year Monitoring

Vegetation Monitoring Worksheet

Site: Daniels **Plot:** 9 **Date:** 10/12/2006

Plot Map



ID	Species	Height (m)	Collar Diameter (cm)	Comments (insect damage, disease, browsing)
1	Water Tupelo (*Nyssa sylvatica* var. *biflora*)	1.0	2.0	healthy
2	Bald Cypress (*Taxodium distichum*)	1.3	3.4	healthy
3	Bald Cypress (*Taxodium distichum*)	1.0	2.6	healthy
4	Bald Cypress (*Taxodium distichum*)	1.0	2.5	healthy
5	Bald Cypress (*Taxodium distichum*)	1.4	2.5	healthy
6	Bald Cypress (*Taxodium distichum*)	1.2	3.1	healthy
7	Bald Cypress (*Taxodium distichum*)	1.3	3.1	healthy
8	Bald Cypress (*Taxodium distichum*)	1.1	2.6	healthy
9	Water Tupelo (*Nyssa sylvatica* var. *biflora*)	0.9	1.4	healthy
10	Overcup Oak (*Quercus lyrata*)	1.5	1.6	healthy
11	Water Tupelo (*Nyssa sylvatica* var. *biflora*)	0.9	1.7	healthy

Species	Percent of Total
Water Tupelo (*Nyssa sylvatica* var. *biflora*)	27%
Bald Cypress (*Taxodium distchum*)	64%
Overcup Oak (*Quercus lyrata*)	9%

Density:

Total Number of Trees **11** / **0.025 acres** = **440** **trees / acre**

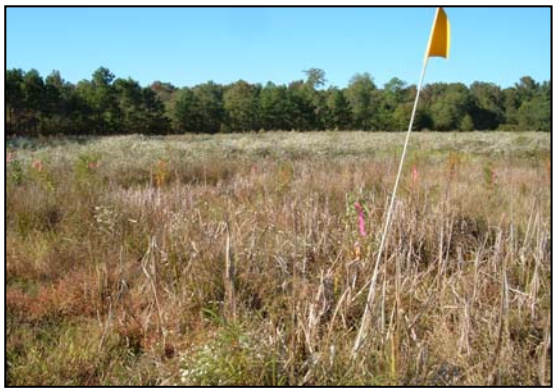
Survivability:

Total Number of Trees **11** / **11 trees** **x** **100** = **100** **% survivability**

