PLUM CREEK WETLAND MITIGATION PROJECT
2012 MONITORING REPORT
MONITORING YEAR 4 OF 5

Brunswick County, NC
Lumber River Basin
Cataloging Unit: 03040207
EEP Project Number: 92549
EEP Contract Number: D06040-A

Prepared for:

North Carolina Department of Environment and Natural Resources
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, North Carolina 27699-1652

2012 Monitoring Report – Year 4 of 5

Project Construction Completed: 2008
Data Collection for Monitoring Year 4 of 5: 2012
Report Submitted: April 2013

Prepared for:

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1. Executive Summary/Project Abstract

The goals of the Plum Creek Wetland Mitigation Project (Appendix A, Figure 1) are to re-establish wetland functions at the Site by restoring wetland hydrology, plant community composition and structure, and wildlife habitat. The project will increase surface water residence time which will improve groundwater recharge. Much of the water budget is influenced by precipitation, as surface flow enters the site from adjoining parcels. A longer residence time will lead to improved biochemical treatment resulting in improved water quality. Restoration of a native wetland vegetative community will enhance floral and faunal habitat diversity benefiting both terrestrial and aquatic wildlife. In order to achieve project goals, the following objectives were implemented:

- Initially the lateral ditches and southern perimeter ditch on the Site were plugged. The west ditch and Boggy Branch were left intact to prevent hydrologic trespass on adjoining properties. Soil to construct ditch plugs was excavated from the Site and the borrow pits were graded to form small, shallow vernal pools. Following Year 2, Berger filled the lateral ditches and southern perimeter ditch completely with on-site soil to facilitate lateral groundwater flow through site.
- Existing vegetation (loblolly pine) was sheared, drum chopped, and left on Site to promote organic matter decomposition. There was no re-grading of the contours of the Site.
- Habitat benefits on Site will be achieved for both terrestrial and aquatic species by increasing micro-habitat diversity and vegetation diversity.

The Plum Creek Wetland Mitigation Site (site) is an 89-acre site located in the Carolina Flatwoods ecoregion of the Middle Atlantic Coastal Plain (Griffith *et al*., 2002). Prior to the restoration, the Site was a loblolly pine plantation for several generations of timber, owned by Plum Creek Timberlands, Inc. The Site occurs in the headwaters of the Lumber River Basin: USGS Hydrologic Unit 03040207 and North Carolina Division of Water Quality (NCDWQ) subbasin 03-07-59. Boggy Branch, which drains to the Lockwoods Folly River, flows along the eastern side of the Site. Land use immediately surrounding the Site is mostly silviculture with timber stands of varying ages in rotation. The Green Swamp Game Land is located to the northwest of the Site. A swine operation is located to the southeast of the Site.

Overall, the Site met the criteria of 288 planted stems per acre with an average sampled density of 341 planted stems per acre. In Year 1, planted and volunteer stems had a sampled density of 1,929 stems per acre; therefore, it was not necessary to perform another count of volunteer stems in Year 2 or Year 3. Visual inspection during Year 2 and Year 3 monitoring efforts confirmed that the volunteer stem count and species remained consistent. Vegetation plot data is presented in the summary table below and in Appendix C.

The Site met the vegetation survival rate success criteria in 7 of the 9 monitoring plots. The results from Year 1 had shown that three plots did not meet the criteria; Plots 4, 6, and 7. Year 2 monitoring results showed that Plots 4 and 7 met the criteria because stems that had been labeled missing in Year 1 or were not included in the As-Built inventory were located in Year 2. Year 4 monitoring confirmed the findings of previous years, again with Plot 6 falling short of the success criteria by just one stem count. Unlike previous years, Plot 2 fell one stem count short of meeting the success criteria in year 4.

Summary Table: Vegetation Attainment Data Plum Creek Wetland Restoration EEP Project Number 92549; EEP Contract Number D06040-A					
Summary of Stems per Acre Results for Years 1 through 5					
Veg Plot	**Success Criteria Achieved / Total Stems (Stems per acre)**				
	Year 1 (2009)	**Year 2 (2010)**	**Year 3 (2011)**	**Year 4 (2012)**	**Year 5 (2013)**
1[1]	Yes /11 stems (445)	Yes / 12 stems (485)	Yes / 13 stems (526)	Yes / 13 stems (526)	
2[3]	Yes / 8 stems (320)	Yes / 8 stems (320)	Yes / 8 stems (320)	No / 7 stems (283)	
3[2]	Yes / 9 stems (364)	Yes / 8 stems (320)	Yes / 9 stems (364)	Yes / 8 stems (323)	
4[2]	No/ 7 stems (283)	Yes / 8 stems (320)	Yes / 8 stems (320)	Yes / 8 stems (323)	
5[1]	Yes / 8 stems (320)	Yes / 8 stems (320)	Yes / 9 stems (364)	Yes / 8 stems (323)	
6[3]	No / 7 stems (283)	No / 7 stems (283)	No / 7 stems (283)	No / 7 stems (283)	
7[2]	No/ 7 stems (283)	Yes / 8 stems (320)	Yes / 8 stems (320)	Yes / 9 stems (364)	
8	Yes / 9 stems (364)	Yes / 9 stems (364)	Yes / 9 stems (364)	Yes / 8 stems (323)	
9	Yes / 8 stems (320)	Yes / 8 stems (320)	Yes / 8 stems (320)	Yes / 8 stems (323)	

[1] - One additional planted stem was found during Year-3 monitoring.

[2] - During Year 1 monitoring, these plots did not make vegetation criteria due to missing stems. These stems were found during subsequent years monitoring efforts.

[3] - Short of meeting the 288 stem/ac threshold.

In 2012, rainfall totals in the pre-growing season were significantly low and the site was classified to be in moderate to severe drought during this period. In addition, rainfall amounts were low at the beginning of the growing season while exhibiting moderate drought conditions. One well (11 percent) on Site continuously recorded soil saturation within the upper 12 inches for greater than 12.5 percent of the growing season. Additionally, three wells (33 percent) of the Site continuously recorded saturation within the upper 12 inches between 5 percent and 12.5 percent of the growing season, and five wells (55 percent) continuously recorded saturation for less than 5 percent of the growing season (See summary table below and Appendix D). Overall, soil saturation measured at well sites during Year 4 was lower than that of Year 3. These finding are consistent with moderate and moderate to severe drought conditions reported during and prior to the start of the 2012 growing season.

Summary Table: Wetland Gauge Attainment Data – >5 percent and <12.5 percent criteria Plum Creek Wetland Restoration EEP Project Number 92549; EEP Contract Number D06040-A					
Summary of Groundwater Gauge Results for Years 1 through 5					
Gauge	**Success Criteria Achieved / Max Consecutive Days During Growing Season (Percentage)**				
	Year 1 (2009)	**Year 2 (2010)**	**Year 3 (2011)**	**Year 4 (2012)**	**Year 5 (2013)**
G-1	No / 3 days (1.2 percent)	No / 9 days (3.6 percent)	No / 11 days (4.4 percent)	No / 4 days (1.6 percent)	
G-2	Yes / 19 days (7.6 percent)	Yes / 19 days (7.6 percent)	Yes / 18 days (7.2 percent)	Yes / 20 days (8 percent)	
G-3	No / 9 days (3.6 percent)	Yes / 15 days (6 percent)	No / 9 days (3.6 percent)	No / 5 days (2 percent)	
G-4	Yes / 22 days (8.8 percent)	Yes / 18 days (7.2 percent)	Yes / 15 days (6.0 percent)	No / 9 days (3.6 percent)	
G-5	Yes / 41 days (16.5 percent)	Yes / 20 days (8 percent)	Yes / 22 days (8.8 percent)	Yes / 22 days (8.8 percent)	
G-6	No / 3 days (1.2 percent)	No / 8 days (3.2 percent)	No / 7 days (2.8 percent)	No / 2 days (0.8 percent)	
G-7	Yes / 24 days (9.6 percent)	Yes / 18 days (7.2 percent)	Yes / 58 days (23 percent)	Yes / 35 days (14.1 percent)	
G-8	Yes / 22 days (8.8 percent)	Yes / 19 days (7.6 percent)	Yes / 50 days (20 percent)	Yes / 31 days (12.4 percent)	
G-9	No / 12 days (4.8 percent)	Yes / 15 days (6 percent)	No / 12 days (4.8 percent)	No / 6 days (2.4 percent)	

The Site is still recovering from a severe drought in the region that has lasted for several years. For Year 4, the region was classified as having abnormally dry to moderate drought conditions for 100 percent of the growing season. Moreover, for 116 of 144 weeks of the last 4 growing seasons, (81 percent of the time), the site has been classified as abnormally dry or having varying degrees of drought conditions. Drought classification data for monitoring years 1 to 4 can be found in the summary table below. Precipitation measured well below average for all of the growing season except August which was above average. The average annual rainfall over the last 30 years at the nearest weather station in Shallotte is approximately 48.3 inches with the least amount of rain recorded in that period is 33.3 inches. The 2012 (Jan-Nov) rainfall on site totaled 38.86 inches, which is roughly 10 inches below average, or 80 percent of the average annual rainfall over the past 30 years. Precipitation data can be found in Appendix D. Reference well locations can be found on Appendix A, Figure 1. Soil profiles were dug at each well location. All profiles displayed hydric soil characteristics of low chroma soil color. Pedon description sheets for each soil profile can be found in Appendix E.

Summary Table: Drought Conditions During Growing Seasons Plum Creek Wetland Restoration EEP Project Number 92549; EEP Contract Number D06040-A					
Summary of Drought Classifications for Years 1 through 5					
	Drought Rating per Week During Growing Season (Percentage)				
	Not Rated	**Abnormally Dry**	**Moderate Drought**	**Severe Drought**	**Extreme Drought**
Year 1 (2009)	7 weeks (19.4 percent)	28 weeks (77.8 percent)	1 week (2.8 percent)	0 weeks (0.0 percent)	0 weeks (0.0 percent)
Year 2 (2010)	21 weeks (58.3 percent)	12 weeks (33.3 percent)	3 weeks (8.3 percent)	0 weeks (0.0 percent)	0 weeks (0.0 percent)
Year 3 (2011)	0 weeks (0.0 percent)	10 weeks (27.8 percent)	13 weeks (36.1 percent)	7 weeks (19.4 percent)	6 weeks (16.7 percent)
Year 4 (2012)	0 weeks (0.0 percent)	19 weeks (52.8 percent)	17 weeks (47.2 percent)	0 weeks (0.0 percent)	0 weeks (0.0 percent)
Year 5 (2013)					

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

2. Methodology

2.1. Vegetation

Vegetative data will be sampled every monitoring year for five years. Survival criteria of planted woody stems will be 320 stems per acre in Year 3, 288 stems per acre in Year 4, and 260 stems per acre at the completion of the project monitoring period at Year 5.

Nine vegetation plots were established on Site. All plots are 10 meters by 10 meters in size. Plots were established at each monitoring well location (Appendix B, Figure 2). Each plot is identified by its corresponding well as shown on Appendix B, Figure 2. The plots were established throughout the Site in order to gain a representative view of the overall success of the plant community.

The CVS-EEP Level 1 was used for assessing vegetative success (Lee *et al.*, 2006). Level 1 is the inventory of planted stems. Berger is only required to perform a Level 1 assessment under the existing contract. Although Berger performed a Level 2 assessment in Year 1, it was not done in Year 2. Visual inspection during Year 2 and Year 3 monitoring efforts confirmed that the volunteer stem count and species remained consistent; therefore, a Level 2 assessment was not necessary.

2.2. Hydrology

Hydrology will be considered successful by two metrics, per the USACE wetland delineation manual (Environmental Laboratory, 1987). One criterion provides for hydrologic success if the soil is ponded, flooded, or saturated within 12 inches of the soil surface continuously for at least 12.5 percent of the growing season, assuming normal precipitation. The second alternative measurement of success would be to attain ponded, flooded, or saturated conditions within 12 inches of the soil surface continuously between 5 and 12.5 percent of the growing season, provided the hydric soil and hydrophytic vegetation wetland criteria are also met. In Brunswick County, the growing season is typically 249 days, assuming a temperature of above 28 degrees F and a frequency of 5 of 10 years (NRCS, 2009). The growing season in Brunswick County typically occurs between approximately March 15 and November 18 in a given calendar year. As a result, 5 to 12.5 percent of the growing season is 12 to 31 days.

The groundwater hydrology of the Plum Creek Site is monitored during the growing season in accordance with USACE guidelines through the use of shallow monitoring wells with automatic data loggers (USACE, 2003). Groundwater data is collected from 15 monitoring wells. Nine wells were established throughout the site to accurately obtain a representative view of the groundwater hydrology. Six additional wells were installed in the western central portion of the site, perpendicular the western border ditch (Appendix B**,** Figure 2). The purpose of these wells is to show the linear extent of drawn down effect of this ditch on the restored wetland.

A stream gauge was installed in Boggy Branch, within the property boundaries, for informational purposes only. The stream gauge keeps records of the level of water in Boggy Branch. No success criteria are attached to the gauge.

2.3. Photo Stations

Eight fixed photo stations were established throughout the Site. These locations are presented in Figure 2, Appendix B. Photographs were taken during the monitoring efforts in November 2012. Photographs can be found in Appendix B.

3. References

Environmental Laboratory, 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, US Army Engineer Waterways Experiment Station, Vicksburg, MS.

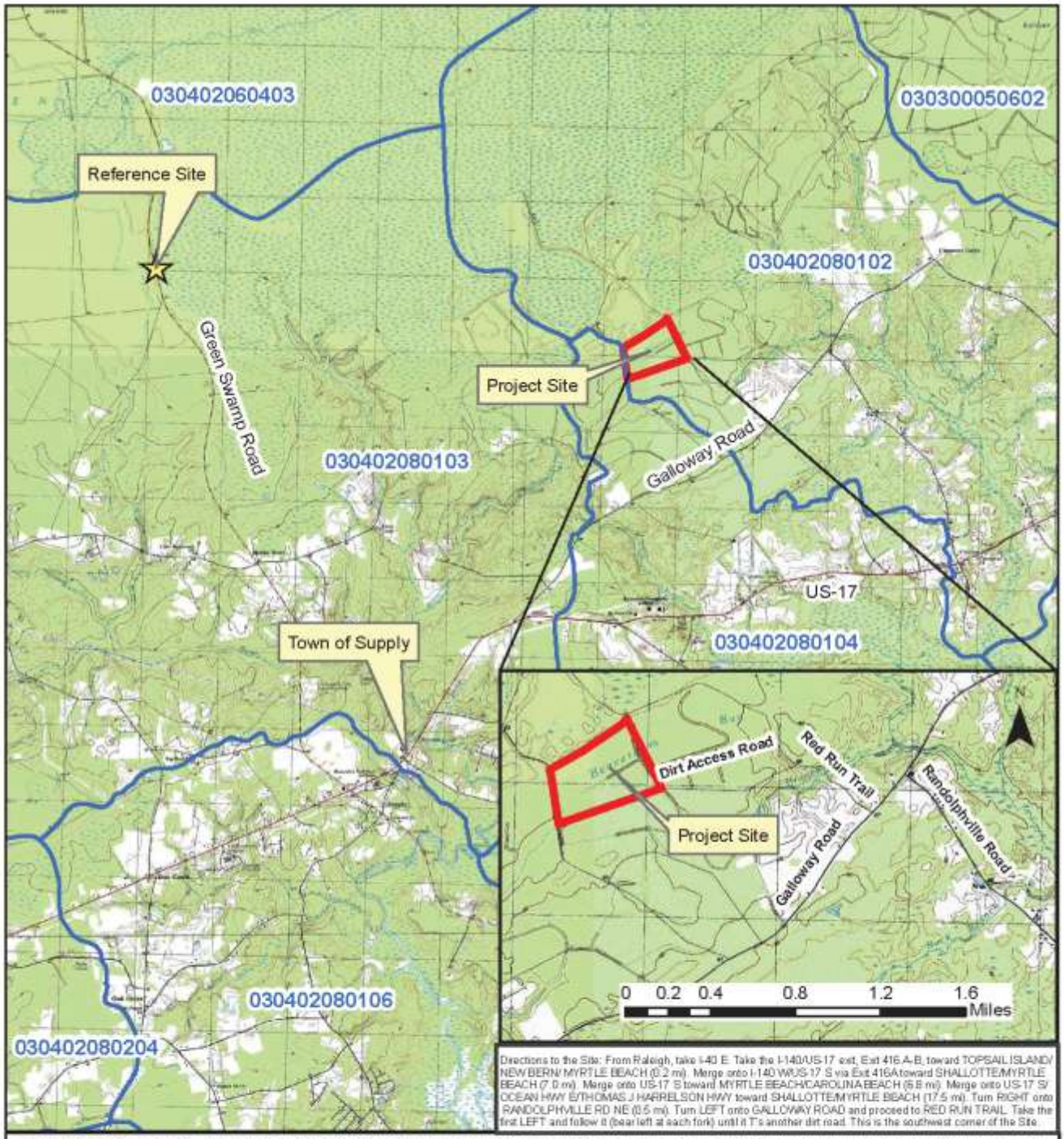
Griffith, Glenn, J. Omernik, J. Comstock, 2002. Ecoregions of North Carolina Regional Descriptions. U.S. Department of Agriculture, Natural Resources Conservation Service, Corvallis, OR.

Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2006. CVS-EEP Protocol for Recording Vegetation, Version 4.0 Available URL: http://cvs.bio.unc.edu/methods.htm.

Natural Resources Conservation Service. Climate Information – Wetlands Retrieval for North Carolina. Brunswick County. Available URL: http://www.wcc.nrcs.usda.gov/cgibin/getwetco.pl?state=nc. Accessed: January 15, 2009.

US Army Corps of Engineers, 2003. Stream Mitigation Guidelines. Prepared by: USACE, NCDWQ, USEPA, NCWRC.

Appendix A:
Project Vicinity Map and Background Tables



Directions to the Site: From Raleigh, take I-40 E. Take the I-140/US-17 exit, Exit 416 A-B, toward TOPSAIL ISLAND/ NEW BERN/ MYRTLE BEACH (0.2 mi). Merge onto I-140 W/US-17 S via Exit 416A toward SHALLOTTE/MYRTLE BEACH (7.0 mi). Merge onto US-17 S toward MYRTLE BEACH/CAROLINA BEACH (6.8 mi). Merge onto US-17 S/ OCEAN HWY E/THOMAS J HARRELSON HWY toward SHALLOTTE/MYRTLE BEACH (17.5 mi). Turn RIGHT onto RANDOLPHVILLE RD NE (0.5 mi). Turn LEFT onto GALLOWAY ROAD and proceed to RED RUN TRAIL. Take the first LEFT and follow it (bear left at each fork) until it T's another dirt road. This is the southwest corner of the Site.

The subject project site is an environmental restoration site of the NCDENR Ecosystem Enhancement Program (EEP) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easement boundary and therefore access by the general public is not permitted. Access by authorized personnel of state and federal agencies or their designees/contractors involved in the development, oversight and stewardship of the restoration site is permitted within the terms and timeframes of their defined roles. Any intended site visitation or activity by any person outside of these previously sanctioned roles and activities requires prior coordination with EEP.

Legend

- Reference Site
- 12 Digit HUC
- Project Easement Boundary
- Roads

N

0 0.5 1 2 Miles

Source: USGS 7.5 Minute Topographic Map: Bolivia, NC

North Carolina
Ecosystem Enhancement Program

Plum Creek Wetland Mitigation Site
Brunswick County
EEP Project No. D06040-A

Project Vicinity Map

The Louis Berger Group, Inc.
1001 Wade Avenue, Suite 400
Raleigh, NC 27605

FIGURE 1

December 2012

Table 1: Project Components and Mitigation Credits Plum Creek Wetland Mitigation Project EEP Project Number 92549; EEP Contract Number D06040-A				
Project Component or Reach ID	**Total Acres***	**Type**	**Restoration Level and Ratio**	**Comment**
Planting Zone 1	77	Non-riverine/ Non-riparian	Restoration 1:1	Pond Pine Woodland Community
Existing Wetland WA	6	Non-riverine/ Non-riparian	Enhancement 2:1	Pond Pine Woodland Community
Mitigation Unit Summations				
Non-Riparian Wetland – 80 acres				

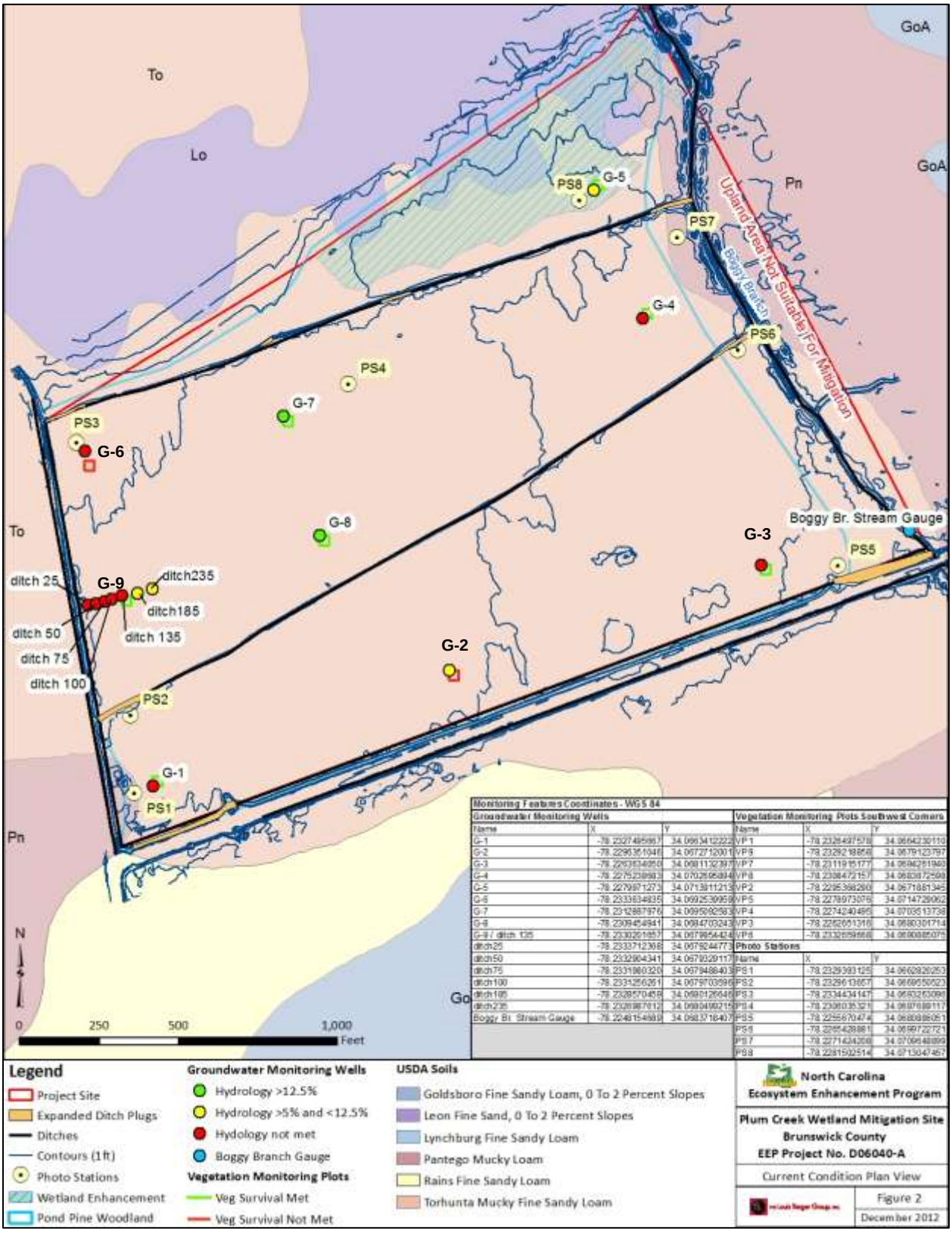
* The remaining acreage is either unsuitable for mitigation or will remain as upland.

Table 2: Project Activity and Reporting History Plum Creek Wetland Mitigation Project EEP Project Number 92549; EEP Contract Number D06040-A		
Elapsed Time Since Vegetation Removal Complete: 3 yrs 6 months **Elapsed Time Since Planting Complete: 3 yrs 1 month** **Number of Reporting Years: 3**		
Activity or Report	**Data Collection Complete**	**Completion or Delivery**
Technical Proposal	January 2006	March 2006
Categorical Exclusion	January 2007	February 2007
Restoration Plan	April 2008	July 2008
Existing Vegetation Removal	N/A	July 2008
Construction	N/A	October 2008
Planting	N/A	December 2008
Mitigation Plan / As-built (Year 0 Monitoring – baseline)	January 2009	April 2009
Year 1 Monitoring	November 2009	February 2010
Year 2 Monitoring	November 2010	February 2011
Year 3 Monitoring	November 2011	December 2011
Year 4 Monitoring	November 2012	December 2012

Table 3: Project Contacts Table Plum Creek Wetland Mitigation Project EEP Project Number 92549; EEP Contract Number D06040-A	
Designer Primary project design POC	The Louis Berger Group, Inc. 1001 Wade Avenue, Suite 400 Raleigh, North Carolina 27605 Michael O'Rourke (919-866-4421)
Construction Contractor Construction contractor POC	River Works, Inc 4117 Pleasant Garden Road Greensboro, NC 27406 Bill Wright (336-279-1002)
Planting Contractor Planting contractor POC	Superior Forestry Services, Inc. 36462 Highway 27 Tilley, AR 72679 John Foley (870-496-2442)
Nursery Stock Suppliers	Division of Forest Resources – Claridge Nursery (919-731-7988) Coastal Plain Nursery (252-482-5707)
Monitoring Performers	The Louis Berger Group, Inc. 1001 Wade Avenue, Suite 400 Raleigh, North Carolina 27605 EEE Consultants, Inc 3834 Althorp Drive Raleigh, NC 27616
Stream Monitoring POC	N/A
Vegetation Monitoring POC	Ray Bode, PWS (919-545-0256) Tina Sekula, PWS (919-696-9506)
Wetland Monitoring POC	Ray Bode, PWS (919-545-0256) Tina Sekula, PWS (919-696-9506)

Table 4: Project Background Table Plum Creek Wetland Mitigation Project EEP Project Number 92549; EEP Contract Number D06040-A			
Project Information			
Project Name	Plum Creek Wetland Mitigation Project		
County	Brunswick County		
Project Area (acres)	Approximately 89 acres		
Project Coordinates (latitude and longitude)	34.068850, -78.229486		
Project Watershed Summary Information			
Physiographic Province	Middle Atlantic Coastal Plain		
River Basin	Lumber River		
USGS Hydrologic Unit 8-digit	03040208		
USGS Hydrologic Unit 12-digit	030402080102		
NCDWQ Sub-basin	Long Bay Subbasin		
Project Drainage area (acres)	110 acres		
Project Drainage Area Percentage of Impervious Area	0%		
CGIA Land Use Classification	Other Needleleaf Evergreen Forests		
Wetland Summary Information			
Size of Wetland (acres)	83 acres		
Wetland Type	Non-Riparian, non-riverine		
Mapped Soil Series	Torhunta Mucky Fine Sandy Loam		
Drainage class	Very poorly drained soils		
Soil Hydric Status	Hydric		
Source of Hydrology	Precipitation / Groundwater		
Hydrologic Impairment	Previous Ditching		
Native Vegetation Community	Pond Pine Woodland Community		
Percent Composition of exotic invasive vegetation	<5%		
Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the United States – Section 404	Yes	Yes	Jurisdictional Determination
Waters of the Unites States – Section 401	No		
Endangered Species Act	No		
Historic Preservation Act	No		
CZMA / CAMA	No		
FEMA Floodplain Compliance	No		
Essential Fisheries Habitat	No		

Appendix B:
Visual Assessment Data


GoA
To
Lo
Pn
PS8
G-5
PS7
Upland Area Not Suitable For Mitigation
Boggy Branch
G-4
PS6
PS4
G-7
PS3
G-6
G-8
Boggy Br. Stream Gauge
G-3
PS5
ditch 25
G-9
ditch235
ditch185
ditch 135
ditch 50
ditch 75
ditch 100
G-2
PS2
G-1
PS1
Go
N
0
250
500
1,000
Feet
Monitoring Features Coordinates - WGS 84
Groundwater Monitoring Wells
Name X Y
G-1 -78.2327495867 34.0663412222
G-2 -78.2296351046 34.0672712001
G-3 -78.2253534859 34.0691132397
G-4 -78.2275238993 34.0702656894
G-5 -78.227997273 34.0713911213
G-6 -78.2333634835 34.0692539959
G-7 -78.2312887976 34.0695902583
G-8 -78.2309454941 34.0684703243
G-9 / ditch 135 -78.2303261857 34.0678954424
ditch25 -78.2333712368 34.0679244773
ditch50 -78.2332904341 34.0679320117
ditch75 -78.2331960320 34.0679488403
ditch100 -78.2331256251 34.0679703596
ditch185 -78.2328570458 34.0690126646
ditch235 -78.2326987612 34.0690499215
Boggy Br. Stream Gauge -78.2248154669 34.0683716407
Vegetation Monitoring Plots Southwest Corners
Name X Y
VP1 -78.2328497578 34.0664230119
VP9 -78.2328218858 34.0679123797
VP7 -78.2311915177 34.0694251963
VP8 -78.2308472157 34.0683972599
VP2 -78.2295398280 34.0671881345
VP5 -78.2278973076 34.0714729062
VP4 -78.2274240495 34.0705513738
VP3 -78.2262651316 34.0680301714
VP6 -78.2332559868 34.0690685075
Photo Stations
Name X Y
PS1 -78.2329393125 34.0662926253
PS2 -78.2329613657 34.0699550523
PS3 -78.2334434147 34.0693263099
PS4 -78.2308035321 34.0697689117
PS5 -78.2255670474 34.0680886051
PS6 -78.2255428881 34.0699722721
PS7 -78.2271424208 34.0706648899
PS8 -78.2281502514 34.0713047457
Legend
Project Site
Expanded Ditch Plugs
Ditches
Contours (1ft)
Photo Stations
Wetland Enhancement
Pond Pine Woodland
Groundwater Monitoring Wells
Hydrology >12.5%
Hydrology >5% and <12.5%
Hydology not met
Boggy Branch Gauge
Vegetation Monitoring Plots
Veg Survival Met
Veg Survival Not Met
USDA Soils
Goldsboro Fine Sandy Loam, 0 To 2 Percent Slopes
Leon Fine Sand, 0 To 2 Percent Slopes
Lynchburg Fine Sandy Loam
Pantego Mucky Loam
Rains Fine Sandy Loam
Torhunta Mucky Fine Sandy Loam
North Carolina
Ecosystem Enhancement Program
Plum Creek Wetland Mitigation Site
Brunswick County
EEP Project No. D06040-A
Current Condition Plan View
Figure 2
December 2012

