

Monitoring Report

Stanley's Slough Stream and Wetland Restoration Site

DMS Contract 004635

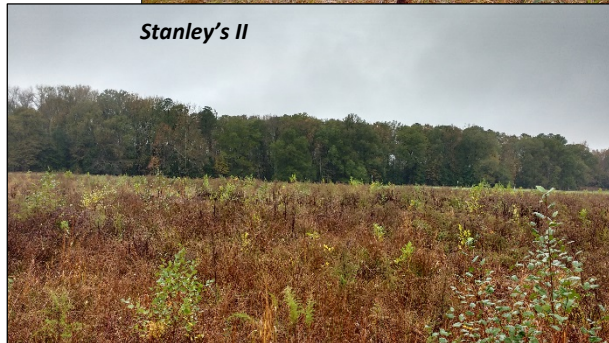
DMS Project Number 95356

Stanley's II Wetland Restoration Site

DMS Contract 5151

DMS Project Number 95838

Monitoring Year 02



Prepared for:

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

Construction Completed: April 2014

Data Collection: 2015

Submitted: December 2015

Design and Monitoring Firm



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1.0 EXECUTIVE SUMMARY / PROJECT ABSTRACT

The Stanley's Slough Stream and Wetland Restoration Site (SSS) was completed in April 2014 and restored a total of 4,274 linear feet of headwater stream along with restoring 3.6 acres of riparian wetlands. The SSS is a headwater stream and riparian wetland system in the Chowan River Basin (03010204 8-digit HUC) in northern Northampton County, North Carolina, that had been substantially modified to maximize agricultural production. The completed project restored impacted agricultural lands to riparian wetland and headwater stream habitat. The Stanley's II Wetland Restoration Site (SII) is located directly adjacent to SSS and was also completed in April 2014, restoring a total of 7.6 acres of riparian wetland restoration. The completed SII project restored, enhanced, and protected wetlands within a productive headwater stream/wetland system.

The SSS is protected by a 17.6-acre permanent conservation easement, while SII is protected by a 9.4-acre permanent conservation easement, both held by the State of North Carolina. Both sites are located on two parcels located off of Margarettsville Road, approximately 0.3 mile north of Margarettsville, North Carolina. The project sites are bounded by NC 186 to the south and by agricultural land on all other sides. The sites have a long history of hydrologic modification in order to allow for farming to take place on the property.

The Chowan River Basin Restoration Priorities state the goals for the SSS and SII'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 SSS and SII are in line with the basin priorities and include the following:

- Restore streams and riparian buffers to provide shade and temperature control and increase instream woody debris for habitat.
- Restore and protect sensitive aquatic resources to improve habitat and species diversity through the restoration of wetlands, streams, and riparian buffers.
- Implement wetland and stream restoration projects that reduce sources of nutrient pollution and surface runoff by restoring hydrology and vegetation, stabilizing banks, and restoring natural geomorphology where appropriate.

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 headwater stream/wetland community.

The project goals will be addressed through the following objectives:

- Restore a headwater stream/wetland vegetation community through maintenance and germination of volunteer wetland vegetation from adjacent seed sources, planting of native trees and shrubs, and incorporation of a custom native seed mix.
- Elevate the local groundwater table through the elimination of lateral drainage ditches and modification of existing channelized streams.
- Reconnect site hydrology to historic flow paths.

The mitigation at SSS included approximately 4,274 linear feet of stream restoration, 3.6 acres of riparian wetland restoration, and 0.5 acre of wetland preservation for a total of 4,274 Stream Mitigation Units and 3.1 Wetland Mitigation Units. The mitigation at SII included approximately 7.6 acres of riparian wetland restoration for a total of 6.9 Wetland Mitigation Units.

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, twenty permanent vegetation monitoring plots (10 by 10 meters) have been established in the mitigation area at a density that statistically represents the total mitigation acreage. Eleven of these plots are in SSS and nine of these are in SII. The site's average density for this monitoring period was 860 planted stems/acre. All twenty plots had greater than 320 planted stems/acre. Including volunteers, the site averaged 1,081 total stems/acre.

The CVS-EEP protocol, Level 2 (Lee, et al., 2008) was used to collect vegetation data from the site. The vegetation monitoring was completed on July 15, 2015

2.2 Hydrology Monitoring Results

Twelve groundwater monitoring gauges were installed in the wetland mitigation areas to measure soil saturation within the upper 12 inches and any surface ponding within the wetland area of the site. Four of these gauges are in SSS and eight of these are in SII. The soil survey for Northampton County estimates that the growing season begins March 11 and ends November 20 (254 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% (22 days) of the 254-day growing season during normal weather conditions. A "normal" year is based on NRCS climatological data for Northampton County, and using the 30th to 70th percentile thresholds as the range of normal, as documented in the USACE Technical Report "Assessing and Using Meteorological Data to Evaluate Wetland Hydrology" (Sprecher and Warne, 2000).