Number of New Recruits : 0

Note : Flag located AZ. 72°, 16 feet from monitoring well

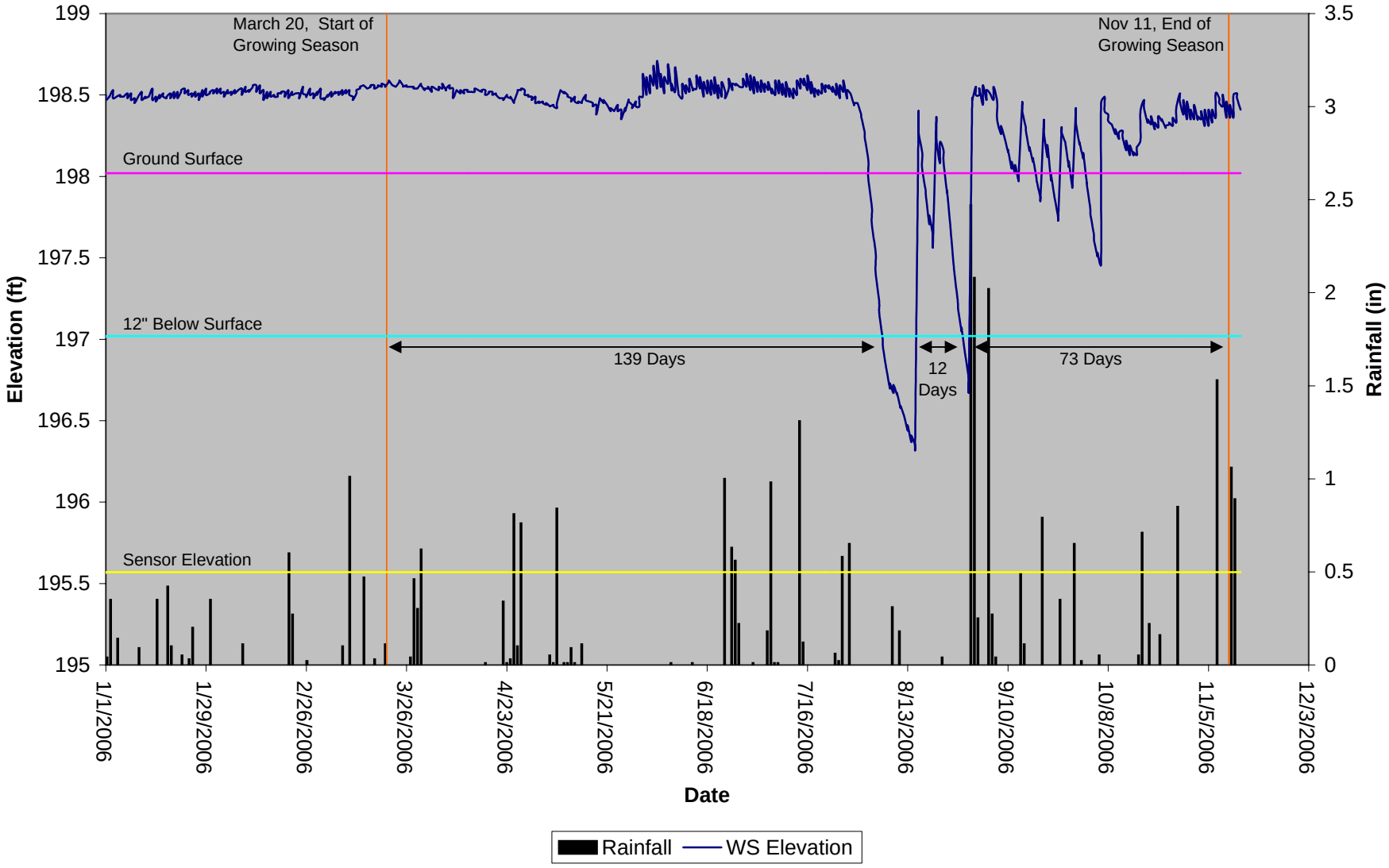
2nd Year Monitoring



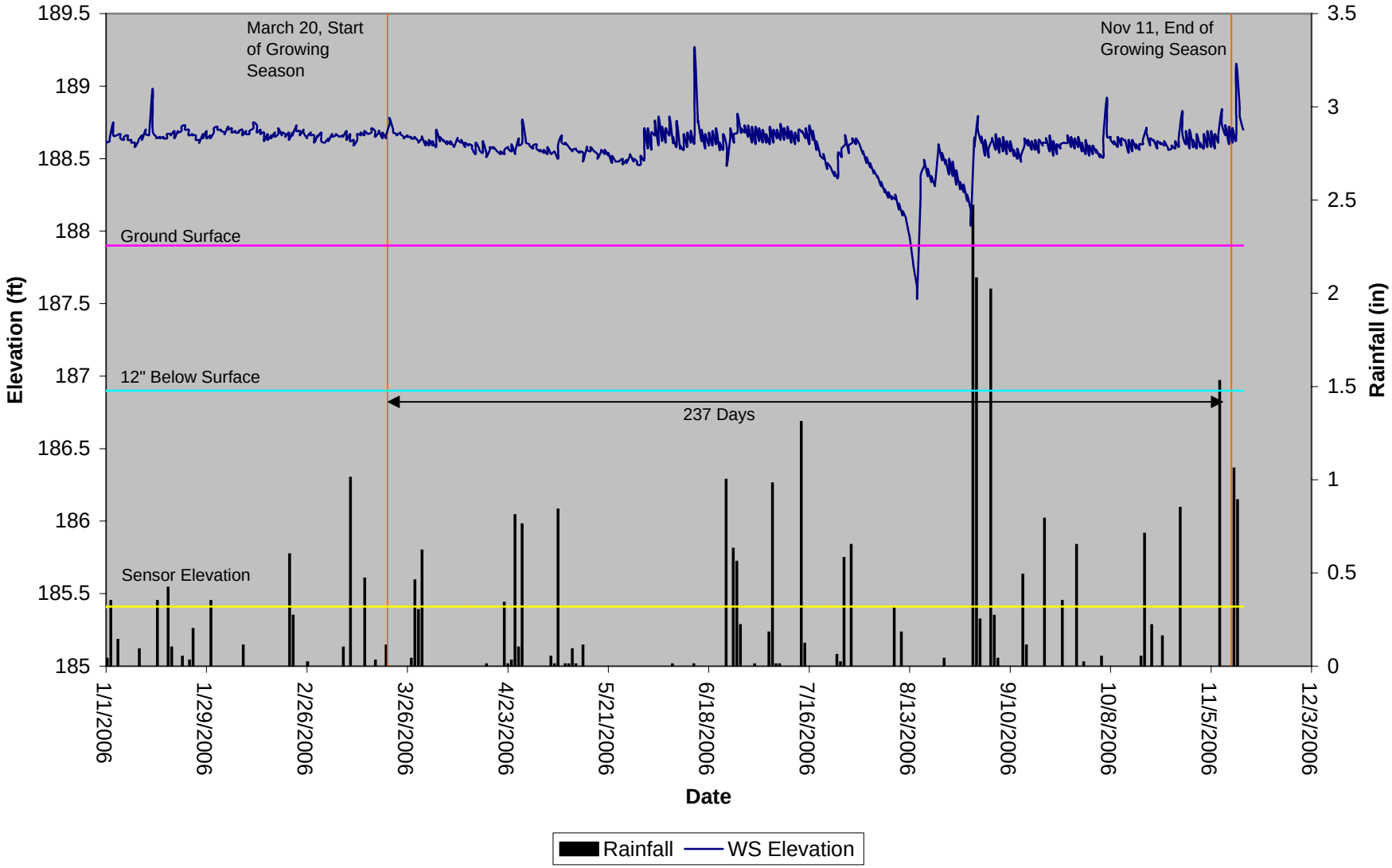
3rd Year Monitoring

Appendix B
Hydrologic Monitoring and Hydroperiod

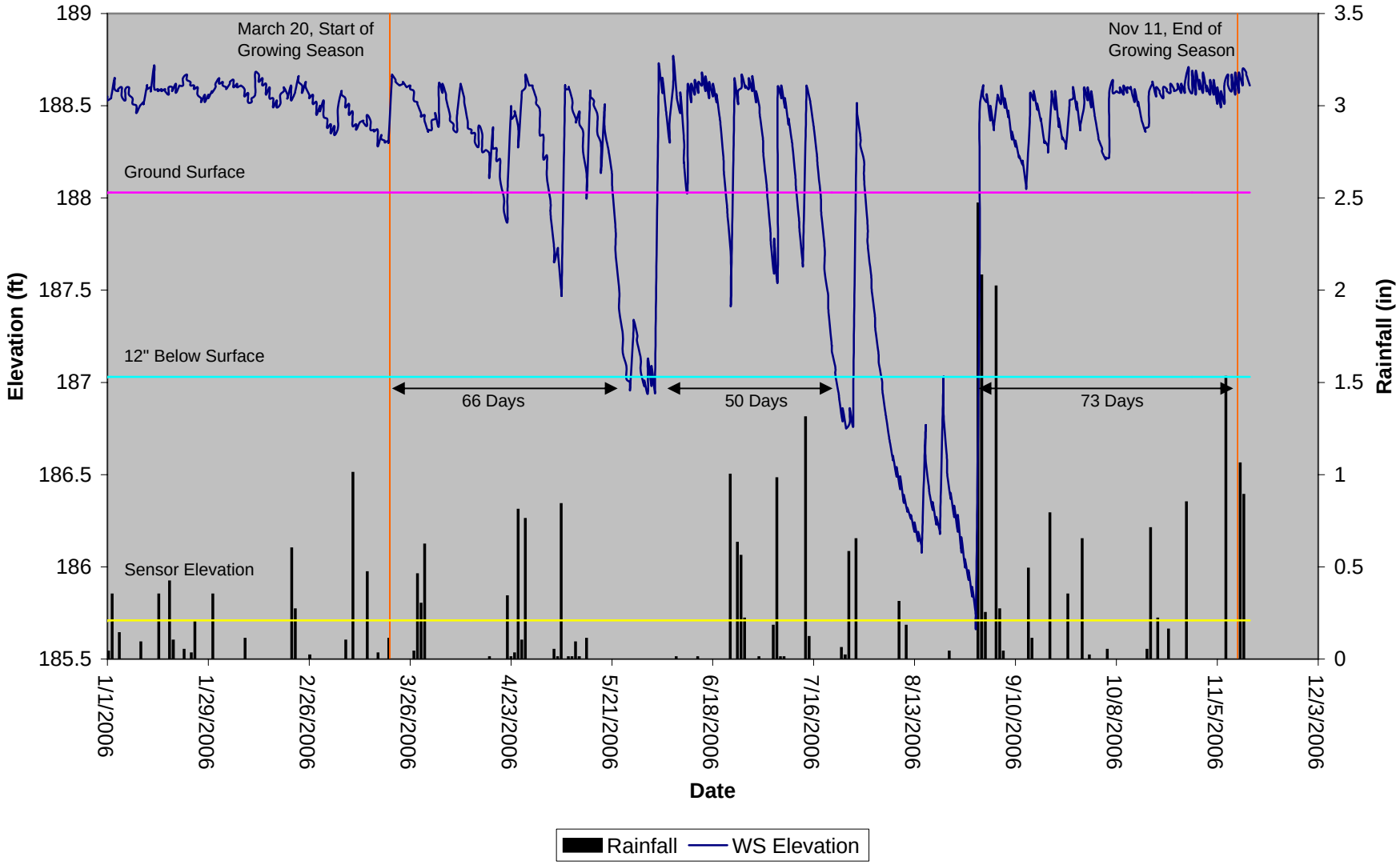
Daniels Farm Gauge 1 Hydrograph



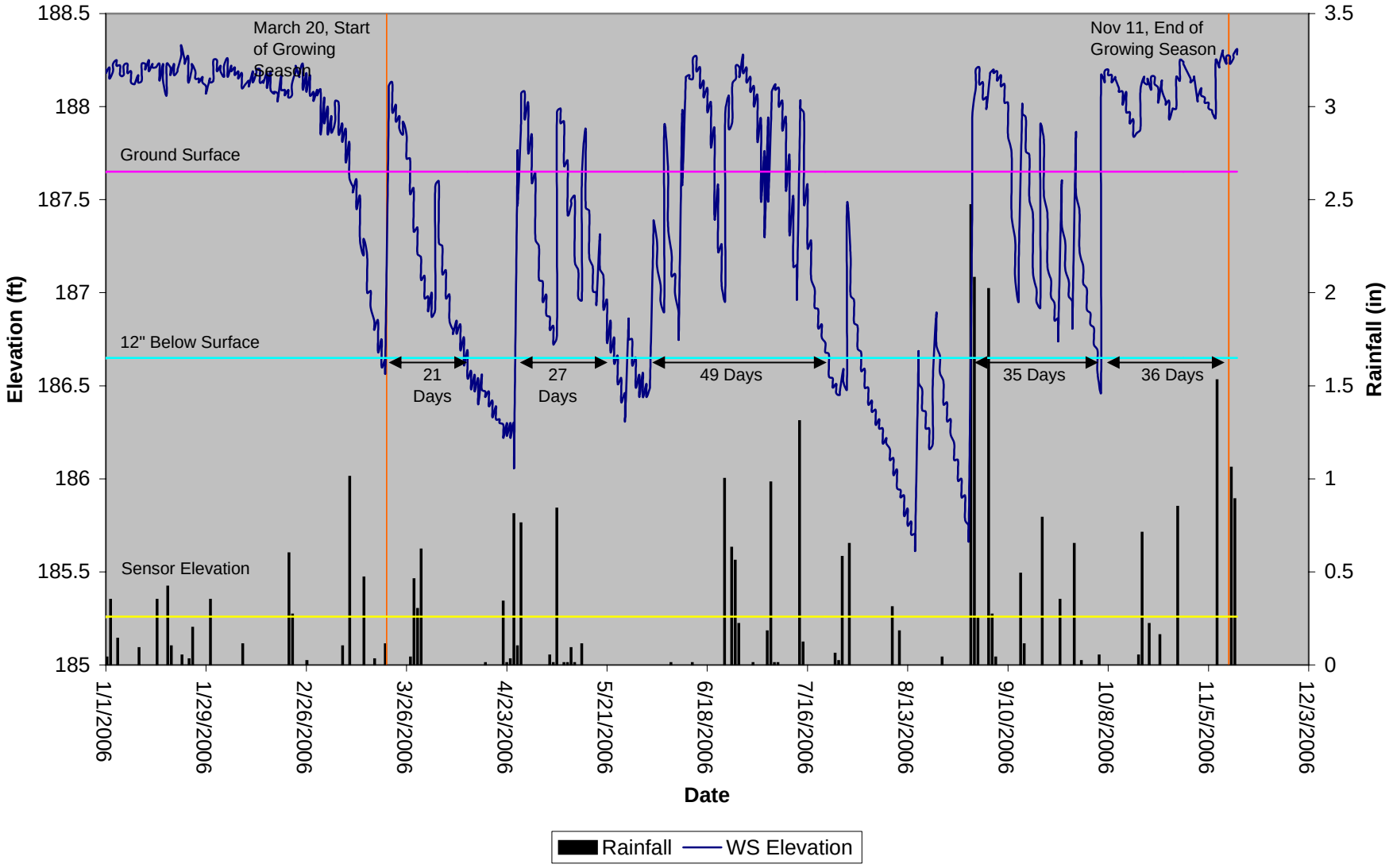
Daniels Farm Gauge 2 Hydrograph



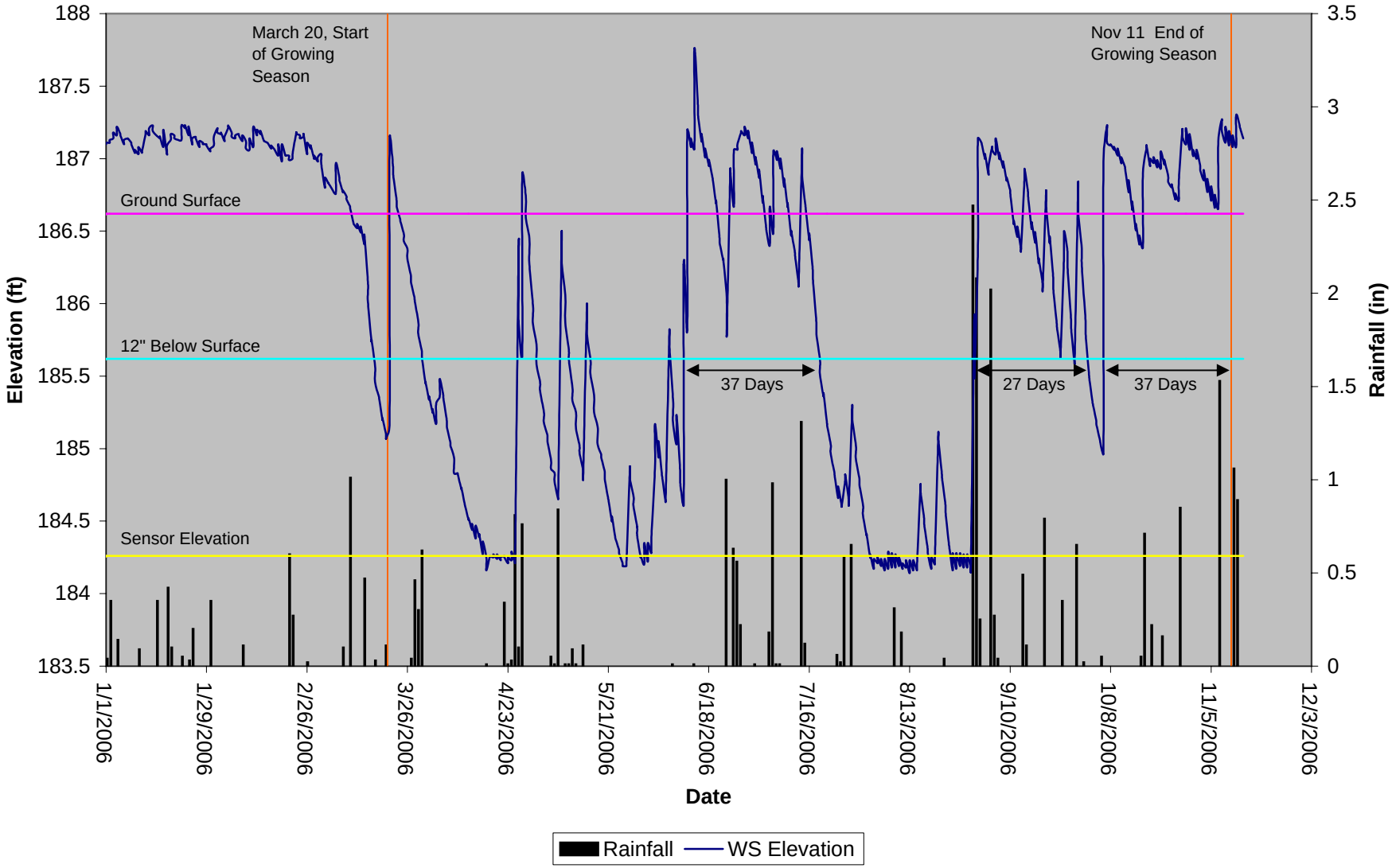
Daniels Farm Gauge 3 Hydrograph



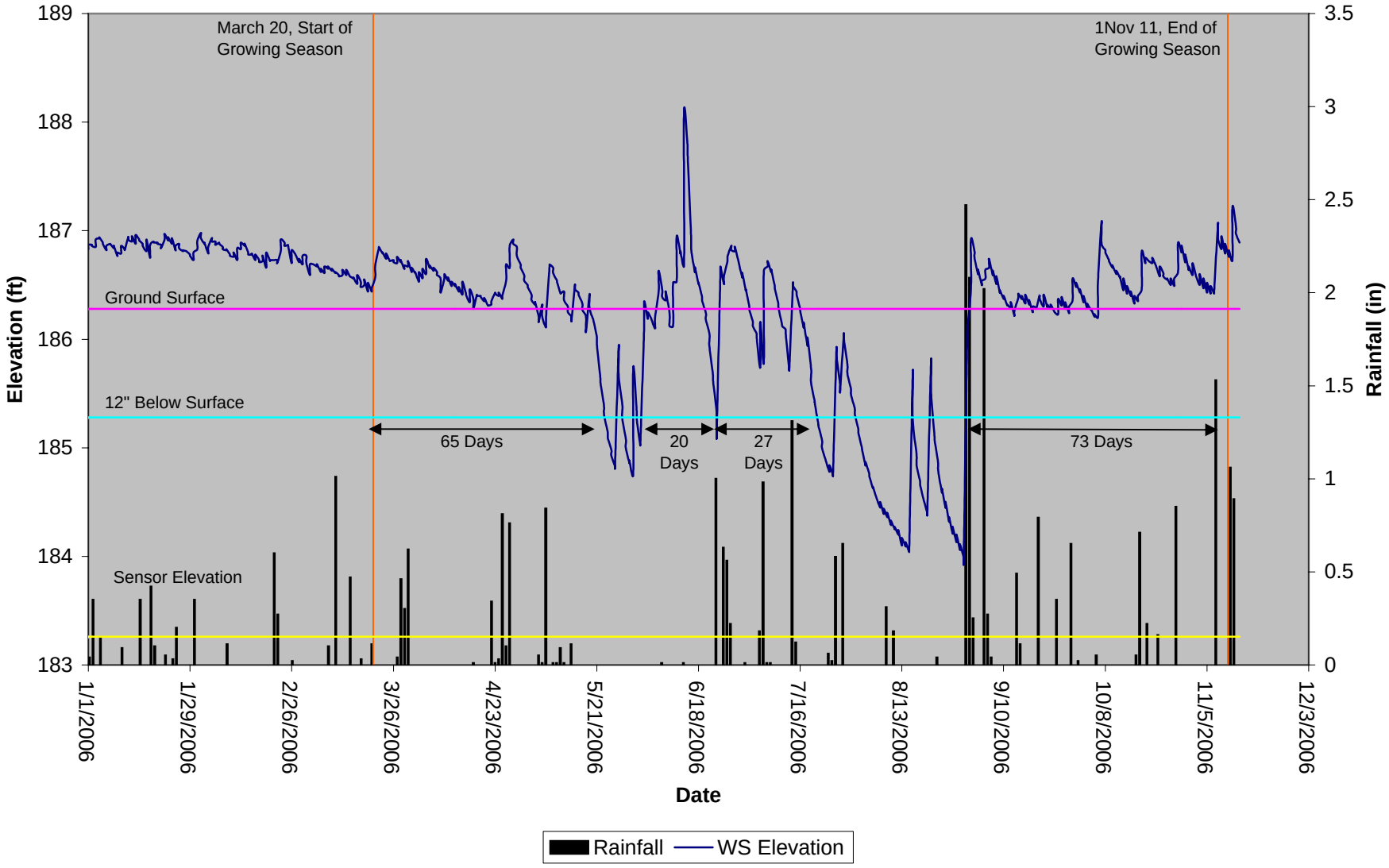
Daniels Farm Gauge 4 Hydrograph



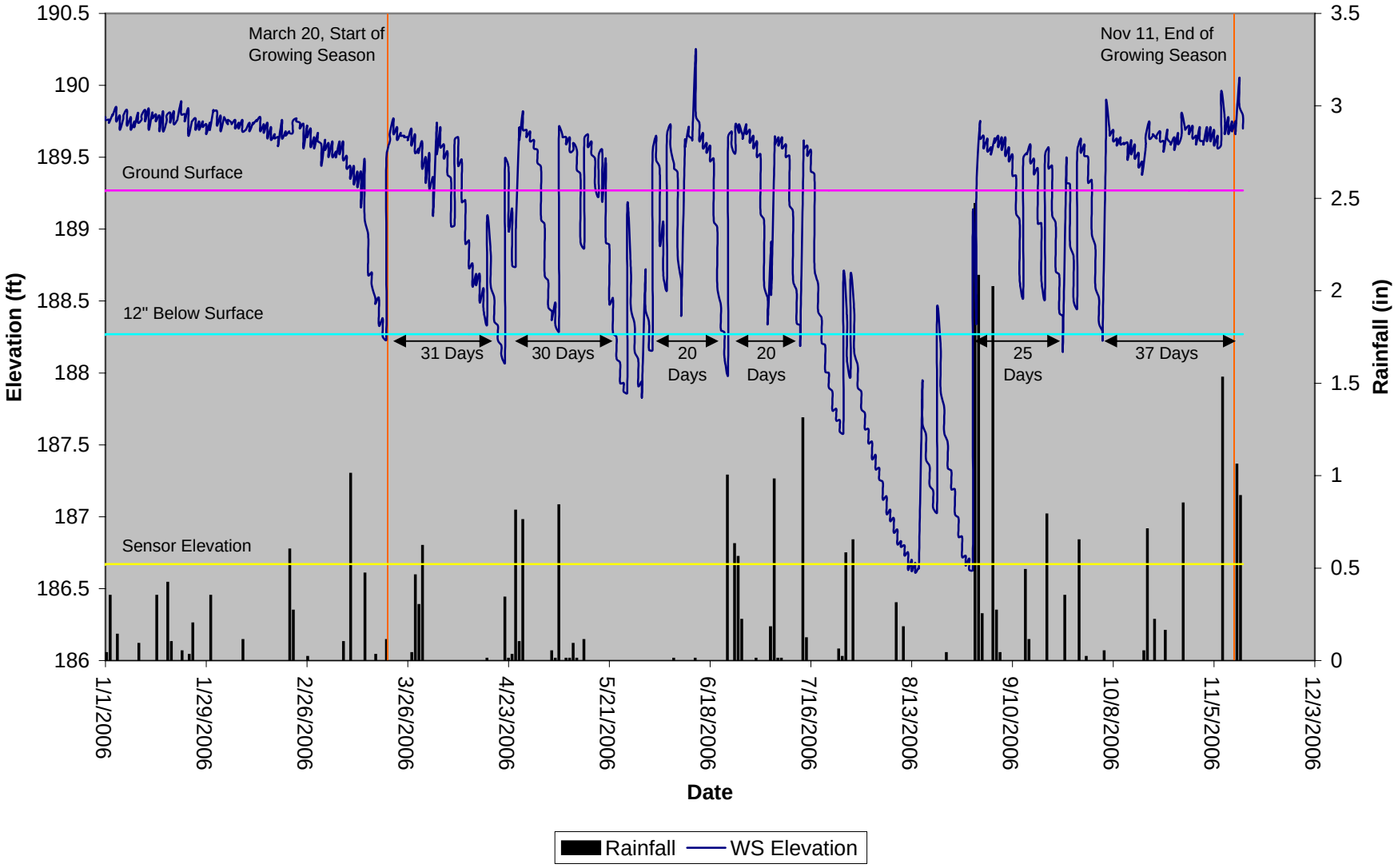
