Bowl Basin Restoration Site
Monitoring Report MY03
DMS Project # 95721
DMS Contract # 005012

Onslow County, NC
CU# 03020106
DWR# 2013-0864
SAW# 2013-00393

Submitted to:

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

Construction Completed: February 2015
Data Collection: 2017
Submitted: January 2018

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

Mitigation Services
ENVIRONMENTAL QUALITY

January 24, 2018

Adam Spiller
KCI Associates of NC

Sent via email to adam.spiller@kci.com

Subject: Monitoring Report Year 3 Comments for
Bowl Basin, Project # 95356, Contract 005012
White Oak Basin – CU# 03020106, Onslow 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-2013-0864), and USACE (SAW-2013-00393) numbers for this project on the cover page.
- Page 33, 70/30 Graph- It may be useful to show the antecedent rainfall from November and December of 2016 as these low amounts may account for two gauges not meeting hydrology in MY3 (this is optional and just a suggestion).

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

Monitoring and Design Firm

4505 Falls of Neuse Road
Suite 400
Raleigh, NC 27609
Phone: (919) 278-2514
Fax: (919) 783-9266

Project Manager: Tim Morris
Email: tim.morris@kci.com

KCI Project No: 20122265

TABLE OF CONTENTS

Appendix A – Project Vicinity Map and Background Tables

Appendix B – Visual Assessment Data

Appendix C – Vegetation Plot Data

Appendix D – Hydrologic Data

1.0 EXECUTIVE SUMMARY / PROJECT ABSTRACT

The Bowl Basin Restoration Site (BBRS) is a full-delivery project that was developed for the North Carolina Division of Mitigation Services (DMS). Construction was completed in February 2015. The site is within the 03020106 Watershed Cataloging Unit (8-digit HUC) and the Local Watershed Unit (14-digit HUC) 03020106010010. In DMS' most recent publication of excluded and Targeted Local Watersheds/Hydrologic Units, the 03020106010010 14-digit HUC has been identified as a Targeted Local Watershed.

The project goals and objectives are listed below.

Project Goals

- Protect and improve water quality by reducing sediment and nutrient inputs
- The protection of a watershed draining into shellfish harvesting waters
- Provide habitat for aquatic flora and fauna by improving physical structure and vegetative composition
- Increase the local hydroperiod by encouraging both surface and subsurface storage and retention
- Restore and establish a functional and diverse wetland community

Project 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.
- Restore a diverse wetland vegetation community through maintenance and germination of existing wetland seed stores, planting of wetland trees and shrubs, and incorporation of a custom wetland seed mix

The project site, which is protected by an 11.7-acre permanent conservation easement held by the State of North Carolina, is situated in Onslow County in the Carolina Flatwoods ecoregion of the Coastal Plains physiographic province. The site is located on a single parcel located off of White Oak River Road approximately 13.5 miles north of Jacksonville, North Carolina.

The BBRS provided mitigation for wetland impacts within Hydrologic Unit 03020106 by restoring 11.7 acres of wetland, generating 11.7 non-riparian wetland mitigation units (WMU's)

The BBRS will be monitored to determine if the project is on-track to meeting jurisdictional wetland status. In the restoration areas, the wetland site 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.

2.0 MONITORING RESULTS

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, 288 stems/acre after four 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.

The third-year vegetation monitoring was based on the Level 2 CVS-EEP vegetation monitoring protocol. The site's average density for this monitoring period was 773 planted stems/acre. All ten plots had greater than 320 planted stems/acre. Including volunteers, the site averaged 3,072 total stems/acre. In general the site is well vegetated, with widespread herbaceous coverage and healthy planted stems. Two of the ten plots (Plots 5 and 6) had greater than 100 sweetgum stems (*Liquidambar styraciflua*) growing in them and an additional three plots (Plots 1, 4, and 7) had approximately 40 sweetgum stems. In each of these plots, at least half of these stems are less than 137 cm tall and in two of the plots (Plots 6 and 7) all of the sweetgum stems are less than 50 cm tall. Because the majority of these sweetgum are much smaller than the planted stems in the area, these large numbers of sweetgum are not seen as problematic for the site. Areas of the site that do contain dense areas of tall sweetgum were treated in the spring of 2017 and this treatment will be repeated as necessary to ensure the sweetgum does not out compete the planted stems.

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 9% of the growing season with a 50% probability of reoccurrence during normal weather conditions. A "normal" year is based on NRCS climatological data for Onslow 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 growing season for Onslow County is considered to extend from March 18 to November 16 (243 days). The water table of the restored wetlands must be within 12" of the soil surface continuously for at least 9% (22 days) of the 243-day growing season. Wetland hydrology will be monitored with eight automatic gauges that record water table depth.

The wetland gauges will be checked and/or downloaded every other month. Daily data will be collected from the automatic gauges over the 7-year monitoring period.

The daily rainfall data was obtained from a local weather station in Pumpkin Center, NC; provided by the NC State Climate Office. For the 2017 year, the month of April experienced above average rainfall, while March, May, July, August, and October experienced average rainfall. The months of January, February, June, September, 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 second growing season, 6 of the 8 gauges had continuous saturation within 12 inches of the ground surface for 9% (22 days) of the 243 day growing season (March 18 to November 16). Overall the gauges on site averaged 33 days (13.7%) of continuous saturation.

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. The vegetation monitoring was completed on June 26, 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)

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

Appendix A

Project Vicinity Map and Background Tables

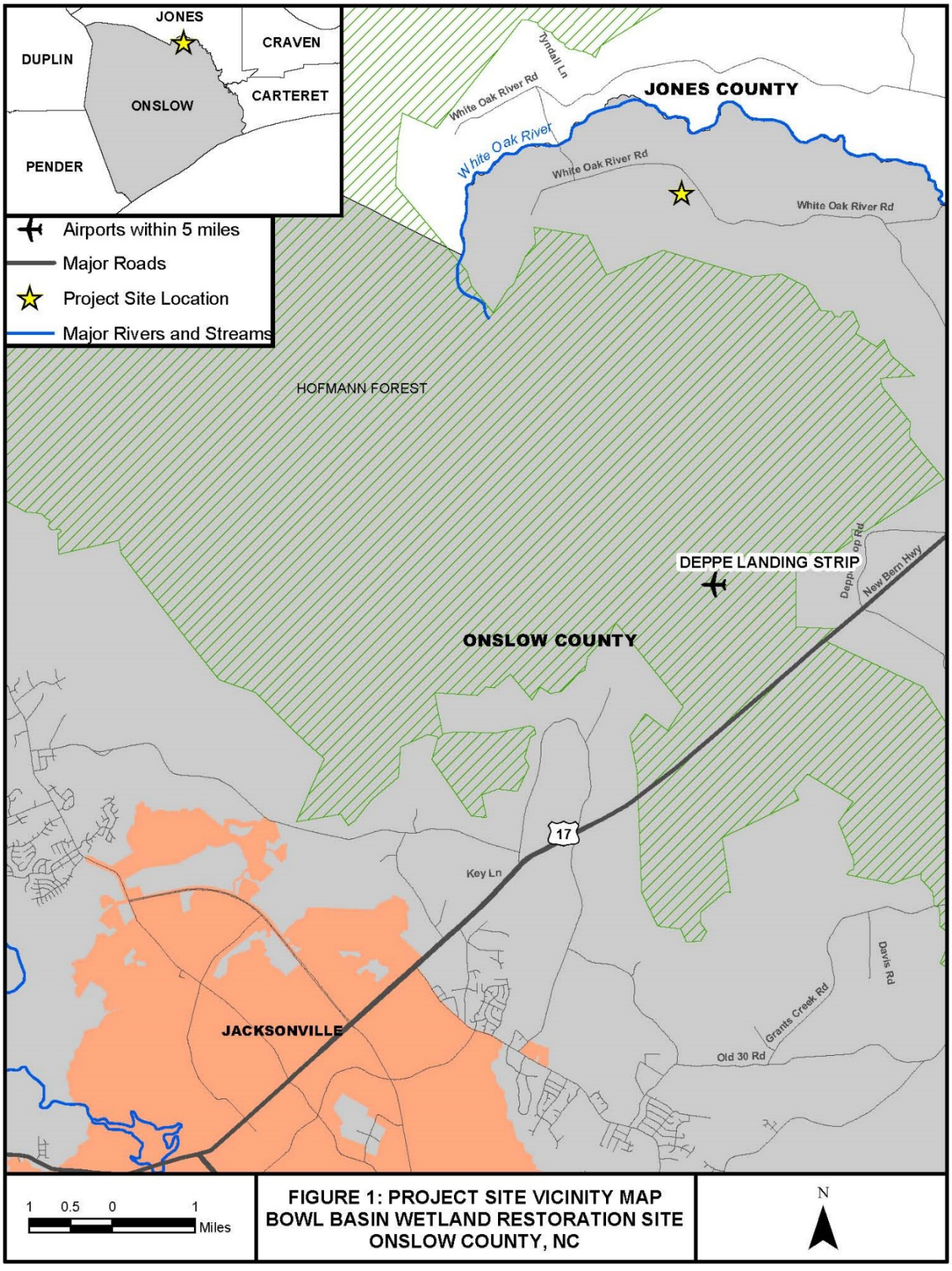

JONES
CRAVEN
DUPLIN
ONSLOW
CARTERET
PENDER
Airports within 5 miles
Major Roads
Project Site Location
Major Rivers and Streams
Tyndall Ln
White Oak River Rd
JONES COUNTY
White Oak River
White Oak River Rd
White Oak River Rd
HOFMANN FOREST
DEPPE LANDING STRIP
New Bern Hwy
ONSLOW COUNTY
17
Key Ln
Davis Rd
Grants Creek Rd
Old 30 Rd
JACKSONVILLE
1 0.5 0 1
Miles
FIGURE 1: PROJECT SITE VICINITY MAP
BOWL BASIN WETLAND RESTORATION SITE
ONSLOW COUNTY, NC
N

FIGURE 2: PROJECT SITE MITIGATION PLAN VIEW
BOWL BASIN WETLAND RESTORATION SITE
ONSLOW COUNTY, NC

Image Source: NC 2010 Statewide Orthoimagery.

Table 1. Project Components
Project Number and Name: 95721 – Bowl Basin Restoration Site

Mitigation Credits

	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Acres	-	-	-	-	11.7	-	-	-	-
Credits	-	-	-	-	11.7	-	-	-	-
TOTAL CREDITS	-		-		11.7		-	-	-

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	-	11.7 acres	-	Restoration	11.7 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				11.7 acres		
Enhancement						
Enhancement I						
Enhancement II						
Creation						
Preservation						
High Quality Preservation						
TOTAL	-	-	-	11.7 acres	-	-

Table 2. Project Activity & Reporting History Project Number and Name: 95721 - Bowl Basin Restoration Site		
Elapsed Time Since Grading Complete: 2 year 10 months **Elapsed Time Since Planting Complete: 2 year 10 months** **Number of Reporting Years: 3**		
Activity or Report	**Data Collection Complete**	**Actual Completion or Delivery**
Mitigation Plan		Oct 2014
Final Design - Construction Plans		Dec 2014
Construction		March 2015
Planting		March 2015
Baseline Monitoring/Report	April 2015	May 2015
Vegetation Monitoring	May 20, 2015	
Photo Points	May 26, 2015	
Year 1 Monitoring	Nov 2015	Jan 2016
Vegetation Monitoring	Oct 16, 2015	
Photo Points	Oct 16, 2015	
Gauge Downloads	Nov 25, 2015	
Year 2 Monitoring	Nov 2016	Dec 2016
Vegetation Monitoring	June 30, 2016	
Photo Points	Aug 23, 2016	
Gauge Downloads	Nov 22, 2016	
Year 3 Monitoring	Dec 2017	Jan 2018
Vegetation Monitoring	June 26, 2017	
Photo Points	Nov 30, 2017	
Gauge Downloads	Dec 1, 2017	

Table 3. Project Contacts **Project Number and Name: 95721 - Bowl Basin Restoration Site**	
Design Firm	KCI Associates of North Carolina, PC 4505 Falls of Neuse Road 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 Road Suite 400. Raleigh, NC 27609 Contact: Mr. Tim Morris Phone: (919) 278-2512 Fax: (919) 783-9266
Planting Contractor	Bruton Nurseries and Landscapes PO Box 1197 Freemont, NC 27830 Contact: Mr. Charlie Bruton Phone: (919) 242-6555
Monitoring Performers	
MY00-MY03	KCI Associates of North Carolina, PC 4505 Falls of Neuse Road Suite 400 Raleigh, NC 27609 Contact: Mr. Adam Spiller Phone: (919) 278-2514 Fax: (919) 783-9266

Table 4. Project Attribute Table **Project Number and Name: 95721 – Bowl Basin Restoration Site**			
County	Onslow County		
Project Area (acres)	11.7 acres		
Project Coordinates (lat. and long.)	34.925365 N , -77.607461 W		
Project Watershed Summary Information			
Physiographic Province	Coastal Plain		
River Basin	White Oak		
USGS Hydrologic Unit 8-digit	03020106	**USGS Hydrologic Unit 14-digit**	03020106010010
DWQ Sub-basin	03-05-01b		
Project Drainage Area (acres)	76.0 acres		
Project Drainage Area Percentage of Impervious Area	1%		
CGIA Land Use Classification	94% Cultivated, 4% Forest, and 2% Low-Intensity Development		
Wetland Summary Information			
Parameters	**Wetland Area**		
Size of Wetland (acres)	11.7 acres		
Wetland Type (non-riparian, riparian riverine or riparian non-riverine)	Non-riparian		
Mapped Soil Series	Pantego loam by detailed soil investigation		
Drainage class	Poorly drained		
Soil Hydric Status	Drained Hydric		
Source of Hydrology	Groundwater / Precipitation		
Hydrologic Impairment	Ditching and Crops		
Native vegetation community	Crops		
Percent composition of exotic invasive vegetation	0%		

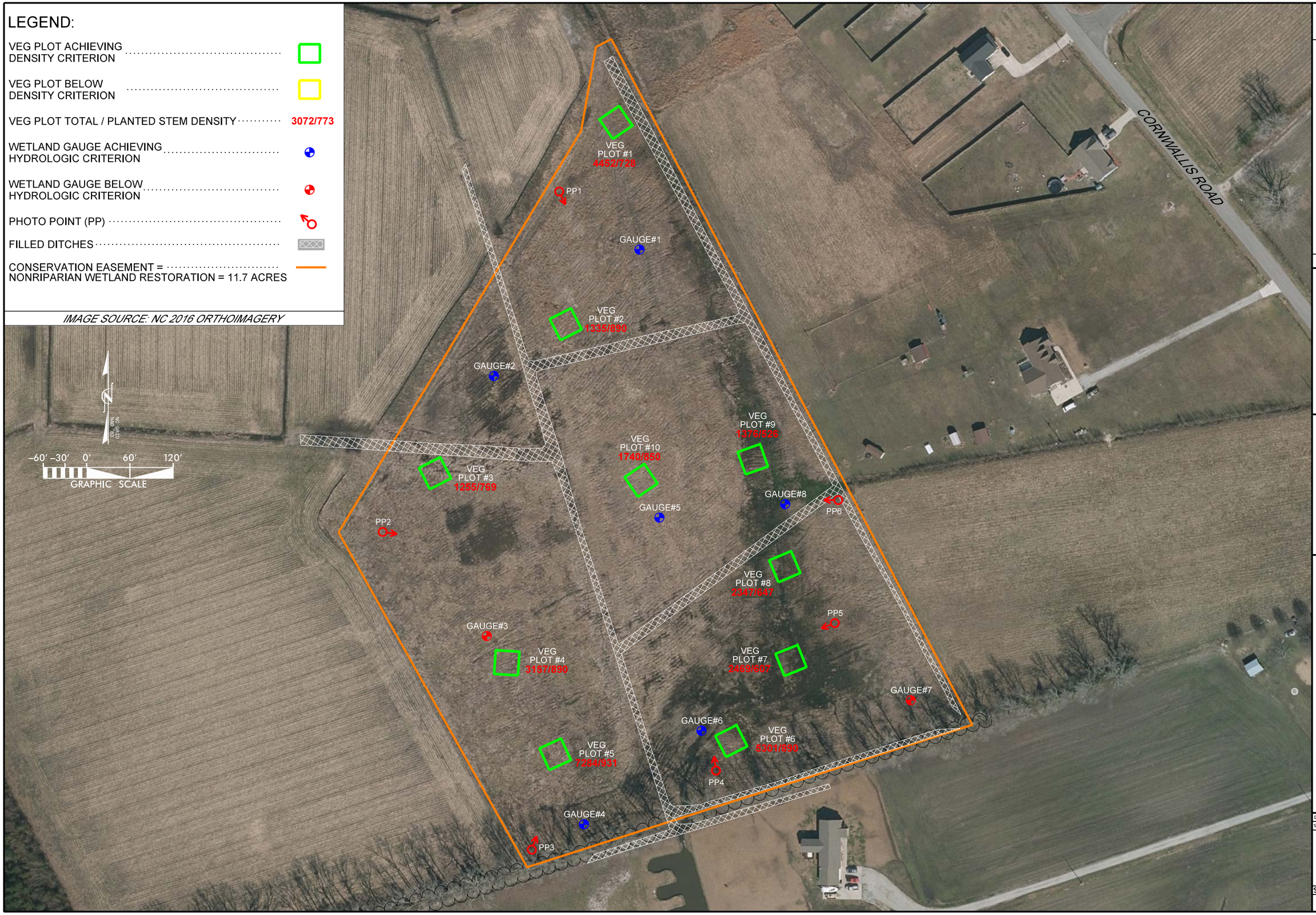
Appendix B

Visual Assessment Data

LEGEND:

- VEG PLOT ACHIEVING DENSITY CRITERION
- VEG PLOT BELOW DENSITY CRITERION
- VEG PLOT TOTAL / PLANTED STEM DENSITY ····· 3072/773
- WETLAND GAUGE ACHIEVING HYDROLOGIC CRITERION
- WETLAND GAUGE BELOW HYDROLOGIC CRITERION
- PHOTO POINT (PP)
- FILLED DITCHES
- CONSERVATION EASEMENT =
  NONRIPARIAN WETLAND RESTORATION = 11.7 ACRES

IMAGE SOURCE: NC 2016 ORTHOIMAGERY



NO.	DESCRIPTION	DATE
	REVISIONS	

NCDEQ DIVISION OF MITIGATION SERVICES

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

BOWL BASIN
RESTORATION SITE
DMS PROJECT #95721
ONSLOW COUNTY, NORTH CAROLINA
MONITORING YEAR 03

DATE: DEC 2017
SCALE: GRAPHIC

CURRENT CONDITION PLAN VIEW

SHEET 1 OF 1

FIGURE 3

Table 5. Vegetation Condition Assessment

Project Number and Name: 95721 – Bowl Basin Restoration Site

Planted Acreage 11.7 **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 acres	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 acres	Not Depicted, Covers Most of Restoration Area	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 acres	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).	1000 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

PP1 – MY-03 – 11/30/17

PP2 – MY-03 – 11/30/17

PP3 – MY-03 – 11/30/17

PP4 – MY-03 – 11/30/17

PP5 – MY-03 – 11/30/17

PP6 – MY-03 – 11/30/17

Vegetation Monitoring Plot Photos

Vegetation Plot 1 – MY-03 – 6/26/17

Vegetation Plot 2 – MY-03 – 6/26/17

Vegetation Plot 3 – MY-03 – 6/26/17

Vegetation Plot 4 – MY-03 – 6/26/17

Vegetation Plot 5 – MY-03 – 6/26/17

Vegetation Plot 6 – MY-03 – 6/26/17

Vegetation Plot 7 – MY-03 – 6/26/17

Vegetation Plot 8 – MY-03 – 6/26/17

Vegetation Plot 9 – MY-03 – 6/26/17

Vegetation Plot 10 – MY-03 – 6/26/17

Appendix C

Vegetation Plot Data

Table 6. Vegetation Plot Criteria Attainment Project Number and Name: 95721 - Bowl Basin Restoration Site			
Vegetation Plot ID	**Vegetation Survival Threshold Met? (320 planted stems/acre)**	**Monitoring Year 03 Planted Stem Density (stems/acre)**	**Monitoring Year 03 Total Stem Density (stems/acre)**
1	Yes	728	4,452
2	Yes	890	1,335
3	Yes	769	1,255
4	Yes	890	3,157
5	Yes	931	7,284
6	Yes	890	5,301
7	Yes	607	2,469
8	Yes	647	2,347
9	Yes	526	1,376
10	Yes	850	1,740

Table 7. CVS Vegetation Plot Metadata Project Number and Name: 95721 - Bowl Basin Wetland Restoration Site	
Report Prepared By	Ben Grunwald
Date Prepared	7/3/2017 13:59
database name	KCI-2015-95721_Bowl Basin.mdb
database location	M:\2012\20122939 Bowl Basin FDP\Monitoring\Veg Database
computer name	12-3ZV4FP1
file size	62558208
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	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.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY----------	
Project Code	
project Name	Bowl Basin Wetland Restoration Site
Description	Wetland Restoration Site
River Basin	White Oak
Sampled Plots	

Table 8. CVS Stem Count Total and Planted by Plot and Speceies

EEP Project Code 95721. Project Name: Bowl Basin			Current Plot Data (MY3 2017)																												
			95721-01-0001			95721-01-0002			95721-01-0003			95721-01-0004			95721-01-0005			95721-01-0006			95721-01-0007			95721-01-0008			95721-01-0009			95721-01-0010		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	Tree																													
Acer rubrum	red maple	Tree												1						1											
Baccharis	baccharis	Shrub																													
Baccharis halimifolia	eastern baccharis	Shrub			3									1						1			1			6					
Betula nigra	river birch	Tree				1	1	1	1	1	1	7	7	7	1	1	1							7	7	7				9	9	9
Celtis occidentalis	common hackberry	Tree																													
Cephalanthus occidentali	common buttonbush	Shrub																			4	4	4	2	2	2	4	4	4			
Diospyros virginiana	common persimmon	Tree									1																				
Fraxinus pennsylvanica	green ash	Tree	4	4	4	6	6	6	11	11	11	8	8	8	11	11	11	3	3	3	4	4	4				1	1	1	7	7	8
Juglans nigra	black walnut	Tree						3									1														
Liquidambar styraciflua	sweetgum	Tree			37			5			8			48			152			105			41			25			7			9
Magnolia virginiana	sweetbay	Tree	2	2	2	2	2	2																1	1	1	1	1	1			
Morella cerifera	wax myrtle	shrub																								2			1			
Myrica	sweetgale	shrub																														
Nyssa aquatica	water tupelo	Tree													6	6	6	1	1	1							1	1	1			
Nyssa biflora	swamp tupelo	Tree	2	2	2																									3	3	3
Pinus taeda	loblolly pine	Tree			52			2			3			6			1			2			4			9			9			12
Quercus michauxii	swamp chestnut oak	Tree				6	6	6	2	2	2																3	3	3	1	1	1
Quercus pagoda	cherrybark oak	Tree				1	1	1	2	2	2	2	2	2	2	2	2													1	1	1
Quercus phellos	willow oak	Tree				6	6	6				5	5	5	1	1	1															
Quercus shumardii	Shumard's oak	Tree																														
Salix	willow	Shrub or Tree																														
Salix alba	white willow	Exotic																														
Salix nigra	black willow	Tree						1									3												4			
Taxodium distichum	bald cypress	Tree	10	10	10				3	3	3				2	2	2	18	18	18	7	7	7	6	6	6	3	3	3			
		Stem count	18	18	110	22	22	33	19	19	31	22	22	78	23	23	180	22	22	131	15	15	61	16	16	58	13	13	34	21	21	43
		size (ares)	1			1			1			1			1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	4	4	7	6	6	10	5	5	8	4	4	8	6	6	10	3	3	7	3	3	6	4	4	8	6	6	10	5	5	7
		Stems per ACRE	728.4	728	4452	890	890	1335	769	769	1255	890	890	3157	931	931	7284	890	890	5301	607	607	2469	647	647	2347	526	526	1376	850	850	1740

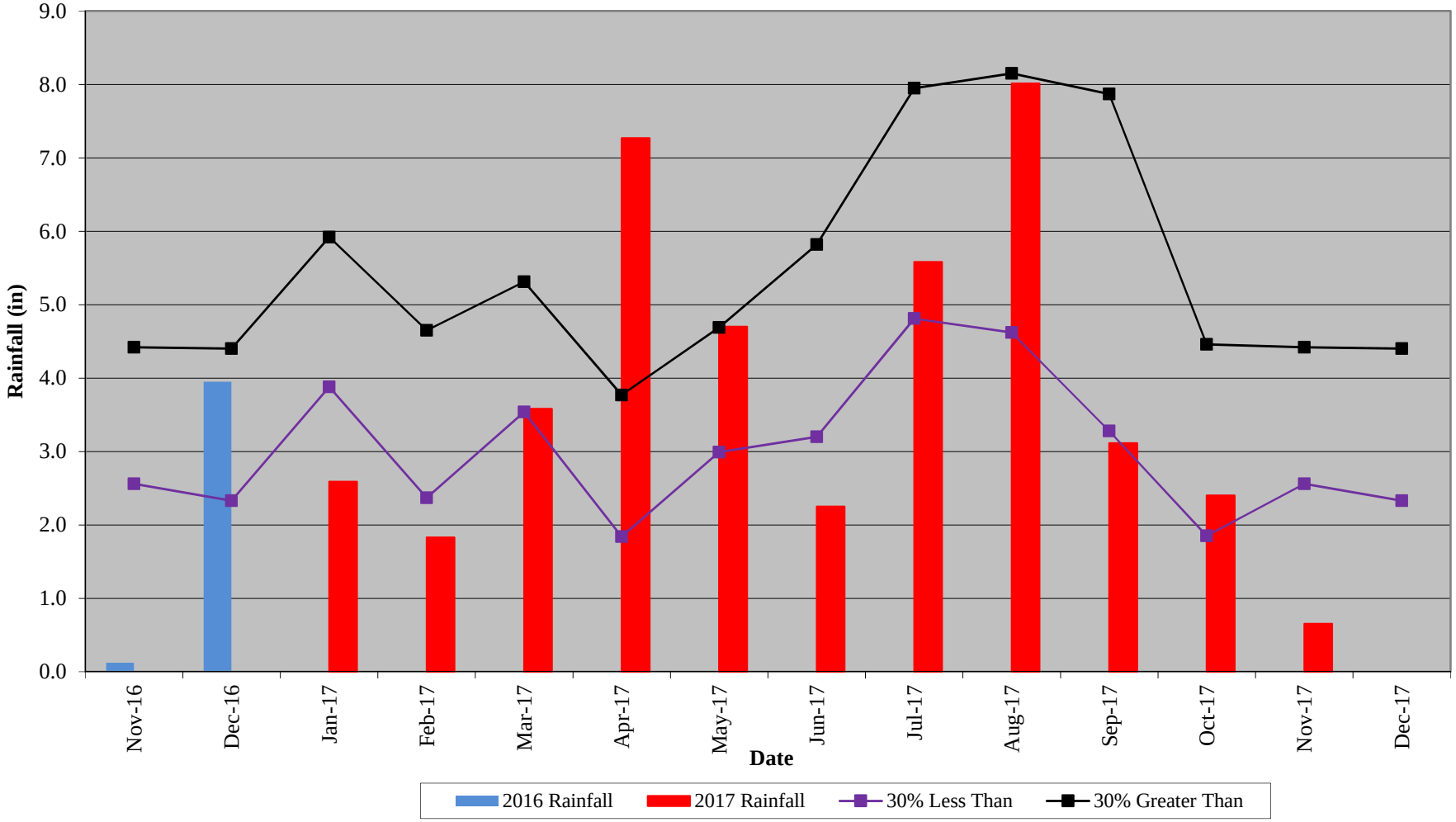
Table 8. CVS Stem Count Total and Planted by Plot and Speceies

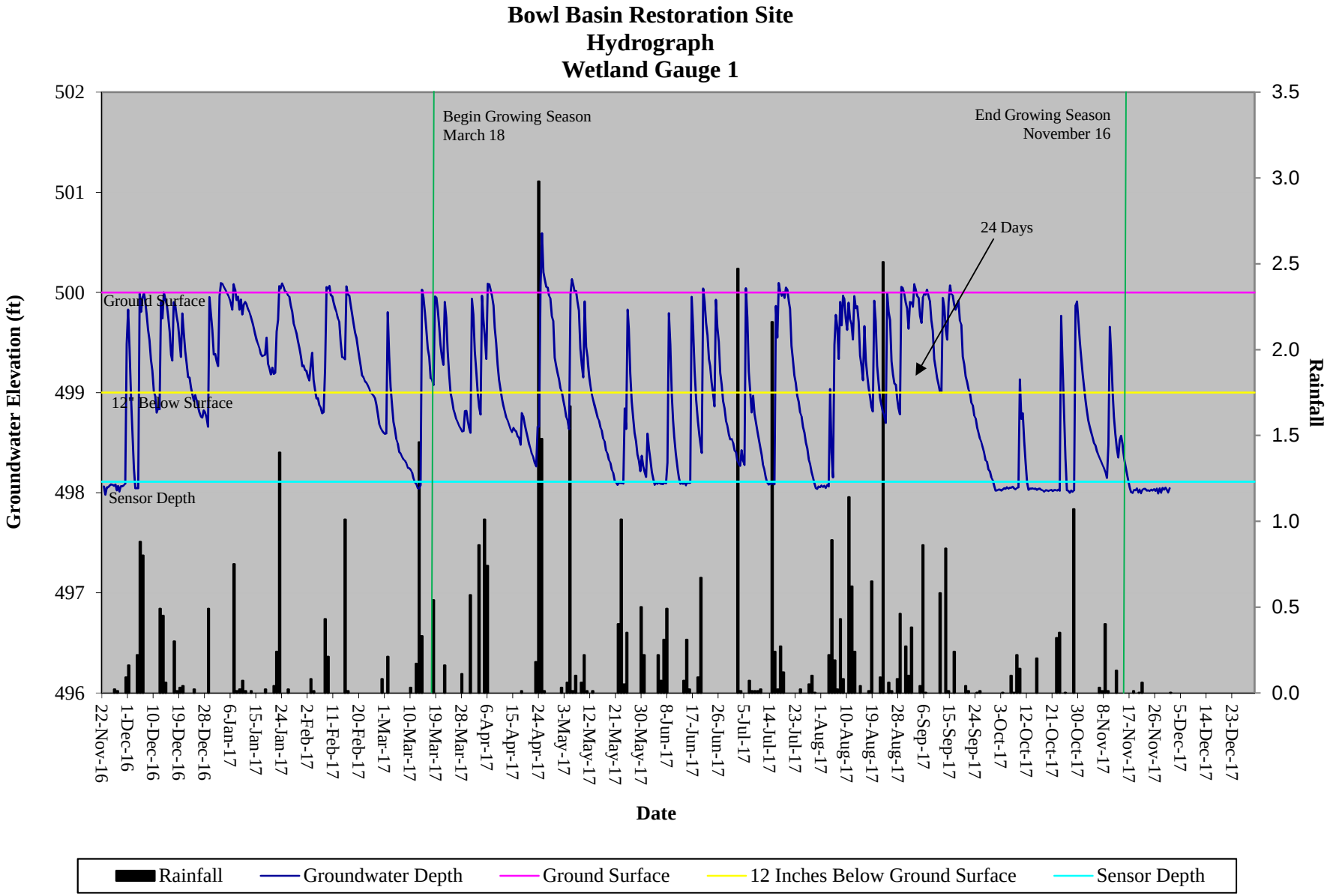
EEP Project Code 95721. Project Name: Bowl Basin			Annual Means											
			MY3 (2017)			MY2 (2016)			MY1 (2015)			MY0 (2015)		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer negundo	boxelder	Tree						1						
Acer rubrum	red maple	Tree			2			2			1			
Baccharis	baccharis	Shrub						7						
Baccharis halimifolia	eastern baccharis	Shrub			12									
Betula nigra	river birch	Tree	26	26	26	27	27	27	27	27	27	22	22	22
Celtis occidentalis	common hackberry	Tree						1						
Cephalanthus occidentali	common buttonbush	Shrub	10	10	10	10	10	10	12	12	12	11	11	11
Diospyros virginiana	common persimmon	Tree			1			1						
Fraxinus pennsylvanica	green ash	Tree	55	55	56	57	57	57	55	55	59	51	51	51
Juglans nigra	black walnut	Tree			4			5			2			
Liquidambar styraciflua	sweetgum	Tree			437			417			280			
Magnolia virginiana	sweetbay	Tree	6	6	6	5	5	5	4	4	4	4	4	4
Morella cerifera	wax myrtle	shrub			3									
Myrica	sweetgale	shrub						2						
Nyssa aquatica	water tupelo	Tree	8	8	8	8	8	8	7	7	7	7	7	7
Nyssa biflora	swamp tupelo	Tree	5	5	5	5	5	5	5	5	5	3	3	3
Pinus taeda	loblolly pine	Tree			100			25						
Quercus michauxii	swamp chestnut oak	Tree	12	12	12	13	13	13	12	12	12	15	15	15
Quercus pagoda	cherrybark oak	Tree	8	8	8	7	7	7	7	7	7	7	7	7
Quercus phellos	willow oak	Tree	12	12	12	11	11	11	9	9	11	9	9	9
Quercus shumardii	Shumard's oak	Tree				1	1	1	1	1	1	2	2	2
Salix	willow	Shrub or Tree						1						
Salix alba	white willow	Exotic						1						
Salix nigra	black willow	Tree			8			1	1	1	2			
Taxodium distichum	bald cypress	Tree	49	49	49	47	47	48	48	48	48	45	45	45
		Stem count	191	191	759	191	191	656	188	188	478	176	176	176
		size (ares)	10			10			10			10		
		size (ACRES)	0.25			0.25			0.25			0.25		
		Species count	10	10	18	11	11	23	12	12	15	11	11	11
		Stems per ACRE	773	773	3072	773	773	2655	761	761	1934	712	712	712

Appendix D

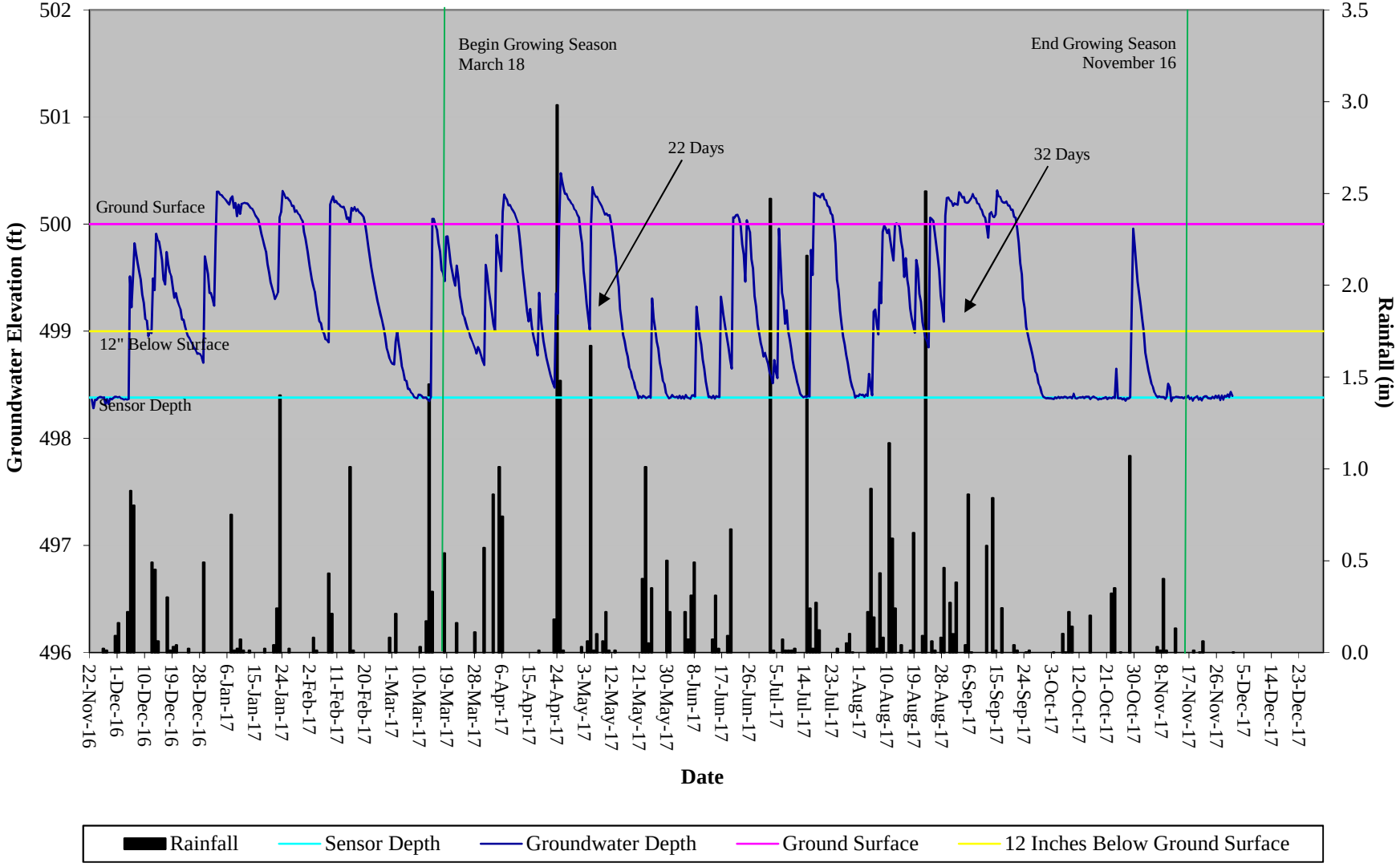
Hydrologic Data

Bowl Basin Wetland Restoration Site
30-70 Percentile Graph
WETS Station Name: NHOF - Hoffman Forest

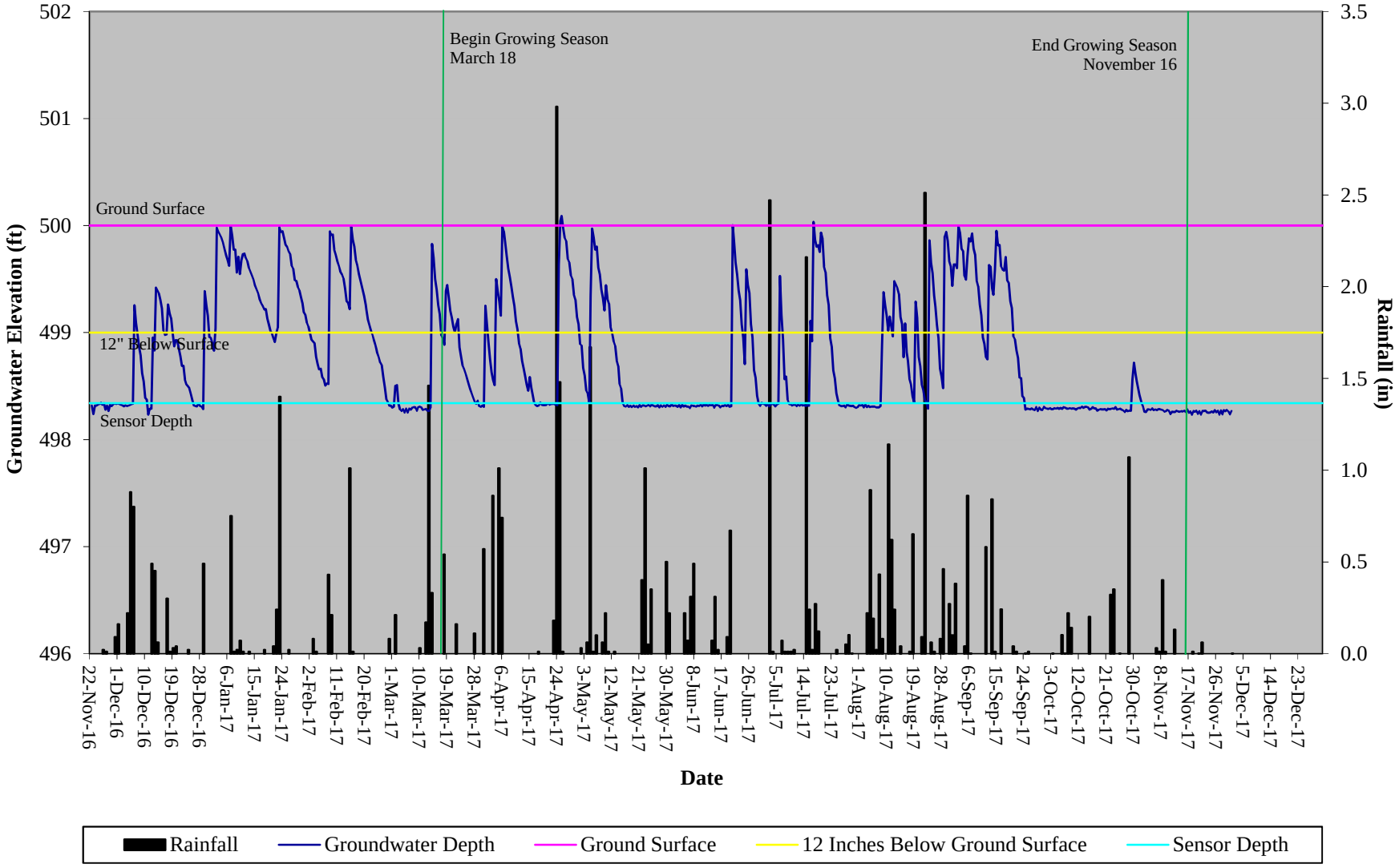



Bowl Basin Restoration Site
Hydrograph
Wetland Gauge 1
Groundwater Elevation (ft)
Rainfall
Date
Begin Growing Season
March 18
End Growing Season
November 16
24 Days
Ground Surface
12" Below Surface
Sensor Depth
502
501
500
499
498
497
496
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
22-Nov-16
1-Dec-16
10-Dec-16
19-Dec-16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

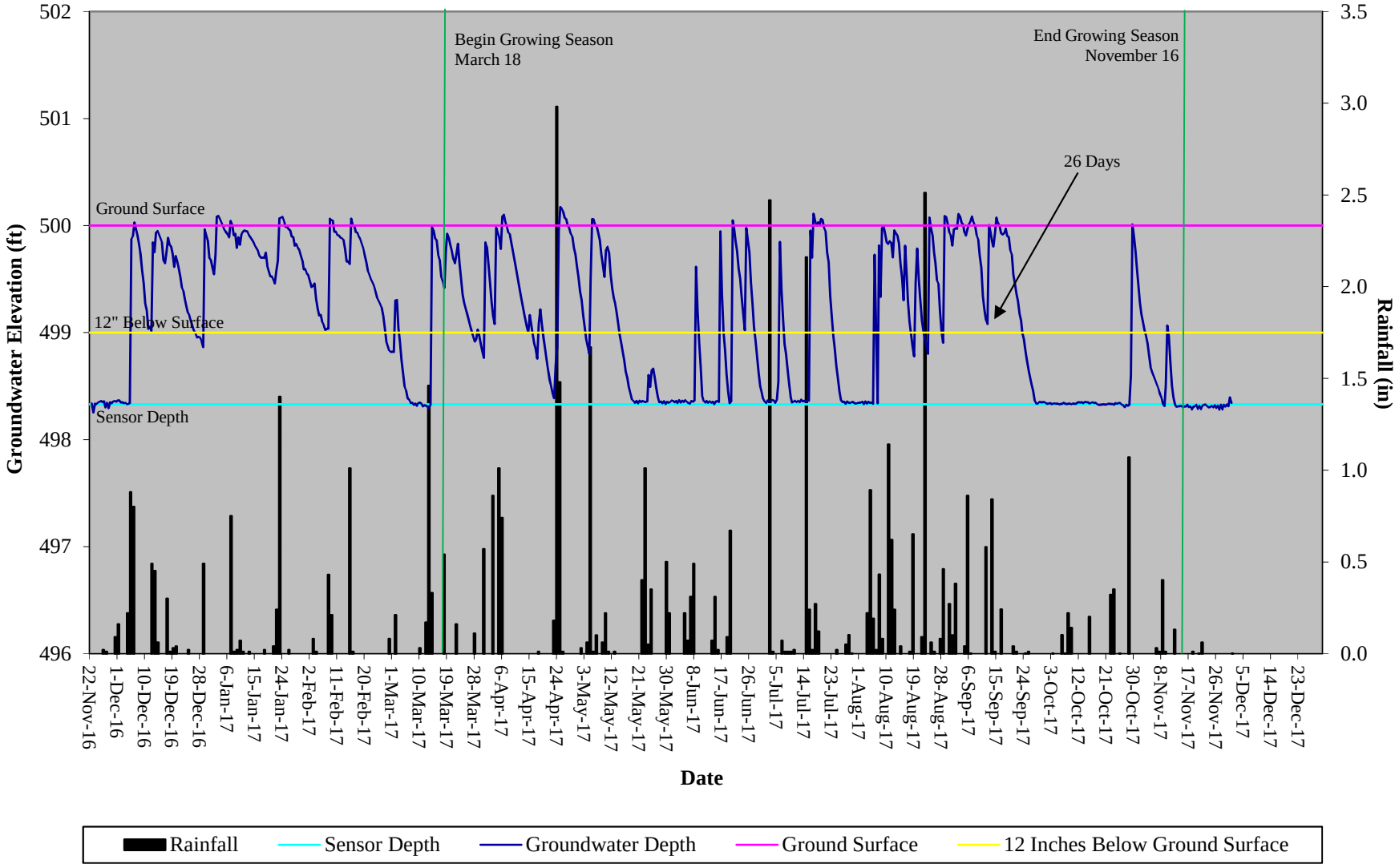
Bowl Basin Restoration Site
Hydrograph
Wetland Gauge 2



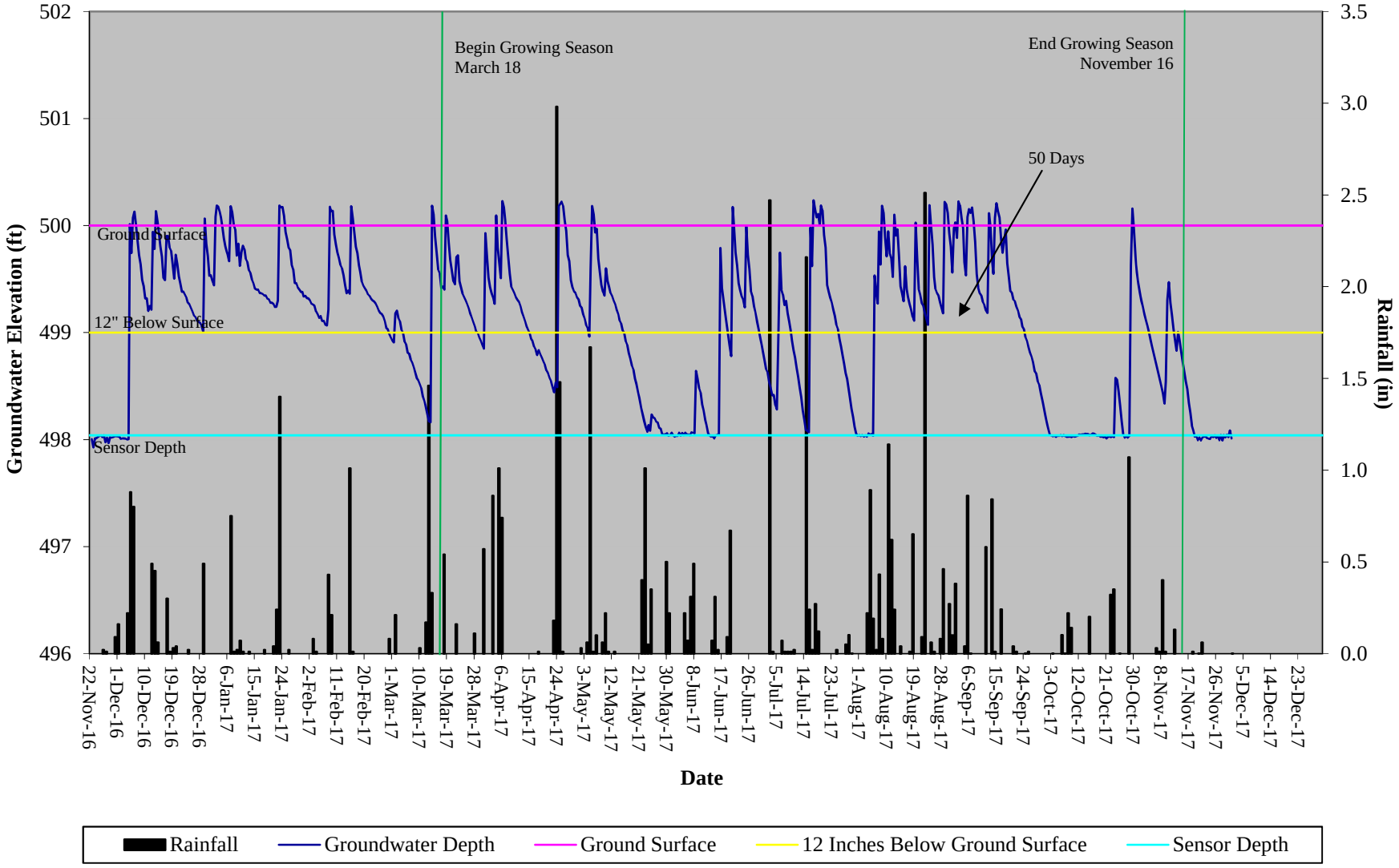
Bowl Basin Restoration Site
Hydrograph
Wetland Gauge 3



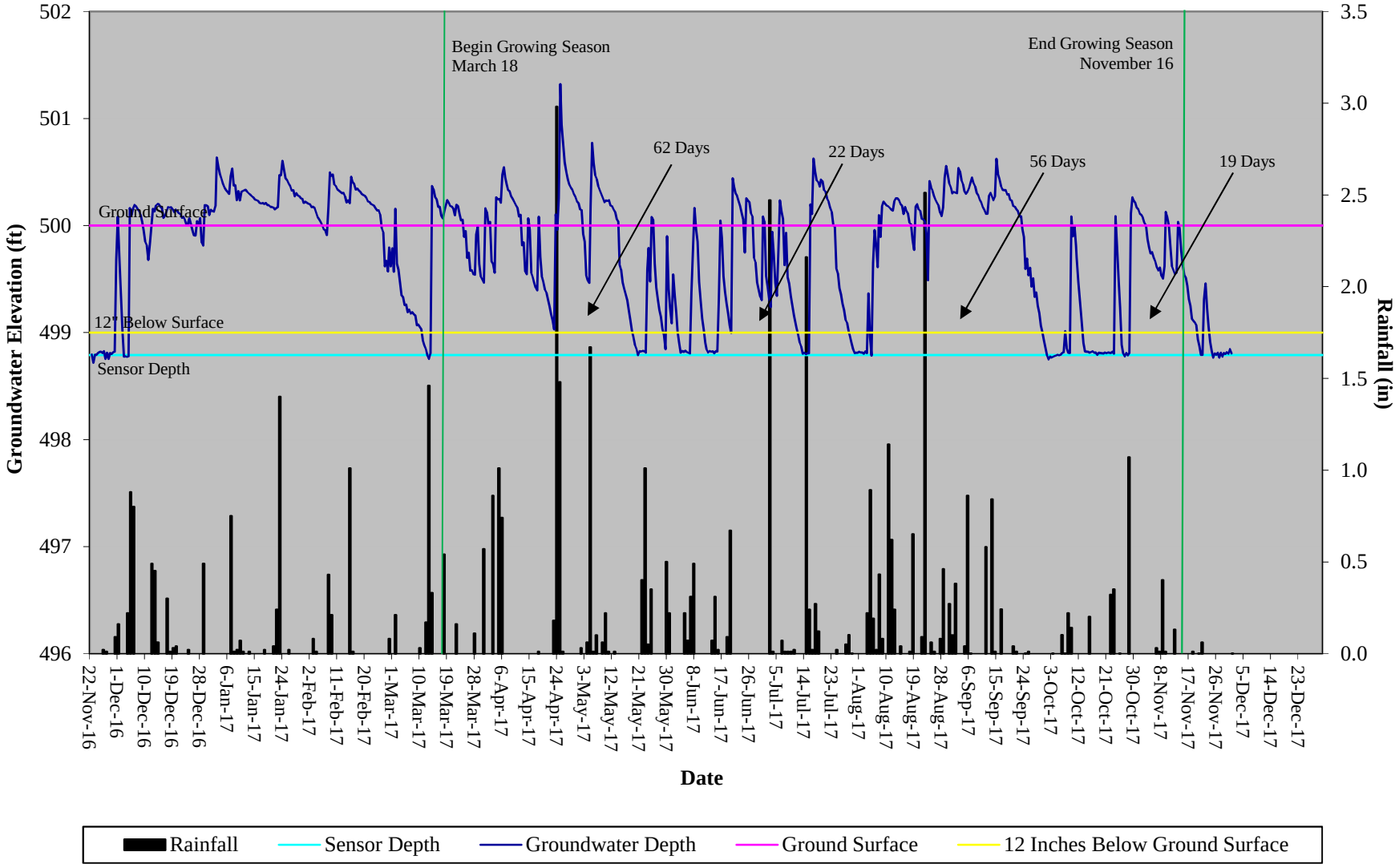
Bowl Basin Restoration Site
Hydrograph
Wetland Gauge 4



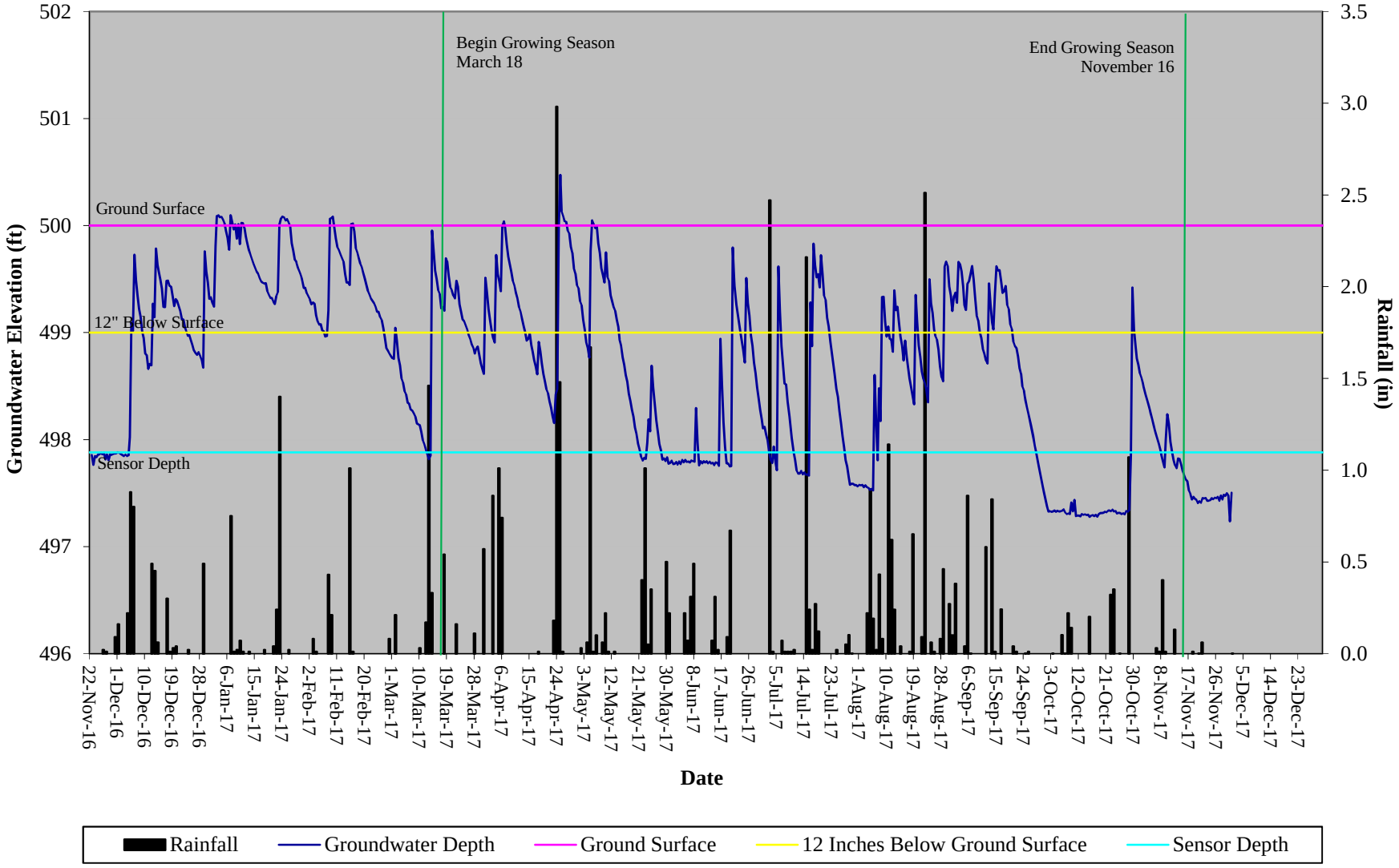
Bowl Basin Restoration Site
Hydrograph
Wetland Gauge 5



Bowl Basin Restoration Site
Hydrograph
Wetland Gauge 6



Bowl Basin Restoration Site
Hydrograph
Wetland Gauge 7



Bowl Basin Restoration Site
Hydrograph
Wetland Gauge 8

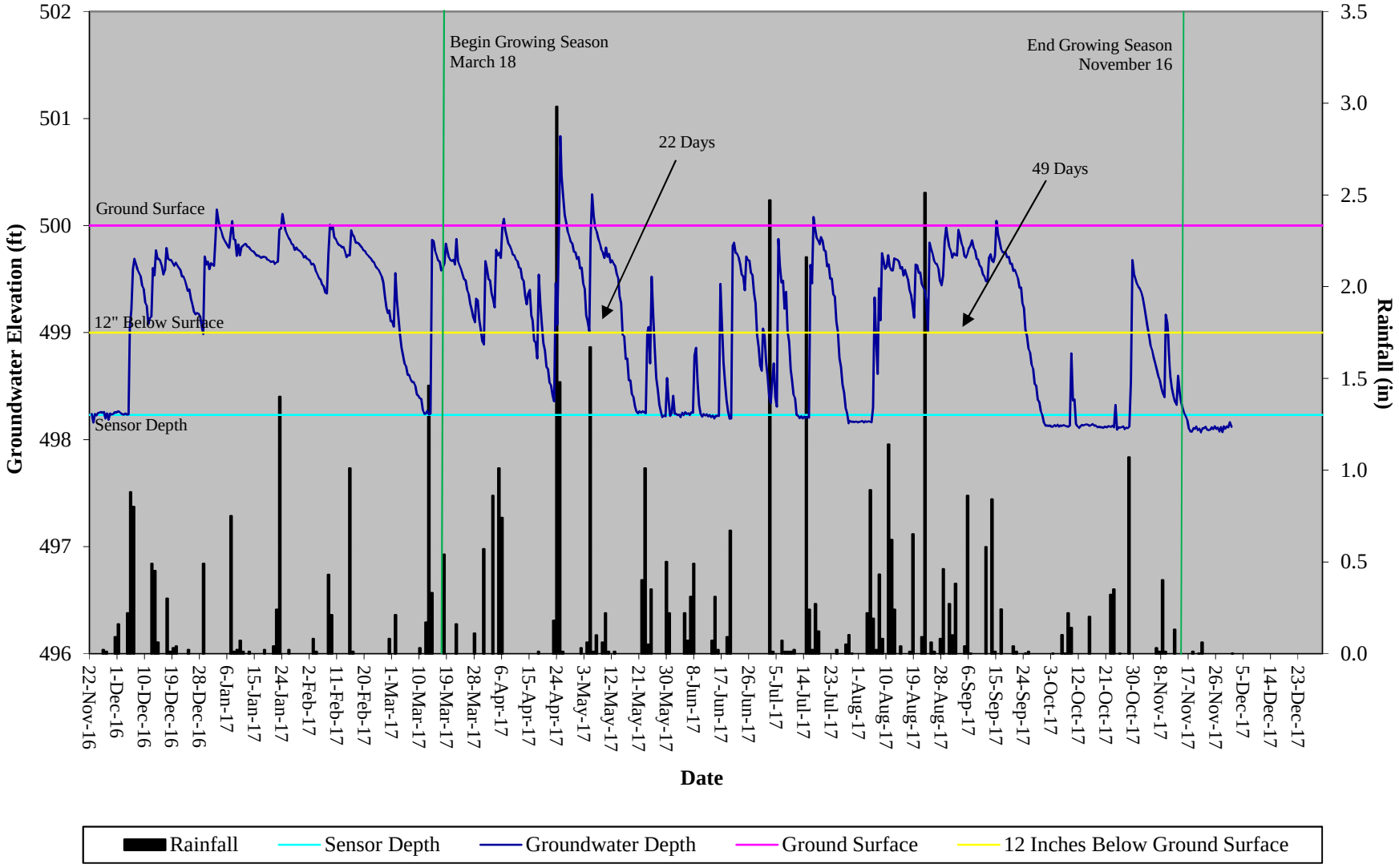


Table 9. Wetland Hydrology Criteria Attainment Table Project Number and Name: 95721 - Bowl Basin Restoration Site							
	Success Criteria Achieved / Max Consecutive Days During Growing Season (Percentage)						
Non-Riparian Gauges Success Criteria (22 Days) (9%)	**MY-01 2015**	**MY-02 2016**	**MY-03 2017**	**MY-04**	**MY-05**	**MY-06**	**MY-07**
Gauge 1	Yes/37 (15.0%)	Yes/29 (11.7%)	Yes/24 (9.9%)				
Gauge 2	Yes/69 (28.4%)	Yes/49 (20.0%)	Yes/32 (13.2%)				
Gauge 3	No/20 (8.2%)	Yes/27 (11.1%)	No/13 (5.3%)				
Gauge 4	Yes/29 (11.7%)	Yes/41 (16.9%)	Yes/26 (10.7%)				
Gauge 5	Yes/24 (9.9%)	Yes/52 (21.2%)	Yes/50 (20.6%)				
Gauge 6	Yes/79 (32.3%)	Yes/60 (24.5%)	Yes/62 (25.5%)				
Gauge 7	Yes/25 (10.3%)	Yes/48 (15.6%)	No/12 (4.9%)				
Gauge 8	Yes/37 (15.2%)	Yes/51 (21.0%)	Yes/49 (20.2%)				