The daily rainfall data was obtained from a local weather station in Emporia, VA; provided by the NC State Climate Office. For the 2015-year, the month of June experienced an above average rainfall, while April, July, August, September, October, and November experienced average rainfall. The months of January, February, March and May recorded below average rainfall for the site. Overall, the area experienced average rainfall during the 2015 growing season.

During the site's second growing season, eleven of the twelve 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% (20 days) of the 239 day growing season (March 28 to November 7) during average climatic conditions. The gauge that did not meet the success criterion is Gauge 7, which had a continuous saturation percentage of 3.3%. This gauge is located in SII.

2.3 Headwater Stream Performance

SSS will also be monitored to document the development of the headwater stream system. The success criteria for the headwater stream states that it will have continuous surface water flow within the valley, for at least 30 consecutive days annually. Additionally, the stream must show signs of supporting the restored channel form as documented with photos. These indicators may include evidence of scour, sediment deposition and sorting, multiple flow events, wrack lines and flow over vegetation, leaf litter, or water staining.

In the headwater stream, six automatic recording gauges were installed to document the presence of surface water within the restored channel. Weirs were constructed just downstream of three (Gauges 2, 3 and Gauge 18) of these gauges to provide a known elevation at which the stream could be considered flowing. Using these elevations as the basis for flow, all three gauges achieved at least 30 consecutive days of flow. Gauges 2 and 3 (on T1) averaged 85 consecutive days of flow between them and Gauge 18 (on T2) achieved 135 consecutive days of flow. See Appendix D, Photo 2 for an example of these weirs.

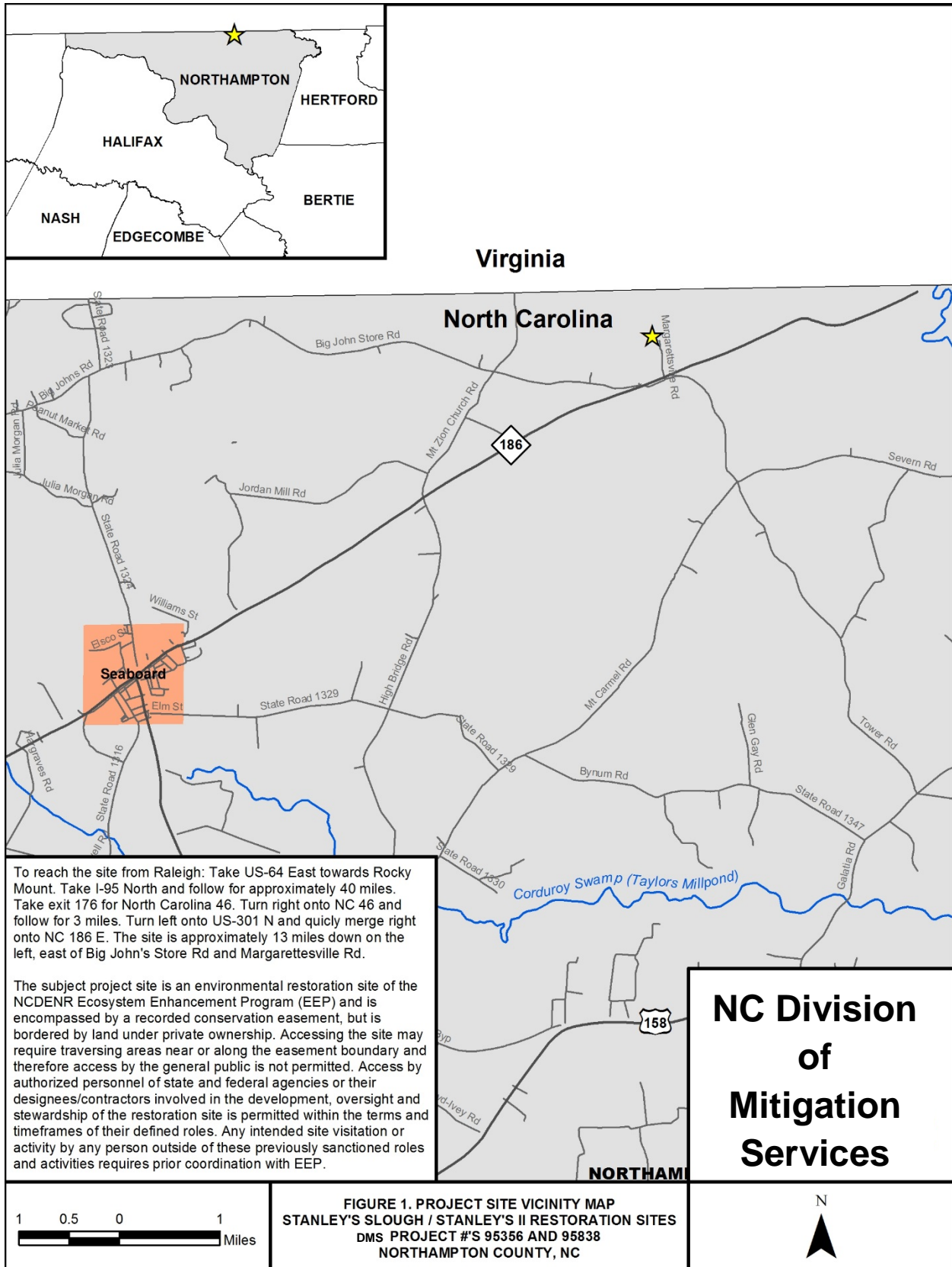
Summary information/data related to the occurrence of items such as encroachment and statistics related to performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the Baseline Monitoring Report and in the Mitigation Plan documents available on the DMSs website. All raw data supporting the tables and figures in the appendices are available from DMS upon request.

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. Chowan River Basin Restoration Priorities 2009. Raleigh, NC.
http://www.nceep.net/services/restplans/FINAL_RBPR_Chowan_2009.pdf
- Sprecher, S. W., and Warne, A. G. (2000). "Assessing 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. 1994. Soil Survey of Northampton County, North Carolina. USDA, NCDENR, SCS.
http://www.nrcs.usda.gov/Internet/FSE_MANUSCRIPTS/north_carolina/NC131/0/northampton.pdf

Appendix A

Project Vicinity Map and Background Tables



To reach the site from Raleigh: Take US-64 East towards Rocky Mount. Take I-95 North and follow for approximately 40 miles. Take exit 176 for North Carolina 46. Turn right onto NC 46 and follow for 3 miles. Turn left onto US-301 N and quickly merge right onto NC 186 E. The site is approximately 13 miles down on the left, east of Big John's Store Rd and Margarettesville Rd.

The subject project site is an environmental restoration site of the NCDENR Ecosystem Enhancement Program (EEP) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easement boundary and therefore access by the general public is not permitted. Access by authorized personnel of state and federal agencies or their designees/contractors involved in the development, oversight and stewardship of the restoration site is permitted within the terms and timeframes of their defined roles. Any intended site visitation or activity by any person outside of these previously sanctioned roles and activities requires prior coordination with EEP.

**Table 1a. Project Components and Mitigation Credits
Stanley's Slough Restoration Site, DMS Project #95356**

Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Length	4,274		3.6						
Credits	4,274		3.1						
TOTAL CREDITS	4,274		3.1						
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			
T1	10+00 – 41+55	2,600	Headwater Stream Valley	Restoration	3,054	1:1			
T2	50+00 – 62+85	1,220	N/A	Restoration	1,220	1:1			
Wetland Reestablishment				Restoration	2.8	1:1			
Wetland Rehabilitation				Restoration	0.8	2.5:1			
Wetland Preservation				N/A	0.5	NA			
Component Summation									
Restoration Level	Stream (linear feet)	Riparian Wetlands (Acres)	Non-Riparian Wetlands (Acres)	Buffer (square feet)	Upland (Acres)				
Restoration	4,274		3.1						
Enhancement I									
Enhancement II									
TOTAL SMU	4,274								
TOTAL WMU			3.1						

Table 1b. Project Components and Mitigation Credits									
Stanley's Slough II Restoration Site, DMS Project #95838									
Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE	R	RE	R	RE			
Length			7.6						
Credits			6.9						
TOTAL CREDITS									
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	6.5	1:1			
Wetland Rehabilitation				Restoration	1.1	2.5:1			
Component Summation									
Restoration Level	Stream (linear feet)	Riparian Wetlands (Acres)		Non-Riparian Wetlands (Acres)	Buffer (square feet)	Upland (Acres)			
		Riverine	Non-Riverine						
Restoration		-	6.9						
Enhancement I									
Enhancement II									
TOTAL WMU			6.9						

Table 2. Project Activity & Reporting History Stanley's Slough & Stanley's II Restoration Sites		
Activity or Report	Data Collection Complete	Actual Completion or Delivery
Mitigation Plan		Aug 13
Final Design - Construction Plans		Oct 13
Construction		April 14
Planting		April 14
Baseline Monitoring/Report	April/May 14	May 14
Year 1 Monitoring	Oct 14	Dec 14
Year 2 Monitoring	July 15	Dec 15

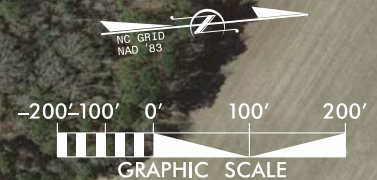
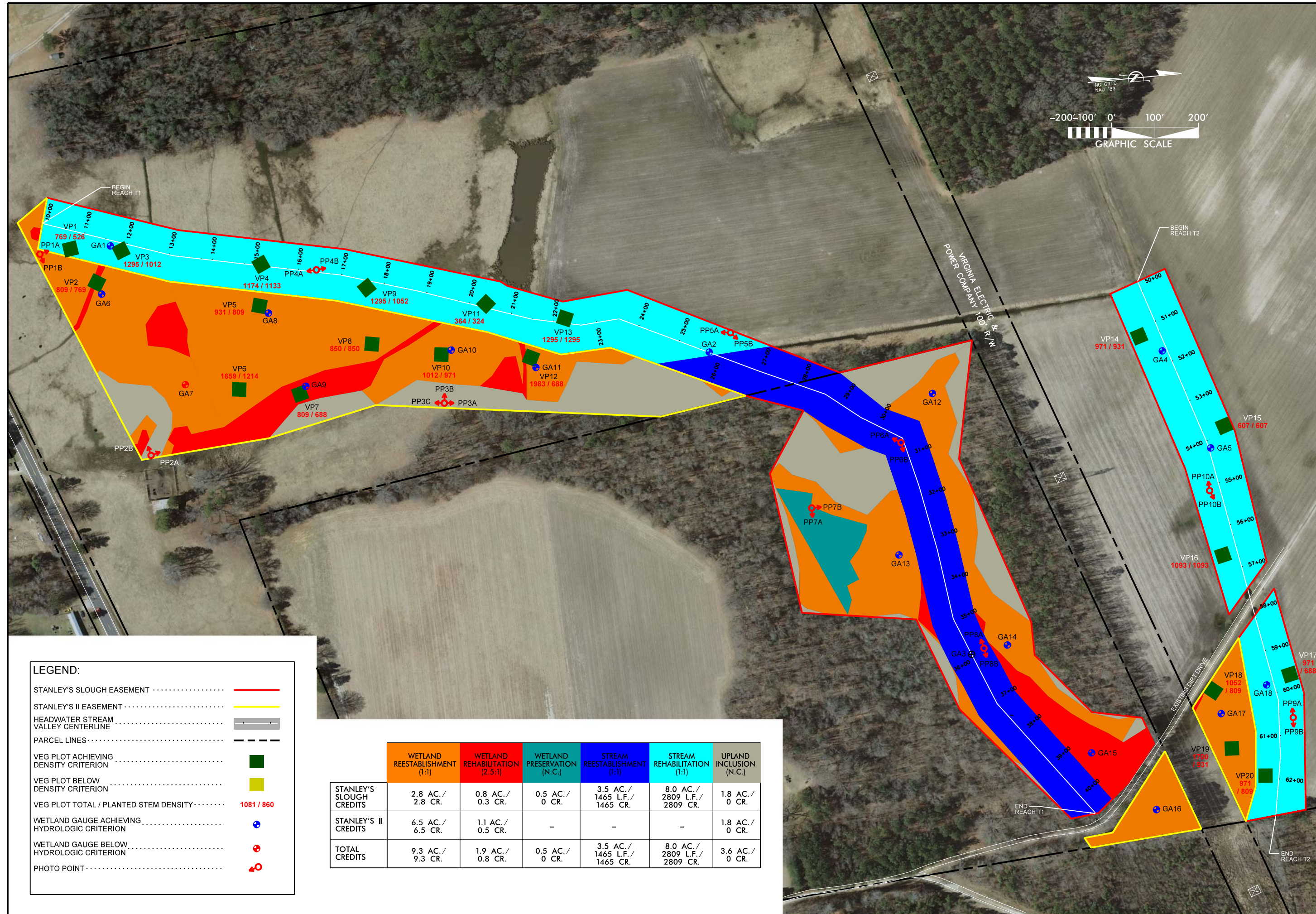
Table 3. Project Contacts Stanley's Slough & Stanley's II Restoration Sites	
Design Firm	KCI Associates of North Carolina, PC Landmark Center II, Suite 220 4601 Six Forks Rd. Raleigh, NC 27609 Contact: Mr. Tim Morris Phone: (919) 278-2512 Fax: (919) 783-9266
Construction Contractor	Wright Contracting, LLC 160 Walker Road Lawndale, NC 28090 Contact: Mr. Stephen James Phone: (704) 692-4633
Planting Contractor	Forestree Management Co. 1280 Maudis Road Bailey, NC 27807 Contact: Mr. Tony Cortez Phone: (252) 243-2513
Monitoring Performers	
MY00 – MY02	KCI Associates of North Carolina, PC Landmark Center II, Suite 220 4601 Six Forks Rd. Raleigh, NC 27609 Contact: Mr. Adam Spiller Phone: (919) 278-2514 Fax: (919) 783-9266

Table 4a. Project Information			
Stanley's Slough Restoration Site, DMS Project #95356			
Project Name	Stanley's Slough Restoration Site		
County	Northampton County		
Project Area (acres)	17.6 acres		
Project Coordinates (lat. and long.)	36.539006 N, -77.348222 W		
Project Watershed Summary Information			
Physiographic Province	Coastal Plain		
River Basin	Chowan		
USGS Hydrologic Unit 8-digit	03010204	USGS Hydrologic Unit 14-digit	03010204180040
DWQ Sub-basin	03-01-02		
Project Drainage Area (acres)	113 acres		
Project Drainage Area Percentage of Impervious Area	<1%		
CGIA Land Use Classification	43.7% forested land, 33.8% rangeland, 22.5% agriculture		
Reach Summary Information (Post Restoration)			
Parameters	T1	T2	
Length of reach (linear feet)	3,054	1,220	
Valley classification	Valley Type X	Valley Type X	
Drainage area (acres)	84 acres	29 acres	
NCDWQ Water Quality Classification	Project Reach Not Classified; Receiving water = Meherrin River (C; NSW)	Project Reach Not Classified; Receiving water = Meherrin River (C; NSW)	
Morphological Description (stream type)	Headwater Stream Valley	Headwater Stream Valley	
Evolutionary trend	Channelized	Channelized	
Mapped Soil Series	Tomotley, Roanoke, Altavista, Wehadkee	Altavista, Roanoke	
Drainage class	Poorly drained, poorly drained, moderately well drained, poorly drained	Moderately well drained, poorly drained	
Soil Hydric status	Hydric	Hydric	
Slope	0.2%	0.06%	
FEMA classification	Zone X, parts in Zone AE(backwater of Meherrin River)	Zone X, parts in Zone AE (backwater of Meherrin River)	
Native vegetation community	Headwater Forest Community	Headwater Forest Community	
Percent composition of exotic invasive vegetation	0%	0%	
Wetland Summary Information (Post Restoration)			
Parameters			
Size of Wetland (acres)	3.6 acres		
Wetland Type	Riparian		
Mapped Soil Series	Roanoke and Tomotley		
Drainage class	Poorly drained		
Soil Hydric Status	Hydric		
Source of Hydrology	Hillside seepage and precipitation		
Hydrologic Impairment	Ditching and Cattle damage		
Native vegetation community	Headwater Forest Community		
Percent composition of exotic invasive vegetation	0%		

Table 4b. Project Information			
Stanley's II Restoration Site, DMS Project #95838			
Project Name	Stanley's II Restoration Site		
County	Northampton County		
Project Area (acres)	9.4 acres		
Project Coordinates (lat. and long.)	34.922569 N , -77.319871 W		
Project Watershed Summary Information			
Physiographic Province	Coastal Plain		
River Basin	Chowan		
USGS Hydrologic Unit 8-digit	03010204	USGS Hydrologic Unit 14-digit	03010204180040
DWQ Sub-basin	03-01-02		
Project Drainage Area (acres)	80 acres		
Project Drainage Area Percentage of Impervious Area	<1%		
CGIA Land Use Classification	53.0% forested land, 34.9% rangeland, 12.1% agriculture		
Wetland Summary Information (Post Restoration)			
Parameters			
Size of Wetland (acres)	7.6 acres		
Wetland Type	Riparian		
Mapped Soil Series	Tomotley, Roanoke		
Drainage class	Poorly Drained		
Soil Hydric Status	Hydric		
Source of Hydrology	Hillside seepage and precipitation		
Hydrologic Impairment	Ditching and Crops		
Native vegetation community	Headwater Forest Community		
Percent composition of exotic invasive vegetation	0%		

Appendix B

Visual Assessment Data



LEGEND:

- STANLEY'S SLOUGH EASEMENT [Red dashed line]
- STANLEY'S II EASEMENT [Yellow dashed line]
- HEADWATER STREAM VALLEY CENTERLINE [Grey dashed line]
- PARCEL LINES [Black dashed line]
- VEG PLOT ACHIEVING DENSITY CRITERION [Green square]
- VEG PLOT BELOW DENSITY CRITERION [Yellow square]
- VEG PLOT TOTAL / PLANTED STEM DENSITY 1081 / 860
- WETLAND GAUGE ACHIEVING HYDROLOGIC CRITERION [Blue circle with cross]
- WETLAND GAUGE BELOW HYDROLOGIC CRITERION [Red circle with cross]
- PHOTO POINT [Red circle with 'P']

	WETLAND REESTABLISHMENT (1:1)	WETLAND REHABILITATION (2.5:1)	WETLAND PRESERVATION (N.C.)	STREAM REESTABLISHMENT (1:1)	STREAM REHABILITATION (1:1)	UPLAND INCLUSION (N.C.)
STANLEY'S SLOUGH CREDITS	2.8 AC./ 2.8 CR.	0.8 AC./ 0.3 CR.	0.5 AC./ 0 CR.	3.5 AC./ 1465 L.F./ 1465 CR.	8.0 AC./ 2809 L.F./ 2809 CR.	1.8 AC./ 0 CR.
STANLEY'S II CREDITS	6.5 AC./ 6.5 CR.	1.1 AC./ 0.5 CR.	-	-	-	1.8 AC./ 0 CR.
TOTAL CREDITS	9.3 AC./ 9.3 CR.	1.9 AC./ 0.8 CR.	0.5 AC./ 0 CR.	3.5 AC./ 1465 L.F./ 1465 CR.	8.0 AC./ 2809 L.F./ 2809 CR.	3.6 AC./ 0 CR.

<p>NCDEQ DIVISION OF MITIGATION SERVICES</p>	<p>KCI ASSOCIATES OF NC ENGINEERS • PLANNERS • SCIENTISTS 4601 SIX FORKS ROAD RALEIGH, NORTH CAROLINA 27609</p>
<p>STANLEY'S SLOUGH / STANLEY'S II RESTORATION SITES EEP PROJECT #95356 & 95838 NORTHAMPTON COUNTY, NORTH CAROLINA MONITORING YEAR 02</p>	
<p>DATE: DEC 2015 SCALE: GRAPHIC</p>	
<p>CURRENT CONDITION PLAN VIEW</p>	
<p>SHEET 1 OF 1</p>	

Table 5a. Vegetation Condition Assessment						
Stanley's Slough Restoration Site, DMS Project #95356						
Planted Acreage 8.74			Easement Acreage 17.6			
Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acre	Pattern and Color	0	0.00	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acre	Pattern and Color	0	0.00	0.0%
Total				0	0.00	0.0%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acre	Pattern and Color	0	0.00	0.0%
Cumulative Total				0	0.00	0.0%
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	1,000 SF	Pattern and Color	0	0.00	0.0%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	none	Pattern and Color	0	0.00	0.0%

Table 5b. Vegetation Condition Assessment						
Stanley's II Restoration Site, DMS Project #95838						
Planted Acreage 8.57			Easement Acreage 9.4			
Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbaceous material.	0.1 acre	Pattern and Color	0	0.00	0.0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acre	Pattern and Color	0	0.00	0.0%
Total				0	0.00	0.0%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acre	Pattern and Color	0	0.00	0.0%
Cumulative Total				0	0.00	0.0%
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	1,000 SF	Pattern and Color	0	0.00	0.0%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	none	Pattern and Color	0	0.00	0.0%

Vegetation Monitoring Plot Photos



Plot 1 – MY-02 – 7/10/15



Plot 2 – MY-02 – 7/10/15



Plot 3 – MY-02 – 7/10/15



Plot 4 – MY-02 – 7/10/15



Plot 5 – MY-02 – 7/10/15



Plot 6 – MY-02 – 7/10/15



Plot 7 – MY-02 – 7/10/15



Plot 8 – MY-02 – 7/10/15



Plot 9 – MY-02 – 7/10/15



Plot 10 – MY-02 – 7/10/15



Plot 11 – MY-02 – 7/10/15



Plot 12 – MY-02 – 7/10/15



Plot 13 – MY-02 – 7/10/15



Plot 14 – MY-02 – 7/10/15



Plot 15 – MY-02 – 7/10/15



Plot 16 – MY-02 – 7/10/15



Plot 17 – MY-02 – 7/10/15



Plot 18 – MY-02 – 7/10/15



Plot 19 – MY-02 – 7/10/15



Plot 20 – MY-02 – 7/10/15

Photo Reference Points



PP1a – MY-00 – 4/17/14



PP1a – MY-02 – 7/10/15



PP1b – MY-00 – 4/17/14



PP1b – MY-02 – 7/10/15



PP2a – MY-00 – 4/17/14



PP2a – MY-02 – 7/10/15



PP2b – MY-00 – 4/17/14



PP2b – MY-02 – 7/10/15



PP3a – MY-00 – 4/17/14



PP3a – MY-02 – 7/10/15



PP3b – MY-00 – 4/17/14



PP3b – MY-02 – 7/10/15



PP3c – MY-00 – 4/17/14



PP3c – MY-02 – 7/10/15



PP4a – MY-00 – 4/17/14



PP4a – MY-02 – 7/10/15



PP4b – MY-00 – 4/17/14



PP4b – MY-02 – 7/10/15



PP5a – MY-00 – 4/17/14



PP5a – MY-02 – 7/10/15



PP5b – MY-00 – 4/17/14



PP5b – MY-02 – 7/10/15



PP6a – MY-00 – 4/17/14



PP6a – MY-02 – 7/10/15



PP6b – MY-00 – 4/17/14



PP6b – MY-02 – 7/10/15



PP7a – MY-00 – 4/17/14



PP7a – MY-02 – 7/10/15



PP7b – MY-00 – 4/17/14



PP7b – MY-02 – 7/10/15



PP8a – MY-00 – 4/17/14



PP8a – MY-02 – 7/10/15



PP8b – MY-00 – 4/17/14



PP8b – MY-02 – 7/10/15



PP9a – MY-00 – 4/17/14



PP9a – MY-02 – 7/10/15



PP9b – MY-00 – 4/17/14



PP9b – MY-02 – 7/10/15



PP10a – MY-00 – 4/17/14



PP10a – MY-02 – 7/10/15



PP10b – MY-00 – 4/17/14



PP10b – MY-02 – 7/10/15

Appendix C

Vegetation Plot Data

Table 6. Vegetation Plot Criteria Attainment			
Stanley's Slough & Stanley's Slough II Restoration Sites			
Vegetation Plot ID	Vegetation Survival Threshold Met?	Monitoring Year 02 Planted Stem Density (stems/acre)	Monitoring Year 02 Total Stem Density (stems/acre)
Stanley's Slough			
1	Yes	526	769
3	Yes	1,012	1,295
4	Yes	1,133	1,174
9	Yes	1,052	1,295
11	Yes	324	364
13	Yes	1,295	1,295
14	Yes	931	971
15	Yes	607	607
16	Yes	1,093	1,093
17	Yes	688	971
20	Yes	809	971
Stanley's II			
2	Yes	769	809
5	Yes	809	931
6	Yes	1,214	1,659
7	Yes	688	809
8	Yes	850	850
10	Yes	971	1,012
12	Yes	688	1,983
18	Yes	809	1,052
19	Yes	931	1,700

Table 7. CVS Vegetation Plot Metadata	
Stanley's Slough & Stanley's Slough II Restoration Sites	
Report Prepared By	Bethany Williams
Date Prepared	7/29/2015 10:35
database name	KCI-2014-S.mdb
database location	M:\2012\20122005 Stanley FDP\Monitoring\Vegetation CVS Database
computer name	12-3ZV4FP1
file size	37392384
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT-----	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY-----	
Project Code	95356
project Name	Stanley's Slough
Description	Stream and Wetland Restoration Site
River Basin	Chowan
length(ft)	
stream-to-edge width (ft)	
area (sq m)	
Required Plots (calculated)	
Sampled Plots	20

Table 8. CVS Stem Count Total and Planted by Plot and Species																																
Stanley's Slough and Stanley's Slough II Restoration Sites, DMS Project Number 95356/95838																																
			Current Plot Year (MY02 2015)																													
Scientific Name	Common Name	Species Type	95356-01-0011			95356-01-0012			95356-01-0013			95356-01-0014			95356-01-0015			95356-01-0016			95356-01-0017			95356-01-0018			95356-01-0019			95356-01-0020		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T			
<i>Acer rubrum</i>	red maple	Tree	2	2	2																											
<i>Betula nigra</i>	river birch	Tree	1	1	1							9	9	9	3	3	3				8	8	8				5	5	5	2	2	2
<i>Celtis laevigata</i>	sugarberry	Tree												1																		
<i>Fraxinus pennsylvanica</i>	green ash	Tree	2	2	2	9	9	9	1	1	1				5	5	5	9	9	9	2	2	2	6	6	6	9	9	9	4	4	5
<i>Juniperus virginiana</i>	eastern redcedar	Tree																									1					
<i>Liquidambar styraciflua</i>	sweetgum	Tree						21															5			13				1		
<i>Liriodendron tulipifera</i>	tuliptree	Tree																														
<i>Magnolia virginiana</i>	sweetbay	Tree				1	1	1							1	1	1	4	4	4	2	2	2				1	1	1			
<i>Nyssa sylvatica</i>	blackgum	Tree	1	1	1				16	16	16							6	6	6				2	2	2				7	7	7
<i>Pinus taeda</i>	loblolly pine	Tree						1																								
<i>Platanus occidentalis</i>	American sycamore	Tree				2	2	2				4	4	4	1	1	1	2	2	2					1	2	2	7	1	1	3	
<i>Quercus</i>	oak	Tree																														
<i>Quercus falcata</i>	southern red oak	Tree							3	3	3	1	1	1				1	1	1	2	2	2						2	2	2	
<i>Quercus michauxii</i>	swamp chestnut oak	Tree	2	2	2				6	6	6	6	6	6	3	3	3	2	2	2	2	2	2	6	6	6	3	3	3	1	1	1
<i>Quercus nigra</i>	water oak	Tree																														
<i>Quercus phellos</i>	willow oak	Tree				5	5	5	1	1	1	2	2	2	1	1	1	3	3	3				6	6	6	3	3	3	1	1	1
<i>Salix nigra</i>	black willow	Tree			1			10														7										
<i>Taxodium distichum</i>	bald cypress	Tree							5	5	5	1	1	1	1	1	1				1	1	1						2	2	2	
Unknown		Shrub or Tree																														
Stem count			8	8	9	17	17	49	32	32	32	23	23	24	15	15	15	27	27	27	17	17	24	20	20	26	23	23	42	20	20	24
size (ares)			1			1			1			1			1			1			1			1			1			1		
size (ACRES)			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
Species count			5	5	6	4	4	7	6	6	6	6	6	7	7	7	7	7	7	7	6	6	7	4	4	6	6	6	8	8	8	9
Stems per ACRE			324	324	364	688	688	1,983	1,295	1,295	1,295	931	931	971	607	607	607	1,093	1,093	1,093	688	688	971	809	809	1,052	931	931	1,700	809	809	971

