Monitoring Report

Norman's Pasture Restoration Site
DMS Contract 005010
DMS Project Number 95717

Norman's Pasture II Restoration Site
DMS Contract 5787
DMS Project Number 96310

USACE Action ID#: SWA-2013-00109
DWR Project #: 2014-0107
Sampson County, NC

Monitoring Year 07

Construction Completed: Feb 2016
Data Collection: 2022
Submitted: December 2022

Monitoring and Design Firm

Prepared by:

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Project Contact: Adam Spiller
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KCI ASSOCIATES OF NORTH CAROLINA, PA

ENGINEERS • SCIENTISTS • SURVEYORS • CONSTRUCTION MANAGERS

4505 Falls of Neuse Road Suite 400 Raleigh, NC 27609 (919) 783-9214 (919) 783-9266 Fax

MEMORANDUM

Date: February 6, 2023
To: Jeremiah Dow, DMS Project Manager
From: Adam Spiller, Project Manager
KCI Associates of North Carolina, PA
Subject: MY-07 Monitoring Report Comments
Norman's Pasture IMS#95717, Contract 005010
Norman's Pasture II IMS#96310, Contract 5787
Cape Fear River Basin CU 03030006
Sampson County, North Carolina

Please find below our responses in italics to the MY-07 Monitoring Report comments from NCDMS received on January 24, 2022, for the Norman's Pasture/Norman's Pasture II Restoration Sites.

1. Section 2.2, 3rd paragraph says "Gauge NPII-4 was installed approximately 50 feet northwest…" I think this should read NPII-14.
   KCI Response: That is correct. The text has been updated.
2. Is the additional invasive treatment planned for spring of 2023 within the same area as the 2021 treatment area? If not, the proposed 2023 treatment should be shown on the CCPV instead of the past treatment.
   KCI Response: The planned treatment areas is the same as the 2021 treatment. The wording on the CCPV has been adjusted to reflect this.
3. Table 5 – Assuming the 2021 invasive treatment area is the same as the proposed 2023 treatment area, recommend a footnote below table to indicate that the 7.10 acre invasive treatment area is scheduled for treatment in spring of 2023 and was not treated in 2022.
   KCI Response: This footnote has been added to the report.
4. Recommend using a different color for the mowed path on the CCPV as that color is the same as the conservation easement boundary for Normans I.
   KCI Response: This change has been made.
5. In Table 6 VPs 18 & 27 planted stems per acre cell is shaded green as if they met success criteria. Please include the veg success color key below Table 6 and shade the cells accordingly.
   KCI Response: These cells were incorrectly shaded green. This error has been corrected and a key has been added below the table.
6. Please shade the Table 8 text or cells different colors to indicate success criteria met or not met for all years.
   KCI Response: This change has been made.

Please contact me if you have any questions or would like clarification concerning these responses.
Sincerely,

Adam Spiller
Project Manager

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1.0 EXECUTIVE SUMMARY / PROJECT ABSTRACT

There are two separate projects included within this report. The projects are adjacent to each other, which is why the reporting structure for these projects is combined. The Norman's Pasture Restoration Site (NPRS) was completed in February 2016 and restored a total of 16.2 acres of riparian wetlands. Two on-site tributaries were also restored to integrated headwater/stream systems, but no stream mitigation credit is included in the NPRS. The NPRS is a riparian wetland system in the Cape Fear River Basin (03030006 8-digit HUC) in eastern Sampson County, North Carolina, that had been substantially modified to maximize agricultural production. The completed project will restore impacted agricultural lands to riparian wetland habitat.

The Norman's Pasture II Restoration Site (NPII) is located directly adjacent to NPRS, was also completed in February 2016, and includes a total of 10.2 acres of riparian wetland restoration and 843 linear feet of stream enhancement II. The NPII also includes 0.8 acres of existing wetland preservation. The completed NPII project will expand on the restoration efforts of the NPRS by extending restoration and protection initiatives to the headwater extents of much of the local watershed. The site will restore and protect a range of unique aquatic resources in one setting – existing riparian wetlands, a forested tributary that had lost connection with its historic floodplain, lower gradient seep-fed headwaters, and adjacent upland buffers.

The NPRS is protected by a 36.9-acre permanent conservation easement, while NPII is protected by a 16.3-acre permanent conservation easement, both held by the State of North Carolina. Both sites are located on two parcels located off of Cornwallis Road, approximately 5 miles west of Magnolia, North Carolina. The project sites are bounded by Stewarts Creek to the south, agricultural land to the north, Cornwallis Road to the east, and woodlands to the west. The sites have 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 NPRS and NPII's 14-digit HUC are to protect and improve water quality throughout the Basin by reducing sediment and nutrient inputs into streams and rivers and to support efforts to restore local watersheds (NCDENR EEP, 2009). The project goals for NPRS and NPII are in line with the basin priorities and include the following:

- Reconnect a continuous stream and wetland headwater wetland system to Stewarts Creek.
- Expand and protect riparian habitat along Stewart's Creek.
- Buffer nutrient inputs from adjacent agricultural and grazing practices.

Additional goals for the project include:

- Increase the local hydroperiod by encouraging both surface and subsurface storage and retention.
- Restore and establish a functional and diverse stream/wetland complex.

The project goals will be addressed through the following objectives:

- Redevelop a stream/wetland complex that has previously been impacted by ditching and cattle grazing.
- Fill field ditches to restore surface flow retention and historic flow paths.
- Protect and integrate existing riparian wetlands into the project design.
- Re-forest riparian areas with native plant communities.
- Re-connect headwater seeps to the broader swamp forest community of Stewarts Creek being restored by NPRS and NPII

Project planting and construction were completed in February 2016. The NPRS involved restoration and establishment of a functional stream/wetland complex with 16.2 acres of riparian wetland restoration (15.5

acres of re-establishment and 0.7 acre of wetland rehabilitation). Select ditches across the site were modified or filled and seeps were redirected and redeveloped to retain and distribute surface flow across the site. The two project tributaries (Tributaries 1 and 2 to Stewarts Creek) were restored to integrated headwater/stream systems, but no stream mitigation credit is included in NPRS. Approximately 9.0 acres of wetland preservation is included throughout the NPRS, but for no additional credit.

The NPII aimed to restore and establish a stream/wetland complex with 10.2 acres of riparian wetland restoration (8.8 acres of re-establishment and 1.4 acres of rehabilitation). Approximately 843 linear feet of Tributary 1 to Stewarts Creek were improved with Enhancement II and reconnected to the historic floodplain. Also, approximately 0.8 acre of existing wetlands were included as preservation at NPII (no mitigation credit).

Both NPRS and NPII were constructed as designed with only a few modifications made to the design plan during construction. On NPRS, several portions of the on-site ditches were not filled and a ditch plug was not installed to allow Stewart's Creek better flood access to the site. Two extra areas were also planted as Headwater Forest Communities. On NPII, one riffle enhancement and one log drop were not installed at the very beginning of the stream reach. Several extra HDPE pipes were also added at the crossings to allow better hydraulic connectivity between the different areas of the site.

The monitoring components were installed in February and March 2016 for both sites. 22 monitoring gauges (9 on NPRS and 13 on NPII) were installed to evaluate the attainment of jurisdictional wetland hydrology for both sites. One monitoring gauge was installed in the stream on NPII to document the presence of surface water and record the occurrence of bankfull events. In addition to this, two other gauges were installed outside of the credit bearing area to monitor hydrology in what could become a (non-credit bearing) wetland creation area within the easement. Three more gauges were installed at NPII in February of 2018 and a fourth was installed in March 2019, for a total of 26 wetland hydrology gauges within the credit bearing portions of the site. To determine the success of the planted mitigation areas, 31 permanent vegetation monitoring plots (18 on NPRS and 13 on NPII) were established according to the CVS-EEP Level 2 protocol. Ten permanent photo points have been established with a total of twelve photos to be taken annually.

The success criteria for the sites state that the planted wetlands must meet the success criteria of a site average 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.

Wetland hydrology is monitored with the series of 27 automatic gauges described above that record water table depth. Two additional gauges are installed outside of the credit bearing area to monitor hydrology in what could become a (non-credit bearing) wetland creation area within the easement. To meet the success criterion, the upper 12 inches of the soil profile must have continuously saturated or inundated conditions for at least 9.0% of the growing season in the Headwater Forest community and 12.0% of the growing season in the Riverine Swamp Forest community during normal weather conditions. Over the course of monitoring, one gauge (NPII-8) has not achieved the success criteria in any of the monitoring years. On January 29, 2021, KCI performed a detailed investigation of the vegetation, soils, and visual hydrology indicators around this gauge. As a result of this investigation, 0.067 acres of wetland reestablishment have been designated as "at-risk." Please see the Current Conditions Plan View for more information.

2.0 MONITORING RESULTS

2.1 Vegetation Monitoring Results

The vegetation monitoring success criterion for the planted mitigation area is a density of 320 stems/acre after the third year of monitoring and an allowance for 10% mortality in the following years for a stem density of 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, thirty-one permanent vegetation monitoring plots (10 by 10 meters) have been established in the mitigation area at a density that represents the total mitigation acreage. Eighteen of these plots are in NPRS and thirteen of these are in NPII. The seventh year vegetation monitoring showed 29 of the 31 plots meeting the success criteria of 210 planted stems/acre. Both of the plots that did not achieve the success criteria were only 1 stem short and had many diverse volunteer species. Across all of the plots, the site averaged 572 planted stems/acre and 2,395 stems/acre including volunteers. Overall the site is well vegetated with many large planted and volunteer woody stems and a robust and diverse herbaceous layer.

One vegetation transect was surveyed within the creation area mentioned above, with the intention of categorizing the vegetation in this area. This transect was surveyed using the point intercept method, was 100 feet long, and sampling frequency was 5 feet. A percent cover of 90% was recorded as well as five different species across 35 individual stem. Please see Appendix C – Vegetation Plot Data for further information.

2.2 Hydrology Monitoring Results

Twenty-two groundwater monitoring gauges were installed at baseline in the wetland mitigation areas to measure wetland hydrology. Nine of these gauges are in Norman's Pasture (NP) and thirteen are in Norman's Pasture II (NPII). In addition to this, two gauges were installed outside of the credit bearing area to monitor hydrology in what could become a (non-credit bearing) wetland creation area within the easement. Three more gauges were installed at NPII in February of 2018, one more gauge was installed in March 2019 and a final gauge was installed in November 2020. The growing season for Sampson County begins February 28 and ends November 21 (267 days). The success criteria for the site states that the water table of the restored wetlands must be within 12" of the soils surface continuously for at least 9% (24 days) of the growing season for headwater forest systems and 12% (32 days) for riverine swamp forest systems during normal weather conditions. A "normal" year is based on NRCS climatological data for Sampson County, and 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" (Sprecher and Warne, 2000).

The daily rainfall data was obtained from a local weather station in Clinton, NC; provided by the NC State Climate Office. In 2022 no months experienced above average rainfall. January, April, and June experienced average rainfall and February, March, May, July, August, September, October, and November recorded below average rainfall. Overall, the area experienced well below average rainfall during 2022.

During the site's seventh growing season, sixteen of the twenty-seven wells met the success criterion of having saturated soil conditions occurring within 12 inches of the ground surface for a minimum continuous period of 9% (24 days) for headwater forest systems or 12% (32 days) for riverine swamp forest systems of the 267 day growing season (February 28 to November 21). Four of the gauges that did not meet the success criteria malfunctioned at the beginning of the growing season and did not record any data during the 2022 growing season. Three of these 4 gauges have met every other year that they were installed while the fourth has only been installed for one year. Of the other 8 gauges that did not achieve the success criteria this year, four of them have met the success criteria in every preceding year, one of them met the success

criteria in all but one of the preceding years, and one of them met the success criteria in all but two of the proceeding years. The low levels of hydrology that these gauges showed were due to the extremely low rainfall totals that the site and surrounding area received this year. The final two gauges that did not achieve the success criteria are NPII-6 and 8. NPII-8 has not met the success criteria in any of the years, and is located within the "at-risk" area described above. NPII-6 has only met the success criteria in 2 out of the 7 monitoring years. This gauge has achieved better than jurisdictional hydrology (5%) in 2 of its 5 unsuccessful years. It achieved continuous saturation for 22 days (8.2%) in MY04 and for 20 days (7.5%) in MY06. Starting in MY03, KCI began investigating the area around this gauge. Gauge NPII-14 was installed approximately 50 feet northwest of NPII-6 and has achieved the success criteria in all 5 years that it has been installed. NPII-18 was installed in MY06 approximately 30 feet to the east of NPII-14 to further evaluate the hydrology in this area. In its one year of recording, it achieved continuous saturation for 22 days (8.2%). The success of NPII-14, as well as the fact that NPII-6 and NPII-18 have achieved greater than jurisdictional hydrology in more than 50% of their time recording indicates that NPII-6 and NPII-18 are located in the transition zone between the higher functioning wetlands and the upland areas outside of the easement. Both NPII-6 and NPII-18 are located within about 30 feet of the easement boundary and so it is unsurprising that the area around them would be transitional. Although the hydrology in this area has been less than the success criteria that is to be expected, this area has not been designated as "at-risk" in the same way as the area around NPII-8 because of these mitigating factors. Please refer to Table 8 in Appendix D for gauge data.

As part of the site success criteria the stream must experience two bankfull events in separate years. The stream experienced several bankfull events in all seven monitoring years and has met this criteria. See Table 7 in Appendix D.

2.3 Visual Monitoring Results

A yearly visual assessment of the enhanced stream on NPII will occur every year. The seventh year monitoring visual assessment found the stream to be in good condition. As the photos show, there has been a high survival rate of live stakes and herbaceous streamside vegetation is thriving. One small area of erosion developed shortly after construction and was repaired before the end of the first growing season. Despite numerous large flow events, the stream has shown no additional signs of erosion since. The stream corridor is also showing signs of a higher water table, which was a goal of raising the streambed elevation. This is evidenced by more standing surface water compared to pre-construction conditions and the gauge data from the adjacent monitored wetlands.

In December 2020 Chinese privet (*Ligustrum sinense*) growing on-site was treated with herbicide application. The majority of this privet was growing in areas where mature trees were left intact during construction, especially along the site's boundary with Stewart's Creek and along the edges of the stream enhancement area. This treatment was repeated in August 2021. An additional treatment is planned for the spring of 2023. Please see Appendix B – Visual Assessment Data for more information.

3.0 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. Cape Fear River Basin Restoration Priorities 2009. Raleigh, NC. https://ncdenr.s3.amazonaws.com/s3fs-public/PublicFolder/Work%20With/Watershed%20Planners/RBRP%20Cape%20Fear%202009.pdf

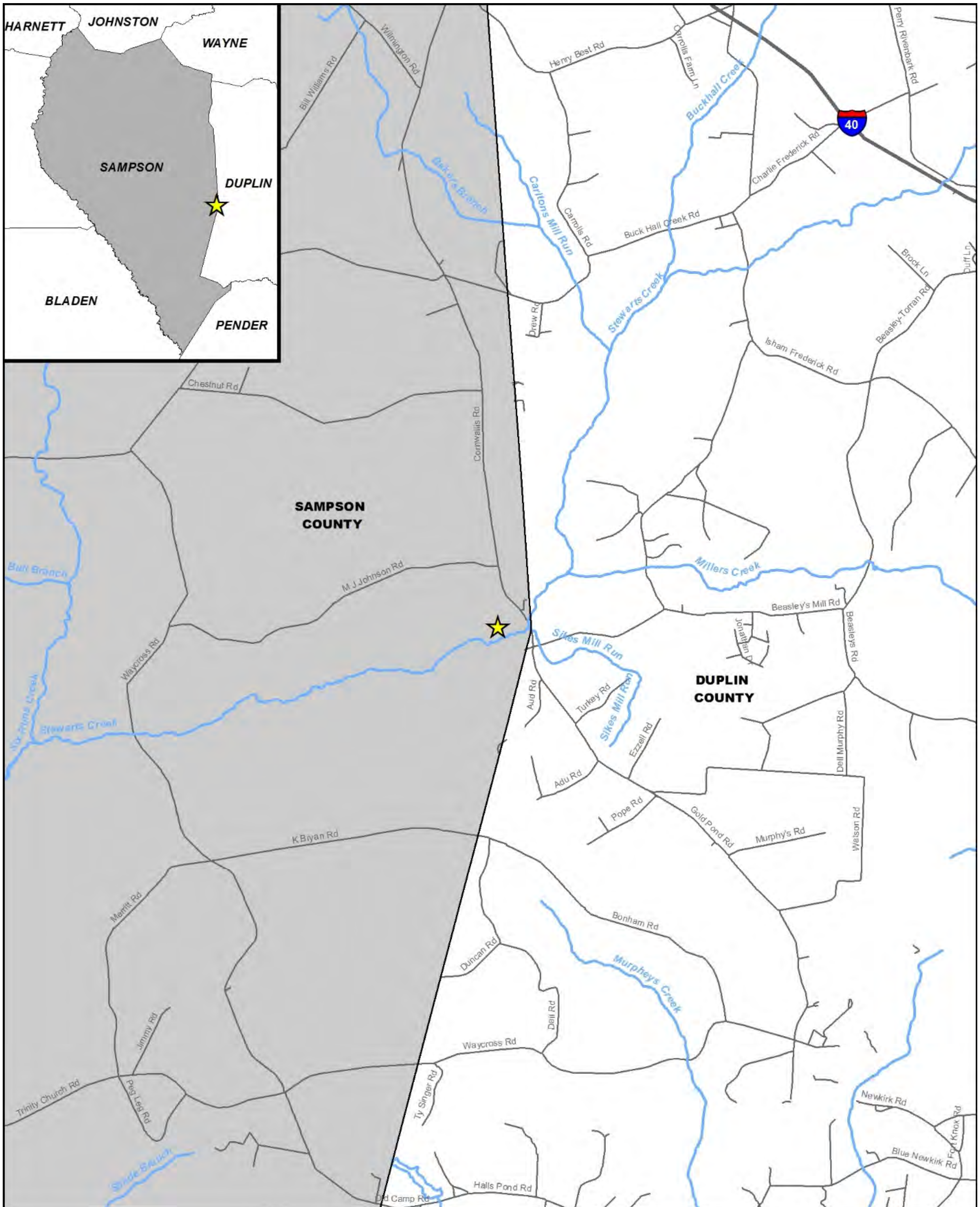
Sprecher, S. W., and Warne, A. G. (2000). "Accessing and Using Meteorological Data to Evaluate Wetland Hydrology," ERDC/EL TR-WRAP-00-1, U.S. Army Engineer Research and Development Center, Vicksburg, MS.USACE. 2003. Stream Mitigation Guidelines. USACE, NCDENR-DWQ, USEPA, NCWRC.

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

United States Department of Agriculture. 1985. Soil Survey of Sampson County, North Carolina. USDA, NCDENR, SCS. https://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/north_carolina/NC163/0/sampson.pdf

Appendix A

Project Vicinity Map and Background Tables



0.5 0.25 0 0.5
Miles

PROJECT SITE VICINITY MAP
NORMAN'S PASTURE/NORMAN'S PASTURE II
SAMPSON COUNTY, NC

There are no airports within 5 miles of the project site.

N

Table 1a. Project Components and Mitigation Credits
Norman's Pasture Restoration Site, DMS Project #95717

Mitigation Credits

	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Length			16.2						
Credits			15.97						
TOTAL CREDITS			15.97						

Project Components

Project Component -or- Reach ID	Stationing/ Location	Existing Footage/ Acreage	Approach (PI, PII etc.)	Restoration -or- Restoration Equivalent	Restoration Footage/Acreage	Mitigation Ratio
Wetland Reestablishment				Restoration	15.5	1:1
Wetland Rehabilitation				Restoration	0.7	1.5:1
Wetland Preservation				Preservation	9.0	NA

Component Summation

Restoration Level	Stream (linear feet)	Riparian Wetlands (Acres)		Non-Riparian Wetlands (Acres)	Buffer (square feet)	Upland (Acres)
		Riverine	Non-Riverine			
Restoration		16.2				
Enhancement						
Enhancement I						
Enhancement II						
Creation						
Preservation						
High Quality Preservation						
TOTAL CREDITS		**15.97**				

Table 1b. Project Components and Mitigation Credits
Norman's II Restoration Site, DMS Project #96310

Mitigation Credits

	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Length		843	10.2						
Credits		337.2	9.73						
TOTAL CREDITS	337.2		9.73						

Project Components

Project Component -or- Reach ID	Stationing/ Location	Existing Footage/ Acreage	Approach (PI, PII etc.)	Restoration -or- Restoration Equivalent	Restoration Footage/Acreage	Mitigation Ratio
Tributary 1	10+00 – 18+43	843		Enhancement II	843	2.5:1
Wetland Reestablishment				Restoration	8.8	1:1
Wetland Rehabilitation				Restoration	1.4	1.5:1
Wetland Preservation				Preservation	0.8	NA

Component Summation

Restoration Level	Stream (linear feet)	Riparian Wetlands (Acres)		Non-Riparian Wetlands (Acres)	Buffer (square feet)	Upland (Acres)
		Riverine	Non-Riverine			
Restoration			10.2			
Enhancement						
Enhancement I						
Enhancement II	843					
Creation						
Preservation						
High Quality Preservation						
TOTAL CREDITS	**337.2**		**9.73**			

Table 2. Project Activity & Reporting History Norman's Pasture and Norman's II Restoration Sites		
Activity or Report	**Data Collection Complete**	**Actual Completion or Delivery**
Mitigation Plan		Nov 2014
Final Design - Construction Plans		Jan 2015
Construction		Jan 2016
Planting		Feb 2016
Baseline Monitoring/Report	April 2016	April 2016
Vegetation Monitoring	March 31, 2016	
Photo Points	April 15, 2016	
Year 1 Monitoring	Nov 2016	Dec 2016
Vegetation Monitoring	Nov 1, 2016	
Photo Points	Aug 16, 2016	
Gauge Downloads	Nov 22, 2016	
Year 2 Monitoring	Nov 2017	Jan 2018
Vegetation Monitoring	Aug 11, 2017	
Photo Points	Nov 30, 2017	
Gauge Downloads	Nov 30, 2017	
Year 3 Monitoring	Dec 2018	Dec 2018
Vegetation Monitoring	July 11, 2018	
Photo Points	Dec 5, 2018	
Gauge Downloads	Nov 12, 2018	
Year 4 Monitoring	Nov 2019	Dec 2019
Vegetation Monitoring	N/A	
Photo Points	Nov 13, 2019	
Gauge Downloads	Nov 13, 2019	
Invasive Treatment		Dec 3, 2020
Year 5 Monitoring	Nov 2020	Dec 2020
Vegetation Monitoring	July 27, 2020	
Photo Points	Nov 20, 2020	
Gauge Downloads	Nov 20, 2020	
Invasive Treatment		Aug 20, 2021
Year 6 Monitoring	Nov 2021	Dec 2021
Photo Points	Sept 17, 2021	
Gauge Downloads	Nov 19, 2021	
Year 7 Monitoring	Dec 2022	Dec 2022
Vegetation Monitoring	August 31, 2022	
Photo Points	Dec 8, 2022	
Gauge Downloads	Dec 8, 2022	

Table 3. Project Contacts **Norman's Pasture and Norman's II Restoration Sites**	
Design Firm	KCI Associates of North Carolina, PC 4505 Falls of Neuse Rd. Suite 400 Raleigh, NC 27609 Contact: Mr. Adam Spiller Phone: (919) 278-2514 Fax: (919) 783-9266
Construction Contractor	KCI Environmental Technologies and Construction 4505 Falls of Neuse Rd. Suite 400 Raleigh, NC 27609 Contact: Mr. Adam Spiller Phone: (919) 278-2514
Planting Contractor	Conservation Services Inc. 1620 N. Delphine Ave. Waynesboro, VA 22980 Contact: Mr. David Coleman Phone: (540) 941-0067
Monitoring Performers	
	KCI Associates of North Carolina, PC 4505 Falls of Neuse Rd. Suite 400 Raleigh, NC 27609 Contact: Mr. Adam Spiller Phone: (919) 278-2514 Fax: (919) 783-9266

Table 4a. Project Information, Norman's Pasture Restoration Site, DMS Project #95717				
Project Name	Norman's Pasture Restoration Site			
County	Sampson County			
Project Area (acres)	36.92 acres			
Project Coordinates (lat. and long.)	34.904893 N , -78.151460 W			
Project Watershed Summary Information				
Physiographic Province	Coastal Plain			
River Basin	Cape Fear			
USGS Hydrologic Unit 8-digit	03030006	**USGS Hydrologic Unit 14-digit**	03030006110040	
DWQ Sub-basin	03-06-19			
Project Drainage Area (acres)	186 acres			
Project Drainage Area Percentage of Impervious Area	1%			
CGIA Land Use Classification	Managed Herbaceous Cover 42% (77.3 ac), Cultivated 24% (44.3 ac), Bottomland Forest/ Hardwood Swamps 17% (31.0 ac), Southern Yellow Pine 10% (19.5 ac), Mixed Hardwoods/Conifers 5% (9.2 ac), and Evergreen Shrubland 2% (4.2 ac)			

Reach Summery Information (Post Restoration)		
Parameters	**T1**	**T2**
Length of reach (linear feet)	1,585	1,612
Valley classification	Valley Type X	Valley Type X
Drainage area (acres)	112 acres	36 acres
NCDWQ Water Quality Classification	Project Reach Not Classified; Receiving water = Stewart's Creek (C; SW)	Project Reach Not Classified; Receiving water = Stewart's Creek (C; SW)
Morphological Description (stream type)	Portions ditched channel; other C5	Portions headwater stream; others ditched channel
Evolutionary trend	Channelized	Channelized
Mapped Soil Series	Chipley Johnston; Torhunta	Bibb and Johnston; Johnston; Lumbee
Drainage class	Somewhat poorly drained, very poorly drained, very poorly drained	Poorly drained; very poorly drained; poorly drained
Soil Hydric status	Drained hydric	Drained hydric
Slope	0-2%	0-2%
FEMA classification	Zone AE	Zone AE
Native vegetation community	Pasture, Headwater Forest	Pasture, Riverine Swamp Forest
Percent composition of exotic invasive vegetation	<5%	<5%

Wetland Summary Information (Post Restoration)				
Parameters	**Area 1**	**Area 4**	**Area 9**	**Area 10**
Size of Wetland (acres)	1.99 acres	5.20 acres	2.19 acres	0.02 acres
Wetland Type	Riparian	Riparian	Riparian	Riparian
Mapped Soil Series	Bibb and Johnston	Lumbee	Bibb and Johnston	Bibb and Johnston
Drainage class	Poorly or very poorly drained	Poorly drained	Poorly or very poorly drained	Poorly or very poorly drained
Soil Hydric Status	Drained hydric	Drained hydric	Drained hydric	Drained hydric
Source of Hydrology	Seepage/ Precipitation	Seepage/ Precipitation	Seepage/ Precipitation	Seepage/ Precipitation
Hydrologic Impairment	Ditching and Crops	Ditching and Crops	Ditching and Crops	Ditching and Crops
Native vegetation community	Crops, Pasture, Wetland	Crops, Pasture, Forested Wetland	Crops, Pasture, Forested Wetland	Crops, Pasture
Percent composition of exotic invasive vegetation	<5%	<5%	<5%	<5%

Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the United States – Section 404	Yes	Yes	Jurisdictional Determination
Waters of the United States – Section 401	Yes	Yes	Jurisdictional Determination
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	Yes	Yes	No-Rise Certification/FEMA Floodplain Checklist
Essential Fisheries Habitat	No	N/A	N/A

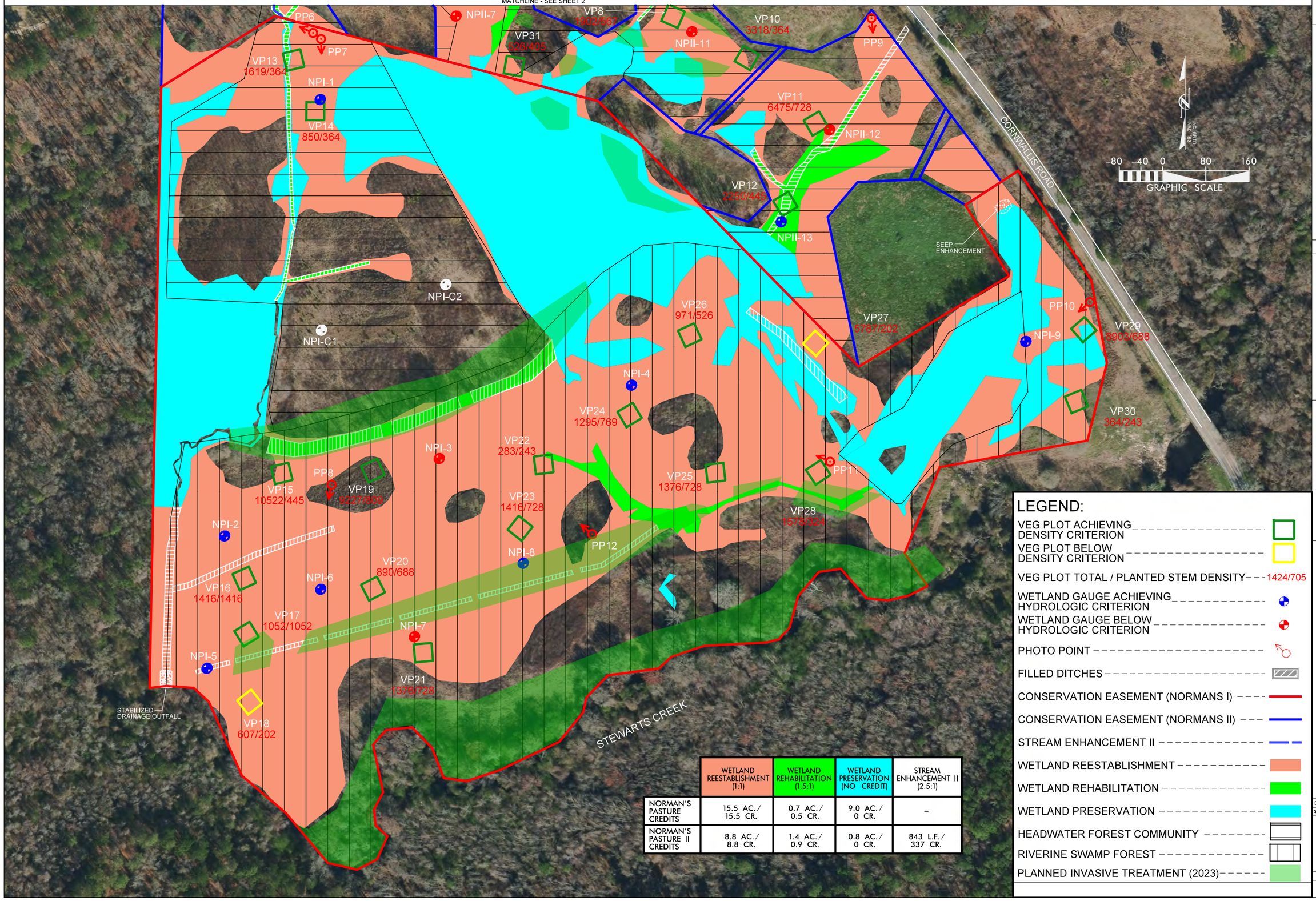
Table 4b. Project Information, Norman's II Restoration Site, DMS Project #96310					
Project Name	Norman's II Restoration Site				
County	Sampson County				
Project Area (acres)	16.3 acres				
Project Coordinates (lat. and long.)	34.906839 N , -78.151797 W				
Project Watershed Summary Information					
Physiographic Province	Coastal Plain				
River Basin	Cape Fear				
USGS Hydrologic Unit 8-digit	03030006	**USGS Hydrologic Unit 14-digit**	03030006110040		
DWQ Sub-basin	03-06-19				
Project Drainage Area (acres)	139 acres				
Project Drainage Area Percentage of Impervious Area	1%				
CGIA Land Use Classification	Cultivated 32% (44.3 ac), Managed Herbaceous Cover 31% (42.9 ac), Bottomland Forest/Hardwood Swamps 14% (19.5 ac), Southern Yellow Pine 14% (19.5 ac), Mixed Hardwoods/Conifers 6% (9.0 ac), and Evergreen Shrubland 3% (4.2 ac)				
Reach Summery Information (Post Restoration)					
Parameters	**T1**				
Length of reach (linear feet)	843				
Valley classification	Valley Type X				
Drainage area (acres)	112 acres				
NCDWQ Water Quality Classification	Project Reach Not Classified; Receiving water = Stewart's Creek (C; SW)				
Morphological Description (stream type)	Modified E5				
Evolutionary trend	Stage III				
Mapped Soil Series	Johnston				
Drainage class	Very poorly drained				
Soil Hydric status	Drained hydric				
Slope	0-1%				
FEMA classification	Zone AE & Zone X				
Native vegetation community	Headwater Forest				
Percent composition of exotic invasive vegetation	<5%				
Wetland Summary Information (Post Restoration)					
Parameters	**Area 6**	**Area 7**	**Area 8**	**Area 9**	**Area 11**
Size of Wetland (acres)	0.09 acre	0.17 acre	0.37 acre	0.02 acre	0.08 acre
Wetland Type	Riparian	Riparian	Pond and Riparian	Riparian	Riparian
Mapped Soil Series	Bibb and Johnston; Lumbee	Johnston loam	Lynn Haven	Bibb and Johnston	Torhunta Variant
Drainage class	Poorly or very poorly drained	Very poorly drained	Poorly or very poorly drained	Poorly or very poorly drained	Very poorly drained
Soil Hydric Status	Drained Hydric	Drained Hydric	Drained Hydric	Drained Hydric	Drained Hydric
Source of Hydrology	Seepage/ Precipitation	Seepage / Precipitation	Seepage/ Precipitation	Seepage / Precipitation	Seepage / Precipitation
Hydrologic Impairment	Ditching and Crops	Ditching and Crops	Ditching and Crops	Ditching and Crops	Ditching
Native vegetation community	Crops, Pasture, Wetland	Crops, Pasture, Wetland	Crops, Pasture	Crops, Pasture, Forested Wetland	Forested Wetland
Percent composition of exotic invasive vegetation	0%	0%	0%	0%	0%

Project Information continued - Norman's II Restoration Site Restoration Site			
Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the United States – Section 404	Yes	Yes	Jurisdictional Determination
Waters of the United States – Section 401	Yes	Yes	Jurisdictional Determination
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	Yes	Yes	FEMA Floodplain Checklist
Essential Fisheries Habitat	No	N/A	N/A

Appendix B

Visual Assessment Data

MATCHLINE - SEE SHEET 2



	WETLAND REESTABLISHMENT (1:1)	WETLAND REHABILITATION (1.5:1)	WETLAND PRESERVATION (NO CREDIT)	STREAM ENHANCEMENT II (2.5:1)
NORMAN'S PASTURE CREDITS	15.5 AC./ 15.5 CR.	0.7 AC./ 0.5 CR.	9.0 AC./ 0 CR.	–
NORMAN'S PASTURE II CREDITS	8.8 AC./ 8.8 CR.	1.4 AC./ 0.9 CR.	0.8 AC./ 0 CR.	843 L.F./ 337 CR.

LEGEND:

- VEG PLOT ACHIEVING DENSITY CRITERION
- VEG PLOT BELOW DENSITY CRITERION
- VEG PLOT TOTAL / PLANTED STEM DENSITY – 1424/705
- WETLAND GAUGE ACHIEVING HYDROLOGIC CRITERION
- WETLAND GAUGE BELOW HYDROLOGIC CRITERION
- PHOTO POINT
- FILLED DITCHES
- CONSERVATION EASEMENT (NORMANS I)
- CONSERVATION EASEMENT (NORMANS II)
- STREAM ENHANCEMENT II
- WETLAND REESTABLISHMENT
- WETLAND REHABILITATION
- WETLAND PRESERVATION
- HEADWATER FOREST COMMUNITY
- RIVERINE SWAMP FOREST
- PLANNED INVASIVE TREATMENT (2023)

REVISIONS | DATE

NCDEQ DIVISION OF MITIGATION SERVICES

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

NORMAN'S PASTURE & NORMAN'S PASTURE II RESTORATION SITES

SAMPSON COUNTY, NORTH CAROLINA

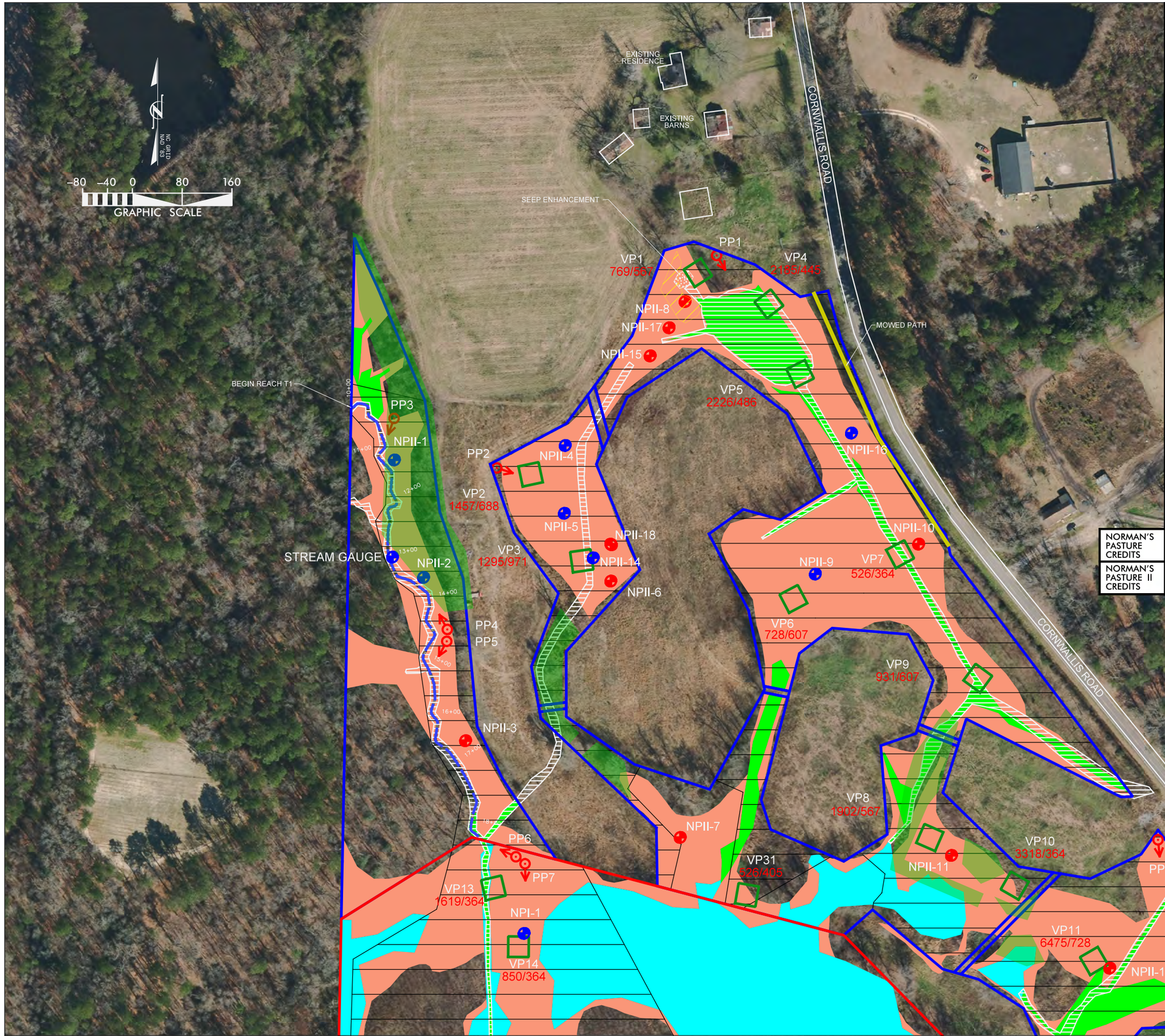
MONITORING YEAR 07

DATE DEC 2022

SCALE: GRAPHIC

CURRENT CONDITION PLAN VIEW

SHEET 1 OF 2



MATCHLINE - SEE SHEET 1

LEGEND:

VEG DATA FROM MY05 (2020)

- VEG PLOT ACHIEVING DENSITY CRITERION
- VEG PLOT BELOW DENSITY CRITERION
- VEG PLOT TOTAL / PLANTED STEM DENSITY – 2401/573
- WETLAND GAUGE ACHIEVING HYDROLOGIC CRITERION
- WETLAND GAUGE BELOW HYDROLOGIC CRITERION
- PHOTO POINT
- FILLED DITCHES
- CONSERVATION EASEMENT (NORMANS I)
- CONSERVATION EASEMENT (NORMANS II)
- STREAM ENHANCEMENT II
- WETLAND REESTABLISHMENT
- WETLAND REHABILITATION
- WETLAND PRESERVATION
- HEADWATER FOREST COMMUNITY
- RIVERINE SWAMP FOREST
- PLANNED INVASIVE TREATMEANT (2023)
- LOW PERFORMING HYDROLOGY AREAS

	WETLAND REESTABLISHMENT (1:1)	WETLAND REHABILITATION (1.5:1)	WETLAND PRESERVATION (NO CREDIT)	STREAM ENHANCEMENT II (2.5:1)
NORMAN'S PASTURE CREDITS	15.5 AC./ 15.5 CR.	0.7 AC./ 0.5 CR.	9.0 AC./ 0 CR.	–
NORMAN'S PASTURE II CREDITS	8.8 AC./ 8.8 CR.	1.4 AC./ 0.9 CR.	0.8 AC./ 0 CR.	843 L.F./ 337 CR.

REVISIONS | DATE

NCDEQ DIVISION OF MITIGATION SERVICES

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RALEIGH, NORTH CAROLINA 27609

NORMAN'S PASTURE & NORMAN'S PASTURE II RESTORATION SITES

SAMPSON COUNTY, NORTH CAROLINA

MONITORING YEAR 07

DATE: DEC 2022

SCALE: GRAPHIC

CURRENT CONDITION PLAN VIEW

SHEET 2 OF 2

Table 5. Vegetation Condition Assessment
Norman's Pasture Restoration Site, DMS Project #95717

Planted Acreage 36.92 **Easement Acreage 36.92**

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. Invasive Treatment Area*	Areas or points (if too small to render as polygons at map scale).	1,000 SF	Pattern and Color	14	7.10	19.2%
6. 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%

*Invasive treatment planned for spring 2023

Vegetation Monitoring Plot Photos

Plot 1 – MY-07 – 7/28/22

Plot 2 – MY-07 – 7/28/22

Plot 3 – MY-07 – 7/28/22

Plot 4 – MY-07 – 7/28/22

Plot 5 – MY-07 – 7/28/22

Plot 6 – MY-07 – 7/28/22

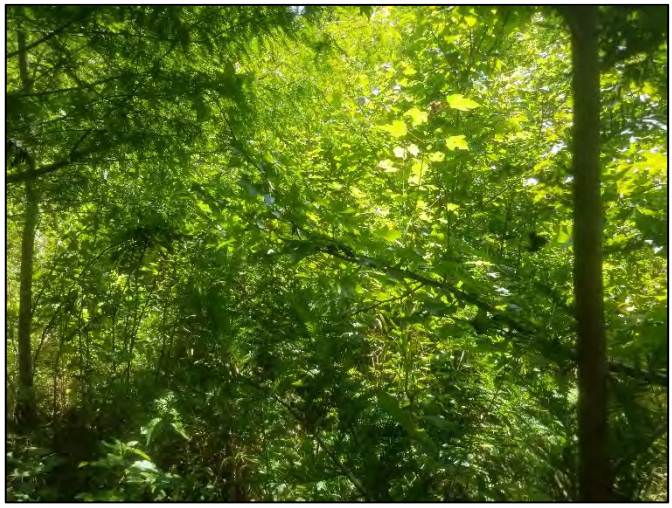
Plot 7 – MY-07 – 7/28/22

Plot 8 – MY-07 – 7/28/22

Plot 9 – MY-07 – 7/26/22

Plot 10 – MY-07 – 7/28/22

Plot 11 – MY-07 – 7/26/22



Plot 12 – MY-07 – 7/26/22

Plot 13 – MY-07 – 7/26/22

Plot 14 – MY-07 – 7/26/22

Plot 15 – MY-07 – 8/31/22

Plot 16 – MY-07 – 8/31/22

Plot 17 – MY-07 – 8/31/22

Plot 18 – MY-07 – 7/26/22

Plot 19 – MY-07 – 8/31/22

Plot 20 – MY-07 – 8/31/22

Plot 21 – MY-07 – 8/31/22

Plot 22 – MY-07 – 8/31/22

Plot 23 – MY-07 – 8/31/22

Plot 24 – MY-07 – 8/31/22

Plot 25 – MY-07 – 8/31/22

Plot 26 – MY-07 – 8/31/22

Plot 27 – MY-07 – 7/26/22

Plot 28 – MY-07 – 7/26/22

Plot 29 – MY-07 – 7/26/22

Plot 30 – MY-07 – 7/26/22

Plot 31 – MY-07 – 7/26/22

Photo Reference Points

PP01 – MY-00 – 4/15/16

PP01 – MY-07 – 12/8/22

PP02 – MY-00 – 4/15/16

PP02 – MY-07 – 12/8/22

PP03 – MY-00 – 4/15/16

PP03 – MY-07 – 12/8/22

PP04 – MY-00 – 4/15/16

PP04 – MY-07 – 12/8/22

PP05 – MY-00 – 4/15/16

PP05 – MY-07 – 12/8/22

PP06 – MY-00 – 4/15/16

PP06 – MY-07 – 12/8/22

PP07 – MY-00 – 4/15/16

PP07 – MY-07 – 12/8/22

PP08 – MY-00 – 4/15/16

PP08 – MY-07 – 12/8/22

PP09 – MY-00 – 4/15/16

PP09 – MY-07 – 12/8/22

PP10 – MY-00 – 4/15/16

PP10 – MY-07 – 12/8/22

PP11 – MY-00 – 4/15/16

PP11 – MY-07 – 12/8/22

PP12 – MY-00 – 4/15/16

PP12 – MY-07 – 12/8/22

Appendix C

Vegetation Plot Data

Table 6: CVS Stem Count Total and Planted by Plot and Species, Norman's Pasture and Norman's Pasture II Restoration Sites																									
DMS Project #: 95717/96310			Current Plot Data (MY7 2022)																						
Scientific Name	Common Name	Species Type	95717-01-0001			95717-01-0002			95717-01-0003			95717-01-0004			95717-01-0005			95717-01-0006			95717-01-0007		
			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 rubrum	red maple	Tree			1			9			4			14			42			2			4
Alnus serrulata	hazel alder	Shrub																					
Baccharis halimifolia	eastern baccharis	Shrub						2						5									
Betula nigra	river birch	Tree	2	2	2	1	1	1	1	1	1	3	3	3	5	5	5	8	8	8	2	2	2
Cephalanthus occidentalis	common buttonbush	Shrub	1	1	1										1	1	1	1	1	1			
Cornus amomum	silky dogwood	Shrub																					
Corylus americana	American hazelnut	Shrub																					
Crataegus phaenopyrum	Washington hawthorn	Shrub Tree																					
Diospyros virginiana	common persimmon	Tree																					
Fraxinus pennsylvanica	green ash	Tree	3	3	3	3	3	3	5	5	5							1	1	1	3	3	3
Juglans nigra	black walnut	Tree			1																		
Liquidambar styraciflua	sweetgum	Tree			2						3			12			1			1			
Liriodendron tulipifera	tuliptree	Tree	1	1	1	1	1	6				1	1	1									
Morella cerifera	wax myrtle	shrub						3						3									
Nyssa aquatica	water tupelo	Tree																					
Nyssa biflora	swamp tupelo	Tree																					
Pinus taeda	loblolly pine	Tree												5									
Platanus occidentalis	American sycamore	Tree																					
Prunus serotina	black cherry	Tree																					
Quercus laurifolia	laurel oak	Tree	1	1	1	1	1	1	1	1	1							1	1	1	1	1	1
Quercus lyrata	overcup oak	Tree	3	3	4	5	5	5	5	5	5				3	3	3	1	1	1			
Quercus michauxii	swamp chestnut oak	Tree	1	1	1	1	1	1	4	4	5	7	7	7	2	2	2	2	2	2	1	1	1
Quercus nigra	water oak	Tree																					
Quercus phellos	willow oak	Tree				1	1	1															
Quercus rubra	northern red oak	Tree																					
Rhus copallinum	flameleaf sumac	shrub																					
Salix nigra	black willow	Tree												4									
Taxodium distichum	bald cypress	Tree	2	2	2	4	4	4	8	8	8				1	1	1				2	2	2
Ulmus americana	American elm	Tree																					
Unknown		Shrub or Tree																					
		Stem count	14	14	19	17	17	36	24	24	32	11	11	54	12	12	55	14	14	17	9	9	13
		size (ares)	1			1			1			1			1			1			1		
		size (ACRES)	0.025			0.025			0.025			0.025			0.025			0.025			0.025		
		Species count	8	8	11	8	8	11	6	6	8	3	3	9	5	5	7	6	6	8	5	5	6
		Stems per ACRE	567	567	769	688	688	1457	971	971	1295	445	445	2185	486	486	2226	567	567	688	364	364	526
Plot meeting success criteria	Plot not meeting success criteria																						

Table 6: CVS Stem Count Total and Planted by Plot and Species, Norman's Pasture and Norman's Pasture II Restoration Sites																							
DMS Project #: 95717/96310			Current Plot Data (MY7 2022)																				
Scientific Name	Common Name	Species Type	95717-01-0008			95717-01-0009			95717-01-0010			95717-01-0011			95717-01-0012			95717-01-0013			95717-01-0014		
			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 rubrum	red maple	Tree			10			5			51			115			49			29			9
Alnus serrulata	hazel alder	Shrub																					
Baccharis halimifolia	eastern baccharis	Shrub												1									
Betula nigra	river birch	Tree							1	1	1	3	3	3				1	1	1	1	1	1
Cephalanthus occidentalis	common buttonbush	Shrub										4	4	4				2	2	2			
Cornus amomum	silky dogwood	Shrub																					
Corylus americana	American hazelnut	Shrub																					
Crataegus phaenopyrum	Washington hawthorn	Shrub Tree																					
Diospyros virginiana	common persimmon	Tree										1	1	1									
Fraxinus pennsylvanica	green ash	Tree				4	4	4	2	2	2	4	4	4	3	3	3	3	3	3			
Juglans nigra	black walnut	Tree	1	1	1			1				1	1	1			1						
Liquidambar styraciflua	sweetgum	Tree			18			2			4			18			2			2			3
Liriodendron tulipifera	tuliptree	Tree				2	2	2				1	1	1									
Morella cerifera	wax myrtle	shrub			1									1									
Nyssa aquatica	water tupelo	Tree																					
Nyssa biflora	swamp tupelo	Tree																					
Pinus taeda	loblolly pine	Tree												2									
Platanus occidentalis	American sycamore	Tree																					
Prunus serotina	black cherry	Tree																					
Quercus laurifolia	laurel oak	Tree	2	2	2	1	1	1	2	2	19	2	2	2									
Quercus lyrata	overcup oak	Tree	4	4	4	2	2	2	1	1	1	1	1	1									
Quercus michauxii	swamp chestnut oak	Tree	5	5	5	1	1	1	1	1	2	1	1	2	1	1	1	2	2	2	1	1	1
Quercus nigra	water oak	Tree																					
Quercus phellos	willow oak	Tree																					
Quercus rubra	northern red oak	Tree																					
Rhus copallinum	flameleaf sumac	shrub												4									
Salix nigra	black willow	Tree			1																		
Taxodium distichum	bald cypress	Tree	2	2	2	5	5	5	2	2	2				7	7	7	1	1	1	7	7	7
Ulmus americana	American elm	Tree																					
Unknown		Shrub or Tree																					
		Stem count	14	14	44	15	15	23	9	9	82	18	18	160	11	11	63	9	9	40	9	9	21
		size (ares)	1			1			1			1			1			1			1		
		size (ACRES)	0.025			0.025			0.025			0.025			0.025			0.025			0.025		
		Species count	5	5	9	6	6	9	6	6	8	9	9	15	3	3	6	5	5	7	3	3	5
		Stems per ACRE	567	567	1781	607	607	931	364	364	3318	728	728	6475	445	445	2550	364	364	1619	364	364	850
Plot meeting success criteria	Plot not meeting success criteria																						

Table 6: CVS Stem Count Total and Planted by Plot and Species, Norman's Pasture and Norman's Pasture II Restoration Sites																								
DMS Project #: 95717/96310			Current Plot Data (MY7 2022)																					
Scientific Name	Common Name	Species Type	95717-01-0015			95717-01-0016			95717-01-0017			95717-01-0018			95717-01-0019			95717-01-0020			95717-01-0021		
			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 rubrum	red maple	Tree			218									4			200			2			6
Alnus serrulata	hazel alder	Shrub																					
Baccharis halimifolia	eastern baccharis	Shrub																					
Betula nigra	river birch	Tree	2	2	14							2	2	2	3	3	4				5	5	5
Cephalanthus occidentalis	common buttonbush	Shrub	2	2	2	1	1	1	6	6	6										2	2	2
Cornus amomum	silky dogwood	Shrub																					
Corylus americana	American hazelnut	Shrub																					
Crataegus phaenopyrum	Washington hawthorn	Shrub Tree			5												1						
Diospyros virginiana	common persimmon	Tree																					
Fraxinus pennsylvanica	green ash	Tree																					
Juglans nigra	black walnut	Tree																					
Liquidambar styraciflua	sweetgum	Tree			8									5			5						10
Liriodendron tulipifera	tuliptree	Tree																					
Morella cerifera	wax myrtle	shrub																					
Nyssa aquatica	water tupelo	Tree	5	5	5	2	2	2	4	4	4	1	1	1	7	7	7	6	6	6	1	1	1
Nyssa biflora	swamp tupelo	Tree										1	1	1									
Pinus taeda	loblolly pine	Tree																					
Platanus occidentalis	American sycamore	Tree																					
Prunus serotina	black cherry	Tree																					
Quercus laurifolia	laurel oak	Tree	2	2	2																2	2	2
Quercus lyrata	overcup oak	Tree										1	1	1				2	2	2			
Quercus michauxii	swamp chestnut oak	Tree													2	2	2				1	1	1
Quercus nigra	water oak	Tree																					
Quercus phellos	willow oak	Tree																					
Quercus rubra	northern red oak	Tree																					
Rhus copallinum	flameleaf sumac	shrub																					
Salix nigra	black willow	Tree			4															3			
Taxodium distichum	bald cypress	Tree			1	32	32	32	16	16	16				8	8	8	9	9	9	7	7	7
Ulmus americana	American elm	Tree			1									1			1						
Unknown		Shrub or Tree																					
		Stem count	11	11	260	35	35	35	26	26	26	5	5	15	20	20	228	17	17	22	18	18	34
		size (ares)	1			1			1			1			1			1			1		
		size (ACRES)	0.025			0.025			0.025			0.025			0.025			0.025			0.025		
		Species count	4	4	10	3	3	3	3	3	3	4	4	7	4	4	8	3	3	5	6	6	8
		Stems per ACRE	445	445	10522	1416	1416	1416	1052	1052	1052	202	202	607	809	809	9227	688	688	890	728	728	1376
Plot meeting success criteria	Plot not meeting success criteria																						

Table 6: CVS Stem Count Total and Planted by Plot and Species, Norman's Pasture and Norman's Pasture II Restoration Sites																								
DMS Project #: 95717/96310			Current Plot Data (MY7 2022)																					
Scientific Name	Common Name	Species Type	95717-01-0022			95717-01-0023			95717-01-0024			95717-01-0025			95717-01-0026			95717-01-0027			95717-01-0028		
			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 rubrum	red maple	Tree						4			9			1			7			52			
Alnus serrulata	hazel alder	Shrub															1						
Baccharis halimifolia	eastern baccharis	Shrub																					
Betula nigra	river birch	Tree						2				1	1	1	4	4	4			21			
Cephalanthus occidentalis	common buttonbush	Shrub	1	1	1										3	3	5	2	2	2			
Cornus amomum	silky dogwood	Shrub																					
Corylus americana	American hazelnut	Shrub																					
Crataegus phaenopyrum	Washington hawthorn	Shrub Tree									1												
Diospyros virginiana	common persimmon	Tree																			2	2	33
Fraxinus pennsylvanica	green ash	Tree																					
Juglans nigra	black walnut	Tree												1									
Liquidambar styraciflua	sweetgum	Tree												8			1			2			
Liriodendron tulipifera	tuliptree	Tree																					
Morella cerifera	wax myrtle	shrub																					
Nyssa aquatica	water tupelo	Tree				3	3	3	1	1	1										1	1	1
Nyssa biflora	swamp tupelo	Tree																					
Pinus taeda	loblolly pine	Tree																					
Platanus occidentalis	American sycamore	Tree																		1			
Prunus serotina	black cherry	Tree																					
Quercus laurifolia	laurel oak	Tree										7	7	7	1	1	1	1	1	1	2	2	2
Quercus lyrata	overcup oak	Tree										6	6	6				1	1	1	1	1	1
Quercus michauxii	swamp chestnut oak	Tree				1	1	1				1	1	1									
Quercus nigra	water oak	Tree																					
Quercus phellos	willow oak	Tree																					
Quercus rubra	northern red oak	Tree																					
Rhus copallinum	flameleaf sumac	shrub																					
Salix nigra	black willow	Tree			1			9			3									6			
Taxodium distichum	bald cypress	Tree	5	5	5	14	14	14	18	18	18	3	3	3	5	5	5	1	1	1	2	2	2
Ulmus americana	American elm	Tree						2						6						17			
Unknown		Shrub or Tree																					
		Stem count	6	6	7	18	18	35	19	19	32	18	18	34	13	13	24	5	5	104	8	8	39
		size (ares)	1			1			1			1			1			1			1		
		size (ACRES)	0.025			0.025			0.025			0.025			0.025			0.025			0.025		
		Species count	2	2	3	3	3	7	2	2	5	5	5	9	4	4	7	4	4	10	5	5	5
		Stems per ACRE	243	243	283	728	728	1416	769	769	1295	728	728	1376	526	526	971	202	202	4209	324	324	1578
Plot meeting success criteria	Plot not meeting success criteria																						

Table 6: CVS Stem Count Total and Planted by Plot and Species, Norman's Pasture and Norman's Pasture II Restoration Sites																							
DMS Project #: 95717/96310			Current Plot Data (MY7 2022)									Annual Means											
Scientific Name	Common Name	Species Type	95717-01-0029			95717-01-0030			95717-01-0031			MY7 (2022)			MY5 (2020)			MY3 (2018)			MY2 (2017)		
			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 rubrum	red maple	Tree			192									1039			355			241			178
Alnus serrulata	hazel alder	Shrub												40						84			13
Baccharis halimifolia	eastern baccharis	Shrub												8						21			16
Betula nigra	river birch	Tree	1	1	1							46	46	82	47	47	54	47	47	80	48	48	83
Cephalanthus occidentalis	common buttonbush	Shrub	1	1	1	2	2	2				29	29	31	27	27	29	31	31	31	31	31	31
Cornus amomum	silky dogwood	Shrub																					
Corylus americana	American hazelnut	Shrub																					
Crataegus phaenopyrum	Washington hawthorn	Shrub Tree			1						1			9			3			6			6
Diospyros virginiana	common persimmon	Tree										3	3	34	3	3	36	3	3	29	3	3	32
Fraxinus pennsylvanica	green ash	Tree							1	1	1	32	32	32	33	33	35	33	33	35	32	32	34
Juglans nigra	black walnut	Tree										2	2	6	2	2	3	2	2	5	2	2	9
Liquidambar styraciflua	sweetgum	Tree			5			3			1			116			102			35			42
Liriodendron tulipifera	tuliptree	Tree										6	6	11	6	6	15	17	17	24	18	18	22
Morella cerifera	wax myrtle	shrub												8						3			2
Nyssa aquatica	water tupelo	Tree				1	1	1				32	32	32	42	42	42	62	62	62	75	75	75
Nyssa biflora	swamp tupelo	Tree										1	1	1	1	1	1	2	2	2	2	2	2
Pinus taeda	loblolly pine	Tree												7			26			23			6
Platanus occidentalis	American sycamore	Tree												1			2						
Prunus serotina	black cherry	Tree																		2			2
Quercus laurifolia	laurel oak	Tree	1	1	1	3	3	3	4	4	4	35	35	52	36	36	36	57	57	57	64	64	64
Quercus lyrata	overcup oak	Tree	8	8	8				1	1	1	45	45	46	54	54	54	59	59	60	63	63	64
Quercus michauxii	swamp chestnut oak	Tree							3	3	3	38	38	41	44	44	45	52	52	52	59	59	59
Quercus nigra	water oak	Tree															1						
Quercus phellos	willow oak	Tree										1	1	1	2	2	11	2	2	2	2	2	2
Quercus rubra	northern red oak	Tree															112						
Rhus copallinum	flameleaf sumac	shrub												4						10			18
Salix nigra	black willow	Tree												31			16			38			49
Taxodium distichum	bald cypress	Tree	6	6	6				1	1	2	168	168	170	166	166	168	171	171	171	173	173	173
Ulmus americana	American elm	Tree			5									33			9			9			6
Unknown		Shrub or Tree																					
		Stem count	17	17	220	6	6	9	10	10	13	438	438	1835	463	463	1155	538	538	1082	572	572	988
		size (ares)	1			1			1			31			31			31			31		
		size (ACRES)	0.025			0.025			0.025			0.766			0.766			0.766			0.766		
		Species count	5	5	9	3	3	4	5	5	7	13	13	24	13	13	22	13	13	24	13	13	24
		Stems per ACRE	688	688	8903	243	243	364	405	405	526	572	572	2395	604	604	1508	702	702	1412	747	747	1290
Plot meeting success criteria	Plot not meeting success criteria																						

Table 6: CVS Stem Count Total and Planted by Plot and Species, Norman's Pasture and Norman's Pasture II Restoration Sit									
DMS Project #: 95717/96310									
Scientific Name	Common Name	Species Type	MY1 (2016)			MY0 (2016)			
			PnoLS	P-all	T	PnoLS	P-all	T	
Acer rubrum	red maple	Tree			92				
Alnus serrulata	hazel alder	Shrub			4				
Baccharis halimifolia	eastern baccharis	Shrub			2				
Betula nigra	river birch	Tree	47	47	61	42	42	42	
Cephalanthus occidentalis	common buttonbush	Shrub	21	21	21				
Cornus amomum	silky dogwood	Shrub	2	2	2				
Corylus americana	American hazelnut	Shrub	4	4	4				
Crataegus phaenopyrum	Washington hawthorn	Shrub Tree			1				
Diospyros virginiana	common persimmon	Tree							
Fraxinus pennsylvanica	green ash	Tree	30	30	31	36	36	36	
Juglans nigra	black walnut	Tree	2	2	5				
Liquidambar styraciflua	sweetgum	Tree			29				
Liriodendron tulipifera	tuliptree	Tree	19	19	21	10	10	10	
Morella cerifera	wax myrtle	shrub			1				
Nyssa aquatica	water tupelo	Tree	79	79	79	60	60	60	
Nyssa biflora	swamp tupelo	Tree	2	2	2				
Pinus taeda	loblolly pine	Tree							
Platanus occidentalis	American sycamore	Tree							
Prunus serotina	black cherry	Tree			1				
Quercus laurifolia	laurel oak	Tree	70	70	70	68	68	68	
Quercus lyrata	overcup oak	Tree	65	65	65	33	33	33	
Quercus michauxii	swamp chestnut oak	Tree	60	60	60	42	42	42	
Quercus nigra	water oak	Tree							
Quercus phellos	willow oak	Tree	3	3	3	1	1	1	
Quercus rubra	northern red oak	Tree							
Rhus copallinum	flameleaf sumac	shrub			5				
Salix nigra	black willow	Tree			26				
Taxodium distichum	bald cypress	Tree	171	171	171	169	169	169	
Ulmus americana	American elm	Tree			6				
Unknown		Shrub or Tree	21	21	35	213	213	213	
		Stem count	596	596	797	674	674	674	
		size (ares)	31			31			
		size (ACRES)	0.766			0.766			
		Species count	15	15	25	10	10	10	
		Stems per ACRE	778	778	1040	880	880	880	
Plot meeting success criteria	Plot not meeting success criteria								

Site: Norman's Pasture Date: 12/8/2022 Crew: TS

Transect Spacing:

	Point	Species	Height (ft)	Species	Height (ft)
Transect #	5	Bald Cypress	8	Buttonbush	7
	10	Red Maple	3		
1	15	Bald Cypress	9		
Start Cord.	20	Bald Cypress, Red Maple	8, 3	Bald Cypress	6
	25	Bald Cypress	9		
	30	Bald Cypress	7		
Heading	35	Bald Cypress	9	River Birch	20
	40	River Birch (x2)	20, 35	Red Maple (x3)	4, 4, 4
	45	Bald Cypress	7	River Birch	35
Pt. Spacing	50	N/A			
	55	N/A			
5'	60	Red Maple	3		
Notes	65	Sweetgum, Buttonbush	9, 8	Red Maple (x2)	4, 4
	70	Buttonbush	8	Red Maple	4
	75	Red Maple (x3)	5, 7, 6		
	80	Red Maple (x3)	9, 10, 12		
	85	Red Maple (x2)	4, 12		
	90	Red Maple (x2)	3, 7		
	95	Red Maple (x3)	3, 3, 9		
	100	Red Maple	3		
Transect #					
Start Cord.					
Heading					
Pt. Spacing					
Notes					

Appendix D

Hydrologic Data

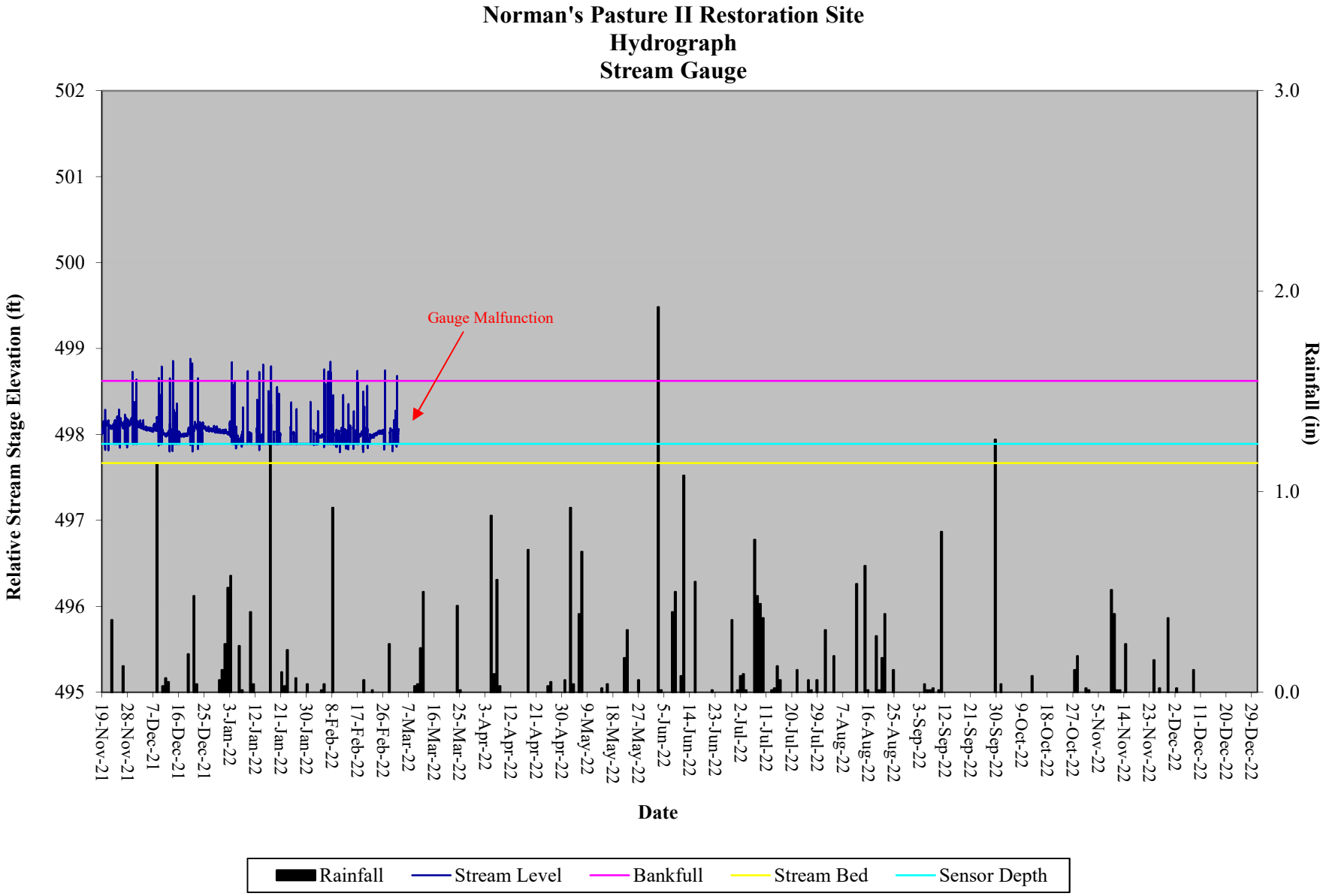
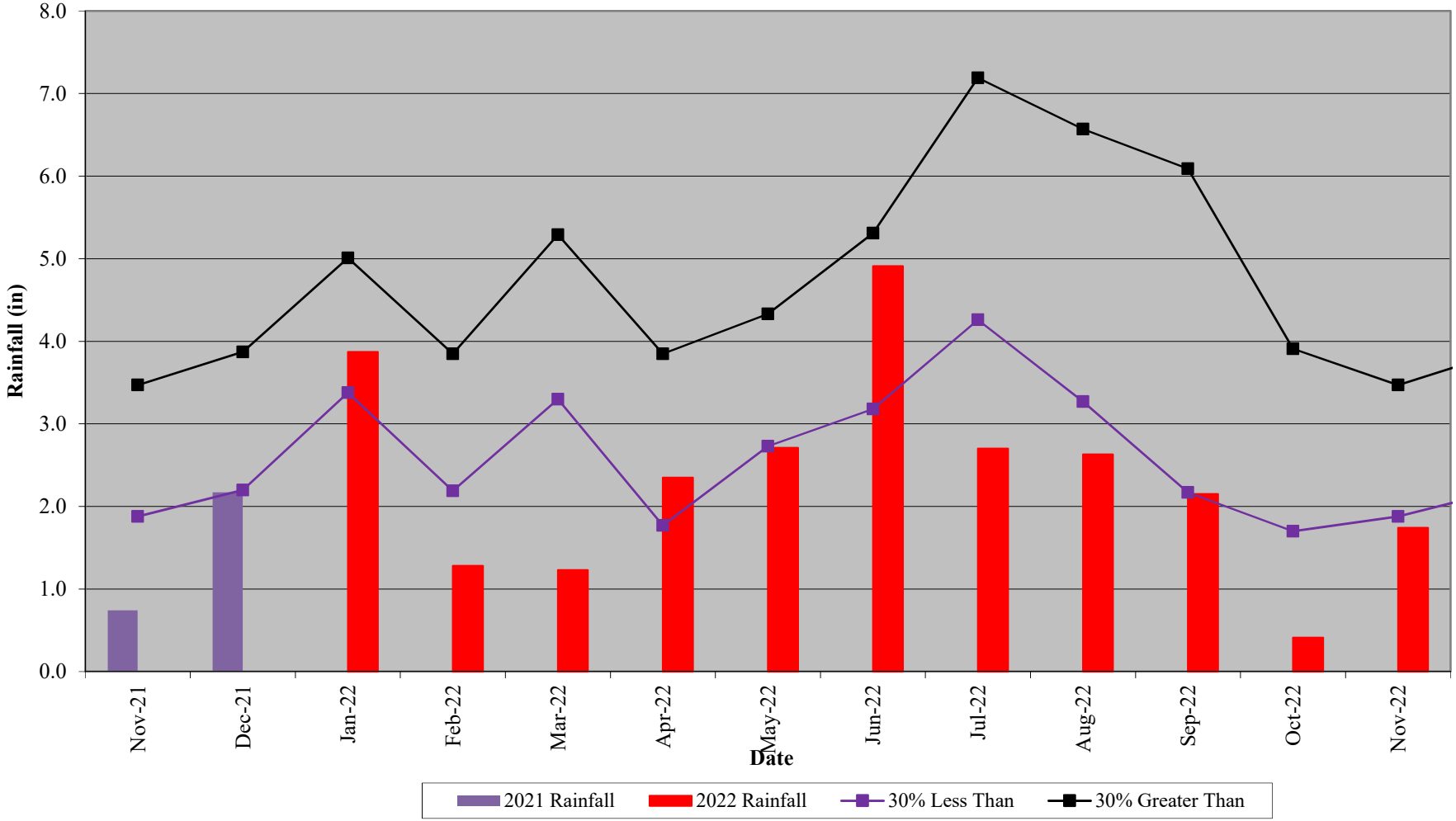

Norman's Pasture II Restoration Site
Hydrograph
Stream Gauge
Relative Stream Stage Elevation (ft)
Rainfall (in)
Gauge Malfunction
502
501
500
499
498
497
496
495
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
17-Feb-22
26-Feb-22
7-Mar-22
16-Mar-22
25-Mar-22
3-Apr-22
12-Apr-22
21-Apr-22
30-Apr-22
9-May-22
18-May-22
27-May-22
5-Jun-22
14-Jun-22
23-Jun-22
2-Jul-22
11-Jul-22
20-Jul-22
29-Jul-22
7-Aug-22
16-Aug-22
25-Aug-22
3-Sep-22
12-Sep-22
21-Sep-22
30-Sep-22
9-Oct-22
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Date
Rainfall
Stream Level
Bankfull
Stream Bed
Sensor Depth

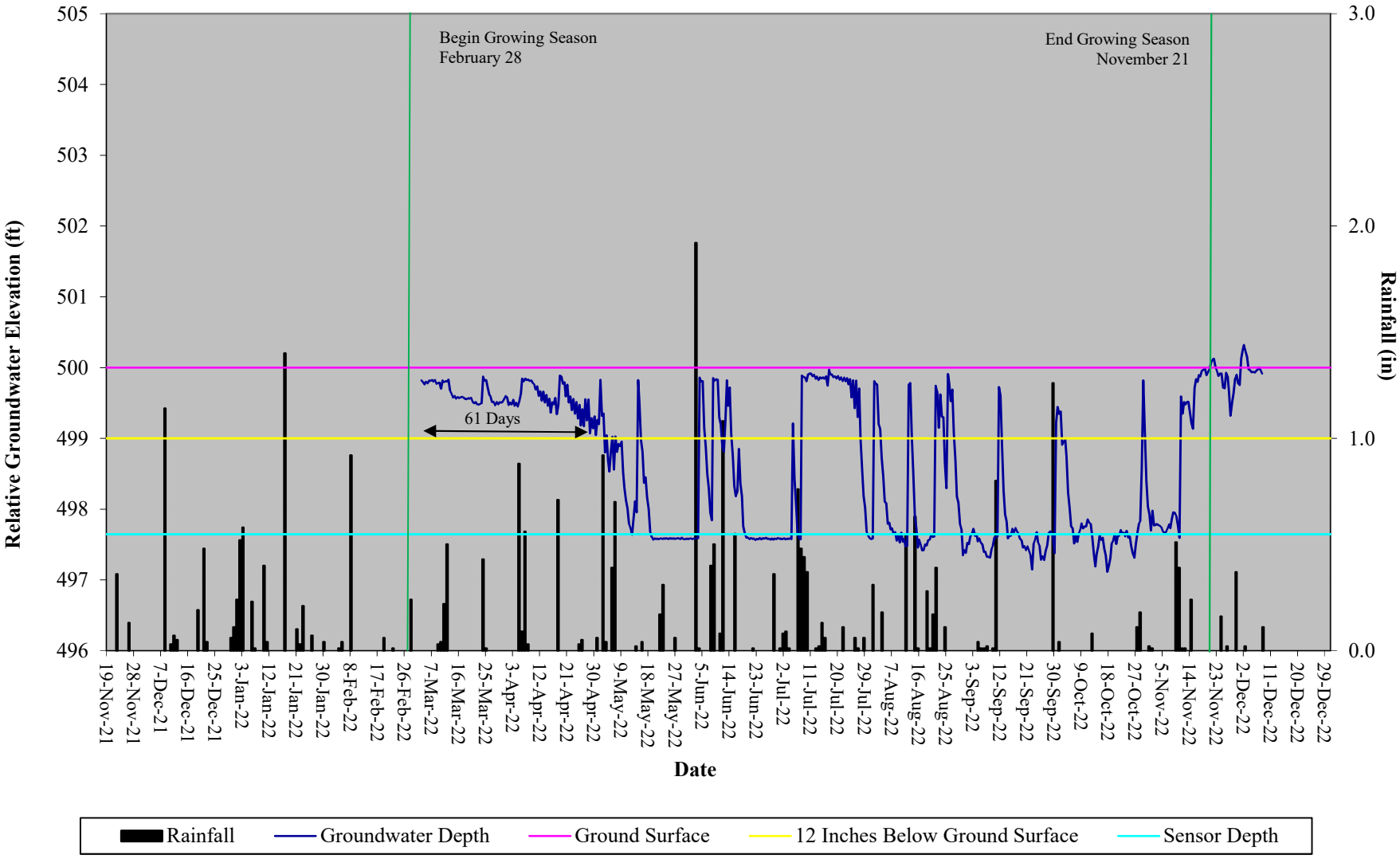
Table 7. Verification of Bankfull Events Norman's Pasture and Norman's Pasture II Restoration Sites, DMS Project Number 95717/96310			
Date of Data Collection	**Date of Occurrence**	**Method**	**Photo Number**
7/15/2016	7/15/2016	On-site automatic gauge	N/A
8/7/2016	8/7/2016	On-site automatic gauge	N/A
10/8/2016	10/8/2016	On-site automatic gauge	N/A
12/21/2016	12/21/2016	On-site automatic gauge	N/A
12/23/2016	12/23/2016	On-site automatic gauge	N/A
12/28/2016	12/28/2016	On-site automatic gauge	N/A
12/30/2016	12/30/2016	On-site automatic gauge	N/A
4/6 - 4/22/2017	4/6 - 4/22/2017	On-site automatic gauge	N/A
4/24/2017	4/24/2017	On-site automatic gauge	N/A
4/27/2017	4/27/2017	On-site automatic gauge	N/A
8/20/2018	8/20/2018	On-site automatic gauge	N/A
9/16/2018	9/16/2018	On-site automatic gauge	N/A
4/13/2019	4/13/2019	On-site automatic gauge	N/A
2/7/2020	2/7/2020	On-site automatic gauge	N/A
8/14/2020	8/14/2020	On-site automatic gauge	N/A
3/31/2021	3/31/2021	On-site automatic gauge	N/A
7/19/2021	7/19/2021	On-site automatic gauge	N/A
8/7/2021	8/7/2021	On-site automatic gauge	N/A
11/29/2021	11/29/2021	On-site automatic gauge	N/A
12/10/2021	12/10/2021	On-site automatic gauge	N/A
12/14/2021	12/14/2021	On-site automatic gauge	N/A
12/20/2021	12/20/2021	On-site automatic gauge	N/A
1/3/2022	1/3/2022	On-site automatic gauge	N/A
1/9/2022	1/9/2022	On-site automatic gauge	N/A
1/14/2022	1/14/2022	On-site automatic gauge	N/A
1/17/2022	1/17/2022	On-site automatic gauge	N/A
2/6/2022	2/6/2022	On-site automatic gauge	N/A
2/7/2022	2/7/2022	On-site automatic gauge	N/A
2/17/2022	2/17/2022	On-site automatic gauge	N/A
2/26/2022	2/26/2022	On-site automatic gauge	N/A
3/2/2022	3/2/2022	On-site automatic gauge	N/A

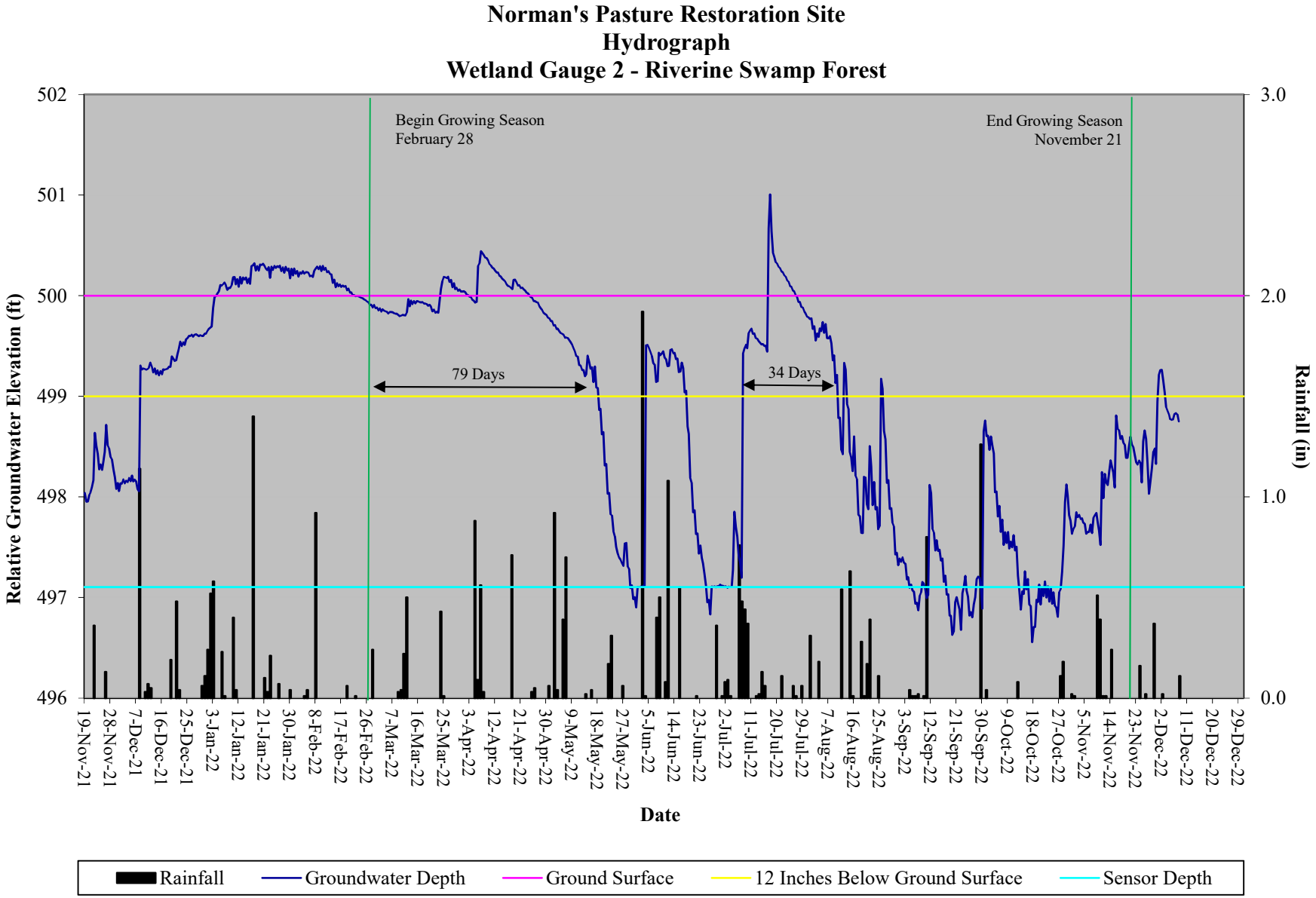
Table 8. Wetland Hydrology Criteria Attainment Norman's Pasture and Norman's Pasture II Restoration Sites, DMS Project Number 95717/96310								
Gauge	**Location**	**MY1 (2016)**	**MY2 (2017)**	**MY3 (2018)**	**MY4 (2019)**	**MY5 (2020)**	**MY6 (2021)**	**MY7 (2022)**
NP1	Headwater Forest	Yes/111 (41.6%)	Yes/91 (34.1%)	Yes/106 (39.7%)	Yes/59 (22.1%)	Yes/73 (27.3%)	Yes/50 (18.7%)	Yes/61 (22.8%)
NP2	Riverine Swamp Forest	Yes/98 (36.7%)	Yes/84 (31.5%)	Yes/73 (27.3%)	Yes/71 (26.6%)	Yes/80 (30.0%)	Yes/80 (30.0%)	Yes/79 (29.6%)
NP3	Riverine Swamp Forest	Yes/99 (37.1%)	Yes/106 (39.7%)	Yes/106 (39.7%)	Yes/73 (27.3%)	Yes/101 (37.8%)	Yes/77 (28.8%)	Gauge Malfunction
NP4	Riverine Swamp Forest	Yes/81 (30.3%)	Yes/105 (39.3%)	Yes/105 (39.3%)	Yes/77 (28.8%)	Yes/176 (65.9%)	Yes/109 (40.8%)	Yes/92 (34.5%)
NP5	Riverine Swamp Forest	Yes/64 (24.0%)	Yes/41 (15.4%)	Yes/67 (25.1%)	Yes/62 (23.2%)	Yes/71 (26.6%)	Yes/78 (29.2%)	Yes/82 (30.7%)
NP6	Riverine Swamp Forest	Yes/100 (37.5%)	Yes/103 (38.6%)	Yes/106 (39.7%)	Yes/76 (28.5%)	Yes/121 (45.3%)	Yes/83 (31.1%)	Yes/84 (31.5%)
NP7	Riverine Swamp Forest	Yes/64 (24.0%)	Yes/77 (28.8%)	Yes/60 (22.5%)	Yes/60 (22.5%)	Yes/71 (26.6%)	Yes/67 (25.1%)	Gauge Malfunction
NP8	Riverine Swamp Forest	No/30 (11.2%)	Yes/58 (21.7%)	Yes/36 (13.5%)	Yes/59 (22.1%)	Yes/71 (26.6%)	Yes/61 (22.8%)	Yes/59 (22.1%)
NP9	Riverine Swamp Forest	Yes/39 (14.6%)	Yes/59 (22.1%)	Yes/35 (13.1%)	Yes/61 (22.8%)	Yes/101 (37.8%)	Yes/76 (28.5%)	Yes/68 (25.5%)
NPII 1	Headwater Forest	Yes/65 (24.3%)	Yes/77 (28.8%)	Yes/66 (24.7%)	Yes/64 (24.0%)	Yes/55 (20.6%)	Yes/53 (19.9%)	Yes/45 (16.9%)
NPII 2	Headwater Forest	Yes/81 (30.3%)	Yes/78 (29.2%)	Yes/65 (24.3%)	Yes/33 (12.4%)	Yes/41 (15.4%)	Yes/49 (18.4%)	Yes/34 (12.7%)
NPII 3	Headwater Forest	Yes/50 (18.7%)	Yes/77 (28.8%)	Yes/51 (19.1%)	Yes/39 (14.6%)	Yes/45 (16.9%)	Yes/50 (18.7%)	No/5 (1.9%)
NPII 4	Headwater Forest	Yes/64 (24.0%)	Yes/65 (24.3%)	Yes/65 (24.3%)	Yes/59 (22.1%)	Yes/60 (22.5%)	Yes/52 (19.5%)	Yes/57 (21.3%)
NPII 5	Headwater Forest	No/22 (8.2%)	Yes/35 (13.1%)	Yes/36 (13.5%)	Yes/58 (21.7%)	Yes/51 (19.1%)	Yes/41 (15.4%)	Yes/24 (9.0%)
NPII 6	Headwater Forest	No/6 (2.2%)	No/7 (2.6%)	Yes/33 (12.4%)	No/22 (8.2%)	Yes/37 (13.9%)	No/20 (7.5%)	No/5 (1.9%)
NPII 7	Headwater Forest	Yes/29 (10.9%)	Yes/53 (19.9%)	Yes/35 (13.1%)	Yes/57 (21.3%)	Yes/37 (13.9%)	Yes/51 (19.1%)	No/10 (3.7%)
NPII 8	Headwater Forest	No/12 (4.5%)	No/7 (2.6%)	No/18 (6.7%)	No/14 (5.2%)	No/22 (8.2%)	No/21 (7.9%)	No/3 (1.1%)
NPII 9	Headwater Forest	No/18 (6.7%)	Yes/35 (13.1%)	Yes/37 (13.9%)	Yes/50 (18.7%)	Yes/44 (16.5%)	Yes/40 (15.0%)	Yes/36 (13.5%)
NPII 10	Headwater Forest	No/18 (6.7%)	Yes/33 (12.4%)	Yes/35 (13.1%)	Yes/33 (12.4%)	Yes/38 (14.2%)	Yes/41 (15.4%)	No/11 (4.1%)
NPII 11	Headwater Forest	No/9 (3.4%)	Yes/31 (11.6%)	Yes/32 (12.0%)	No/22 (8.2%)	Yes/37 (13.9%)	Yes/24 (9.0%)	No/11 (4.1%)
NPII 12	Headwater Forest	Yes/27 (10.1%)	Yes/58 (21.7%)	Yes/35 (13.1%)	Yes/33 (12.4%)	Yes/37 (13.9%)	Yes/48 (18.0%)	No/9 (3.4%)
NPII 13	Headwater Forest	Yes/64 (24.0%)	Yes/ 81 (30.3%)	Yes/76 (28.5%)	Yes/70 (26.2%)	Yes/95 (35.6%)	Yes/86 (32.2%)	Yes/84 (31.5%)
NPII 14	Headwater Forest			Yes/36 (13.5%)	Yes/58 (21.7%)	Yes/45 (16.9%)	Yes/40 (15.0%)	Yes/25 (9.4%)
NPII 15	Headwater Forest			Yes/34 (12.7%)	Yes/24 (9.0%)	Yes/44 (16.5%)	Yes/40 (15.0%)	Gauge Malfunction
NPII 16	Headwater Forest			Yes/53 (19.9%)	Yes/59 (22.1%)	Yes/50 (18.7%)	Yes/51 (19.1%)	Yes/36 (13.5%)
NPII 17	Headwater Forest				Yes/24 (9.0%)	Yes/44 (16.5%)	Yes/50 (18.7%)	No/10 (3.7%)
NPII 18	Headwater Forest						No/22 (8.2%)	Gauge Malfunction
NPC1	Non-credited Creation Area	11 (4.1%)	38 (14.2%)	35 (13.1%)	18 (6.7%)	24 (9.0%)	23 (8.6%)	11 (4.1%)
NPC2	Non-credited Creation Area	24 (9.0%)	61 (22.8%)	71 (26.6%)	61 (22.8%)	59 (22.1%)	53 (19.9%)	49 (18.4%)

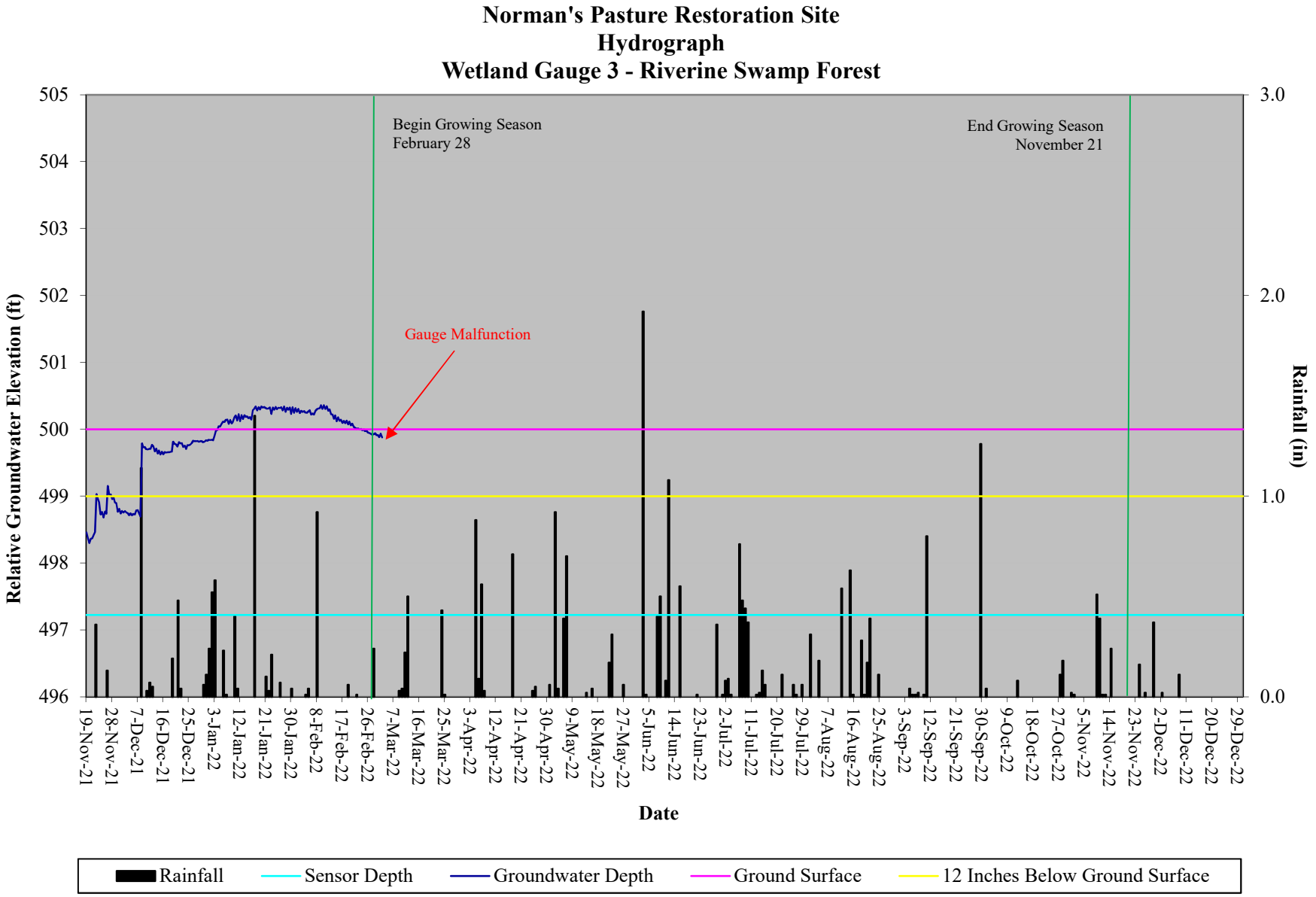
Norman's Pasture Wetland Restoration Site
30-70 Percentile Graph
WETS Station Name: Clinton, NC



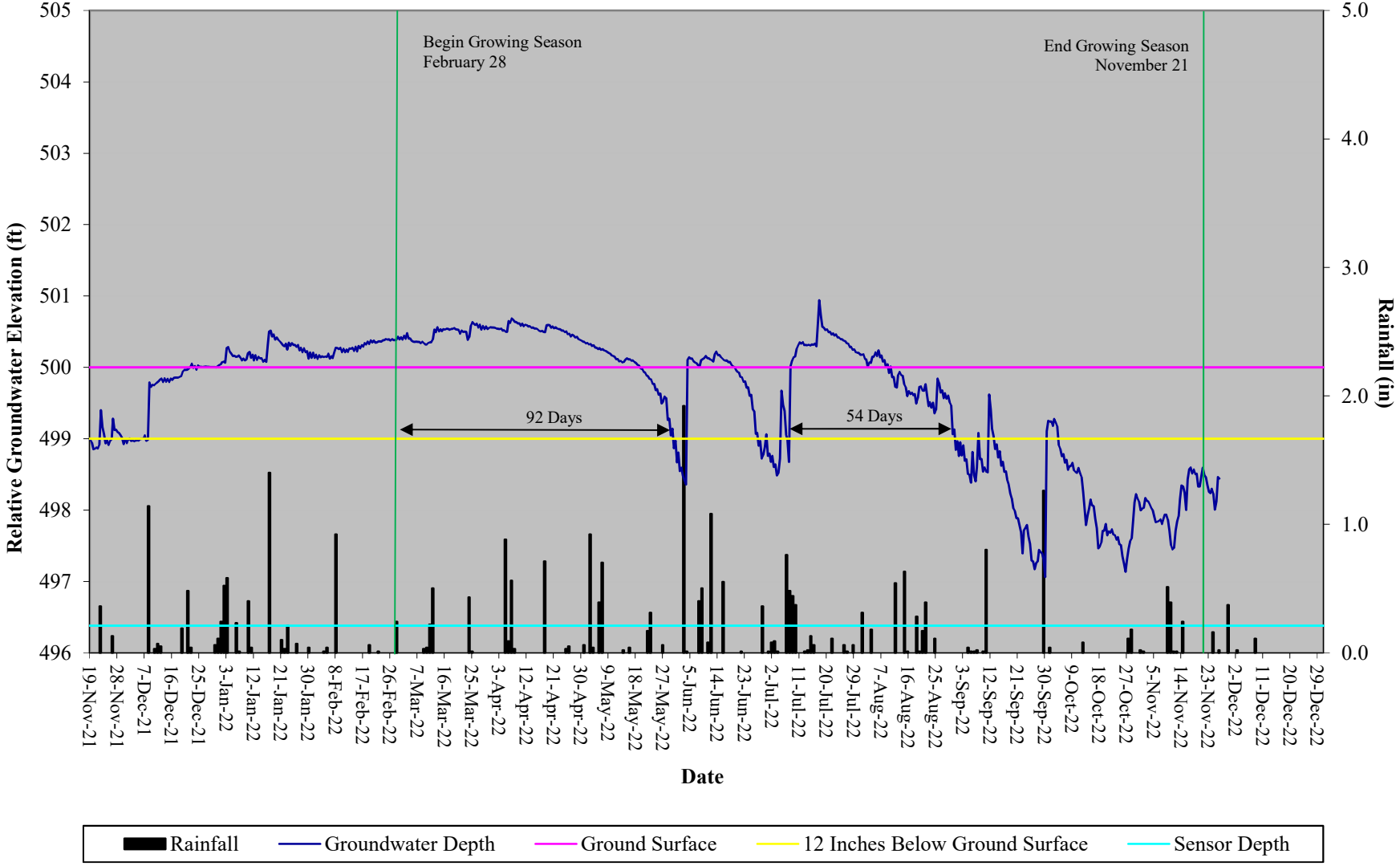
Norman's Pasture Restoration Site
Hydrograph
Wetland Gauge 1 - Headwater Forest



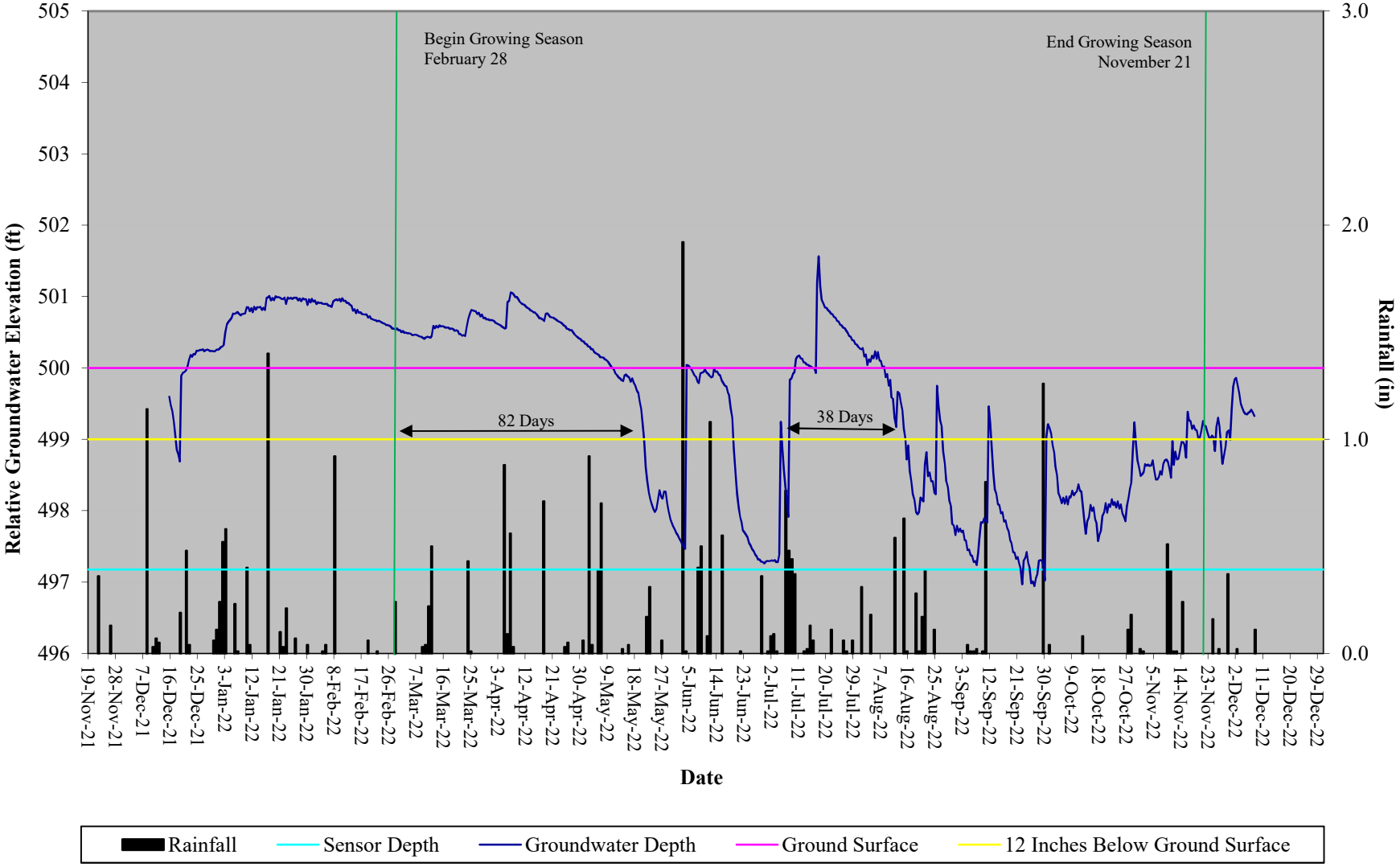

Norman's Pasture Restoration Site
Hydrograph
Wetland Gauge 2 - Riverine Swamp Forest
Begin Growing Season
February 28
End Growing Season
November 21
79 Days
34 Days
Relative Groundwater Elevation (ft)
Rainfall (in)
Date
502
501
500
499
498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
17-Feb-22
26-Feb-22
7-Mar-22
16-Mar-22
25-Mar-22
3-Apr-22
12-Apr-22
21-Apr-22
30-Apr-22
9-May-22
18-May-22
27-May-22
5-Jun-22
14-Jun-22
23-Jun-22
2-Jul-22
11-Jul-22
20-Jul-22
29-Jul-22
7-Aug-22
16-Aug-22
25-Aug-22
3-Sep-22
12-Sep-22
21-Sep-22
30-Sep-22
9-Oct-22
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Rainfall
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface
Sensor Depth

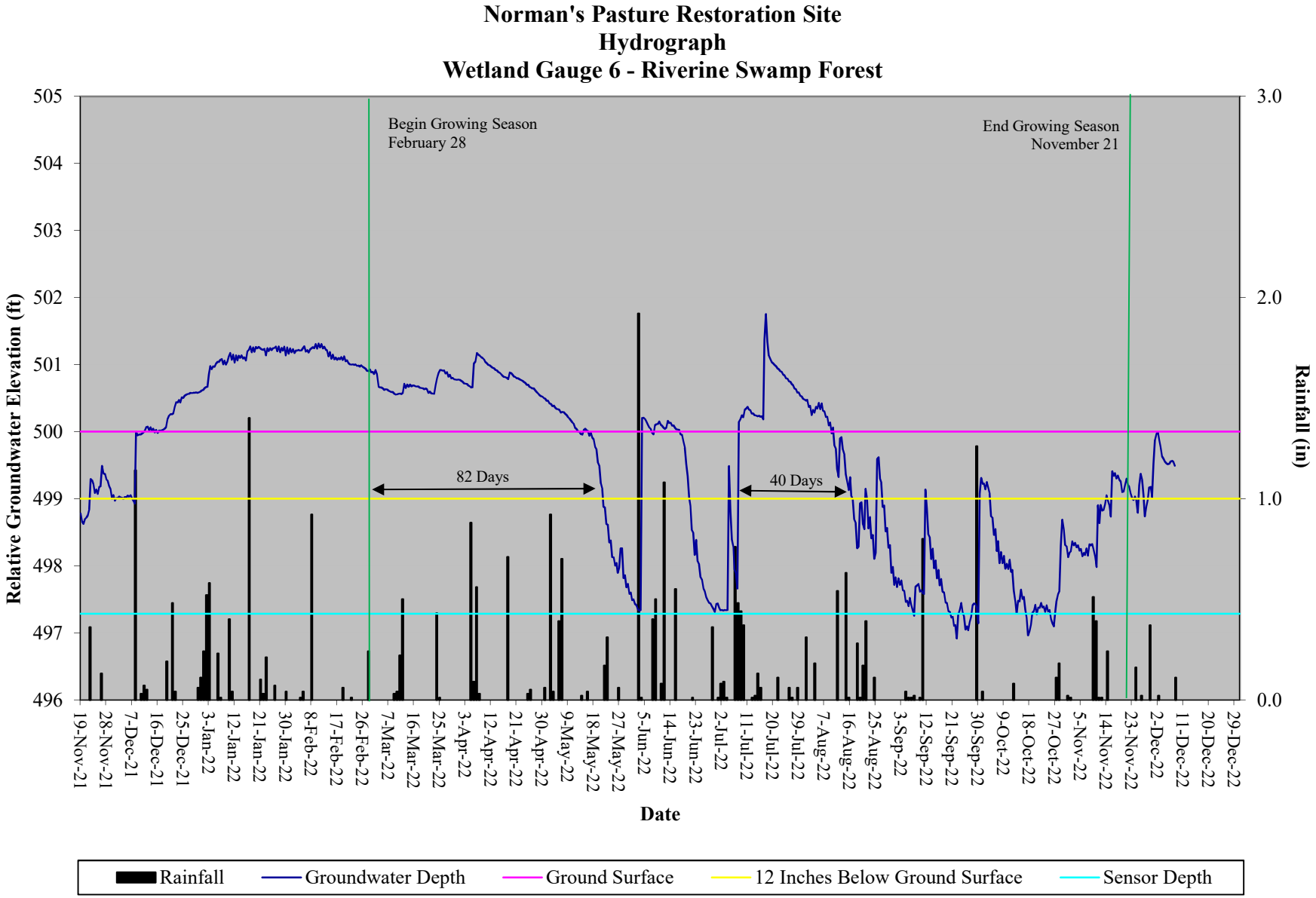

Norman's Pasture Restoration Site
Hydrograph
Wetland Gauge 3 - Riverine Swamp Forest
Begin Growing Season
February 28
End Growing Season
November 21
Gauge Malfunction
Relative Groundwater Elevation (ft)
Rainfall (in)
Date
505
504
503
502
501
500
499
498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
17-Feb-22
26-Feb-22
7-Mar-22
16-Mar-22
25-Mar-22
3-Apr-22
12-Apr-22
21-Apr-22
30-Apr-22
9-May-22
18-May-22
27-May-22
5-Jun-22
14-Jun-22
23-Jun-22
2-Jul-22
11-Jul-22
20-Jul-22
29-Jul-22
7-Aug-22
16-Aug-22
25-Aug-22
3-Sep-22
12-Sep-22
21-Sep-22
30-Sep-22
9-Oct-22
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Rainfall
Sensor Depth
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface

Norman's Pasture Restoration Site
Hydrograph
Wetland Gauge 4 - Riverine Swamp Forest

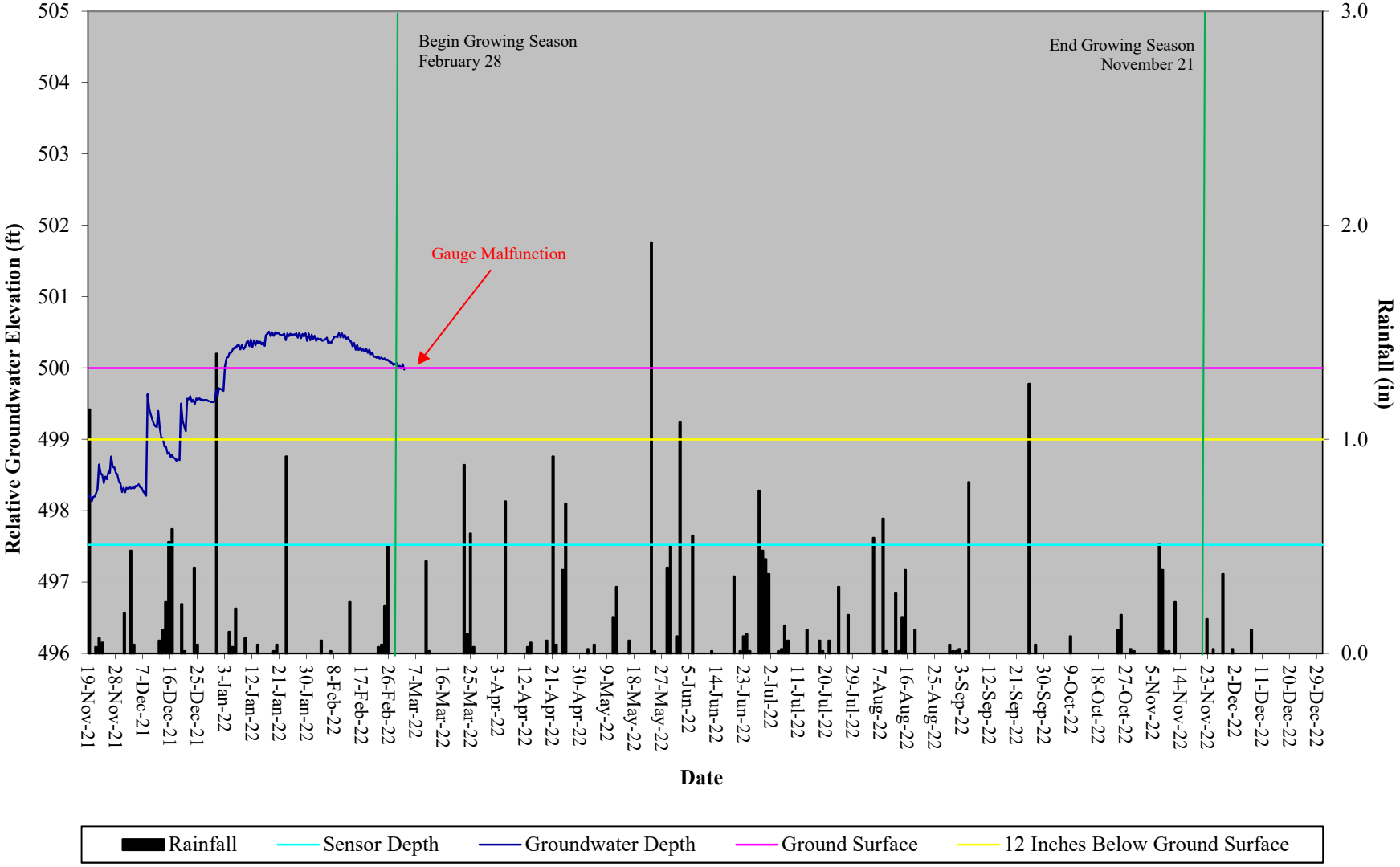


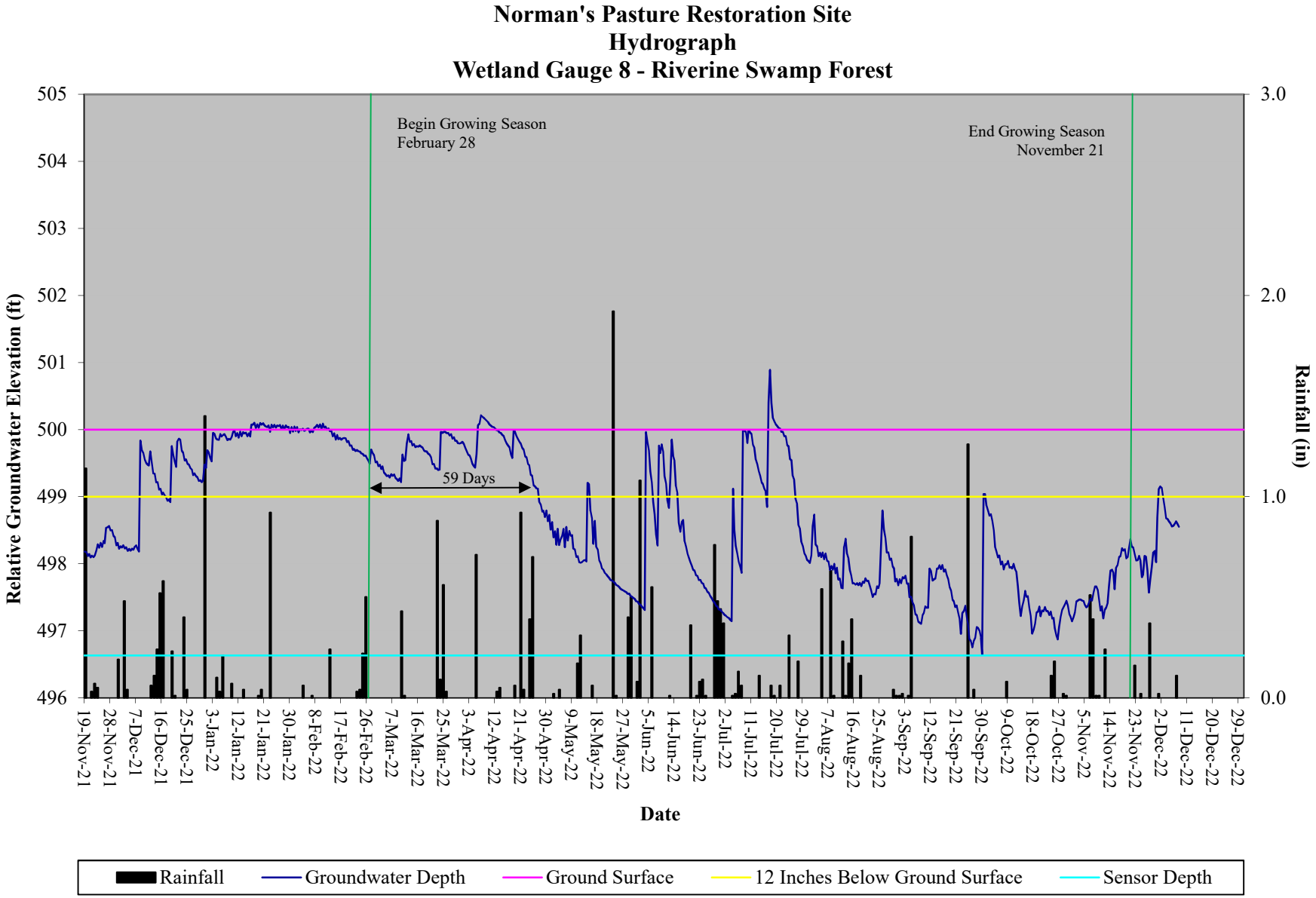
Norman's Pasture Restoration Site
Hydrograph
Wetland Gauge 5 - Riverine Swamp Forest




Norman's Pasture Restoration Site
Hydrograph
Wetland Gauge 6 - Riverine Swamp Forest
Begin Growing Season
February 28
End Growing Season
November 21
82 Days
40 Days
Relative Groundwater Elevation (ft)
Rainfall (in)
Date
505
504
503
502
501
500
499
498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
17-Feb-22
26-Feb-22
7-Mar-22
16-Mar-22
25-Mar-22
3-Apr-22
12-Apr-22
21-Apr-22
30-Apr-22
9-May-22
18-May-22
27-May-22
5-Jun-22
14-Jun-22
23-Jun-22
2-Jul-22
11-Jul-22
20-Jul-22
29-Jul-22
7-Aug-22
16-Aug-22
25-Aug-22
3-Sep-22
12-Sep-22
21-Sep-22
30-Sep-22
9-Oct-22
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Rainfall
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface
Sensor Depth

Norman's Pasture Restoration Site
Hydrograph
Wetland Gauge 7 - Riverine Swamp Forest




Norman's Pasture Restoration Site
Hydrograph
Wetland Gauge 8 - Riverine Swamp Forest
Begin Growing Season
February 28
End Growing Season
November 21
59 Days
Relative Groundwater Elevation (ft)
Rainfall (in)
Date
505
504
503
502
501
500
499
498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
17-Feb-22
26-Feb-22
7-Mar-22
16-Mar-22
25-Mar-22
3-Apr-22
12-Apr-22
21-Apr-22
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9-May-22
18-May-22
27-May-22
5-Jun-22
14-Jun-22
23-Jun-22
2-Jul-22
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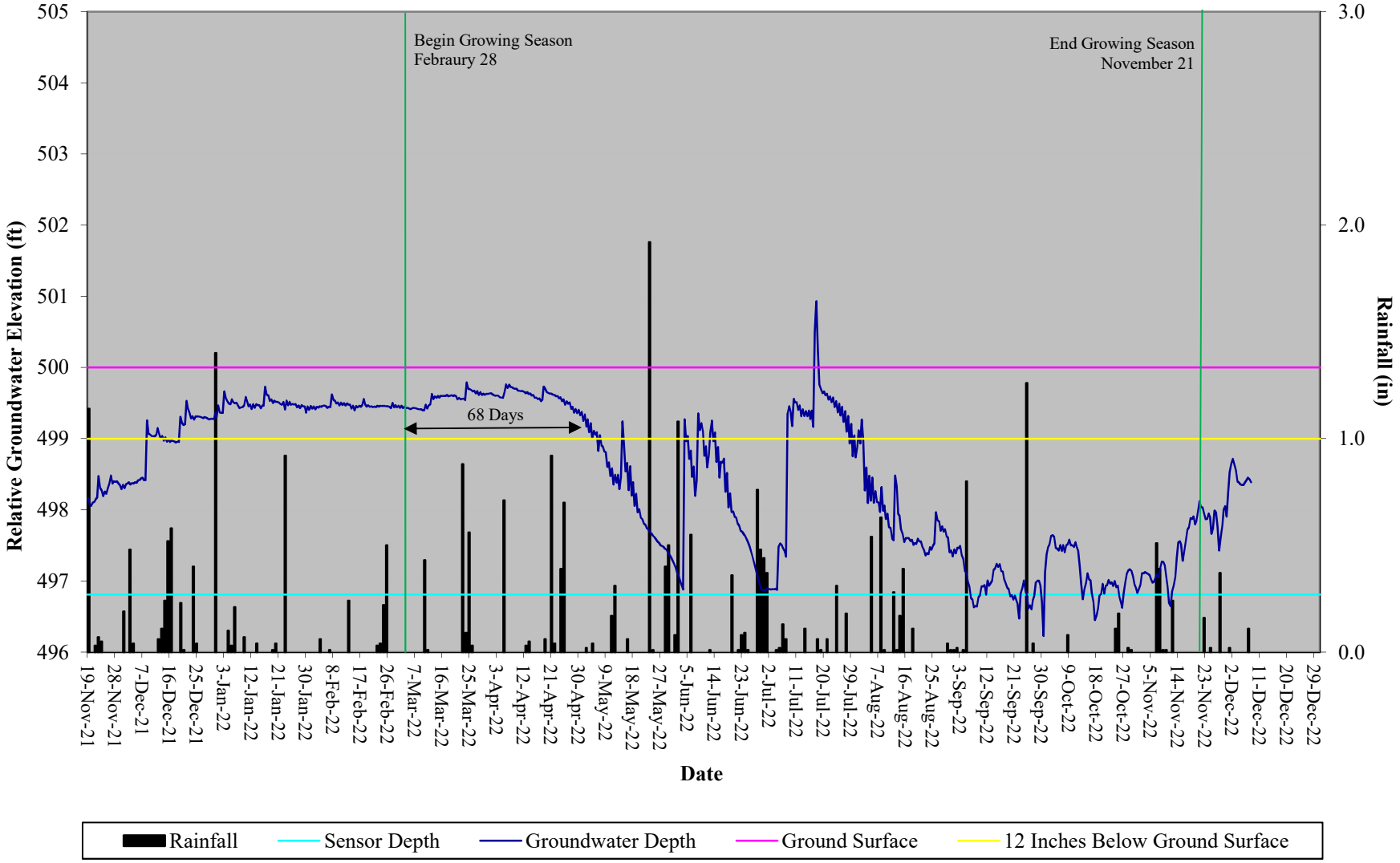
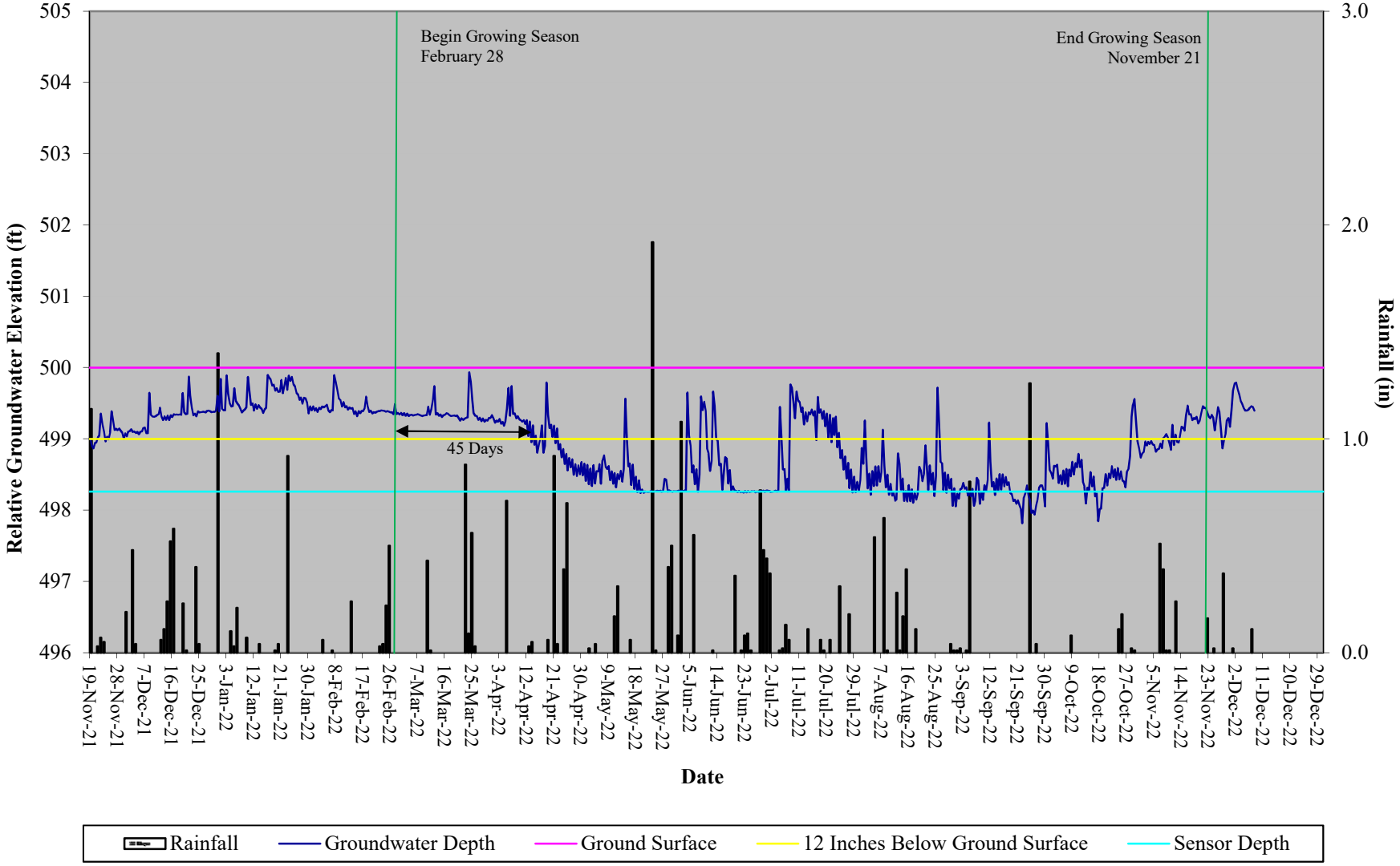
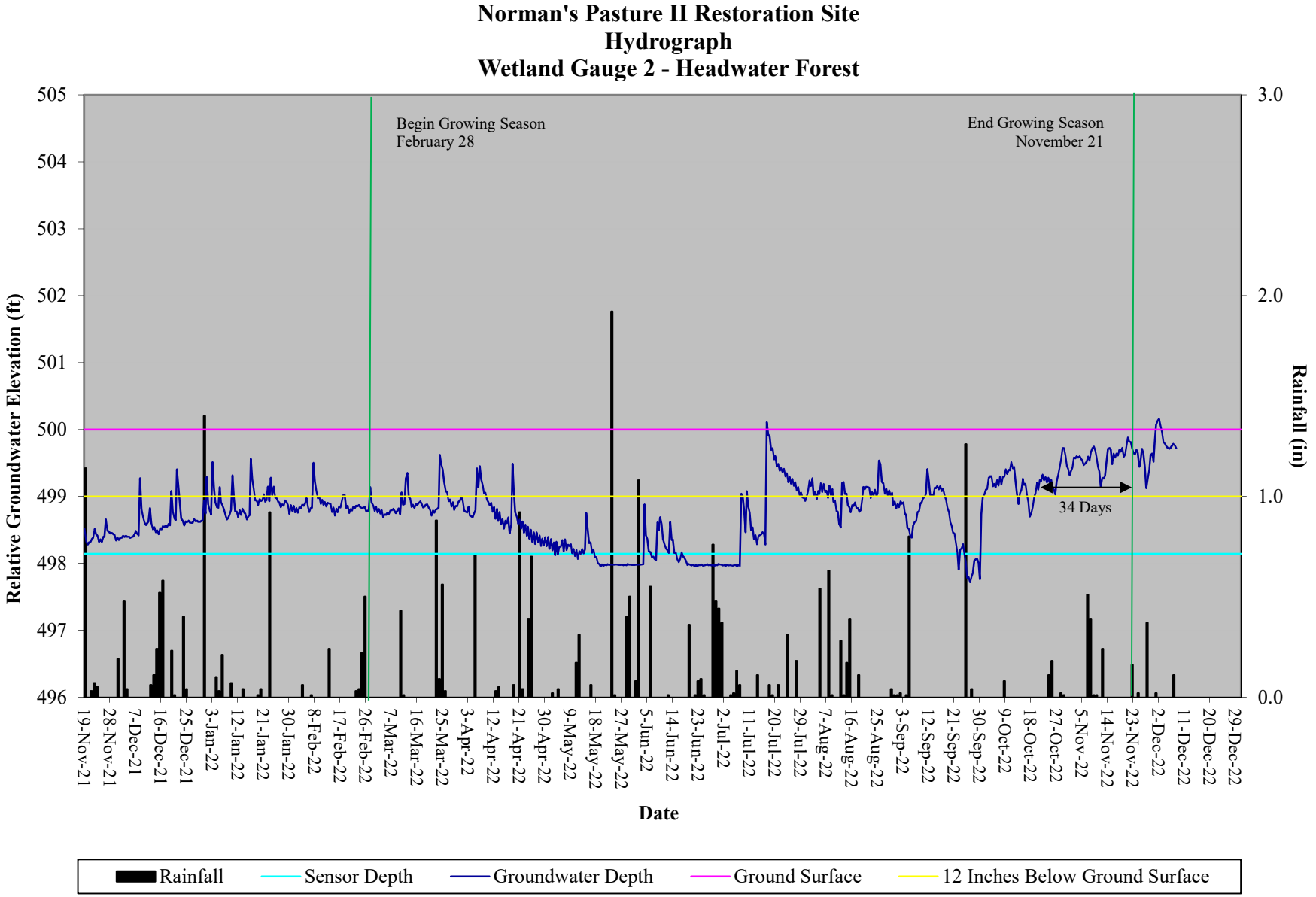
29-Jul-22
7-Aug-22
16-Aug-22
25-Aug-22
3-Sep-22
12-Sep-22
21-Sep-22
30-Sep-22
9-Oct-22
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Rainfall
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface
Sensor Depth

Norman's Pasture Restoration Site
Hydrograph
Wetland Gauge 9 - Riverine Swamp Forest



Norman's Pasture II Restoration Site
Hydrograph
Wetland Gauge 1 - Headwater Forest




Norman's Pasture II Restoration Site
Hydrograph
Wetland Gauge 2 - Headwater Forest
Begin Growing Season
February 28
End Growing Season
November 21
34 Days
Relative Groundwater Elevation (ft)
Rainfall (in)
Date
505
504
503
502
501
500
499
498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
17-Feb-22
26-Feb-22
7-Mar-22
16-Mar-22
25-Mar-22
3-Apr-22
12-Apr-22
21-Apr-22
30-Apr-22
9-May-22
18-May-22
27-May-22
5-Jun-22
14-Jun-22
23-Jun-22
2-Jul-22
11-Jul-22
20-Jul-22
29-Jul-22
7-Aug-22
16-Aug-22
25-Aug-22
3-Sep-22
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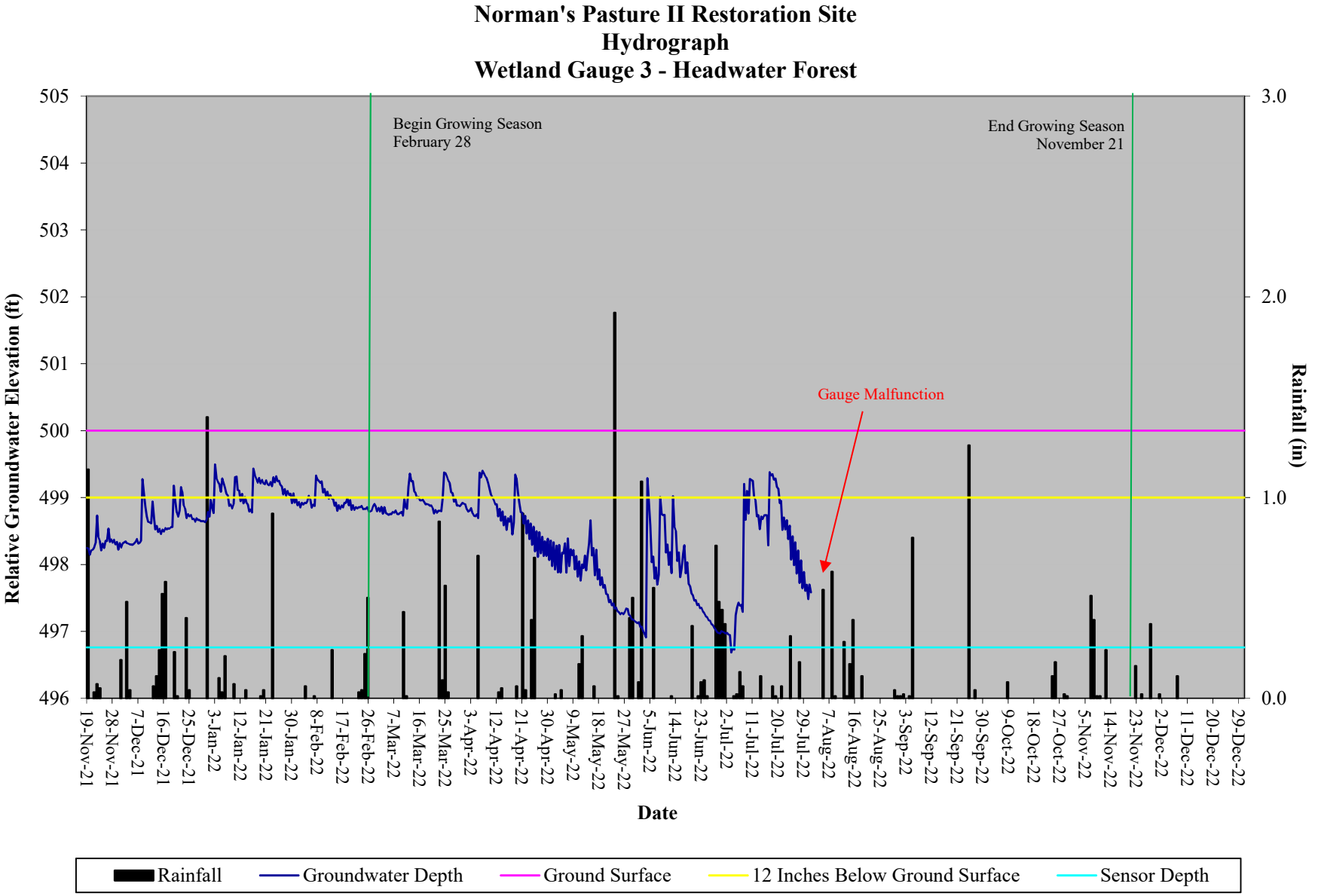
21-Sep-22
30-Sep-22
9-Oct-22
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Rainfall
Sensor Depth
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface


Norman's Pasture II Restoration Site
Hydrograph
Wetland Gauge 3 - Headwater Forest
Begin Growing Season
February 28
End Growing Season
November 21
Gauge Malfunction
Relative Groundwater Elevation (ft)
Rainfall (in)
Date
505
504
503
502
501
500
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498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
17-Feb-22
26-Feb-22
7-Mar-22
16-Mar-22
25-Mar-22
3-Apr-22
12-Apr-22
21-Apr-22
30-Apr-22
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2-Jul-22
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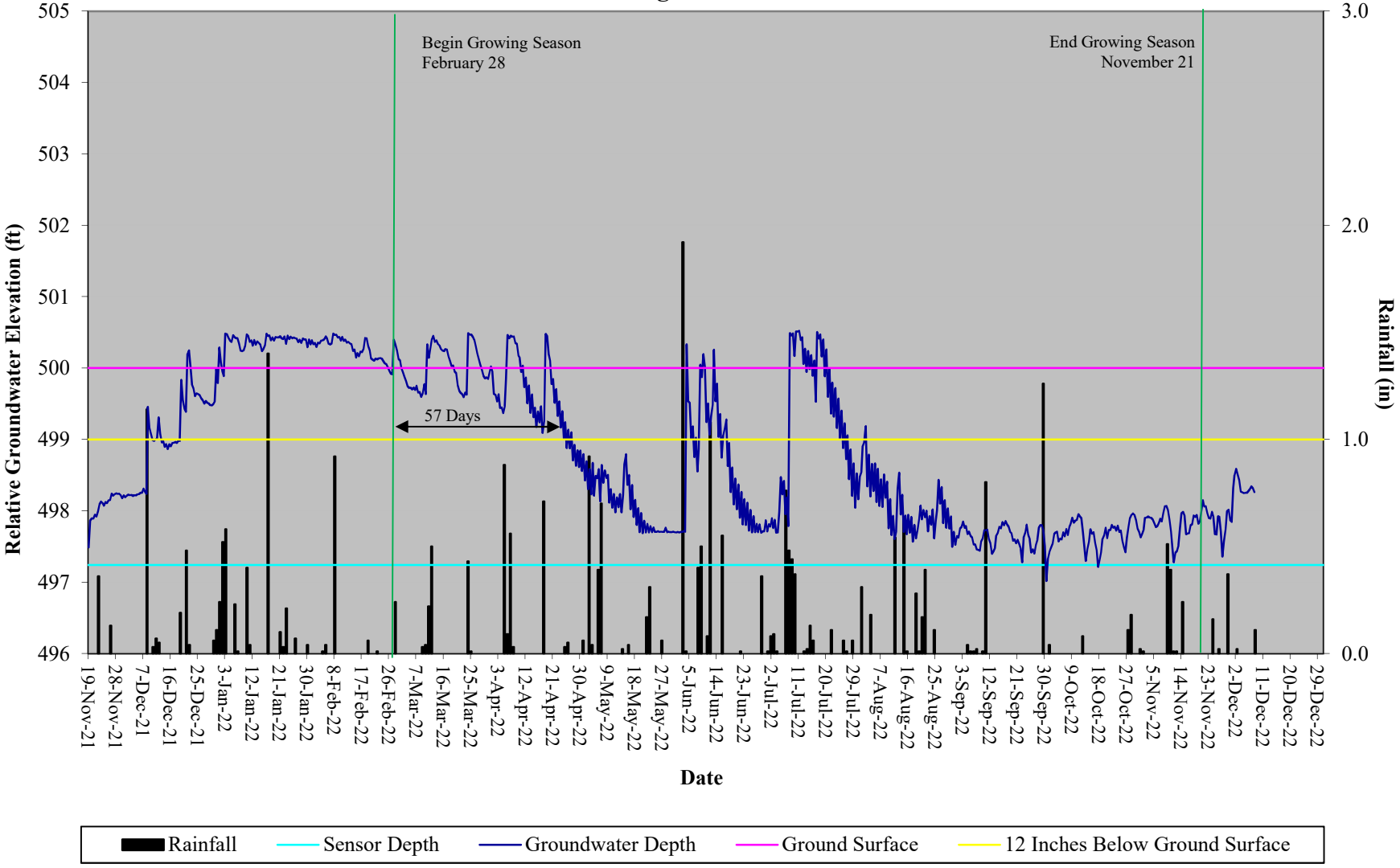
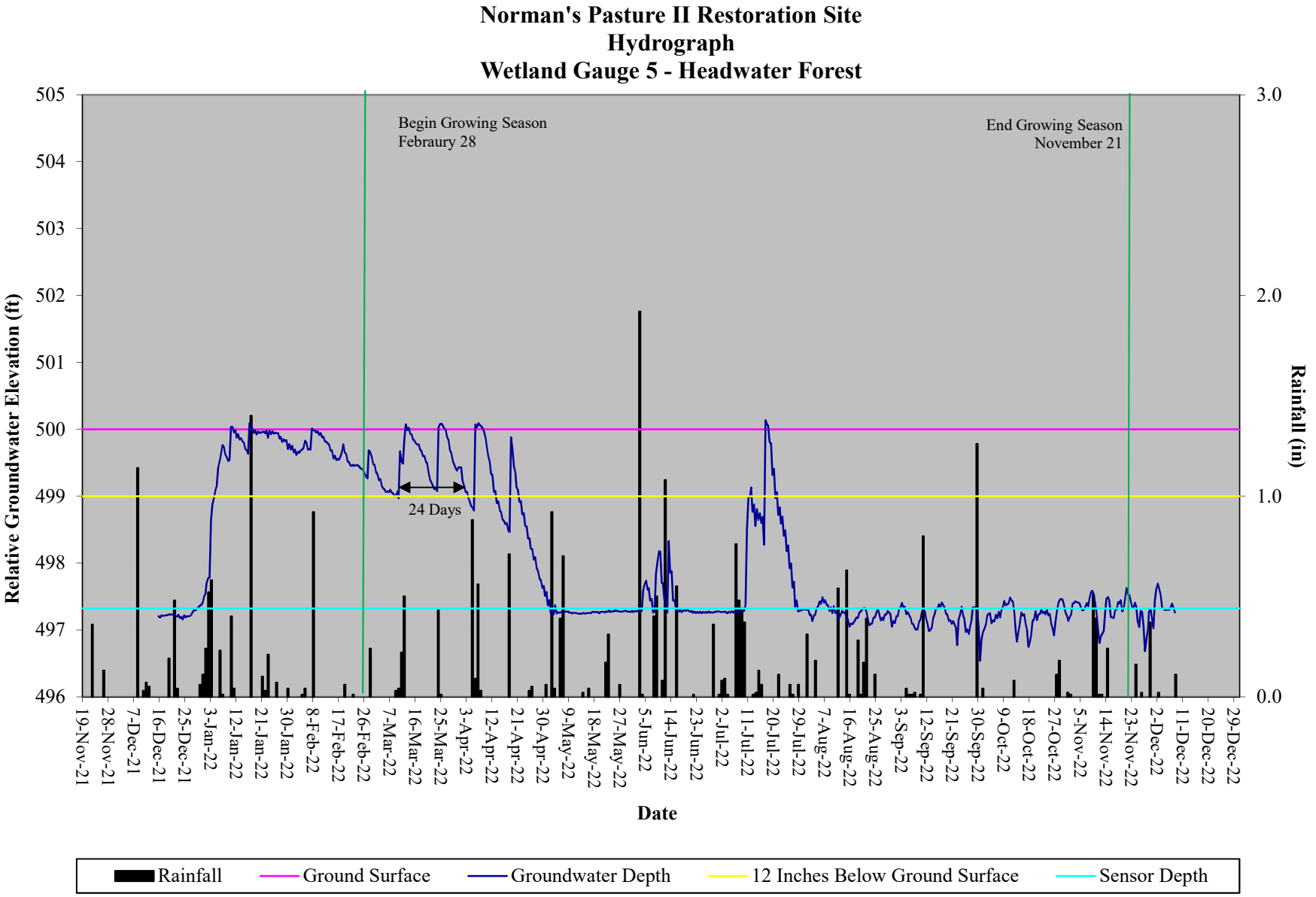
20-Jul-22
29-Jul-22
7-Aug-22
16-Aug-22
25-Aug-22
3-Sep-22
12-Sep-22
21-Sep-22
30-Sep-22
9-Oct-22
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Rainfall
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface
Sensor Depth

Norman's Pasture II Restoration Site
Hydrograph
Wetland Gauge 4 - Headwater Forest




Norman's Pasture II Restoration Site
Hydrograph
Wetland Gauge 5 - Headwater Forest
Begin Growing Season
Febraury 28
End Growing Season
November 21
24 Days
Relative Groundwater Elevation (ft)
Rainfall (in)
Date
505
504
503
502
501
500
499
498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
17-Feb-22
26-Feb-22
7-Mar-22
16-Mar-22
25-Mar-22
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27-May-22
5-Jun-22
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23-Jun-22
2-Jul-22
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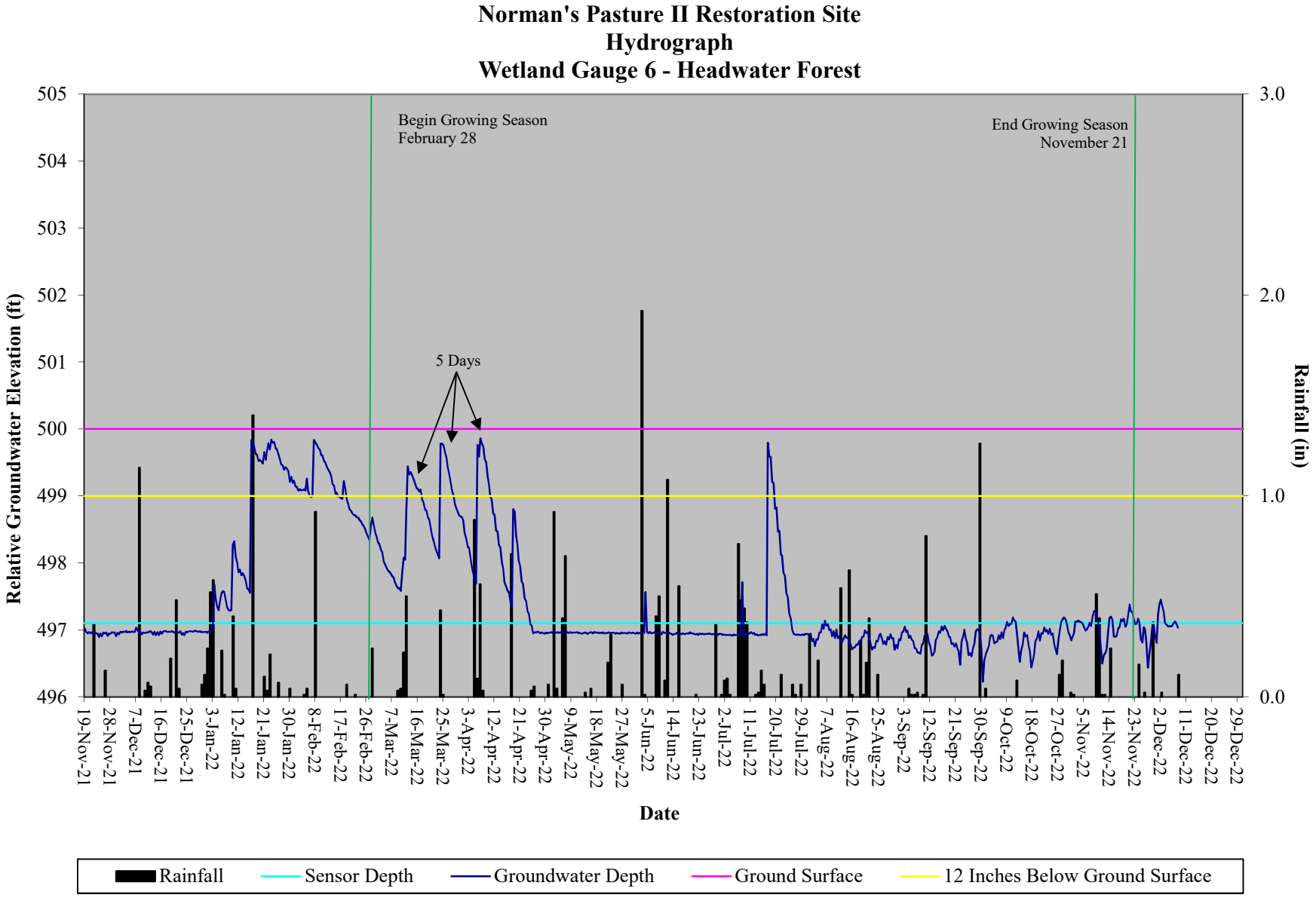
20-Jul-22
29-Jul-22
7-Aug-22
16-Aug-22
25-Aug-22
3-Sep-22
12-Sep-22
21-Sep-22
30-Sep-22
9-Oct-22
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Rainfall
Ground Surface
Groundwater Depth
12 Inches Below Ground Surface
Sensor Depth


Norman's Pasture II Restoration Site
Hydrograph
Wetland Gauge 6 - Headwater Forest
Begin Growing Season
February 28
End Growing Season
November 21
5 Days
Relative Groundwater Elevation (ft)
Rainfall (in)
Date
505
504
503
502
501
500
499
498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
17-Feb-22
26-Feb-22
7-Mar-22
16-Mar-22
25-Mar-22
3-Apr-22
12-Apr-22
21-Apr-22
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7-Aug-22
16-Aug-22
25-Aug-22
3-Sep-22
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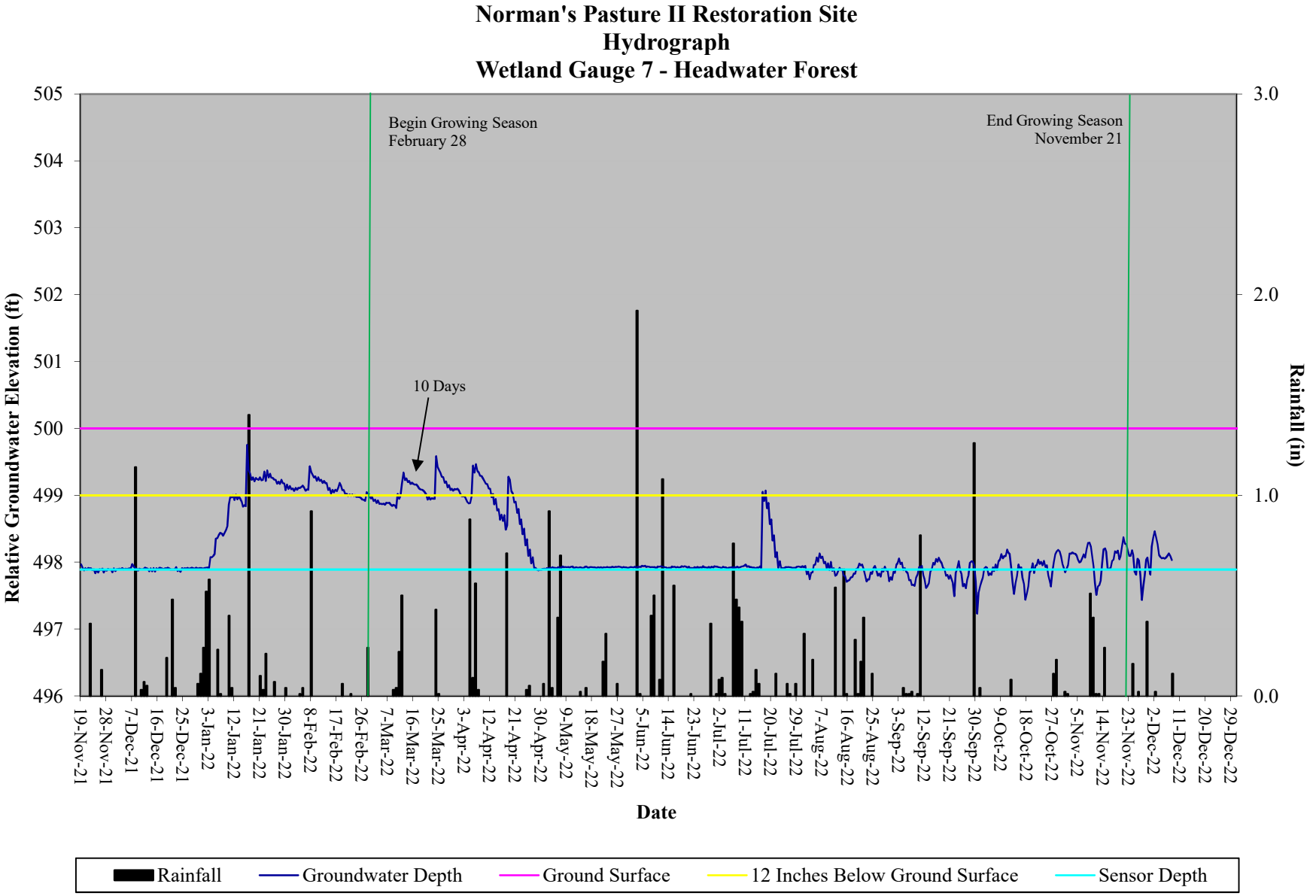
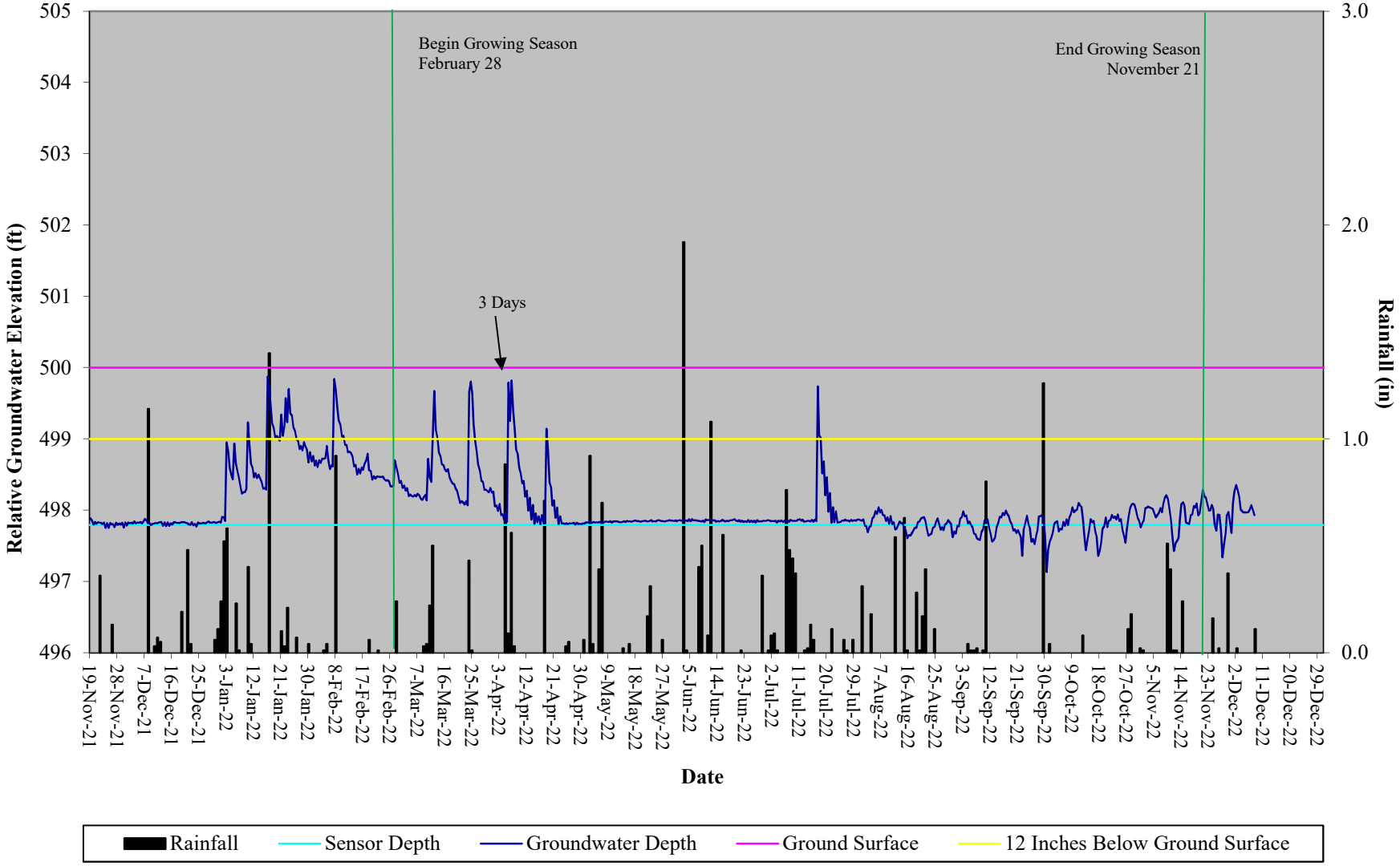
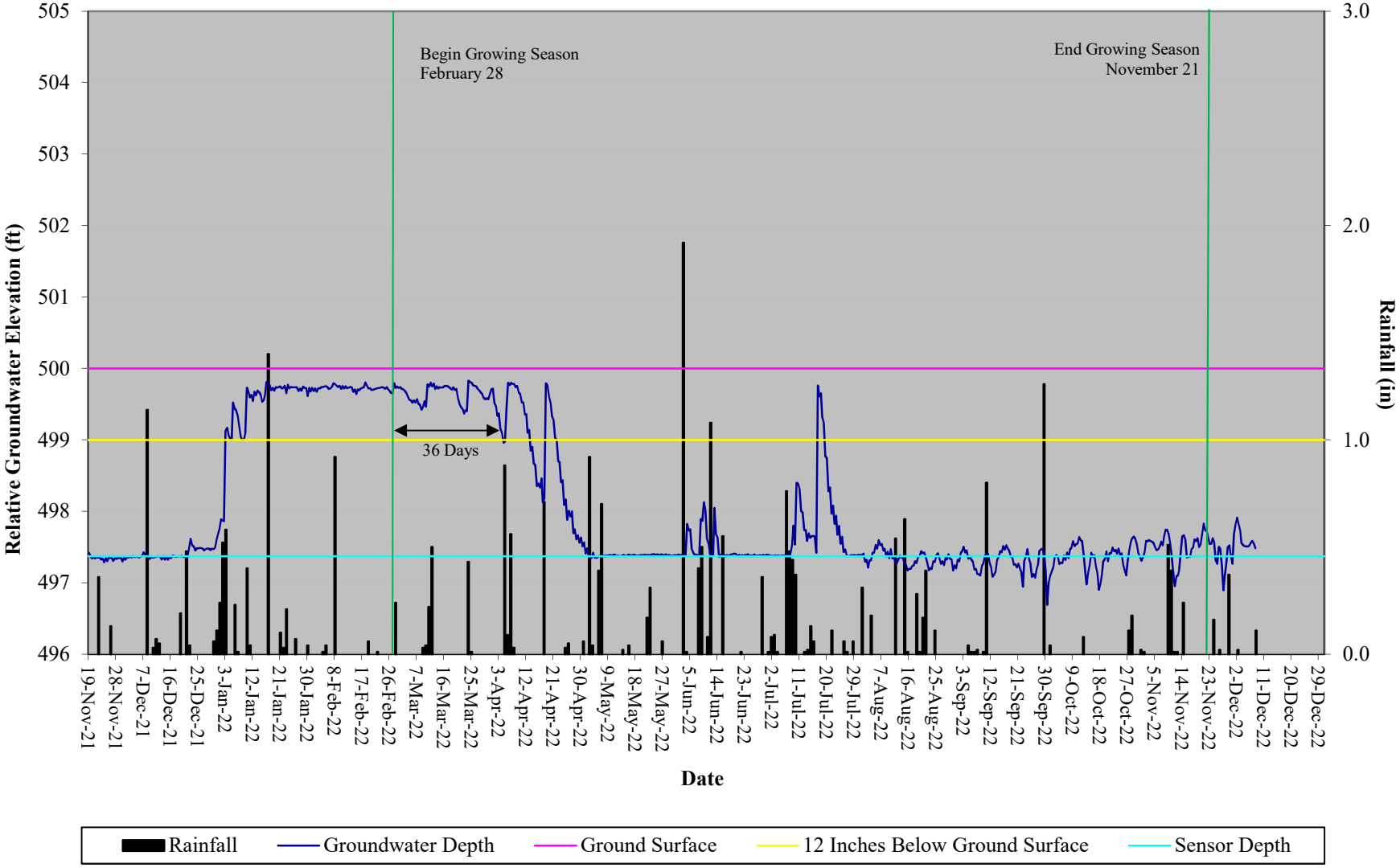
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Rainfall
Sensor Depth
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface

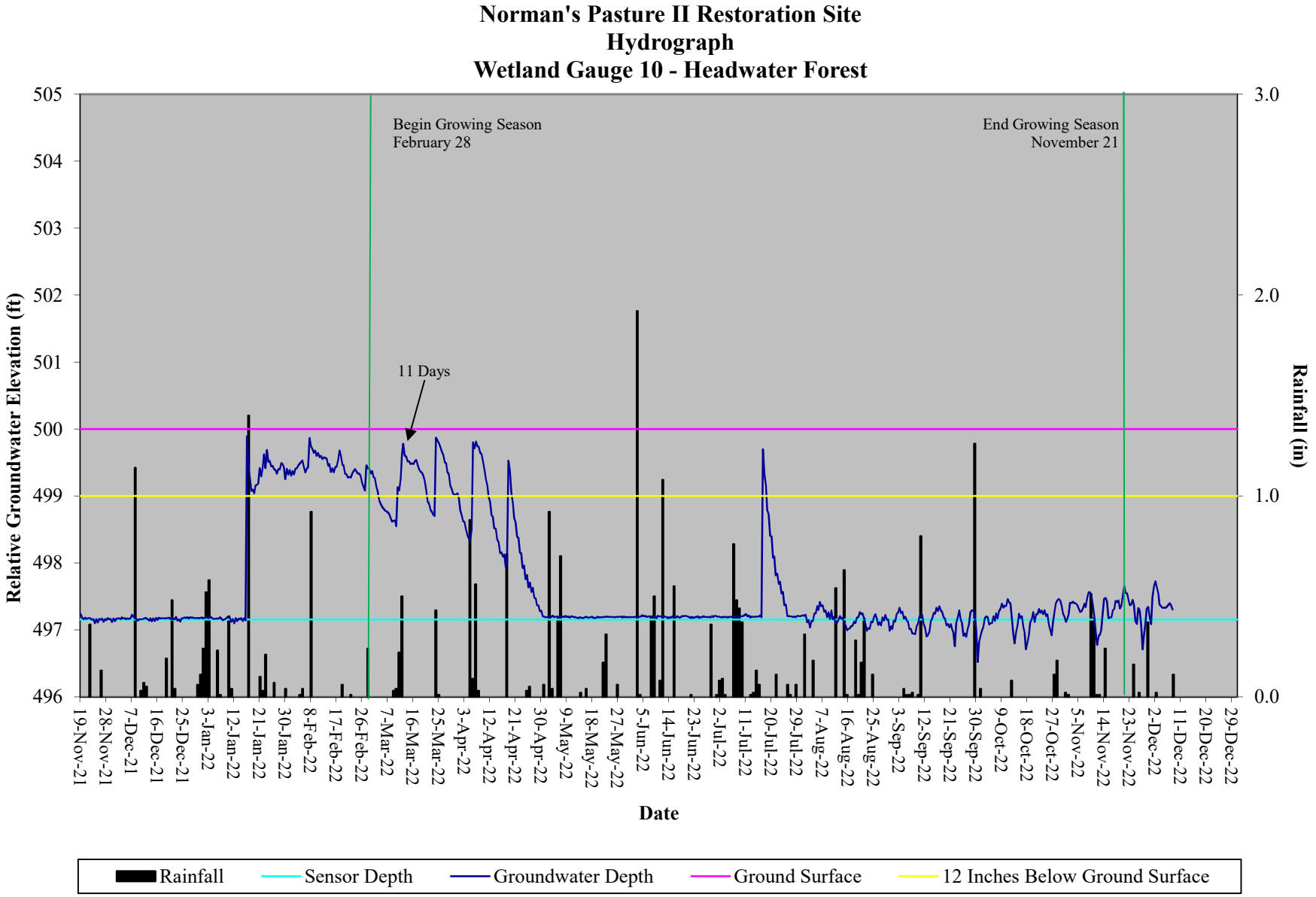

Norman's Pasture II Restoration Site
Hydrograph
Wetland Gauge 7 - Headwater Forest
Begin Growing Season
February 28
End Growing Season
November 21
10 Days
Relative Groundwater Elevation (ft)
Rainfall (in)
Date
505
504
503
502
501
500
499
498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
17-Feb-22
26-Feb-22
7-Mar-22
16-Mar-22
25-Mar-22
3-Apr-22
12-Apr-22
21-Apr-22
30-Apr-22
9-May-22
18-May-22
27-May-22
5-Jun-22
14-Jun-22
23-Jun-22
2-Jul-22
11-Jul-22
20-Jul-22
29-Jul-22
7-Aug-22
16-Aug-22
25-Aug-22
3-Sep-22
12-Sep-22
21-Sep-22
30-Sep-22
9-Oct-22
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Rainfall
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface
Sensor Depth

Norman's Pasture II Restoration Site
Hydrograph
Wetland Gauge 8 - Headwater Forest



Norman's Pasture II Restoration Site
Hydrograph
Wetland Gauge 9 - Headwater Forest




Norman's Pasture II Restoration Site
Hydrograph
Wetland Gauge 10 - Headwater Forest
Begin Growing Season
February 28
End Growing Season
November 21
11 Days
Relative Groundwater Elevation (ft)
Rainfall (in)
Date
505
504
503
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500
499
498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
17-Feb-22
26-Feb-22
7-Mar-22
16-Mar-22
25-Mar-22
3-Apr-22
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21-Apr-22
30-Apr-22
9-May-22
18-May-22
27-May-22
5-Jun-22
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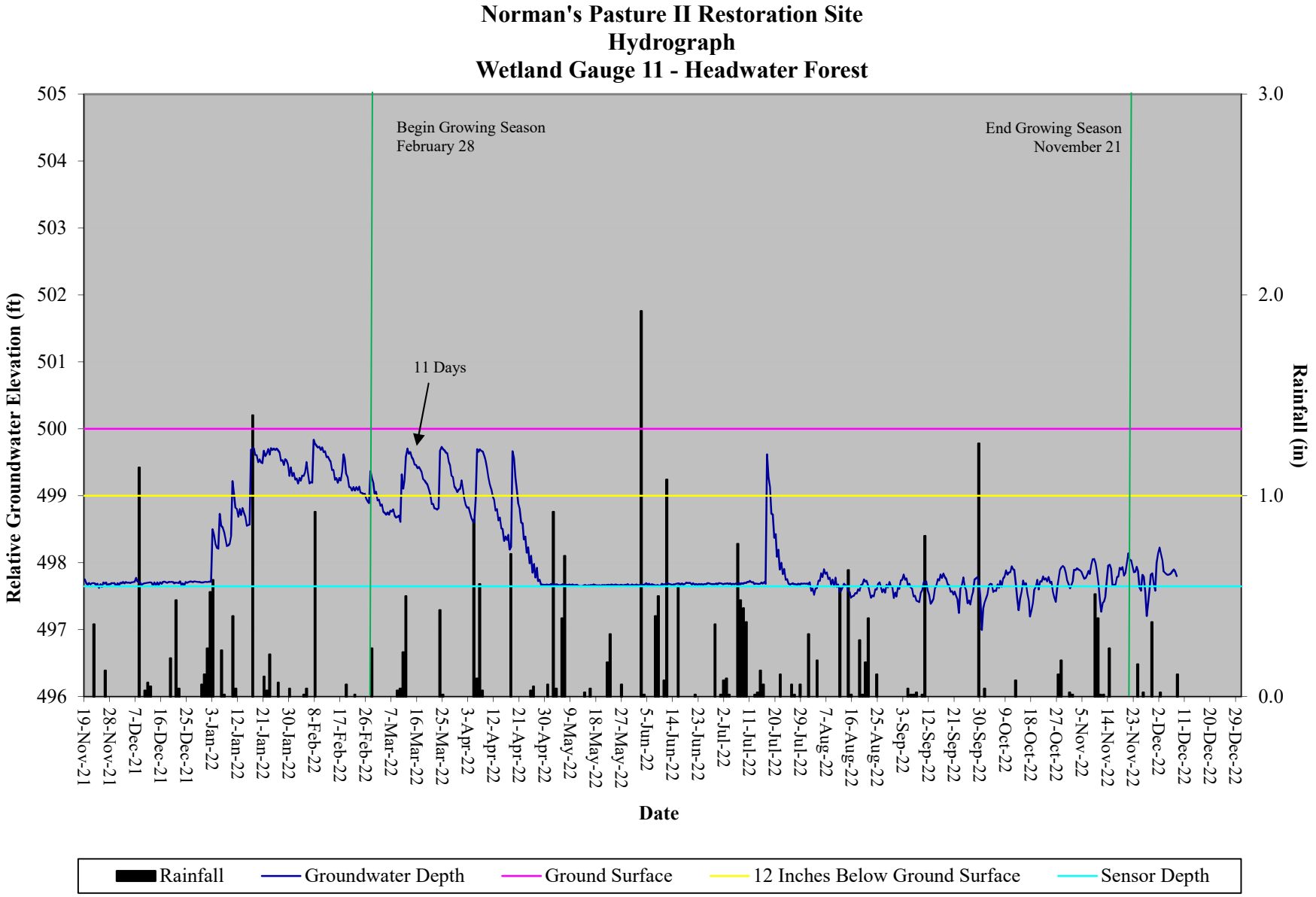
23-Jun-22
2-Jul-22
11-Jul-22
20-Jul-22
29-Jul-22
7-Aug-22
16-Aug-22
25-Aug-22
3-Sep-22
12-Sep-22
21-Sep-22
30-Sep-22
9-Oct-22
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Rainfall
Sensor Depth
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface


Norman's Pasture II Restoration Site
Hydrograph
Wetland Gauge 11 - Headwater Forest
Begin Growing Season
February 28
End Growing Season
November 21
11 Days
Relative Groundwater Elevation (ft)
Rainfall (in)
Date
505
504
503
502
501
500
499
498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
17-Feb-22
26-Feb-22
7-Mar-22
16-Mar-22
25-Mar-22
3-Apr-22
12-Apr-22
21-Apr-22
30-Apr-22
9-May-22
18-May-22
27-May-22
5-Jun-22
14-Jun-22
23-Jun-22
2-Jul-22
11-Jul-22
20-Jul-22
29-Jul-22
7-Aug-22
16-Aug-22
25-Aug-22
3-Sep-22
12-Sep-22
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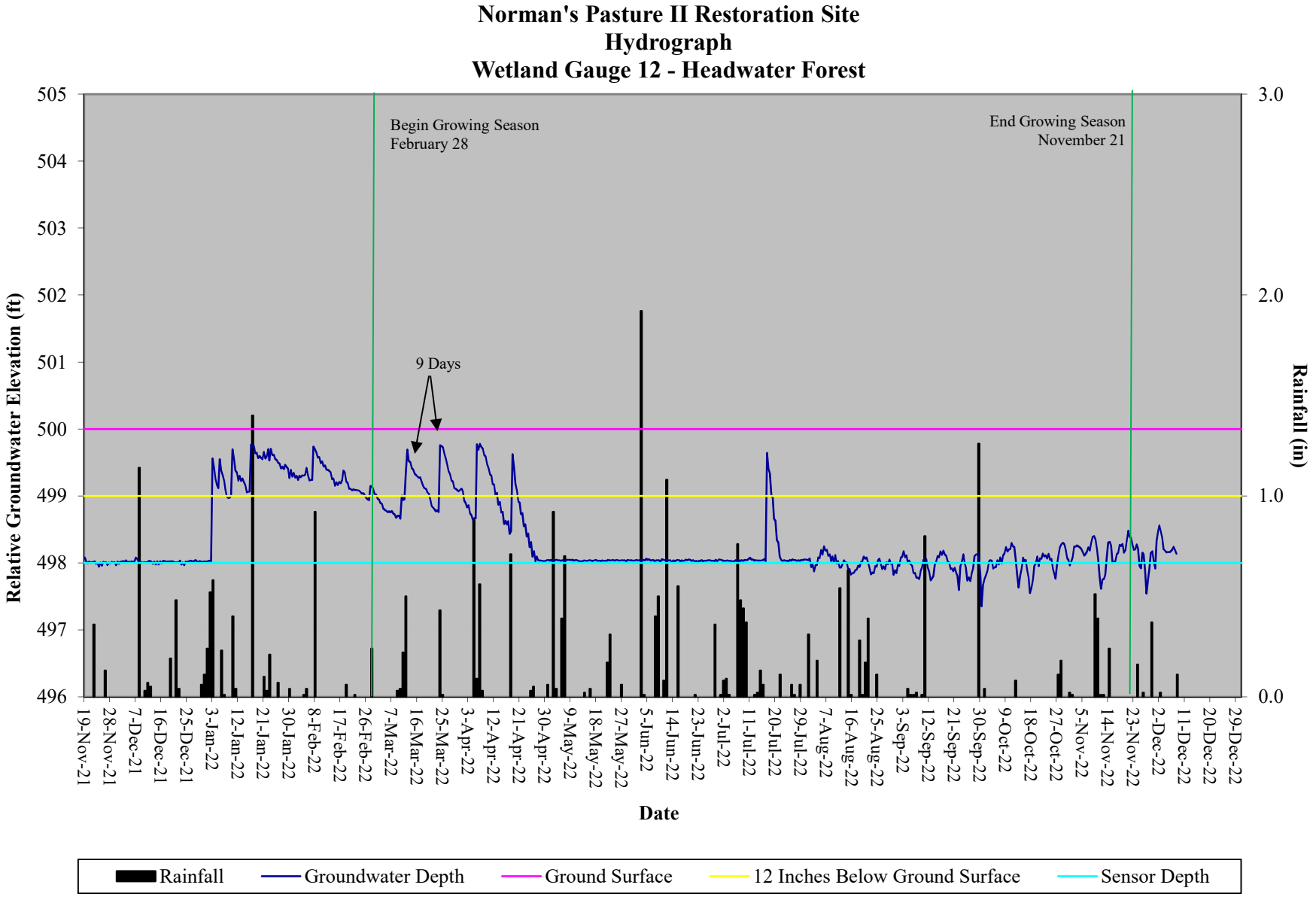
9-Oct-22
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Rainfall
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface
Sensor Depth


Norman's Pasture II Restoration Site
Hydrograph
Wetland Gauge 12 - Headwater Forest
Begin Growing Season
February 28
End Growing Season
November 21
9 Days
Relative Groundwater Elevation (ft)
Rainfall (in)
Date
505
504
503
502
501
500
499
498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
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16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
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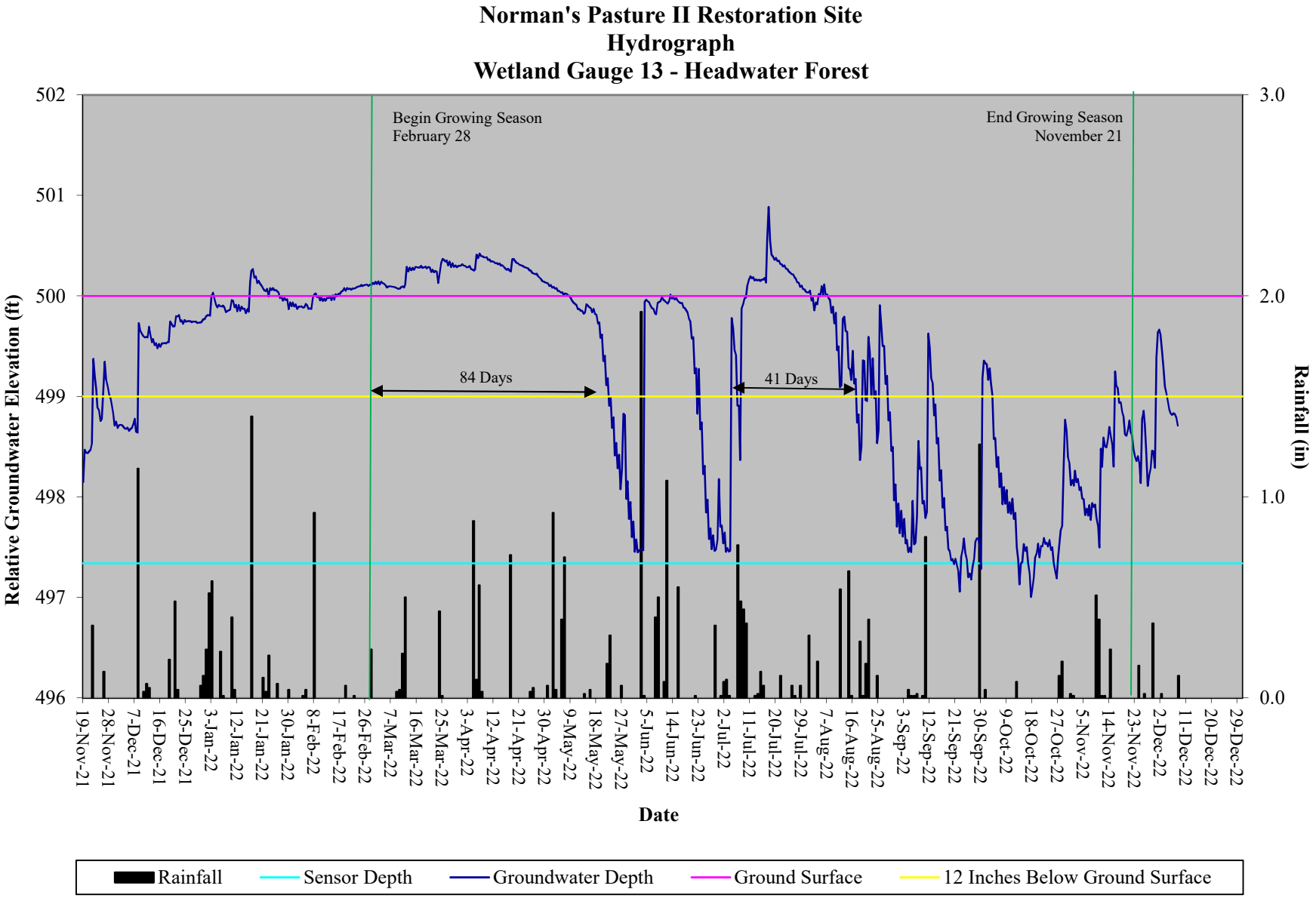
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Rainfall
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface
Sensor Depth


Norman's Pasture II Restoration Site
Hydrograph
Wetland Gauge 13 - Headwater Forest
Begin Growing Season
February 28
End Growing Season
November 21
84 Days
41 Days
Relative Groundwater Elevation (ft)
Rainfall (in)
Date
502
501
500
499
498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
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12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
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7-Mar-22
16-Mar-22
25-Mar-22
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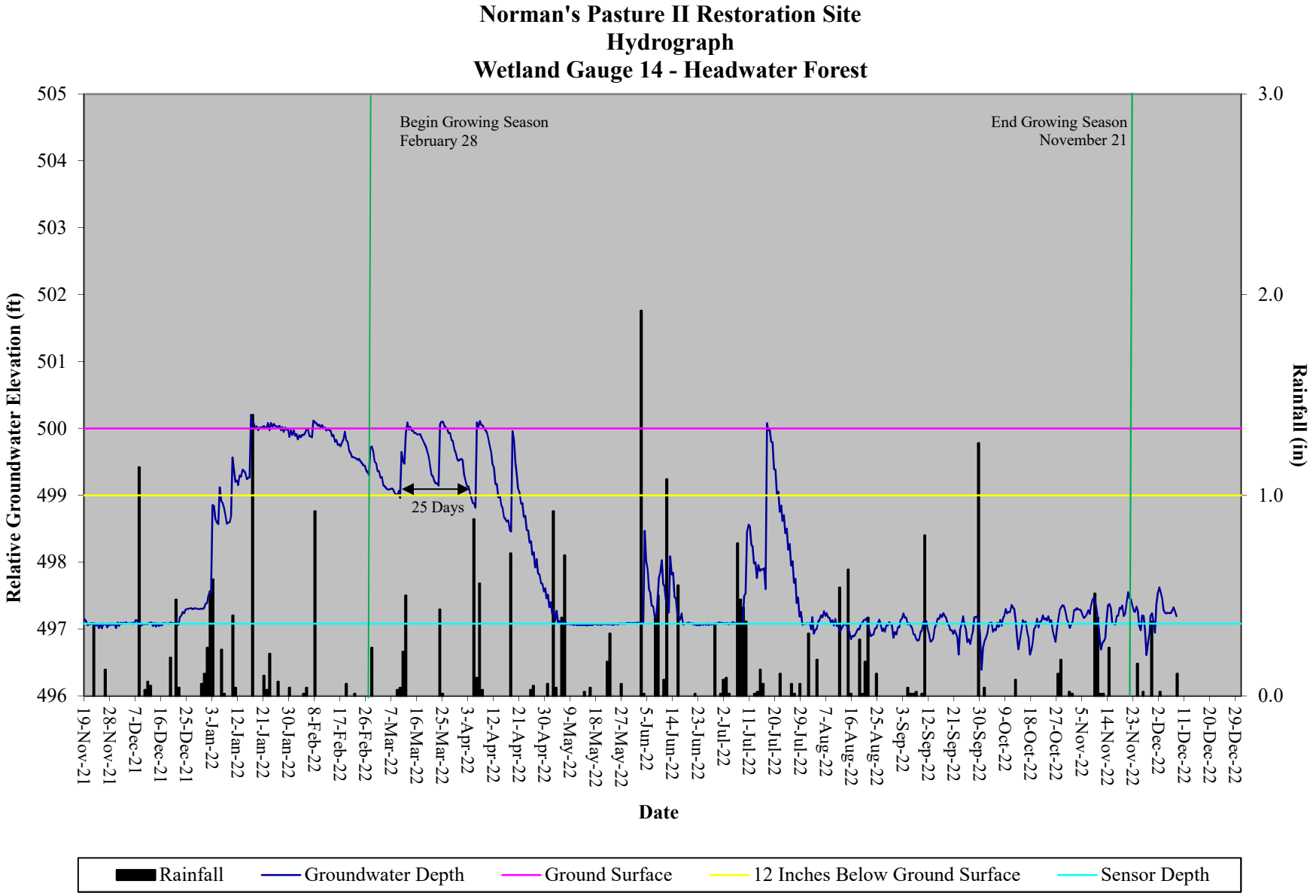
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Rainfall
Sensor Depth
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface


Norman's Pasture II Restoration Site
Hydrograph
Wetland Gauge 14 - Headwater Forest
Begin Growing Season
February 28
End Growing Season
November 21
25 Days
Relative Groundwater Elevation (ft)
Rainfall (in)
Date
505
504
503
502
501
500
499
498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
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7-Mar-22
16-Mar-22
25-Mar-22
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7-Aug-22
16-Aug-22
25-Aug-22
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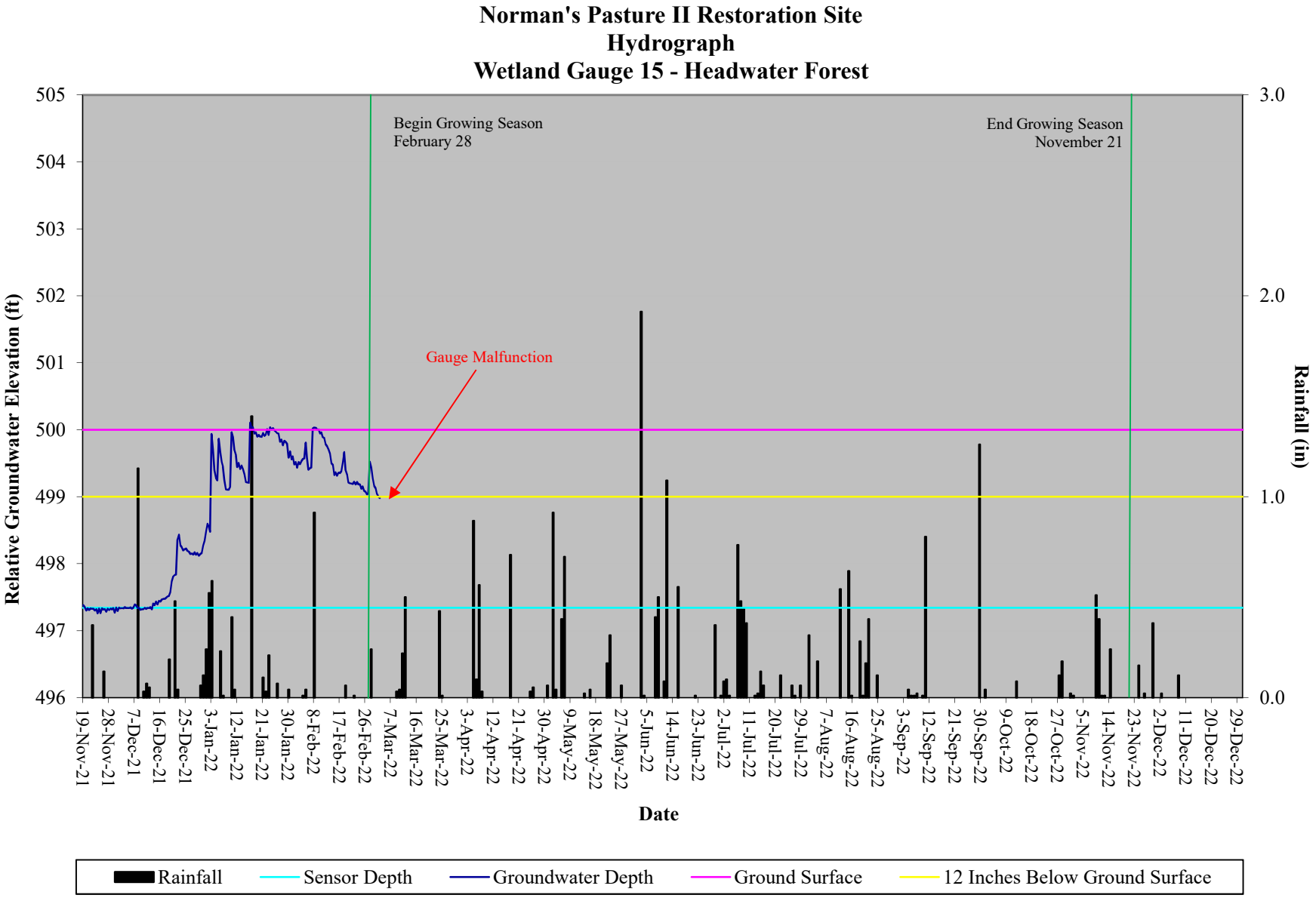
9-Oct-22
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Rainfall
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface
Sensor Depth


Norman's Pasture II Restoration Site
Hydrograph
Wetland Gauge 15 - Headwater Forest
Begin Growing Season
February 28
End Growing Season
November 21
Gauge Malfunction
Relative Groundwater Elevation (ft)
Rainfall (in)
505
504
503
502
501
500
499
498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
17-Feb-22
26-Feb-22
7-Mar-22
16-Mar-22
25-Mar-22
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7-Aug-22
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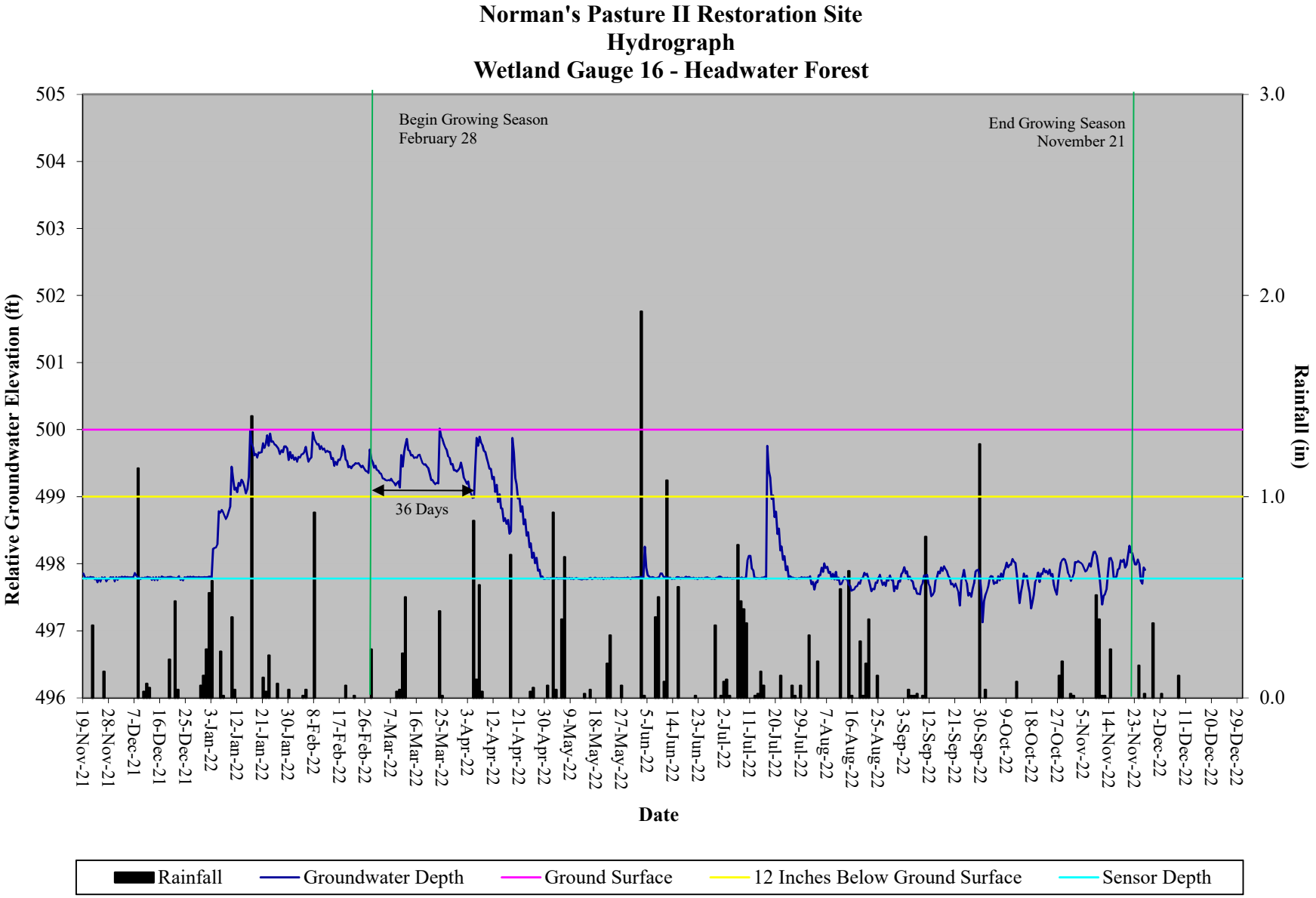
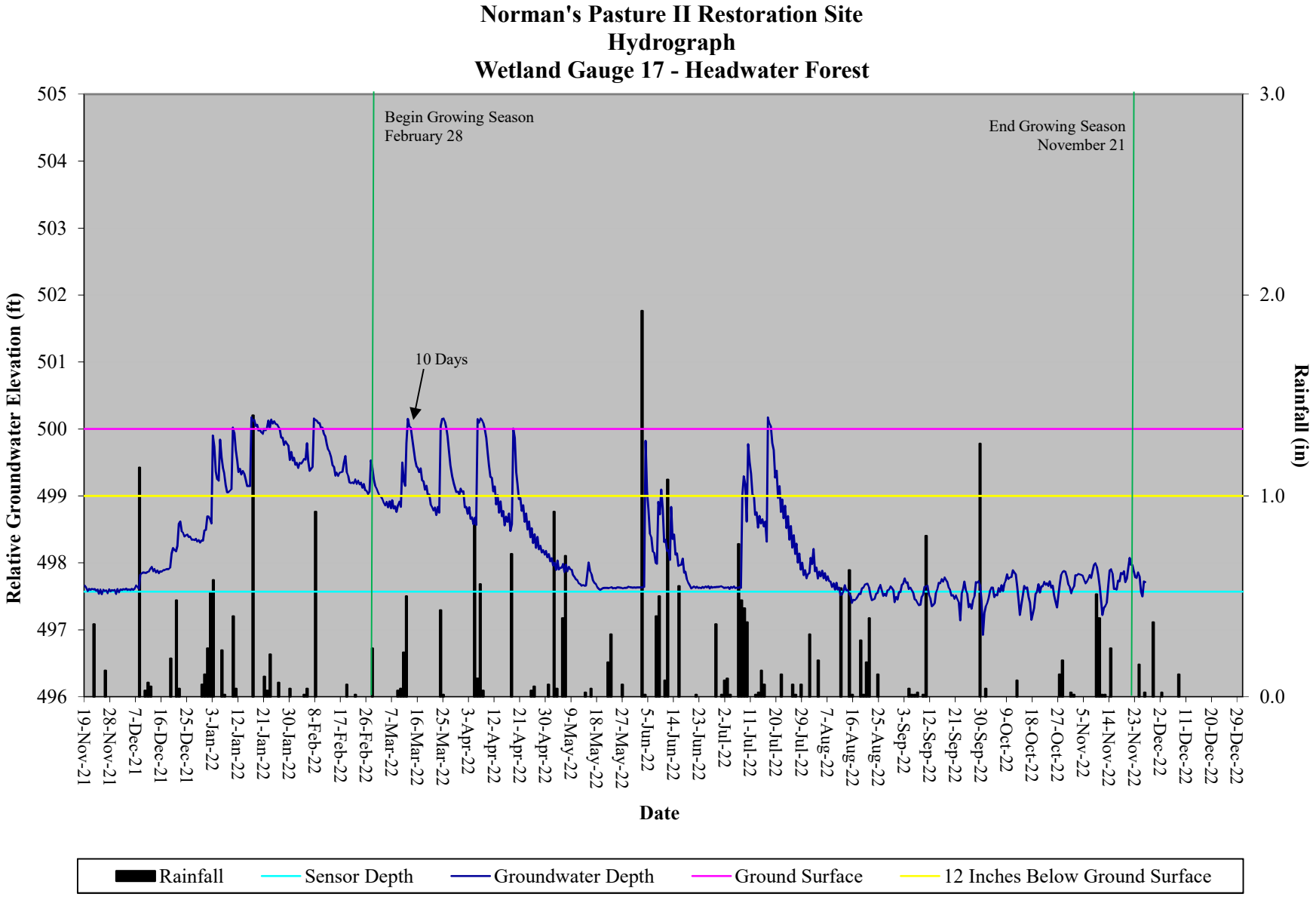
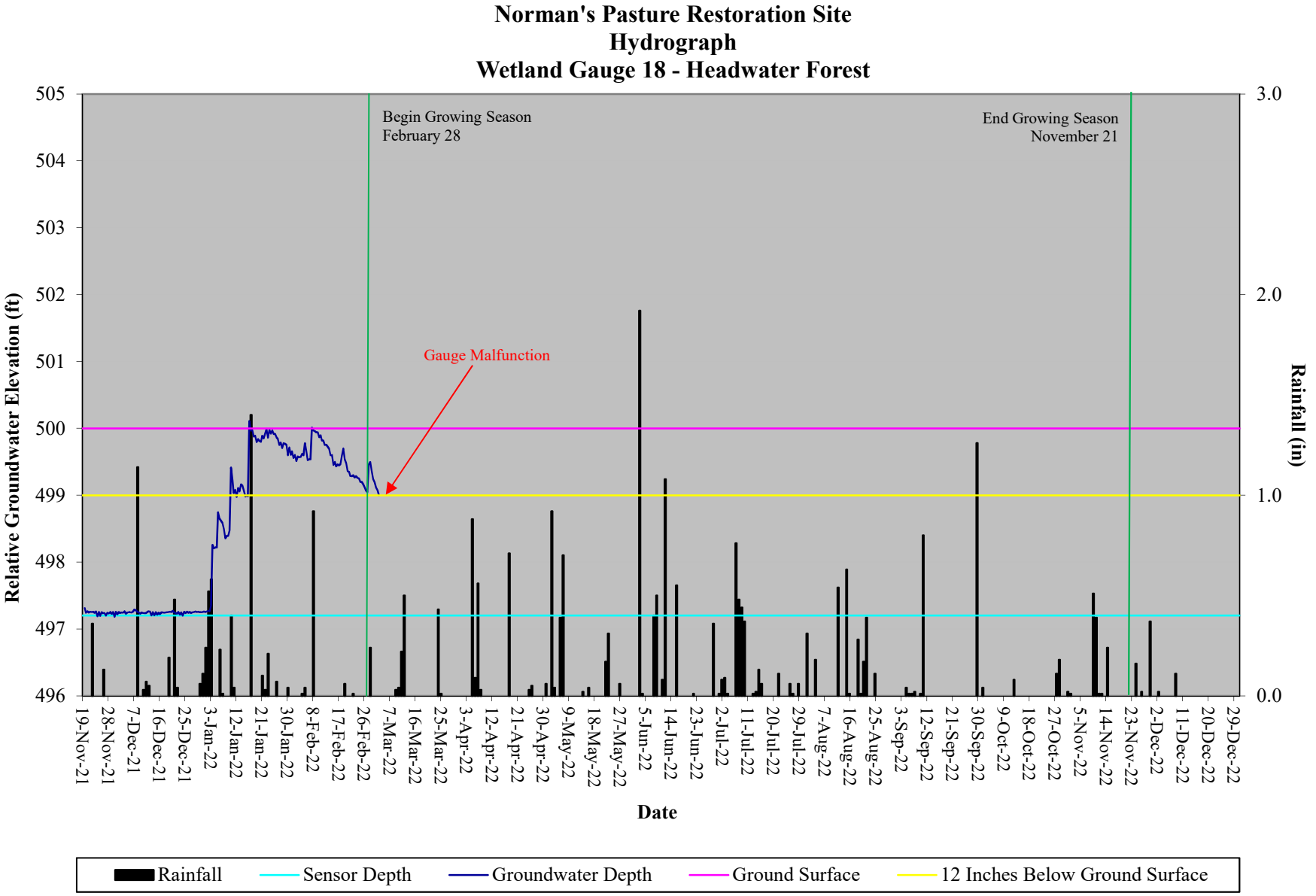
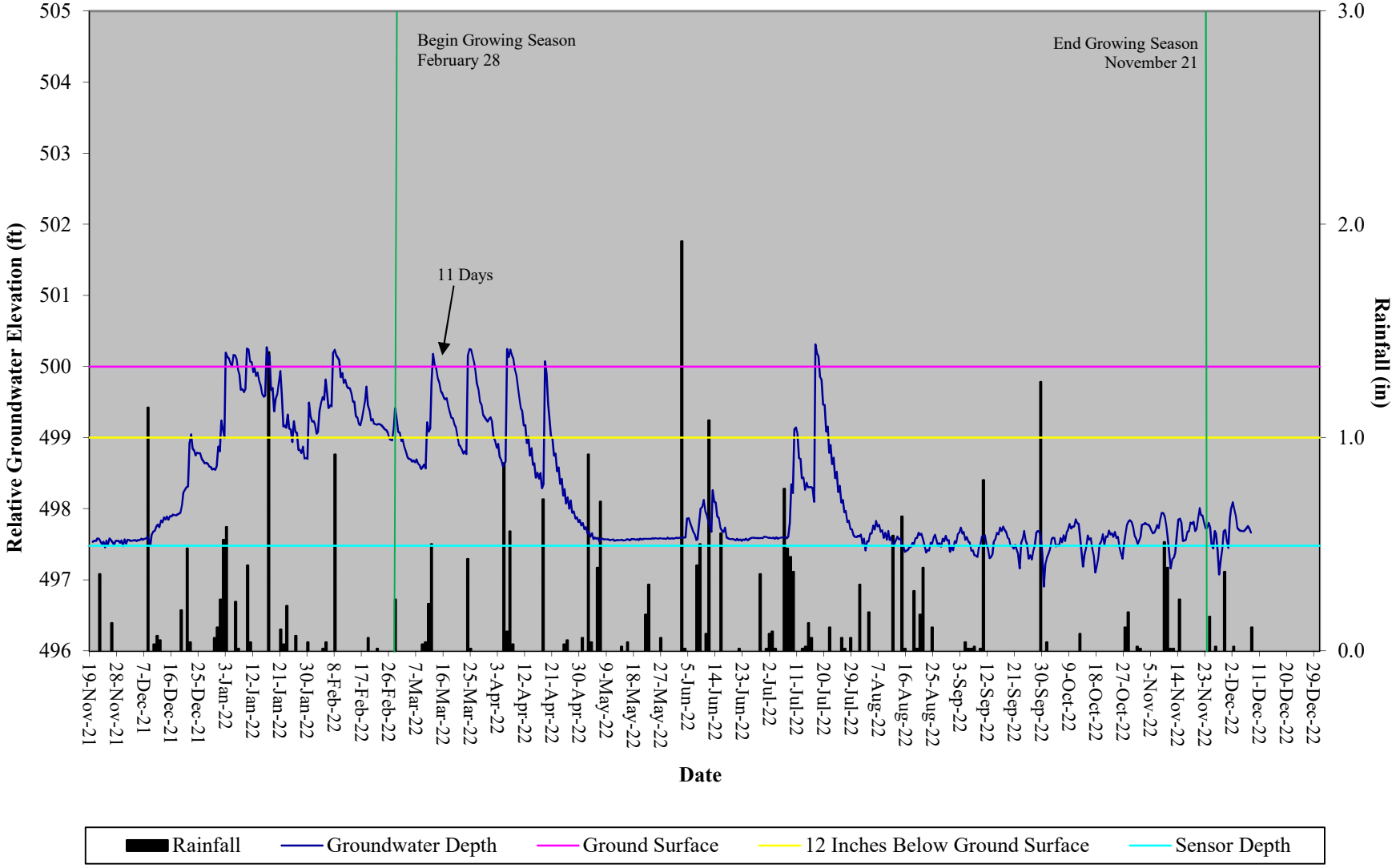
9-Oct-22
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Date
Rainfall
Sensor Depth
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface


Norman's Pasture II Restoration Site
Hydrograph
Wetland Gauge 16 - Headwater Forest
Begin Growing Season
February 28
End Growing Season
November 21
36 Days
Relative Groundwater Elevation (ft)
Rainfall (in)
Date
505
504
503
502
501
500
499
498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
17-Feb-22
26-Feb-22
7-Mar-22
16-Mar-22
25-Mar-22
3-Apr-22
12-Apr-22
21-Apr-22
30-Apr-22
9-May-22
18-May-22
27-May-22
5-Jun-22
14-Jun-22
23-Jun-22
2-Jul-22
11-Jul-22
20-Jul-22
29-Jul-22
7-Aug-22
16-Aug-22
25-Aug-22
3-Sep-22
12-Sep-22
21-Sep-22
30-Sep-22
9-Oct-22
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Rainfall
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface
Sensor Depth


Norman's Pasture II Restoration Site
Hydrograph
Wetland Gauge 17 - Headwater Forest
Begin Growing Season
February 28
End Growing Season
November 21
10 Days
Relative Groundwater Elevation (ft)
Rainfall (in)
Date
505
504
503
502
501
500
499
498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
17-Feb-22
26-Feb-22
7-Mar-22
16-Mar-22
25-Mar-22
3-Apr-22
12-Apr-22
21-Apr-22
30-Apr-22
9-May-22
18-May-22
27-May-22
5-Jun-22
14-Jun-22
23-Jun-22
2-Jul-22
11-Jul-22
20-Jul-22
29-Jul-22
7-Aug-22
16-Aug-22
25-Aug-22
3-Sep-22
12-Sep-22
21-Sep-22
30-Sep-22
9-Oct-22
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Rainfall
Sensor Depth
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface


Norman's Pasture Restoration Site
Hydrograph
Wetland Gauge 18 - Headwater Forest
Begin Growing Season
February 28
End Growing Season
November 21
Gauge Malfunction
Relative Groundwater Elevation (ft)
Rainfall (in)
Date
505
504
503
502
501
500
499
498
497
496
3.0
2.0
1.0
0.0
19-Nov-21
28-Nov-21
7-Dec-21
16-Dec-21
25-Dec-21
3-Jan-22
12-Jan-22
21-Jan-22
30-Jan-22
8-Feb-22
17-Feb-22
26-Feb-22
7-Mar-22
16-Mar-22
25-Mar-22
3-Apr-22
12-Apr-22
21-Apr-22
30-Apr-22
9-May-22
18-May-22
27-May-22
5-Jun-22
14-Jun-22
23-Jun-22
2-Jul-22
11-Jul-22
20-Jul-22
29-Jul-22
7-Aug-22
16-Aug-22
25-Aug-22
3-Sep-22
12-Sep-22
21-Sep-22
30-Sep-22
9-Oct-22
18-Oct-22
27-Oct-22
5-Nov-22
14-Nov-22
23-Nov-22
2-Dec-22
11-Dec-22
20-Dec-22
29-Dec-22
Rainfall
Sensor Depth
Groundwater Depth
Ground Surface
12 Inches Below Ground Surface

Norman's Pasture Restoration Site
Hydrograph
Wetland Gauge C1 - non credit zone



Norman's Pasture Restoration Site
Hydrograph
Wetland Gauge C2 - non-credit zone