

**Bear Basin Restoration Site
Monitoring Report MY08
DMS Project # 95362
DMS Contract # 004741**

**Onslow County, NC
CU# 03030001
DWR# 2013-0456
SAW# 2012-01391**



Submitted to:

[NCDMS, 1652 Mail Service Center, Raleigh, NC 27699-1652](#)

**Construction Completed: February 2015
Data Collection: 2022
Submitted: January 2023**

Monitoring and Design Firm



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KCI Project No: 20122266**

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MONITORING RESULTS

This report represents the eighth year of monitoring at the Bear Basin Wetland Mitigation Site (BBWMS). The eighth year of monitoring was prompted by less than ideal hydrology success in previous monitoring years, especially since MY05 (2019). This was an exceptionally dry year and allowed loblolly pine trees to become established at the site. As the pines began to thrive, they had a negative effect on site hydrology. The adjacent pine plantation, which served as the seed source, has been harvested and the pines on-site were removed in February 2022. Monitoring of the site was extended for an additional year to evaluate the effect of the removal of these pines on the hydrology and vegetation of the site.

VEGETATION MONITORING

The vegetation monitoring plots were not sampled in MY08. In MY07 all seven of the vegetation monitoring plots achieved the success criteria of greater than 210 planted stems/acre, the site averaged 711 planted stems/acre and the average height of the planted stems was 12.3 feet. At the 2022 credit release meeting the IRT requested that KCI sample several transects in the area in which the pines were removed to characterize the vegetation in this area and to ensure that a healthy and diverse overstory was still present. KCI sampled three transects in the area that was treated for pines. These transects were 100 feet in length and were sampled using the point intercept method, with sampling points located at 5 foot intervals. All three transects had greater than 65% cover and at least 4 different species. Across all three transects, 41 individual stems and 11 different species were recorded. The average height across all three transects was 16.3 feet. Overall these transects showed a robust overstory in the areas of pine treatment.

Although the majority of the site has healthy and thriving vegetative cover, there is an area of open water that does not have significant vegetation. Over the course of the year, this area expands and shrinks with the seasons so that it reaches its fullest extent in the winter and its lowest during the summer. This results in areas around the edge that, while inundated during the winter, support vegetation during the summer. Species such as *Juncus effuses*, *Scirpus cyperinus*, *Scirpus atrovirens*, *Carex comosa*, *Carex vulpinodea*, and *Schoenoplectus tabernaemontani* are abundant in these areas. In December 2018, KCI used GPS to map the extent of the area that is inundated to the point of excluding vegetation year round and found it to be 0.87 acres. This area was surveyed again in September 2021 to evaluate whether it had decreased in size as a result of vegetation colonizing the fringes. This survey found the area to be 0.695 acres. It is believed that as the site continues to mature, this area will continue to decrease. On May 8, 2022, KCI planted the entire open water area with live stakes. Approximately 400 live stakes of black willow (*Salix nigra*), silky dogwood (*Cornus amomum*), buttonbush (*Cephalanthus occidentalis*), and sycamore (*Platanus occidentalis*) were planted throughout this area. At a site visit on June 21, 2022, it was noted that many of the live stakes, including almost all of the black willows and buttonbush, had sprouted leaves and were growing. KCI is planning on visiting the site before the 2023 credit release meeting to evaluate the health of these live stakes and get an estimate of the survival of these trees after their first winter in the ground. KCI is proposing a 2:1 credit ratio for the open water area.

HYDROLOGY MONITORING

During the sites first seven years of monitoring, 15 of the 21 credit bearing gauges, and 1 of the 4 non-credit bearing gauges achieved the success criteria of 8% continuous saturation (20 days) during the growing season in at least 50% of the years that they were installed.

The daily rainfall data was obtained from a local weather station in Jacksonville, NC; provided by the NC State Climate Office. In 2022, the months of March, August, and September experienced average rainfall. January, February, April, May, June, October, and November experienced below average rainfall while only July recorded above average rainfall. Overall the site experienced below average rainfall in 2022. The Palmer Drought Severity Index (PDSI), as compiled by the USACE's Antecedent Precipitation Tool (APT) further backs up this analysis. According to the PDSI, the site spent 10% of the year in mild drought, 50% of the year in moderate drought, and 40% of the year in severe drought.

During the site's eighth growing season, 8 of the 21 credit bearing gauges achieved the success criteria. The low rate of success that these gauges achieved is a result of the abnormally low rainfall that the site received in 2022 and does not reflect a "typical year".

SOIL MONITORING

The majority of the gauges that have not met the success criteria in more than 50% of the years that they were installed are located near the western edge of the site. This area of the site is bordered by a large ditch that was not filled in as part of the project because it is located on a different parcel than the project. When the mitigation plan was prepared, the potential horizontal drainage influence of this ditch was modeled using Lateral Effect and determined to be 85 feet. It was assumed that other on-site modifications, such as filling other ditches and surface roughening, would increase the surface and groundwater across the entire site and decrease the effect of this ditch. For this reason, the non-credit bearing area associated with this ditch was set at half of the area of influence of this ditch (42.5 feet from the ditch). Based on the data obtained from the gauges during monitoring, it was determined that the extent of influence of this ditch was greater than originally estimated. To determine the exact extent of the area of influence of this ditch, an analysis of the soils and vegetation in this area was completed on December 5, 2022. This analysis also looked at the area around Gauge 4, which has only achieved the success criteria in 2 of the 8 years that it has been installed. This analysis identified the soils on the site as having a dark mineral surface underlain by a lighter E or Bt horizon, consistent with the site's mapped soil series of Stallings and Rains. In areas of the site that had consistently meet the hydrologic success criteria, this Bt horizon generally began at a shallower depth, had a lower chroma, and showed stronger evidence of redoximorphic features than in areas that had failed to meet the success criteria consistently. F3 – Depleted Matrix and A11 – Depleted Below Dark Surface were the predominant hydric soil indicator used during this delineation. There were also some areas of A12 – Thick Dark Surface, but in general, areas with thick dark surfaces failed to meet the chroma or redox requirements for the underlying layer that this indicator requires. A representative description of both soil types is presented in Appendix A – Visual Assessment Data. After identifying the main difference between the "wet" and "dry" soils, a detailed delineation of the extent of each was completed in the areas that had shown less than ideal hydrology. Based on this analysis, 0.642 acres have been designated as low performing hydrology areas and KCI is proposing to remove these areas from crediting.

CONCLUSION

While the site hydrology has been below the success criteria in the areas as described above and there is an area of open water that is not ideal, this restoration site brings significant wetland functions back to this system and this part of the river basin. The open water and variable hydrology wetlands create a complex habitat with varied niches throughout the site. While some of the gauge data did not meet the hydrology success criteria, there were many years that some gauges were close to achieving. Additionally, one of the gauges in a non-credit area (Gauge 12) routinely met the success criteria, indicating that some non-credit portions of the site may have achieved wetland hydrology. This site also placed some adjacent non-credit upland acreage into the conservation easement that has developed into a diverse well vegetated buffer to the wetlands on-site. For these reasons, and as documented above, KCI would like to close out the low hydrology and open water areas at a 2:1 ratio.

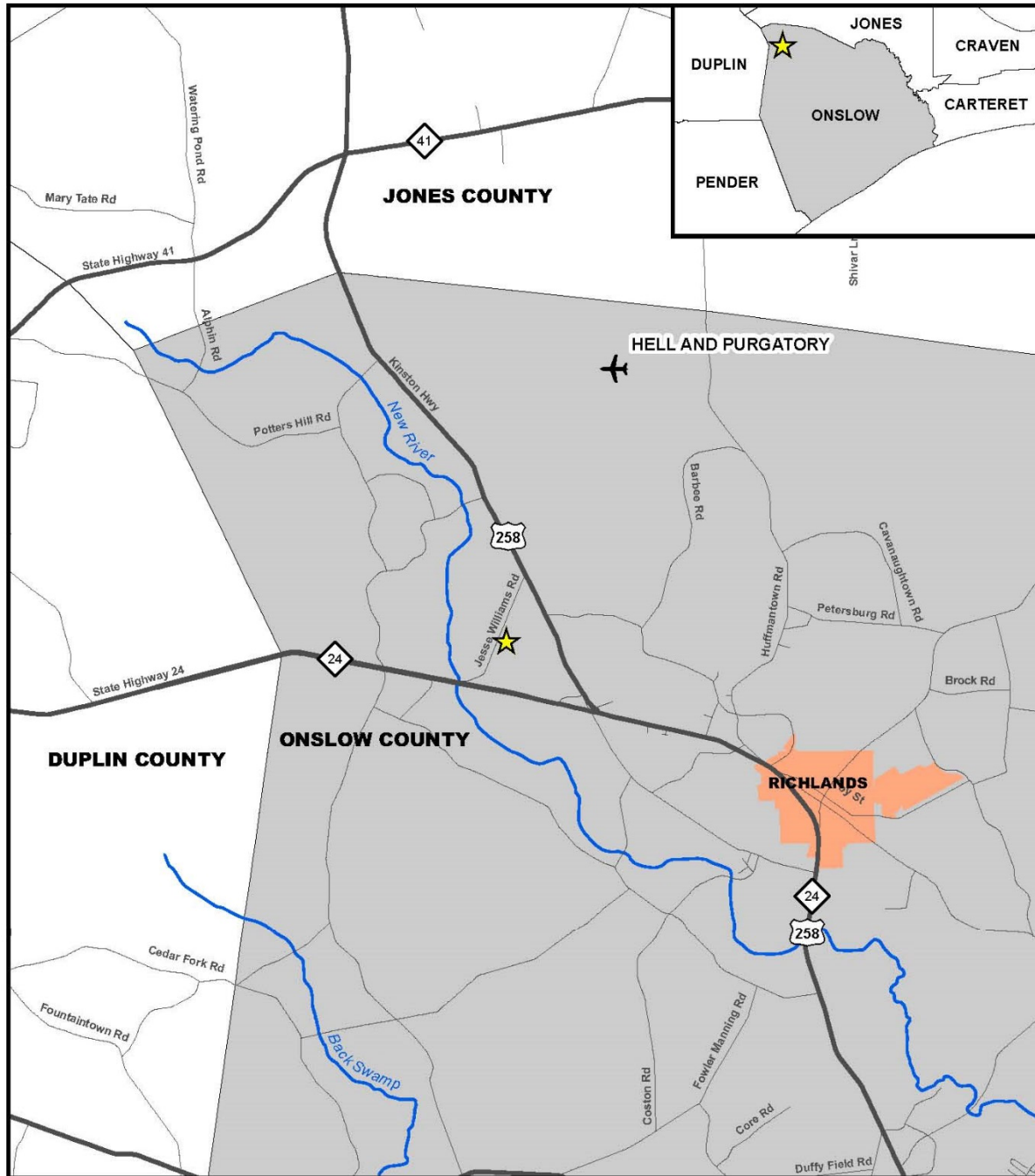


Figure 1. Vicinity Map



Table 1. Project Assets									
Project Number and Name: 95362 – Bear Basin Restoration Site									
Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Acres	-	-	-	-	8.600	-	-	-	-
Credits	-	-	-	-	7.611	-	-	-	-
TOTAL CREDITS	-		-		7.611		-	-	-
Project Components									
Project Component -or- Reach ID	Stationing/ Location		Restoration Footage or Acreage		Approach (PI, PII etc.)		Restoration -or- Restoration Equivalent	Credits	Mitigation Ratio
Wetland Area	-		7.263 acres		-		Restoration	7.263	1:1
Open Water Area	-		0.695		-		Restoration	0.348	2:1
Low Performing Hydrology Area	-		0.642		-		Restoration	N/A	N/A
Component Summation									
Restoration Level	Stream (linear feet)		Riparian Wetland (acres)		Non-riparian Wetland (acres)		Buffer (square feet)	Upland (acres)	
			Riverine	Non-Riverine					
Restoration	-		-	-	8.6 acres		-	-	
Enhancement			-	-	-		-	-	
Enhancement I	-								
Enhancement II	-								
Creation			-	-	-			-	
Preservation	-		-	-	-			1.9 acres	
High Quality Preservation	-		-	-	-			-	
TOTAL	-		-	-	8.6 acres			1.9 acres	

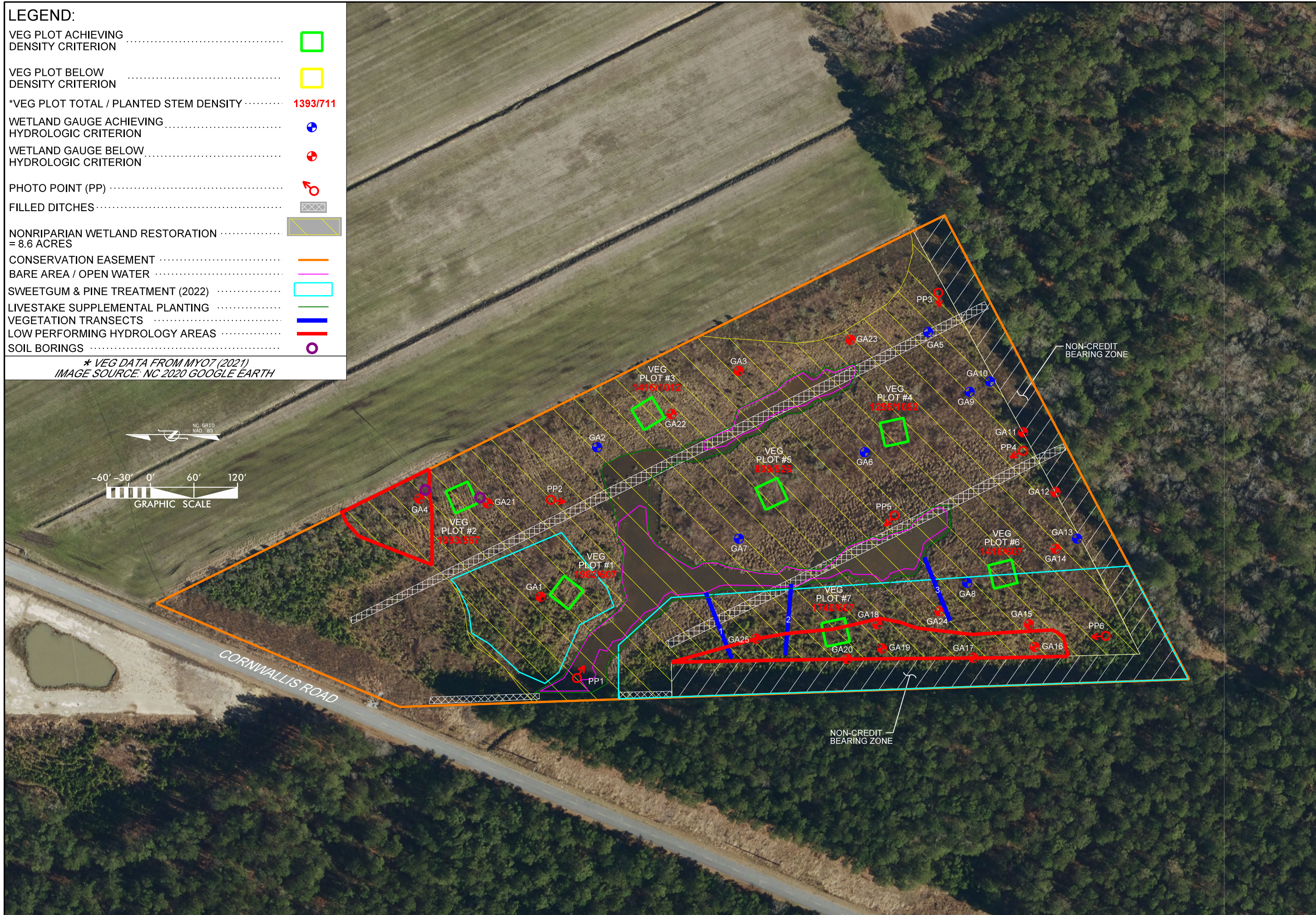
Appendix A

Visual Assessment Data

LEGEND:

- VEG PLOT ACHIEVING DENSITY CRITERION □
- VEG PLOT BELOW DENSITY CRITERION □
- *VEG PLOT TOTAL / PLANTED STEM DENSITY 1393/711
- WETLAND GAUGE ACHIEVING HYDROLOGIC CRITERION ●
- WETLAND GAUGE BELOW HYDROLOGIC CRITERION ●
- PHOTO POINT (PP) ⊕
- FILLED DITCHES
- NONRIPARIAN WETLAND RESTORATION = 8.6 ACRES
- CONSERVATION EASEMENT
- BARE AREA / OPEN WATER
- SWEETGUM & PINE TREATMENT (2022)
- LIVESTAKE SUPPLEMENTAL PLANTING VEGETATION TRANSECTS
- LOW PERFORMING HYDROLOGY AREAS
- SOIL BORINGS

** VEG DATA FROM MY07 (2021)
IMAGE SOURCE: NC 2020 GOOGLE EARTH*



	REVISIONS
	DATE
	SYMBOL
	DESCRIPTION
NCDEQ DIVISION OF MITIGATION SERVICES	
KCI ASSOCIATES OF NC ENGINEERS • PLANNERS • SCIENTISTS 4505 FALLS OF NEUSE ROAD RALEIGH, NORTH CAROLINA 27609	
BEAR BASIN RESTORATION SITE DMS PROJECT #95362 RICHLANDS, ONSLOW COUNTY, NORTH CAROLINA MONITORING YEAR 08	
DATE: DEC 2022	
SCALE: GRAPHIC	
CURRENT CONDITION PLAN VIEW	
SHEET 1 OF 1	
FIGURE 3	

Photo Reference Points



PP1 – MY-07 – 9/10/21



PP1 – MY-08 – 12/5/22



PP2 – MY-07 – 9/10/21



PP2 – MY-08 – 12/5/22



PP3 – MY-07 – 9/10/21



PP3 – MY-08 – 12/5/22



PP4 – MY-07 – 9/10/21



PP4 – MY-08 – 12/5/22



PP5 – MY-07 – 9/10/21



PP5 – MY-08 – 12/5/22



PP6 – MY-07 – 9/10/21



PP6 – MY-08 – 12/5/22



SOIL PROFILE DESCRIPTION

Client: KCI Associates of North Carolina, P.A. **Date:** December 5, 2022
Project: Bear Basin **Project #:** 95362
County: Onslow **State:** NC
Location: Representative Dry Soil **Site/Lot:** GW-4
Soil Series: Stallings Loamy Fine Sand
Soil Classification: Coarse-loamy, siliceous, semiactive, thermic Aeric Paleaquults
AWT: >24" **SHWT:** 16" **Slope:** 0-2% **Aspect:** Concave
Elevation: ~70' **Drainage:** Somewhat poorly drained **Permeability:** Moderate
Vegetation: Planted non-raiparian wetland vegetation

Borings terminated at 24 **Inches**

HORIZON	DEPTH (IN)	MATRIX	MOTTLES	PERCENTAGE	LOCATION	TEXTURE	STRUCTURE	NOTES
A	0-10	10YR 3/1				sL	2msbk	
E	10-16	2.5Y 7/3	10YR 6/8	10	M	sL	1msbk	
Btg	16-24+	2.5Y 7/1	10YR 6/8	10	M	sc	2msbk	

COMMENTS:

DESCRIBED BY: Tommy Seelinger

DATE: 12/5/2022



SOIL PROFILE DESCRIPTION

Client: KCI Associates of North Carolina, P.A. **Date:** December 5, 2022
Project: Bear Basin **Project #:** 95362
County: Onslow **State:** NC
Location: Representative Wet Soil **Site/Lot:** GW-21
Soil Series: Rains fine sandy loam
Soil Classification: Fine-loamy, siliceous, semiactive, thermic Typic Paleaquults
AWT: >24" **SHWT:** 0" **Slope:** 0-2% **Aspect:** Concave
Elevation: ~70' **Drainage:** Poorly drained **Permeability:** Moderate
Vegetation: Planted non-raiparian wetland vegetation
Borings terminated at 24 **Inches**

HORIZON	DEPTH (IN)	MATRIX	MOTTLES	PERCENTAGE	LOCATION	TEXTURE	STRUCTURE	NOTES
A	0-4	10YR 3/1				sL	2msbk	
AB	4-10	10YR 6/1	10YR 3/1	20	M	scL	2msbk	
			10YR 6/6	5	PL			
Btg1	10-20	10YR 6/1	10YR 6/6	10	M, PL	scL	2msbk	
Btg2	20-24+	10YR 6/1	10YR 6/6	20	M	sc	3msbk	
			2.5YR 4/8	10	M			

COMMENTS:

DESCRIBED BY: Tommy Seelinger

DATE: 12/5/2022

LEGEND:










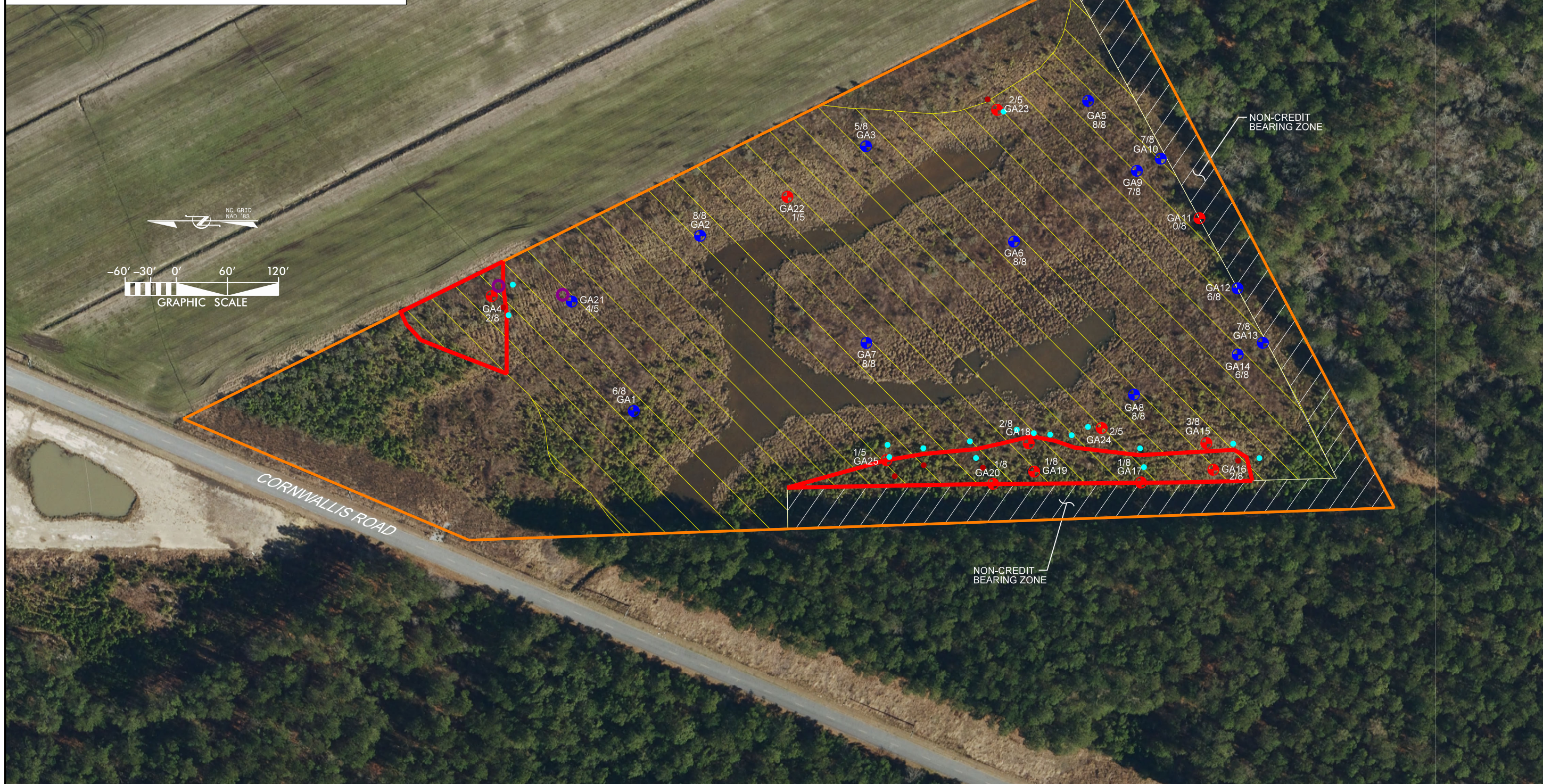
- WETLAND GAUGE ACHIEVING HYDROLOGIC CRITERION 
- WETLAND GAUGE BELOW HYDROLOGIC CRITERION 
- FILLED DITCHES 
- NONRIPARIAN WETLAND RESTORATION = 8.6 ACRES 
- CONSERVATION EASEMENT 
- LOW PERFORMING HYDROLOGY AREAS 
- SOIL DESCRIPTIONS 
- WET SOIL BORINGS 
- DRY SOIL BORINGS 

IMAGE SOURCE: NC 2020 GOOGLE EARTH



REV	DATE	DESCRIPTION	REVISIONS

NCDEQ DIVISION OF
MITIGATION SERVICES

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

BEAR BASIN
RESTORATION SITE
DMS PROJECT #95362
RICHLANDS, ONSLOW COUNTY, NORTH CAROLINA
MONITORING YEAR 08

DATE: DEC 2022
SCALE: GRAPHIC
SOIL BORINGS MAP
SHEET 1 OF 1
FIGURE 3

Appendix B

Vegetation Data

Table 2. CVS Stem Count by Plot and Species																					
DMS Project Code 95362. Project Name: Bear Basin																					
Scientific Name	Common Name	Species Type	Annual Means																		
			MY7 (2021)			MY5 (2019)			MY3 (2017)			MY2 (2016)			MY1 (2015)			MY0 (2015)			
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	
<i>Acer rubrum</i>	red maple	Tree			11			10			2										
<i>Aronia arbutifolia</i>	Red Chokeberry	Shrub	2	2	2	3	3	3	4	4	4	3	3	3	4	4	4	4	4	4	
<i>Baccharis halimifolia</i>	eastern baccharis	Shrub			1			3			1			2							
<i>Betula nigra</i>	river birch	Tree	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
<i>Celtis occidentalis</i>	common hackberry	Tree										1	1	1							
<i>Cephalanthus occidentalis</i>	common buttonbush	Shrub	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	
<i>Diospyros virginiana</i>	common persimmon	Tree	5	5	5	5	5	5	5	5	5	5	5	5	6	6	7	7	7	7	
<i>Fraxinus pennsylvanica</i>	green ash	Tree	7	7	7	8	8	8	8	8	8	8	8	8	7	7	7	8	8	8	
<i>Juglans nigra</i>	black walnut	Tree			2			4			1										
<i>Liquidambar styraciflua</i>	sweetgum	Tree			12			17			9			5							
<i>Liriodendron tulipifera</i>	tuliptree	Tree	5	5	6	7	7	7	13	13	13	9	9	10	10	10	10	15	15	15	
<i>Magnolia virginiana</i>	sweetbay	Tree	8	8	8	8	8	8	8	8	8	7	7	7	6	6	6	5	5	5	
<i>Morella cerifera</i>	wax myrtle	shrub			3			2													
<i>Nyssa biflora</i>	swamp tupelo	Tree	3	3	3	4	4	4	4	4	4	4	4	4							
<i>Pinus taeda</i>	loblolly pine	Tree			84			81			13										
<i>Quercus</i>	oak	Tree							1	1	1	1	1	6	3	3	4	2	2	2	
<i>Quercus laurifolia</i>	laurel oak	Tree	5	5	6	5	5	5													
<i>Quercus nigra</i>	water oak	Tree																1	1	1	
<i>Quercus pagoda</i>	cherrybark oak	Tree	62	62	64	65	65	66	66	66	66	66	66	64	64	68	67	67	67	67	
<i>Quercus phellos</i>	willow oak	Tree	13	13	13	13	13	14	18	18	18	16	16	16	15	15	15	16	16	16	
<i>Salix nigra</i>	black willow	Tree			1			1													
<i>Taxodium distichum</i>	bald cypress	Tree	3	3	3	3	3	3	3	3	3	3	3	1	1	1					
<i>Vaccinium corymbosum</i>	highbush blueberry	Shrub	2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	2	2	
Stem count			123	123	241	131	131	251	141	141	167	133	133	146	125	125	139	134	134	134	
size (ares)			7			7			7			7			7			7			
size (ACRES)			0.17			0.17			0.17			0.17			0.17			0.17			
Species count			13	13	20	13	13	20	13	13	18	14	14	16	12	12	13	12	12	12	
Stems per ACRE			711	711	1,393	757	757	1,451	815	815	965	769	769	844	723	723	804	775	775	775	

Site: Bear Basin

Date: 10/31/2022

Crew: TS

Transect Spacing:

	Point	Species	Height (ft)	Species	Height (ft)	
Transect # 1	5	Betula nigra	18'			
	10	Betula nigra	18'			
	15	N/A				
	Start Cord.	20	Taxodium distichum	12'		
		25	Taxodium distichum	12'	Taxodium distichum	12'
		30	Taxodium distichum	25'		
	Heading	35	Taxodium distichum	25'	Taxodium distichum	30'
		40	Taxodium distichum	25'		
		45	N/A			
	Pt. Spacing 5'	50	N/A			
		55	N/A			
		60	Quercus pagoda	5'		
	Notes	65	Betula nigra	30'		
		70	Betula nigra	30'	Quercus palustris	25'
		75	Quercus palustris	25'	Quercus palustris	10'
		80	Quercus palustris	10'		
		85	Quercus pagoda	12'		
		90	N/A			
		95	Quercus pagoda	10'		
100		Quercus pagoda	10'			
Transect # 2		5	Quercus phellos	12'		
	10	N/A				
	15	Quercus pagoda	15'			
	Start Cord.	20	N/A			
		25	Quercus pagoda	15'		
		30	N/A			
	Heading	35	N/A			
		40	Magnolia virginiana	5'		
		45	N/A			
	Pt. Spacing 5'	50	Quercus pagoda	4'		
		55	N/A			
		60	Quercus pagoda	5'		
	Notes	65	N/A			
		70	Magnolia virginiana	3'	Bachcharis hamilifolia	15'
		75	Morella cerifera	10'	Quercus pagoda	8'
		80	Bachcharis hamilifolia	15'		
		85	Quercus pagoda	15'		
		90	Quercus pagoda	15'	Morella cerifera	10'
		95	Morella cerifera	10'		
100		Liquidambar styraciflua	8'			

Site: Bear Basin

Date: 10/31/2022

Crew: TS

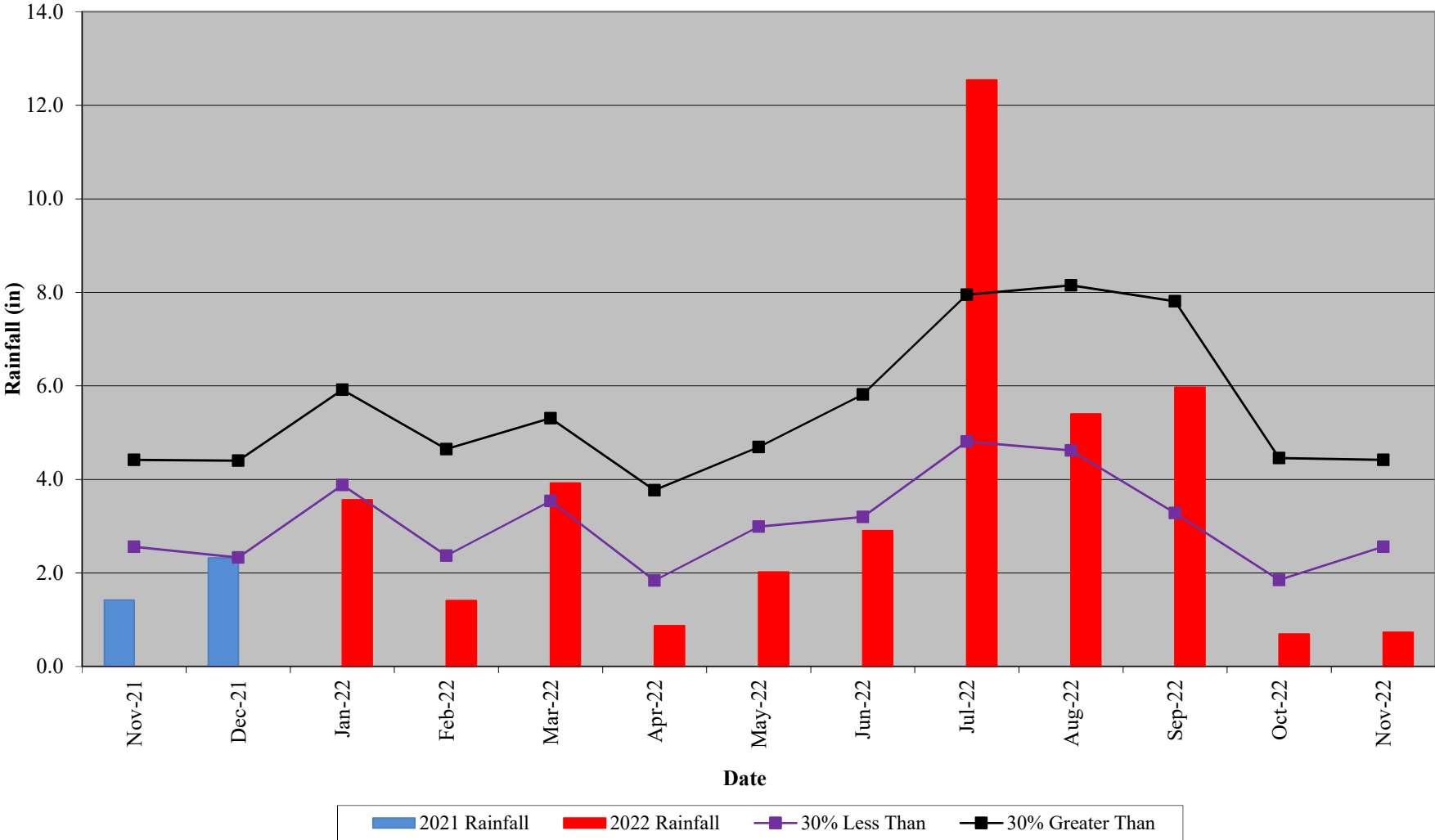
Transect Spacing:

	Point	Species	Height (ft)	Species	Height (ft)
Transect #	5	Salix nigra	9'		
3	10	Salix nigra	6'	Betula nigra	35'
	15	Betula nigra	35'		
Start Cord.	20	Betula nigra	35'		
	25	Betula nigra	35'		
	30	N/A			
Heading	35	Quercus lyrata	20', 20'	Bachcharis hamilifolia	8'
	40	Quercus lyrata	20'	Bachcharis hamilifolia	8', 7'
	45	Quercus lyrata	20'		
Pt. Spacing	50	N/A			
	55	Quercus phellos	10'		
5'	60	Quercus phellos	12'		
	65	Quercus phellos	12'		
Notes	70	Betula nigra	40'		
	75	Betula nigra	40'	Betula nigra	45'
	80	Betula nigra	40'	Taxodium distichum	12'
	85	Betula nigra	40', 45'	Morella cerifera	6'
	90	Betula nigra	45'		
	95	Betula nigra	40'		
	100	Betula nigra	40'	Betula nigra	25'
Transect #	5				
Start Cord.	10				
	15				
	20				
	25				
	30				
Heading	35				
	40				
	45				
Pt. Spacing	50				
	55				
	60				
Notes	65				
	70				
	75				
	80				
	85				
	90				
	95				
	100				

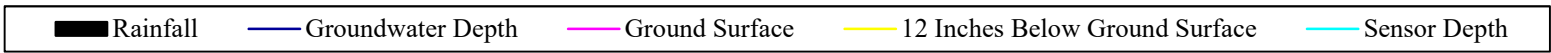
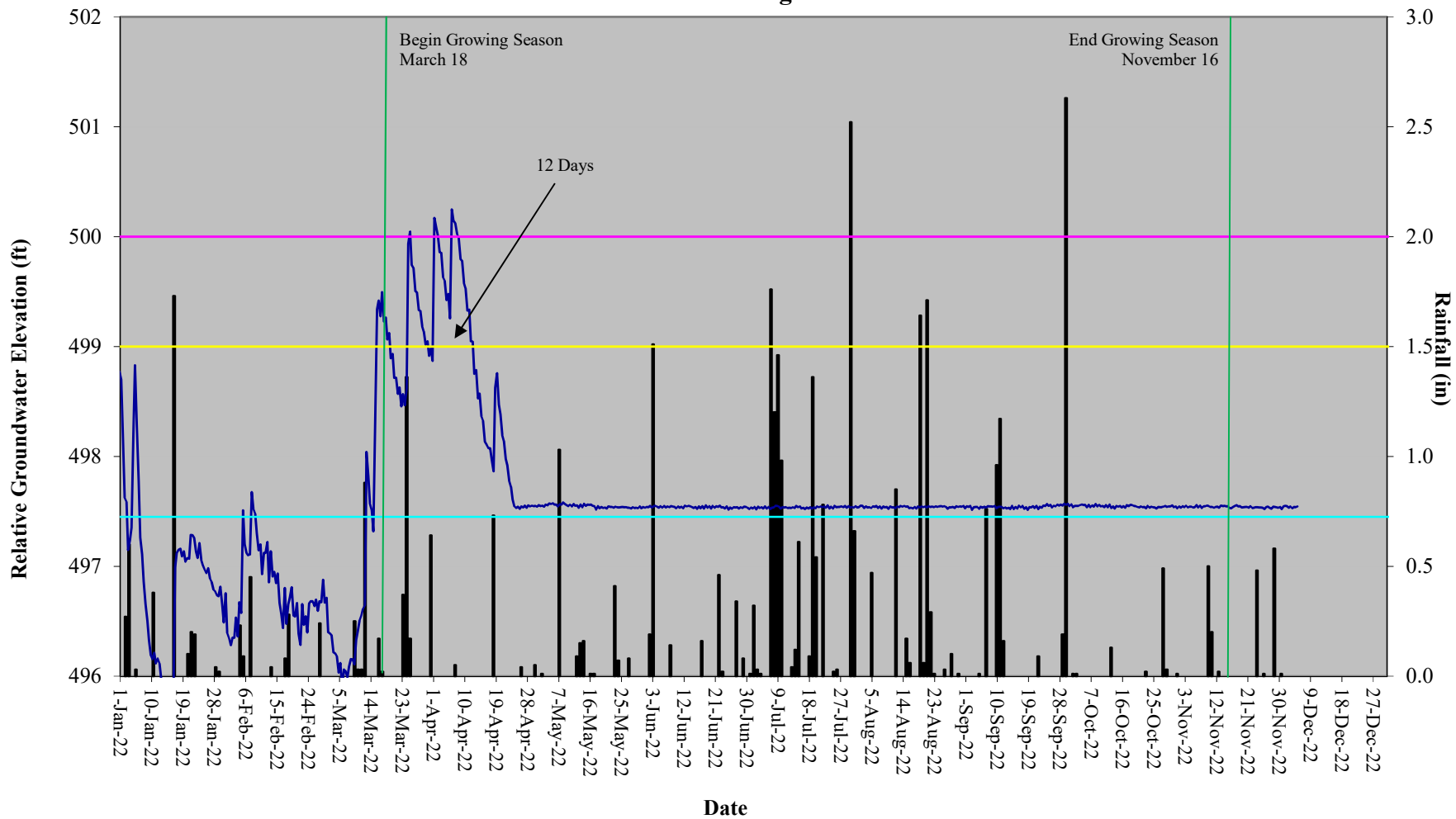
Appendix C

Hydrologic Data

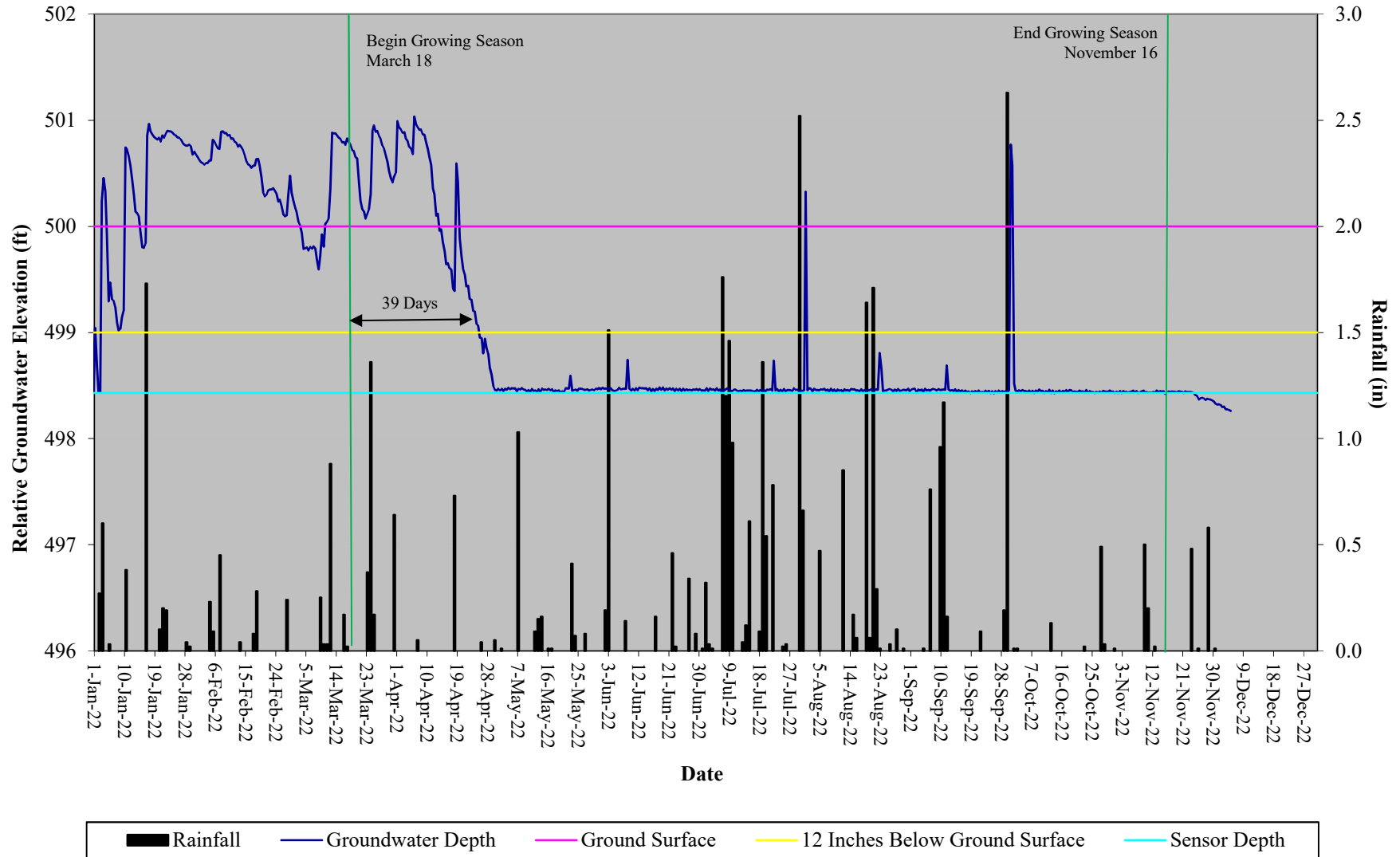
**Bear Basin Wetland Restoration Site
30-70 Percentile Graph
WETS Station Name: Maysville, NC**



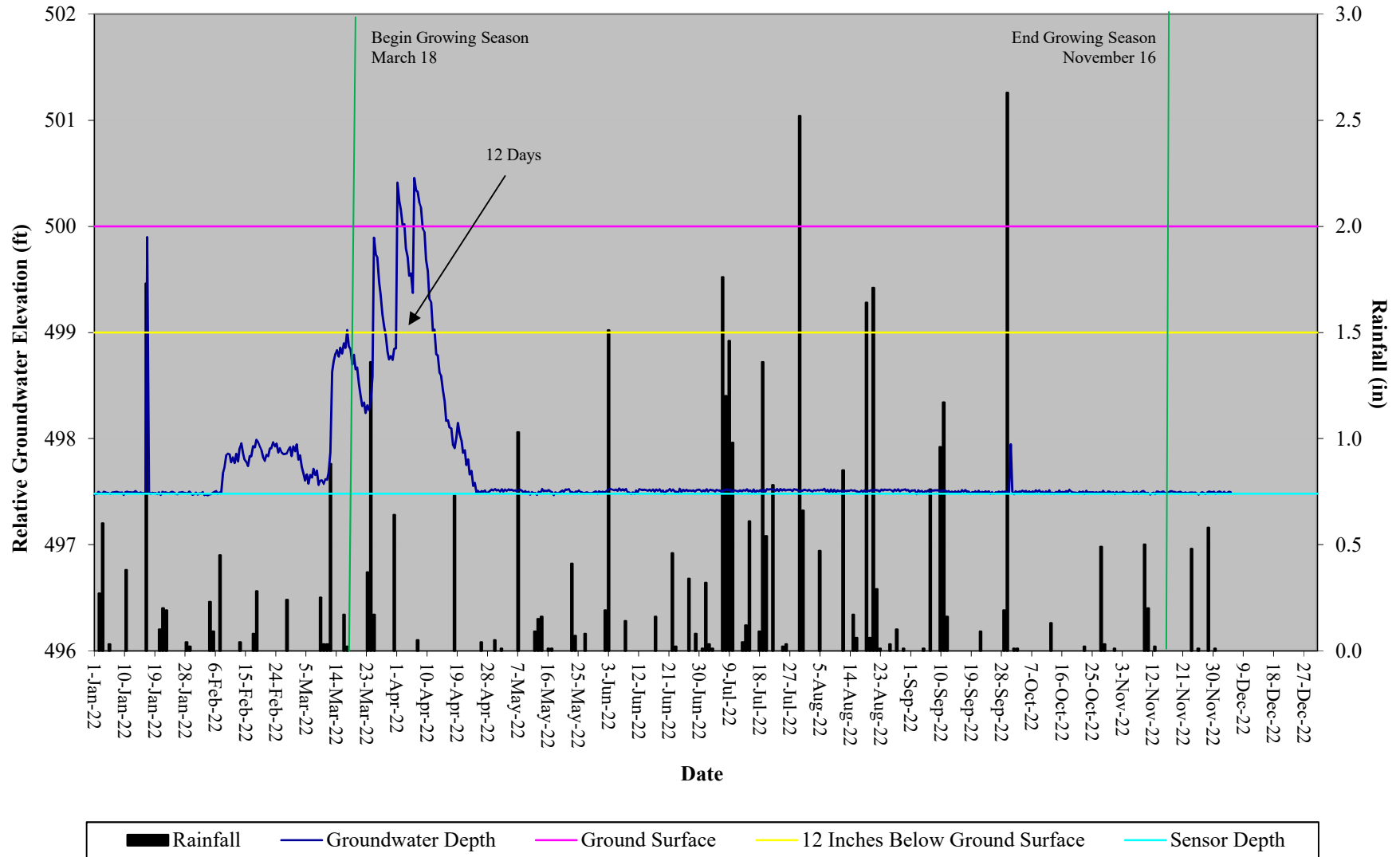
Bear Basin Restoration Site Hydrograph Wetland Gauge 1



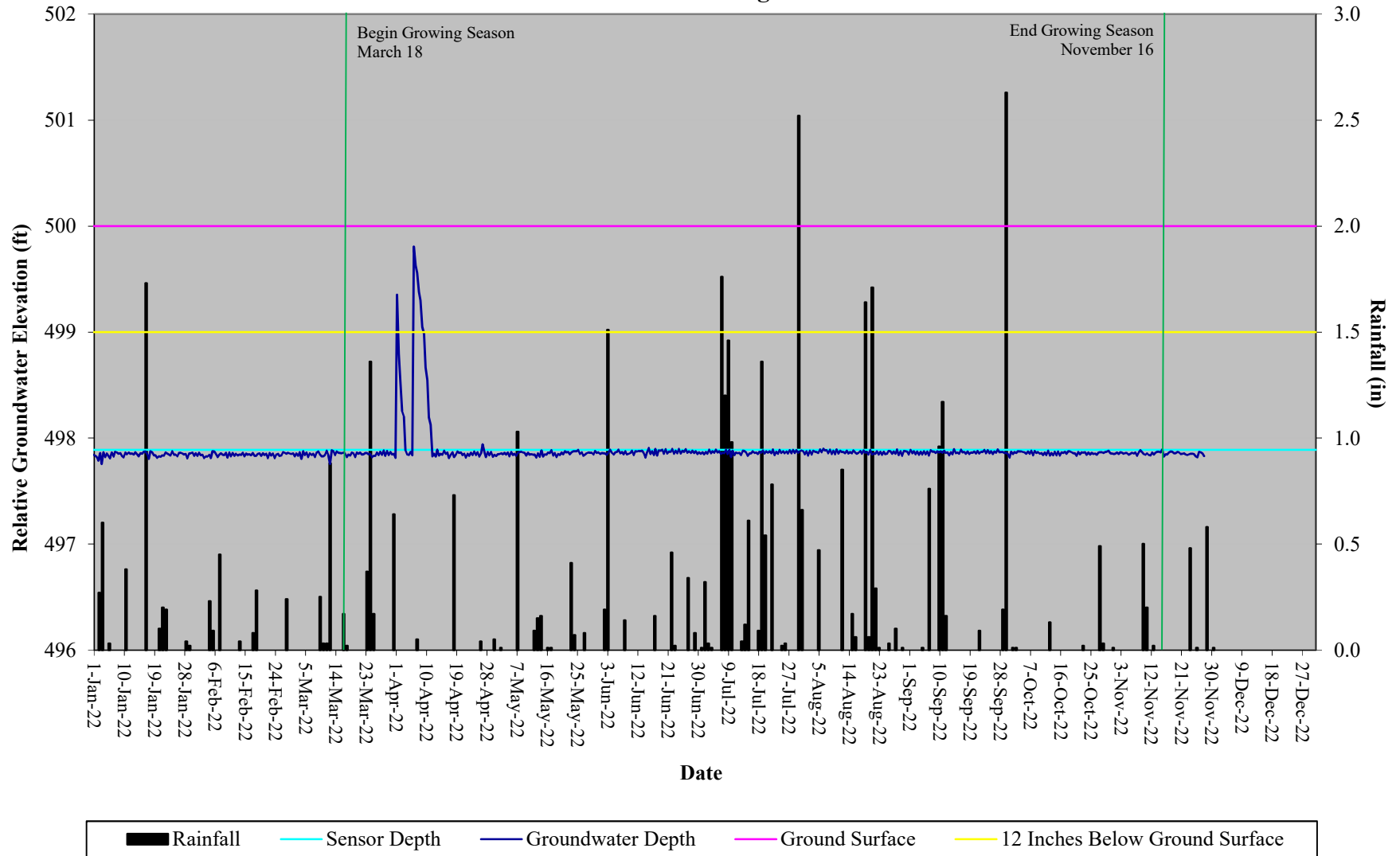
Bear Basin Restoration Site Hydrograph Wetland Gauge 2



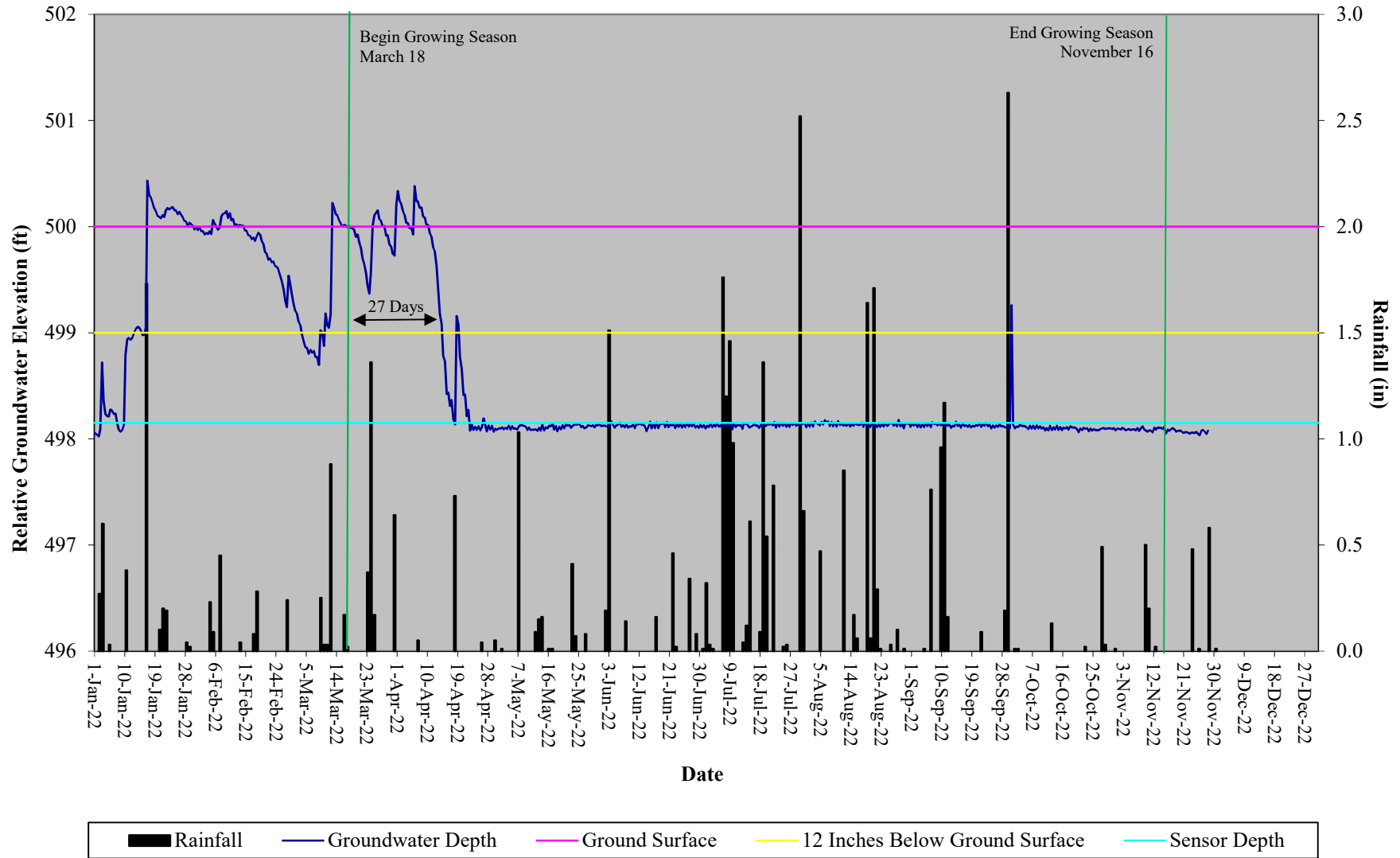
Bear Basin Restoration Site Hydrograph Wetland Gauge 3



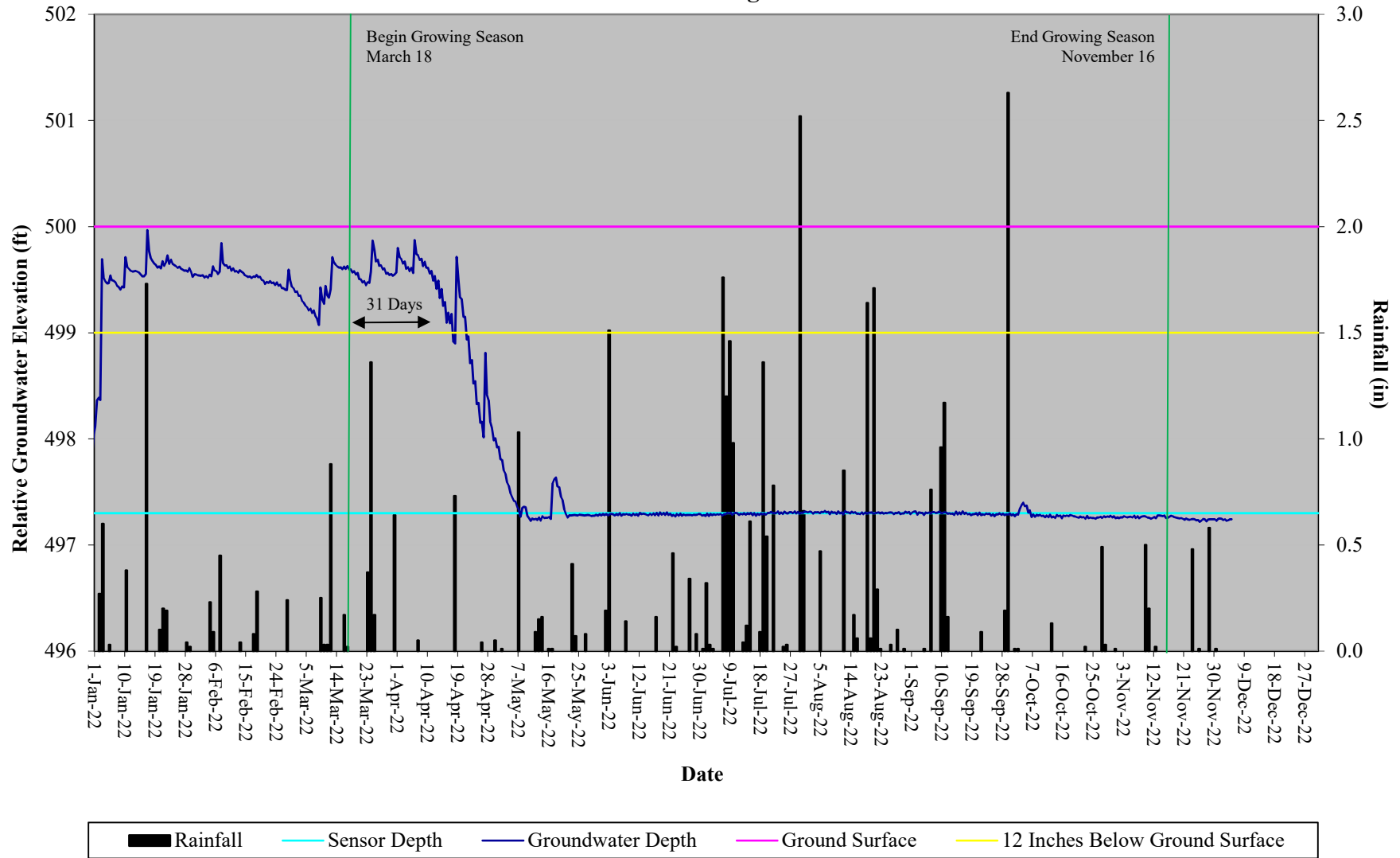
Bear Basin Restoration Site Hydrograph Wetland Gauge 4



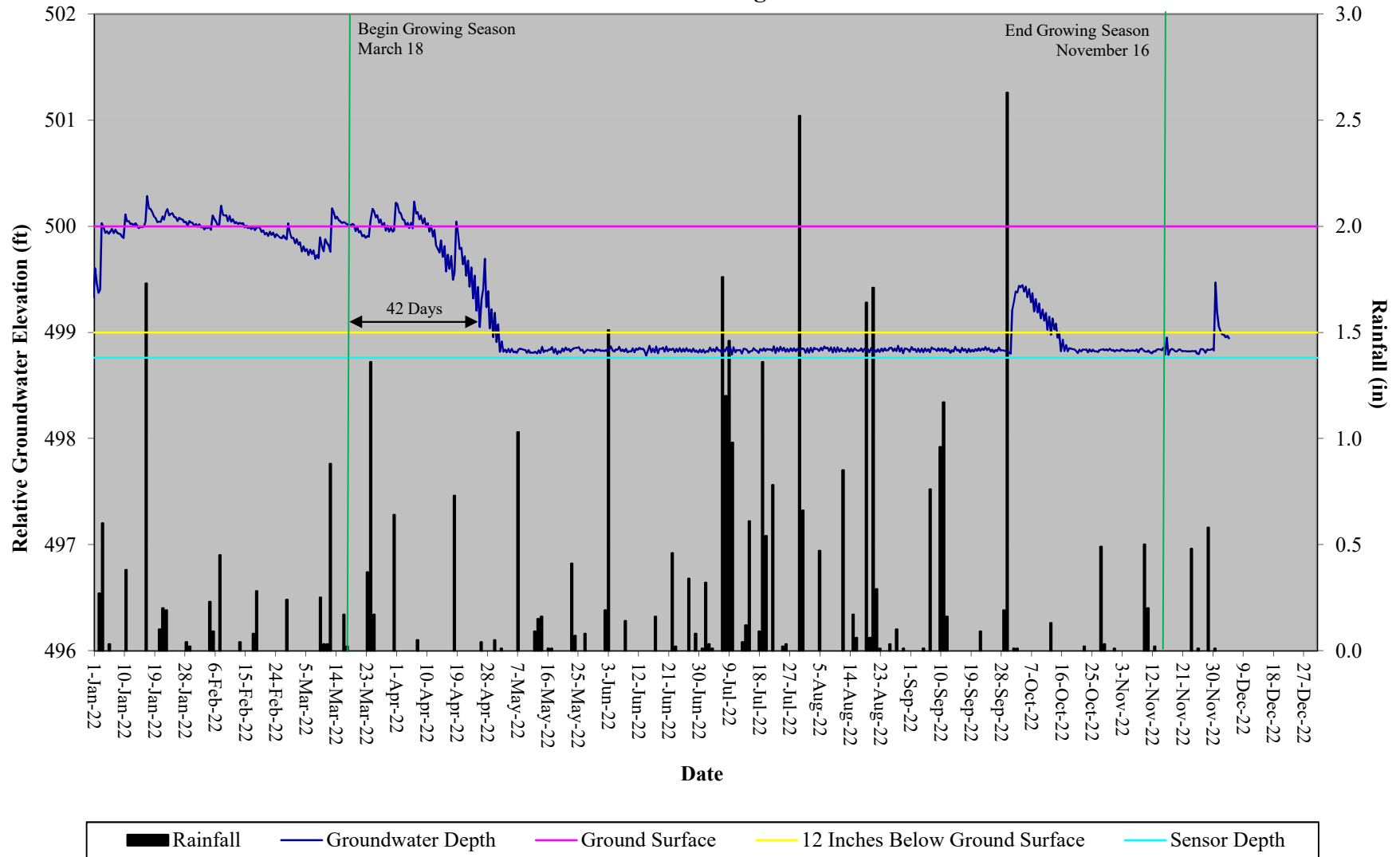
Bear Basin Restoration Site Hydrograph Wetland Gauge 5



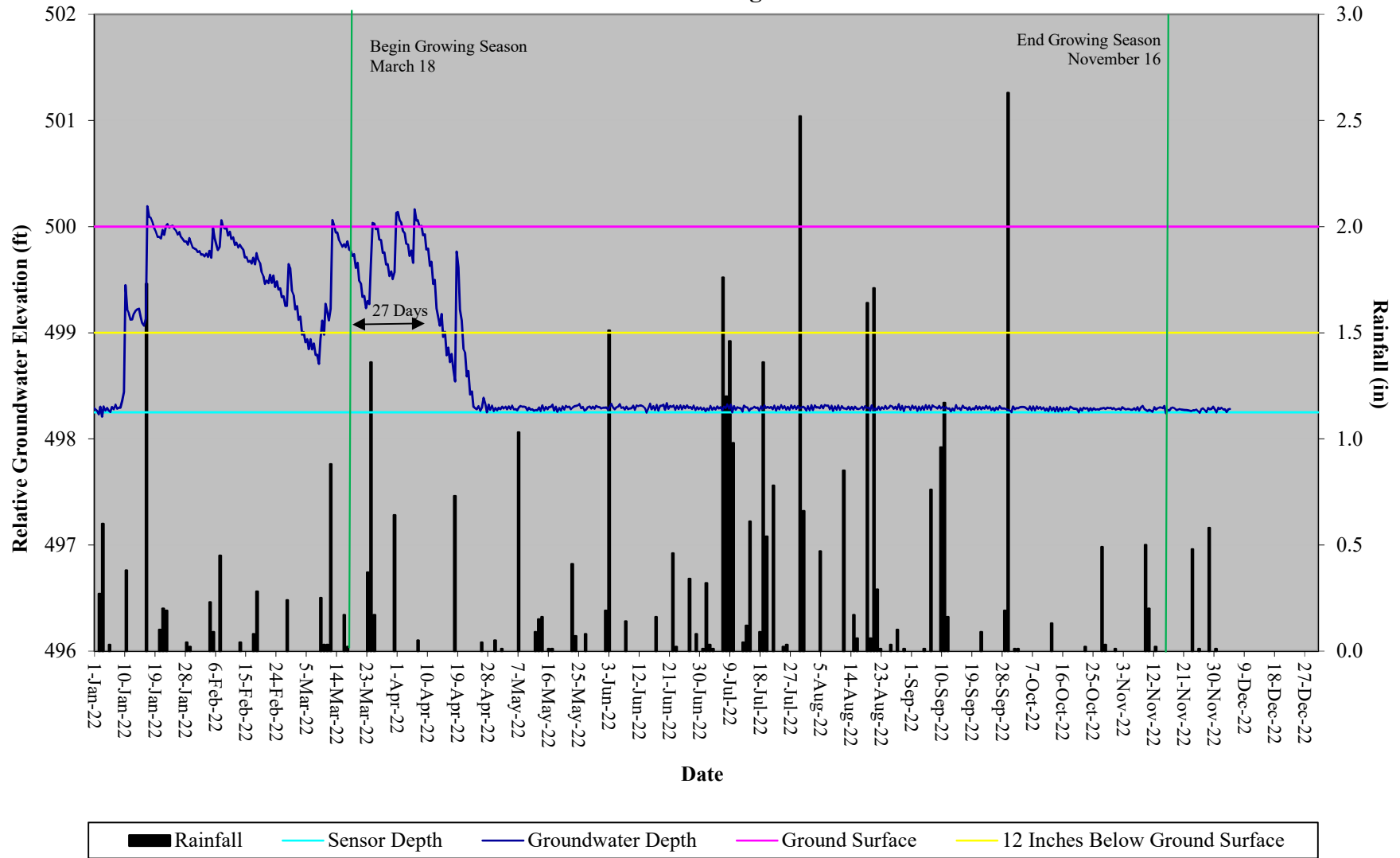
Bear Basin Restoration Site Hydrograph Wetland Gauge 6



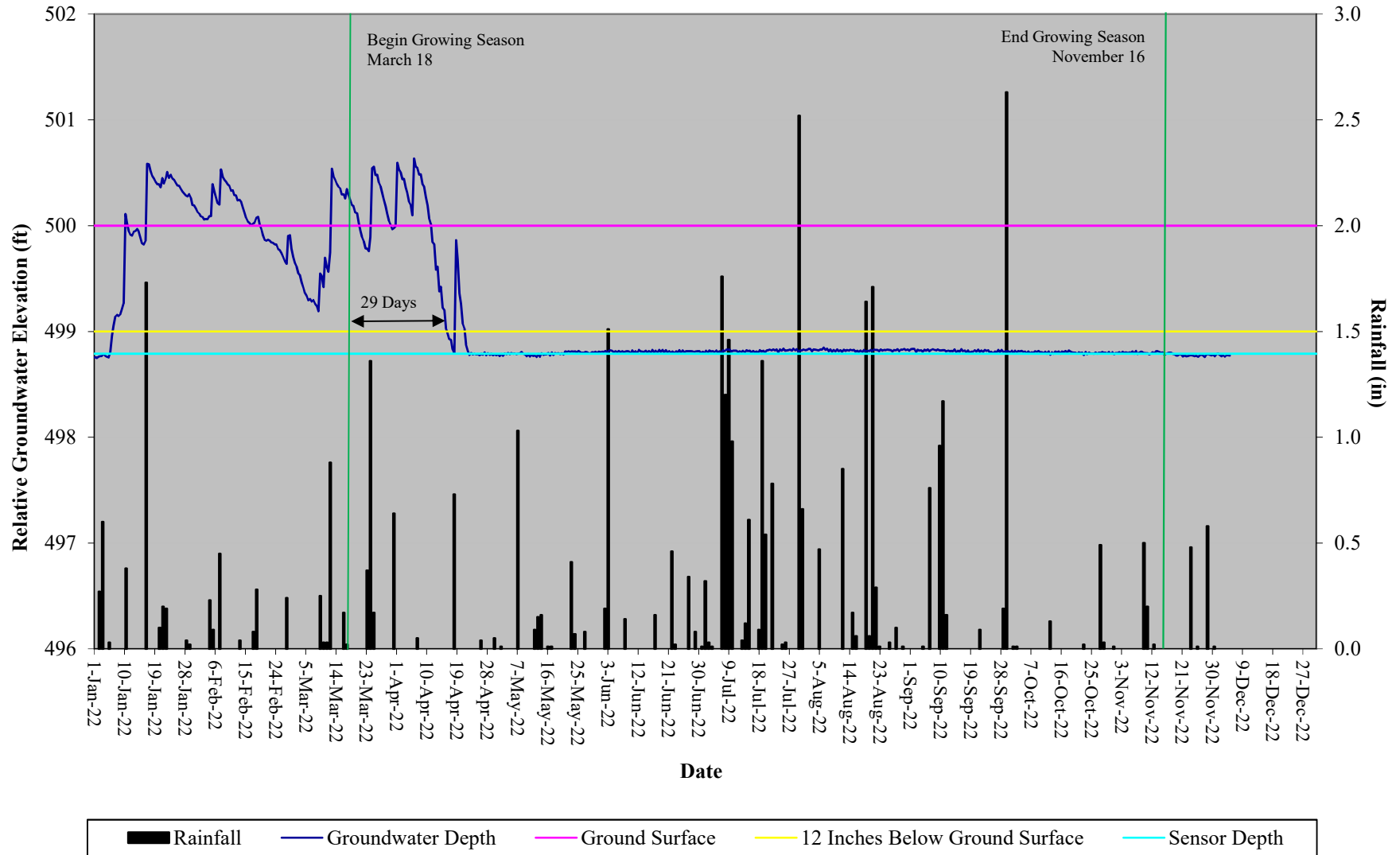
Bear Basin Restoration Site Hydrograph Wetland Gauge 7



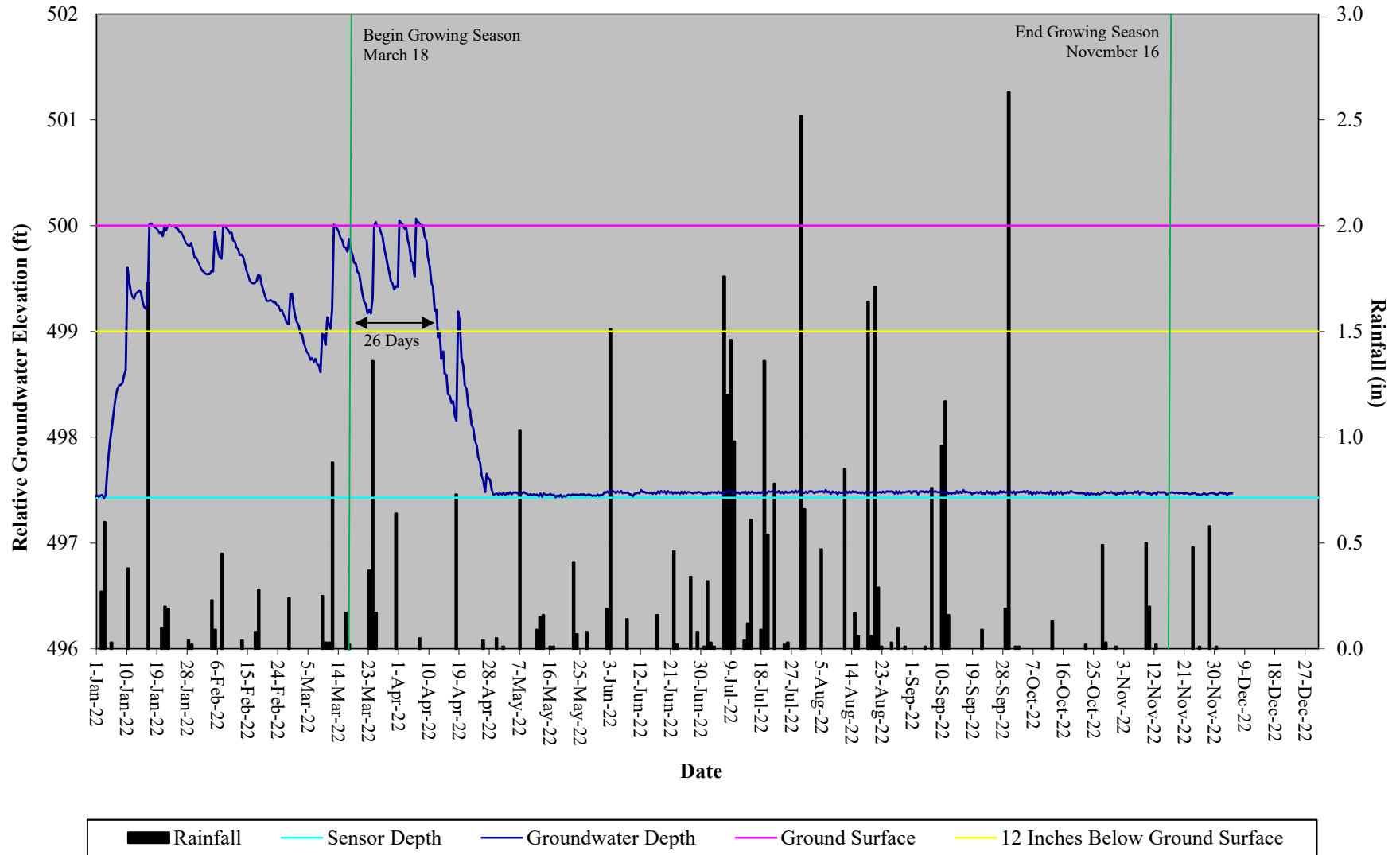
Bear Basin Restoration Site Hydrograph Wetland Gauge 8



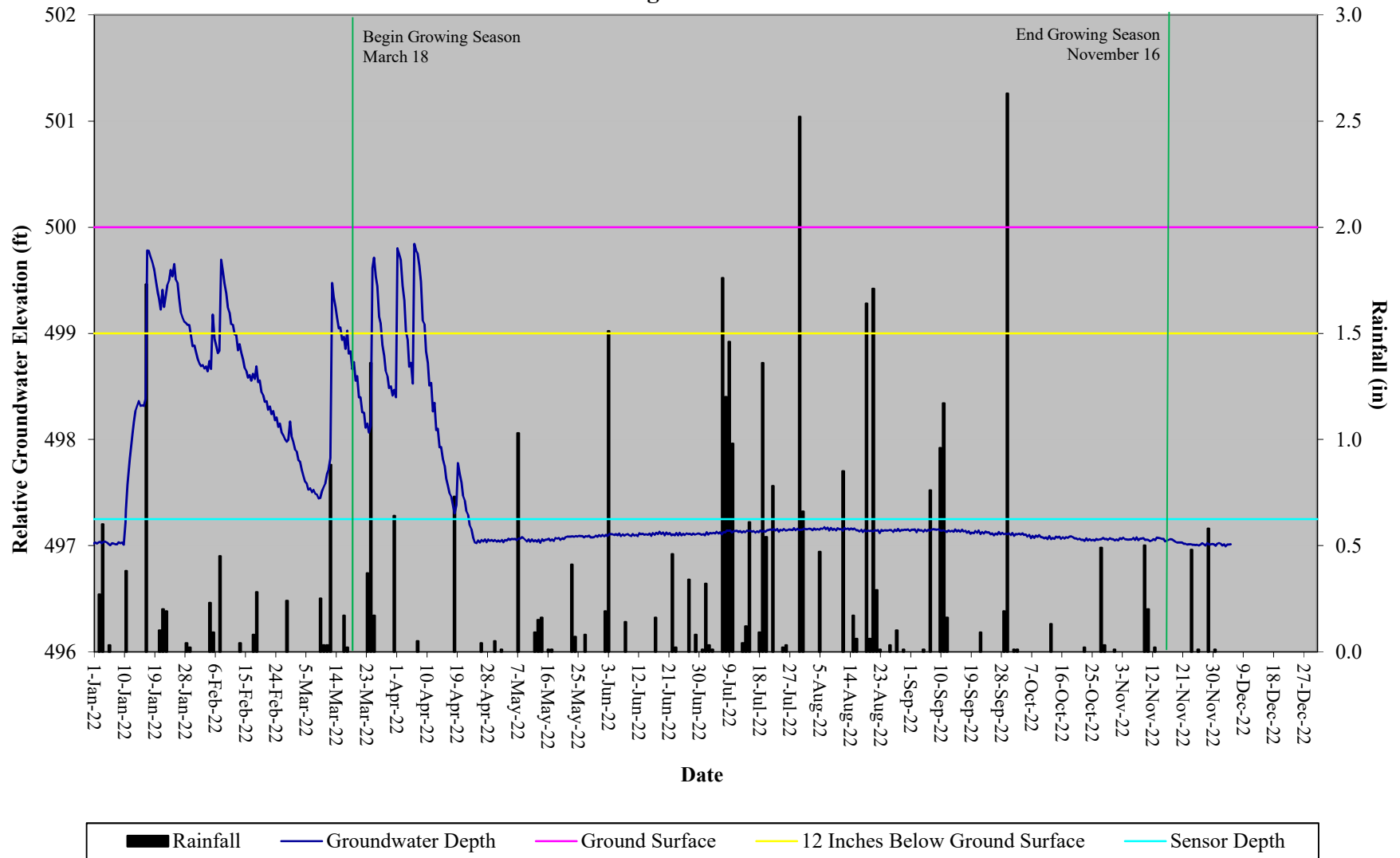
Bear Basin Restoration Site Hydrograph Wetland Gauge 9



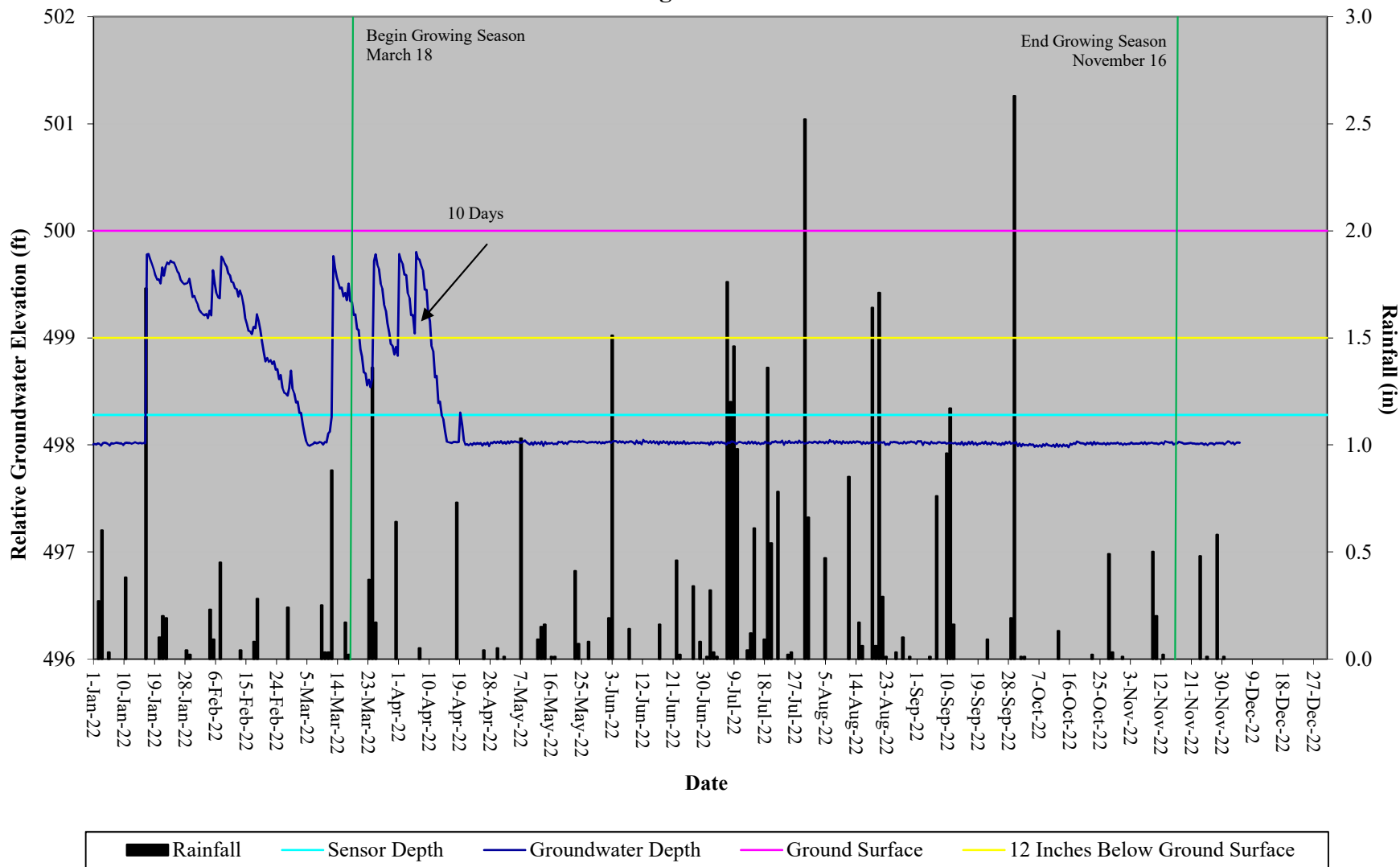
Bear Basin Restoration Site Hydrograph Wetland Gauge 10



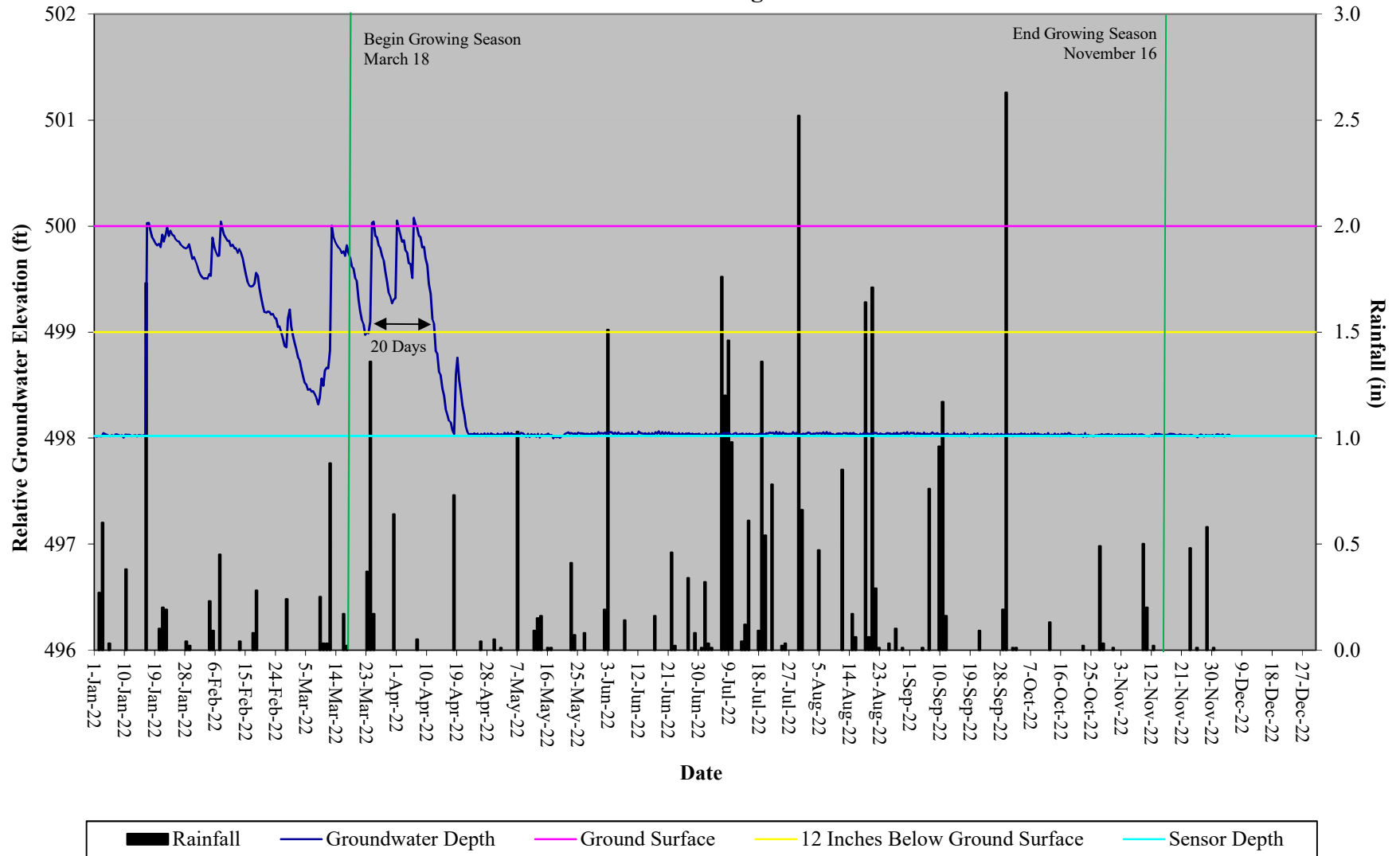
Bear Basin Restoration Site Hydrograph Wetland Gauge 11 - **non-credit zone**



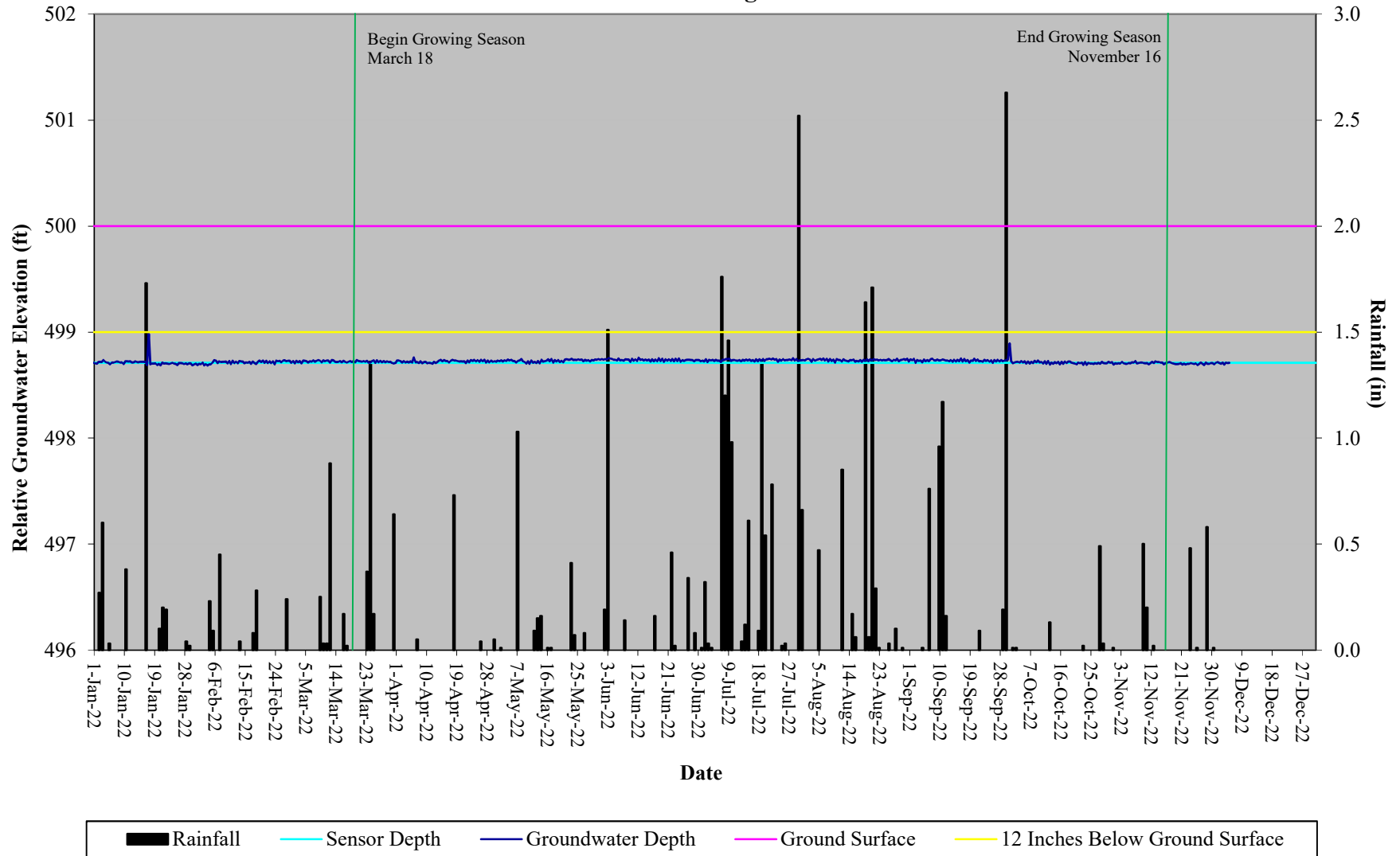
Bear Basin Restoration Site Hydrograph Wetland Gauge 12 - non-credit zone



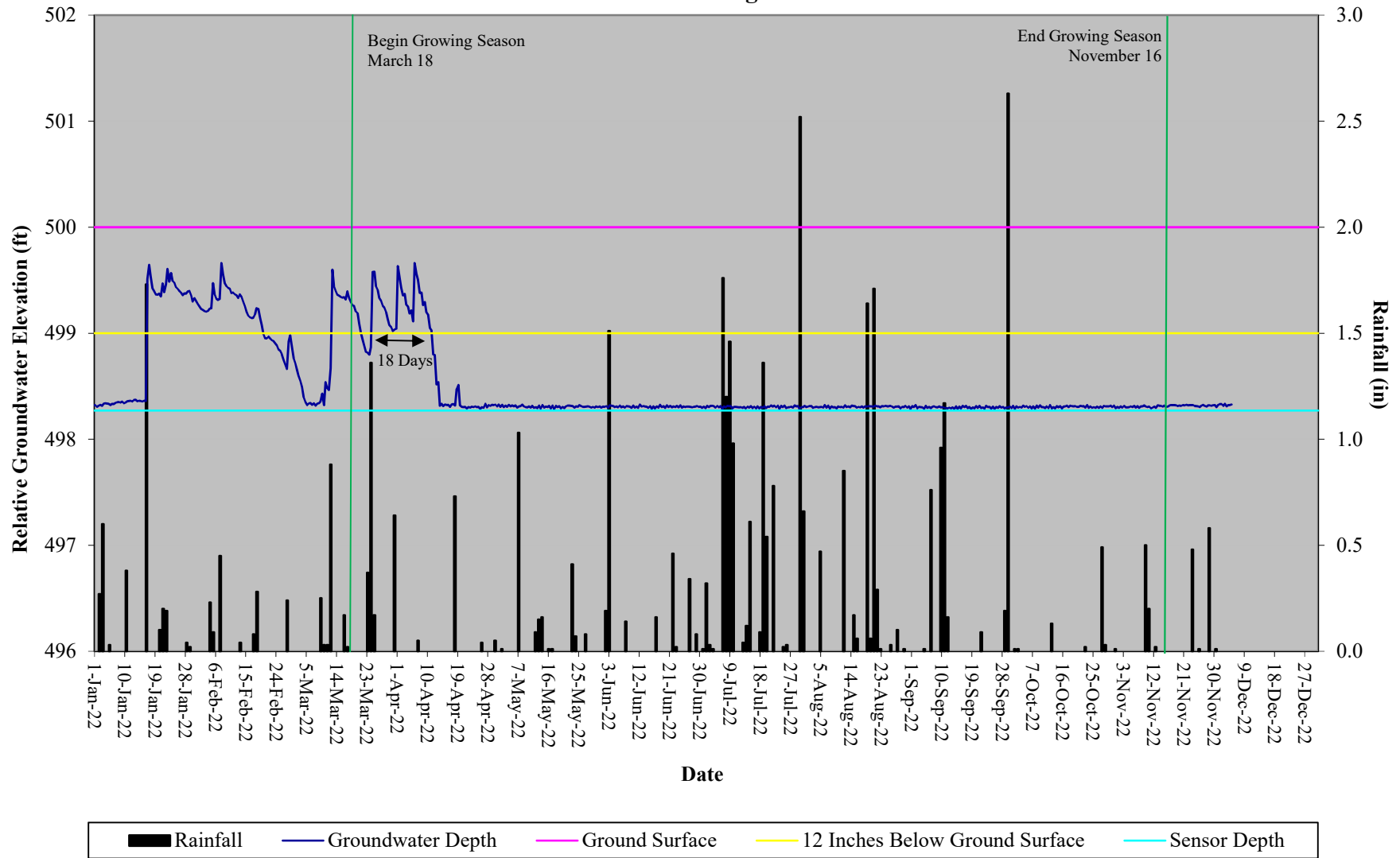
Bear Basin Restoration Site Hydrograph Wetland Gauge 13



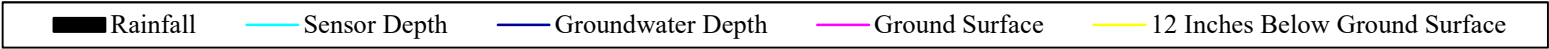
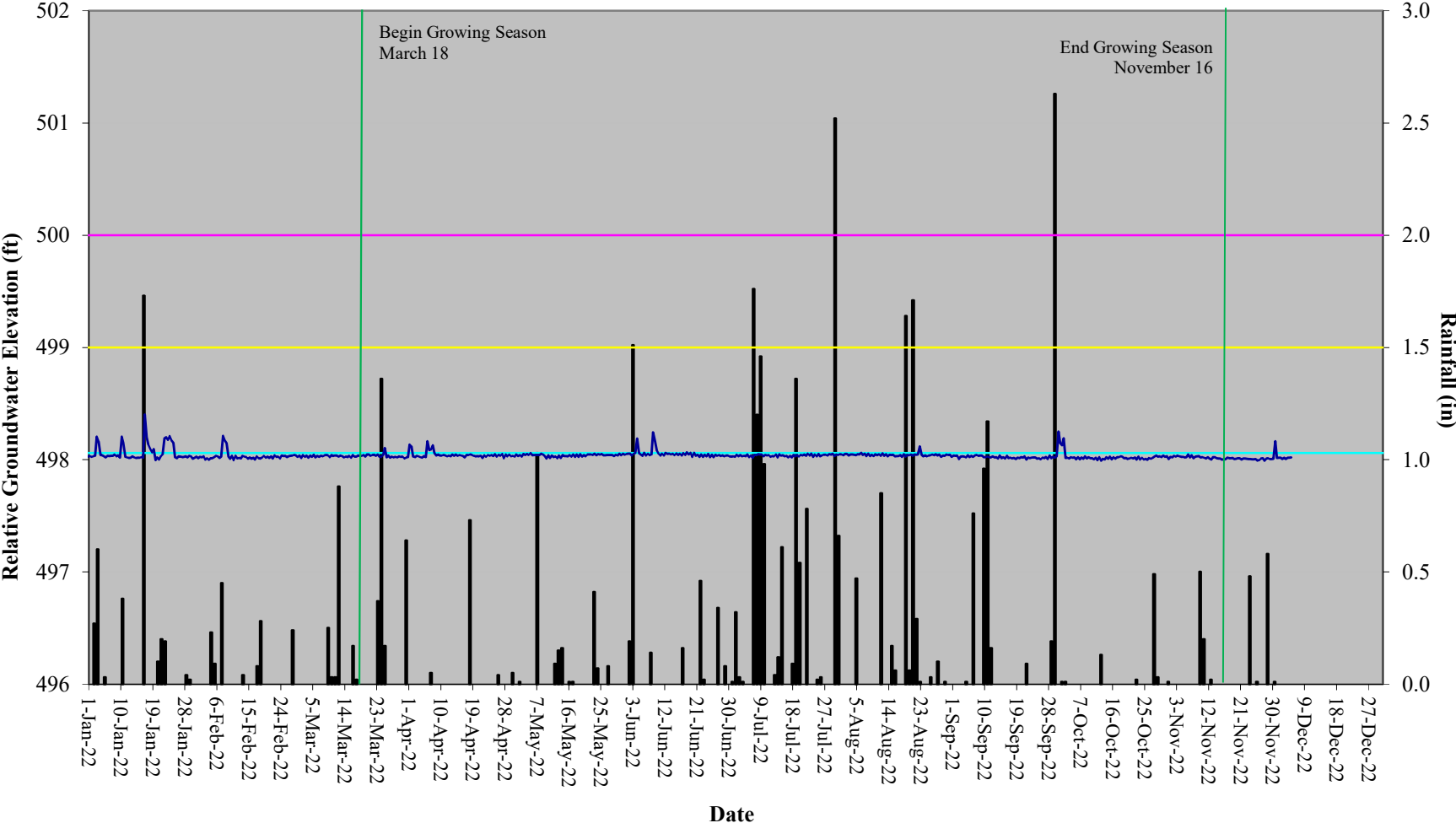
Bear Basin Restoration Site Hydrograph Wetland Gauge 14



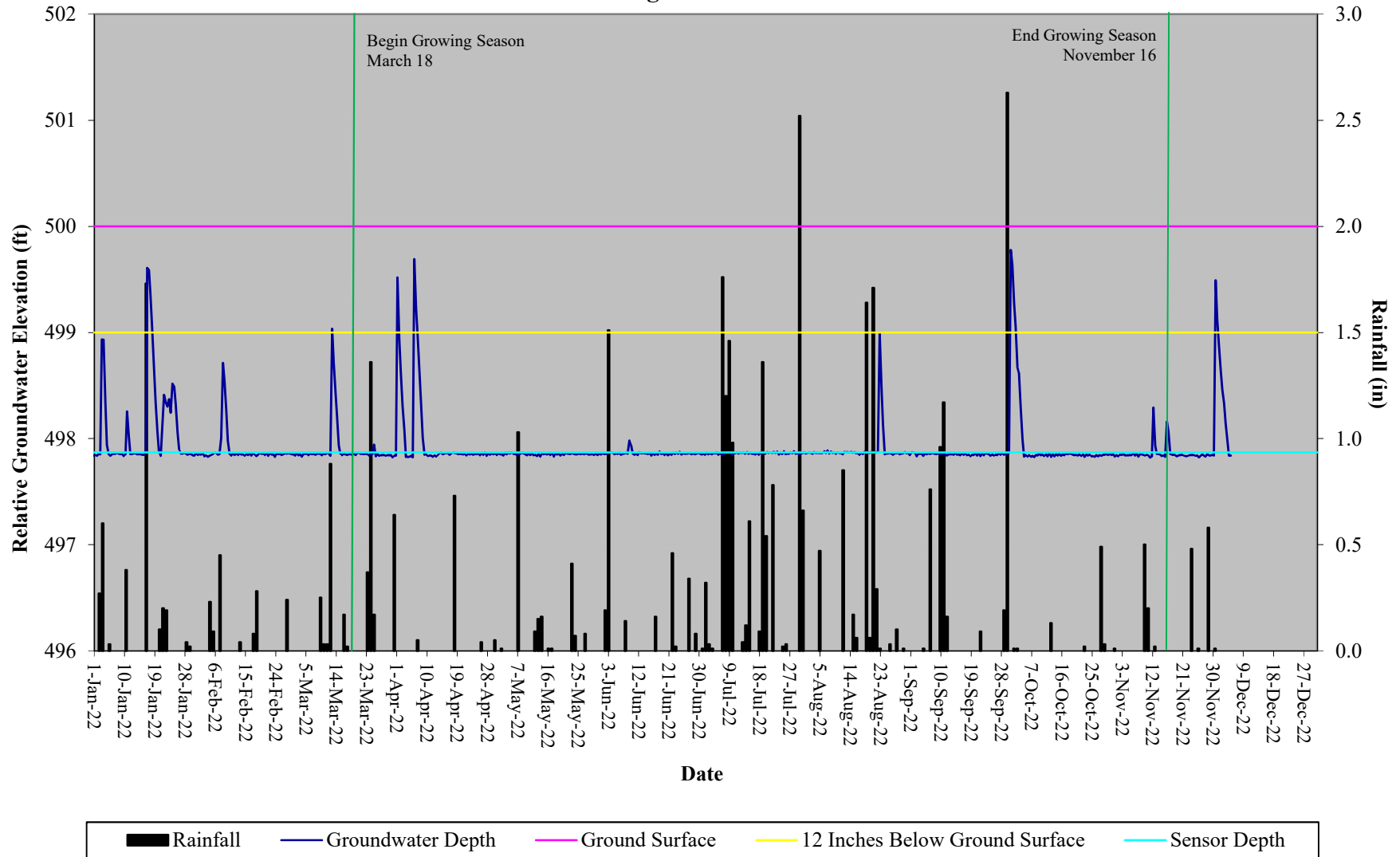
Bear Basin Restoration Site Hydrograph Wetland Gauge 15



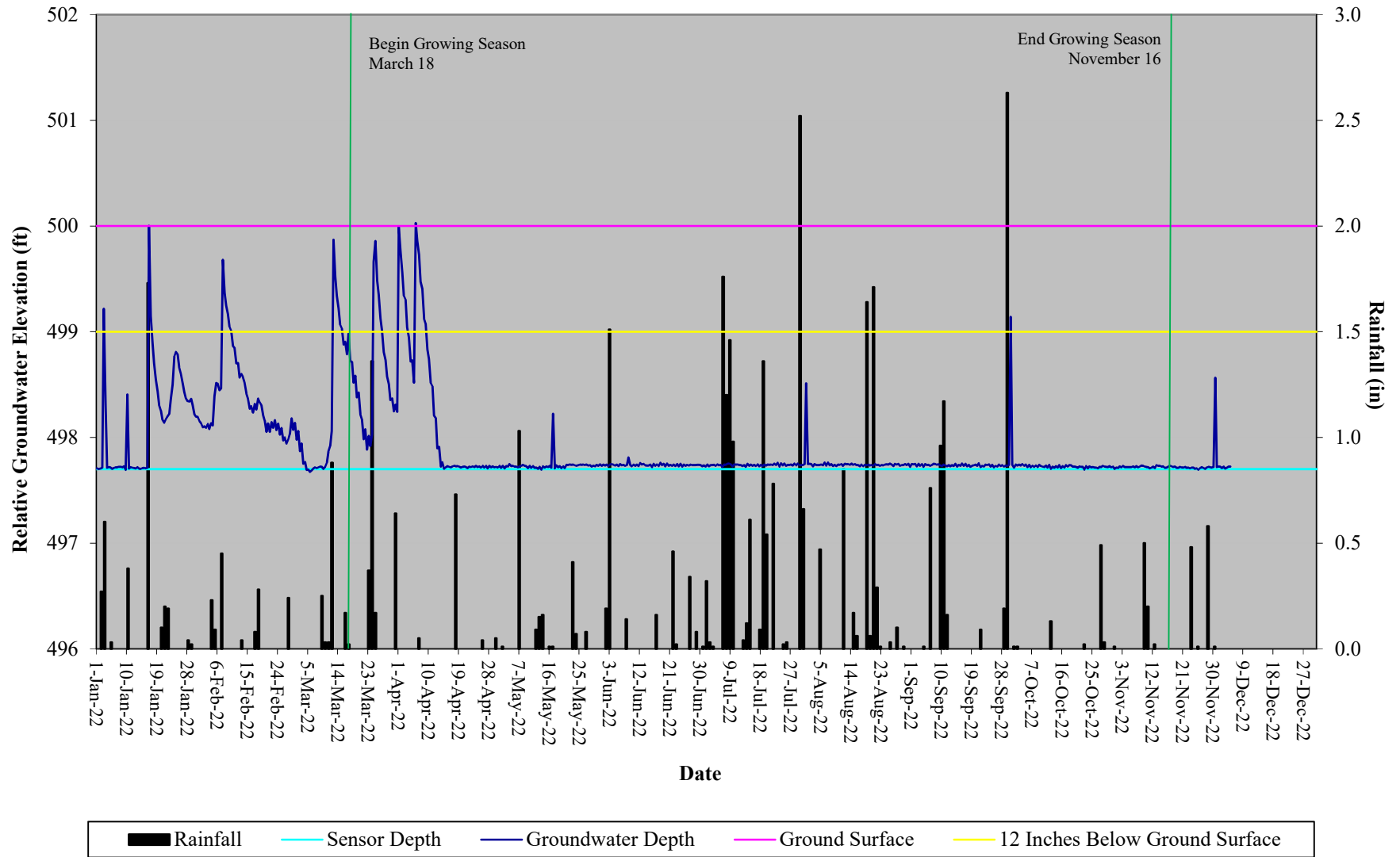
Bear Basin Restoration Site Hydrograph Wetland Gauge 16



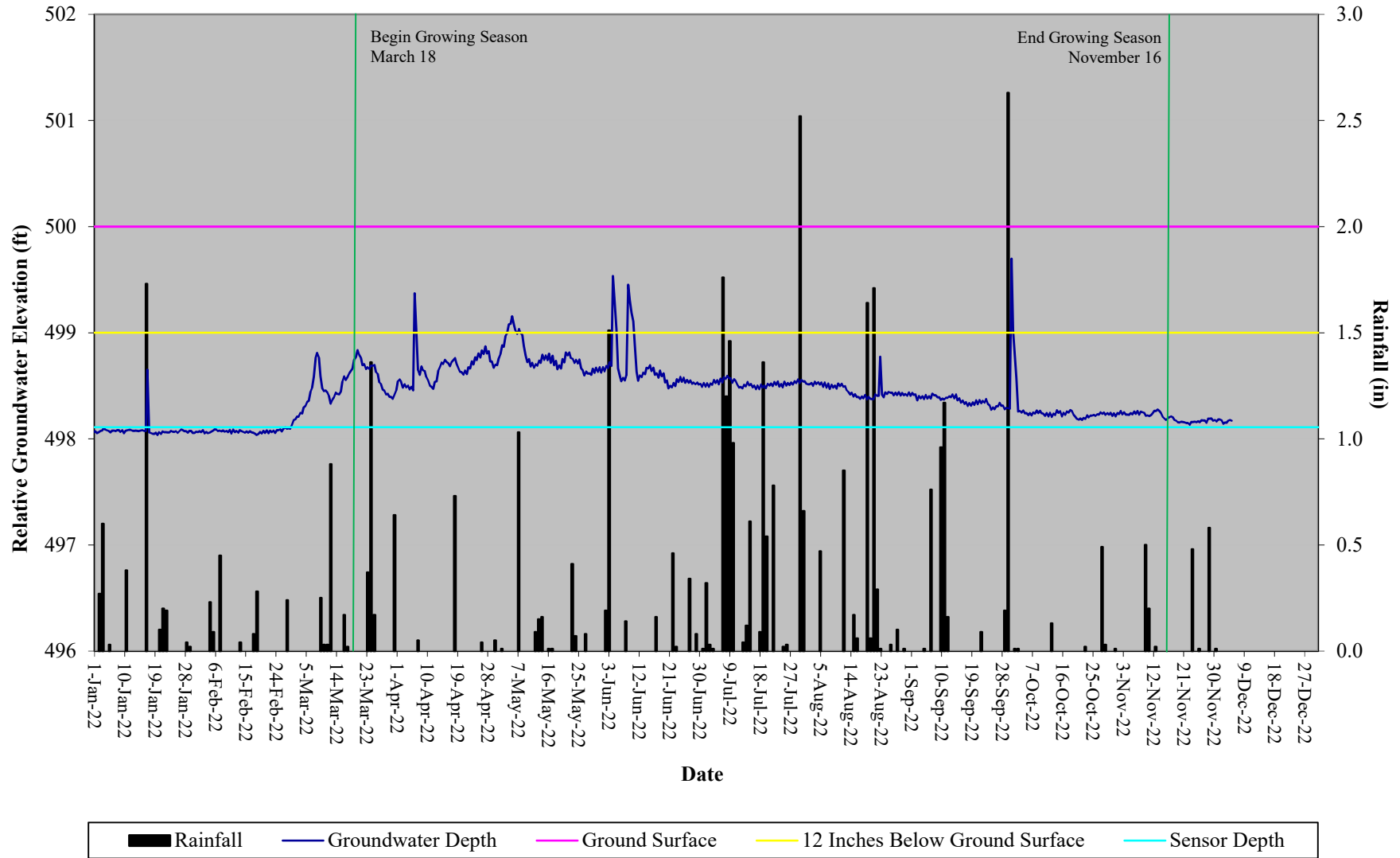
Bear Basin Restoration Site Hydrograph Wetland Gauge 17 - non-credit zone



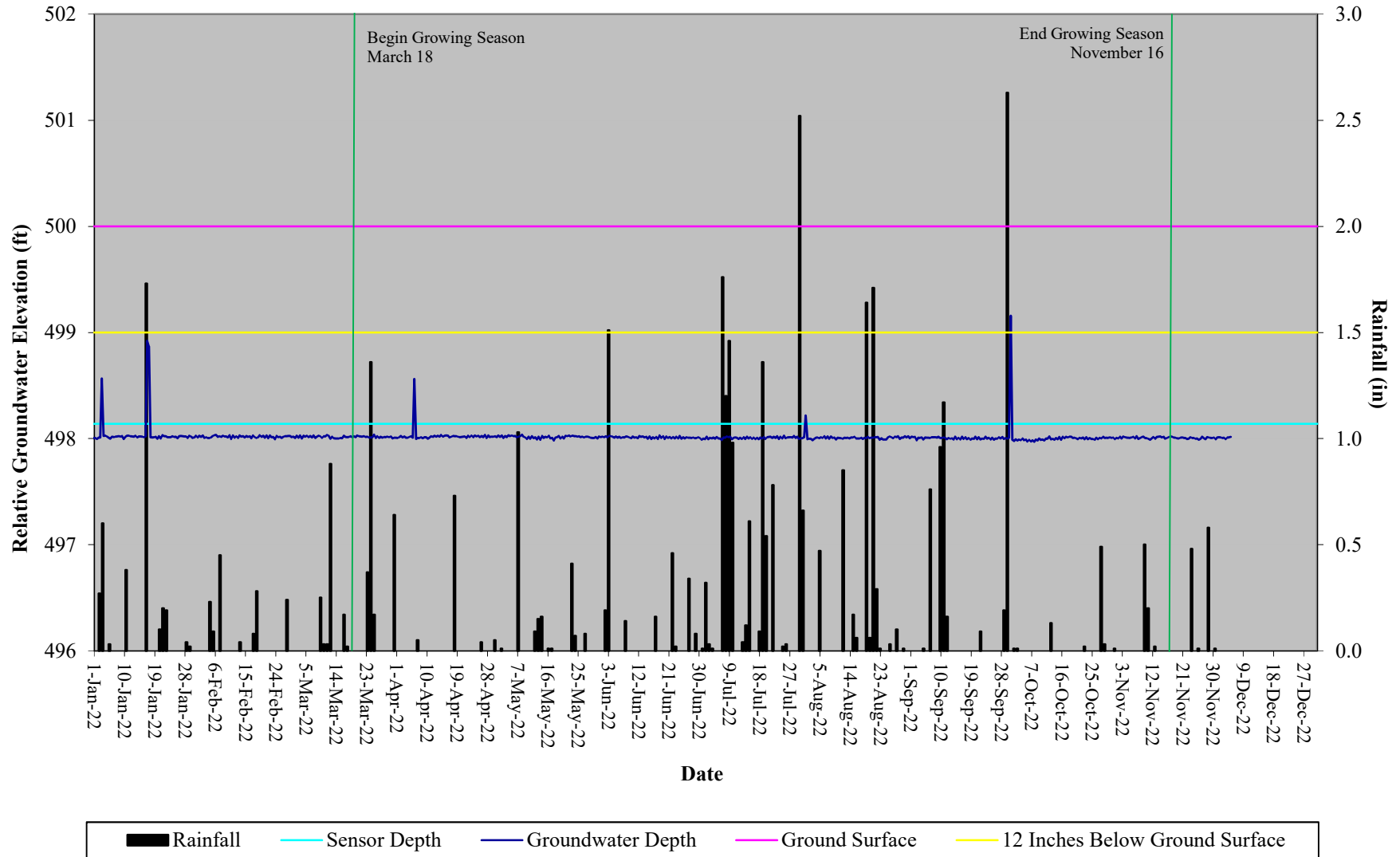
Bear Basin Restoration Site Hydrograph Wetland Gauge 18



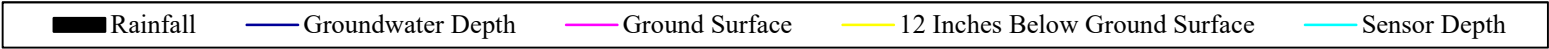
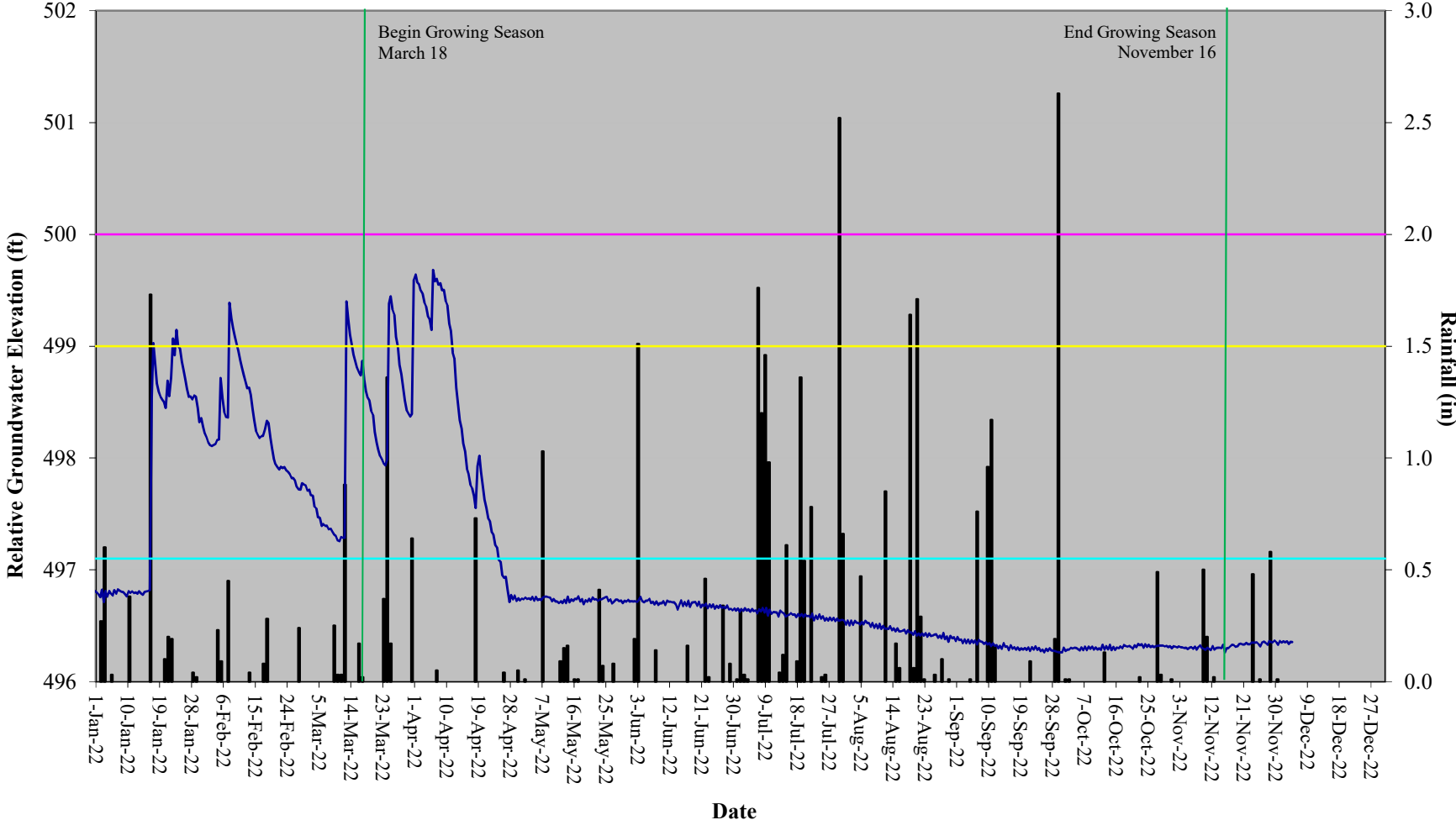
Bear Basin Restoration Site Hydrograph Wetland Gauge 19



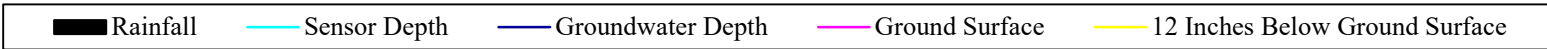
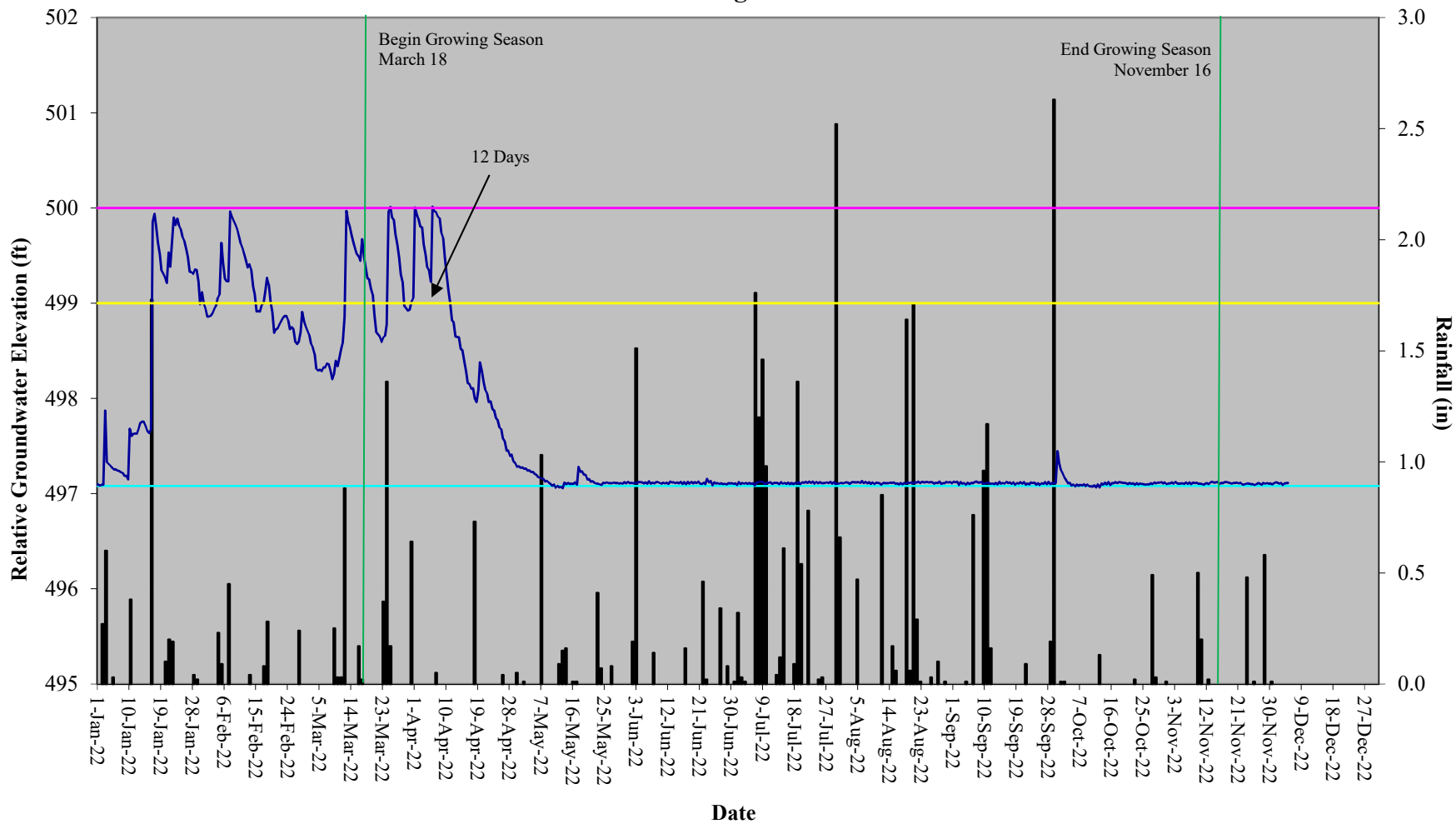
Bear Basin Restoration Site Hydrograph Wetland Gauge 20 - non-credit zone



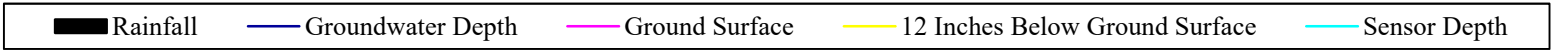
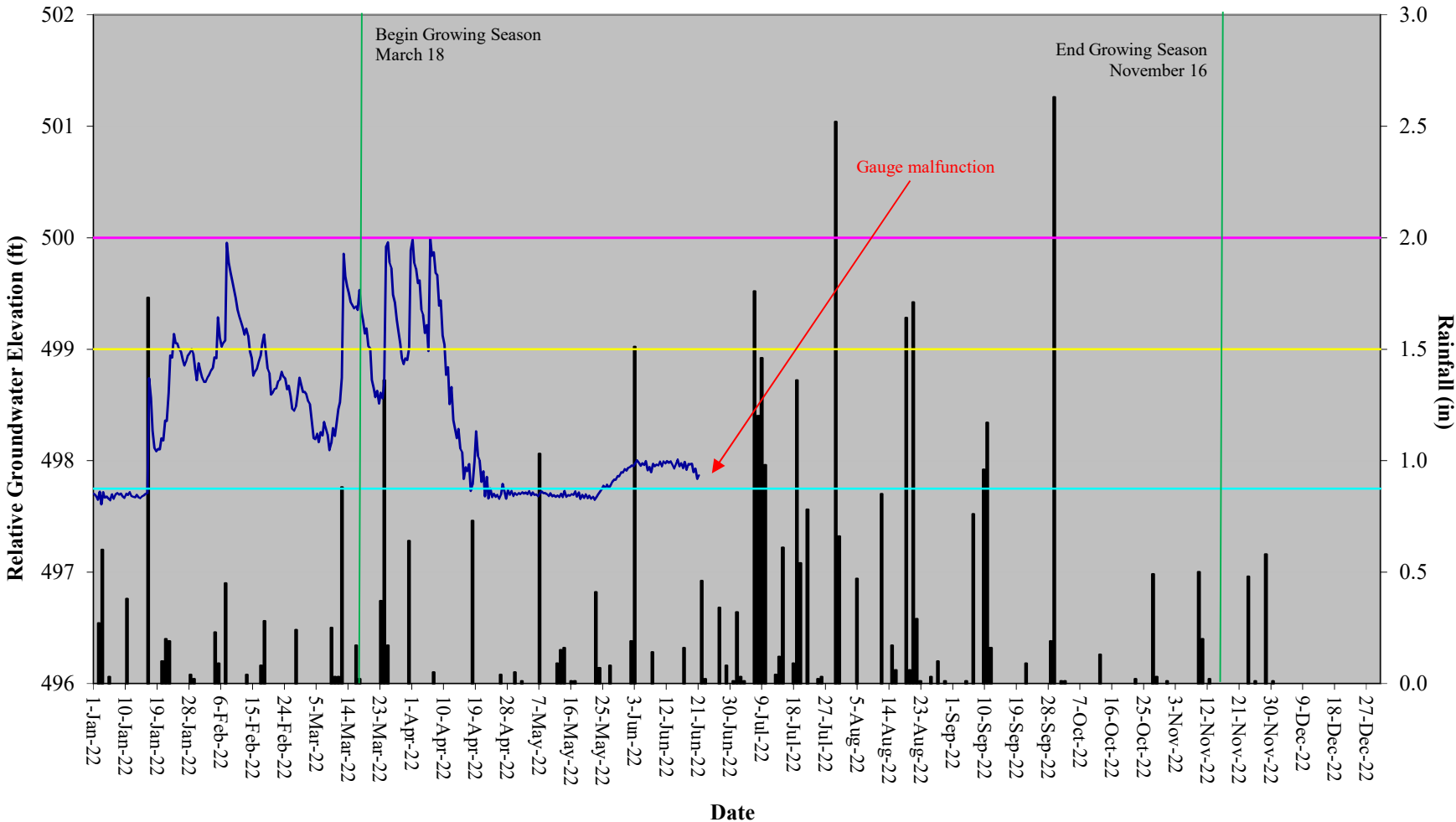
Bear Basin Restoration Site Hydrograph Wetland Gauge 21



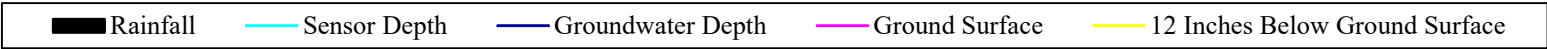
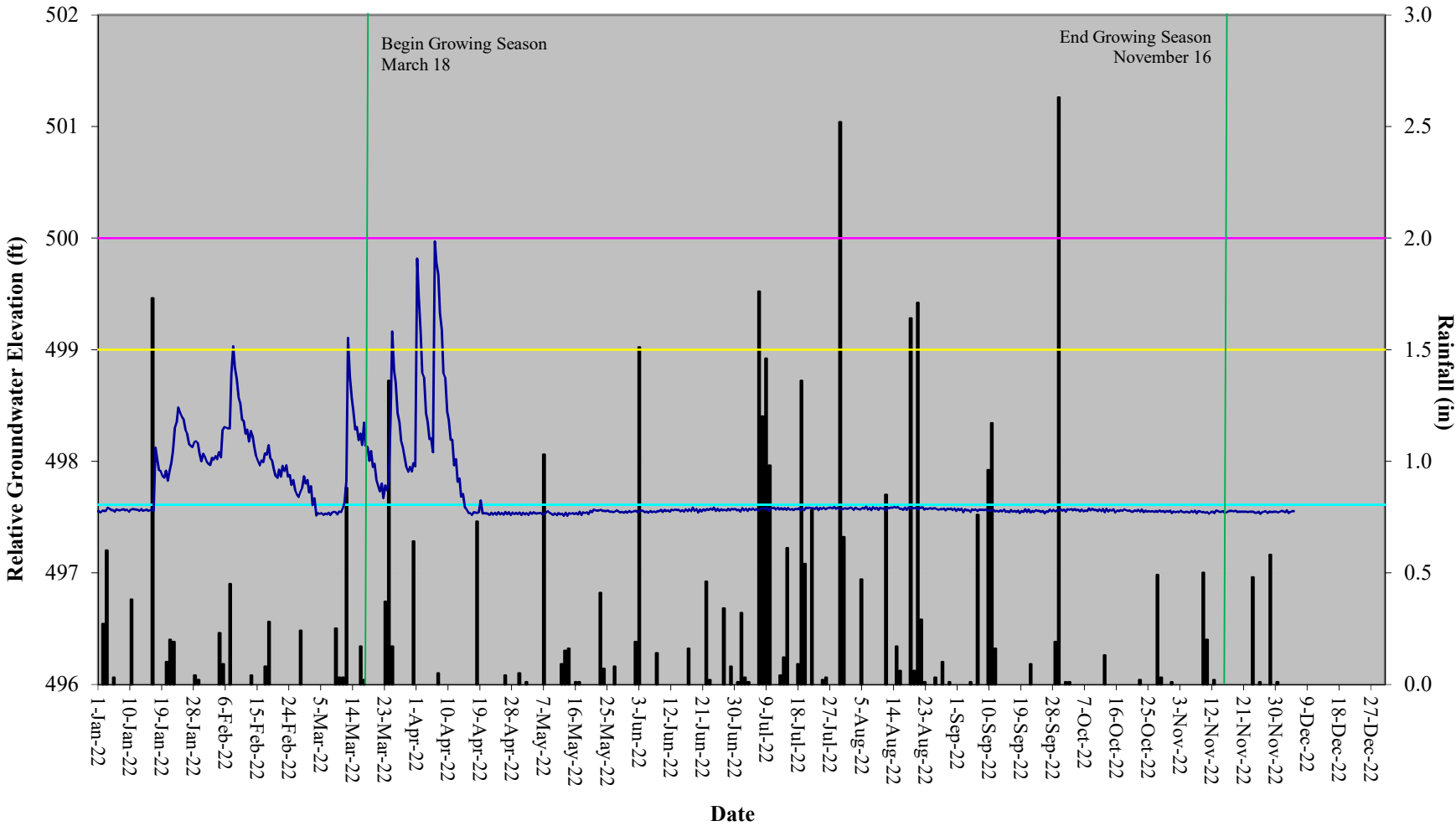
Bear Basin Restoration Site Hydrograph Wetland Gauge 22



Bear Basin Restoration Site Hydrograph Wetland Gauge 23



Bear Basin Restoration Site Hydrograph Wetland Gauge 24



Bear Basin Restoration Site Hydrograph Wetland Gauge 25

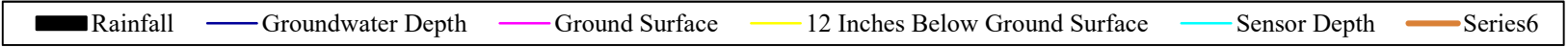
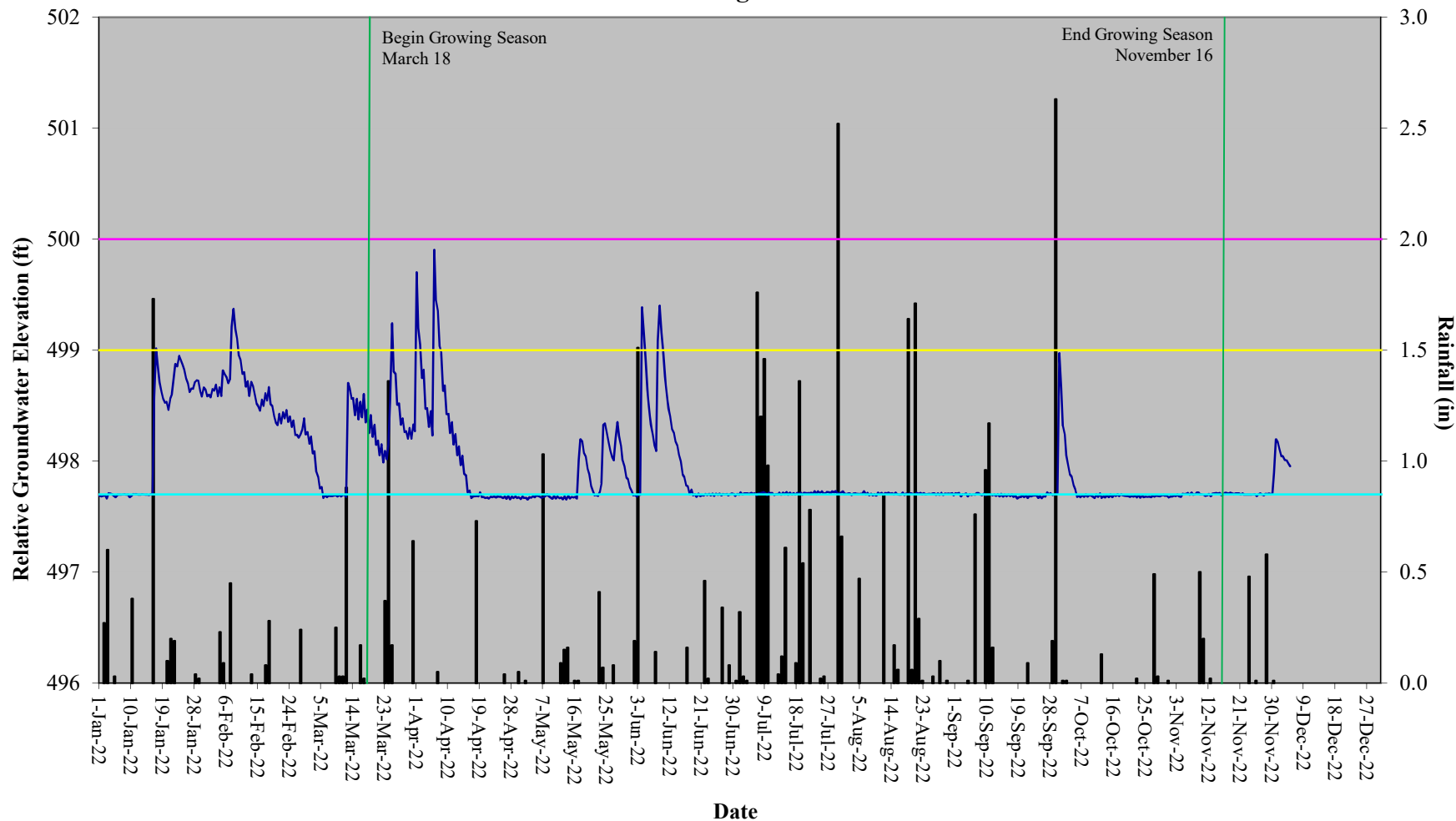


Table 7. Wetland Hydrology Criteria Attainment Table								
Project Number and Name: 95362 - Bear Basin Restoration Site								
	Success Criteria Achieved / Max Consecutive Days During Growing Season (Percentage)							
Success Criteria (20 Days) (8%)	MY-01 2015	MY-02 2016	MY-03 2017	MY-04 2018	MY-05 2019	MY-06 2020	MY-07 2021	MY-08 2022
Gauge 1	Yes/23 (9.4%)	Yes/24 (9.8%)	Yes/26 (10.7%)	Yes/31 (12.7%)	No/12 (4.9%)	Yes/20 (8.2%)	Yes/21 (8.6%)	No/12 (4.9%)
Gauge 2	Yes/28 (11.5%)	Yes/42 (17.2%)	Yes/28 (11.5%)	Yes/37 (15.2%)	Yes/40 (16.4%)	Yes/56 (23.0%)	Yes/31 (12.8%)	Yes/39 (16.0%)
Gauge 3	Yes/22 (9.0%)	No/14 (5.7%)	No/10 (4.1%)	Yes/27 (11.1%)	Yes/24 (9.8%)	Yes/25 (10.2%)	Yes/22 (9.1%)	No/12 (4.9%)
Gauge 4	No/17 (7.0%)	No/15 (6.1%)	Yes/25 (10.2%)	Yes/26 (10.7%)	No/9 (3.7%)	No/7 (2.9%)	No/19 (7.8%)	No/3 (1.2%)
Gauge 5	Yes/90 (36.9%)	Yes/48 (19.7%)	Yes/30 (12.3%)	Yes/48 (19.7%)	Yes/43 (17.6%)	Yes/41 (16.8%)	Yes/25 (10.3%)	Yes/27 (11.1%)
Gauge 6	Yes/28 (11.5%)	Yes/41 (16.8%)	Yes/29 (11.9%)	Yes/46 (18.9%)	Yes/39 (16.0%)	Yes/42 (17.2%)	Yes/28 (11.5%)	Yes/31 (12.8%)
Gauge 7	Yes/51 (20.9%)	Yes/45 (18.4%)	Yes/25 (10.2%)	Yes/47 (19.3%)	Yes/56 (23.0%)	Yes/60 (24.6%)	Yes/35 (14.4%)	Yes/42 (17.3%)
Gauge 8	Yes/28 (11.5%)	Yes/42 (17.2%)	Yes/27 (11.1%)	Yes/33 (13.5%)	Yes/41 (16.8%)	Yes/41 (16.8%)	Yes/26 (10.7%)	Yes/27 (11.1%)
Gauge 9	Yes/23 (9.4%)	Yes/23 (9.4%)	Yes/25 (10.2%)	Yes/31 (12.7%)	No/13 (5.3%)	Yes/41 (16.8%)	Yes/27 (11.1%)	Yes/29 (11.9%)
Gauge 10	Yes/24 (9.8%)	No/18 (7.4%)	Yes/26 (10.7%)	Yes/33 (13.5%)	Yes/23 (9.4%)	Yes/20 (8.2%)	Yes/23 (9.5%)	Yes/26 (10.7%)
Gauge 11*	15 (6.1%)	15 (6.1%)	4 (1.6%)	13 (5.3%)	4 (1.6%)	5 (2.0%)	10 (4.1%)	4 (1.6%)
Gauge 12*	25 (10.2%)	19 (7.8%)	25 (10.2%)	32 (13.1%)	23 (9.4%)	20 (8.2%)	22 (9.1%)	10 (4.1%)
Gauge 13	Yes/27 (11.1%)	Yes/42 (17.2%)	Yes/26 (10.7%)	Yes/32 (13.1%)	No/11 (4.5%)	Yes/20 (8.2%)	Yes/22 (9.1%)	Yes/20 (8.2%)
Gauge 14	Yes/25 (10.2%)	No/19 (7.8%)	Yes/26 (10.7%)	Yes/32 (13.1%)	Yes/23 (9.4%)	Yes/20 (8.2%)	Yes/22 (9.1%)	No/0 (0.0%)
Gauge 15	Yes/35 (14.3%)	Yes/42 (17.2%)	Yes/27 (11.1%)	Yes/33 (13.5%)	No/13 (5.3%)	No/15 (6.1%)	Yes/20 (8.2%)	No/18 (7.4%)
Gauge 16	Yes/22 (9.0%)	No/14 (5.7%)	No/10 (4.1%)	Yes/31 (12.7%)	No/12 (4.9%)	No/11 (4.5%)	No/10 (4.1%)	No/0 (0.0%)
Gauge 17*	23 (9.4%)	14 (5.7%)	9 (3.7%)	14 (5.7%)	7 (2.9%)	4 (1.6%)	2 (0.8%)	2 (0.8%)
Gauge 18	Yes/22 (9.0%)	No/14 (5.7%)	No/9 (3.7%)	Yes/26 (10.7%)	No/8 (3.3%)	No/10 (4.1%)	No/19 (7.8%)	No/4 (1.6%)
Gauge 19	No/18 (7.4%)	No/12 (4.9%)	No/7 (2.9%)	Yes/25 (10.2%)	No/4 (1.6%)	No/8 (3.3%)	No/3 (1.2%)	No/3 (1.2%)
Gauge 20*	19 (7.8%)	12 (4.9%)	7 (2.9%)	26 (10.7%)	8 (3.3%)	10 (4.1%)	5 (2.1%)	1 (0.4%)
Gauge 21**				Yes/30 (12.3%)	Yes/23 (9.4%)	Yes/20 (8.2%)	Yes/21 (8.6%)	No/11 (4.5%)
Gauge 22**				Yes/27 (11.1%)	No/10 (4.1%)	No/19 (7.8%)	No/15 (6.2%)	No/12 (4.9%)
Gauge 23**				Yes/26 (10.7%)	No/12 (4.9%)	No/14 (5.7%)	Yes/21 (8.6%)	No/6 (2.5%)
Gauge 24**				Yes/27 (11.1%)	No/9 (3.7%)	No/14 (5.7%)	Yes/20 (8.2%)	No/3 (1.2%)
Gauge 25**				Yes/26 (10.7%)	No/8 (3.3%)	No/10 (4.1%)	No/10 (4.1%)	No/2 (0.8%)

*=non-credit bearing area **=Gauge installed March 7, 2018