Vegetation Monitoring Plot Photos

Veg Plot 1, view from southwest corner
January 7, 2009

Veg Plot 1, view from southwest corner
November 15, 2010

Veg Plot 1, view from southwest corner
November, 11 2011

Veg Plot 1, view from southwest corner
November 12, 2012

Veg Plot 2, view from southwest corner
January 7, 2009

Veg Plot 2, view from southwest corner
November 15, 2010

Veg Plot 2, view from southwest corner
November 15, 2011

Veg Plot 2, view from southwest corner
November 13, 2012

Veg Plot 3, view from southwest corner
January 8, 2009

Veg Plot 3, view from southwest corner
November 16, 2010

Veg Plot 3, view from southwest corner
November 16, 2011

Veg Plot 3, view from southwest corner
November 13, 2012

Veg Plot 4, view from southwest corner
January 8, 2009

Veg Plot 4, view from southwest corner
November 16, 2010

Veg Plot 4, view from southwest corner
November 16, 2011

Veg Plot 4, view from southwest corner
November 13, 2012

Veg Plot 5, view from southwest corner
January 8, 2009

Veg Plot 5, view from southwest corner
November 15, 2010

Veg Plot 5, view from southwest corner
November 16, 2011

Veg Plot 5, view from southwest corner
November 13, 2012

Veg Plot 6, view from southwest corner
January 7, 2009

Veg Plot 6, view from southwest corner
November 15, 2010

Veg Plot 6, view from southwest corner
November 15, 2011

Veg Plot 6, view from southwest corner
November 12, 2012

Veg Plot 7, view from southwest corner
January 7, 2009

Veg Plot 7, view from southwest corner
November 15, 2010

Veg Plot 7, view from southwest corner
November 15, 2011

Veg Plot 7, view from southwest corner
November 13, 2012

Veg Plot 8, view from southwest corner
January 7, 2009

Veg Plot 8, view from southwest corner
November 15, 2010

Veg Plot 8, view from southwest corner
November 15, 2011

Veg Plot 8, view from southwest corner
November 13, 2012

Veg Plot 9, view from southwest corner,
January 7, 2009

Veg Plot 9, view from southwest corner
November 15, 2010

Veg Plot 9, view from southwest corner
November 15, 2011

Veg Plot 9, view from southwest corner
November 12, 2012

Photo Stations

Photo Station 1, view looking north
October 28, 2009

Photo Station 1, view looking north
November 15, 2010

Photo Station 1, view looking north
November 15, 2011

Photo Station 1, view looking north
November 12, 2012

Photo Station 2, view looking east
October 28, 2009

Photo Station 2, view looking east
November 15, 2010

Photo Station 2, view looking east
November 15, 2011

Photo Station 2, view looking east
November 12, 2012

Photo Station 3, view looking east
October 28, 2009

Photo Station 3, view looking east
November 15, 2010

Photo Station 3, view looking east
November 15, 2011

Photo Station 3, view looking east
November 12, 2012

Photo Station 4, view looking east
October 29, 2009

Photo Station 4, view looking east
November 15, 2010

Photo Station 4, view looking east
November 15, 2011

Photo Station 4, view looking east
November 13. 2012

Photo Station 5, view looking east
October 29, 2009

Photo Station 5, view looking east
November 15, 2010

Photo Station 5, view looking east
November 16, 2011

Photo Station 5, view looking east
November 13, 2012

Photo Station 6, view looking west
October 29, 2009

Photo Station 6, view looking west
November 15, 2010

Photo Station 6, view looking west
November 16, 2011

Photo Station 6, view looking west
November 13, 2012

Photo Station 7, view looking east
October 29, 2009

Photo Station 7, view looking east
November 15, 2010

Photo Station 7, view looking east
November 16, 2011

Photo Station 7, view looking east
November 13, 2012

Photo Station 8, view looking north
October 29, 2009

Photo Station 8, view looking north
November 15, 2010

Photo Station 8, view looking north
November 16, 2011

Photo Station 8, view looking north
November 13, 2012

Appendix C:
Vegetation Plot Data

Table 5: Veg Plot Criteria Attainment Plum Creek Wetland Restoration EEP Project Number 92549; EEP Contract Number D06040-A				
Tract	**Veg Plot ID**	**Stems Per Acre**	**Veg Survival Threshold Met? (288 stems per acre)**	**Tract Mean**
Plum Creek Wetland Restoration Site	1	526	Y	**78%**
	2	283	N	
	3	323	Y	
	4	323	Y[1]	
	5	323	Y	
	6	283	N	
	7	364	Y[1]	
	8	323	Y	
	9	323	Y	

[1] - During Year 1 monitoring, these plots did not make vegetation criteria due to missing stems. These stems were found during Yr-2's monitoring efforts.

Table 6: CVS Vegetation Metadata Table Plum Creek Wetland Restoration EEP Project Number 92549; EEP Contract Number D06040-A	
3. Report Prepared By	4. Tina Sekula
5. Date Prepared	6. 11/21/2012 1:49 PM
7.	8.
9.	10.
11. database name	12. The Louis Berger Group-Plum-2011-A.mdb
13. database location	14. C:\Users\tsekula\Desktop\temp\Plum2012
15. computer name	16. TINASEKULA-WIN7
17. file size	18. 59760640
19.	20.
21.	22.
23. DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	24.
25. Metadata	26. Description of database file, the report worksheets, and a summary of project(s) and project data.
27. Proj, planted	28. Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
29. Proj, total stems	30. Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
31. Plots	32. List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
33. Vigor	34. Frequency distribution of vigor classes for stems for all

Table 6: CVS Vegetation Metadata Table Plum Creek Wetland Restoration EEP Project Number 92549; EEP Contract Number D06040-A	
	plots.
35. Vigor by Spp	36. Frequency distribution of vigor classes listed by species.
37. Damage	38. List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
39. Damage by Spp	40. Damage values tallied by type for each species.
41. Damage by Plot	42. Damage values tallied by type for each plot.
43. Planted Stems by Plot and Spp	44. A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
45.	46.
47.	48.
49. PROJECT SUMMARY----------	50.
51. Project Code	52. 92549
53. project Name	54. Plum Creek Wetland Restoration Site
55. Description	56. The project involves the construction of approximately 80 acres of non-riverine wetland restoration.
57. River Basin	58. Lumber
59. length(ft)	60. NA
61. stream-to-edge width (ft)	62. NA
63. area (sq m)	64. 323, 748 mi^2
65. Required Plots (calculated)	66. 9
67. Sampled Plots	68. 9

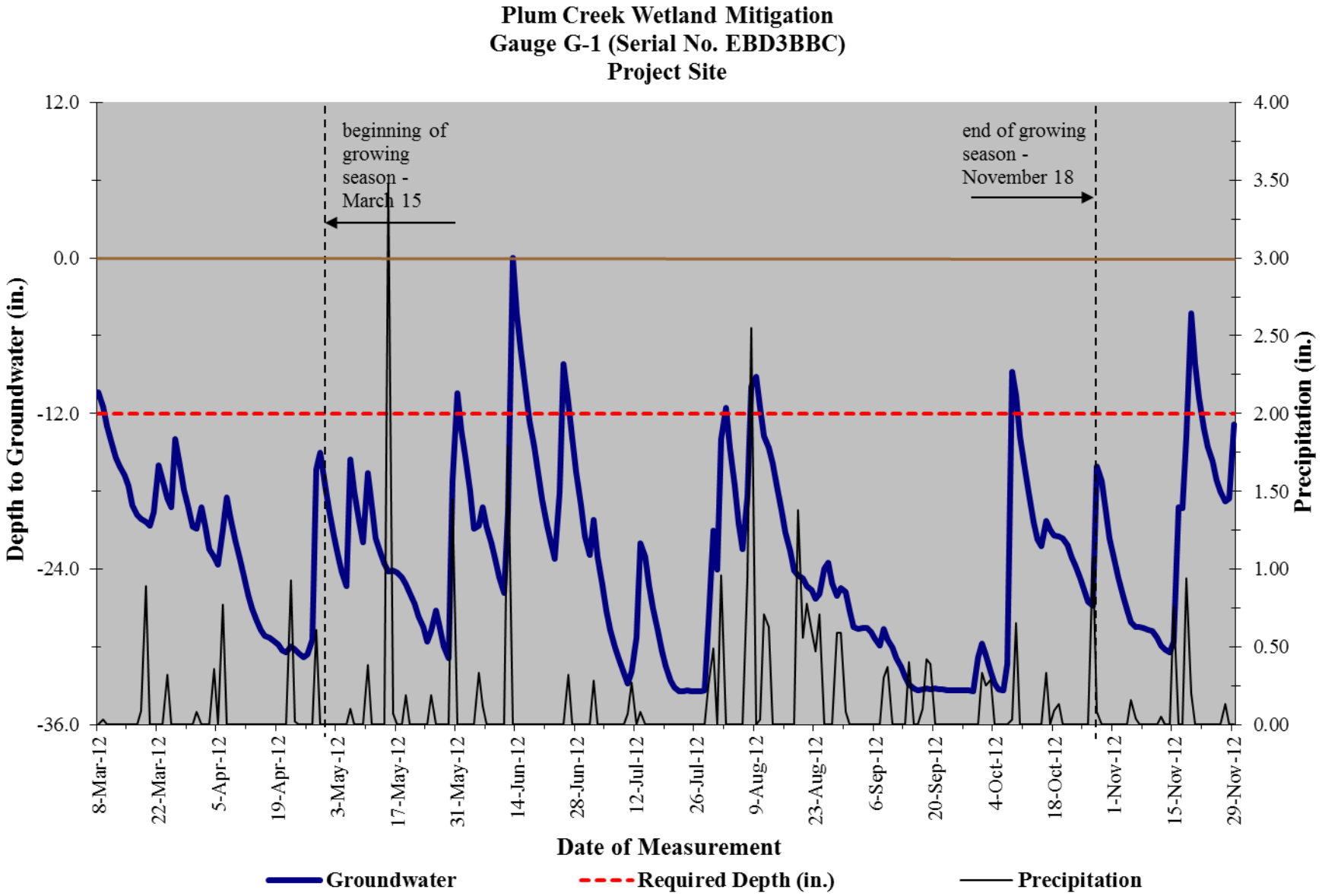
Table 7: CVS Stem Count Total and Planted by Plot and Species
Plum Creek Wetland Restoration
EEP Project Number 92549; EEP Contract Number D06040-A

	Comment	Species	Common Name	Total Planted Stems	# plots	avg# stems	plot 92549-01-1-year:4	plot 92549-01-2-year:4	plot 92549-01-3-year:4	plot 92549-01-4-year:4	plot 92549-01-5-year:4	plot 92549-01-6-year:4	plot 92549-01-7-year:4	plot 92549-01-8-year:4	plot 92549-01-9-year:4
		Chamaecyparis thyoides	Atlantic white cedar	4	3	1.33			1		2				1
		Gordonia lasianthus	loblolly bay	8	6	1.33	1		1	2	1			1	2
		Pinus serotina	pond pine	62	9	6.89	10	7	6	6	5	7	9	7	5
		Quercus laurifolia	laurel oak	1	1	1.00	1								
		Quercus michauxii	swamp chestnut oak	1	1	1.00	1								
TOT:		**5**	**5**	**76**	**5**		**13**	**7**	**8**	**8**	**8**	**7**	**9**	**8**	**8**

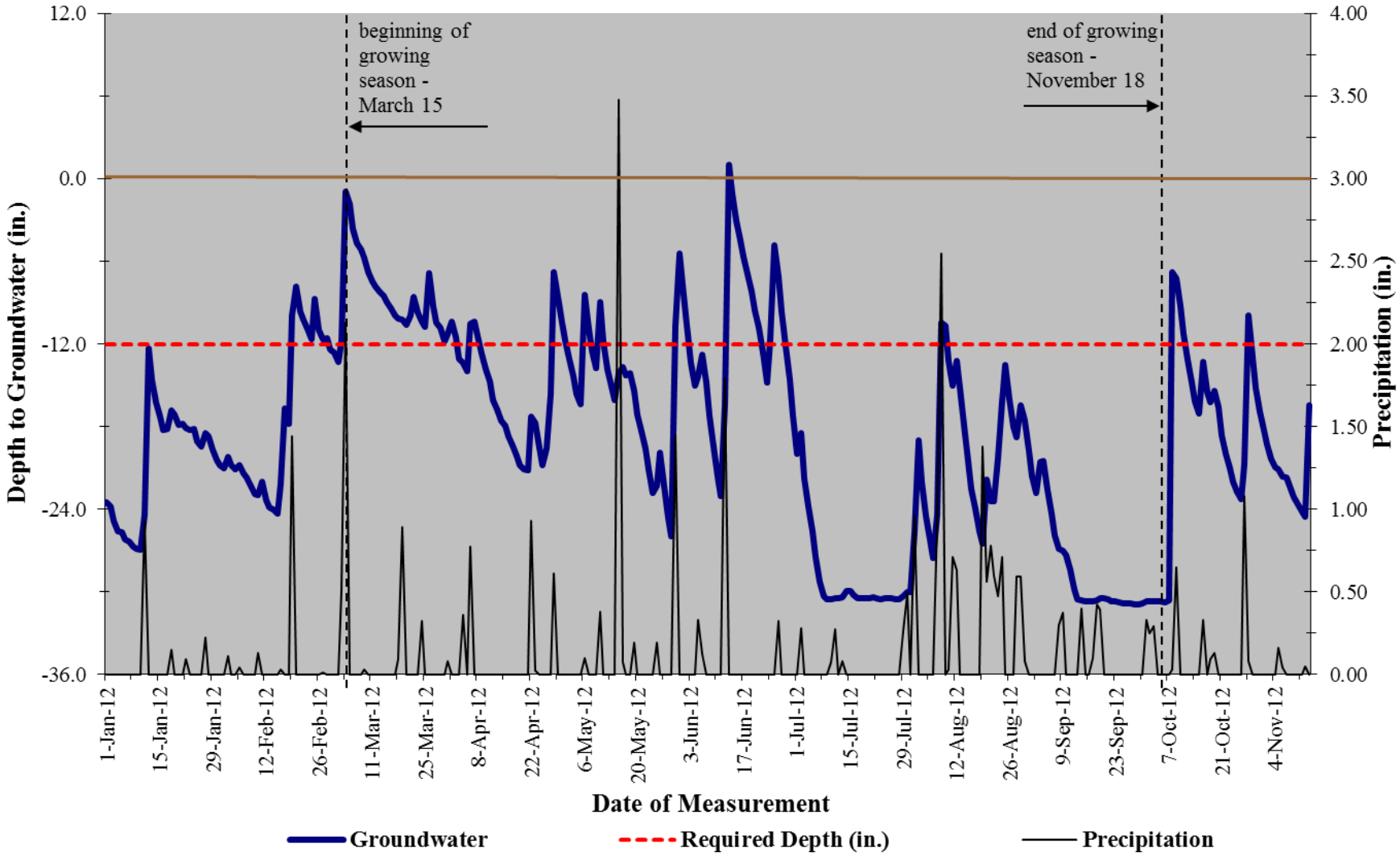
Project Code	**Project Name**	**River Basin**	**Year 4 Stem Count**
92549	Plum Creek Wetland Restoration Site	Lumber	341.734543

Appendix D:
Hydrologic Data

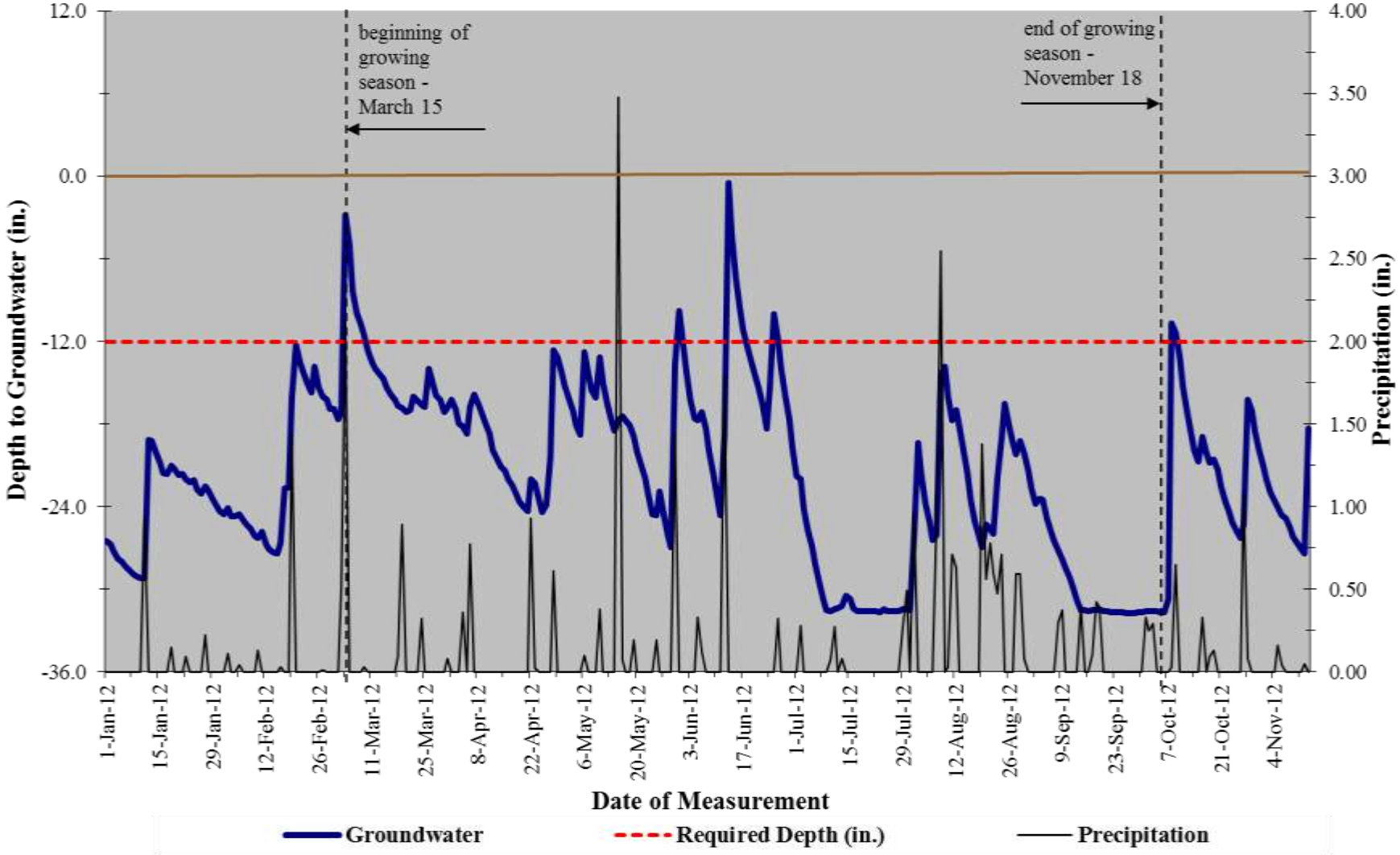
Table 8: Wetland Gauge Attainment Data – >5 percent and <12.5 percent criteria Plum Creek Wetland Restoration EEP Project Number 92549; EEP Contract Number D06040-A					
Summary of Groundwater Gauge Results for Years 1 through 5					
Gauge	**Success Criteria Achieved / Max Consecutive Days During Growing Season (Percentage)**				
	Year 1 (2009)	**Year 2 (2010)**	**Year 3 (2011)**	**Year 4 (2012)**	**Year 5 (2013)**
G-1 ~~PCW1~~	No / 3 days (1.2 percent)	No / 9 days (3.6 percent)	No / 11 days (4.4 percent)	No / 4 days (1.6 percent)	
G-2 ~~PCW2~~	Yes / 19 days (7.6 percent)	Yes / 19 days (7.6 percent)	Yes / 18 days (7.2 percent)	Yes / 20 days (8 percent)	
G-3 ~~PCW3~~	No / 9 days (3.6 percent)	Yes / 15 days (6.0 percent)	No / 9 days (3.6 percent)	No / 5 days (2 percent)	
G-4 ~~PCW4~~	Yes / 22 days (8.8 percent)	Yes / 18 days (7.2 percent)	Yes / 15 days (6.0 percent)	No / 9 days (3.6 percent)	
G-5 ~~PCW5~~	Yes / 41 days (16.5 percent)	Yes / 20 days (8.0 percent)	Yes / 22 days (8.8 percent)	Yes / 22 days (8.8 percent)	
G-6 ~~PCW6~~	No / 3 days (1.2 percent)	No / 8 days (3.2 percent)	No / 7 days (2.8 percent)	No / 2 days (0.8 percent)	
G-7 ~~PCW7~~	Yes / 24 days (9.6 percent)	Yes / 18 days (7.2 percent)	Yes / 58 days (23.3 percent)	Yes / 35 days (14.1 percent)	
G-8 ~~PCW8~~	Yes / 22 days (8.8 percent)	Yes / 19 days (7.6 percent)	Yes / 50 days (20.1 percent)	Yes / 31 days (12.4 percent)	
G-9 ~~PCW9~~	No / 12 days (4.8 percent)	Yes / 15 days (6.0 percent)	No / 12 days (4.8 percent)	No / 6 days (2.4 percent)	

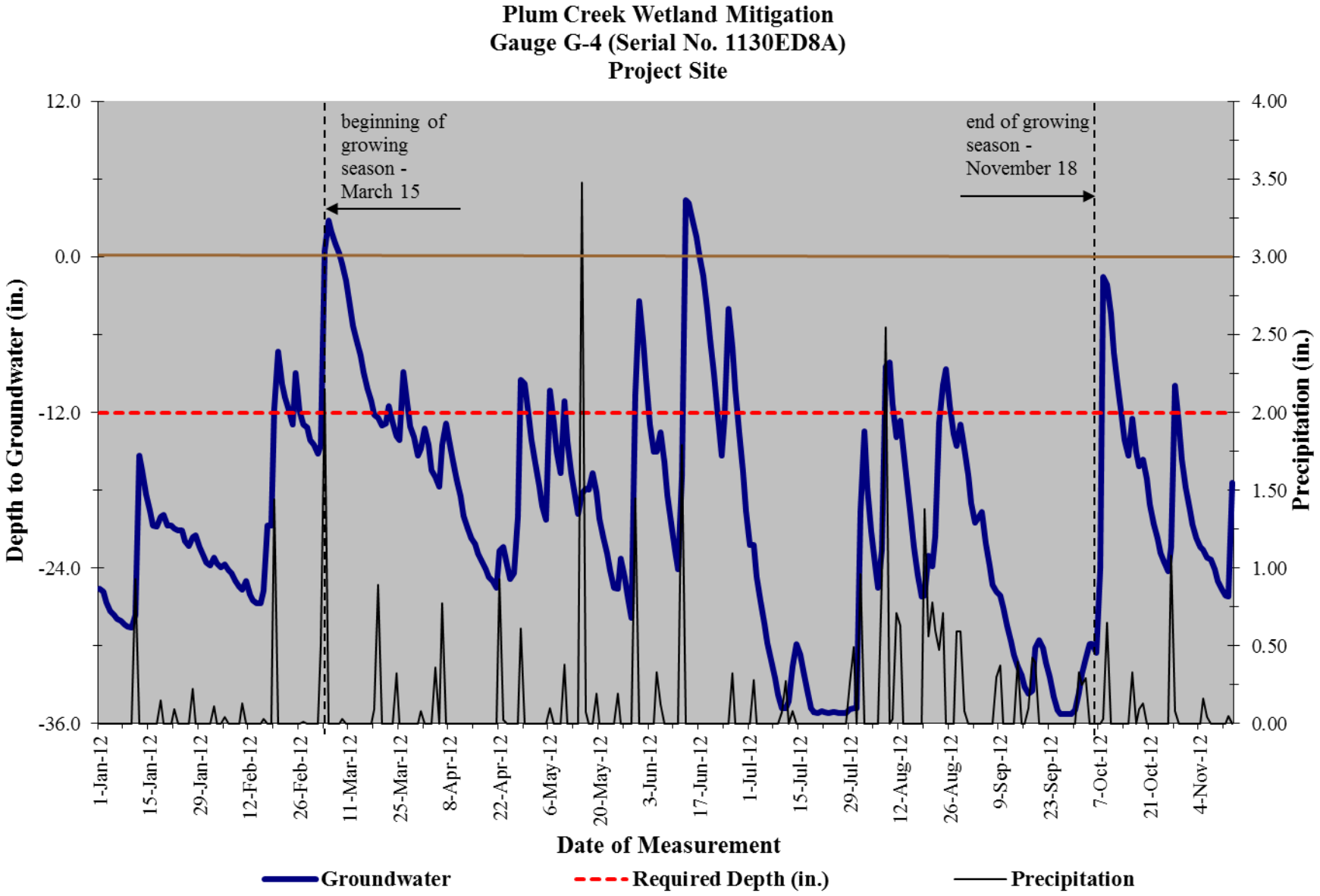

Plum Creek Wetland Mitigation
Gauge G-1 (Serial No. EBD3BBC)
Project Site
beginning of growing season - March 15
end of growing season - November 18
Depth to Groundwater (in.)
Precipitation (in.)
12.0
0.0
-12.0
-24.0
-36.0
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
8-Mar-12
22-Mar-12
5-Apr-12
19-Apr-12
3-May-12
17-May-12
31-May-12
14-Jun-12
28-Jun-12
12-Jul-12
26-Jul-12
9-Aug-12
23-Aug-12
6-Sep-12
20-Sep-12
4-Oct-12
18-Oct-12
1-Nov-12
15-Nov-12
29-Nov-12
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation

Plum Creek Wetland Mitigation
Gauge G-2 (Serial No. EBD77A1)
Project Site

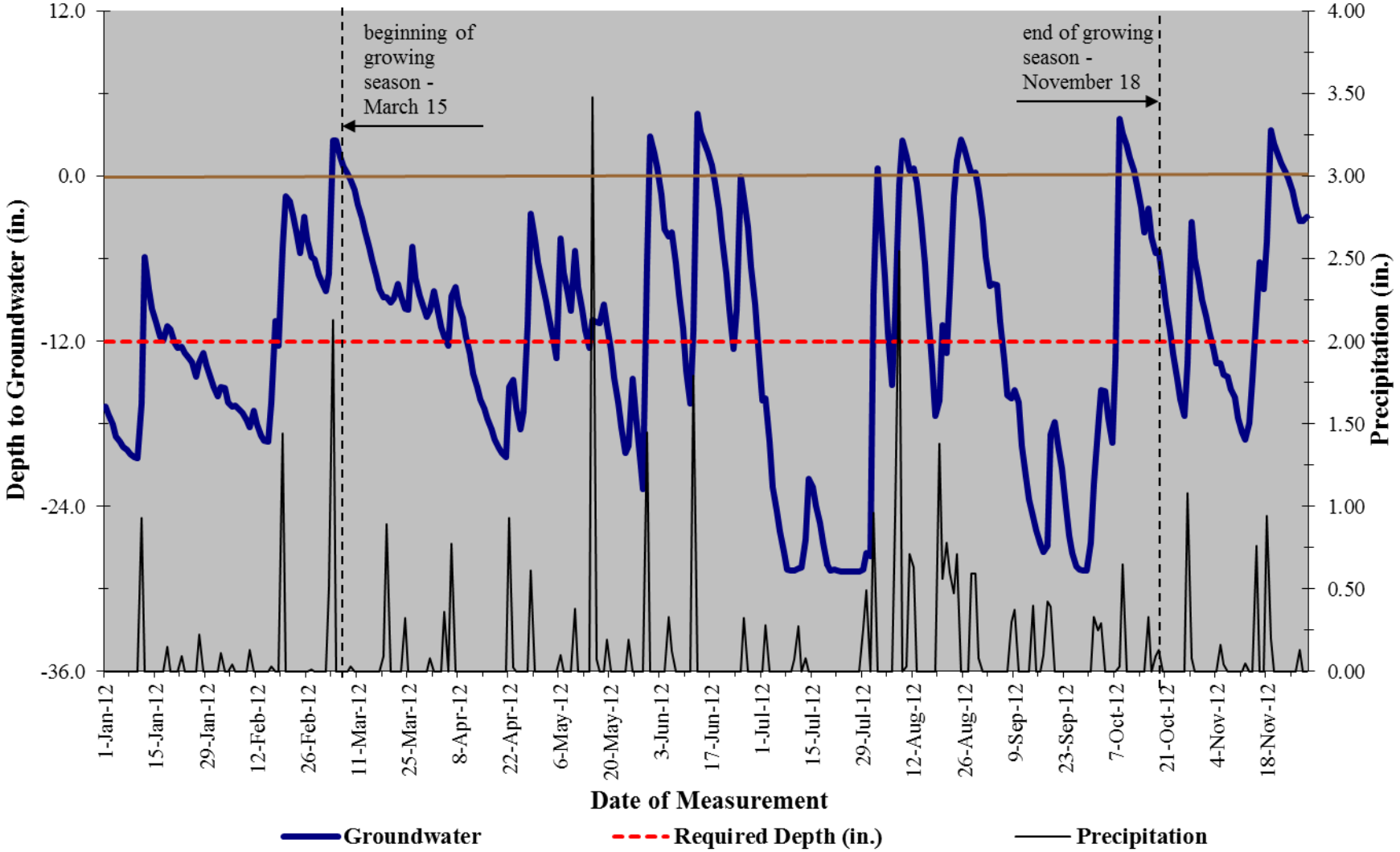


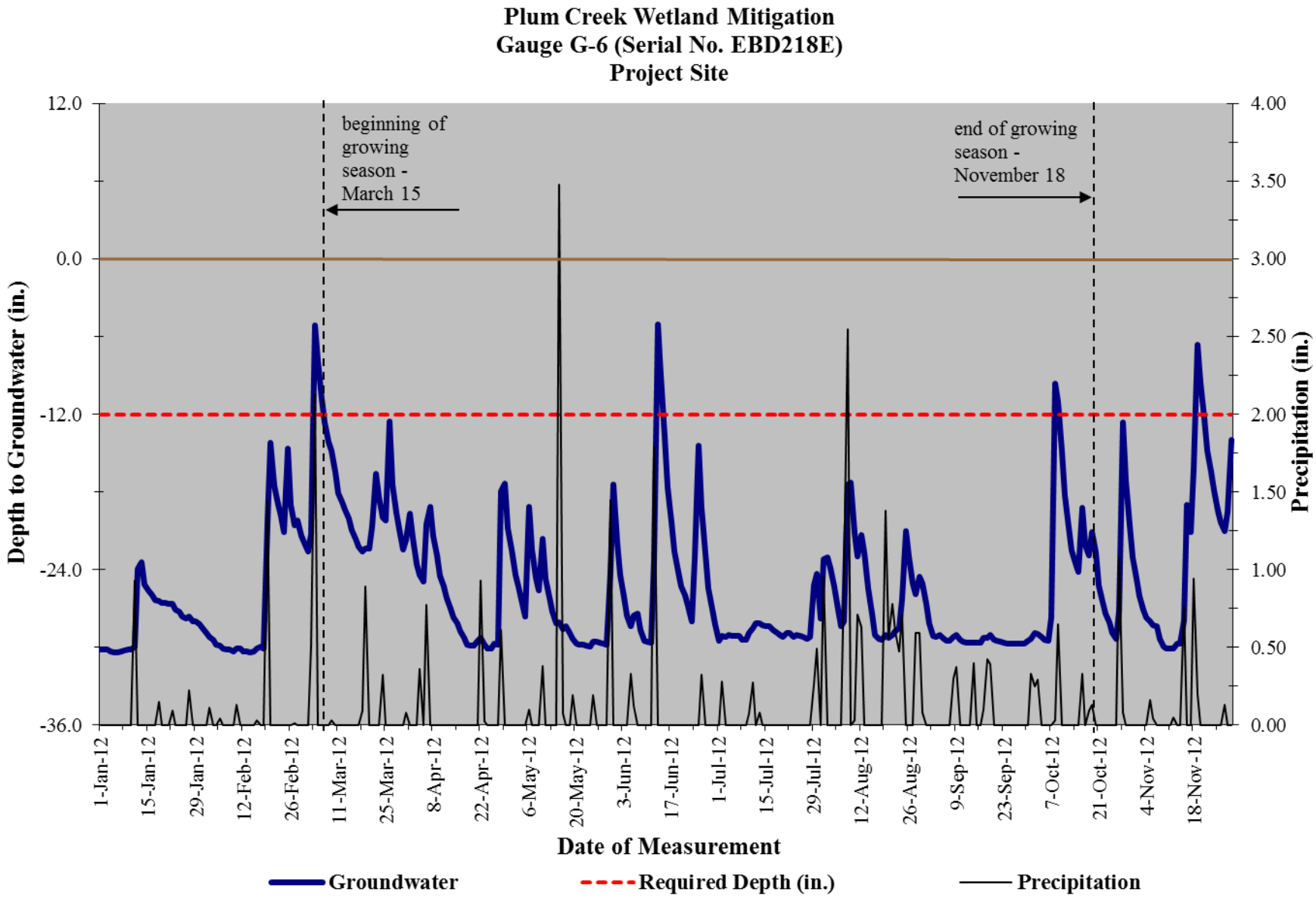
Plum Creek Wetland Mitigation
Gauge G-3 (Serial No. 11313B87)
Project Site




Plum Creek Wetland Mitigation
Gauge G-4 (Serial No. 1130ED8A)
Project Site
beginning of growing season - March 15
end of growing season - November 18
Depth to Groundwater (in.)
Precipitation (in.)
12.0
0.0
-12.0
-24.0
-36.0
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-Jan-12
15-Jan-12
29-Jan-12
12-Feb-12
26-Feb-12
11-Mar-12
25-Mar-12
8-Apr-12
22-Apr-12
6-May-12
20-May-12
3-Jun-12
17-Jun-12
1-Jul-12
15-Jul-12
29-Jul-12
12-Aug-12
26-Aug-12
9-Sep-12
23-Sep-12
7-Oct-12
21-Oct-12
4-Nov-12
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation

Plum Creek Wetland Mitigation
Gauge G-5 (Serial No. 11313B7D)
Project Site

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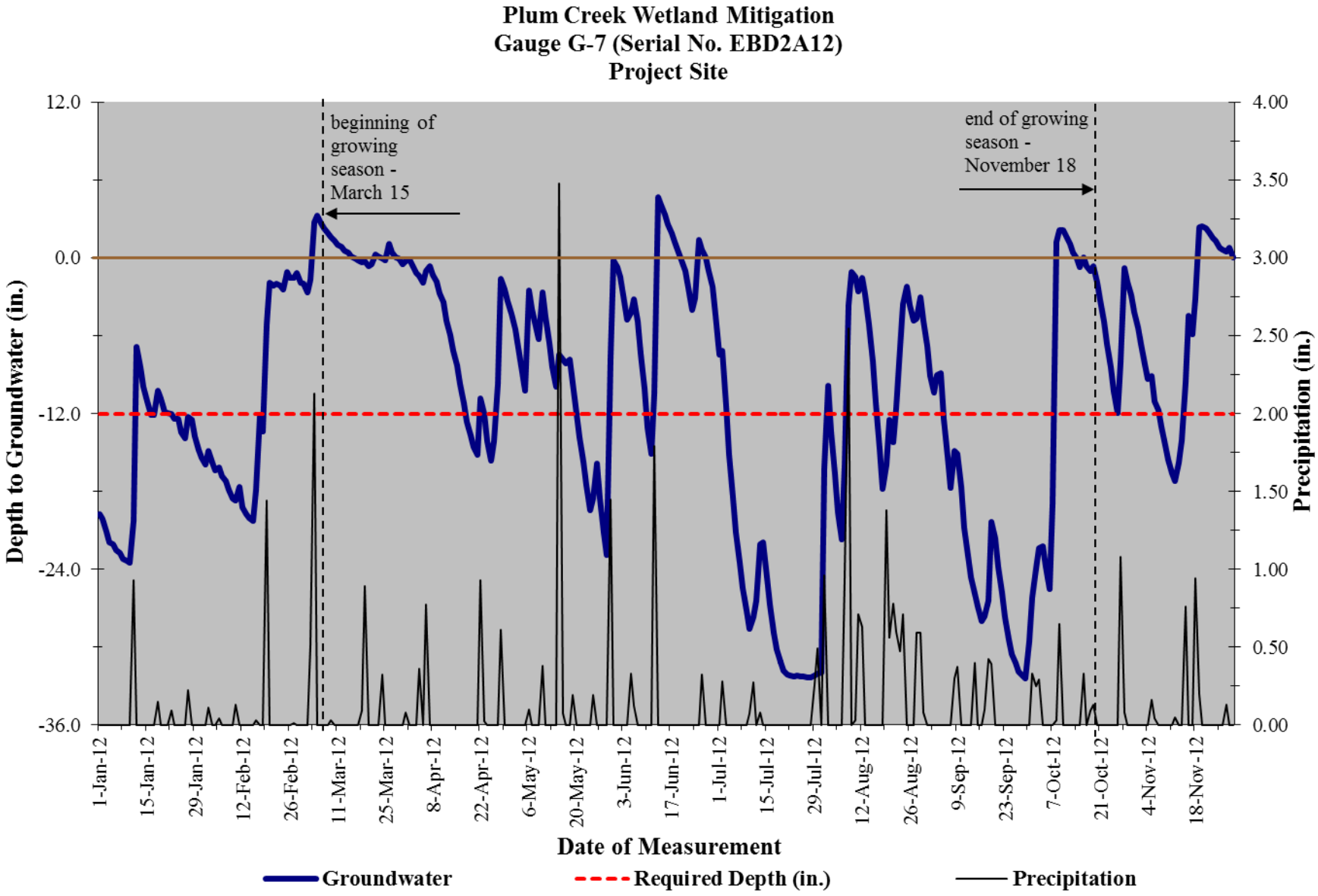
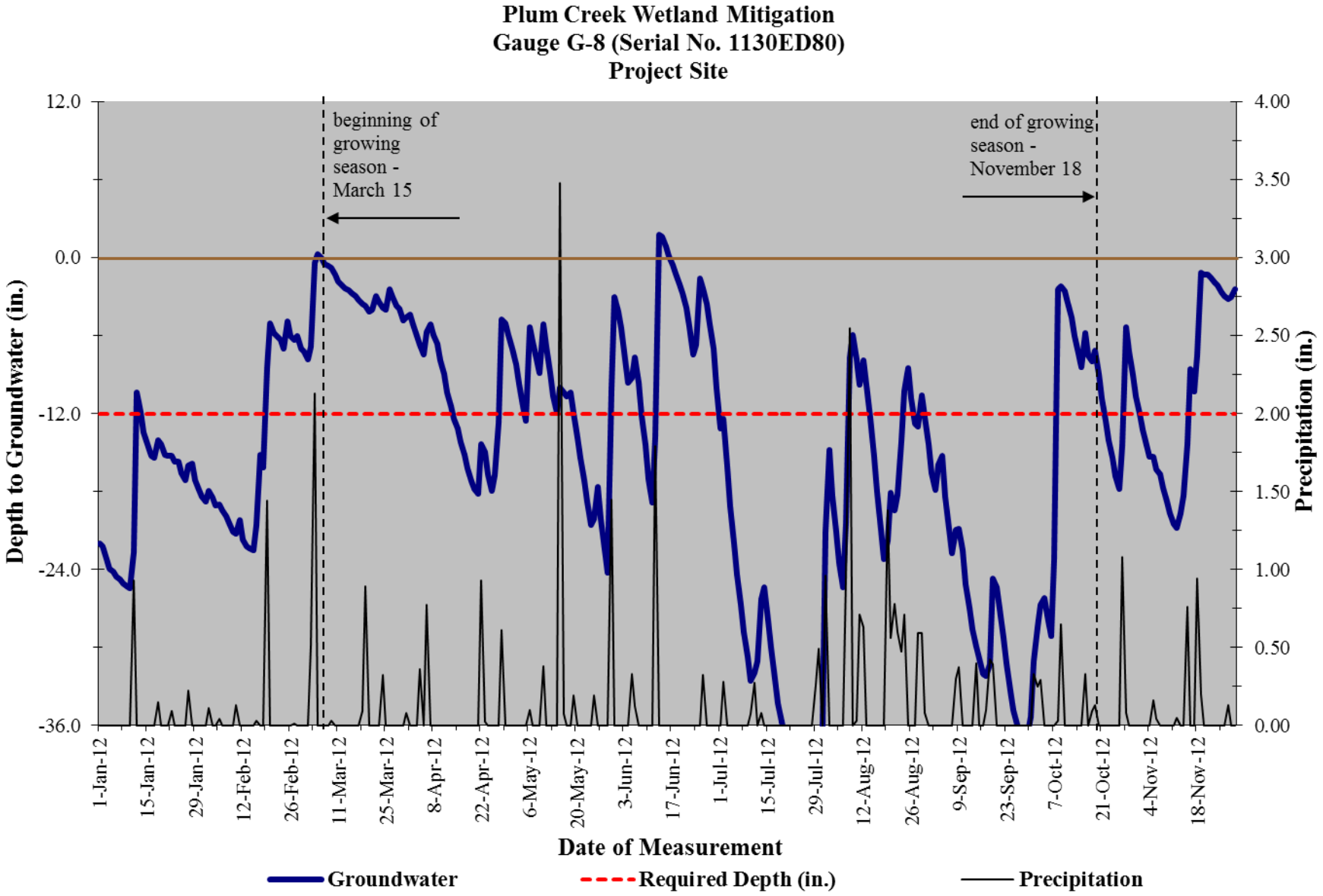
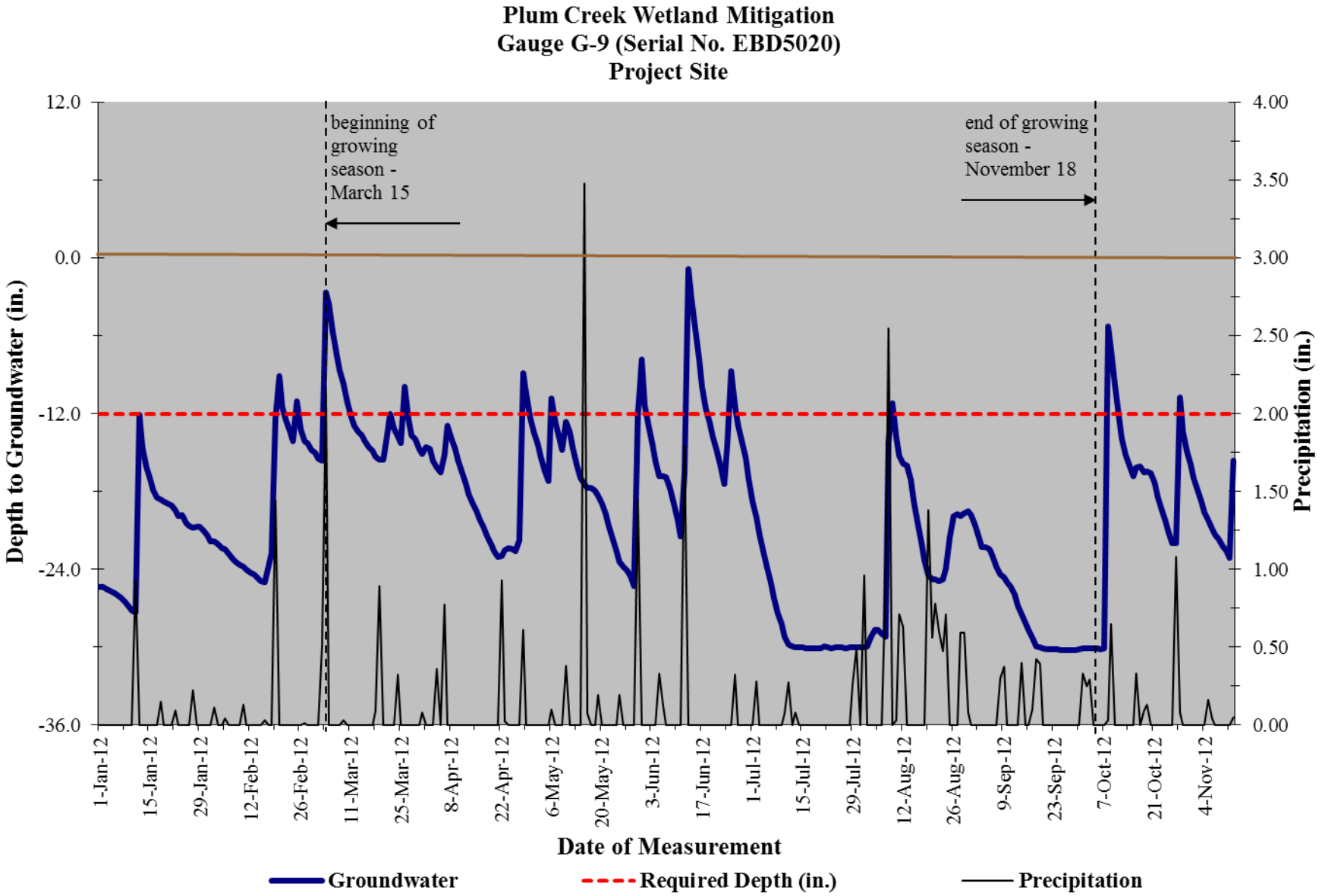
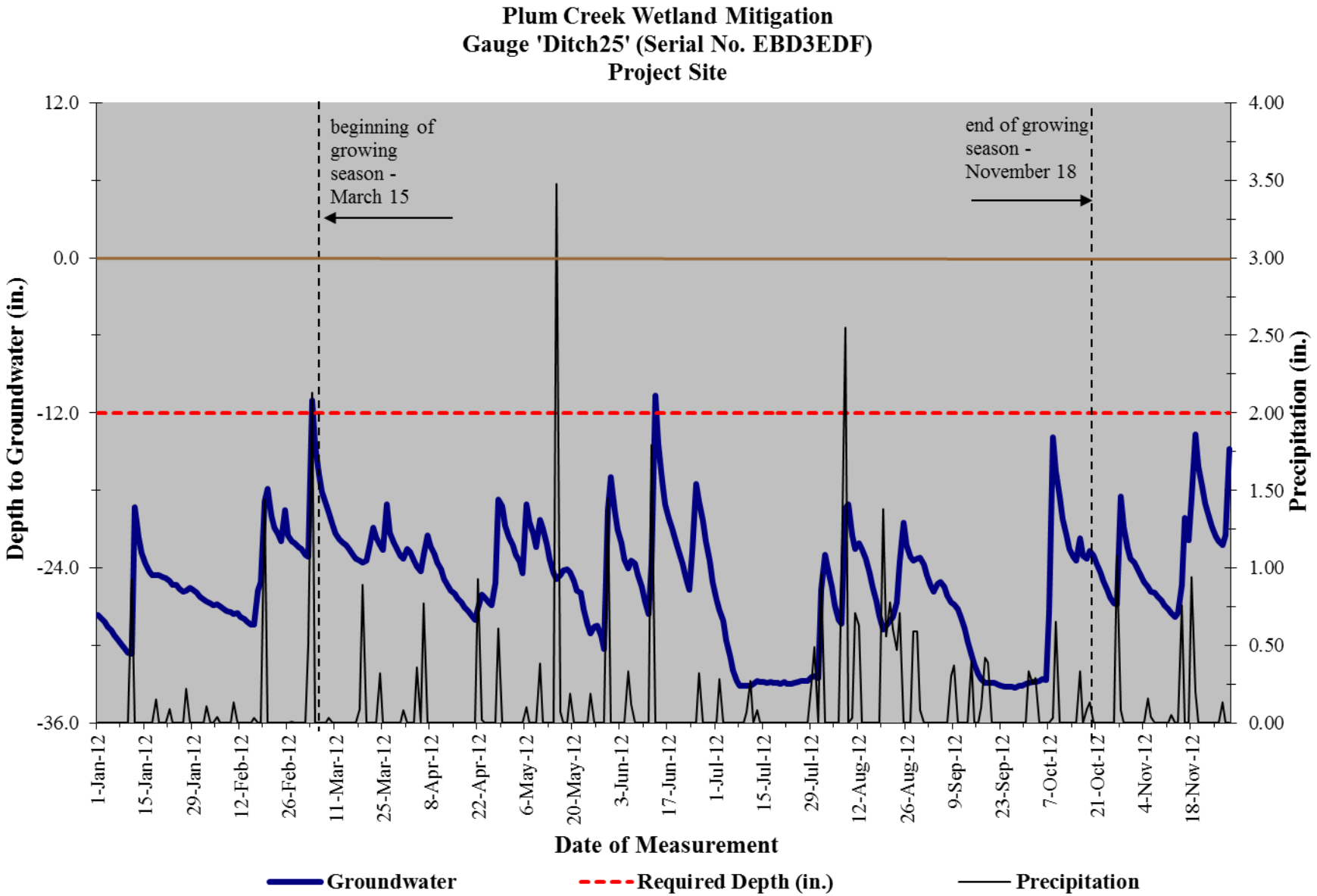
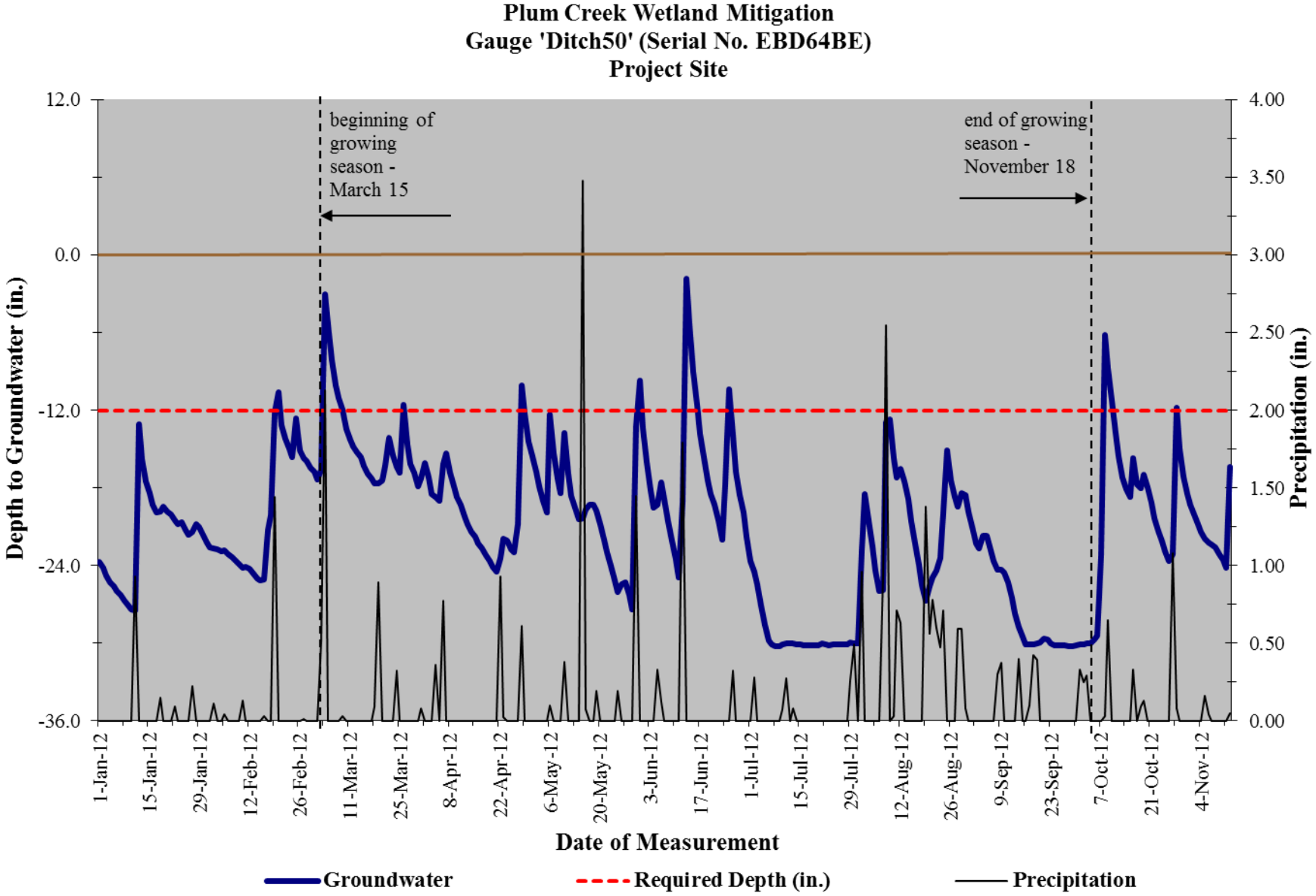
Project Site
beginning of growing season - March 15
end of growing season - November 18
Depth to Groundwater (in.)
Precipitation (in.)
12.0
0.0
-12.0
-24.0
-36.0
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-Jan-12
15-Jan-12
29-Jan-12
12-Feb-12
26-Feb-12
11-Mar-12
25-Mar-12
8-Apr-12
22-Apr-12
6-May-12
20-May-12
3-Jun-12
17-Jun-12
1-Jul-12
15-Jul-12
29-Jul-12
12-Aug-12
26-Aug-12
9-Sep-12
23-Sep-12
7-Oct-12
21-Oct-12
4-Nov-12
18-Nov-12
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation


Plum Creek Wetland Mitigation
Gauge G-7 (Serial No. EBD2A12)
Project Site
beginning of growing season - March 15
end of growing season - November 18
Depth to Groundwater (in.)
Precipitation (in.)
12.0
0.0
-12.0
-24.0
-36.0
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-Jan-12
15-Jan-12
29-Jan-12
12-Feb-12
26-Feb-12
11-Mar-12
25-Mar-12
8-Apr-12
22-Apr-12
6-May-12
20-May-12
3-Jun-12
17-Jun-12
1-Jul-12
15-Jul-12
29-Jul-12
12-Aug-12
26-Aug-12
9-Sep-12
23-Sep-12
7-Oct-12
21-Oct-12
4-Nov-12
18-Nov-12
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation

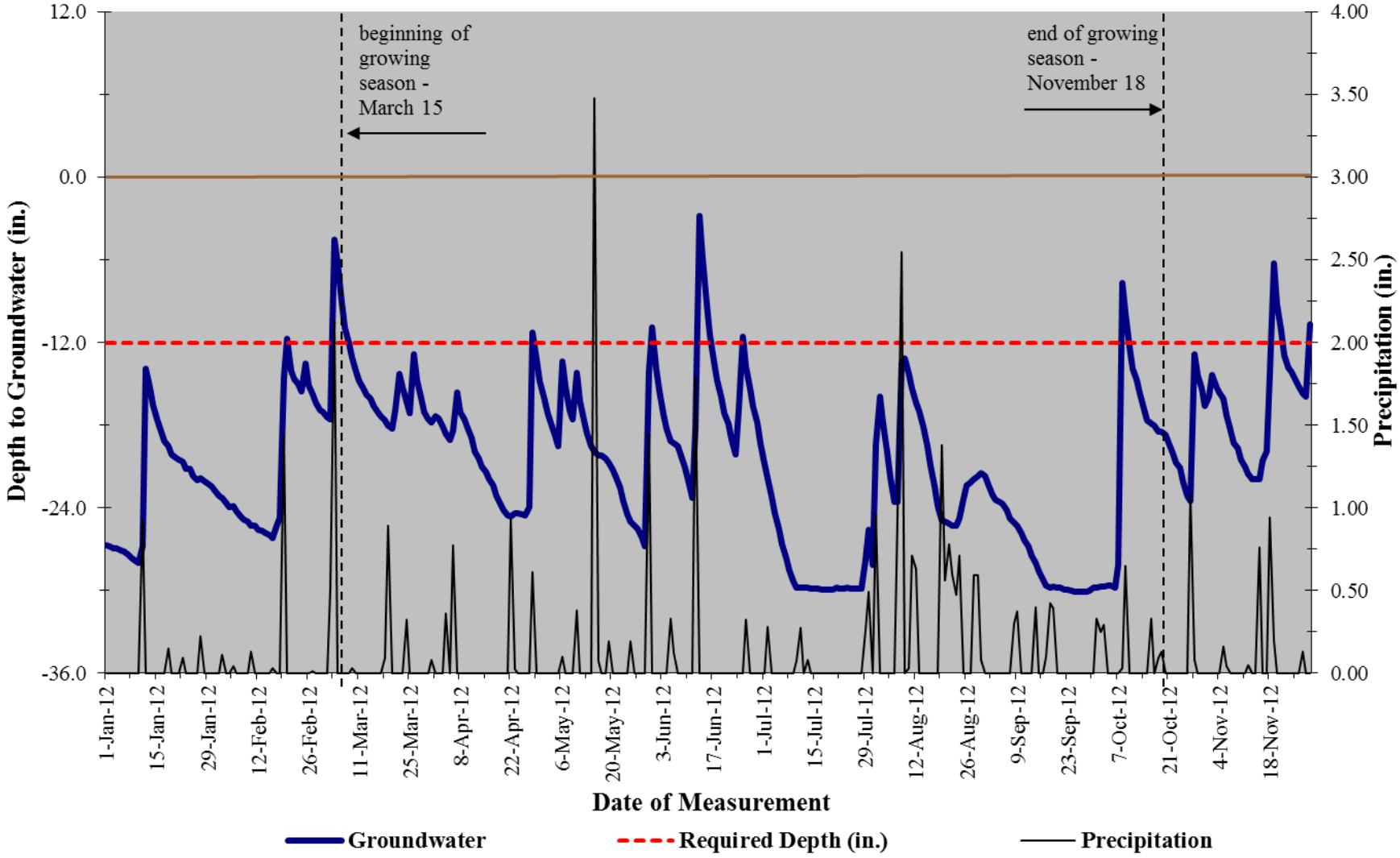

Plum Creek Wetland Mitigation
Gauge G-8 (Serial No. 1130ED80)
Project Site
beginning of growing season - March 15
end of growing season - November 18
Depth to Groundwater (in.)
Precipitation (in.)
12.0
0.0
-12.0
-24.0
-36.0
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-Jan-12
15-Jan-12
29-Jan-12
12-Feb-12
26-Feb-12
11-Mar-12
25-Mar-12
8-Apr-12
22-Apr-12
6-May-12
20-May-12
3-Jun-12
17-Jun-12
1-Jul-12
15-Jul-12
29-Jul-12
12-Aug-12
26-Aug-12
9-Sep-12
23-Sep-12
7-Oct-12
21-Oct-12
4-Nov-12
18-Nov-12
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation

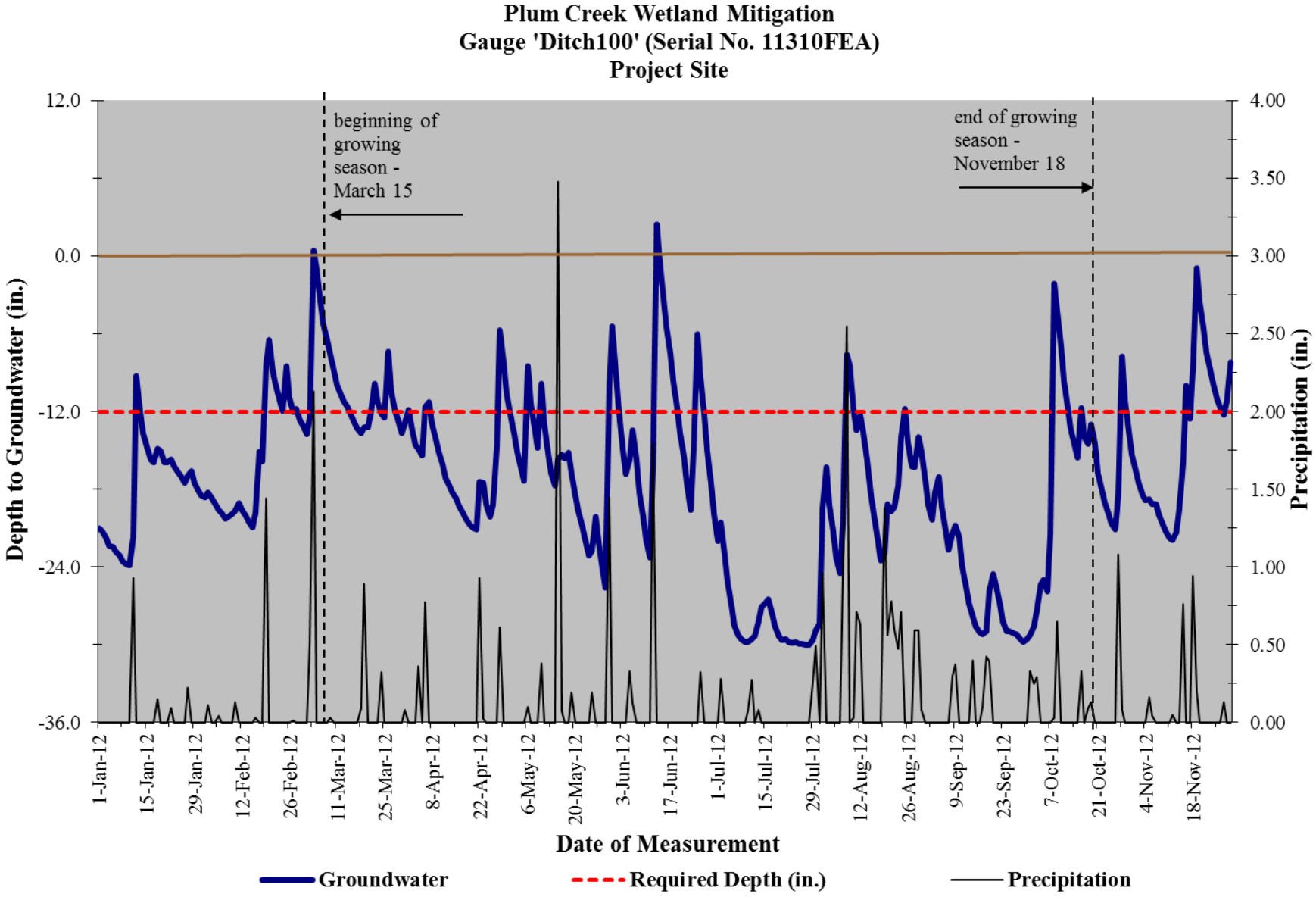

Plum Creek Wetland Mitigation
Gauge G-9 (Serial No. EBD5020)
Project Site
beginning of growing season - March 15
end of growing season - November 18
Depth to Groundwater (in.)
Precipitation (in.)
12.0
0.0
-12.0
-24.0
-36.0
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-Jan-12
15-Jan-12
29-Jan-12
12-Feb-12
26-Feb-12
11-Mar-12
25-Mar-12
8-Apr-12
22-Apr-12
6-May-12
20-May-12
3-Jun-12
17-Jun-12
1-Jul-12
15-Jul-12
29-Jul-12
12-Aug-12
26-Aug-12
9-Sep-12
23-Sep-12
7-Oct-12
21-Oct-12
4-Nov-12
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation

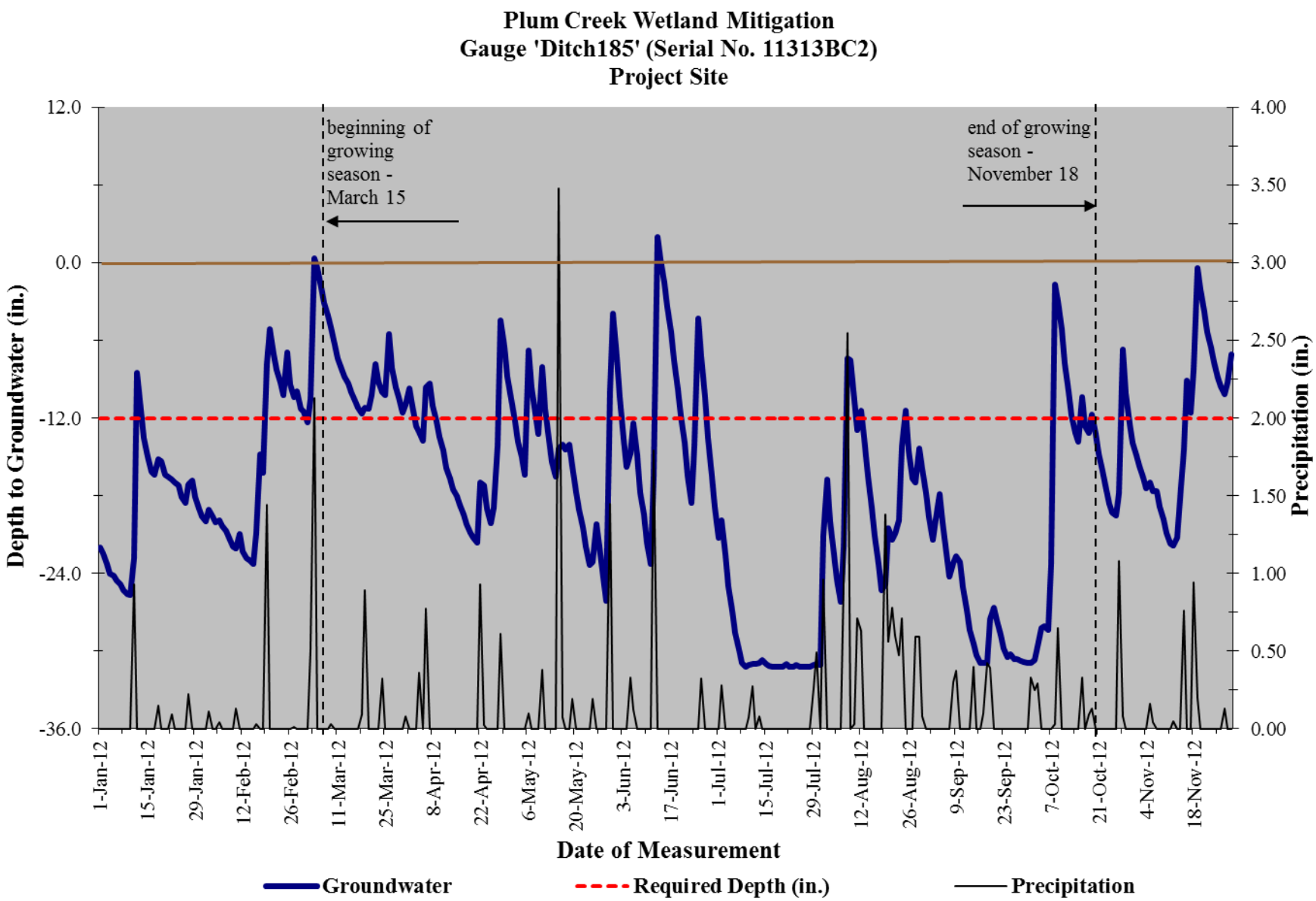

Plum Creek Wetland Mitigation
Gauge 'Ditch25' (Serial No. EBD3EDF)
Project Site
beginning of growing season - March 15
end of growing season - November 18
Depth to Groundwater (in.)
Precipitation (in.)
12.0
0.0
-12.0
-24.0
-36.0
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-Jan-12
15-Jan-12
29-Jan-12
12-Feb-12
26-Feb-12
11-Mar-12
25-Mar-12
8-Apr-12
22-Apr-12
6-May-12
20-May-12
3-Jun-12
17-Jun-12
1-Jul-12
15-Jul-12
29-Jul-12
12-Aug-12
26-Aug-12
9-Sep-12
23-Sep-12
7-Oct-12
21-Oct-12
4-Nov-12
18-Nov-12
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation


Plum Creek Wetland Mitigation
Gauge 'Ditch50' (Serial No. EBD64BE)
Project Site
beginning of growing season - March 15
end of growing season - November 18
Depth to Groundwater (in.)
Precipitation (in.)
12.0
0.0
-12.0
-24.0
-36.0
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-Jan-12
15-Jan-12
29-Jan-12
12-Feb-12
26-Feb-12
11-Mar-12
25-Mar-12
8-Apr-12
22-Apr-12
6-May-12
20-May-12
3-Jun-12
17-Jun-12
1-Jul-12
15-Jul-12
29-Jul-12
12-Aug-12
26-Aug-12
9-Sep-12
23-Sep-12
7-Oct-12
21-Oct-12
4-Nov-12
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation

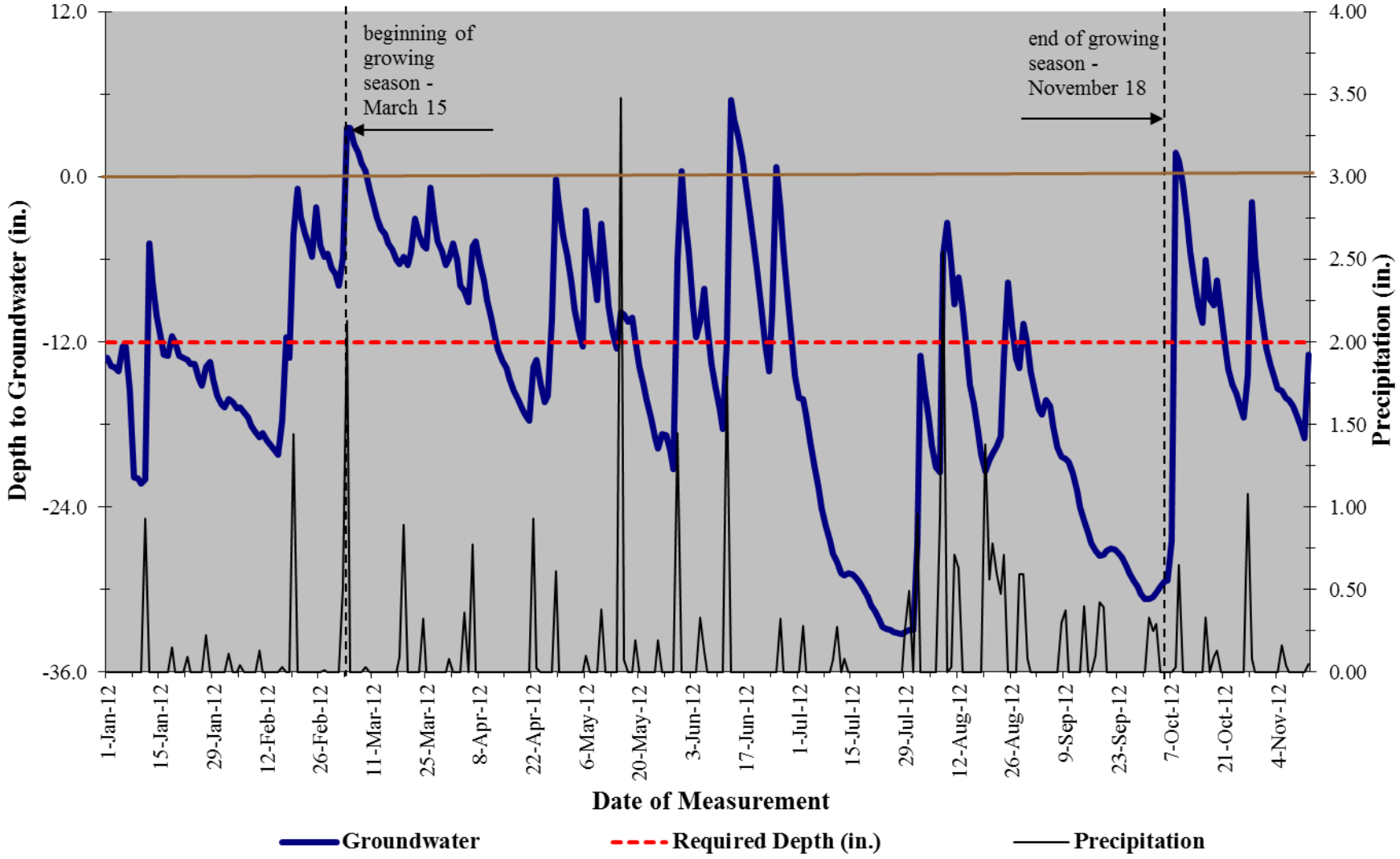
Plum Creek Wetland Mitigation
Gauge 'Ditch75' (Serial No. EBDBA05)
Project Site



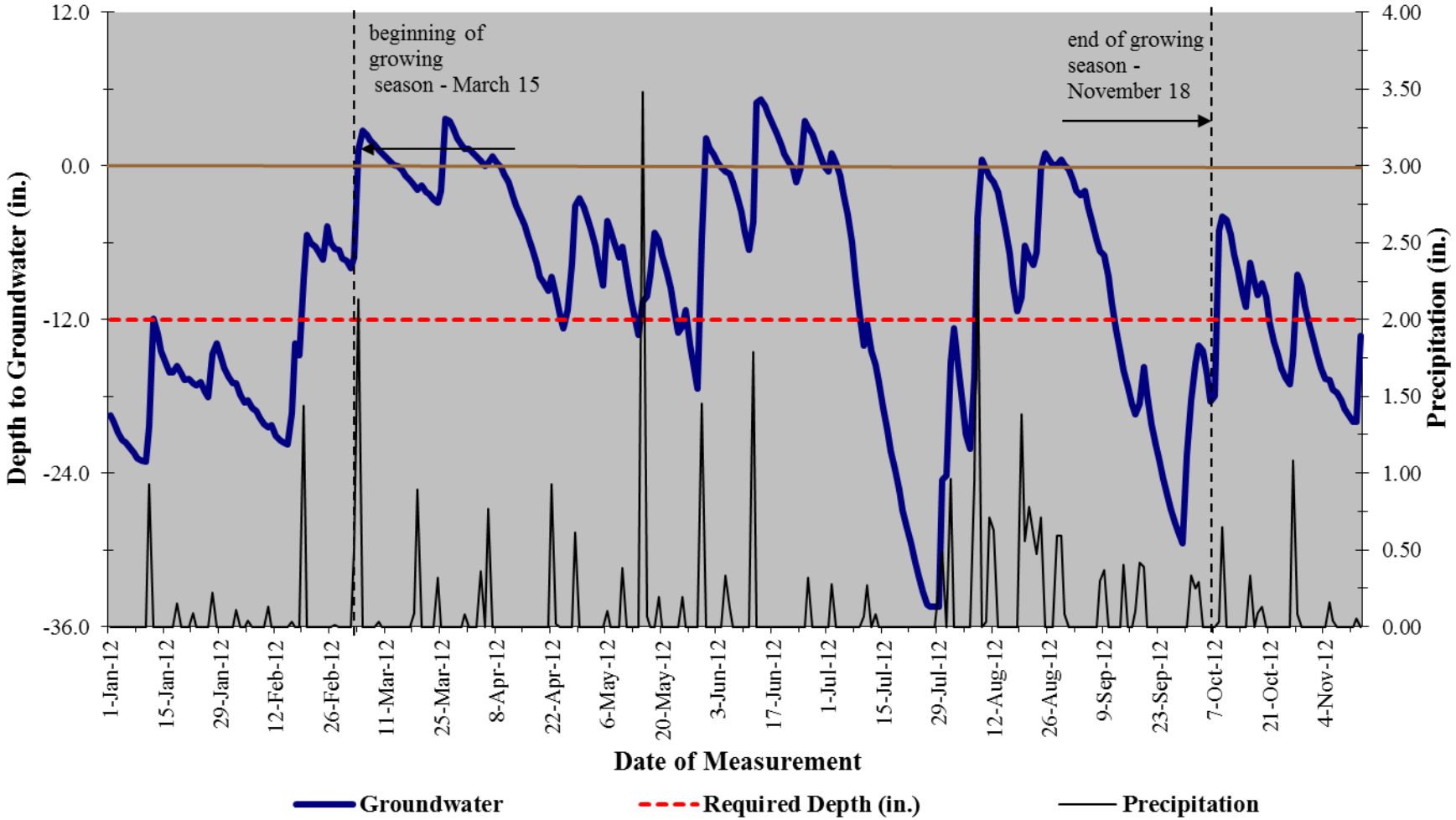

Plum Creek Wetland Mitigation
Gauge 'Ditch100' (Serial No. 11310FEA)
Project Site
beginning of growing season - March 15
end of growing season - November 18
Depth to Groundwater (in.)
Precipitation (in.)
12.0
0.0
-12.0
-24.0
-36.0
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-Jan-12
15-Jan-12
29-Jan-12
12-Feb-12
26-Feb-12
11-Mar-12
25-Mar-12
8-Apr-12
22-Apr-12
6-May-12
20-May-12
3-Jun-12
17-Jun-12
1-Jul-12
15-Jul-12
29-Jul-12
12-Aug-12
26-Aug-12
9-Sep-12
23-Sep-12
7-Oct-12
21-Oct-12
4-Nov-12
18-Nov-12
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation


Plum Creek Wetland Mitigation
Gauge 'Ditch185' (Serial No. 11313BC2)
Project Site
beginning of growing season - March 15
end of growing season - November 18
Depth to Groundwater (in.)
Precipitation (in.)
12.0
0.0
-12.0
-24.0
-36.0
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-Jan-12
15-Jan-12
29-Jan-12
12-Feb-12
26-Feb-12
11-Mar-12
25-Mar-12
8-Apr-12
22-Apr-12
6-May-12
20-May-12
3-Jun-12
17-Jun-12
1-Jul-12
15-Jul-12
29-Jul-12
12-Aug-12
26-Aug-12
9-Sep-12
23-Sep-12
7-Oct-12
21-Oct-12
4-Nov-12
18-Nov-12
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation

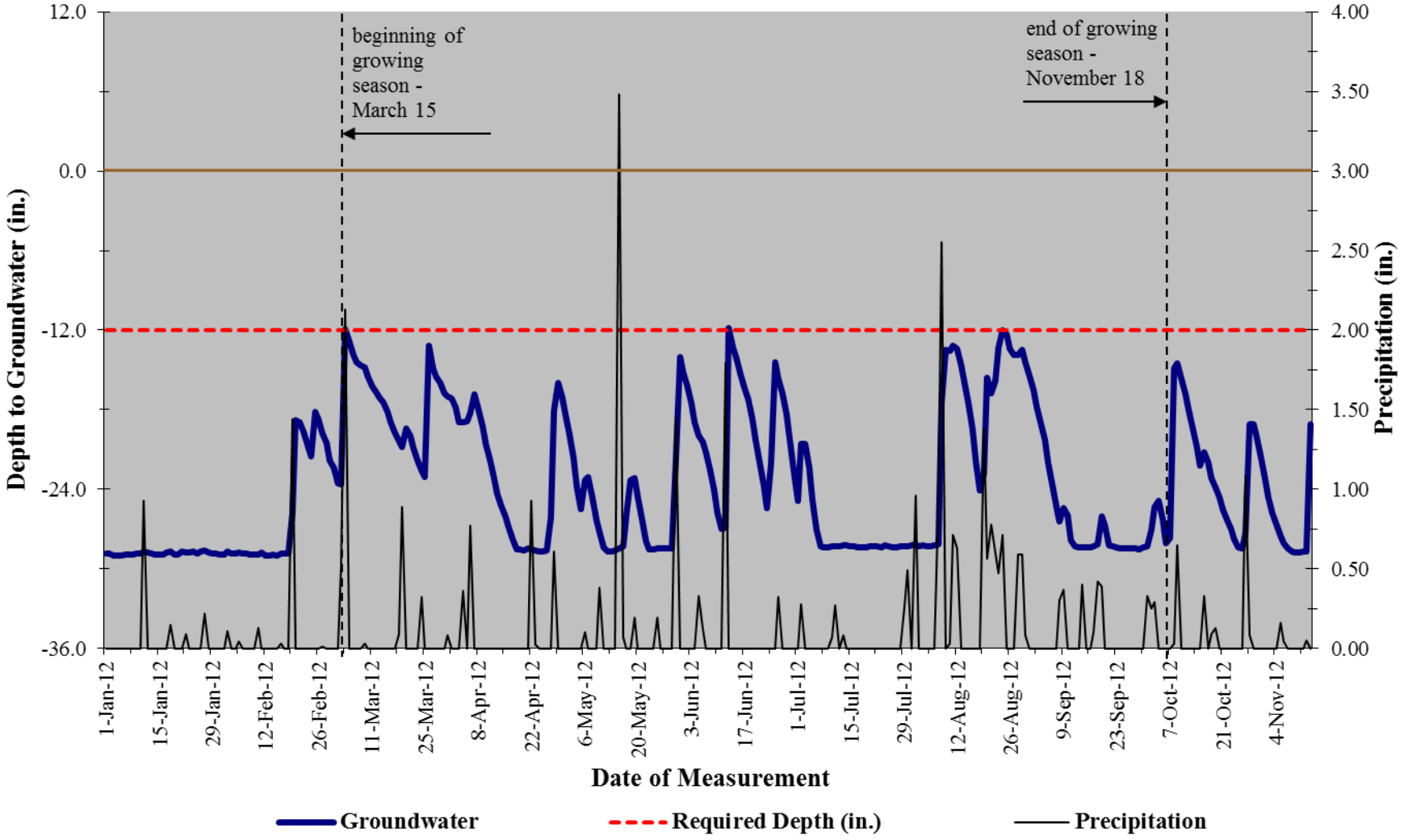
Plum Creek Wetland Mitigation
Gauge "Ditch235' (Serial No. A28C5CB)
Project Site



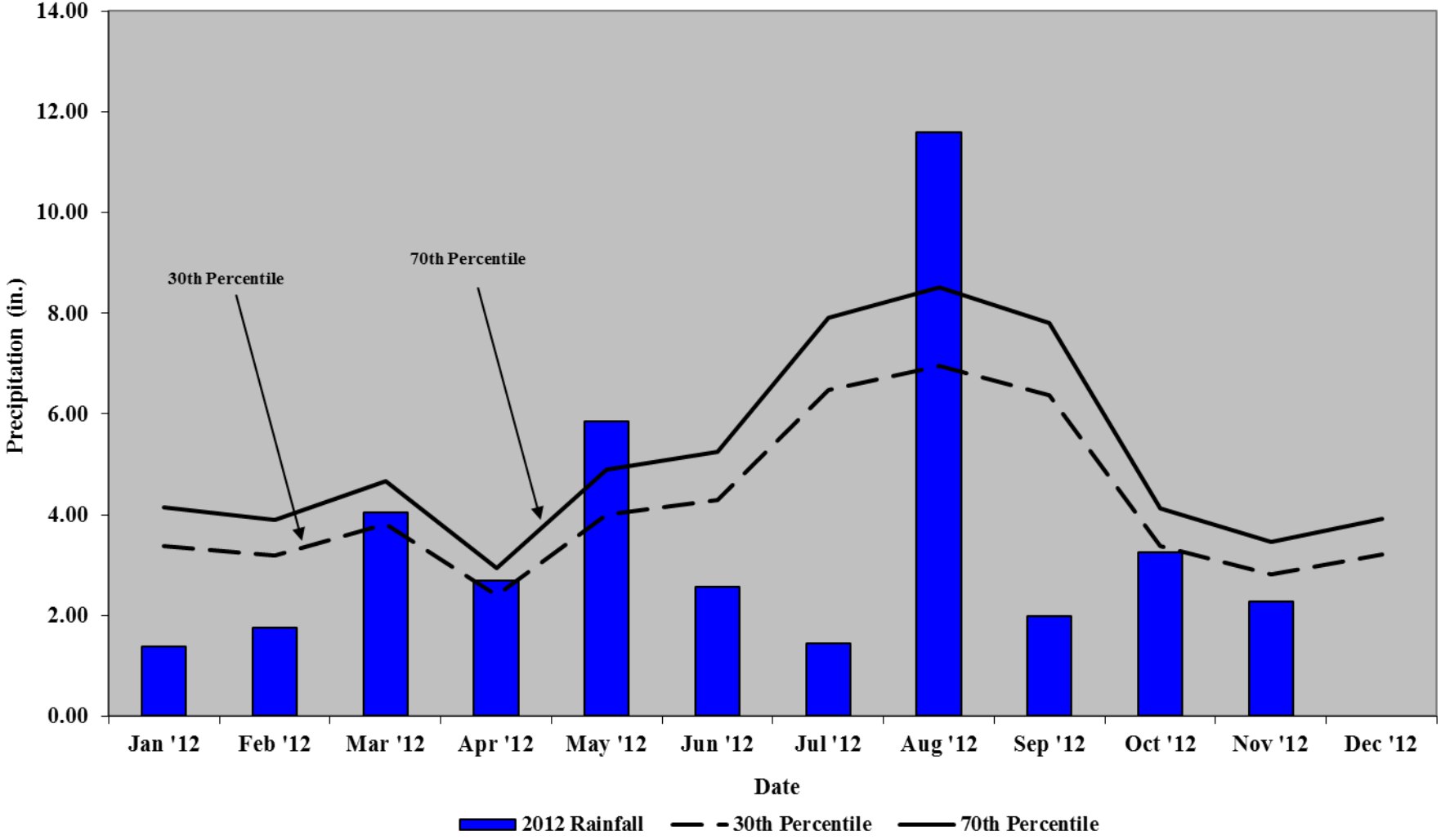
Plum Creek Wetland Mitigation Reference Site
FOREST GUAGE {Formerly REF 2} (Serial No. EBCFCF6)



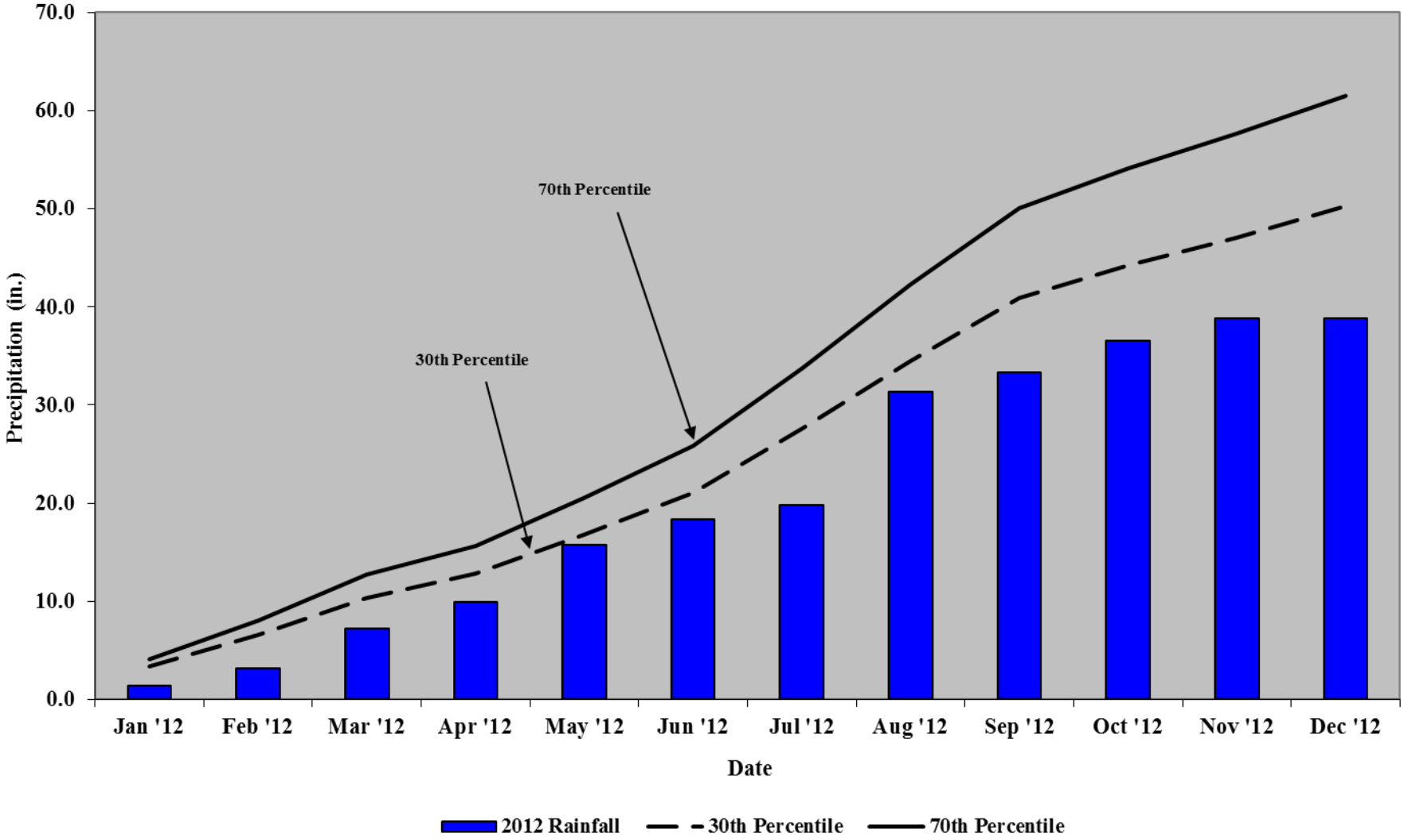
Plum Creek Wetland Mitigation Reference Site
POND GUAGE {Formerly PC-REF1} (Serial No. EBD2B2F)



Plum Creek 30-70 Percentile Graph
Shallotte, North Carolina



Plum Creek 30-70 Percentile Graph
Shallotte, North Carolina



Appendix E:
Pedon Description Sheets

Sampling Location: Well 1		Time:	Date: 11/13/2012	Weather:
Describer: Roberts/Bode			Landscape Position: Headwater wetland	
Depth to Saturation or Free Water:			Vegetative Cover: Scrub-shrub	
Parent Material(s):			Hydric Soil: **x** Yes No Hydric Soil Indicator:	
Soil Series:			HGM Wetland Class: Slope	
Depth (in):	Matrix Color/Colors:	Redox Concentrations percent/size/color/location/type	Texture % rock frags & size	Roots size & abundance
0-14	10 YR 2/1		sandy loam	Oxidized rhizomes
14-18	10 YR 4/2		sandy loam	No saturation
Sampling Location: Well 1		Time:	Date: 11/13/2012	Weather:

Sampling Location: Well 2		Time:	Date: 11/13/2012	Weather:
Describer: Roberts/Bode			Landscape Position: Headwater wetland	
Depth to Saturation or Free Water:			Vegetative Cover: Scrub-shrub	
Parent Material(s):			Hydric Soil: **x** Yes No Hydric Soil Indicator:	
Soil Series:			HGM Wetland Class: Slope	
Depth (in):	Matrix Color/Colors:	Redox Concentrations percent/size/color/location/type	Texture % rock frags & size	Roots size & abundance
0-9	10 YR 2/1		sandy loam	Oxidized rhizomes
9-18	10 YR 2/1		sandy clay loam	
Sampling Location: Well 2		Time:	Date: 11/13/2012	Weather:

Sampling Location: Well 3		Time:	Date: 11/13/2012	Weather:
Describer: Roberts/Bode			Landscape Position: Headwater wetland	
Depth to Saturation or Free Water:			Vegetative Cover: Scrub-shrub	
Parent Material(s):			Hydric Soil: **x** Yes No Hydric Soil Indicator:	
Soil Series:			HGM Wetland Class: Slope	
Depth (in):	Matrix Color/Colors:	Redox Concentrations percent/size/color/location/type	Texture % rock frags & size	Roots size & abundance
0-10	10 YR 2/1		SACL Lo	
10-18	10 YR 3/2		SACL	
Sampling Location: Well 3		Time:	Date: 11/13/2012	Weather:

Sampling Location: Well 4		Time:	Date: 11/13/2012	Weather:
Describer: Roberts/Bode			Landscape Position: Headwater wetland	
Depth to Saturation or Free Water:			Vegetative Cover: Scrub-shrub	
Parent Material(s):			Hydric Soil: **x** Yes No Hydric Soil Indicator:	
Soil Series:			HGM Wetland Class: Slope	
Depth (in):	Matrix Color/Colors:	Redox Concentrations percent/size/color/location/type	Texture % rock frags & size	Roots size & abundance
0-15	10 YR 2/1		SACL Lo	
15-18	10 YR 4/2		SACL	
Sampling Location: Well 4		Time:	Date: 11/13/2012	Weather:

Sampling Location: Well 5		Time:	Date: 11/13/2012	Weather:
Describer: Roberts/Bode			Landscape Position: Headwater wetland	
Depth to Saturation or Free Water:			Vegetative Cover: Scrub-shrub	
Parent Material(s):			Hydric Soil: **x** Yes No Hydric Soil Indicator:	
Soil Series:			HGM Wetland Class: Slope	
Depth (in):	Matrix Color/Colors:	Redox Concentrations percent/size/color/location/type	Texture % rock frags & size	Roots size & abundance
0-18	10 YR 2/1		SACL Lo	
Sampling Location: Well 5		Time:	Date: 11/13/2012	Weather:

Sampling Location: Well 6		Time:	Date: 11/13/2012	Weather:
Describer: Roberts/Bode			Landscape Position: Headwater wetland	
Depth to Saturation or Free Water:			Vegetative Cover: Scrub-shrub	
Parent Material(s):			Hydric Soil: **x** Yes No Hydric Soil Indicator:	
Soil Series:			HGM Wetland Class: Slope	
Depth (in):	Matrix Color/Colors:	Redox Concentrations percent/size/color/location/type	Texture % rock frags & size	Roots size & abundance
0-2			organic	Oxidized rhizomes
0-10	10 YR 2/1		sandy loam	
Sampling Location: Well 6		Time:	Date: 11/13/2012	Weather:

Sampling Location: Well 7		Time:	Date: 11/13/2012	Weather:
Describer: Roberts/Bode			Landscape Position: Headwater wetland	
Depth to Saturation or Free Water:			Vegetative Cover: Scrub-shrub	
Parent Material(s):			Hydric Soil: **x** Yes No Hydric Soil Indicator:	
Soil Series:			HGM Wetland Class: Slope	
Depth (in):	Matrix Color/Colors:	Redox Concentrations percent/size/color/location/type	Texture % rock frags & size	Roots size & abundance
0-18	10 YR 2/1		SaCl Lo	Oxidized roots
Sampling Location: Well 7		Time:	Date: 11/13/2012	Weather:

Sampling Location: Well 8		Time:	Date: 11/13/2012	Weather:
Describer: Roberts/Bode			Landscape Position: Headwater wetland	
Depth to Saturation or Free Water:			Vegetative Cover: Scrub-shrub	
Parent Material(s):			Hydric Soil: **x** Yes No Hydric Soil Indicator:	
Soil Series:			HGM Wetland Class: Slope	
Depth (in):	Matrix Color/Colors:	Redox Concentrations percent/size/color/location/type	Texture % rock frags & size	Roots size & abundance
0-18	10 YR 2/1		SaCl Lo	Oxidized roots
Sampling Location: Well 8		Time:	Date: 11/13/2012	Weather:

Sampling Location: Well 9		Time:	Date: 11/13/2012	Weather:
Describer: Roberts/Bode			Landscape Position: Headwater wetland	
Depth to Saturation or Free Water:			Vegetative Cover: Scrub-shrub	
Parent Material(s):			Hydric Soil: **x** Yes No Hydric Soil Indicator:	
Soil Series:			HGM Wetland Class: Slope	
Depth (in):	Matrix Color/Colors:	Redox Concentrations percent/size/color/location/type	Texture % rock frags & size	Roots size & abundance
0-18	10 YR 2/1		Sandy loam	Oxidized roots
Sampling Location: Well 9		Time:	Date: 11/13/2012	Weather: