PLUM CREEK WETLAND MITIGATION PROJECT
2013 MONITORING REPORT
MONITORING YEAR 5 OF 6

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

2013 Monitoring Report – Year 5 of 6

Project Construction Completed: 2008
Data Collection for Monitoring Year 5 of 6: 2013
Report Submitted: September 2014

Prepared for:

Prepared by:

The Louis Berger Group, Inc.
1001 Wade Avenue, Suite 400
Raleigh, North Carolina 27605
Tel (919) 866-4400
Fax (919) 755-3502

Project Manager:

Edward Samanns
Tel (973) 407-1468
Fax (973) 267-6468
e@louisberger.com

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

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 260 planted stems per acre with an average sampled density of 346 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 all 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)	Yes / 13 stems (526)
2[3]	Yes / 8 stems (320)	Yes / 8 stems (320)	Yes / 8 stems (320)	No / 7 stems (283)	Yes / 7 stems (283)
3[2]	Yes / 9 stems (364)	Yes / 8 stems (320)	Yes / 9 stems (364)	Yes / 8 stems (323)	Yes / 8 stems (323)
4[2]	No/ 7 stems (283)	Yes / 8 stems (320)	Yes / 8 stems (320)	Yes / 8 stems (323)	Yes / 8 stems (323)
5[1]	Yes / 8 stems (320)	Yes / 8 stems (320)	Yes / 9 stems (364)	Yes / 8 stems (323)	Yes / 9 stems (364)
6[3]	No / 7 stems (283)	No / 7 stems (283)	No / 7 stems (283)	No / 7 stems (283)	Yes / 7 stems (283)
7[2]	No/ 7 stems (283)	Yes / 8 stems (320)	Yes / 8 stems (320)	Yes / 9 stems (364)	Yes / 9 stems (364)
8	Yes / 9 stems (364)	Yes / 9 stems (364)	Yes / 9 stems (364)	Yes / 8 stems (323)	Yes / 8 stems (323)
9	Yes / 8 stems (320)	Yes / 8 stems (320)	Yes / 8 stems (320)	Yes / 8 stems (323)	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 during Year 4.

In 2013, rainfall totals fell below average for the majority of the year despite being higher than those of the previous year. The latter half of the 2013 pre-growing season was classified as being abnormally dry (D0) according to the U.S. Drought Monitor (USDM 2014). Rainfall amounts were normal throughout the majority of the growing season but fell within the abnormally dry range during the months of October and November. Five wells (56 percent) on Site continuously recorded soil saturation within the upper 12 inches for greater than 12.5 percent of the growing season. Four wells (44 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 5 was greater than that of Year 4. These finding are consistent with higher rainfall recorded in 2013 and some the absence of moderate and moderate to severe drought conditions which persisted through much of the 2012 growing season.

Summary Table: Wetland Gauge Attainment Data – >8 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)	No / 9 days (3.6 percent)
G-2	No / 19 days (7.6 percent)	No / 19 days (7.6 percent)	No / 18 days (7.2 percent)	Yes / 20 days (8 percent)	Yes / 59 days (23.7 percent)
G-3	No / 9 days (3.6 percent)	No / 15 days (6 percent)	No / 9 days (3.6 percent)	No / 5 days (2 percent)	No / 15 days (6.0 percent)
G-4	Yes / 22 days (8.8 percent)	No / 18 days (7.2 percent)	No / 15 days (6.0 percent)	No / 9 days (3.6 percent)	Yes / 60 days (24.1 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)	Yes / 63 days (25.3 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)	No / 9 days (3.6 percent)
G-7	Yes / 24 days (9.6 percent)	No / 18 days (7.2 percent)	Yes / 58 days (23 percent)	Yes / 35 days (14.1 percent)	Yes / 65 days (26.1 percent)
G-8	Yes / 22 days (8.8 percent)	No / 19 days (7.6 percent)	Yes / 50 days (20 percent)	Yes / 31 days (12.4 percent)	Yes / 64 days (25.7 percent)
G-9	No / 12 days (4.8 percent)	No / 15 days (6 percent)	No / 12 days (4.8 percent)	No / 6 days (2.4 percent)	No/ 15 days (6.0 percent)

Although year 5 had the highest total rainfall since the beginning of monitoring, the Site is still recovering from a severe drought in the region that has lasted for several years. During Year 5, the region had normal rainfall for 75 percent of the growing season, and was classified as having abnormally dry conditions for the remaining 25 percent. This is a drastic increase from Year 4 and the first year since monitoring began in which drought conditions of at least moderate severity were not recorded at all. Drought classification data for monitoring years 1 to 5 can be found in the summary table below. Precipitation measured below average for much of the growing season except April, June, and November which were 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 2013 (Jan-Nov) rainfall on site totaled 39.99 inches, which is roughly 8 inches below average, or 83 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)	27 weeks (75.0 percent)	9 weeks (25 percent)	0 weeks (0.0 percent)	0 weeks (0.0 percent)	0 weeks (0.0 percent)

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 8 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, 8 to 12.5 percent of the growing season is 19 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. Remedial Plan

Louis Berger will continue to monitoring groundwater within the site for an additional growing season (Year 6) to confirm the normal rainfall year findings. In addition, additional monitoring wells will be established near the two groundwater wells which have not met the hydrology criteria: G-1 and G-6. Two additional groundwater monitoring gages will be installed near each of these gages (four total) to further define the limits of where wetland hydrology is met near these existing gages. The locations are shown in Figure 2. Based on the results of these additional measurements compared with the previously collected data, an estimate of the area not meeting the wetland hydrology criteria under normal rainfall conditions will be determined at the end of the year 6 growing season.

4. 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.

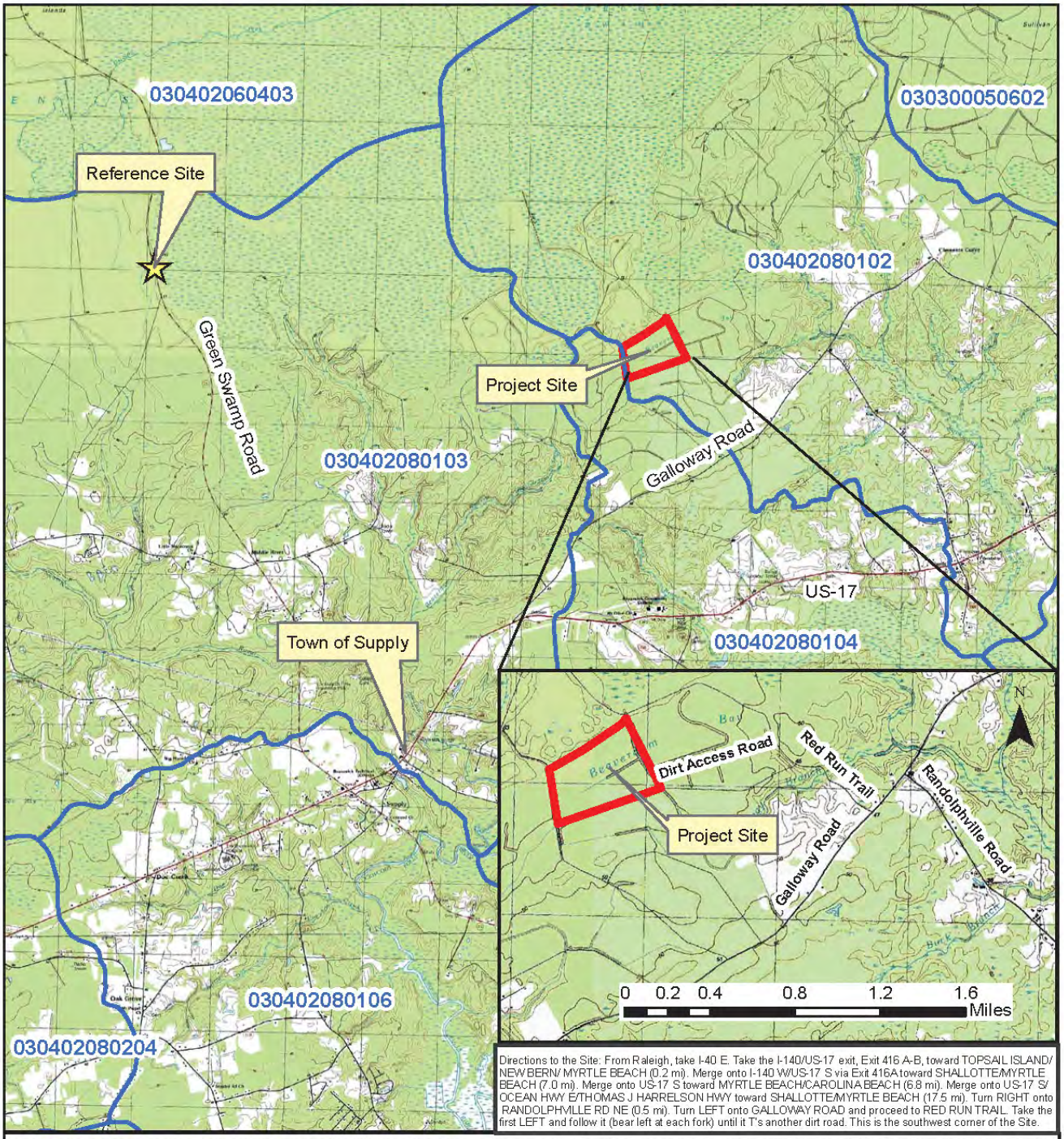
Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2006. CVS-EEP Protocol for Recording Vegetation, Version 4.0 Available URL: http://cvs.bio.unc.edu/methods.htm.

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.

US Drought Monitor (USDM), 2014. National Drought Summary. Available URL: http://droughtmonitor.unl.edu/. Accessed: April 21, 2014.

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				

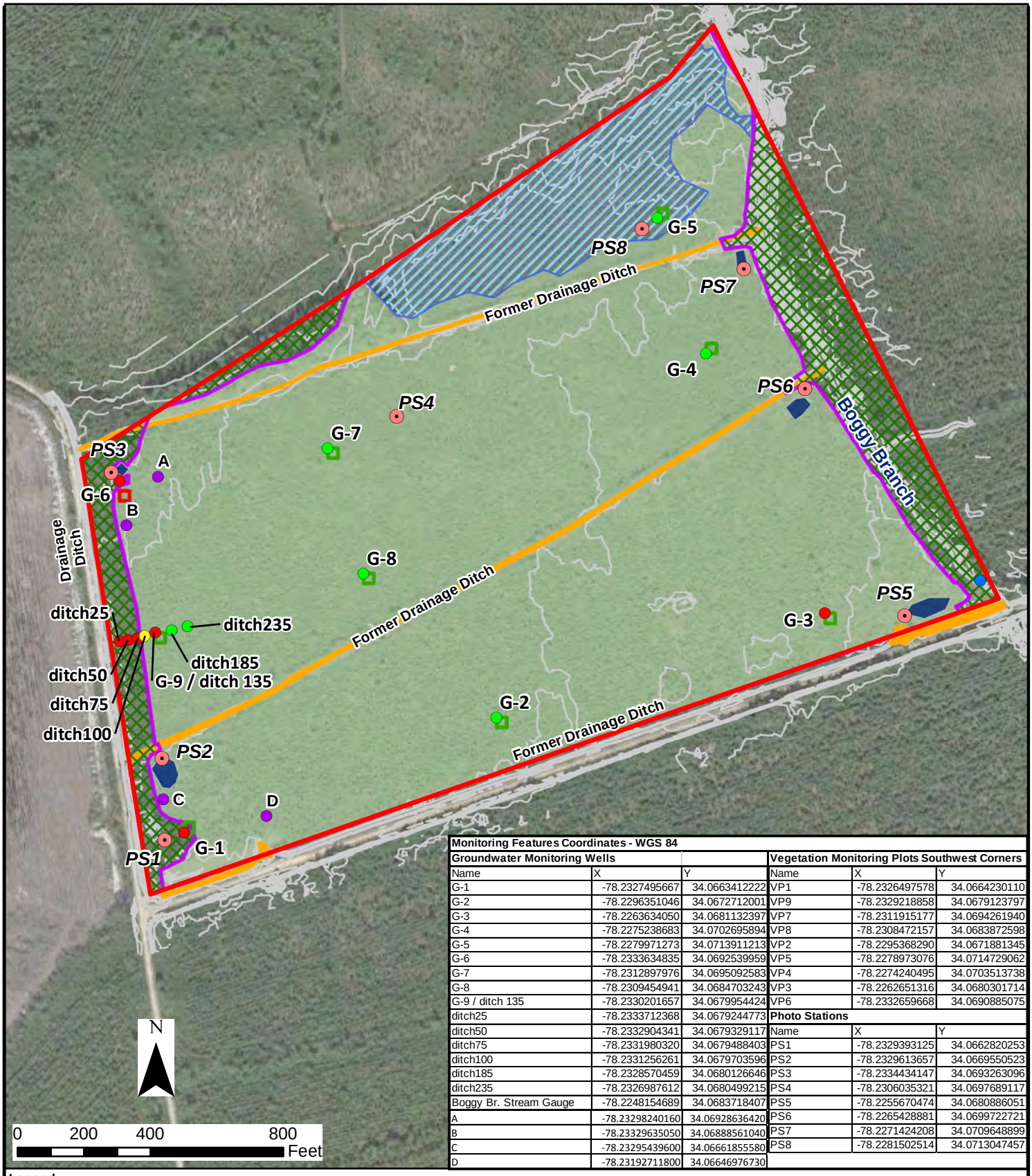
* The remaining acreage is either unsuitable for mitigation or will remain as upland.

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: 5 yrs 4 months **Elapsed Time Since Planting Complete: 4 yrs 11 months** **Number of Reporting Years: 5**		
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
Year 5 Monitoring	November 2013	September 2014

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 Edward Samanns (973-407-1468)
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



Monitoring Features Coordinates - WGS 84					
Groundwater Monitoring Wells			**Vegetation Monitoring Plots Southwest Corners**		
Name	X	Y	Name	X	Y
G-1	-78.2327495667	34.0663412222	VP1	-78.2326497578	34.0664230110
G-2	-78.2296351046	34.0672712001	VP9	-78.2329218858	34.0679123797
G-3	-78.2263634050	34.0681132397	VP7	-78.2311915177	34.0694261940
G-4	-78.2275238683	34.0702695894	VP8	-78.2308472157	34.0683872598
G-5	-78.2279971273	34.0713911213	VP2	-78.2295368290	34.0671881345
G-6	-78.2333634835	34.0692539959	VP5	-78.2278973076	34.0714729062
G-7	-78.2312897976	34.0695092583	VP4	-78.2274240495	34.0703513738
G-8	-78.2309454941	34.0684703243	VP3	-78.2262651316	34.0680301714
G-9 / ditch 135	-78.2330201657	34.0679954424	VP6	-78.2332659668	34.0690885075
ditch25	-78.2333712368	34.0679244773	**Photo Stations**		
ditch50	-78.2332904341	34.0679329117	Name	X	Y
ditch75	-78.2331980320	34.0679488403	PS1	-78.2329393125	34.0662820253
ditch100	-78.2331256261	34.0679703596	PS2	-78.2329613657	34.0669550523
ditch185	-78.2328570459	34.0680126646	PS3	-78.2334434147	34.0693263096
ditch235	-78.2326987612	34.0680499215	PS4	-78.2306035321	34.0697689117
Boggy Br. Stream Gauge	-78.2248154689	34.0683718407	PS5	-78.2255670474	34.0680886051
A	-78.23298240160	34.06928636420	PS6	-78.2265428881	34.0699722721
B	-78.23329635050	34.06888561040	PS7	-78.2271424208	34.0709648899
C	-78.23295439600	34.06661855580	PS8	-78.2281502514	34.0713047457
D	-78.23192711800	34.06646976730			

Legend

- Project Easement Boundary (89.36 ac)
- Restoration (72.27 ac)
- Wetland Enhancement (7.33 ac)
- Vernal Pool (0.36 ac)
- Pond Pine Woodland (79.57 ac)
- Upland/Riparian Forest (10.91 ac)
- Photo Station
- Contours
- Extended Ditch Plugs

Groundwater Monitoring Wells

- Hydrology greater than 12.5 percent
- Hydrology >8 percent and <12.5 percent
- Hydrology not met
- Boggy Branch Gauge
- 2014 Groundwater Monitoring Well

Vegetation Monitoring Plots

- Veg Survival Met
- Veg Survival Not Met

Note: Enhancement area and vernal pools are a subset of Pond Pine area.

North Carolina
Ecosystem Enhancement Program

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

Current Condition Plan View

Louis Berger

March 2015

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 1, view from southwest corner
March 18, 2014

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 2, view from southwest corner
March 19, 2014

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

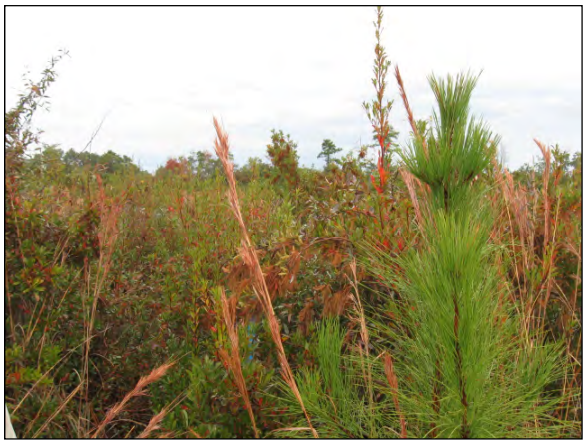
Veg Plot 3, view from southwest corner
November 16, 2010

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

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

Veg Plot 3, view from southwest corner
March 19, 2014

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 4, view from southwest corner
March 19, 2014

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

Veg Plot 5, view from southwest corner
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March 18, 2014

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 7, view from southwest corner
March 19, 2014

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 8, view from southwest corner
March 19, 2014

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

Veg Plot 9, view from southwest corner
March 18, 2014

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 1, view looking north
March 18, 2014

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 2, view looking east
March 19, 2014

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 3, view looking east
March 19, 2014

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 4, view looking east
March 19, 2014

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 5, view looking east
March 19, 2014

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 6, view looking west
March 18, 2014

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 7, view looking east
March 19, 2014

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

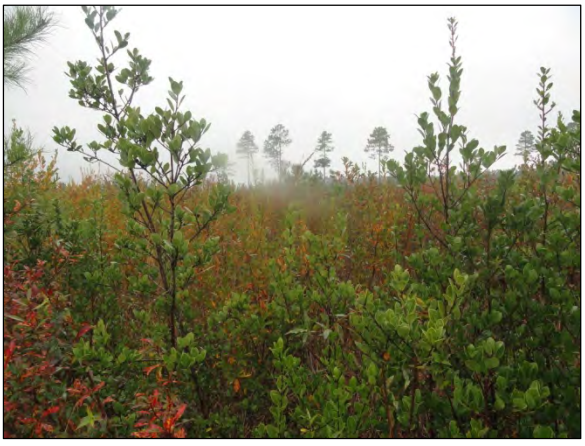


Photo Station 8, view looking north
November 13, 2012

Photo Station 8, view looking north
March 19, 2014

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? (260 stems per acre)**	**Tract Mean**
Plum Creek Wetland Restoration Site	1	526	Y	**100%**
	2	283	Y	
	3	323	Y	
	4	323	Y[1]	
	5	364	Y	
	6	283	Y	
	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

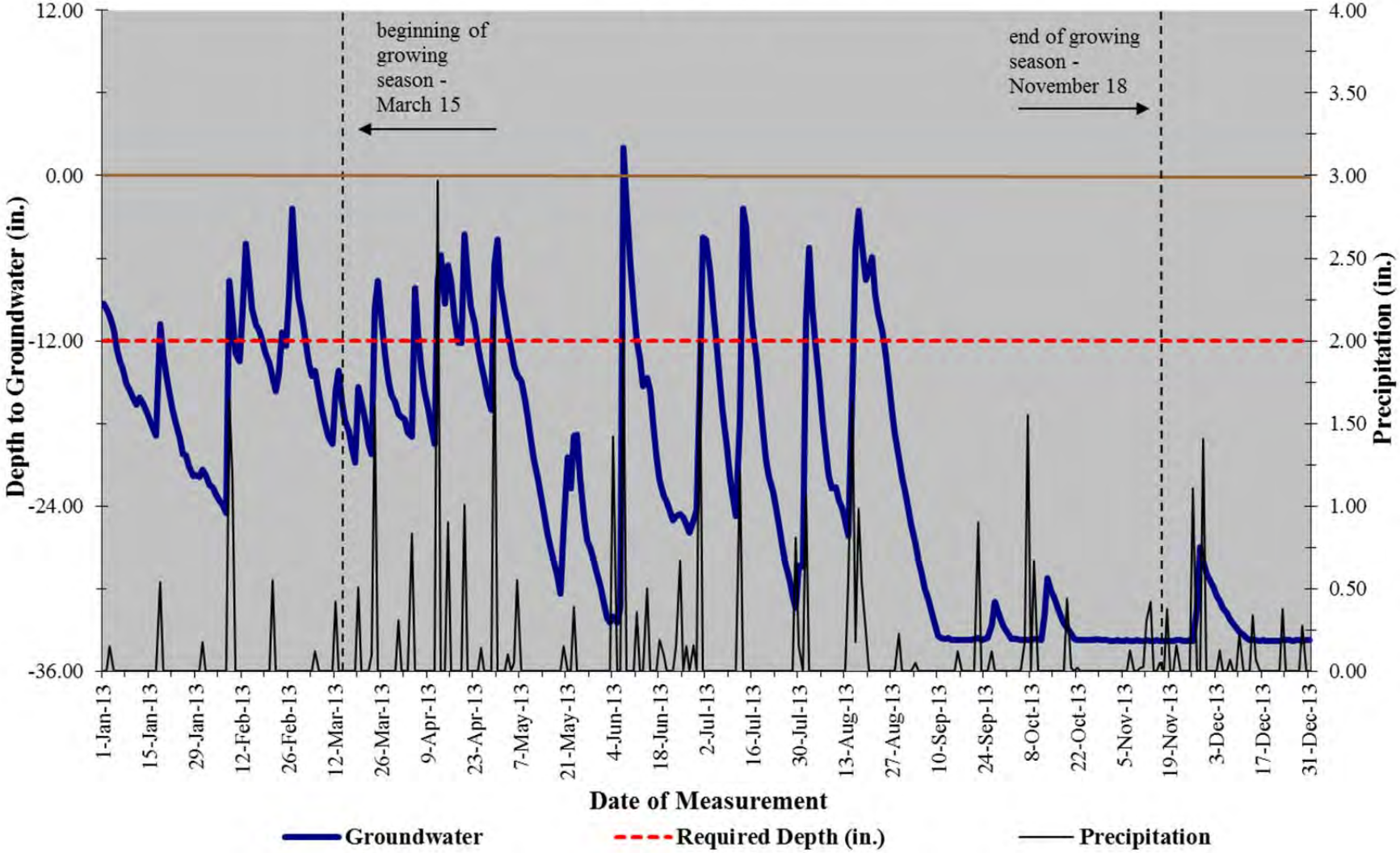
	Comment	Species	Common Name	Total Planted Stems	# plots	avg# stems	plot 92549-01-1-year:5	plot 92549-01-2-year:5	plot 92549-01-3-year:5	plot 92549-01-4-year:5	plot 92549-01-5-year:5	plot 92549-01-6-year:5	plot 92549-01-7-year:5	plot 92549-01-8-year:5	plot 92549-01-9-year:5
		Chamaecyparis thyoides	Atlantic white cedar	4	3	1.33			1		2				1
		Gordonia lasianthus	loblolly bay	9	6	1.50	1		1	2	2			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**	**77**	**5**		**13**	**7**	**8**	**8**	**9**	**7**	**9**	**8**	**8**

Project Code	**Project Name**	**River Basin**	**Year 5 Stem Count**
92549	Plum Creek Wetland Restoration Site	Lumber	346.2313556

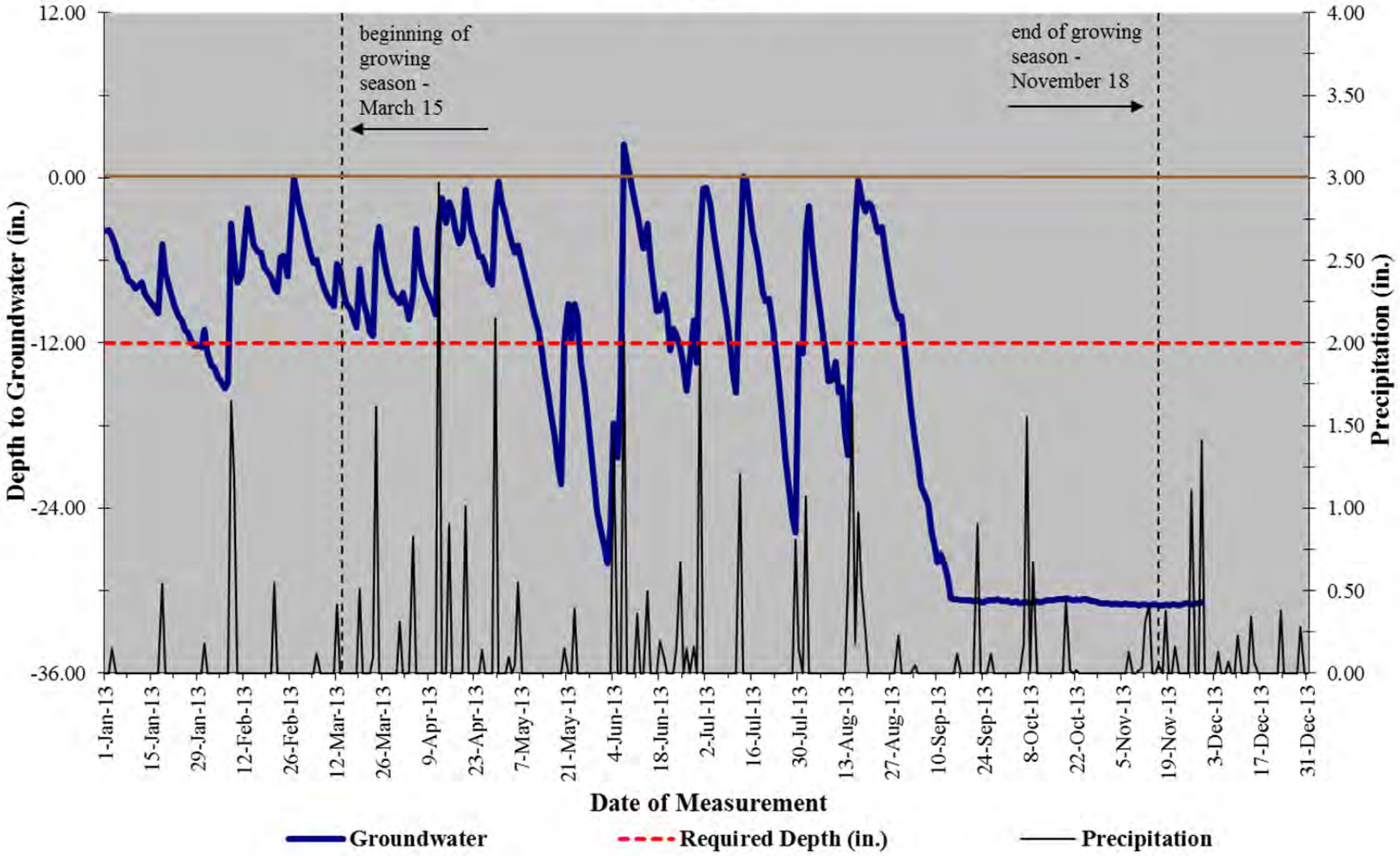
Appendix D:
Hydrologic Data

Summary Table: Wetland Gauge Attainment Data – >8 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)	No / 9 days (3.6 percent)
G-2	No / 19 days (7.6 percent)	No / 19 days (7.6 percent)	No / 18 days (7.2 percent)	Yes / 20 days (8 percent)	Yes / 59 days (23.7 percent)
G-3	No / 9 days (3.6 percent)	No / 15 days (6 percent)	No / 9 days (3.6 percent)	No / 5 days (2 percent)	No / 15 days (6.0 percent)
G-4	Yes / 22 days (8.8 percent)	No / 18 days (7.2 percent)	No / 15 days (6.0 percent)	No / 9 days (3.6 percent)	Yes / 60 days (24.1 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)	Yes / 63 days (25.3 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)	No / 9 days (3.6 percent)
G-7	Yes / 24 days (9.6 percent)	No / 18 days (7.2 percent)	Yes / 58 days (23 percent)	Yes / 35 days (14.1 percent)	Yes / 65 days (26.1 percent)
G-8	Yes / 22 days (8.8 percent)	No / 19 days (7.6 percent)	Yes / 50 days (20 percent)	Yes / 31 days (12.4 percent)	Yes / 64 days (25.7 percent)
G-9	No / 12 days (4.8 percent)	No / 15 days (6 percent)	No / 12 days (4.8 percent)	No / 6 days (2.4 percent)	No/ 15 days (6.0 percent)

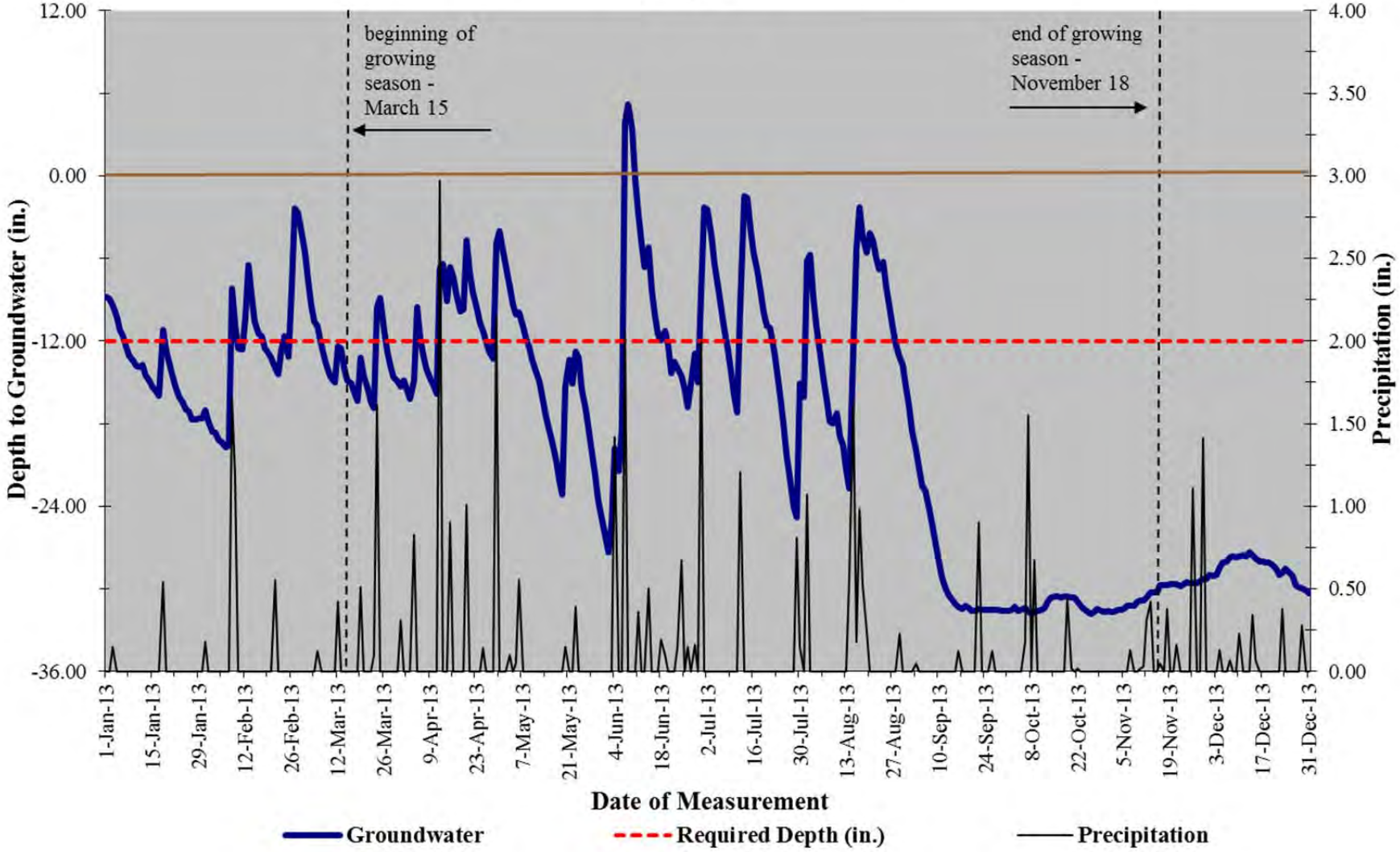
Plum Creek Wetland Mitigation
Gauge G-1 (Serial No. EBD3BBC)
Project Site

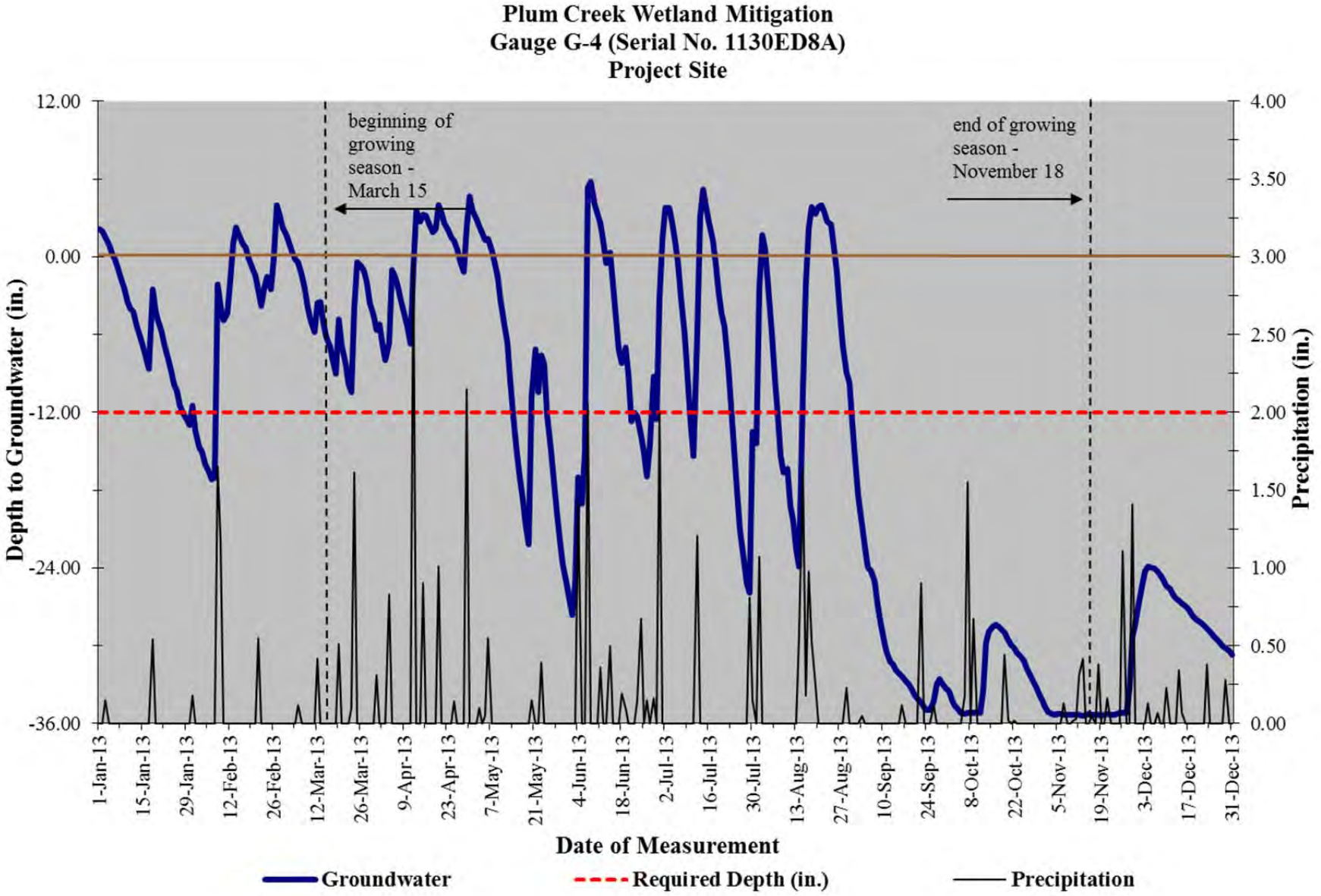


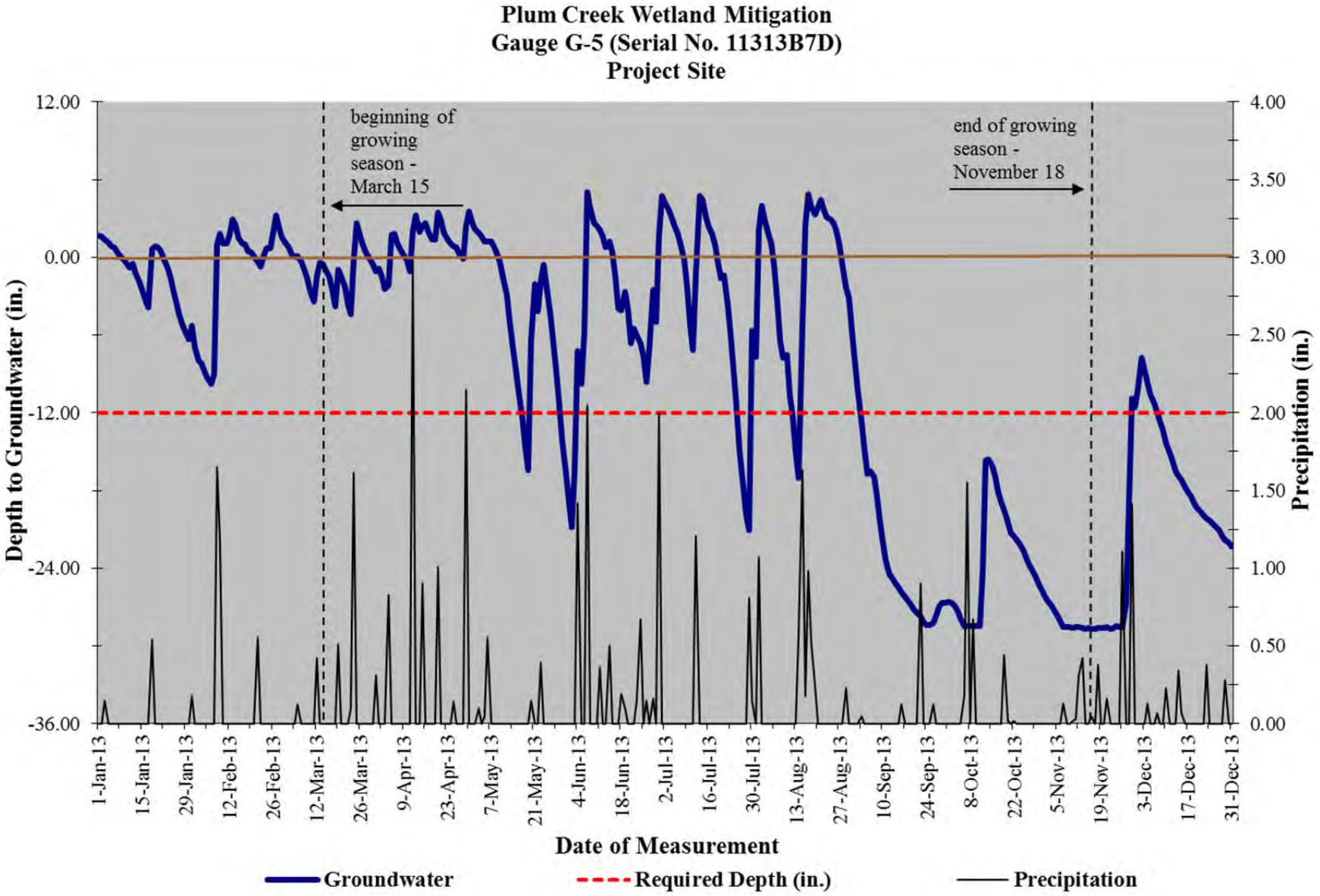
Plum Creek Wetland Mitigation
Gauge G-2 (Serial No. EBD77A1)
Project Site



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.)
12.00
0.00
-12.00
-24.00
-36.00
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-Jan-13
15-Jan-13
29-Jan-13
12-Feb-13
26-Feb-13
12-Mar-13
26-Mar-13
9-Apr-13
23-Apr-13
7-May-13
21-May-13
4-Jun-13
18-Jun-13
2-Jul-13
16-Jul-13
30-Jul-13
13-Aug-13
27-Aug-13
10-Sep-13
24-Sep-13
8-Oct-13
22-Oct-13
5-Nov-13
19-Nov-13
3-Dec-13
17-Dec-13
31-Dec-13
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation


Plum Creek Wetland Mitigation
Gauge G-5 (Serial No. 11313B7D)
Project Site
beginning of growing season - March 15
end of growing season - November 18
Depth to Groundwater (in.)
Precipitation (in.)
12.00
0.00
-12.00
-24.00
-36.00
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-Jan-13
15-Jan-13
29-Jan-13
12-Feb-13
26-Feb-13
12-Mar-13
26-Mar-13
9-Apr-13
23-Apr-13
7-May-13
21-May-13
4-Jun-13
18-Jun-13
2-Jul-13
16-Jul-13
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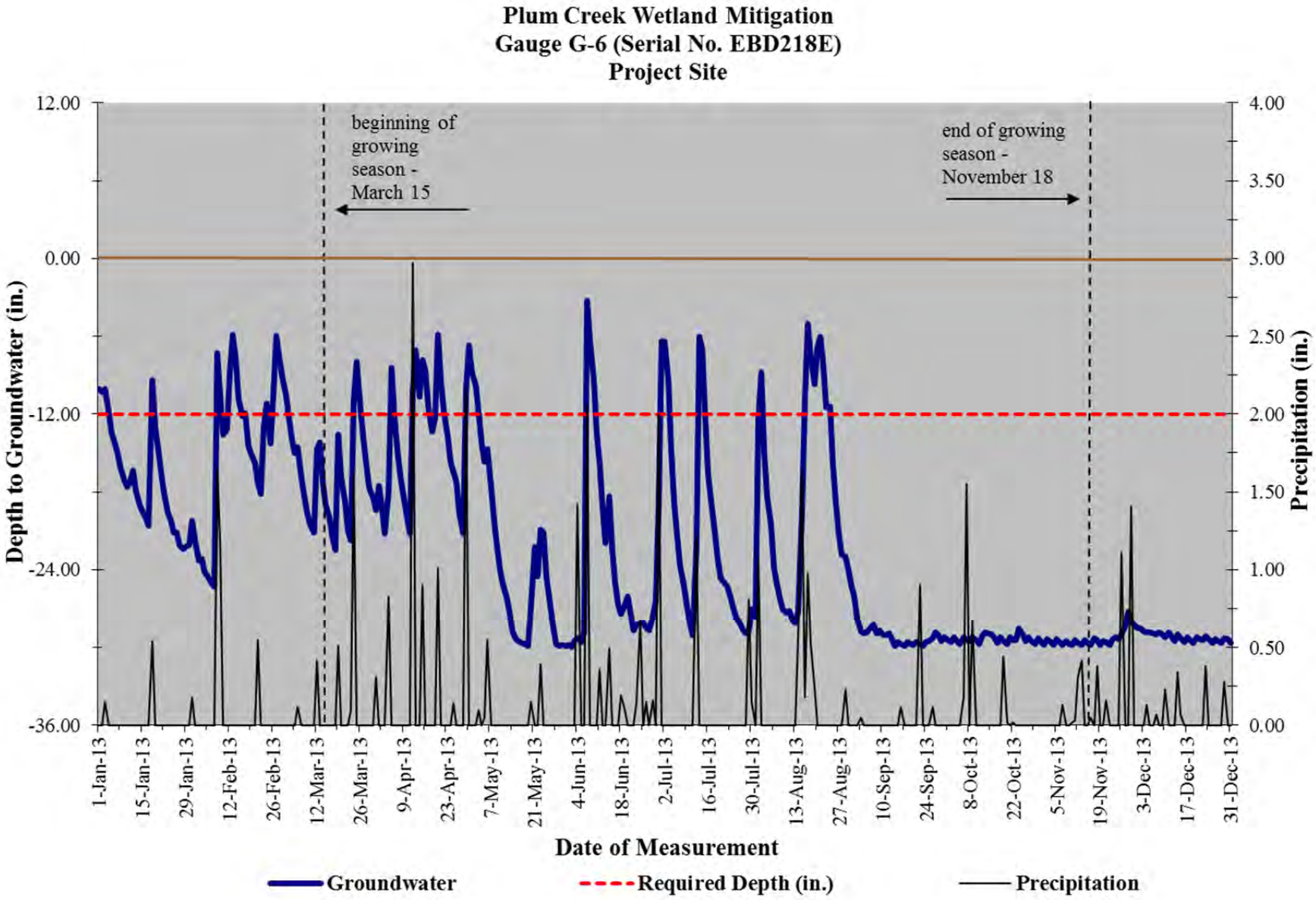
27-Aug-13
10-Sep-13
24-Sep-13
8-Oct-13
22-Oct-13
5-Nov-13
19-Nov-13
3-Dec-13
17-Dec-13
31-Dec-13
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation


Plum Creek Wetland Mitigation
Gauge G-6 (Serial No. EBD218E)
Project Site
beginning of growing season - March 15
end of growing season - November 18
Depth to Groundwater (in.)
Precipitation (in.)
12.00
0.00
-12.00
-24.00
-36.00
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-Jan-13
15-Jan-13
29-Jan-13
12-Feb-13
26-Feb-13
12-Mar-13
26-Mar-13
9-Apr-13
23-Apr-13
7-May-13
21-May-13
4-Jun-13
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2-Jul-13
16-Jul-13
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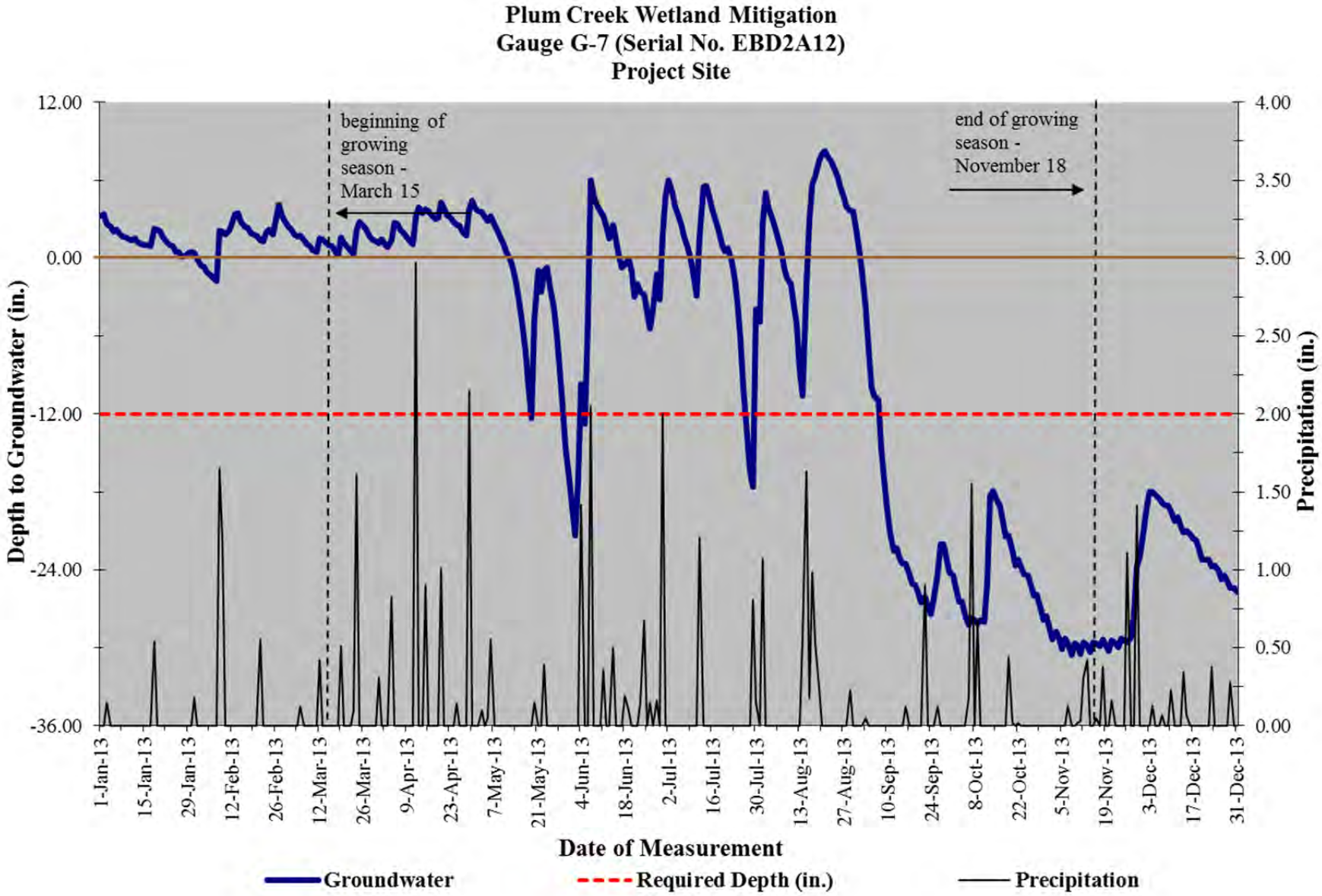
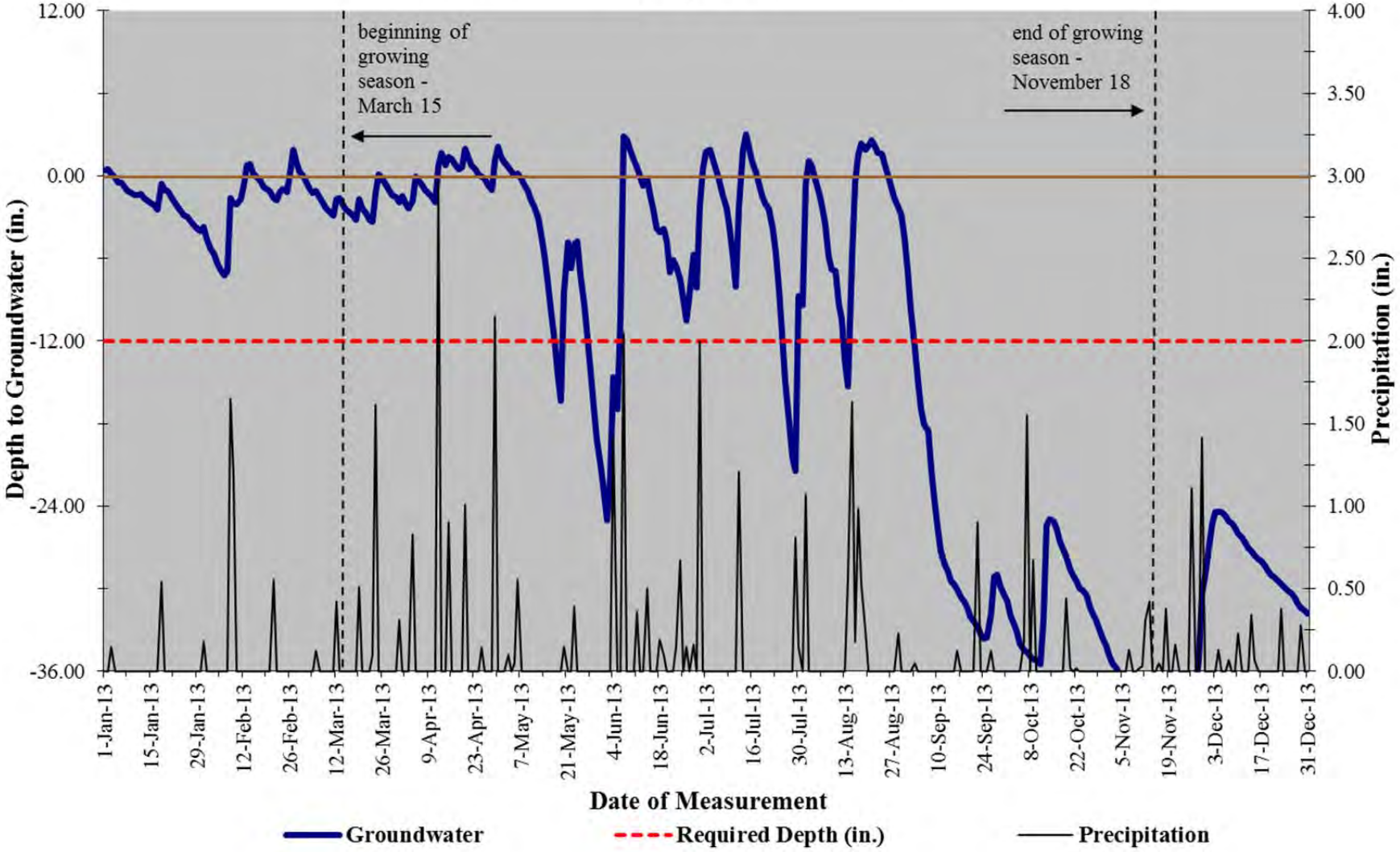
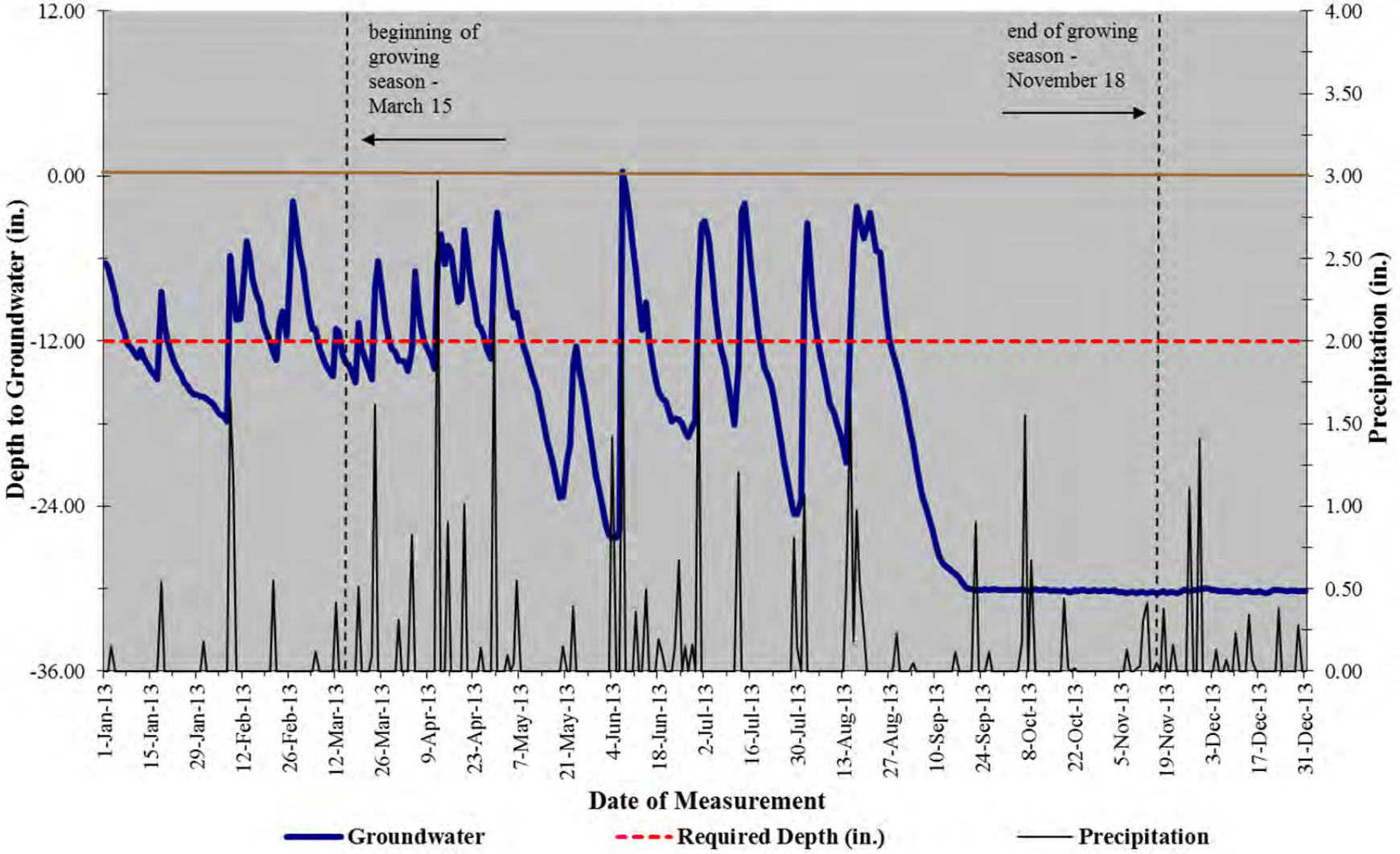
10-Sep-13
24-Sep-13
8-Oct-13
22-Oct-13
5-Nov-13
19-Nov-13
3-Dec-13
17-Dec-13
31-Dec-13
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation


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.)
12.00
0.00
-12.00
-24.00
-36.00
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-Jan-13
15-Jan-13
29-Jan-13
12-Feb-13
26-Feb-13
12-Mar-13
26-Mar-13
9-Apr-13
23-Apr-13
7-May-13
21-May-13
4-Jun-13
18-Jun-13
2-Jul-13
16-Jul-13
30-Jul-13
13-Aug-13
27-Aug-13
10-Sep-13
24-Sep-13
8-Oct-13
22-Oct-13
5-Nov-13
19-Nov-13
3-Dec-13
17-Dec-13
31-Dec-13
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation

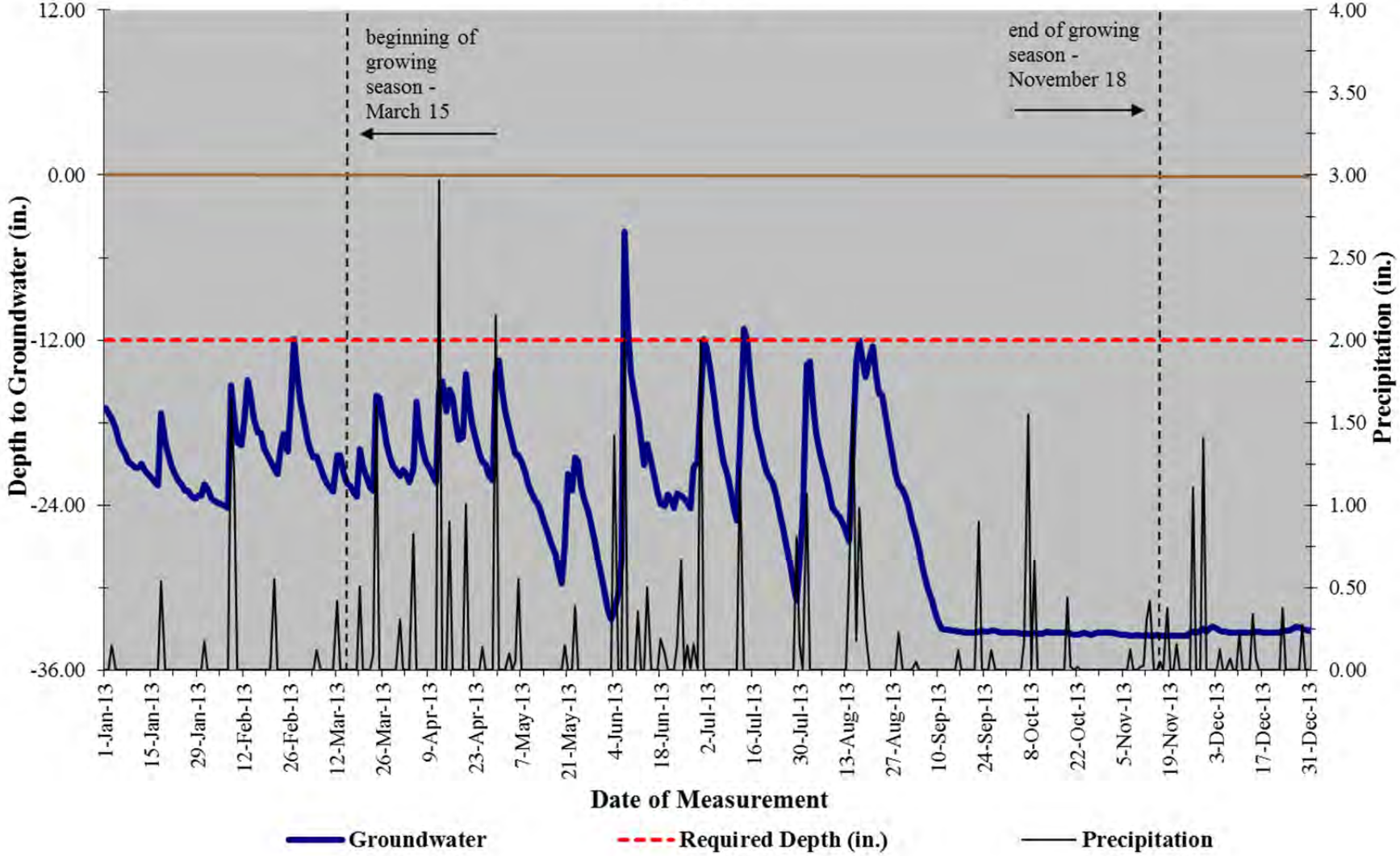
Plum Creek Wetland Mitigation
Gauge G-8 (Serial No. 1130ED80)
Project Site

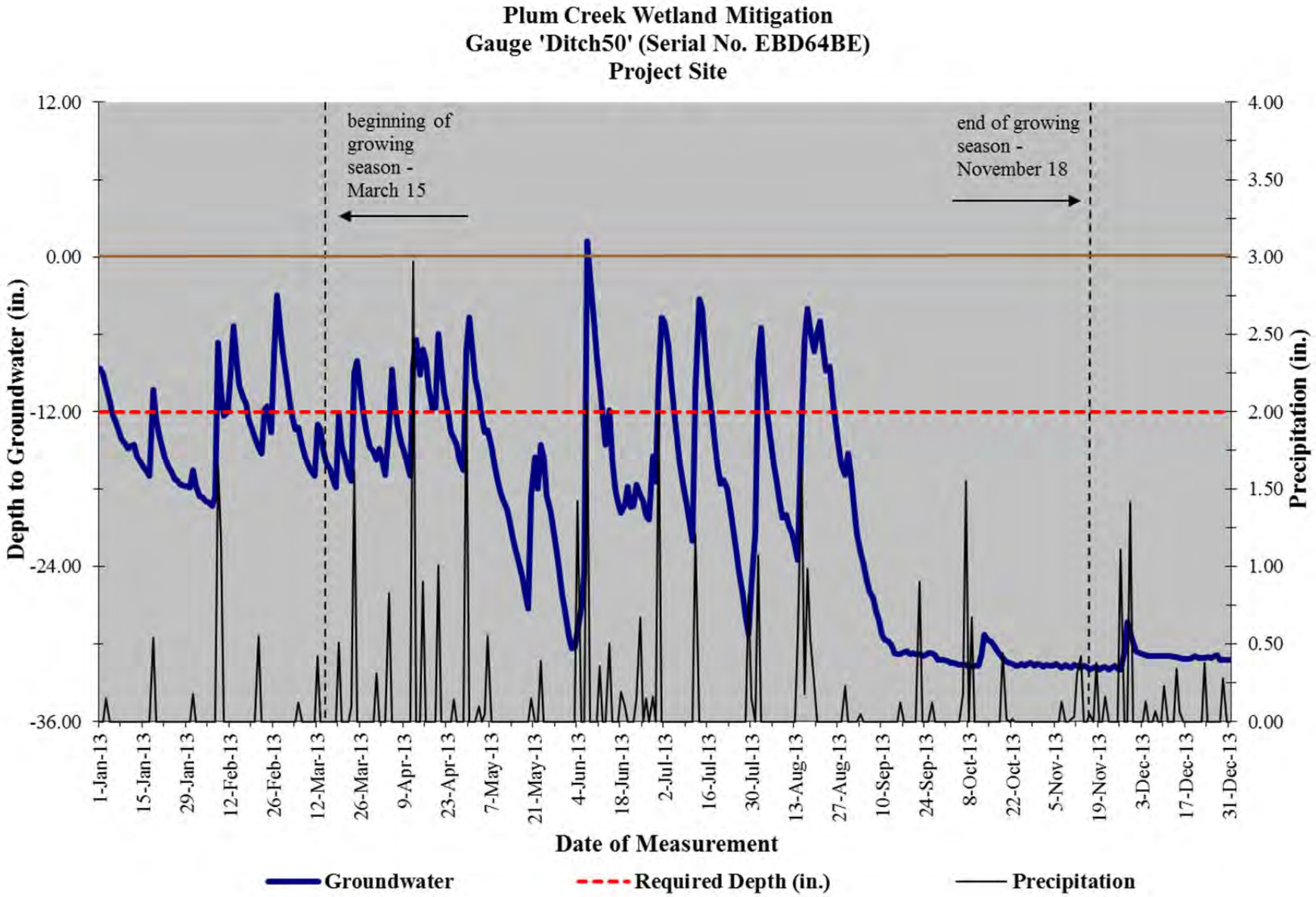


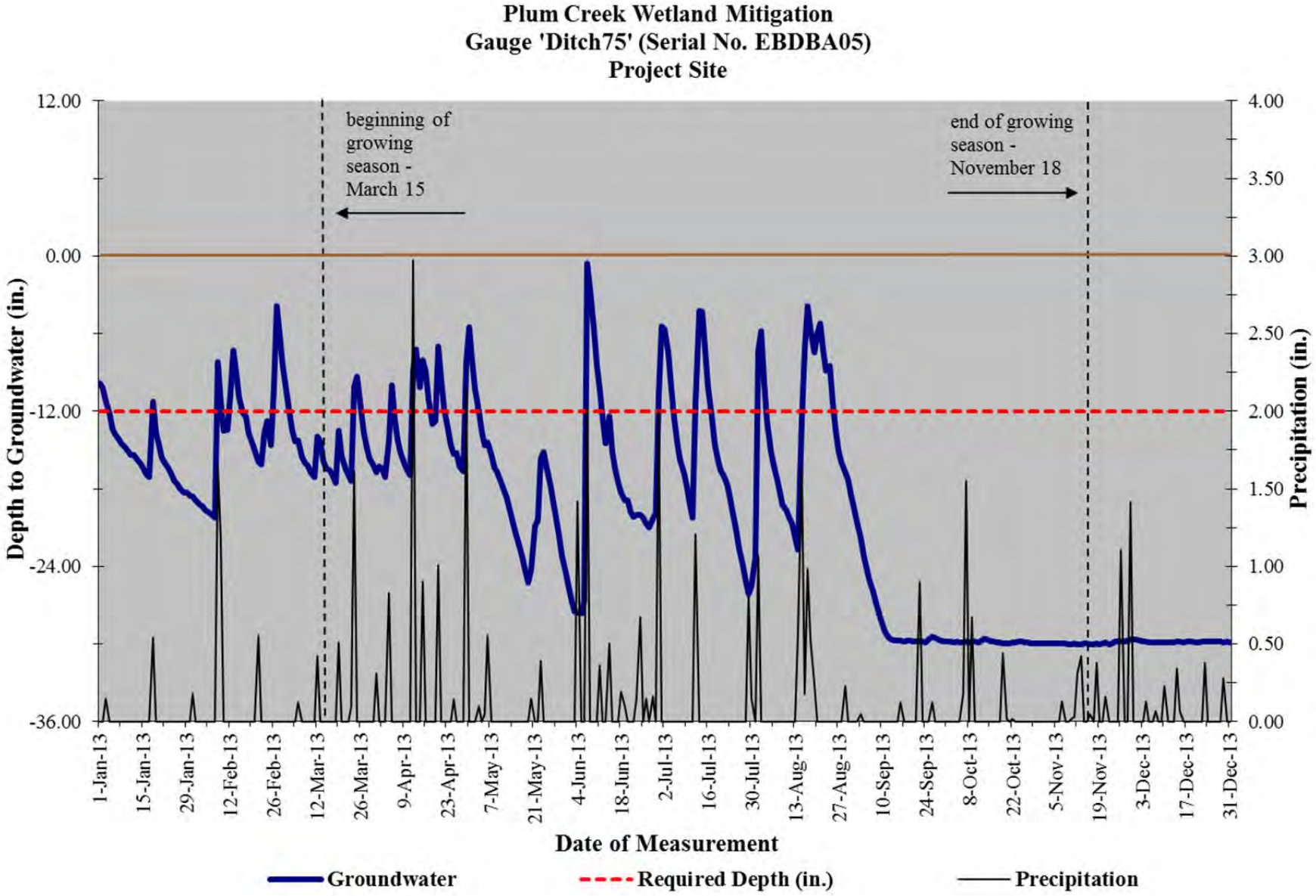
Plum Creek Wetland Mitigation
Gauge G-9 (Serial No. EBD5020)
Project Site

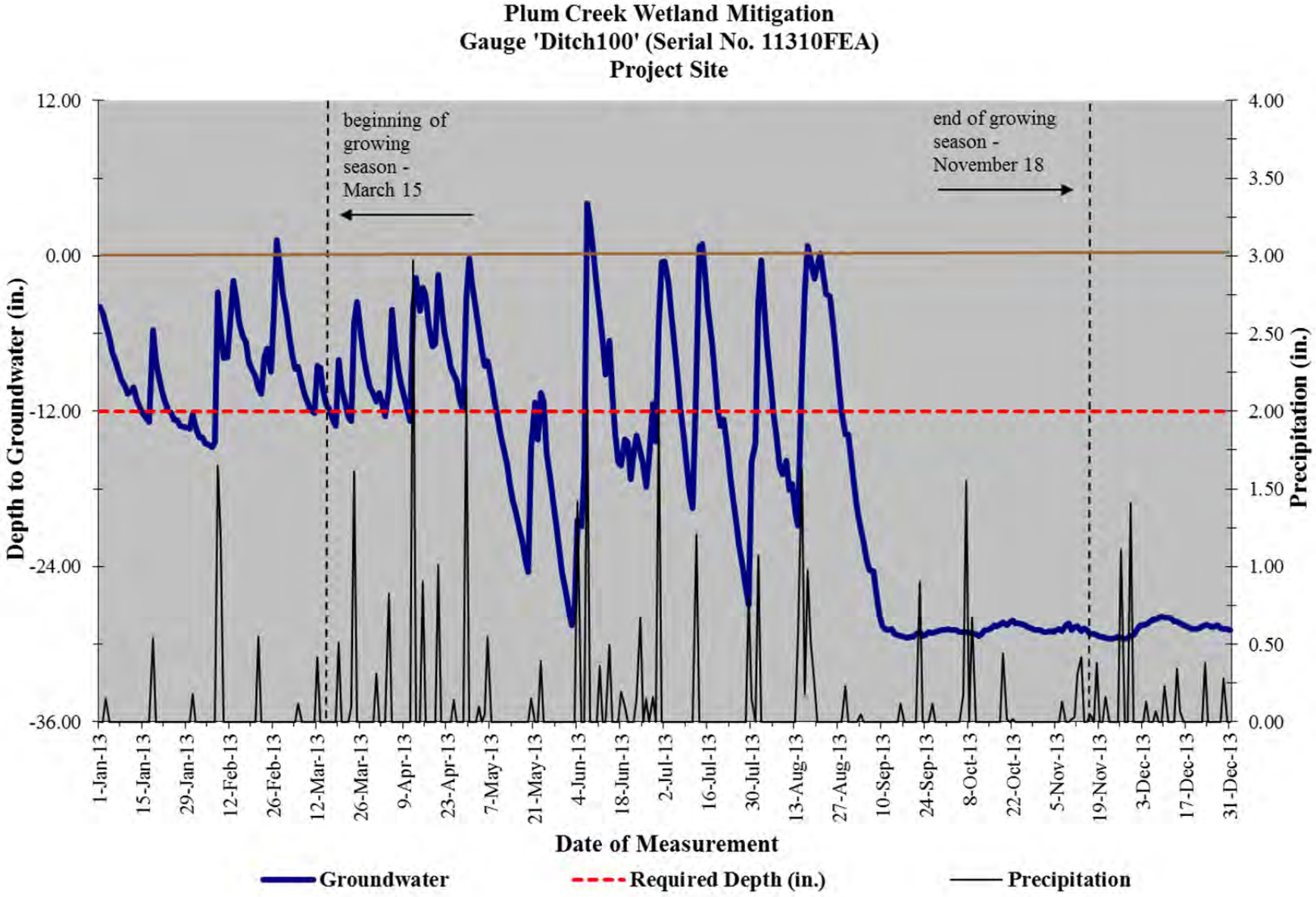


Plum Creek Wetland Mitigation
Gauge 'Ditch25' (Serial No. EBD3EDF)
Project Site




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.)
12.00
0.00
-12.00
-24.00
-36.00
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-Jan-13
15-Jan-13
29-Jan-13
12-Feb-13
26-Feb-13
12-Mar-13
26-Mar-13
9-Apr-13
23-Apr-13
7-May-13
21-May-13
4-Jun-13
18-Jun-13
2-Jul-13
16-Jul-13
30-Jul-13
13-Aug-13
27-Aug-13
10-Sep-13
24-Sep-13
8-Oct-13
22-Oct-13
5-Nov-13
19-Nov-13
3-Dec-13
17-Dec-13
31-Dec-13
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation


Plum Creek Wetland Mitigation
Gauge 'Ditch75' (Serial No. EBDBA05)
Project Site
beginning of growing season - March 15
end of growing season - November 18
Depth to Groundwater (in.)
Precipitation (in.)
12.00
0.00
-12.00
-24.00
-36.00
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-Jan-13
15-Jan-13
29-Jan-13
12-Feb-13
26-Feb-13
12-Mar-13
26-Mar-13
9-Apr-13
23-Apr-13
7-May-13
21-May-13
4-Jun-13
18-Jun-13
2-Jul-13
16-Jul-13
30-Jul-13
13-Aug-13
27-Aug-13
10-Sep-13
24-Sep-13
8-Oct-13
22-Oct-13
5-Nov-13
19-Nov-13
3-Dec-13
17-Dec-13
31-Dec-13
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation


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.)
12.00
0.00
-12.00
-24.00
-36.00
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-Jan-13
15-Jan-13
29-Jan-13
12-Feb-13
26-Feb-13
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26-Mar-13
9-Apr-13
23-Apr-13
7-May-13
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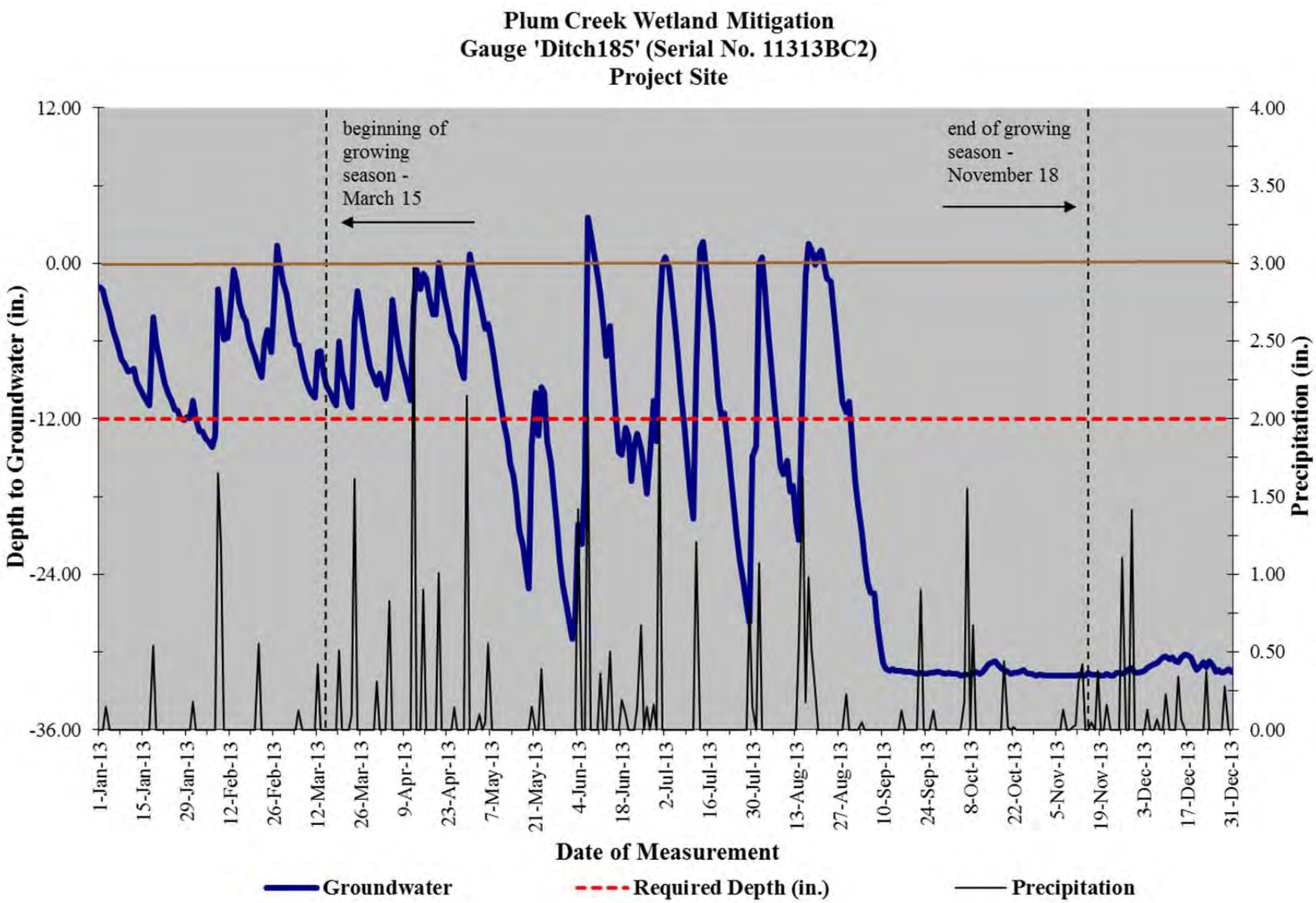
10-Sep-13
24-Sep-13
8-Oct-13
22-Oct-13
5-Nov-13
19-Nov-13
3-Dec-13
17-Dec-13
31-Dec-13
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation


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.)
12.00
0.00
-12.00
-24.00
-36.00
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
1-Jan-13
15-Jan-13
29-Jan-13
12-Feb-13
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9-Apr-13
23-Apr-13
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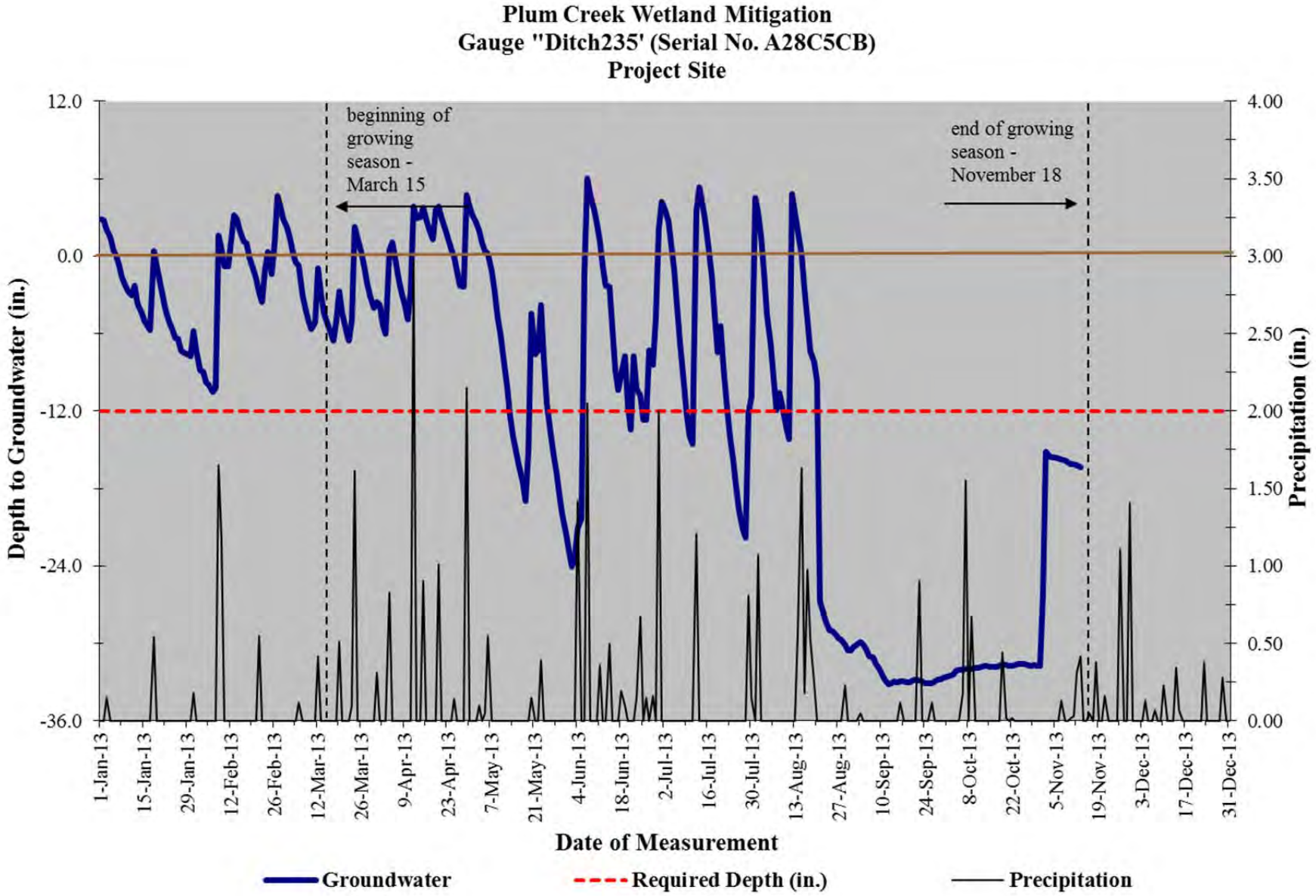
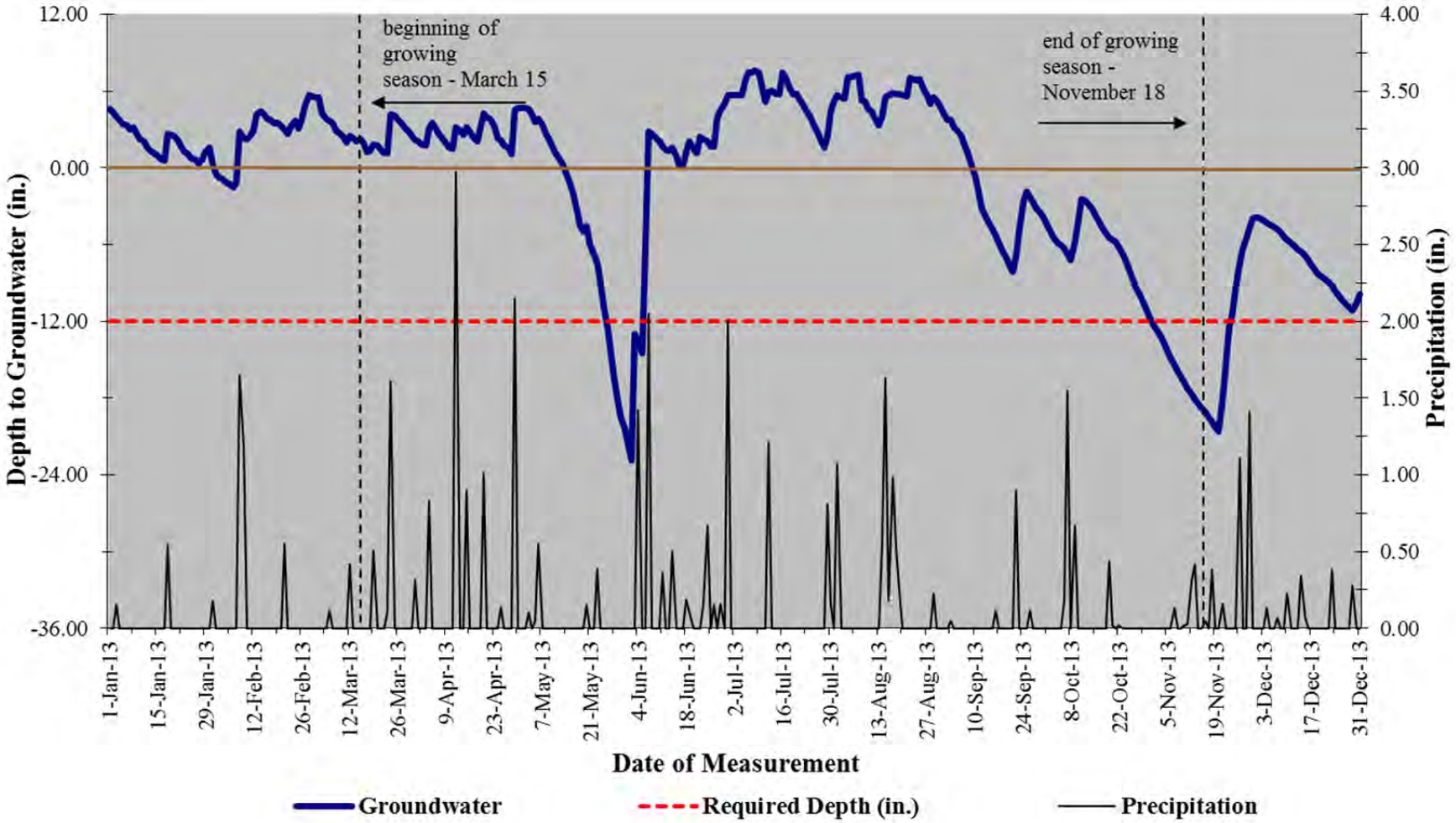
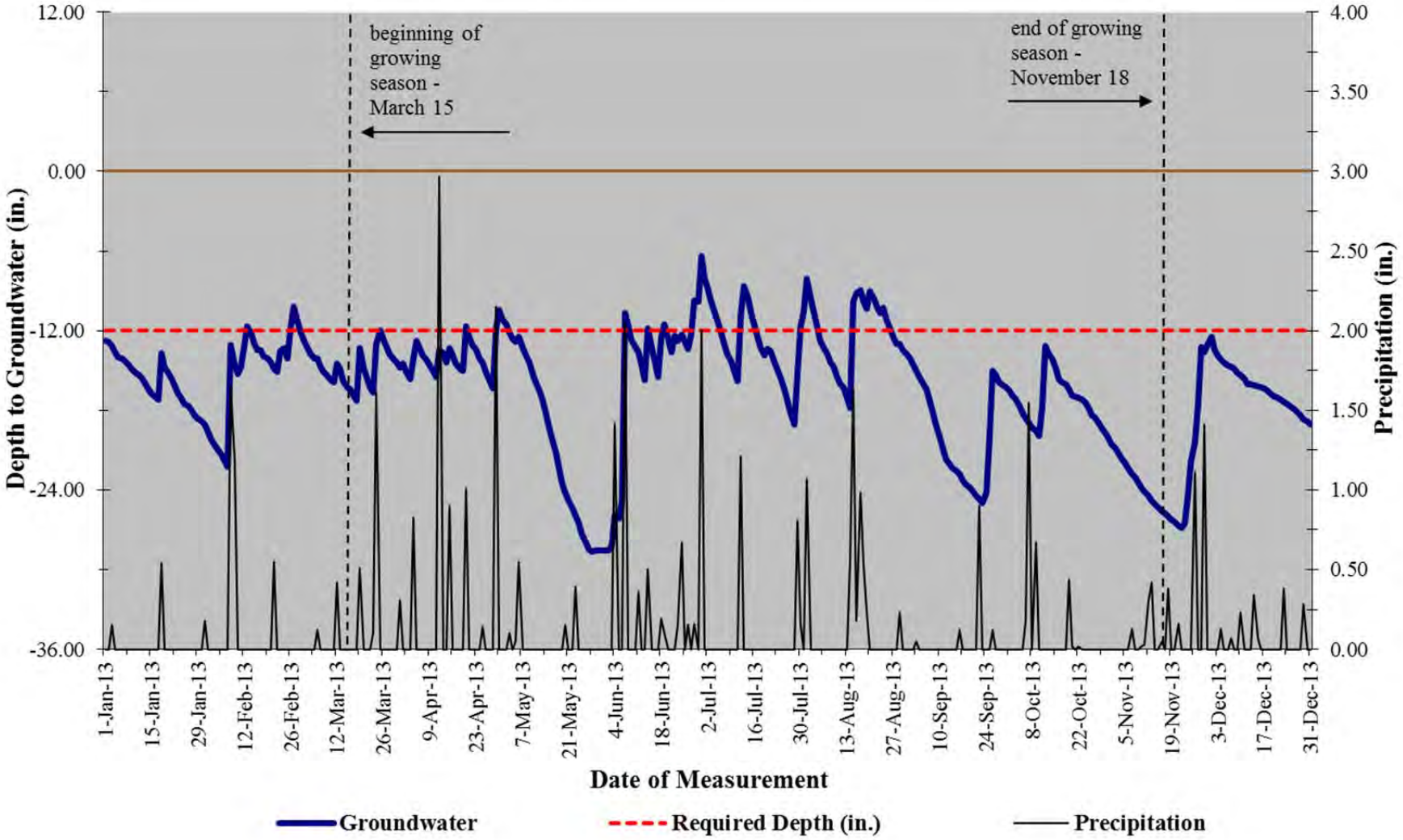
27-Aug-13
10-Sep-13
24-Sep-13
8-Oct-13
22-Oct-13
5-Nov-13
19-Nov-13
3-Dec-13
17-Dec-13
31-Dec-13
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation


Plum Creek Wetland Mitigation
Gauge "Ditch235' (Serial No. A28C5CB)
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-13
15-Jan-13
29-Jan-13
12-Feb-13
26-Feb-13
12-Mar-13
26-Mar-13
9-Apr-13
23-Apr-13
7-May-13
21-May-13
4-Jun-13
18-Jun-13
2-Jul-13
16-Jul-13
30-Jul-13
13-Aug-13
27-Aug-13
10-Sep-13
24-Sep-13
8-Oct-13
22-Oct-13
5-Nov-13
19-Nov-13
3-Dec-13
17-Dec-13
31-Dec-13
Date of Measurement
Groundwater
Required Depth (in.)
Precipitation

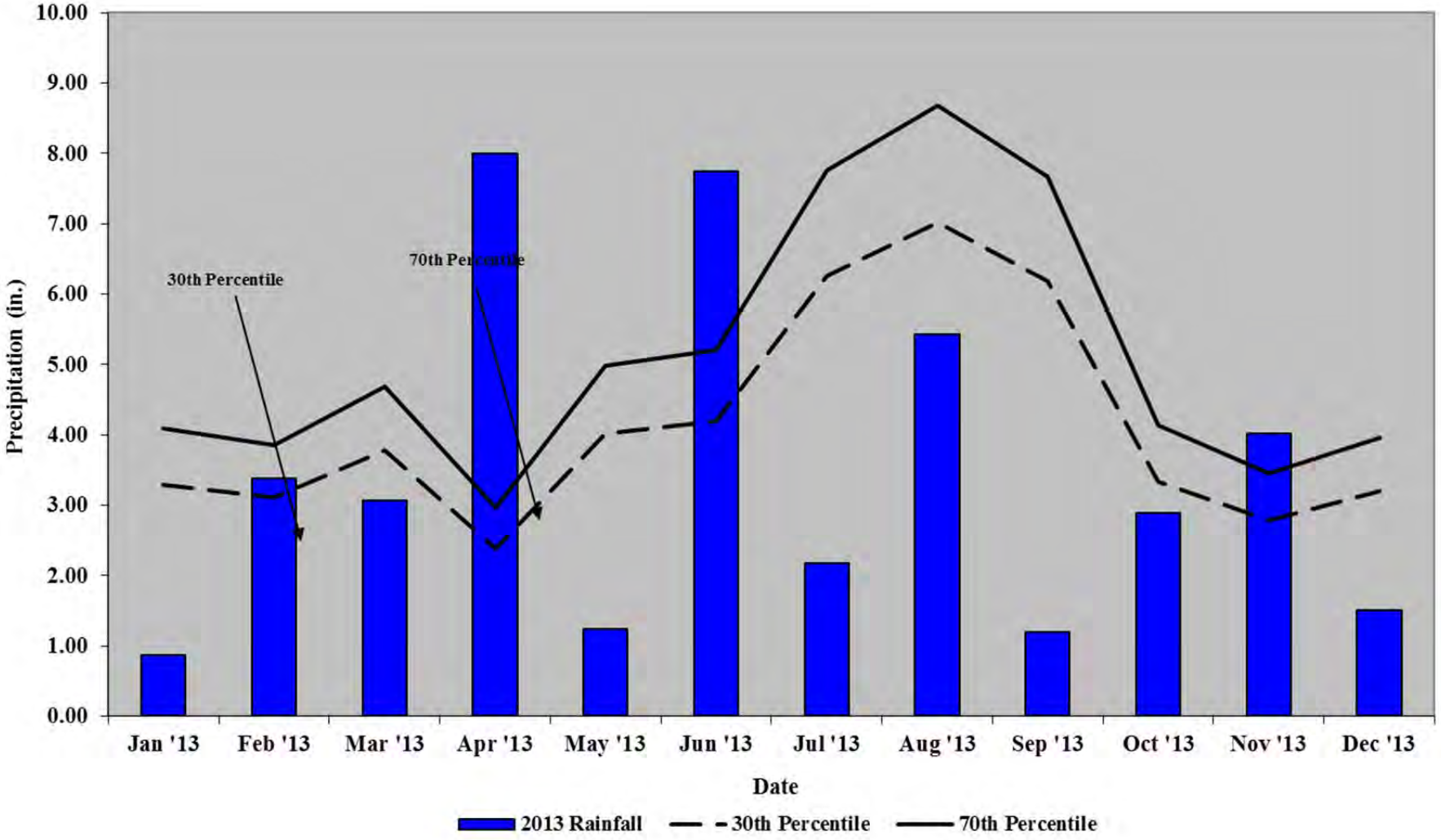
Plum Creek Wetland Mitigation Reference Site
FOREST GUAGE {Formerly REF 2} (Serial No. EBCFCF6)



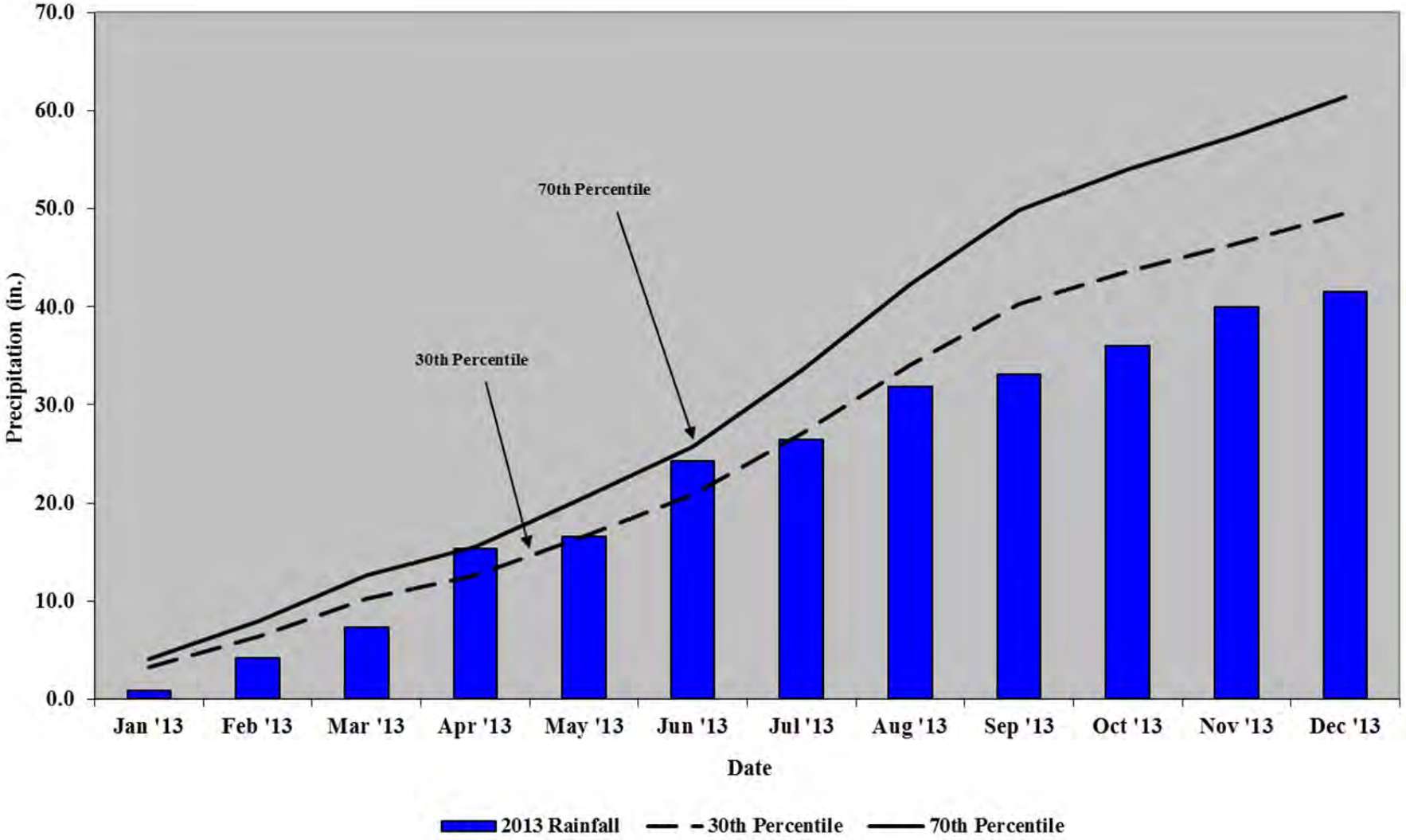
Plum Creek Wetland Mitigation Reference Site
POND GUAGE {Formerly PC-REF1} (Serial No. EBD2B2F)



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: