

**MAPLE SWAMP WETLAND MITIGATION SITE
ANNUAL MONITORING REPORT – YEAR 2**

Edgecombe County, NC

NCDEQ Contract No. 200206-01

NCDMS ID No. 100190

NCDWR Project No. 2021-0409v2

USACE Action ID: SAW-2021-00345

RFP No. 16-20200206



Tar-Pamlico River Basin

HUC 03020102

January 2024

Prepared For:

NC Department of Environmental Quality

Division of Mitigation Services

1652 Mail Service Center, Raleigh, NC 27699-1652



Mitigation Services
ENVIRONMENTAL QUALITY



January 8, 2024

Danielle Mir
NCDMS

**MY2 Draft Report
Maple Swamp Wetland Mitigation Site
Project ID #100190, DMS Contract 200206-01**

Report:

1. Table 2 – Please use the headings for Table 2 found in the latest DMS Monitoring Report updated 10/1/2020, found on the DMS website. Headers are found on the tab labeled “Table 2 – Example Goals Table”. Specifically, the table needs to include the Monitoring Results column.

Eco Terra: Table 2 has been updated to include Monitoring Results column.

2. Section 3.1 – Please provide a table for Supplemental Planted Stems Planted in March 2023 that includes species and quantity. Please verify that all supplementally planted stems were from the approved mitigation plan.

ET: Table 5 listing approved, supplementally planted stems has been provided in Section 3.1.

3. Section 3.2 and Appendix C – Why is the reference groundwater gauge data not presented after mid-June 2023? Section 3.2 states “further evaluation will occur to try and collect data for the second part of 2023.” What evaluation is being done? Please provide this data in the final MY2 report.

ET: Reference well data for the remainder of the year has since been gathered and included in this report.

4. Section 3.2 – Is there a plan to have a working rain gauge on site? With the USGS rain gauge 13 miles away, I believe this will introduce inconsistent rainfall amounts at the site. Spring and summer rainfall events can be very isolated, and amounts can differ within a 5-mile radius.

ET: Gaps have occurred in the on-site rain gauge owed to bad battery, tipping bucket malfunction, and full memory. Plans are being made to replace the original gauge and better maintain it throughout the growing season to ensure that more localized precipitation data is obtained and presented for subsequent monitoring years. See revised statement in Section 3.2 of the report.



5. CCVP – a) Please differentiate the symbology for groundwater gauges that did not meet success criteria.
c) Remove rain gauge point from map if onsite collection will not occur. c) Please color all veg plots green if they met success and red only if they did not meet success criteria, including with random plots. d) Add layer showing where supplemental planting occurred.
ET: CCPV figure has been revised. All Veg Plots that met success criteria are shown in green. The GWG that met success criteria have been shown in green and the ones that did not meet success criteria are shown in red. A hatched area showing where supplemental planting occurred has been added.
6. Table 10 – Add required row for supplemental planting done in March 2023 between MY1 and MY2.
ET: Table 10 has been updated.

Digital Comments:

- a) There appears to be a discrepancy between the CCPV and Visual Vegetation Assessment Table. The CCPV indicates 0.281 acres of low stem density which exceeds the threshold for inclusion on the visual vegetation table, but this area is not noted on the table. Please revise the table to reflect the CCPV.
ET: 1.125 acres of supplemental planting occurred during MY2, therefore the low stem density areas from MY1 have been removed since this observation has been addressed for MY2.
- b) The vegetation data summary table appears to be the output of the Shiny based application. The vegetation data submitted is in the form of the no longer supported EEP CVS access database. If the data is available in Shiny output excel format, please submit to DMS.
ET: While veg data is not readily available in Shiny format, the same data is present in what has already been submitted.

Sincerely,

Jordan Burbage
Eco Terra

**MAPLE SWAMP WETLAND MITIGATION SITE
ANNUAL MONITORING REPORT – YEAR 2**

Edgecombe County, NC

NCDEQ Contract No. 200206-01

NCDMS ID No. 100190

NCDWR Project No. 2021-0409v2

USACE Action ID: SAW-2021-00345

RFP No. 16-20200206

Tar-Pamlico River Basin

HUC 03020102

Prepared For:



NC Department of Environmental Quality

Division of Mitigation Services

1652 Mail Service Center, Raleigh, NC 27699-1652

Prepared By:

With Assistance From:



117 Centrewest Court

Cary, NC 27513

404-596-8004



MCADAMS

621 Hillsborough St Suite 500

Raleigh, NC 27603

919-361-5000

January 2024

Table of Contents

1.0	Project Overview.....	1
1.1	Project Mitigation Quantities and Credits	1
1.2	Project Goals and Objectives.....	2
1.3	Project Attributes	4
2.0	As-Built Condition (Baseline).....	5
2.1	Site Planting	5
3.0	Monitoring Year 2 Data Assessment	6
3.1	Vegetation Assessment.....	6
3.2	Wetland Assessment.....	7
3.3	Visual Assessment.....	7
3.4	MY2 Assessment Summary	8
4.0	Methodology.....	8
5.0	Climate Assessment	8
5.1	Methodology	8
5.2	PDSI Assessment.....	8
5.3	Climate Assessment Summary	8
6.0	References.....	9

Figures

Figure 1 Current Conditions Site Map

Appendices

Appendix A. Visual Assessment Data
Appendix B. Vegetation Plot Data
Appendix C. Hydrologic Data and Rainfall
Appendix D. Rainfall and PDSI Summary
Appendix E. Project Timeline and Contact Info

1.0 Project Overview

The Site is a 15.34-acre wetland mitigation project located in Edgecombe County, North Carolina. The Site is approximately two miles northeast of the Town of Leggett, on the north side of NC HWY 97E and is accessed via a dirt farm path. The Site is within the Tar-Pamlico 8-digit HUC 03020102, more specifically in the 14-digit HUC 03020102060010. The 15.34-acre Site includes 8.635 acres of wetland re-establishment (REE) and 0.449 acres of wetland rehabilitation (RH) to provide a total of 9.084 acres of non-riparian wetland credits for the Tar-Pamlico 03020102 watershed.

1.1 Project Mitigation Quantities and Credits

Site restoration activities included filling on-Site agricultural ditches, planting of native woody wetland vegetation, and establishment of a conservation easement to protect the site in perpetuity. Table 1a and 1b give the as-built quantities and credits for the Site.

Table 1a – Project Mitigation Quantities and Credits

Project Segment	Original Mitigation Plan ac	As-Built ac	Original Mitigation Category	Original Restoration Level	Original Mitigation Ratio (X:1)	Credits
Wetland						
Wetland 1	8.635	8.635	NR	REE	1.000	8.635
Wetland 2 (Ditch A)	0.449	0.449	NR	RH	1.000	0.449
					Total:	9.084

Table 1b – Project Credit Summary

Restoration Level	Stream			Riparian Wetland	Non-Rip Wetland	Coastal Marsh
	Warm	Cool	Cold			
Restoration						
Re-establishment					8.635	
Rehabilitation					0.449	
Enhancement						
Enhancement I						
Enhancement II						
Creation						
Preservation						
Total:	0.000	0.000	0.000	0.000	9.084	0.000

1.2 Project Goals and Objectives

The Site was chosen due to proximity of adjacent forested corridors servicing the sub-watershed to Maple Swamp as well as the ability to restore and protect a non-riparian system and support overarching goals listed by the North Carolina Division of Mitigation Services (DMS) in the 2018 Tar-Pamlico River Basin Restoration Priorities (RBRP) document. Restoration of the Site will directly and indirectly address specific goals and stressors related to the goals identified in the RBRP. Table 2 lists the goals and objectives of the project.

Table 2 – Site Goals and Performance Standards

Goal	Objective	Expected Outcome	Function Supported	Performance Standard	Measurement	Cumulative Monitoring Results
Reduce Nutrients and Sediment in Agricultural Areas	Remove fertilizer and agricultural byproducts applied to wetland. Establish native woody wetland vegetation, securing soil in place, and reducing wind and runoff erosion.	Improve Water Quality through nutrient & sediment reduction.	Biological Physicochemical	N/A	Vegetation Plots - Fixed (n=9) - Random (n=2) Visual assessment of the Site	11 vegetation plots exceed MY3 success criteria (MY2 - 2023)
Restore Wetland Hydrology	Fill drainage ditches and remove drain tiles to restore Site hydrology.	Increase hydrology and shallow water table during the early growing season (9%), reduce nutrients and sediment in agricultural areas, and increase wetland habitats.	Hydrological Physicochemical Biological	Shallow groundwater within 12 inches of the soil surface for a minimum of 9% (21 consecutive growing season days) (MY1-MY2) and 12% (28 consecutive growing season days) (MY3-MY7).	Groundwater Gauges (n=9)	3 groundwater wells achieved hydroperiod performance standard (MY2 - 2023)

Table 2 (continued) – Site Goals and Performance Standards

Goal	Objective	Expected Outcome	Function Supported	Performance Standard	Measurement	Cumulative Monitoring Results
Improve Habitat	Establish native woody wetland vegetation. Promote habitat in near vicinity to existing conserved lands.	Increase native wetland tree species diversity and habitats. Increase habitat from non-riparian forest wetland to Maple Swamp non-riparian corridor and near vicinity protected lands associated with 1,290 NCWRC Lower Fishing Creek Game Lands.	Biological	N/A	Visual assessment of the Site	Visual assessment indicates high survivorship of planted stems across the Site (MY2 - 2023)
Restore Wetland Vegetation	Establish native woody wetland vegetation in proposed wetland re-establishment areas.	Increase native wetland tree species quantity and diversity. Increase nutrient cycling and sequestering sediment.	Physiochemical Biological	Survival of 210 planted stems/ac (MY7). Interim survival of at least 320 planted stems/ac (MY3) and at least 260 stems/ac (MY5). Planted stems must average 7 ft in height (MY5) and 10 feet in height (MY7).	Vegetation Plots - Fixed (n=9) - Random (n=2)	11 vegetation plots exceed MY3 success criteria (MY2 - 2023)
Protect the Site in Perpetuity	Record permanent Conservation Easement to protect the Site in perpetuity.	Protect Site from future impacts and encroachment and direct impacts to wetlands. Support all wetland functions in perpetuity.	Hydrological Physicochemical Biological	Record Conservation Easement	Visual assessment for easement encroachment and Site integrity	No sign of Site encroachment have been noticed (MY2 - 2023)

1.3 Project Attributes

The Site is situated on an approximately 356-acre parcel used for row crop production and agricultural rotations. Mature forests along Moore's Swamp to the north and Maple Swamp to the east border the cleared parcel and a smaller stand of mature forest exists to the west. Moore's Swamp and Maple Swamp are classified as water supply (WS-IV) and nutrient sensitive waters (NSW). Site hydrology drains to Maple Swamp (28-79-31-(0.7)) via a series of agricultural ditches which artificially drain groundwater from the adjacent agricultural fields.

Table 3: Project Attributes

Project Information			
Project Name	Maple Swamp Wetland Mitigation Site		
County	Edgecombe		
Project Area [Planted Area] (acres)	15.34 [13.68]		
Project Coordinates (latitude and longitude decimal degrees)	36.013378, -77.559158		
Project Watershed Summary Information			
Physiographic Province	Coastal Plain		
River Basin	Tar-Pamlico		
USGS Hydrologic Unit 8-digit; 14-digit	3020102; 03020102060010		
DWR Sub-basin	03-03-04		
Project Drainage Area (acres)	49.4		
Project Drainage Area Percentage of Impervious Area	0%		
Land Use Classification	Agriculture		
Wetland Summary Information			
Parameters	Wetland 1	Wetland 2 (Ditch A)	
Pre-project (acres)	8.635	0.449	
Post-project (acres)	8.635	0.449	
Wetland Type (non-riparian, riparian)	Non-Riparian	Non-Riparian	
Mapped Soil Series	Roanoke	Roanoke	
Soil Hydric Status	Hydric (100%)	Hydric (100%)	
Regulatory Considerations			
Parameters	Applicable?	Resolved?	Supporting Docs?
Water of the United States - Section 404	Yes	Yes	PJD
Water of the United States - Section 401	Yes	Yes	PJD
Endangered Species Act	Yes	Yes	Cat. Ex.
Historic Preservation Act	Yes	Yes	Cat. Ex.
Coastal Zone Management Act (CZMA or CAMA)	No	Yes	Cat. Ex.
Essential Fisheries Habitat	No	Yes	Cat. Ex.

2.0 As-Built Condition (Baseline)

2.1 Site Planting

See Table 4 for a list of species planted on site.

Table 4: Site Planted Stems

Scientific Name	Common Name	Vegetative Strata	Planting Zone	Wetland Indicator Status	%	Quantity
<i>Quercus michauxii</i>	Swamp Chestnut Oak	Canopy	1	FACW	17%	2000
<i>Gordonia lasianthus</i>	Loblolly bay	Understory	4	FACW	--	--
<i>Populus heterophylla</i>	Swamp Cottonwood	Canopy	2	OBL	--	--
<i>Carpinus caroliniana</i>	Ironwood	Understory	4	FACW	--	--
<i>Quercus phellos</i>	Willow Oak	Canopy	1	FACW	8%	1000
<i>Quercus laurifolia</i>	Laurel Oak	Canopy	1	FACW	4%	500
<i>Quercus nigra</i>	Water Oak	Canopy	1	FAC	8%	1000
<i>Nyssa biflora</i>	Swamp blackgum	Canopy	4	OBL	--	--
<i>Magnolia virginiana</i>	Sweetbay magnolia	Understory	4	FACW	--	--
<i>Ulmus americana</i>	American elm	Canopy	1	FAC	4%	500
<i>Persea palustris</i>	Swamp bay	Understory	4	FACW	--	--
<i>Platanus occidentalis</i>	Sycamore	Overstory	1	FACW	4%	500
<i>Taxodium distichum</i>	Bald cypress	Overstory	1/2	OBL	17%	2000
<i>Nyssa aquatica</i>	Swamp tupelo	Overstory	2	FACW	4%	500
<i>Quercus shumardii</i>	Shumard Oak	Overstory	1	FAC	17%	2000
<i>Fraxinus pennsylvanica</i>	Green ash	Overstory	1	FACW	3%	300
<i>Cephalanthus occidentalis</i>	Buttonbush	Understory	2	OBL	4%	500
<i>Quercus lyrata</i>	Overcup Oak	Overstory	1/2	OBL	8%	1000

Total: 100% 11800

Species listed in Table 4 with strike-through marks were included in the conceptual planting plan in the Final Mitigation Plan but were not planted at the Site.

3.0 Monitoring Year 2 Data Assessment

Site monitoring for MY2 took place from January – November 2023. Collected data for MY2 was analyzed and is summarized the following sections. MY2 data is presented in the appropriate appendices of this report.

3.1 Vegetation Assessment

- Vegetation assessment for MY2 was conducted in September 2023. Vegetation surveys of the nine fixed and two random vegetation plots resulted in calculated stem densities ranging from 485-1012 stems per acre and a 94% overall survival rate of planted stems from the as-built (baseline) condition. The calculated average stem density for the Site was 754 stems per acre, well above the interim success criteria of 320 stems per acres in MY3. All 11 vegetation plots exceeded the MY3 interim success criteria. Vegetation plot photographs are included in Appendix A and vegetation plot data is included in Appendix B.
- During the as-built IRT site walk on October 17, 2022, members of the IRT reiterated desires to girdle sweetgum and pine trees growing on the embankment west of the existing irrigation pond. Following this discussion, in May 2023, pine trees were girdled and sweetgum trees were hack-sprayed. Discussion of the practices and results will be included in annual monitoring reports.
- Site grading during construction and uplift of the water table due to ditch plugging led to the formation of two shallow water areas in the southern portion of the Site (see Figure 1). Members of the IRT and Eco Terra noted during the as-built site walk that these two areas exhibited lower than average stem survival as compared to the remainder of the Site. In March 2023, Eco Terra supplementally planted these areas with approximately 2,000 stems of hydrophytic species which include bald cypress, swamp chestnut oak, and overcup oak. This supplemental planting area spans from the vicinity of Plot 7 to Plot 2 to cover the low-density areas present in the MY1 report. See Table 5 for a breakdown of the planted species.

Table 5: Supplemental Planted Stems - March 2023

Scientific Name	Common Name	Quantity
<i>Taxodium distichum</i>	Bald-cypress	1000
<i>Quercus michauxii</i>	Swamp Chestnut Oak	500
<i>Quercus lyrata</i>	Overcup Oak	500

- Current state and growth rate of the invasive species does not warrant any treatment or remedial action in the area. Eco Terra will continue to monitor *Lespedeza cuneata* in this area and the remainder of the Site. Remedial actions and/or treatments will be discussed in future monitoring reports.
- There are currently no areas of concern with respect to Site vegetation. The Site will continue to be monitored for invasive and aggressive pioneer species. Any future vegetation treatments

will be conducted in accordance with the approved adaptive management plan and will be discussed the annual monitoring reports.

3.2 Wetland Assessment

- Performance standard for wetlands at the Site during MY2 is groundwater elevation within 12 inches of the ground surface for 21 consecutive days (9% of the growing season). The estimated growing season for the Site, as determined by NRCS WETS tables for Edgecombe County, is March 20 to November 11. Site groundwater monitoring for MY2 began on January 1, 2023, and ended November 10, 2023. Of the nine groundwater wells installed at the Site, three wells achieved the MY2 performance standard (GW2, GW8, GW9). GW1 is within one day of the minimum hydroperiod, and the remaining groundwater wells did not meet minimum hydroperiod. However, in general, groundwater wells had more days within wetland criteria than MY1. The results of the remaining wells are considered to be a response to consecutive years with below average rainfall. An additional Table has been included in Appendix C showing the total number of days during the growing season that met wetland criteria. Summary of MY2 groundwater hydrology is included in Appendix C.
- Assessment of data collected by the reference groundwater well located in a forested wetland to the east of the Site indicates that groundwater in the area did not come within 12 inches of the ground surface during the monitoring period.
- The site rainfall gauge experienced equipment malfunction. Rainfall data for the entirety of the MY2 monitoring period was obtained from USGS gauge station 02082585 (Tar River at NC97), located approximately 13 miles southwest of the Site in Rocky Mount, NC. The Site's rainfall gauge will be replaced and maintained throughout the subsequent monitoring years to ensure that accurate precipitation data is obtained and presented for monitoring periods.
- The area received less than average rainfall during 2023. Rainfall data analysis indicates that five out of the ten months in 2023 (January, March, May, June, and August) experienced cumulative rainfall less than the 30th percentile value for the month. April was the only month to experience cumulative rainfall above the 70th percentile value for the month. As shown in graphs in Appendix C, 44% of the 30-day rainfall within the growing season was below the 30th percentile, and 75% was below the average rainfall. A large percentage of the 30-day rainfall within the growing season was also below the 30th percentile daily normals as compiled using the Antecedent Precipitation Tool (APT) presented in Appendix C.

3.3 Visual Assessment

Visual assessment of the Site indicates that the Site is stable and planted vegetation is in good health. The constructed ditch plug in the southeast corner of the Site shows no signs of deterioration and the constructed sediment forebays on the western side of the Site appear to be functioning as intended. The Site boundary has been well marked with signage and there is no evidence of encroachment. Photographs taken from the seven established photo points are presented in the Appendix A.

3.4 MY2 Assessment Summary

- Overall, the Site is in good condition. Planted stems appear to be in good health and herbaceous ground cover is establishing across the Site. Stem density in the 11 vegetation plots ranged between 485-1012 stems per acre, all above the MY3 performance standard of 320 stems per acre. Average stem height and vigor for the Site is 2.9 feet (88.4 cm) and 4.0, respectively.
- Three of the nine installed groundwater wells achieved the MY2 performance standard and one additional well was within one day of achieving the minimum continuous hydroperiod. Between March 9 and May 18, GW1 had a single groundwater measurement fall below 12" from the soil surface by 0.04' on March 27, 2023. The 2023 growing season had three months below the 30th percentile of typical rainfall in the respective months. Hydrologic performance of the Site is expected to improve in MY3 as soil structure and organic material accumulation increases in the upper soil horizons and the water table in the vicinity of the Site continues to adjust to current land management practices.

Summary information of the Site for MY2 can be found in the report appendices. Raw data for the Site supporting the observations and conclusions in this report will be made available to DMS upon request.

4.0 Methodology

Hydrologic monitoring and instrument installation followed guidance put forth by the USACE (2003) and the USACE and NCIRT Stream and Wetland Compensatory Mitigation Update (2016). Vegetation monitoring followed the Carolina Vegetation Survey – EEP Level II Protocol (Lee et al., 2008). Visual assessment followed most recent guidance put forth by the USACE and NCIRT (USACE, 2016).

5.0 Climate Assessment

5.1 Methodology

- To further assess the climatic conditions of the monitoring year, the Palmer Drought Severity Index (PDSI) was examined for the Site. PDSI data was obtained from the Gridded Surface Meteorological (gridMET) Dataset provided through the National Integrated Drought Information System (NIDIS). The gridMET dataset is a dataset of daily high-spatial resolution (~4-km, 1/24th degree) surface meteorological data covering the contiguous U.S. from 1979-present day. A PDSI rating is estimated for every 5-days of the dataset which indicates the severity of the departure from normal conditions based on simplified soil water balances and estimates of relative soil moisture conditions.

5.2 PDSI Assessment

- According to the PDSI data, the Site experienced moderate drought for 53% of the year and severe drought for 44% of the year. According to PDSI ratings for the Site's climate division (NC Northern Coastal Plain), the division spent 53% of the year in mild drought and 47% in moderate drought. A summary of the PDSI ratings for the Site and climate division is attached in Appendix D.

5.3 Climate Assessment Summary

- Drought conditions persisted throughout the Northern Coastal Plain climate division for 2023, and more locally, the Site and adjacent areas underwent intensified drought conditions throughout the year. When compared to the region's climate division, the local PDSI rating experienced more severe drought during the first half of the year and less severe drought during the last half of the year.

Analysis of drought conditions, in addition the Site's rainfall and wetland hydrology data, indicates that the environmental conditions of 2023 do not reflect a typical year for the Site. Therefore, success criteria not being met by 6 of the credit bearing wells is a result of the abnormally low rainfall that the Site received and the persistence of drought conditions in 2023.

6.0 References

Eco Terra, LLC. 2022. Final Mitigation Plan - Maple Swamp Wetland Mitigation Site.

Lee, M.T., Peet, R.K., Roberts, S.D., & Wentworth, T.R. 2008. CVS-EEP Protocol for Recording Vegetation Version 4.2. Available: <http://cvs.bio.unc.edu/protocol/cvs-EEP-protocol-v4.2-lev1-2.pdf>

Natural Resources Conservation Service (NRCS). 2022. North Carolina Field Office Technical Guide. Available: <http://agacis.rcc-acis.org/?fips=37065>

N.C. Department of Environmental Quality. Division of Mitigation Services. 2018. Tar-Pamlico Basin Restoration Priorities 2010. Amended 2018. Available: https://files.nc.gov/ncdeq/Mitigation%20Services/Watershed_Planning/Tar-Pamlico_River_Basin/FINAL%20BRP%20Tar-Pamlico%202010_%2020111207%20CORRECTED.pdf

US Army Corps of Engineers (USACE). 2003. Stream Mitigation Guidelines.

US Army Corps of Engineers (USACE) and North Carolina Interagency Review team (NCIRT). 2016. Wilmington District Stream and Wetland Compensatory Mitigation Update. North Carolina Interagency Review Team – October 24, 2016. Available: <http://saw-reg.usace.army.mil/PN/2016/Wilmington-District-Mitigation-Update.pdf>



Figures

Current Conditions Map

- Conservation Easement
- Wetland Re-establishment (8.635 ac)
- Wetland Rehabilitation (0.449 ac)
- Fixed Vegetation Plot
- Random Vegetation Plot
- ▲ Photo Points
- Rain Gauge and Baratroll
- GWG Did Not Meet Success Criteria
- GWG Met Success Criteria
- GWG Reference
- Supplemental Planting Area (1.125 ac)



MAPLE SWAMP WETLAND MITIGATION SITE
MONITORING YEAR 2 - CURRENT CONDITIONS SITE MAP
 Tar-Pamlico 03020102
 Edgecombe County, North Carolina

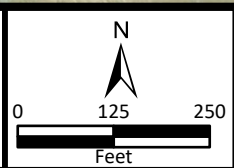


FIGURE
1

APPENDIX A

Visual Assessment Data

Table 6: Visual Vegetation Assessment

Maple Swamp Wetland Mitigation Site

DMS ID No. 100190

Monitoring Year 2 – 2023

Planted Acreage = 13.68 ac

Vegetation Category	Definitions	Mapping Threshold	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material.	0.10 acres	0.00	0.0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on current MY stem count criteria.	0.10 acres	0.00	0.0%
Total			0.00	0.0%
Areas of Poor Growth Rates	Planted areas where average height is not meeting current MY Performance Standard.	0.10 acres	0.00	0.0%
Cumulative Total			0.00	0.0%

Easement Acreage = 15.34 ac

Vegetation Category	Definitions	Mapping Threshold	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern	Invasives may occur outside of planted areas and within the easement and will therefore be calculated against the total easement acreage. Include species with the potential to directly outcompete native, young, woody stems in the short-term or community structure for existing communities. Species included in summation above should be identified in report summary.	0.10 acres	0.00	0.0%
Easement Encroachment Areas	Encroachment may be point, line, or polygon. Encroachment to be mapped consists of any violation of restrictions specified in the conservation easement. Common encroachments are mowing, cattle access, vehicular access. Encroachment has no threshold value as will need to be addressed regardless of impact area.	None	0 Encroachments Noted	

Vegetation Plot Photographs

MY2 MONITORING PLOT PHOTOS

MY2	MY1
-----	-----

Photo #1
Date: 09/18/2023
Feature: Plot 1
Direction: East



Photo #2
Date: 09/18/2023
Feature: Plot 2
Direction: East



Photo #3
Date: 09/18/2023
Feature: Plot 3
Direction: East



MY2 MONITORING PLOT PHOTOS

MY2	MY1
-----	-----

Photo #4
 Date: 09/18/2023
 Feature: Plot 4
 Direction: East



Photo #5
 Date: 09/18/2023
 Feature: Plot 5
 Direction: East

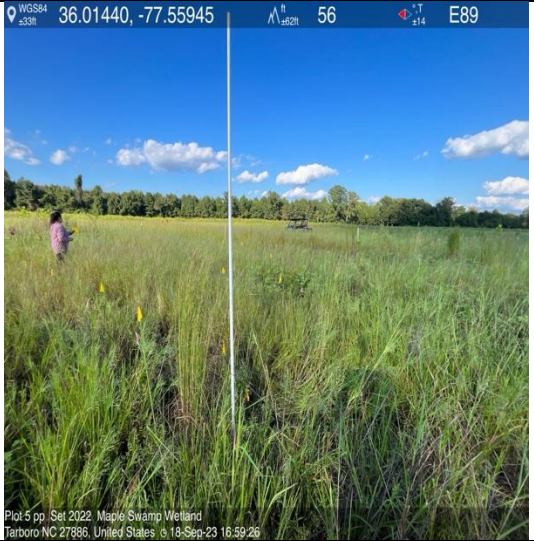


Photo #6
 Date: 09/18/2023
 Feature: Plot 6
 Direction: East



MY2 MONITORING PLOT PHOTOS

MY2	MY1
-----	-----

<p>Photo #7</p> <p>Date: 09/19/2023</p> <p>Feature: Plot 7</p> <p>Direction: East</p>	 <p>Plot 7 pp Maple Swamp Wetland Tarboro NC 27886, United States © 19-Sep-23 12:02:25</p>	
--	---	--

<p>Photo #8</p> <p>Date: 09/19/2023</p> <p>Feature: Plot 8</p> <p>Direction: East</p>	 <p>Plot 8 pp Set 2022 Maple Swamp Wetland Plot 8 pp Tarboro NC 27886, United States © 19-Sep-23 11:49:52</p>	
--	---	---

<p>Photo #9</p> <p>Date: 09/19/2023</p> <p>Feature: Plot 9</p> <p>Direction: East</p> <p>Description: Photo labeled wrong in photo software.</p>	 <p>Random plot 2 pp Set 2022 Maple Swamp Wetland Plot 9 pp Tarboro NC 27886, United States © 19-Sep-23 11:33:23</p>	
---	---	--

MY2 MONITORING PLOT PHOTOS

MY2	MY1
-----	-----

<p>Photo #10</p> <p>Date: 09/19/2023</p> <p>Feature: Random Plot 1</p> <p>Direction: East</p>		
--	--	--

<p>Photo #11</p> <p>Date: 09/19/2023</p> <p>Feature: Random Plot 2</p> <p>Direction: East</p>		
--	--	--

Photo Point Photographs

MY2 PHOTO STATIONS

MY2	MY1
-----	-----

Photo #1
Date: 09/18/2023
Feature: Photo Station 1
Direction: East



Photo #2
Date: 09/18/2023
Feature: Photo Station 2
Direction: East




Photo #3
Date: 09/18/2023
Feature: Photo Station 3
Direction: East





MY2 PHOTO STATIONS

MY2	MY1
-----	-----

<p>Photo #4</p> <p>Date: 09/18/2023</p> <p>Feature: Photo Station 4</p> <p>Direction: East</p>	 <p>PP 4 Set 2022: Maple Swamp Wetland Tarboro NC 27886, United States © 18-Sep-23 09:53:46</p>	
---	--	--

<p>Photo #5</p> <p>Date: 09/18/2023</p> <p>Feature: Photo Station 5</p> <p>Direction: East</p>	 <p>PP 5 Set 2022: Maple Swamp Wetland Tarboro NC 27886, United States © 18-Sep-23 17:13:41</p>	
---	---	---

<p>Photo #6</p> <p>Date: 09/18/2023</p> <p>Feature: Photo Station 6</p> <p>Direction: East</p>	 <p>PP 6 Set 2022: Maple Swamp Wetland Tarboro NC 27886, United States © 18-Sep-23 17:05:02</p>	
---	--	--

MY2 PHOTO STATIONS

MY2	MY1
-----	-----

Photo #7
Date: 09/19/2023
Feature: Photo Station 7
Direction: East



APPENDIX B

Vegetation Plot Data

Table 7a: Vegetation Plot Data

Maple Swamp Wetland Mitigation Site
DMS ID No. 100190
Monitoring Year 2 – 2023

	Scientific Name	Common Name	Tree / Shrub	Indicator Status	Veg Plot 1 F		Veg Plot 2 F		Veg Plot 3 F		Veg Plot 4 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	<i>Cephalanthus occidentalis</i>	Buttonbush	Tree	OBL			2	2				
	<i>Fraxinus pennsylvanica</i>	Green ash	Tree	FACW	2	2	4	4	2	2		
	<i>Nyssa aquatica</i>	Water tupelo	Tree	FACW			5	5				
	<i>Platanus occidentalis</i>	Sycamore	Tree	FACW	2	2	1	1	1	1	2	2
	<i>Quercus laurifolia</i>	Laurel oak	Tree	FACW	1	1	2	2			5	5
	<i>Quercus lyrata</i>	Overcup oak	Tree	OBL	2	2	1	1	8	8	2	2
	<i>Quercus michauxii</i>	Swamp chestnut oak	Tree	FACW	2	2	2	2	2	2	1	1
	<i>Quercus nigra</i>	Water oak	Tree	FAC	1	1	1	1	3	3	3	3
	<i>Quercus phellos</i>	Willow oak	Tree	FACW	1	1	2	2	4	4	1	1
	<i>Quercus shumardii</i>	Shumard oak	Tree	FAC	3	3			1	1	1	1
	<i>Taxodium distichum</i>	Bald-cypress	Tree	OBL	5	5			4	4	5	5
	<i>Ulmus americana</i>	American elm	Tree	FAC	3	3					1	1
<i>Quercus pagoda</i>	Cherrybark oak	Tree	FACW									
Sum	Performance Standard				22	22	20	20	25	25	21	21
Post Mitigation Plan Species	<i>Diospyros virginiana</i>	American Persimmon	Tree	FAC								
Sum	Proposed Standard											
Mitigation Plan Performance Standard	Current Year Stem Count					22		20		25		21
	Stems/Acre					890		809		1012		850
	Species Count					10		9		8		9
	Dominant Species Composition (%)					23%		25%		32%		24%
	Average Plot Height (ft)					4.2		2.1		3.2		3.3
	% Invasives					0%		0%		0%		0%
Post Mitigation Plan Performance Standard	Current Year Stem Count					22		20		25		21
	Stems/Acre					890		809		1012		850
	Species Count					10		9		8		9
	Dominant Species Composition (%)					23%		25%		32%		24%
	Average Plot Height (ft)					4.2		2.1		3.2		3.3
	% Invasives					0%		0%		0%		0%

- 1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
- 2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded), species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
- 3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 7b: Vegetation Plot Data

Maple Swamp Wetland Mitigation Site
 DMS ID No. 100190
 Monitoring Year 2 – 2023

	Scientific Name	Common Name	Tree / Shrub	Indicator Status	Veg Plot 5 F		Veg Plot 6 F		Veg Plot 7 F		Veg Plot 8 F	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	<i>Cephalanthus occidentalis</i>	Buttonbush	Tree	OBL	1	1						
	<i>Fraxinus pennsylvanica</i>	Green ash	Tree	FACW	1	1	2	2				
	<i>Nyssa aquatica</i>	Swamp tupelo	Tree	FACW			2	2			3	3
	<i>Platanus occidentalis</i>	Sycamore	Tree	FACW			3	3				
	<i>Quercus laurifolia</i>	Laurel oak	Tree	FACW			3	3	3	3	1	1
	<i>Quercus lyrata</i>	Overcup oak	Tree	OBL	2	2			7	7	6	6
	<i>Quercus michauxii</i>	Swamp chestnut oak	Tree	FACW	1	1	2	2	1	1	1	1
	<i>Quercus nigra</i>	Water oak	Tree	FAC	4	4			1	1		
	<i>Quercus phellos</i>	Willow oak	Tree	FACW	2	2	1	1	1	1		
	<i>Quercus shumardii</i>	Shumard oak	Tree	FAC	2	2	2	2				
	<i>Taxodium distichum</i>	Bald-cypress	Tree	OBL	2	2	1	1	4	4	5	5
	<i>Ulmus americana</i>	American elm	Tree	FAC			2	2				
<i>Quercus pagoda</i>	Cherrybark oak	Tree	FACW			2	2					
Sum	Performance Standard				15	15	20	20	17	17	16	16
Post Mitigation Plan Species	<i>Diospyros virginiana</i>	American Persimmon	Tree	FAC								
Sum	Proposed Standard											
Mitigation Plan Performance Standard	Current Year Stem Count					15		20		17		16
	Stems/Acre					607		809		688		647
	Species Count					8		9		6		5
	Dominant Species Composition (%)					27%		15%		41%		38%
	Average Plot Height (ft)					2.2		3.2		3.3		2.5
	% Invasives					0%		0%		0%		0%
Post Mitigation Plan Performance Standard	Current Year Stem Count					15		20		17		16
	Stems/Acre					607		809		688		647
	Species Count					8		9		6		5
	Dominant Species Composition (%)					27%		15%		41%		38%
	Average Plot Height (ft)					2.2		3.2		3.3		2.5
	% Invasives					0%		0%		0%		0%

- 1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
- 2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
- 3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 7c: Vegetation Plot Data

Maple Swamp Wetland Mitigation Site

DMS ID No. 100190

Monitoring Year 2 – 2023

	Scientific Name	Common Name	Tree / Shrub	Indicator Status	Veg Plot 9 F		Veg Plot R1	Veg Plot R2
					Planted	Total	Total	Total
Species Included in Approved Mitigation Plan	<i>Cephalanthus occidentalis</i>	Buttonbush	Tree	OBL				
	<i>Fraxinus pennsylvanica</i>	Green ash	Tree	FACW			2	
	<i>Nyssa aquatica</i>	Swamp tupelo	Tree	FACW	2	2	3	
	<i>Platanus occidentalis</i>	Sycamore	Tree	FACW				
	<i>Quercus laurifolia</i>	Laurel oak	Tree	FACW			3	3
	<i>Quercus lyrata</i>	Overcup oak	Tree	OBL	4	4	2	2
	<i>Quercus michauxii</i>	Swamp chestnut oak	Tree	FACW	3	3		
	<i>Quercus nigra</i>	Water oak	Tree	FAC			1	1
	<i>Quercus phellos</i>	Willow oak	Tree	FACW	1	1	4	2
	<i>Quercus shumardii</i>	Shumard oak	Tree	FAC			3	4
	<i>Taxodium distichum</i>	Bald-cypress	Tree	OBL	2	2	4	
<i>Ulmus americana</i>	American elm	Tree	FAC				3	
<i>Quercus pagoda</i>	Cherrybark oak	Tree	FACW					
Sum	Performance Standard				12	12	22	15
Post Mitigation Plan Species	<i>Diospyros virginiana</i>	American Persimmon	Tree	FAC				
Sum	Proposed Standard							
Mitigation Plan Performance Standard	Current Year Stem Count					12	22	15
	Stems/Acre					485	890	607
	Species Count					5	8	6
	Dominant Species Composition (%)					33%	18%	27%
	Average Plot Height (ft)					2.2	3.1	3.0
	% Invasives					0%	0%	0%
Post Mitigation Plan Performance Standard	Current Year Stem Count					12	22	15
	Stems/Acre					485	890	607
	Species Count					5	8	6
	Dominant Species Composition (%)					33%	18%	27%
	Average Plot Height (ft)					2.2	3.1	3.0
	% Invasives					0%	0%	0%

- 1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.
- 2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the current monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).
- 3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 8: Vegetation Performance Standards Summary

Maple Swamp Wetland Mitigation Site

DMS ID No. 100190

Monitoring Year 2 – 2023

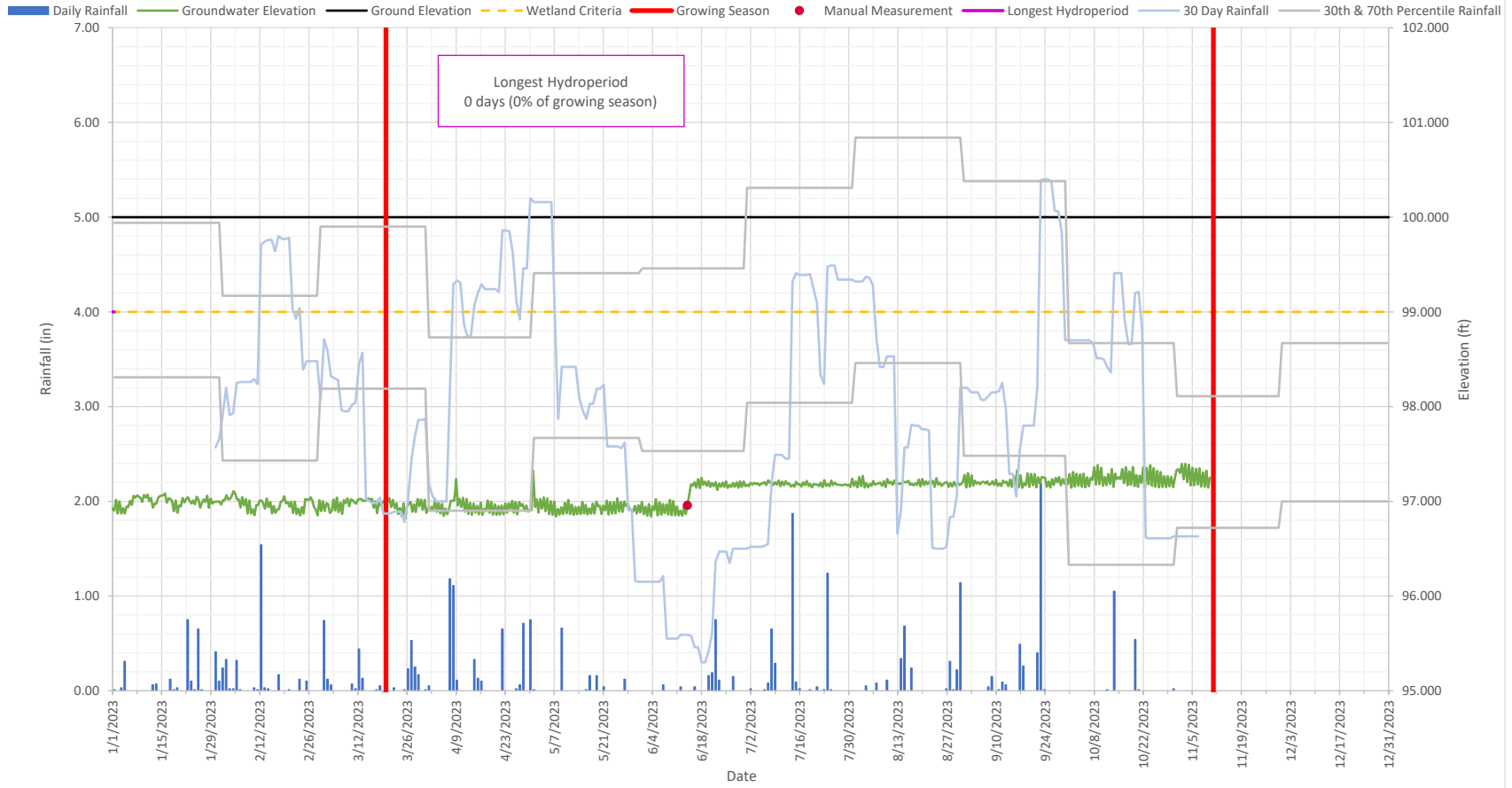
	Veg Plot 1 F				Veg Plot 2 F				Veg Plot 3 F			
	Stems/Acre	Avg Ht (ft)	# Species	% Invasive	Stems/Acre	Avg Ht (ft)	# Species	% Invasive	Stems/Acre	Avg Ht (ft)	# Species	% Invasive
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2	890	4.2	10	0%	809	2.1	9	0%	1012	3.2	8	0%
Monitoring Year 1	931	3.0	9	0%	809	1.6	8	0%	1012	2.0	9	0%
Monitoring Year 0	931	1.5	9	0%	809	1.5	8	0%	1012	1.6	9	0%
	Veg Plot 4 F				Veg Plot 5 F				Veg Plot 6 F			
	Stems/Acre	Avg Ht (ft)	# Species	% Invasive	Stems/Acre	Avg Ht (ft)	# Species	% Invasive	Stems/Acre	Avg Ht (ft)	# Species	% Invasive
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2	850	3.3	9	0%	607	2.2	8	0%	809	3.2	9	0%
Monitoring Year 1	809	2.2	9	0%	809	1.8	12	0%	769	2.1	9	0%
Monitoring Year 0	850	1.5	9	0%	769	1.6	12	0%	809	1.6	10	0%
	Veg Plot 7 F				Veg Plot 8 F				Veg Plot 9 F			
	Stems/Acre	Avg Ht (ft)	# Species	% Invasive	Stems/Acre	Avg Ht (ft)	# Species	% Invasive	Stems/Acre	Avg Ht (ft)	# Species	% Invasive
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2	688	3.3	6	0%	647	2.5	5	0%	485	2.2	5	0%
Monitoring Year 1	1093	2.1	7	0%	688	2.2	6	0%	566	1.9	6	0%
Monitoring Year 0	607	1.6	6	0%	809	1.7	6	0%	809	1.5	8	0%
	Veg Plot R1				Veg Plot R2							
	Stems/Acre	Avg Ht (ft)	# Species	% Invasive	Stems/Acre	Avg Ht (ft)	# Species	% Invasive				
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2	890	3.1	8	0%	607	3.0	6	0%				
Monitoring Year 1	728	1.7	6	0	647	1.8	6	0				
Monitoring Year 0	728	1.5	9	0	769	1.9	7	0				

*Each monitoring year represents a different plot for the random vegetation plot "groups". Random plots are denoted with an R, and fixed plots with an F.

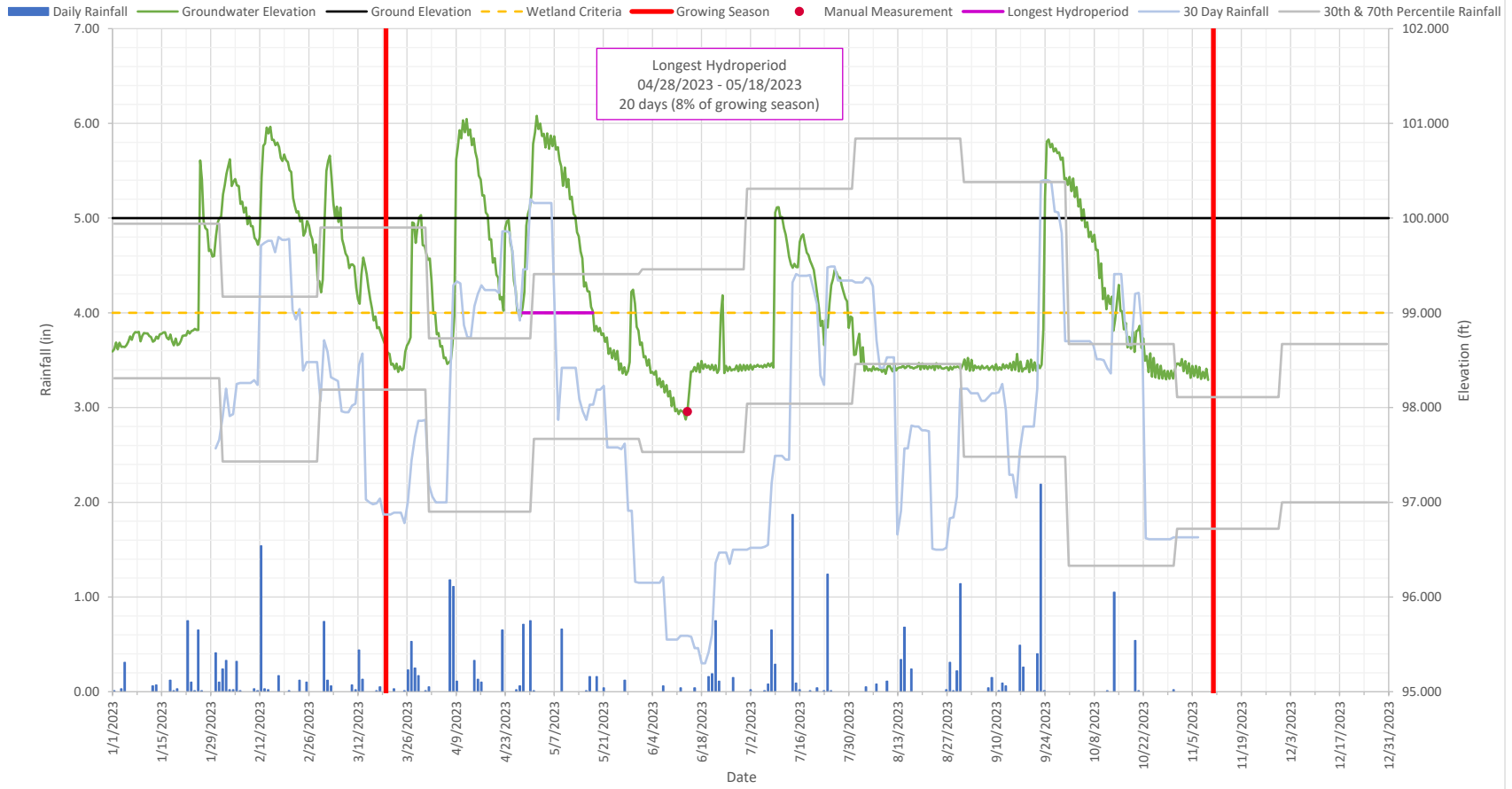
APPENDIX C

Hydrologic Data and Rainfall

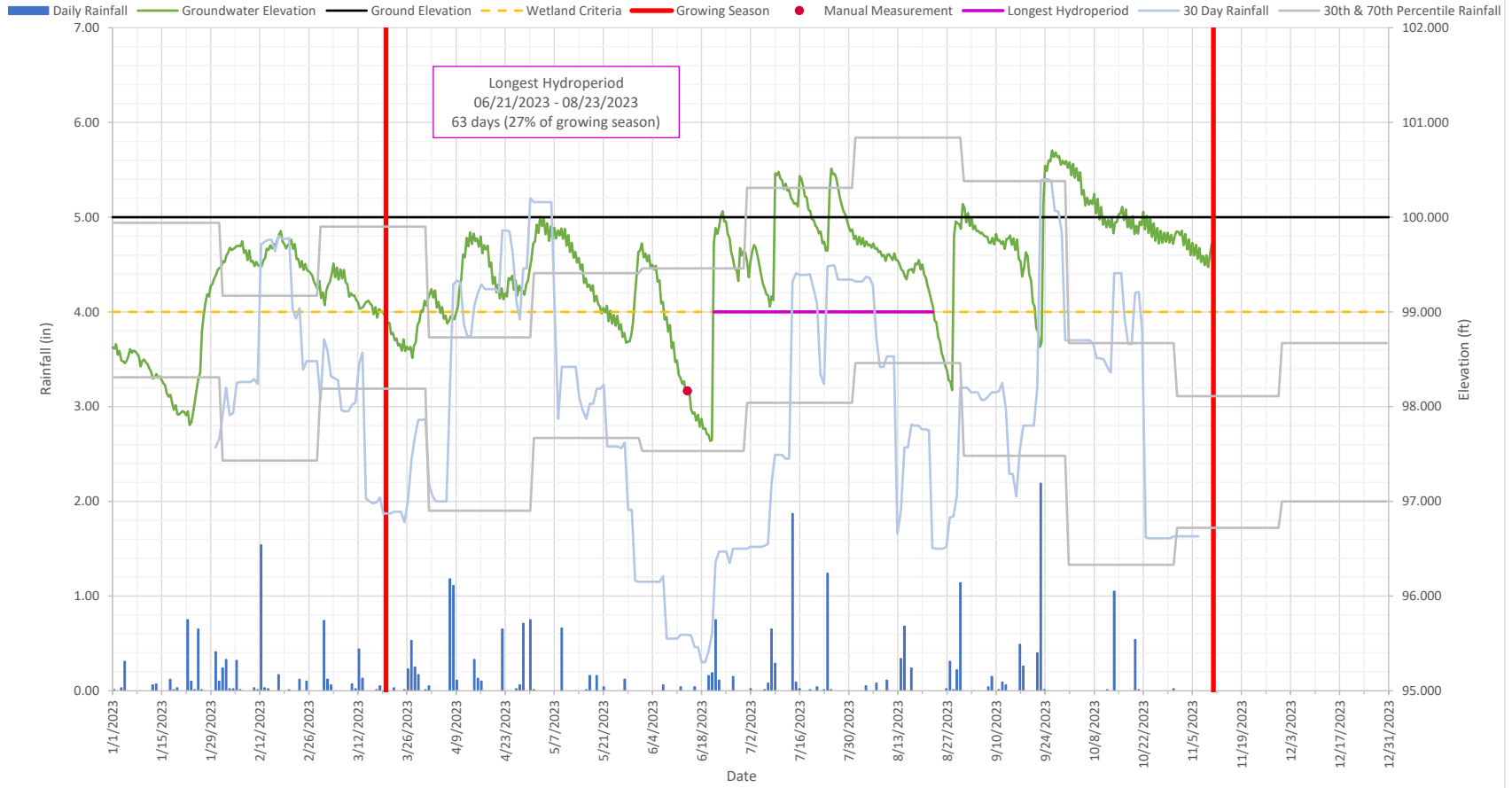
Maple Swamp Wetland Mitigation Site - MY2 2023 Groundwater Well Reference



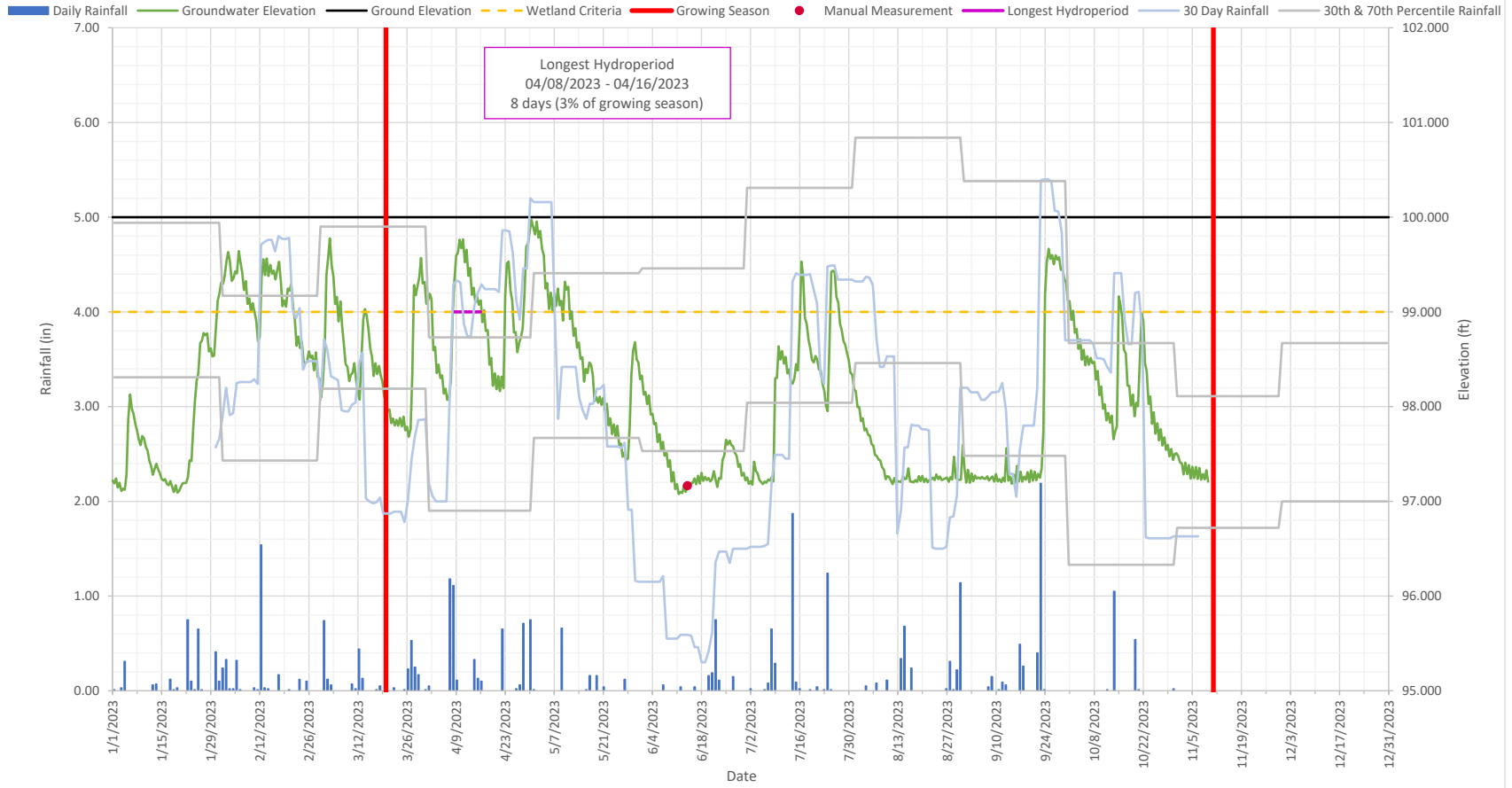
Maple Swamp Wetland Mitigation Site - MY2 2023 Groundwater Well 1



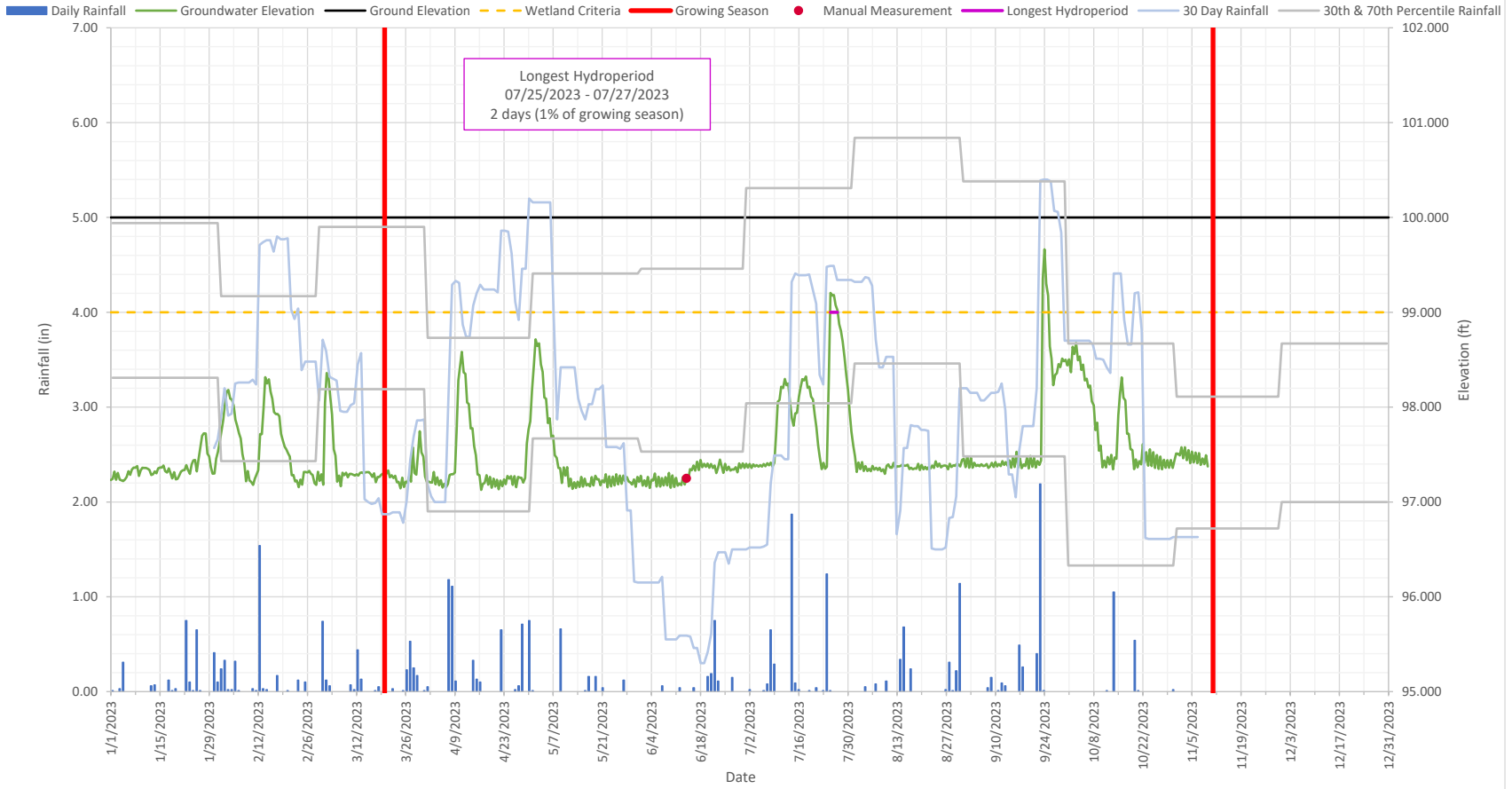
Maple Swamp Wetland Mitigation Site - MY2 2023 Groundwater Well 2



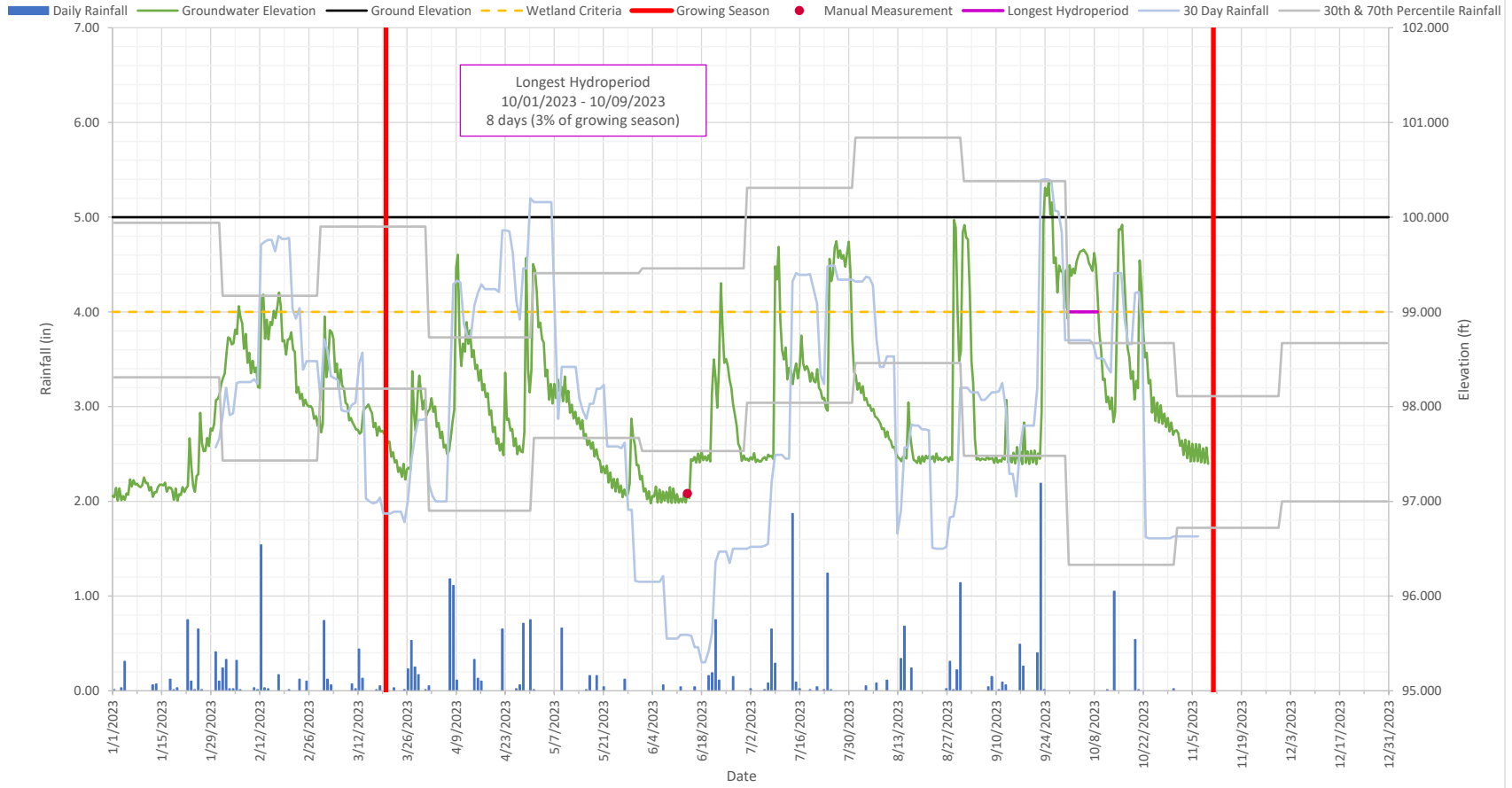
Maple Swamp Wetland Mitigation Site - MY2 2023 Groundwater Well 3



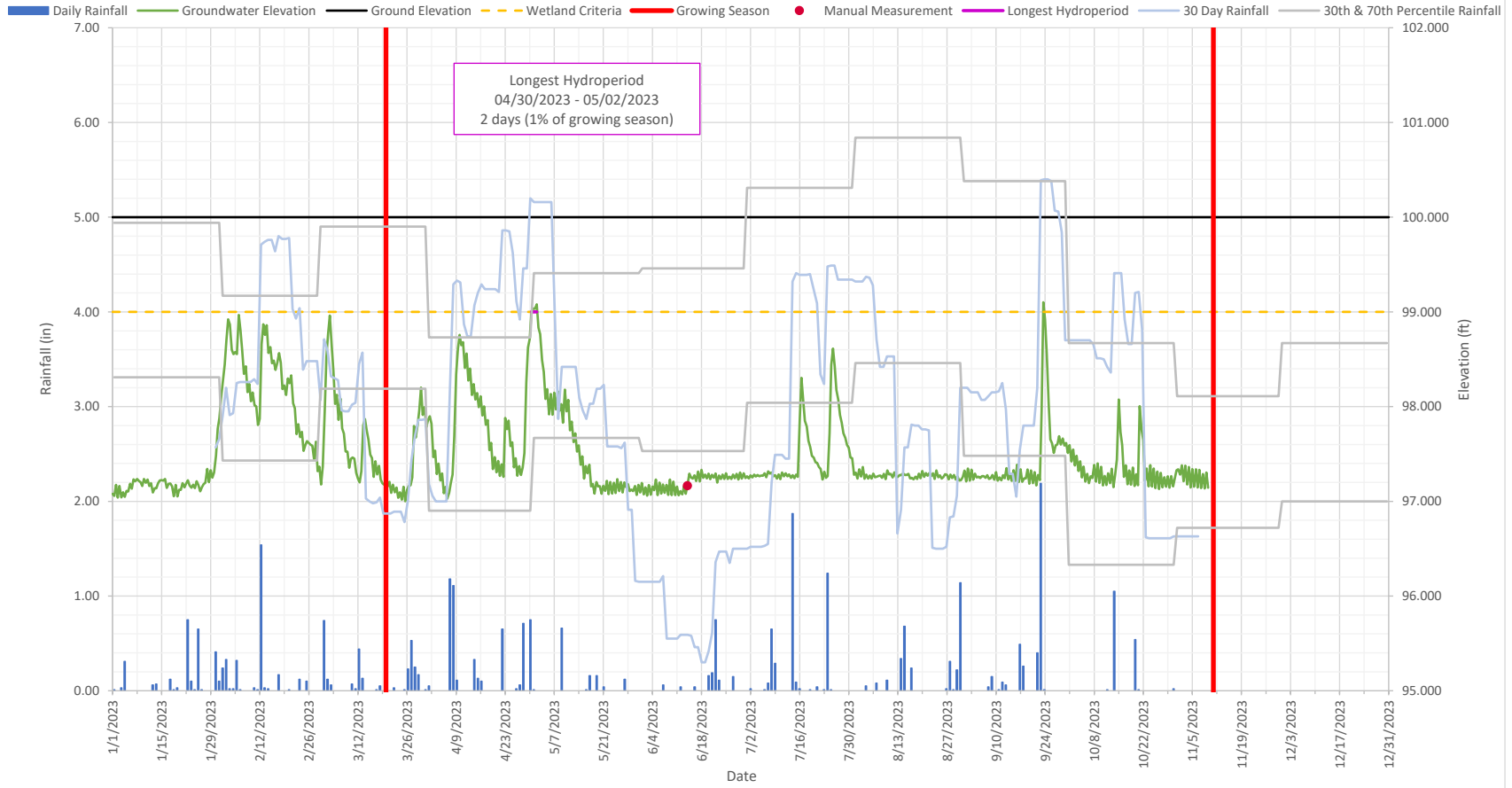
Maple Swamp Wetland Mitigation Site - MY2 2023 Groundwater Well 4



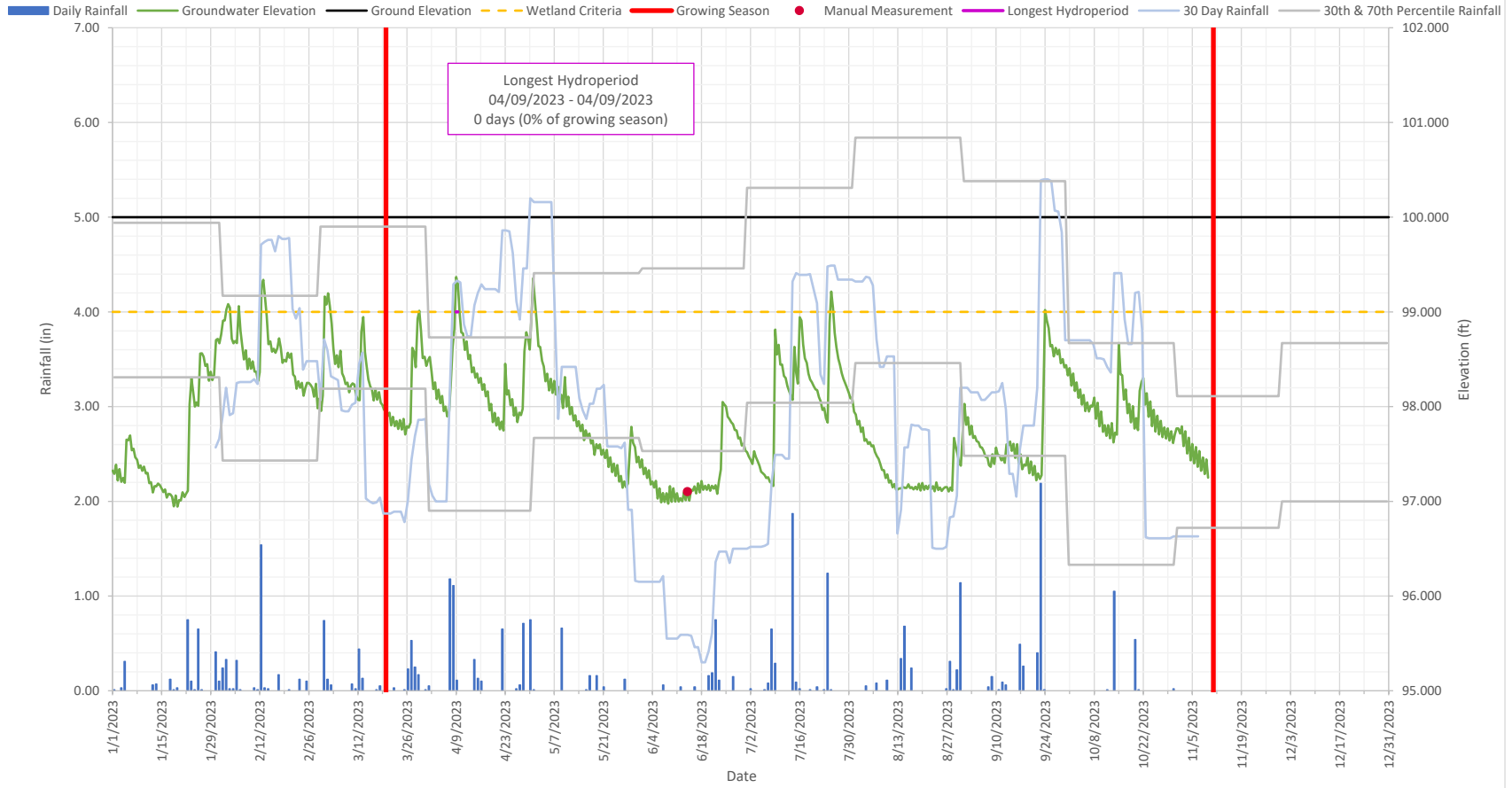
Maple Swamp Wetland Mitigation Site - MY2 2023 Groundwater Well 5



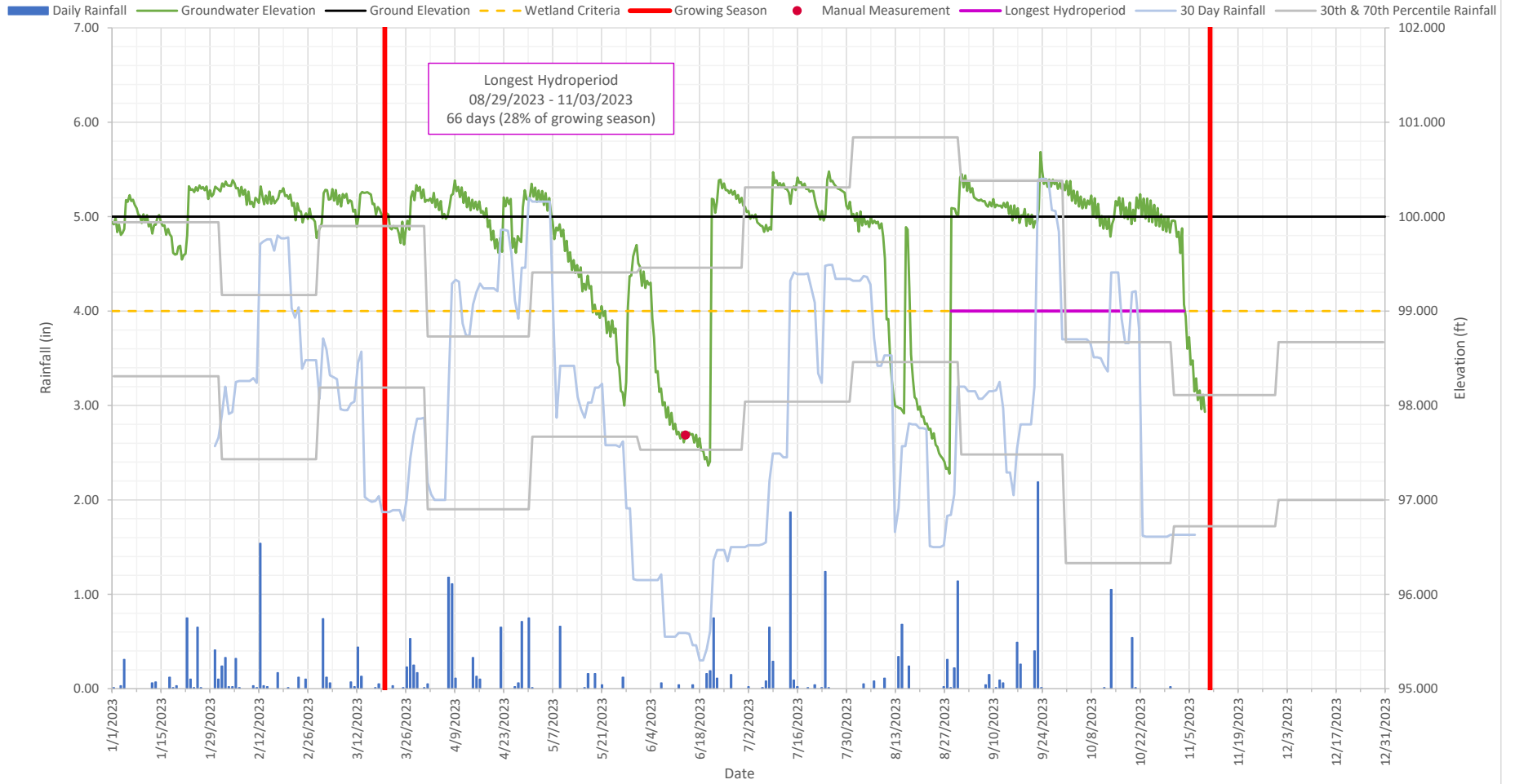
Maple Swamp Wetland Mitigation Site - MY2 2023 Groundwater Well 6



Maple Swamp Wetland Mitigation Site - MY2 2023 Groundwater Well 7



Maple Swamp Wetland Mitigation Site - MY2 2023 Groundwater Well 8



Maple Swamp Wetland Mitigation Site - MY2 2023 Groundwater Well 9

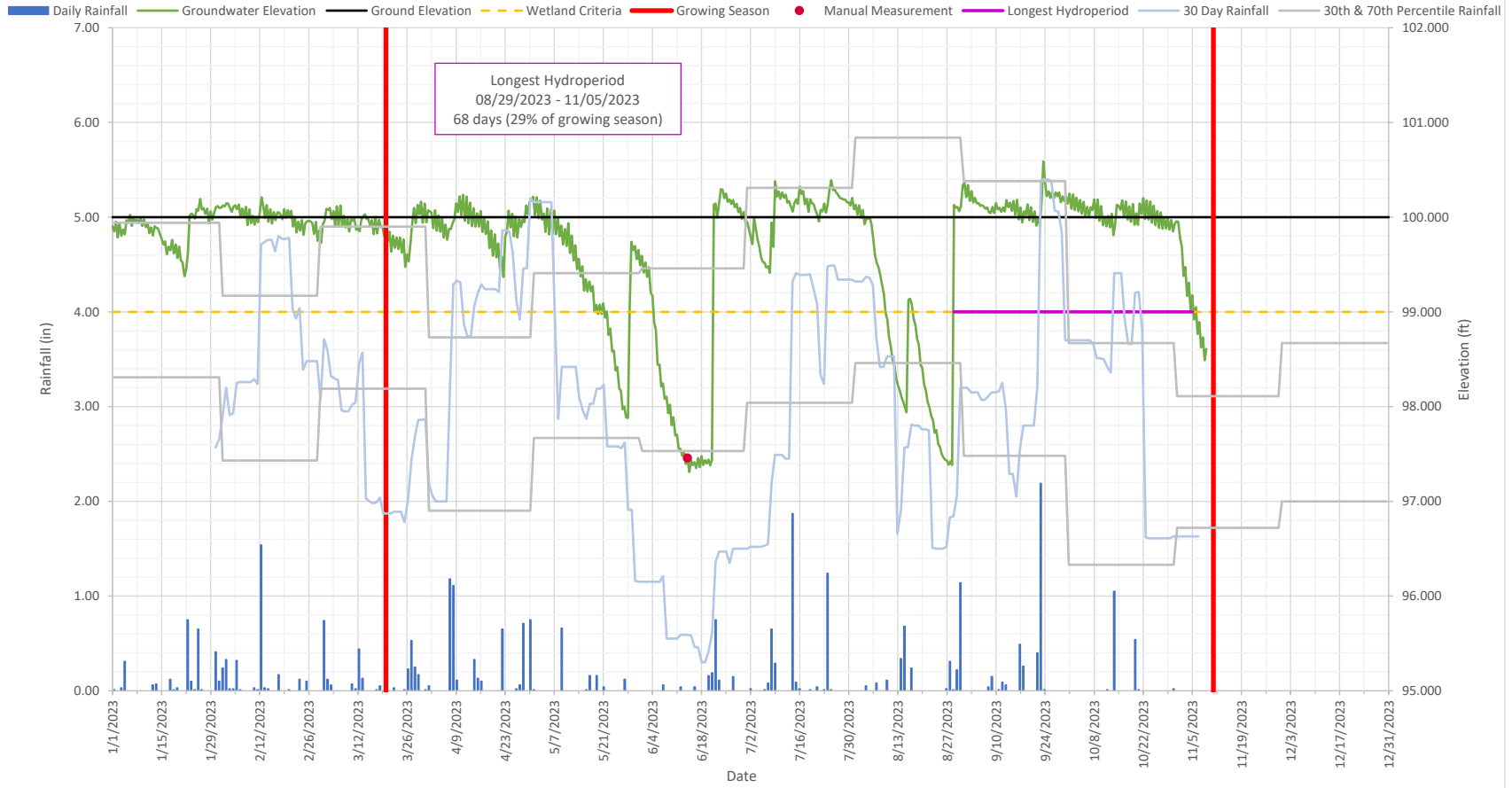


Table 9: Rainfall Summary

Maple Swamp Wetland Mitigation Site
 DMS ID No. 100190
 Monitoring Year 2 – 2023

Month	Cumulative Rainfall (in)							
	30th / 70th Percentile	MY1 2022	MY2 2023	MY3 2024	MY4 2025	MY5 2026	MY6 2027	MY7 2027
January	3.31 / 4.94	1.76	2.68					
February	2.43 / 4.17	1.75	2.97					
March	3.19 / 4.90	2.26	2.87					
April	1.90 / 3.73	2.21	5.20					
May	2.67 / 4.41	2.84	1.16					
June	2.53 / 4.46	2.36	1.50					
July	3.04 / 5.31	4.14	4.34					
August	3.46 / 5.94	3.18	3.20					
September	2.48 / 5.38	4.63	3.70					
October	1.33 / 3.67	0.69	1.63					
November	1.72 / 3.11							
December	2.00 / 3.67							

Red values indicate recorded rainfall less than the 30th percentile value.

Blue values indicate recorded rainfall greater than the 70th percentile value.

30th and 70th percentile rainfall values based on NRCS WETS station Tarboro 1 S, NC

Rainfall data obtained from USGS 02082585 (Tar River at NC97)

Table 10a: Goundwater Gauge Summary

Maple Swamp Wetland Mitigation Site
 DMS ID No. 100190
 Monitoring Year 2 – 2023

Growing Season 3/20 - 11/11 236 days	Performance Standard	Longest Hydroperiod									
		GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	GW9	Reference
MY1 - 2022	21 days 9%	1 day <1%	12 days 5%	0 days 0%	0 days 0%	0 days 0%	0 days 0%	0 days 0%	43 days 18%	23 days 10%	0 days 0%
MY2 - 2023		20 days 8%	63 days 27%	8 days 3%	2 days 1%	8 days 3%	2 days 1%	0 days 0%	66 days 28%	68 days 29%	0 days 0%
MY3 - 2024	28 days 12%										
MY4 - 2025											
MY5 - 2026											
MY6 - 2027											
MY7 - 2028											

WETS Station: Tarboro 1 S, NC

MY2 Monitoring dates: 1/1/2023 - 11/10/2023

Table 10b: Goundwater Gauge Summary

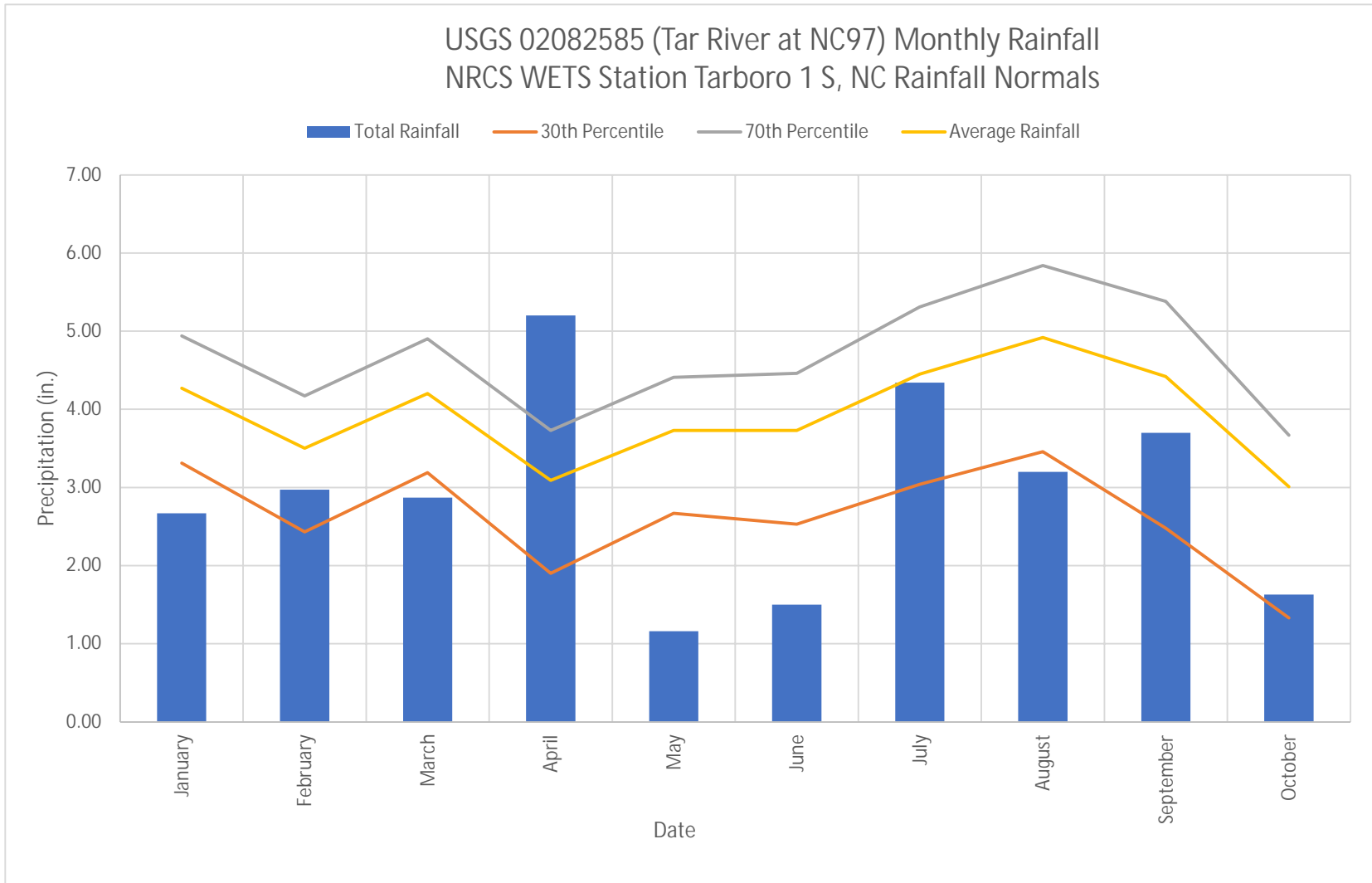
Maple Swamp Wetland Mitigation Site
 DMS ID No. 100190
 DWR Project No. 2021-0409v2
 Monitoring Year 2 – 2023

Growing Season 3/20 - 11/11 236 days	Success Criteria	Total Days Above Success Criteria									
		GW1	GW2	GW3	GW4	GW5	GW6	GW7	GW8	GW9	Reference
MY1 - 2022	Groundwater within 12" of surface										
MY2 - 2023		88 days	191 days	42 days	5 days	34 days	2 days	4 days	186 days	188 days	0 days
MY3 - 2024											
MY4 - 2025											
MY5 - 2026											
MY6 - 2027											
MY7 - 2028											

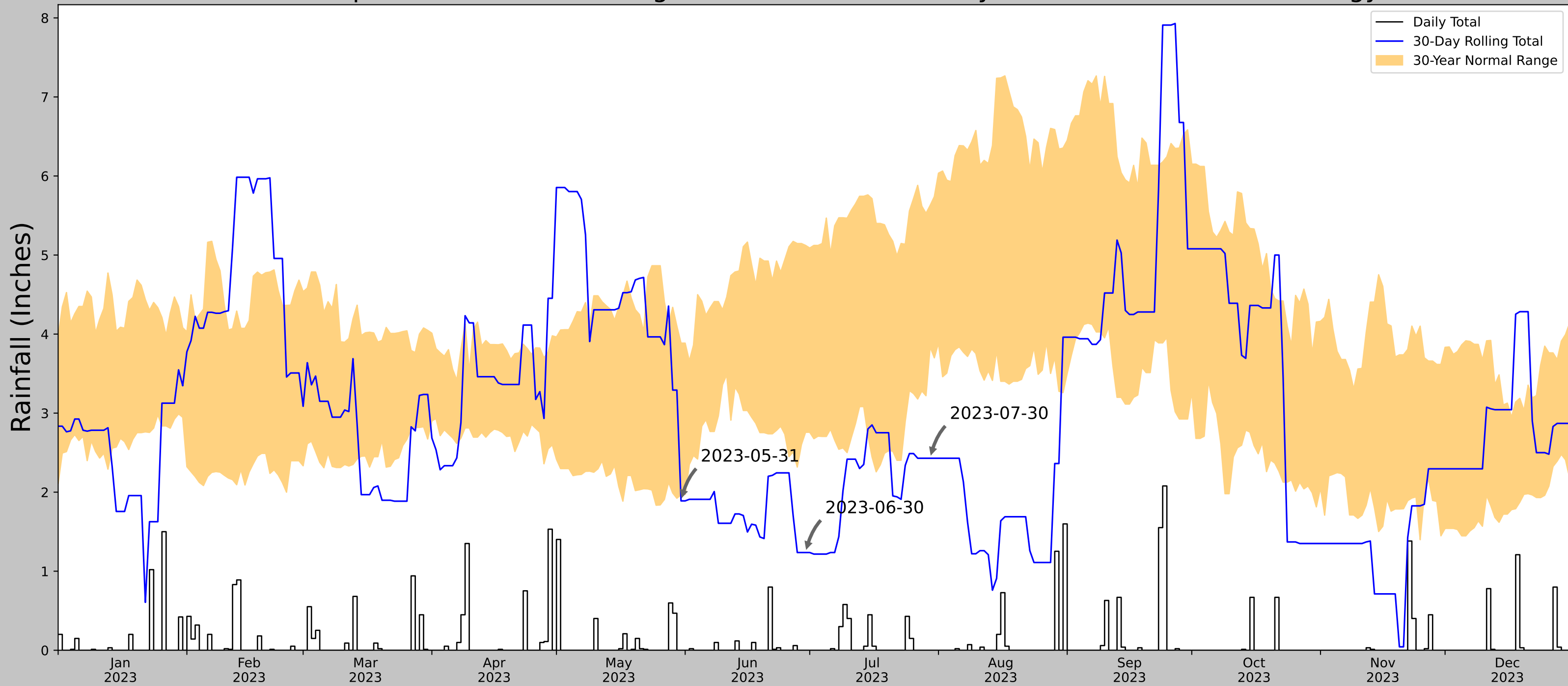
WETS Station: Tarboro 1 S, NC

MY2 Monitoring dates: 1/1/2023 - 11/10/2023

Cumulative Monthly Rainfall Summary
Maple Swamp Wetland Mitigation Site
DMS ID No. 100190
DWR Project No. 2021-0409v2
Monitoring Year 2 – 2023




Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network




Coordinates	36.012528, -77.559504
Observation Date	2023-07-30
Elevation (ft)	58.301
Drought Index (PDSI)	Moderate drought
WebWIMP H ₂ O Balance	Dry Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-07-30	3.83937	5.627953	2.429134	Dry	1	3	3
2023-06-30	2.75748	5.122047	1.236221	Dry	1	2	2
2023-05-31	1.966535	3.885827	1.889764	Dry	1	1	1
Result							Drier than Normal - 6



Figures and tables made by the
Antecedent Precipitation Tool
Version 2.0

Developed by:
U.S. Army Corps of Engineers and
U.S. Army Engineer Research and
Development Center

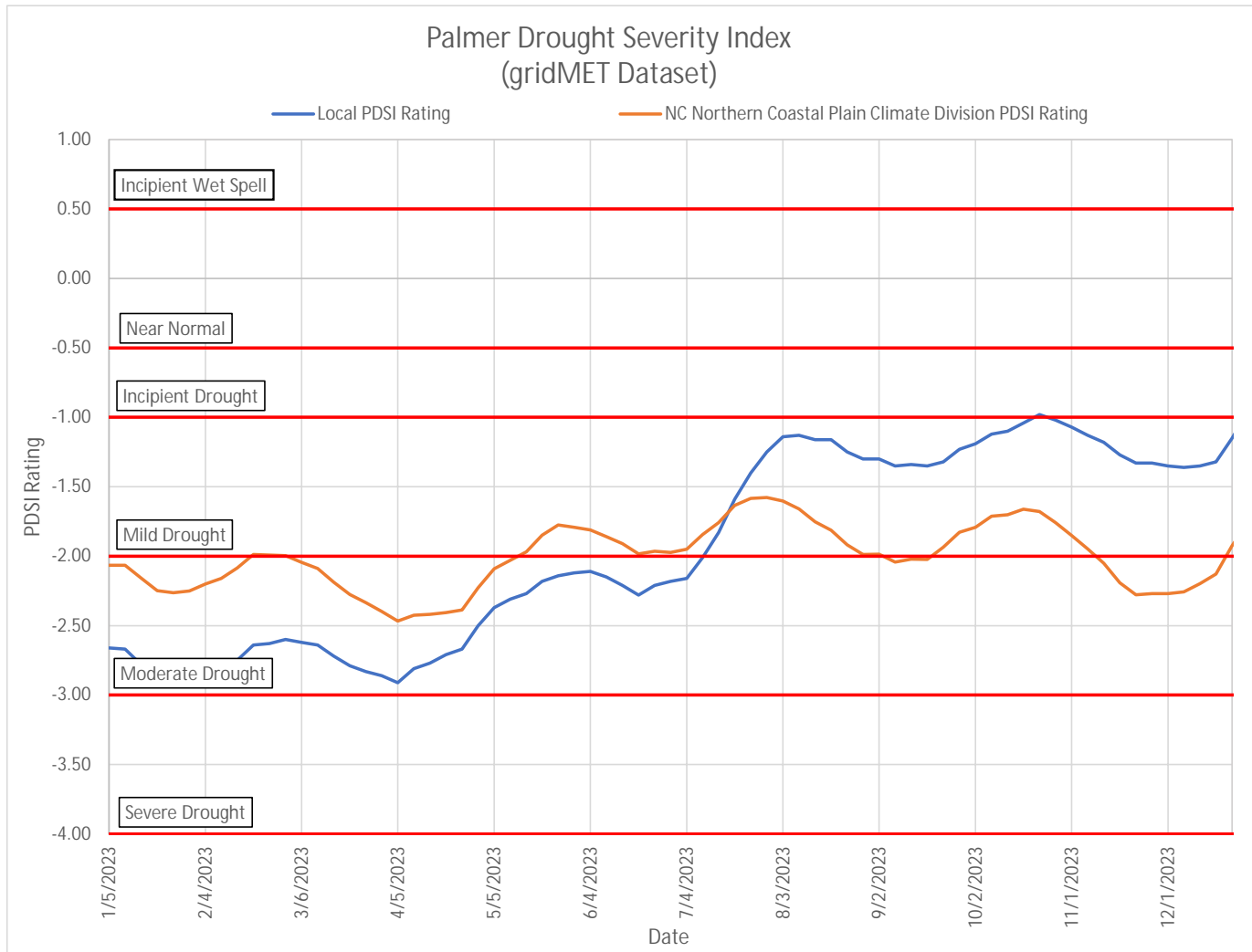


Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
TARBORO 1 S	35.8842, -77.5386	35.105	8.943	23.196	4.232	10754	89
TARBORO 0.7 S	35.8984, -77.5544	66.929	1.321	31.824	0.636	70	0
TARBORO 5.9 SE	35.8391, -77.495	43.963	3.959	8.858	1.817	155	1
CONETOE 3.0 ENE	35.8391, -77.4105	50.853	7.821	15.748	3.643	9	0
ROCKY MT 8 ESE	35.8936, -77.6805	109.908	7.97	74.803	4.183	241	0
GREENVILLE	35.64, -77.3983	32.152	18.616	2.953	8.432	124	0

APPENDIX D

Palmer Drought Severity Index (PDSI) Summary

Palmer Drought Severity Index (PDSI)
Maple Swamp Wetland Mitigation Site
DMS ID No. 100190
DWR Project No. 2021-0409v2
Monitoring Year 2 – 2023



APPENDIX E

Project Timeline and Contacts Info

Table 11: Project Activity and Reporting History

Maple Swamp Wetland Mitigation Site

DMS ID No. 100190

Monitoring Year 2 – 2023

Activity or Report	Data Collection Complete	Completion or Scheduled Delivery
Project Instituted	N/A	February 11, 2021
Mitigation Plan Approved	N/A	January 26, 2022
Construction (Grading) Completed	N/A	April 7, 2022
As-Built Survey Completed	May 2022	May 2022
Planting Completed	N/A	April 7, 2022
Baseline Monitoring Document (Year 0) - Vegetation Survey	March 2022	July 2022
Year 1 Monitoring - Vegetation Survey	October 2022	November 2022
Year 2 Monitoring - Supplemental Planting	March 2023	
Year 2 Monitoring - Vegetation Survey	September 2023	November 2023
Year 3 Monitoring - Vegetation Survey	2024	November 2024
Year 4 Monitoring - Vegetation Survey	2025	November 2025
Year 5 Monitoring - Vegetation Survey	2026	November 2026
Year 6 Monitoring - Vegetation Survey	2027	November 2027
Year 7 Monitoring - Vegetation Survey	2028	November 2028

Table 12: Project Contacts

Maple Swamp Wetland Mitigation Site

DMS ID No. 100190

Monitoring Year 2 – 2023

<p><u>Manager</u> Eco Terra - Jordan Burbage</p>	<p>Eco Terra, LLC 117 Centrewest Ct Cary, NC 27513 984.354.3800</p>
<p><u>Engineer</u> McAdams - Rebecca Stubbs, PE</p>	<p>McAdams 621 Hillsborough Street, Suite 500 Raleigh, NC 27603 919.361.5000</p>
<p><u>Construction Contractor</u> William Gilbert</p>	<p>W Gilbert and Co., Inc 487 Fillmore Rd Tarboro, NC 27886 252.469.3989</p>
<p><u>Monitoring</u> Eco Terra - Jordan Burbage</p>	<p>Eco Terra, LLC 117 Centrewest Ct Cary, NC 27513 984.354.3800</p>