Daniels Farm Gauge 5 Hydrograph



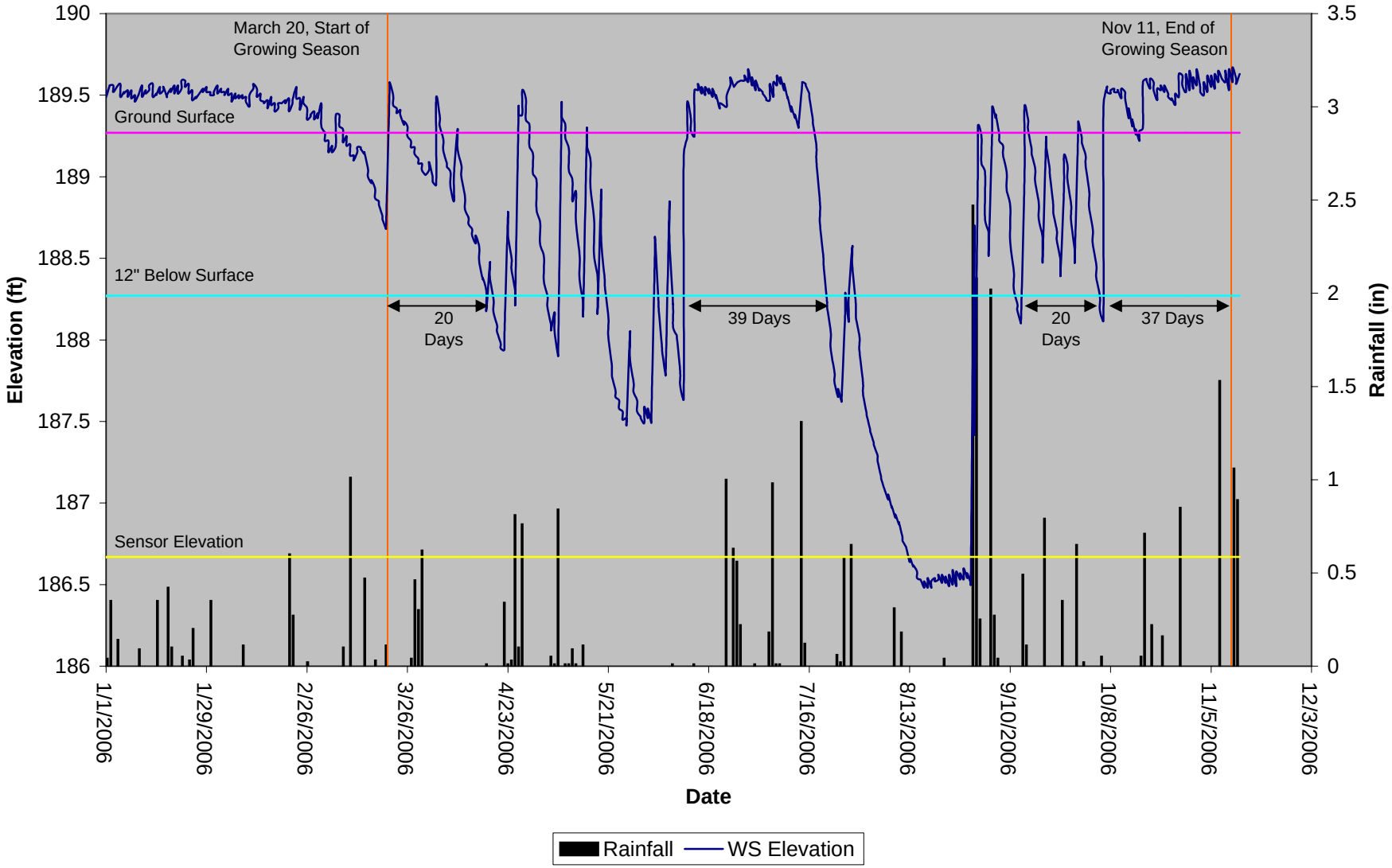
Daniels Farm Gauge 6 Hydrograph



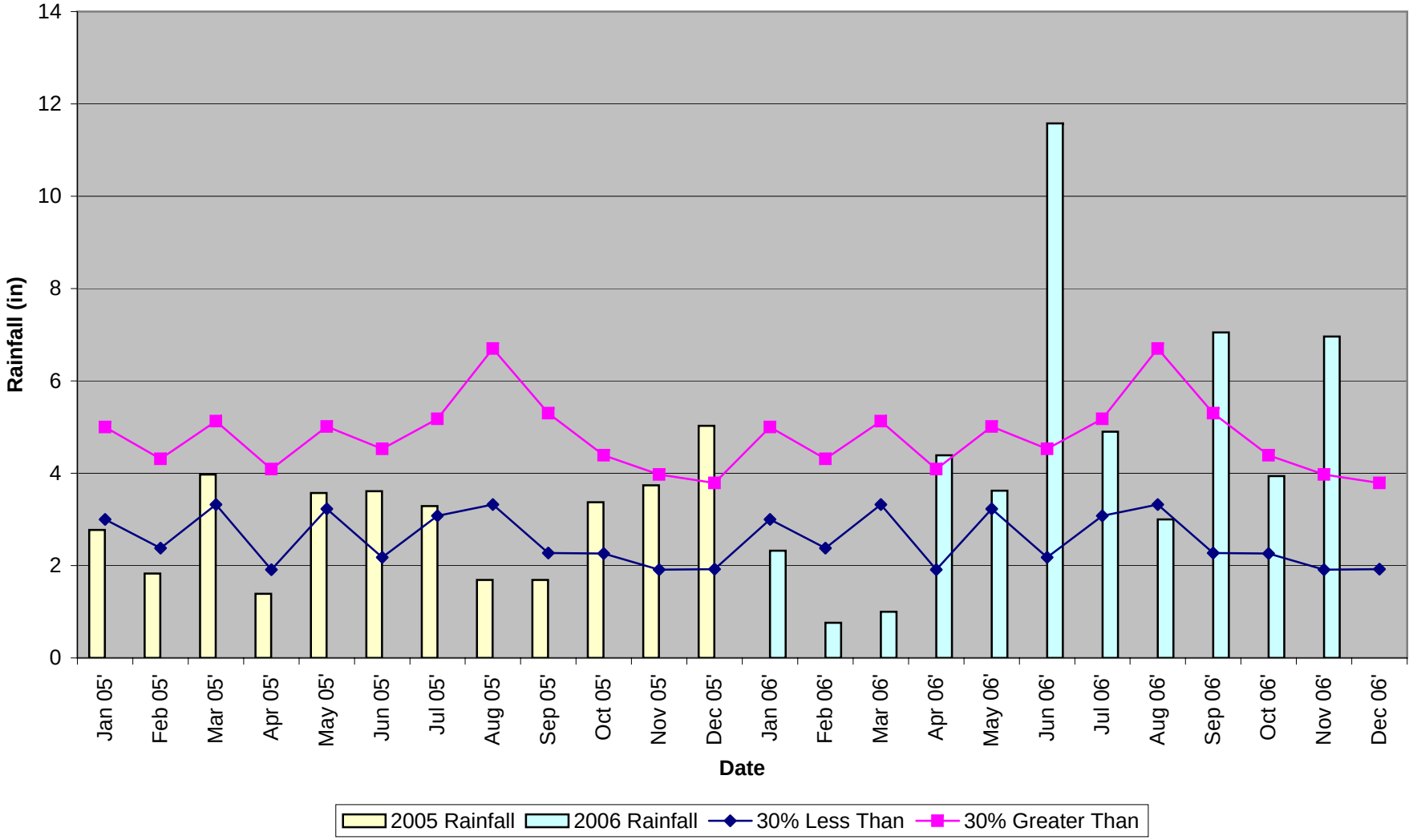
Daniels Farm Gauge 7 Hydrograph



Daniels Farm Gauge 8 Hydrograph



Daniels Property 30-70 Percentile Graph 2005-2006
Louisburg, NC Monthly Rainfall



Appendix C
Permanent Photo Documentation Points

Photo Location 1: View looking toward vegetation plot # 8 identified by the yellow flag.

Photo Location 2: View looking toward vegetation plot # 1.

Photo Location 3: View looking toward vegetation plot # 4.

Photo Location 4: View looking toward vegetation plot # 5.

Photo Location 5: View looking toward vegetation plot # 6 identified by the yellow flag. The upland area shown to the left of the yellow flag is non-wetland.