Monitoring Report

Twin Bays Wetland Restoration Site
DMS Contract 004739
DMS Project Number 95363

Duplin County, NC
CU# 03030007
DWR# 2013-0455
SAW# 2012-01385

Monitoring Year 04

Prepared for:

NCDMS, 1652 Mail Service Center, Raleigh, NC 27699-1652

Construction Completed: March 2014
Data Collection: 2017
Submitted: January 2018

Design and Monitoring Firm

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Project Contact: Tim Morris
Email: tim.morris@kci.com
KCI Project No: 20122265

Mitigation Services
ENVIRONMENTAL QUALITY

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

January 29, 2018

Adam Spiller
KCI Associates of NC

Sent via email to adam.spiller@kci.com

Subject: Monitoring Report Year 4 Comments for
Twin Bays, Project # 95363, Contract 004739
Cape Fear Basin – CU# 03030007, Duplin County, North Carolina

Mr. Spiller:

On January 12, 2017, the Division of Mitigation Services (DMS) received the Draft Monitoring Report for Bowl Basin and a site visit is planned for February 19th. After reviewing the document, please make the following updates to finalize:

- Please add the Project County, CU, DWR (DWR-2013-0455), and USACE (SAW-2012-01385) numbers for this project on the cover page.
- Page 2, section 2.1: The vegetation monitoring indicates that success is 288 stems per acre at year four. This is not in the mitigation plan, and vegetation was not monitored this year. Please remove that success reference.
- Page 3, section 2.2 last paragraph: The text indicates that 3 out of 19 did not meet hydrology, when two of these gauges were not in non-credit bearing areas (no success criteria for these gauges). Revise accordingly to indicate which gauges have success criteria and which do not.
- Suggest revising all Table 9 to not indicate Yes or No for meeting hydrology on gauges in the non-credit areas. These boxes should just include the hydroperiod (%) and number of days.

Following any site visit discussion, please submit 3 hard copies and an electronic copy of the final report.

Thanks for your work,

Lindsay Crocker, DMS

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1.0 EXECUTIVE SUMMARY / PROJECT ABSTRACT

The Twin Bays Wetland Restoration Site, (TBWRS) completed in March 2014, restored 10.6 acres of non-riparian wetland along with 0.4 acre of upland preservation. The TBWRS is a non-riparian wetland system in the Cape Fear Basin (03030007 8-digit HUC) in southern Duplin County, North Carolina. The project is located in the 14-digit HUC 03030007090040 (Rock Fish Creek), which DMS has identified as a Targeted Local Watershed (TLW) (NCDENR, EEP 2009).

The project site is protected by an 11.72-acre permanent conservation easement held by the State of North Carolina. TBWRS is located on a single parcel located off of Cornwallis Road approximately two miles northwest of Wallace, North Carolina. The project site is bounded by Cornwallis Road to the west, a ditch along the property line to the south, and agricultural land to the east and north. Prior to construction, the site was actively used for row crop farming. The site had a long history of hydrologic modification in order to allow for farming to take place on the property.

The Cape Fear River Basin Restoration Priorities state the goals for the TBWRS's 14-digit HUC are to expand restoration opportunities and repair riparian buffers (NCDENR EEP, 2009). The project goals for TBWRS are in line with the basin priorities and include the following:

- Slow and treat the runoff of upslope agricultural drainage.
- Restore a Hardwood Flats Community.
- Develop valuable wetland habitat niches within a drained agricultural landscape.

The project goals will be addressed through the following objectives:

- Fill field ditches to restore surface flow retention and elevate local groundwater levels.
- Redevelop longer wetland flow patterns to increase surface flow retention time.
- Modify an existing pond to its natural seep condition to feed the downslope wetland.
- Restore a native forested hardwood wetland community using natives trees and seed mixes.

There are three non-credit generating areas on the site. There is 0.4-acre of uplands located in the forested northeastern corner of the project boundary. This area remained undisturbed and is included in the TBWRS conservation easement. There is a 0.2 acre utility easement on the west side of the site along Cornwallis Road that remained undisturbed. Additionally, the southernmost ditch, located adjacent to the project easement, was left open and not filled. It is anticipated that leaving this ditch open will have minimal impacts to the overall hydrologic performance of the site. The hydrologic influence of this ditch was modeled using Lateral Effect, a software program that determines the lateral effect of a drainage ditch or borrow pit on adjacent wetland hydrology (NCSU BAE, 2011). This analysis determined that the potential horizontal drainage influence averages 76'. Due to the fact that the southern ditch cannot be filled because of the potential for hydrologic trespass, the area immediately adjacent to the ditch will not be a credit generating part of the site. It is assumed that with the onsite modifications, such as filling ditches and surface roughening, the entire site will have more surface and groundwater, which may decrease the effect of the ditch. For this reason, the non-credit generating portion of the site is assumed to be half of the zone of influence for the ditch.

The TBWRS provided mitigation for wetland impacts within Hydrologic Unit 03030007 by restoring 10.6 acres of wetland and preserving 0.4-acre of uplands, generating 10.6 riparian wetland mitigation units (WMU's). The TBWRS will be monitored to determine if the project is on-track to meeting jurisdictional wetland status. The wetland site will be deemed successful once hydrology is established and vegetation success criteria are met. During the site's fourth growing season, sixteen of the nineteen groundwater monitoring gauges met the success criteria, with only gauges 1, 3 (both non-credit bearing), and 19 not achieving success. Vegetation monitoring was not performed during the fourth monitoring year, in accordance with the mitigation plan.

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 and in the Mitigation Plan documents available on the DMS website. All raw data supporting the tables and figures in the appendices are available from DMS upon request.

2.0 MONITORING RESULTS

The TBWRS will be monitored to determine if the project is on-track to meeting jurisdictional wetland status. The wetland restoration area will be deemed successful once hydrology is established and vegetation success criteria are met. The site will be monitored for at least seven years or until the success criteria are achieved.

2.1 VEGETATION MONITORING

The success criteria for the planted species in the mitigation area will be based on the vegetative density estimated as woody stems/acre based on monitoring plot data. The site will demonstrate the re-establishment of targeted vegetative communities through the survival and growth of planted species and volunteer colonization, with an average stem density of 320 stems/acre after three years, 260 stems/acre after five years, and 210 stems/acre after seven years to be considered successful. To determine the success of the planted mitigation area, ten permanent vegetation monitoring plots (10 by 10 meters) have been established in the wetland restoration area at a density that represents the total mitigation acreage. The average density of these plots will determine whether the site meets the success criterion.

Vegetation monitoring was not performed during the fourth monitoring year, in accordance with the mitigation plan. It will occur again during Monitoring Year 5.

2.2 HYDROLOGY MONITORING

Wetland hydrology will be monitored with a series of automatic gauges that record water table depth. The site must present continuous saturated or inundated hydrologic conditions for at least 8% of the growing season with a 50% probability of reoccurrence during normal weather conditions. A “normal” year is based on NRCS climatological data for Duplin County using the 30th to 70th percentile thresholds as the range of normal as documented in the USACE Technical Report “Accessing and Using Meteorological Data to Evaluate Wetland Hydrology, April 2000.” The soil survey for Duplin County does not contain growing season data; therefore, due to its close proximity, the Sampson County soil survey was used. The estimated growing season begins March 18 and ends November 11 (239 days). The water table of the restored wetlands must be within 12” of the soils surface continuously for at least 8% (19 days) of the 239-day growing season. Wetland hydrology will be monitored with nineteen automatic gauges that record water table depth. Daily data will be collected from the automatic gauges over the 7-year monitoring period. Two new gauges were installed on the site on April 6, 2017, bringing the site total to 19 gauges.

To monitor the effect of the unfilled ditch described in Section 1.0, four sets of coupled gauges were installed perpendicular to the unfilled ditch. Each set includes a gauge that is 40’ from the open ditch and another that is 75’ from the ditch. An additional two gauges were installed between the coupled gauges to monitor hydrology less than 40’ from the open ditch in the non-credit bearing zone.

The daily rainfall data were obtained from the NC State Climate Office for a local weather station in Jacksonville, NC. In 2017, the months of April and May experienced above average rainfall, while

January, June, July, September, and October experienced average rainfall. The months of February, March, August, and November recorded below average rainfall for the site. Overall, the area experienced slightly below average rainfall during the 2017 growing season.

During the site's fourth growing season, all but 2 of the seventeen credit-bearing gauges met the hydrologic success criteria. One of these gauges was right on the edge of the non-credit bearing area. The other gauge that did not meet the criteria was newly installed this year and missed the first nineteen days of the growing season. Additionally, one of the two non-credit bearing gauges achieved the success criteria this year.

3.0 METHODOLOGY

The CVS-EEP protocol, Level 2 (http://cvs.bio.unc.edu/methods.htm) was used to collect vegetation data from the site in previous years. No vegetation data was collected during 2017.

4.0 REFERENCES

Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation, Version 4.2 (http://cvs.bio.unc.edu/methods.htm)

NCDENR, Ecosystem Enhancement Program. 2009. Lower Yadkin Pee-Dee River Basin Priorities 2009. Raleigh, NC. http://www.nceep.net/services/restplans/Yadkin_Pee_Dee_RBRP_2009_Final.pdf

NCSU BAE. North Carolina State University, Biological and Agricultural Engineering. 2011. Method to Determine Lateral Effect of a Drainage Ditch on Adjacent Wetland Hydrology. Last accessed 11/2012 at: http://www.bae.ncsu.edu/soil_water/projects/lateral_effect.html

USACE. 2003. Stream Mitigation Guidelines. USACE, NCDENR-DWQ, USEPA, NCWRC.

Appendix A

Project Vicinity Map and Background Tables

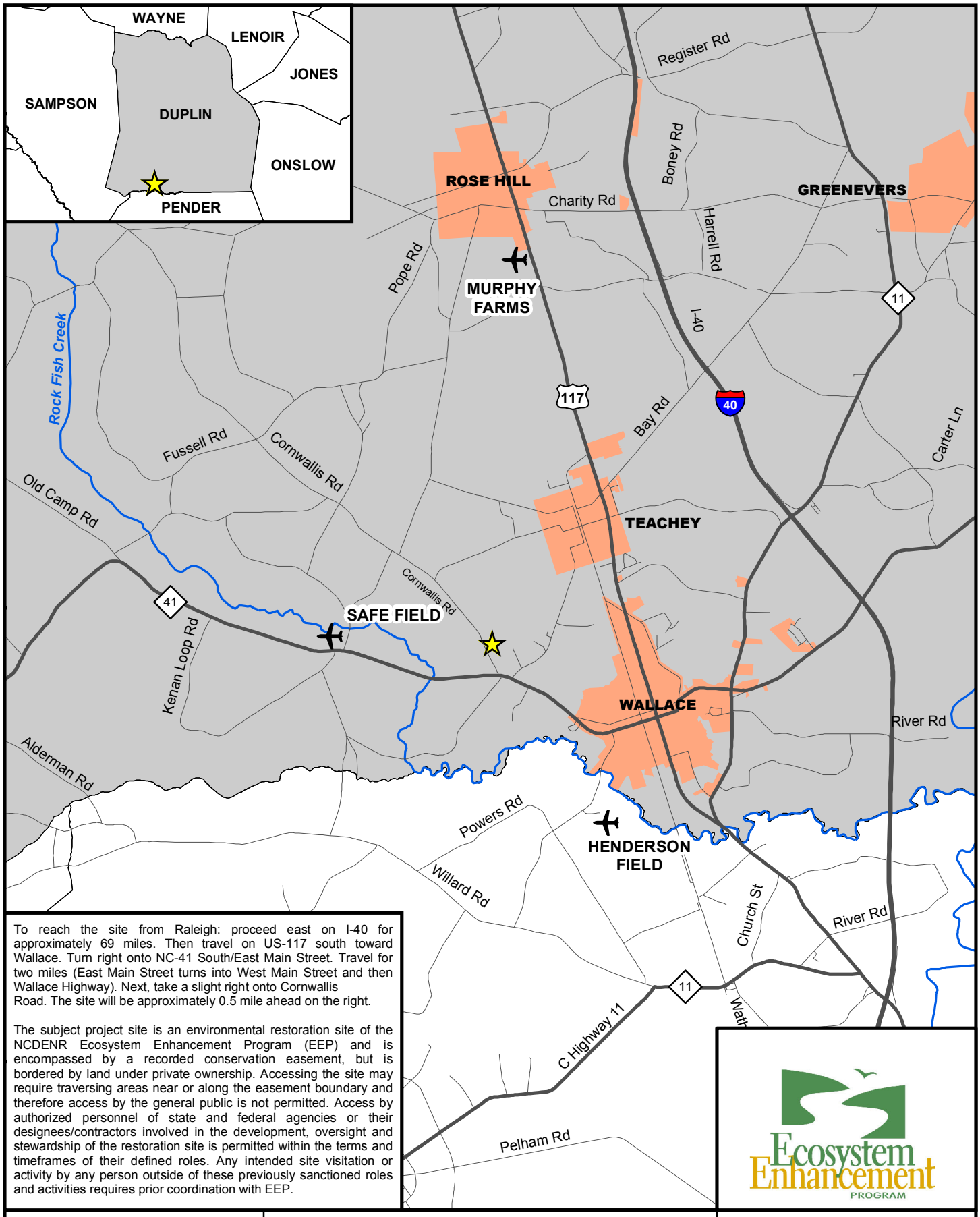


FIGURE 1. PROJECT SITE VICINITY MAP
TWIN BAYS WETLAND RESTORATION SITE
EEP PROJECT #95363, DUPLIN COUNTY, NC

Table 1. Project Components and Mitigation Credits									
Twin Bays Wetland Restoration Site, DMS Project # 95363									
Mitigation Credits									
	Stream		**Riparian Wetland**		**Non-riparian Wetland**		**Buffer**	**Nitrogen Nutrient Offset**	**Phosphorous Nutrient Offset**
Type	R	RE	R	RE	R	RE			
Acres					10.6				
Credits					10.6				
TOTAL CREDITS					10.6				
Project Components									
Project Component -or- Reach ID	**Stationing/ Location**		**Existing Footage/ Acreage**		**Approach (PI, PII etc.)**		**Restoration -or- Restoration Equivalent**	**Restoration Footage or Acreage**	**Mitigation Ratio**
Wetland Area	Central and Southern portion of project easement		10.6 acres		-		Restoration	10.6 acres	1:1
Component Summation									
Restoration Level	**Stream (linear feet)**		**Riparian Wetland (acres)**		**Non-riparian Wetland (acres)**			**Buffer (square feet)**	**Upland (acres)**
			Riverine	Non-Riverine					
Restoration					10.6 acres				
Enhancement									
Enhancement I									
Enhancement II									
Creation									
Preservation									0.4 acre
High Quality Preservation									
TOTAL	**-**		**-**	**-**	**10.6 acres**			**-**	**0.4 acre**
TOTAL WMU	**-**		**-**	**-**	**10.6**			**-**	**-**

Table 2. Project Activity & Reporting History Twin Bays Wetland Restoration Site, DMS Project # 95363		
Activity or Report	**Data Collection Complete**	**Actual Completion or Delivery**
Mitigation Plan		Oct 2013
Final Design - Construction Plans		Dec 2013
Construction		Feb/March 2014
Planting		March 2014
Baseline Monitoring/Report	April 2014	May 2014
Vegetation Monitoring	April 10, 2014	
Photo Points	April 10, 2015	
Year 1 Monitoring	Nov 2014	Dec 2014
Vegetation Monitoring	Nov 3, 2014	
Photo Points	Nov 3, 2014	
Gauge Download	Nov 2017, 2014	
Supplemental Planting		March 2015
Year 2 Monitoring	Nov 2015	Jan 2016
Vegetation Monitoring	July 30, 2015	
Photo Points	July 30, 2015	
Gauge Download	Nov 25, 2015	
Year 3 Monitoring	Dec 2016	Dec 2016
Vegetation Monitoring	July 6, 2016	
Photo Points	Aug 23, 2016	
Gauge Download	Dec 14, 2016	
Year 4 Monitoring	Nov 2017	Dec 2017
Vegetation Monitoring	N/A	
Photo Points	Nov 30, 2017	
Gauge Download	Nov 30, 2017	

Table 3. Project Contacts **Twin Bays Wetland Restoration Site, DMS Project # 95363**	
Design Firm	KCI Associates of North Carolina, PA 4505 Falls of Neuse Rd. Suite 400 Raleigh, NC 27609 Contact: Mr. Tim Morris Phone: (919) 278-2512 Fax: (919) 783-9266
Construction Contractor	KCI Environmental Technologies and Construction, Inc. 4505 Falls of Neuse Rd. Suite 400 Raleigh, NC 27609 Contact: Mr. Tim Morris Phone: (919) 278-2512 Fax: (919) 783-9266
Planting Contractor	Forestree Management Co. 1280 Maudis Road Bailey, NC 27807 Contact: Mr. Tony Cortez Phone: (252) 243-2513
Monitoring Performers	
MY-00-04	KCI Associates of North Carolina, PA 4505 Falls of Neuse Rd. Suite 400 Raleigh, NC 27609 Contact: Mr. Adam Spiller Phone: (919) 278-2514 Fax: (919) 783-9266

Table 4. Project Information			
Twin Bays Wetland Restoration Site, DMS Project # 95363			
Project Name	Twin Bays Wetland Restoration Site		
County	Duplin County		
Project Area (acres)	11.72 acres		
Project Coordinates (lat. and long.)	34.748418 N , -78.027129 W		
Project Watershed Summary Information			
Physiographic Province	Coastal Plain		
River Basin	Cape Fear		
USGS Hydrologic Unit 8-digit	03030007	**USGS Hydrologic Unit 14-digit**	03030007090040
DWQ Sub-basin	18-74-29b		
Project Drainage Area (acres)	25.4 acres		
Project Drainage Area Percentage of Impervious Area	2%		
CGIA Land Use Classification	93% Cultivated, 2% Mixed Shrubland, and 5% Low-Intensity Development		
Wetland Summary Information (Post-Restoration)			
Parameters	**Wetland Area**		
Size of Wetland (acres)	10.6 acres		
Wetland Type (non-riparian, riparian riverine or riparian non-riverine)	Non-riparian		
Mapped Soil Series	Rains (Torhunta, Murville/Leon and Udorthents by detailed soil investigation)		
Drainage class	Poorly drained		
Soil Hydric Status	Drained Hydric		
Source of Hydrology	Hillside seepage / precipitation		
Hydrologic Impairment	Ditching and Crops		
Native vegetation community	Hardwood Flats Community		
Percent composition of exotic invasive vegetation	0%		
Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the United States – Section 404	Yes	Yes, received 404 permit	N/A
Waters of the United States – Section 401	Yes	Yes, received 401 permit	N/A
Endangered Species Act*	No	N/A	N/A
Historic Preservation Act*	No	N/A	N/A
Coastal Zone Management Act * (CZMA)/ Coastal Area Management Act (CAMA)	No	N/A	N/A
FEMA Floodplain Compliance	No	N/A	FEMA Floodplain Checklist
Essential Fisheries Habitat*	No	N/A	N/A

Appendix B

Visual Assessment Data

LEGEND:

- CONSERVATION EASEMENT
- VEG PLOT ACHIEVING DENSITY CRITERION
- VEG PLOT BELOW DENSITY CRITERION
- VEG PLOT TOTAL / PLANTED STEM DENSITY — 1137 / 987
- WETLAND GAUGE ACHIEVING HYDROLOGIC CRITERION
- WETLAND GAUGE BELOW HYDROLOGIC CRITERION
- PHOTO POINT

IMAGE SOURCE: NC 2016 ORTHOIMAGERY

NAD 83 NC GRID

–50′ –25′ 0′ 50′ 100′

GRAPHIC SCALE

SYM.	DESCRIPTION	DATE
	REVISIONS	

NCDEQ DIVISION OF MITIGATION SERVICES

KCI ASSOCIATES OF NC
ENGINEERS • PLANNERS • SCIENTISTS
4505 FALLS OF NEUSE ROAD
RALEIGH, NORTH CAROLINA 27609

TWIN BAYS
WETLAND RESTORATION SITE
DMS PROJECT #95363
WALLACE, DUPLIN COUNTY, NORTH CAROLINA
MONITORING YEAR 04

DATE: DEC 2017
SCALE: GRAPHIC

CURRENT CONDITION PLAN VIEW

SHEET 1 OF 1

Table 5. Vegetation Condition Assessment
Twin Bays Restoration Site, DMS Project #95363

Planted Acreage 10.6 **Easement Acreage 11.7**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acre	Pattern and Color	0	0.00	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acre	Pattern and Color	0	0.00	0.0%
			Total	0	0.00	0.0%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acre	Pattern and Color	0	0.00	0.0%
			Cumulative Total	0	0.00	0.0%
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	1,000 SF	Pattern and Color	0	0.00	0.0%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	none	Pattern and Color	0	0.00	0.0%

Photo Reference Points

PP1a – MY-00 – 4/10/14

PP1a – MY04 – 11/30/17

PP1b– MY-00 – 4/10/14

PP1b – MY04 – 11/30/17

PP2a – MY-00 – 4/10/14

PP2a – MY04 – 11/30/17

PP2b – MY-00 – 4/10/14

PP2b – MY04 – 11/30/17

PP3 – MY-00 – 4/10/14

PP3 – MY04 – 11/30/17

PP4a – MY-00 – 4/10/14

PP4a – MY04 – 11/30/17

PP4b – MY-00 – 4/10/14

PP4b – MY04 – 11/30/17

PP5a – MY-00 – 4/10/14

PP5a – MY04 – 11/30/17

PP5b – MY-00 – 4/10/14

PP5b – MY04 – 11/30/17

PP6a – MY-00 – 4/10/14

PP6a – MY04 – 11/30/17

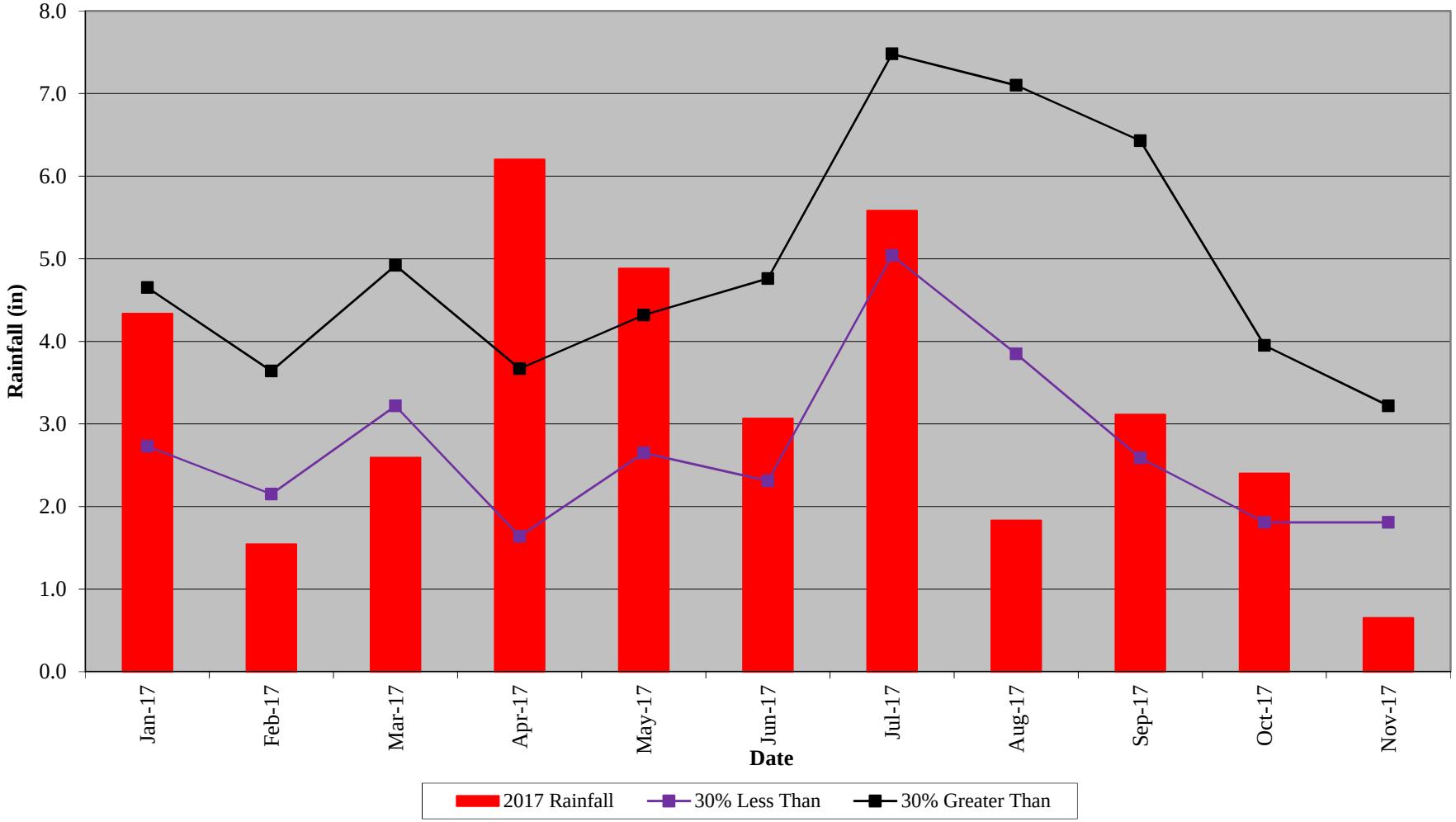
PP6b– MY-00 – 4/10/14

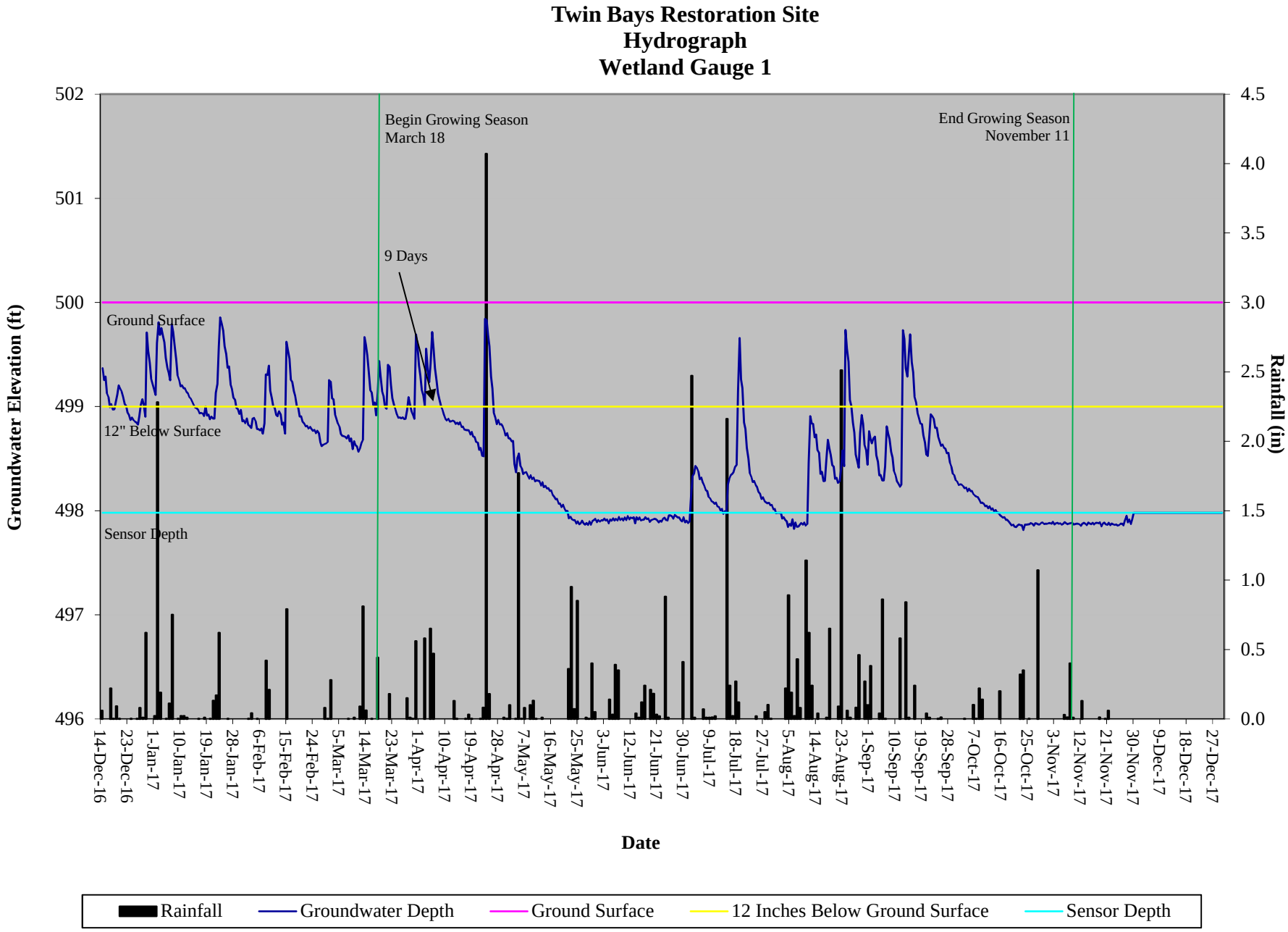
PP6b – MY04 – 11/30/17

Appendix C

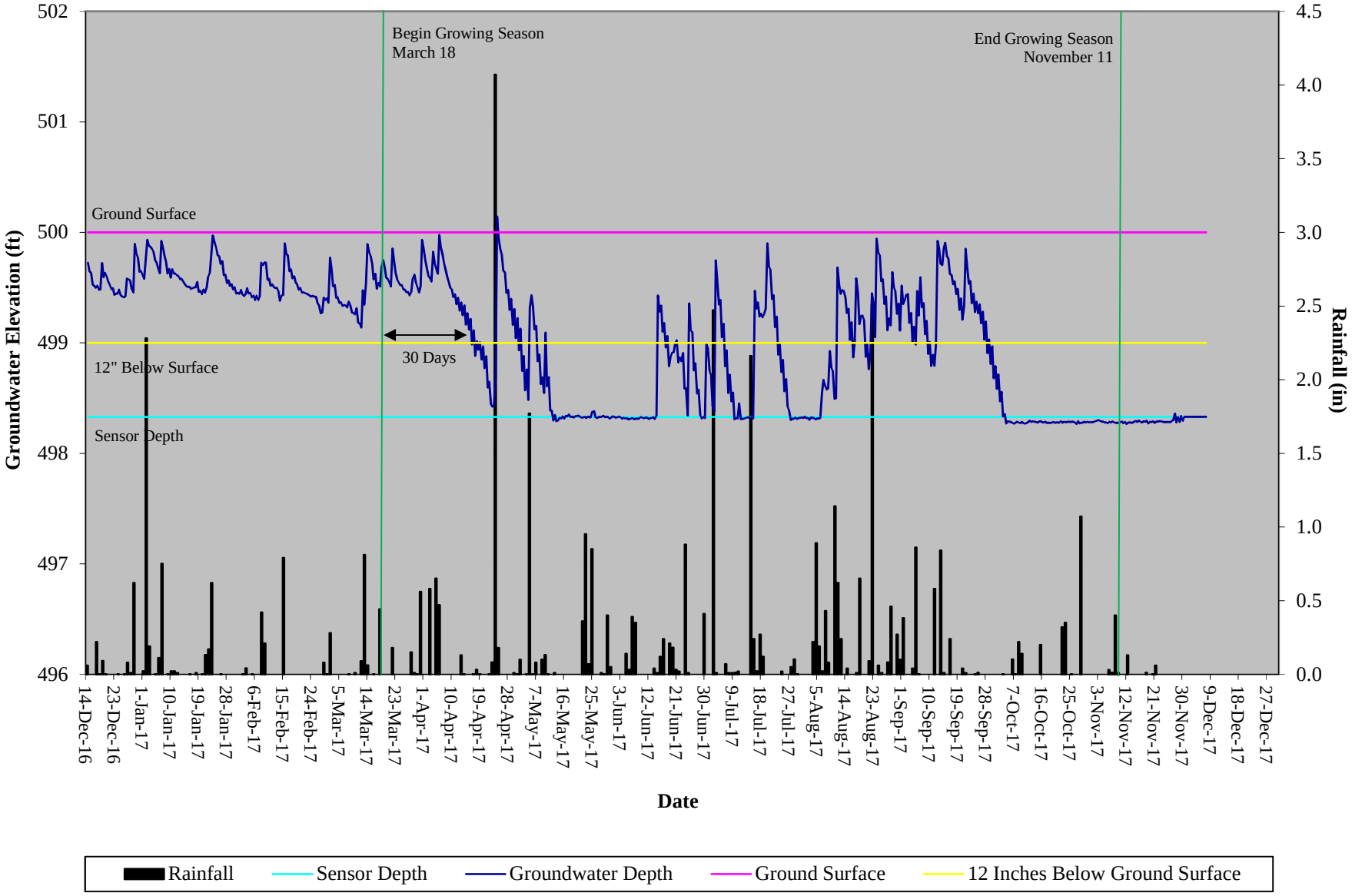
Hydrologic Data

Twin Bays Wetland Restoration Site
30-70 Percentile Graph
WETS Station Name: KOAJ - Albert Ellis Airport

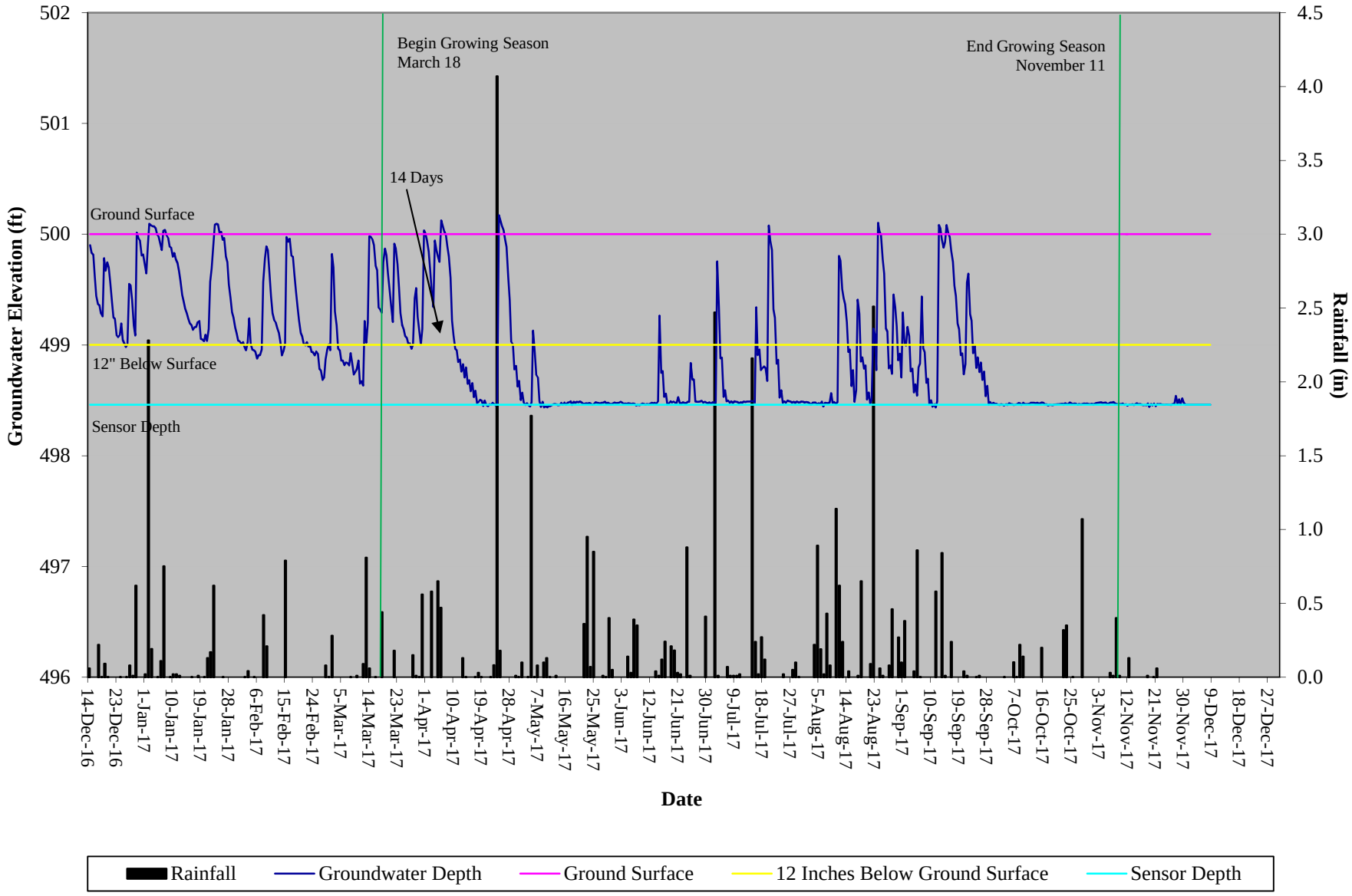



Twin Bays Restoration Site
Hydrograph
Wetland Gauge 1
Groundwater Elevation (ft)
Rainfall (in)
Date
Begin Growing Season
March 18
End Growing Season
November 11
9 Days
Ground Surface
12" Below Surface
Sensor Depth
502
501
500
499
498
497
496
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
14-Dec-16
23-Dec-16
1-Jan-17
10-Jan-17
19-Jan-17
28-Jan-17
6-Feb-17
15-Feb-17
24-Feb-17
5-Mar-17
14-Mar-17
23-Mar-17
1-Apr-17
10-Apr-17
19-Apr-17
28-Apr-17
7-May-17
16-May-17
25-May-17
3-Jun-17
12-Jun-17
21-Jun-17
30-Jun-17
9-Jul-17
18-Jul-17
27-Jul-17
5-Aug-17
14-Aug-17
23-Aug-17
1-Sep-17
10-Sep-17
19-Sep-17
28-Sep-17
7-Oct-17
16-Oct-17
25-Oct-17
3-Nov-17
12-Nov-17
21-Nov-17
30-Nov-17
9-Dec-17
18-Dec-17
27-Dec-17
Rainfall
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface
Sensor Depth

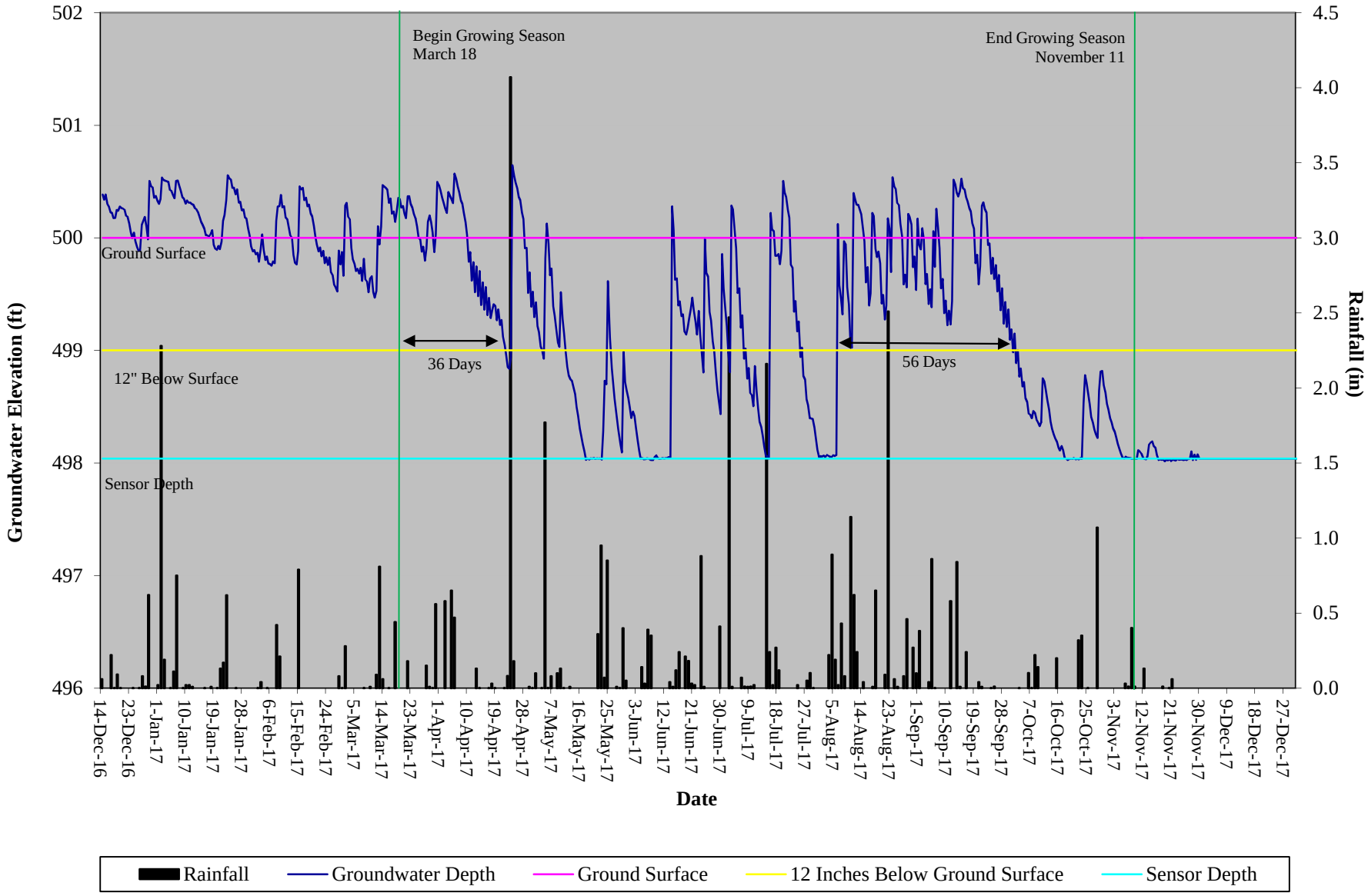
Twin Bays Restoration Site
Hydrograph
Wetland Gauge 2



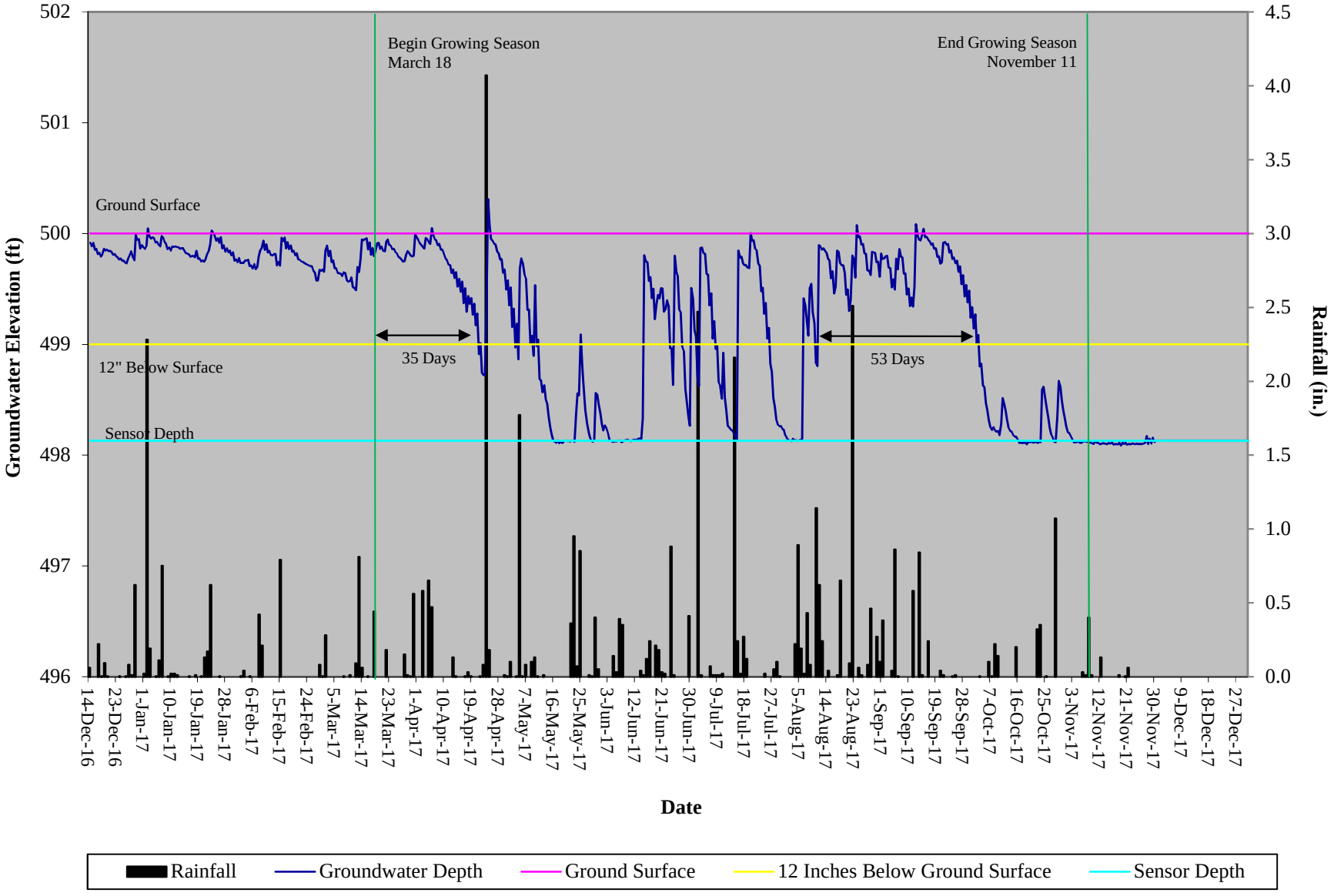
Twin Bays Restoration Site
Hydrograph
Wetland Gauge 3 - non-credit bearing



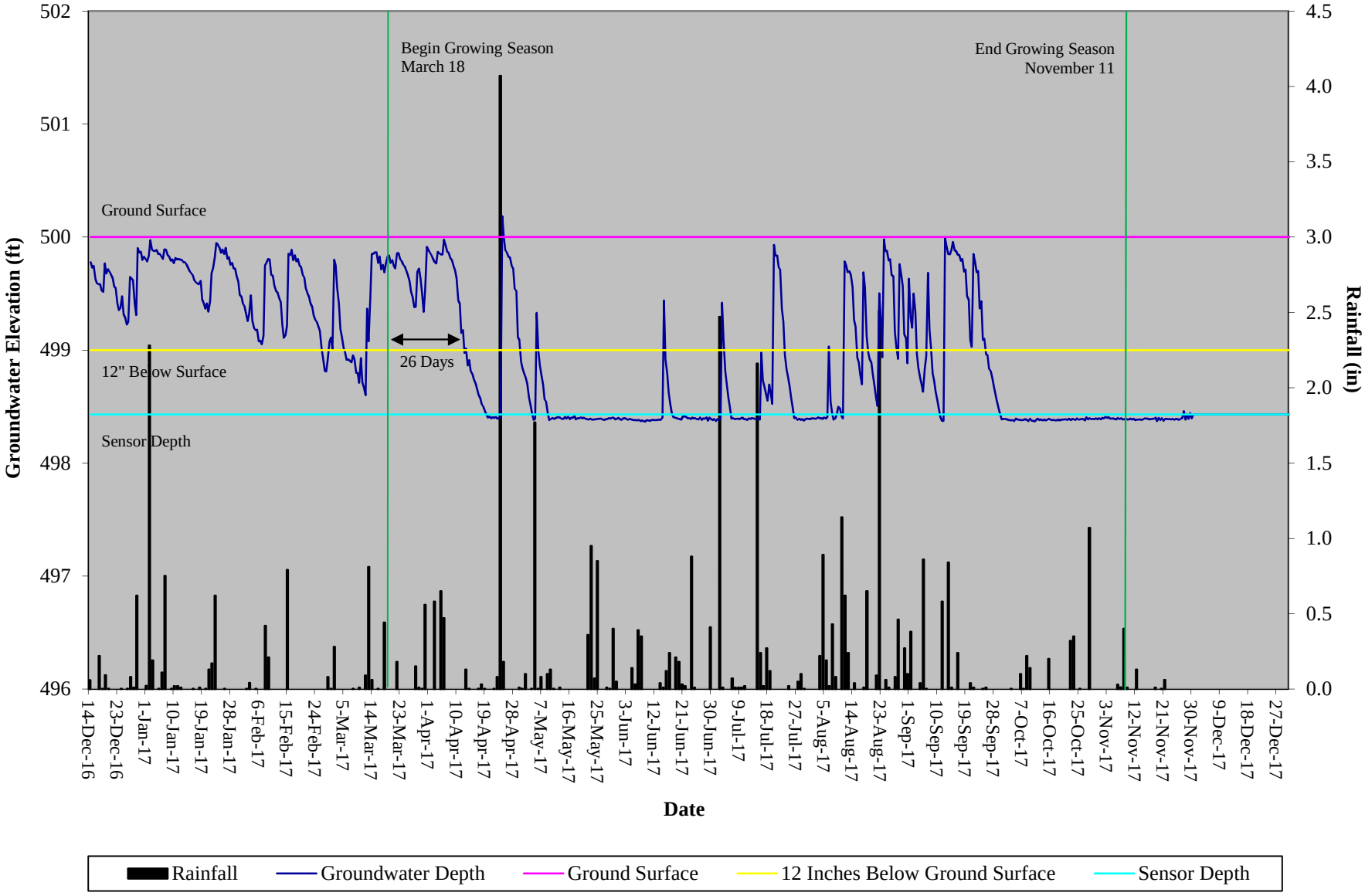
Twin Bays Restoration Site
Hydrograph
Wetland Gauge 4



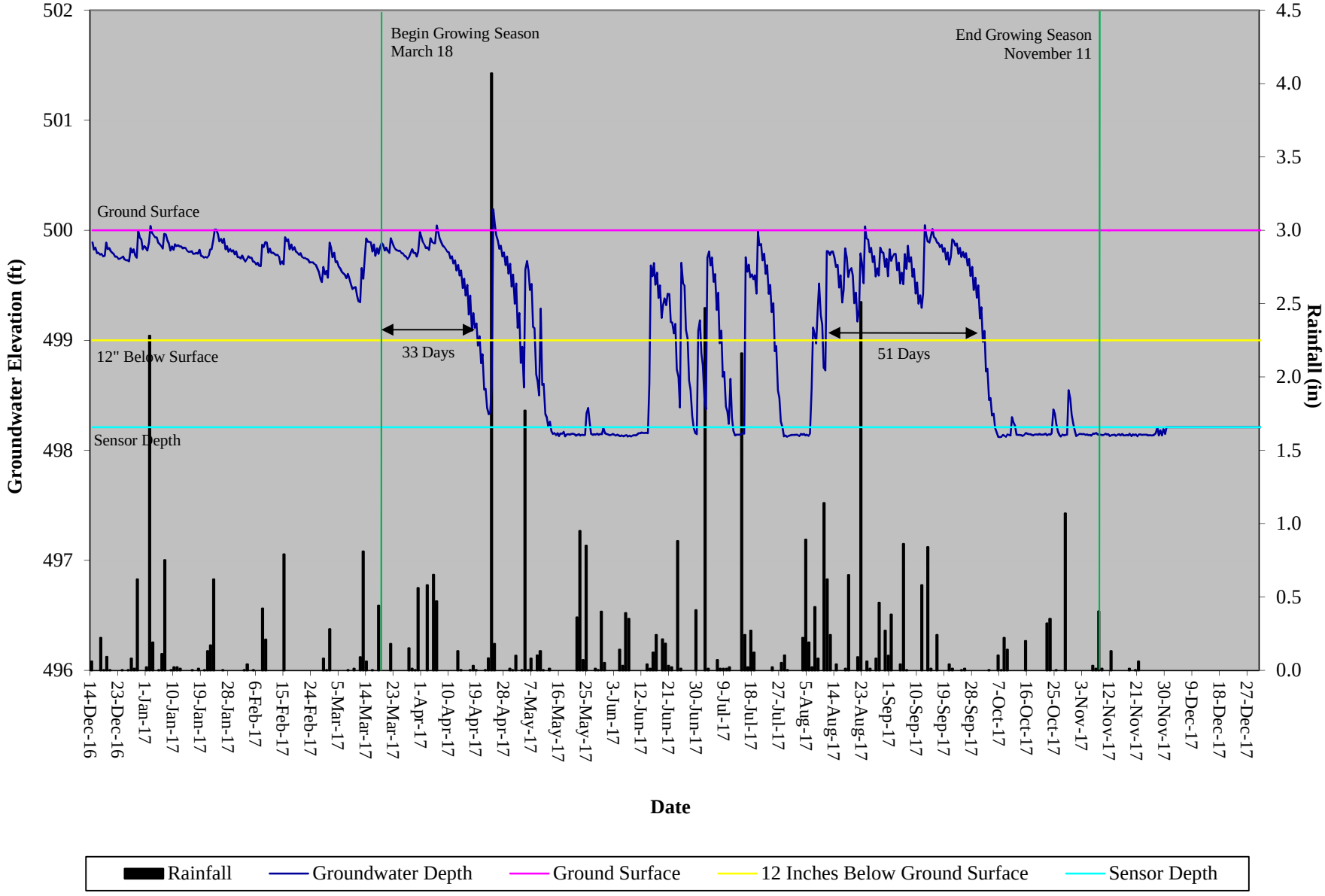
Twin Bays Restoration Site
Hydrograph
Wetland Gauge 5



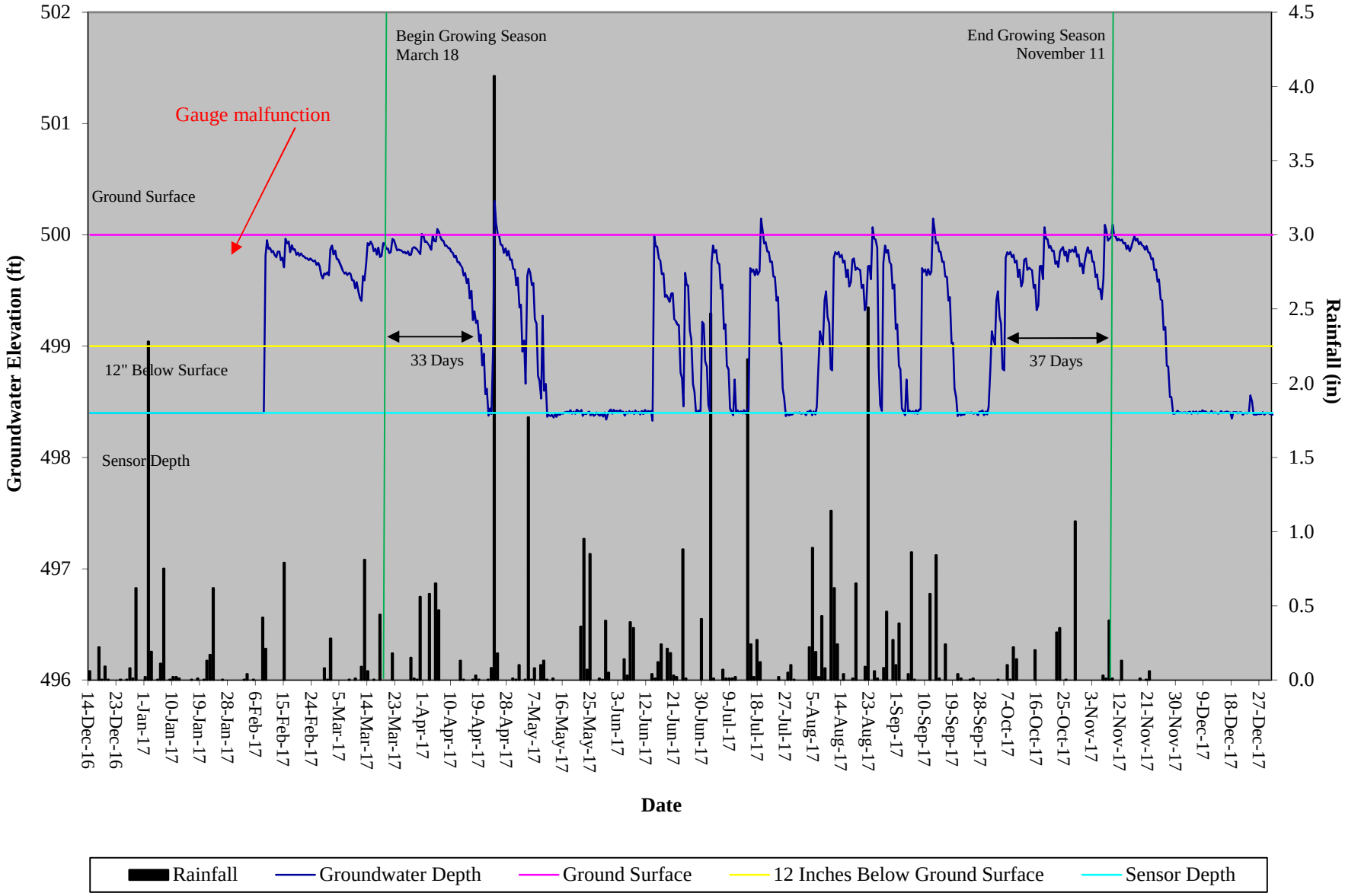
Twin Bays Restoration Site
Hydrograph
Wetland Gauge 6 - non-credit bearing



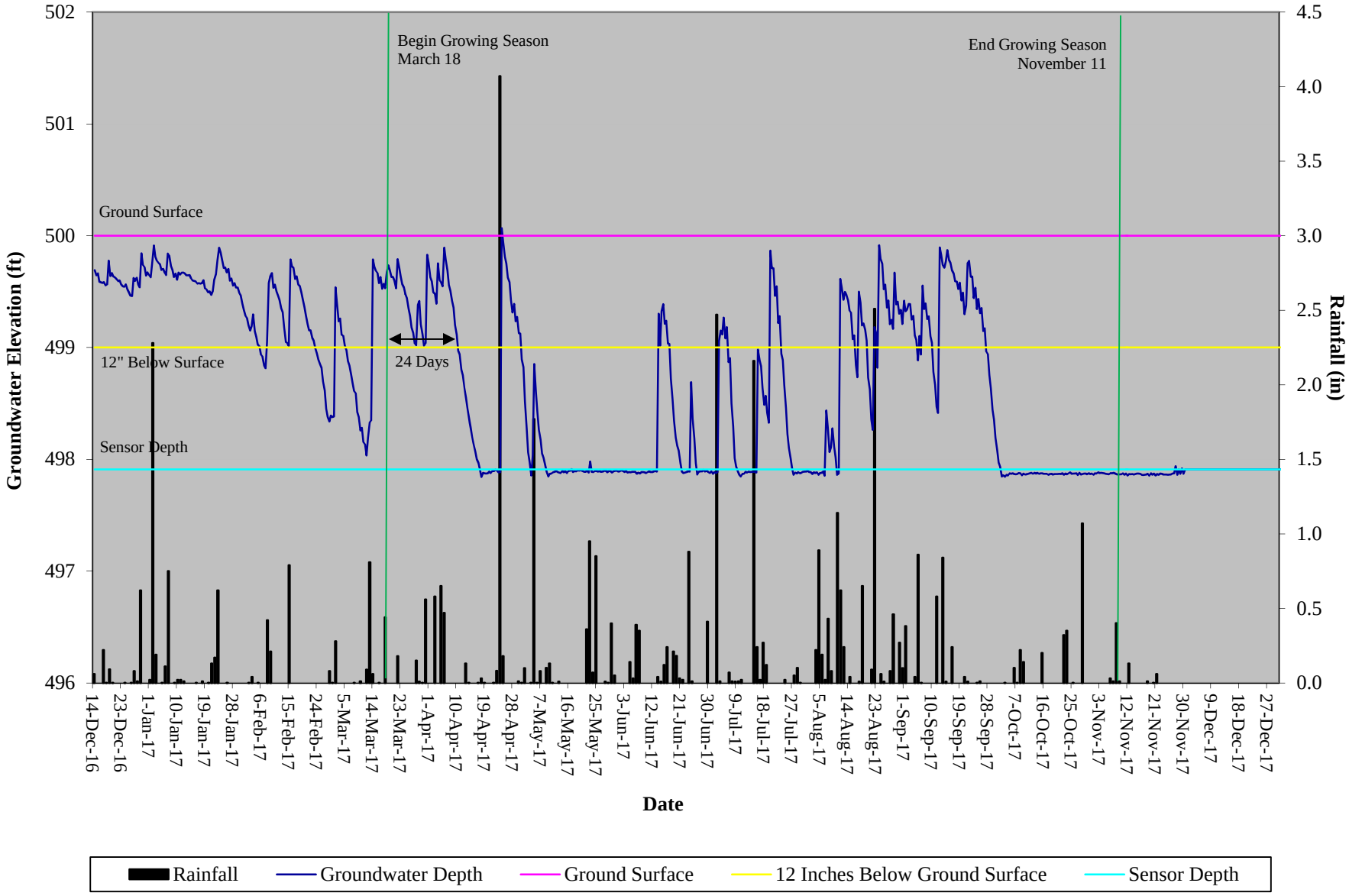
Twin Bays Restoration Site
Hydrograph
Wetland Gauge 7



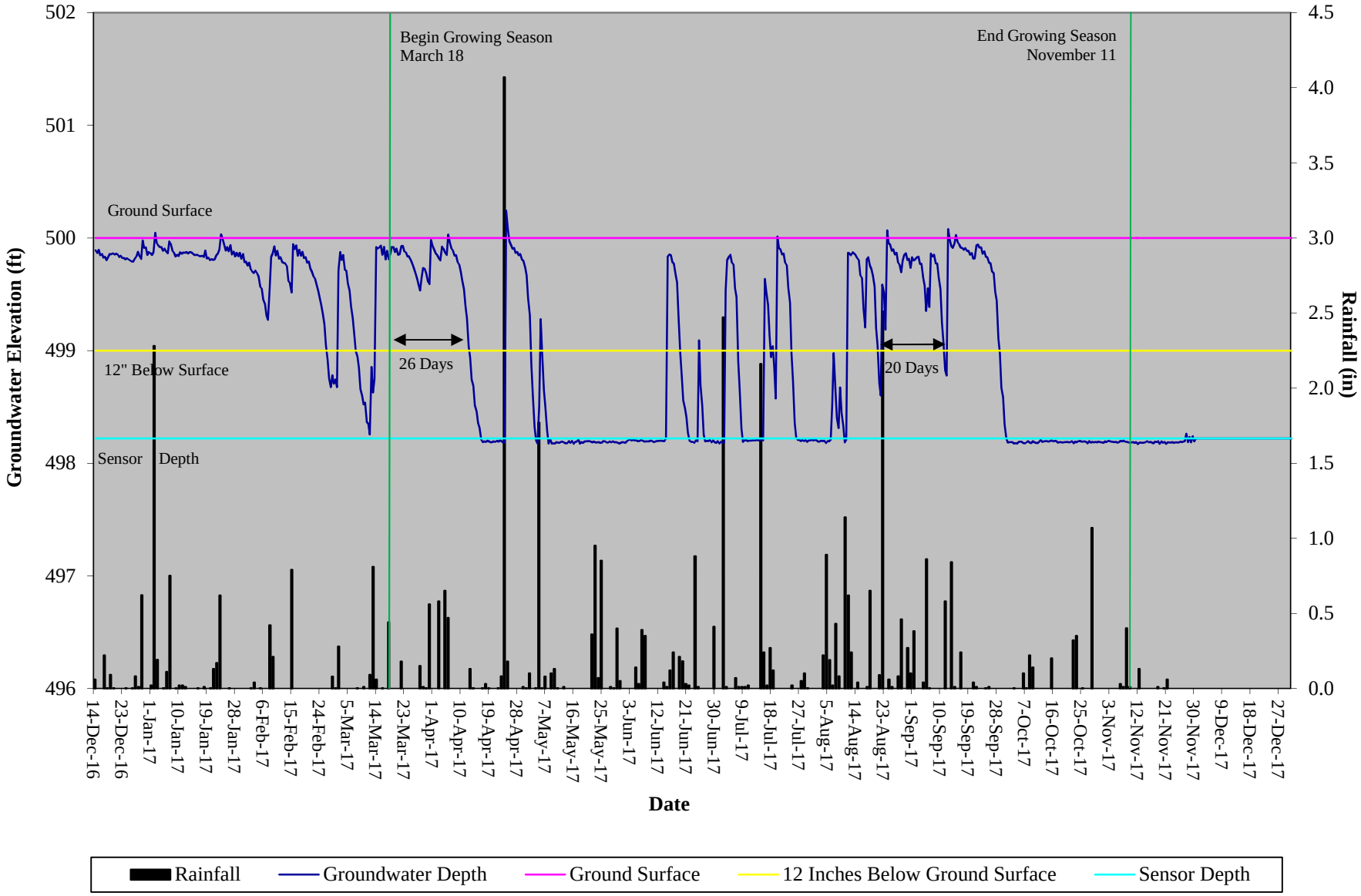
Twin Bays Restoration Site
Hydrograph
Wetland Gauge 8



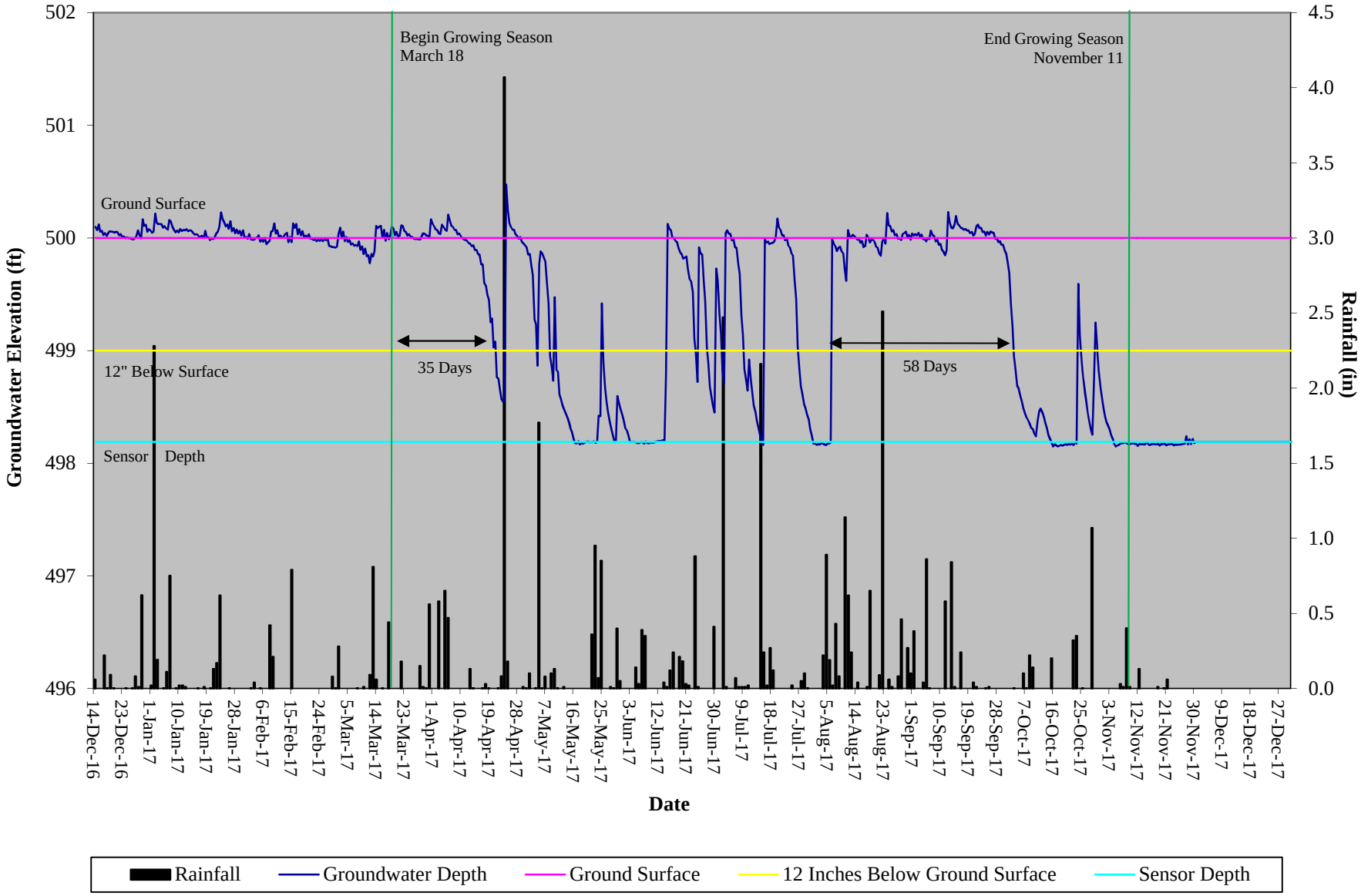
Twin Bays Restoration Site
Hydrograph
Wetland Gauge 9



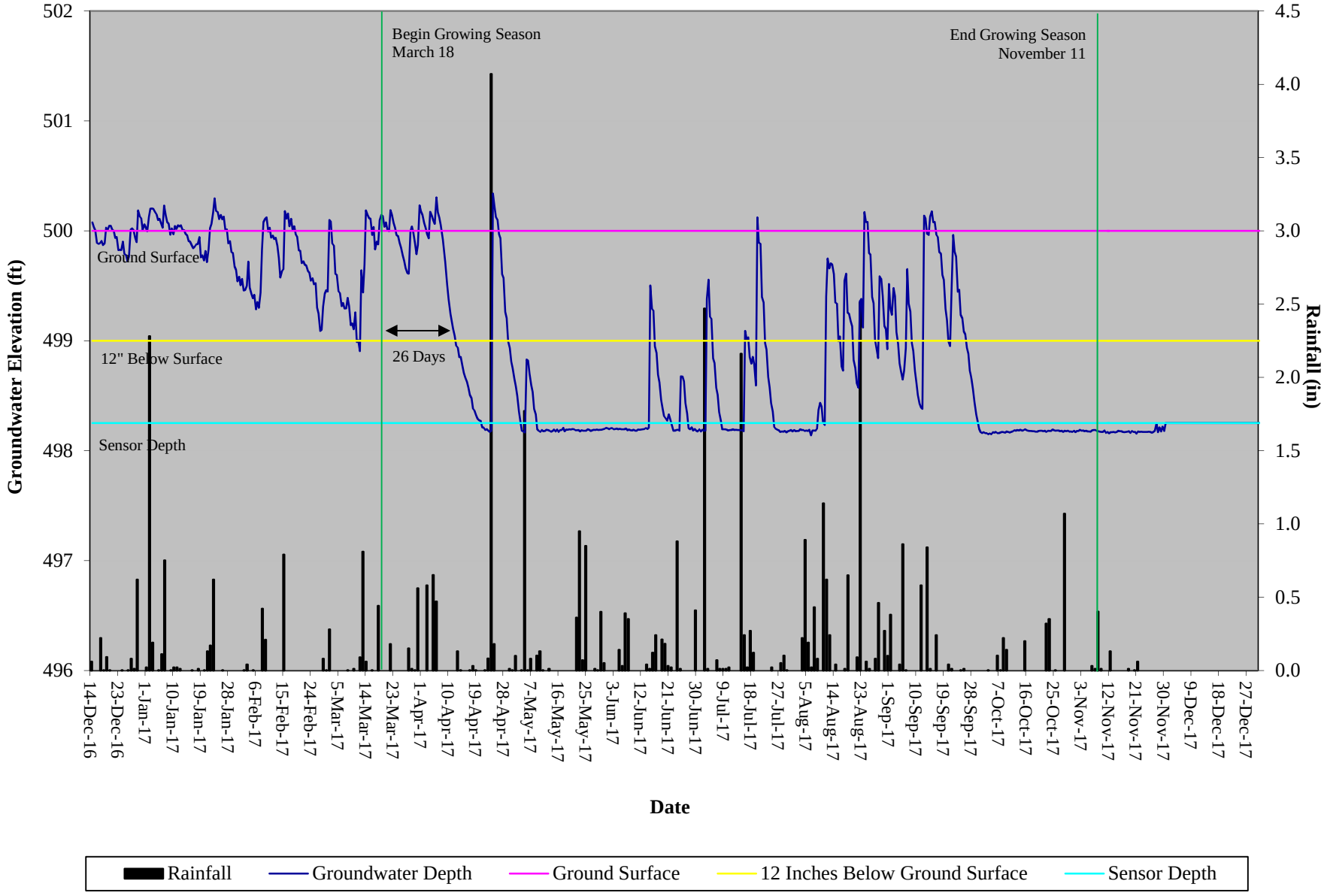
Twin Bays Restoration Site
Hydrograph
Wetland Gauge 10



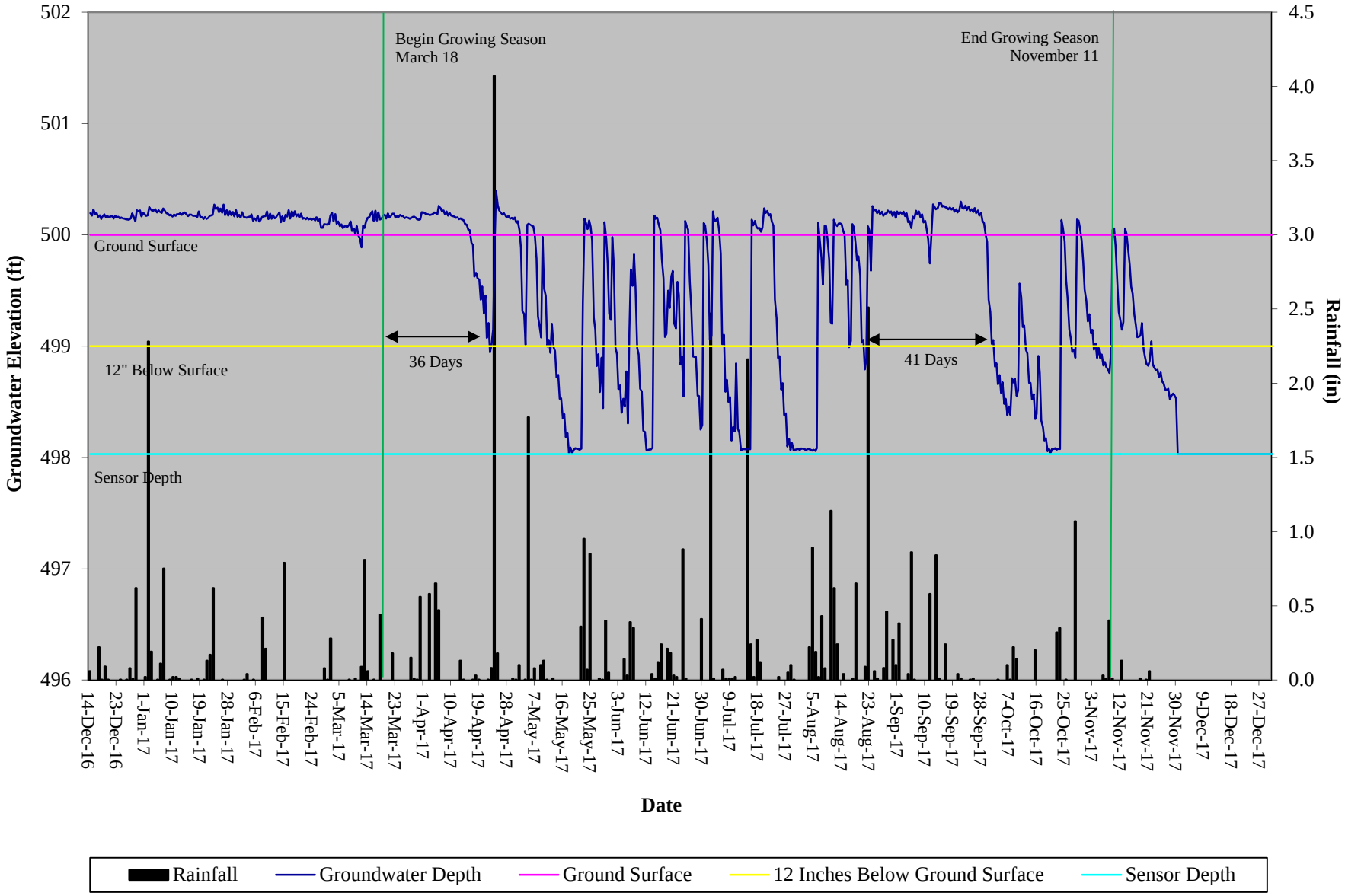
Twin Bays Restoration Site
Hydrograph
Wetland Gauge 11



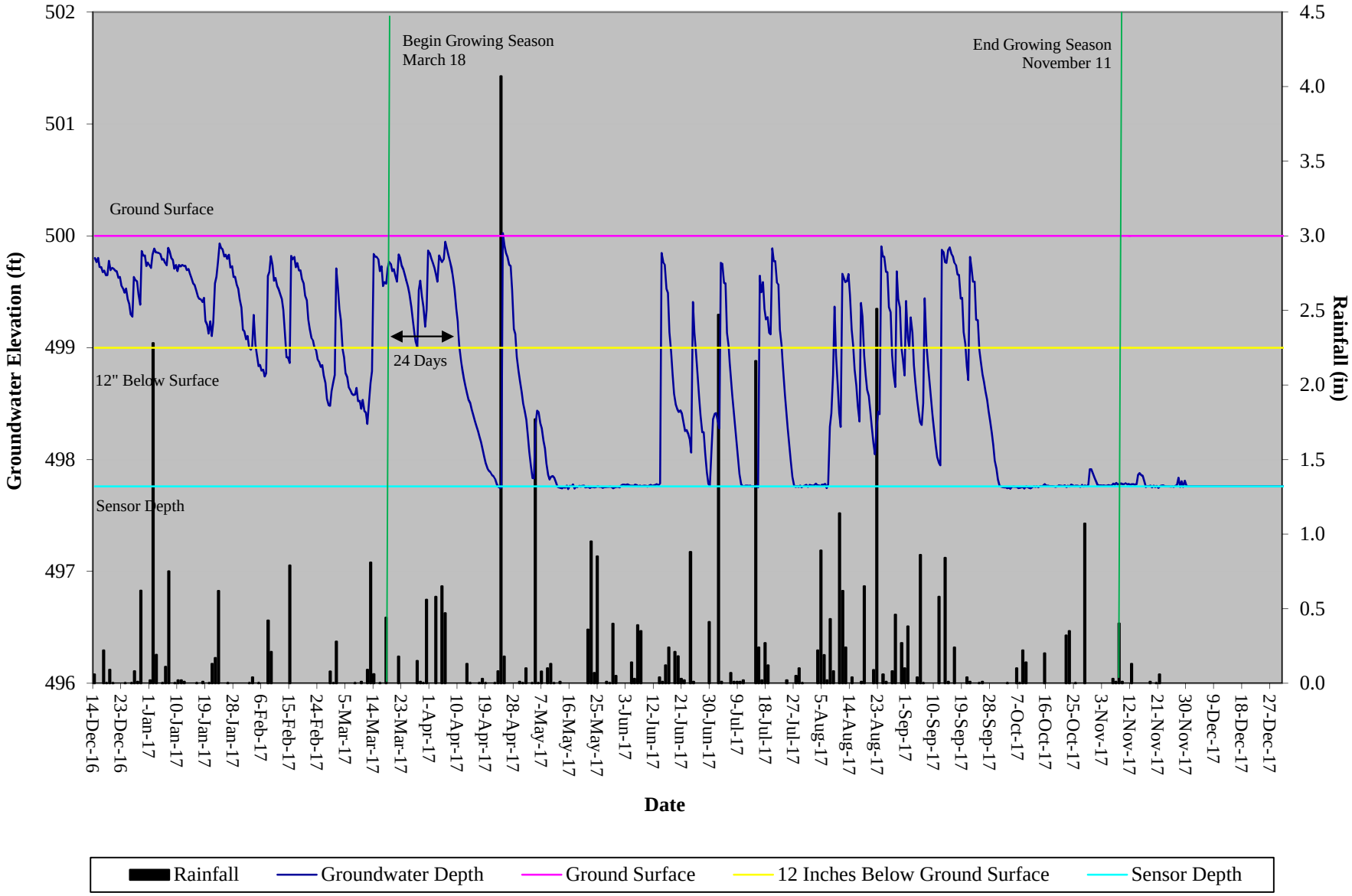
Twin Bays Restoration Site
Hydrograph
Wetland Gauge 12

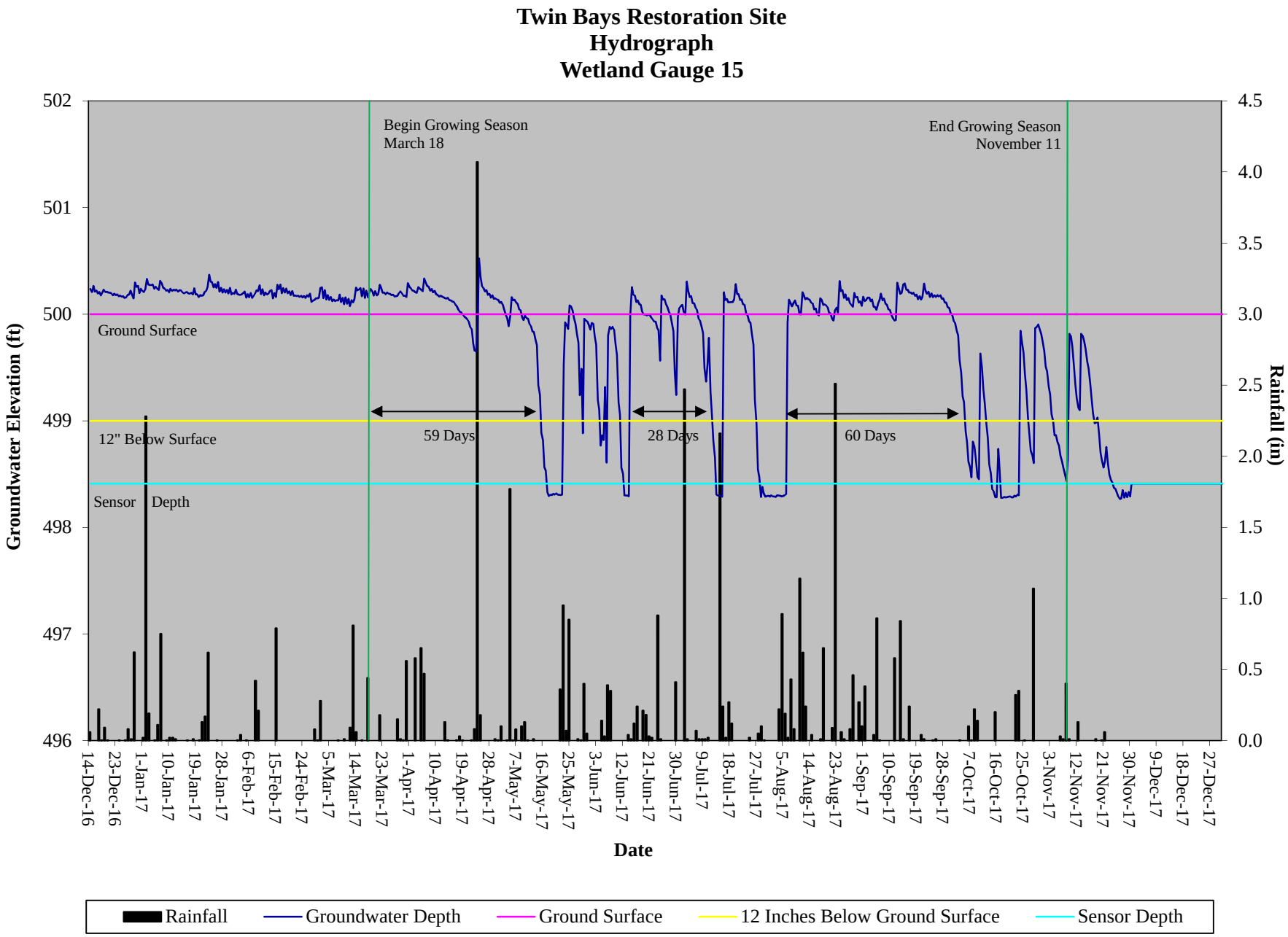


Twin Bays Restoration Site
Hydrograph
Wetland Gauge 13

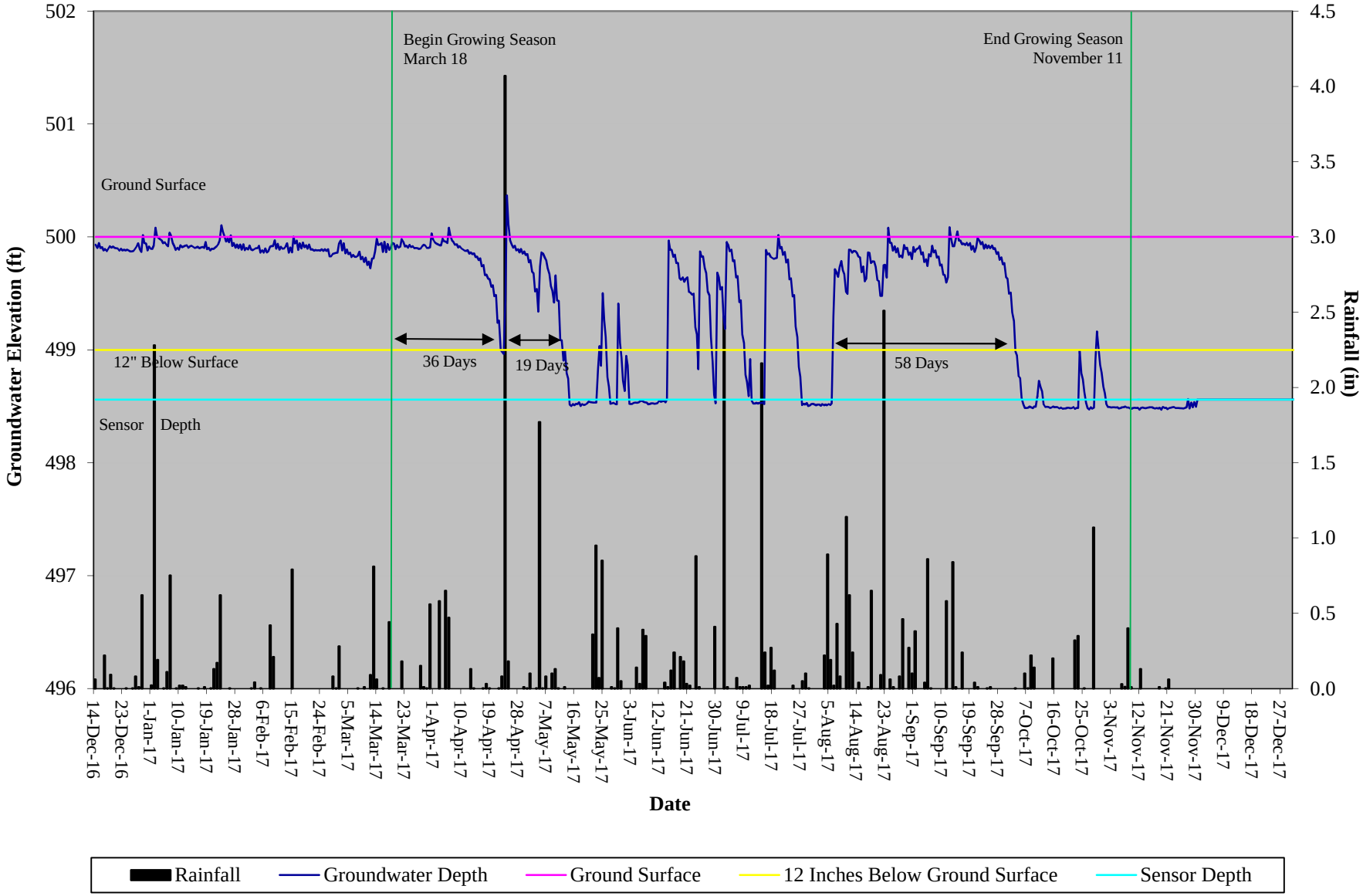


Twin Bays Restoration Site
Hydrograph
Wetland Gauge 14

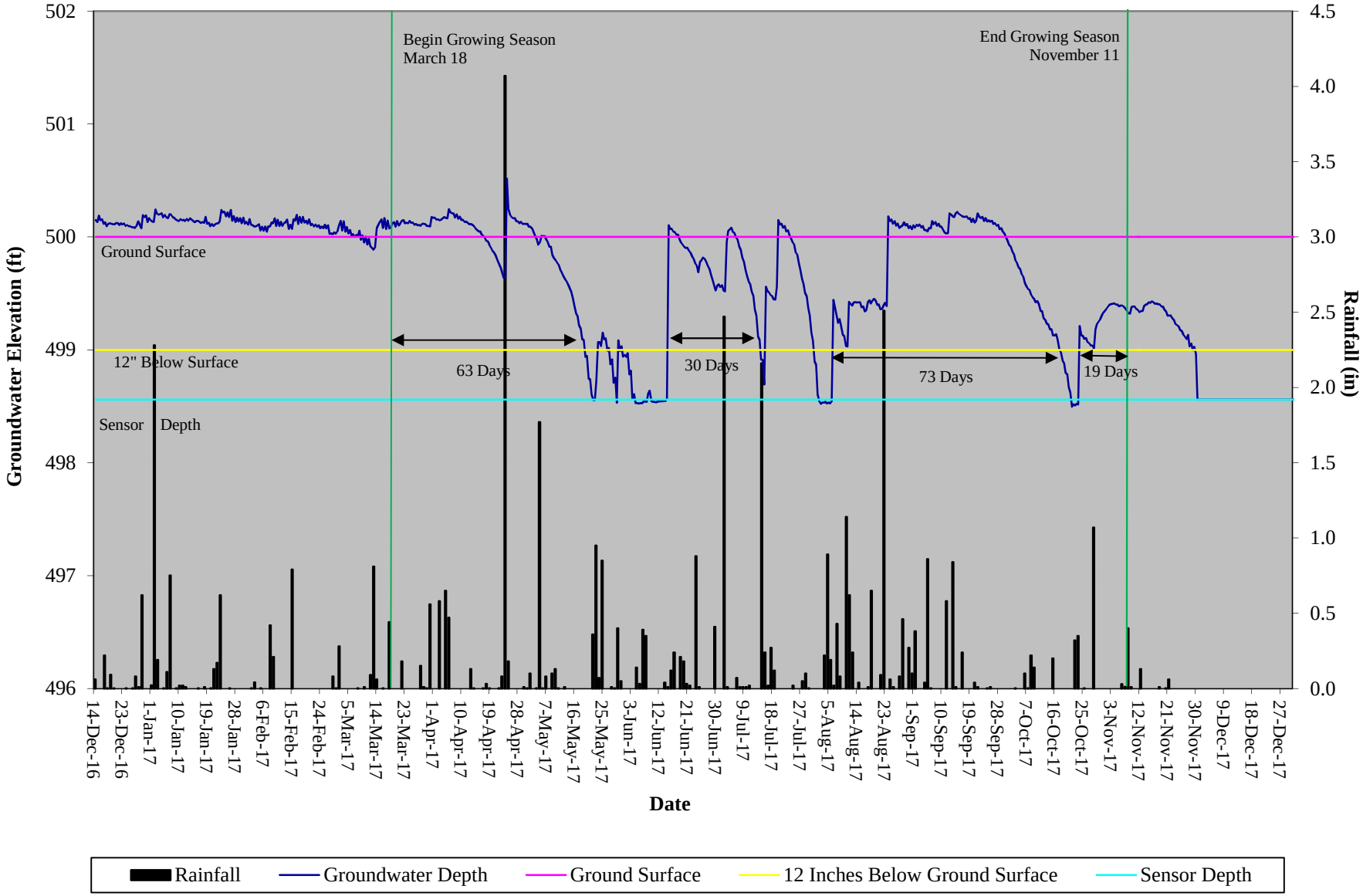



Twin Bays Restoration Site
Hydrograph
Wetland Gauge 15
Groundwater Elevation (ft)
Rainfall (in)
Begin Growing Season
March 18
End Growing Season
November 11
Ground Surface
12" Below Surface
Sensor Depth
59 Days
28 Days
60 Days
Date
Rainfall
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface
Sensor Depth

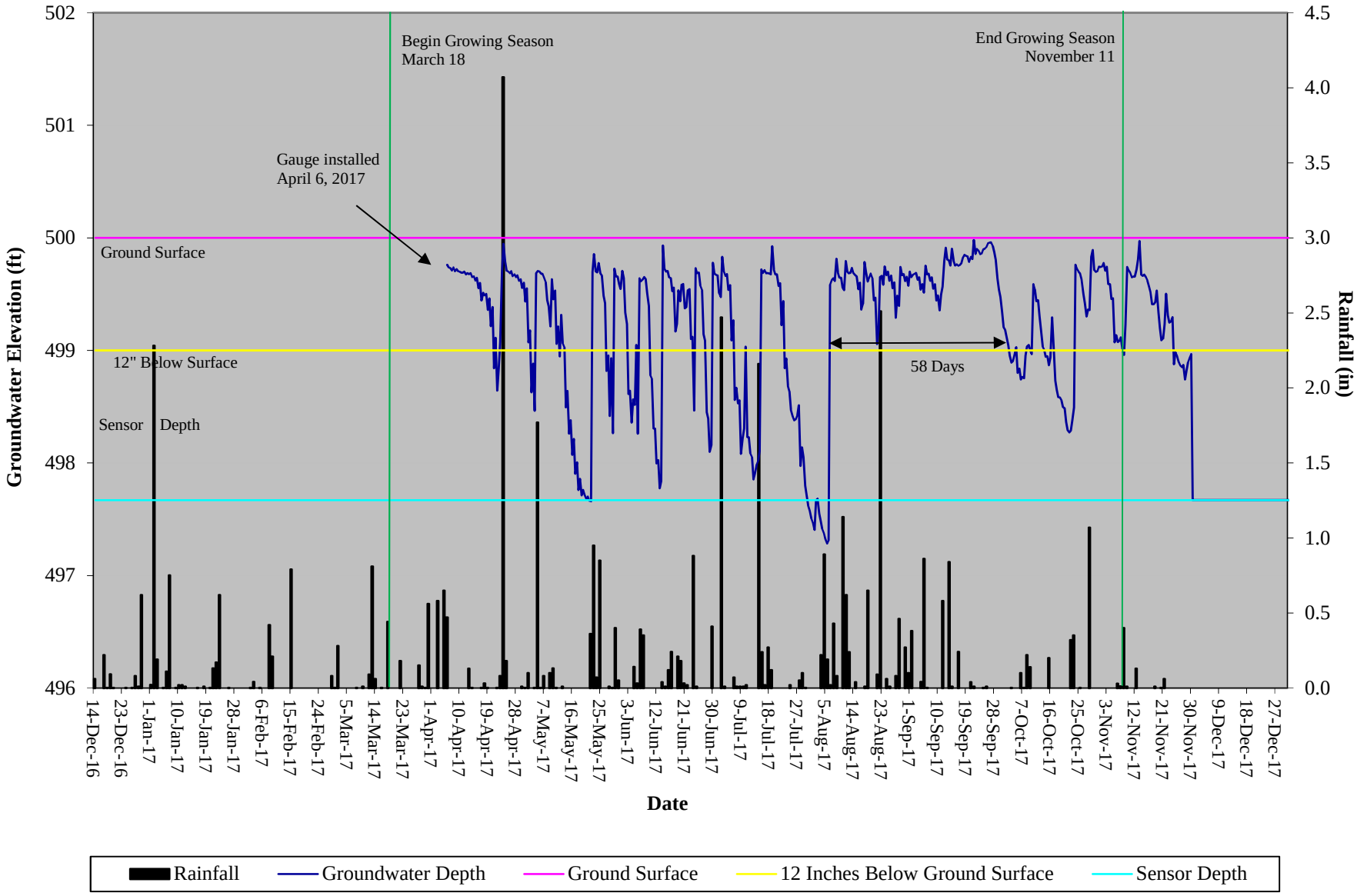
Twin Bays Restoration Site
Hydrograph
Wetland Gauge 16



Twin Bays Restoration Site
Hydrograph
Wetland Gauge 17



Twin Bays Restoration Site
Hydrograph
Wetland Gauge 18



Twin Bays Restoration Site
Hydrograph
Wetland Gauge 19

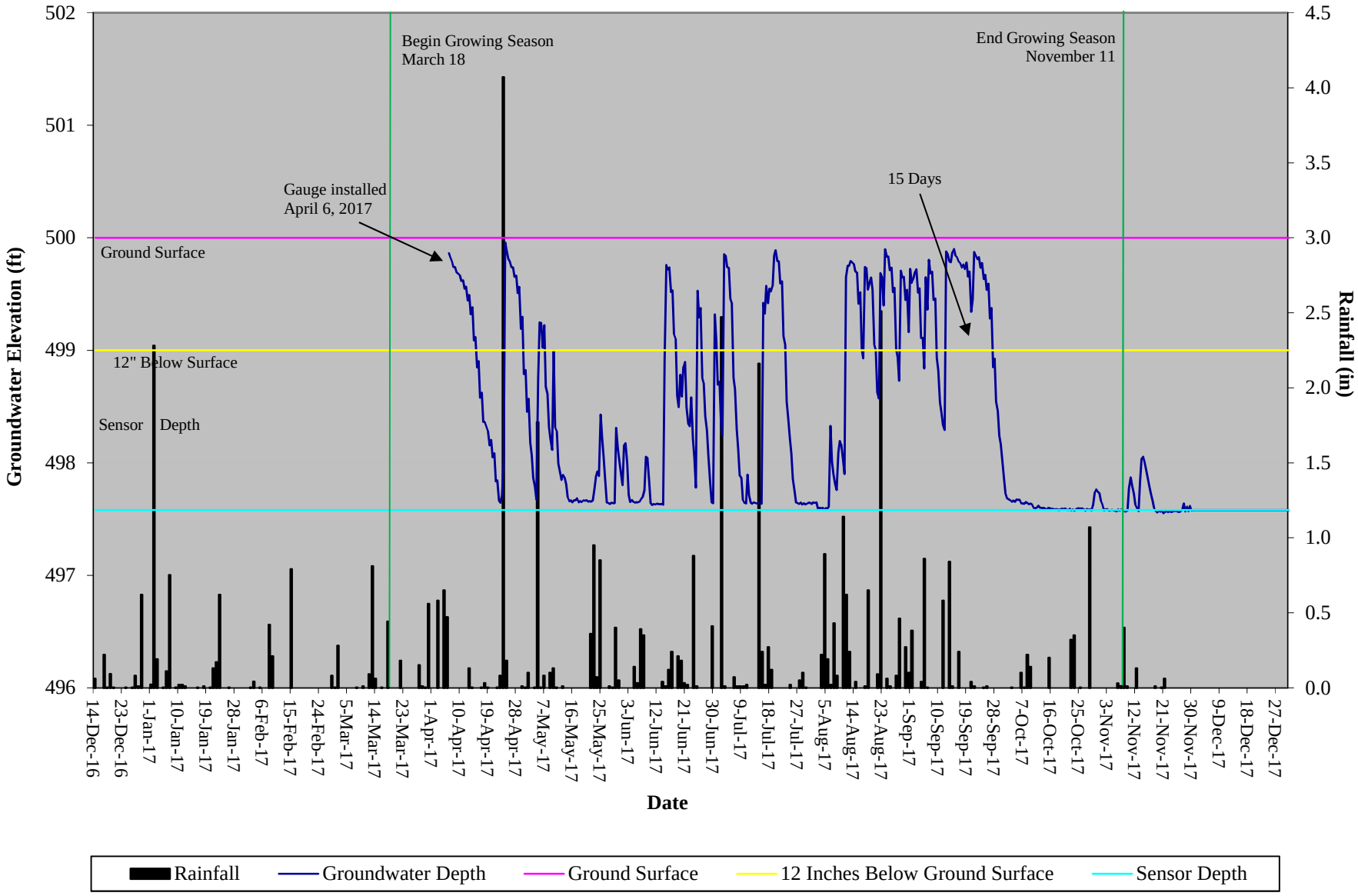


Table 9. Wetland Hydrology Attainment Table Twin Bays Restoration Site, DMS Project #95363							
	Greater than 8% Continuous Saturation/Max Consecutive Days During Growing Season (Percentage)						
Gauge #	**MY-01 2014**	**MY-02 2015**	**MY-03 2016**	**MY-04 2017**	**MY-05 2018**	**MY-06 2019**	**MY-07 2020**
Gauge 1	Yes/25 (10.5%)	Yes/105 (43.9%)	No/2 (0.8%)	No/9 (3.8%)			
Gauge 2	No/16 (6.5%)	Yes/75 (31.4%)	Yes/36 (14.9%)	Yes/30 (12.6%)			
Gauge 3*	13 (5.2%)	18 (7.3%)	10 (4.0%)	14 (5.9%)			
Gauge 4	Yes/26 (10.9%)	Yes/92 (38.5%)	Yes/36 (15.1%)	Yes/56 (23.4%)			
Gauge 5	Yes/27 (11.1%)	Yes/98 (41.0%)	Yes/53 (22.2%)	Yes/53 (22.2%)			
Gauge 6*	13 (5.4%)	41 (17.2%)	28 (11.5%)	26 (10.9%)			
Gauge 7	Yes/27 (11.1%)	Yes/75 (31.4%)	Yes/36 (14.9%)	Yes/51 (21.3%)			
Gauge 8	Yes/24 10.0%	Yes/75 (31.4%)	Yes/89 (37.0%)	Yes/37 (15.5%)			
Gauge 9	No/17 (6.9%)	Yes/92 (38.3%)	Yes/27 (11.1%)	Yes/24 (10.0%)			
Gauge 10	Yes/24 (9.8%)	Yes/22 (9.2%)	Yes/49 (20.5%)	Yes/26 (10.9%)			
Gauge 11	Yes/28 (11.7%)	Yes/100 (41.8%)	Yes/92 (38.5%	Yes/58 (24.3%)			
Gauge 12	No/14 (5.9%)	Yes/103 (43.1%)	No/18 (7.3%)	Yes/26 (10.9%)			
Gauge 13	No/15 (6.1%)	Yes/74 (30.8%)	Yes/54 (22.6%)	Yes/41 (17.2%)			
Gauge 14	Yes/22 (9.0%)	Yes/19 (8.0%)	No/13 (5.2%)	Yes/24 (10.0%)			
Gauge 15	Yes/27 (11.1%)	Yes/76 (31.8%)	Yes/95 (39.7%	Yes/60 (25.1%)			
Gauge 16	Yes/49 20.3%	Yes/76 (31.8%)	Yes/59 (24.5%)	Yes/58 (24.3%)			
Gauge 17**	-	Yes/104 (43.5%)	Yes/103 (42.9%)	Yes/73 (30.5%)			
Gauge 18‡	-	-	-	Yes/58 (24.3%)			
Gauge 19‡	-	-	-	No/15 (6.3%)			

* = Gauge in the non-credit bearing zone ‡=Gauge installed 4/6/2017

** = Gauge installed 3/8/2015