**Table 8. CVS Stem Count Total and Planted by Plot and Species
Stanley's Slough and Stanley's Slough II Restoration Sites, DMS Project Number 95356/95838**

			Annual Means								
Scientific Name	Common Name	Species Type	MY2 (2015)			MY1 (2014)			MY0 (2014)		
			PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
<i>Acer rubrum</i>	red maple	Tree	8	8	9	9	9	10	11	11	11
<i>Betula nigra</i>	river birch	Tree	67	67	67	67	67	67	73	73	73
<i>Celtis laevigata</i>	sugarberry	Tree			1			1			
<i>Fraxinus pennsylvanica</i>	green ash	Tree	113	113	116	113	113	113	117	117	117
<i>Juniperus virginiana</i>	eastern red cedar	tree			1						
<i>Liquidambar styraciflua</i>	sweetgum	Tree			56			32			
<i>Liriodendron tulipifera</i>	tuliptree	Tree			1						
<i>Magnolia virginiana</i>	sweetbay	Tree	11	11	11	9	9	9	19	19	19
<i>Nyssa sylvatica</i>	blackgum	Tree	41	41	41	42	42	42	46	46	46
<i>Pinus taeda</i>	loblolly pine	Tree			2			2			
<i>Platanus occidentalis</i>	American sycamore	Tree	13	13	24	15	15	27	19	19	19
<i>Quercus spp.</i>	oak	Tree			1						
<i>Quercus falcata</i>	southern red oak	Tree	22	22	22	27	27	27	30	30	30
<i>Quercus michauxii</i>	swamp chestnut oak	Tree	56	56	56	57	57	57	50	50	50
<i>Quercus nigra</i>	water oak	Tree	1	1	1				1	1	1
<i>Quercus phellos</i>	willow oak	Tree	56	56	62	49	49	49	65	65	65
<i>Salix nigra</i>	black willow	Tree			22			23			
<i>Taxodium distichum</i>	bald cypress	Tree	32	32	36	32	32	32	33	33	33
Unknown		Shrub or Tree	5	5	5	2	2	2	52	52	52
Stem count			425	425	534	422	493	493	516	516	516
size (ares)			20			20			20		
size (ACRES)			0.49			0.49			0.49		
Species count			12	12	19	11	15	15	12	12	12
Stems per ACRE			860	860	1,081	854	998	998	1,044	1,044	1,044

Appendix D

Hydrologic Data

Table 9. Verification of Support for the Restored Channel
Stanley's Slough and Stanley's Slough II Restoration Sites, DMS Project Number 95356/95838

Date of Data Collection	Verification	Photo #
11/20/14	Vegetation break, evidence of flow	1
11/11/15	Observation of flow, development of multiple channel threads	3

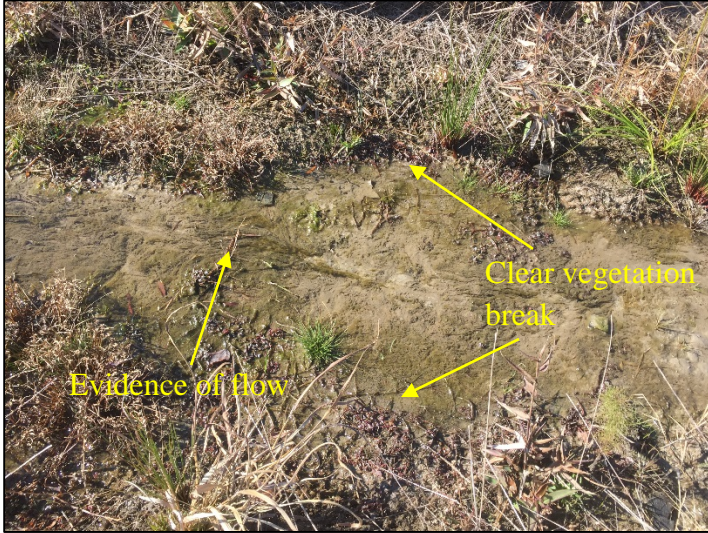


Photo 1. Evidence for support of the restored stream channel



Photo 2. Weir at Gauge 3

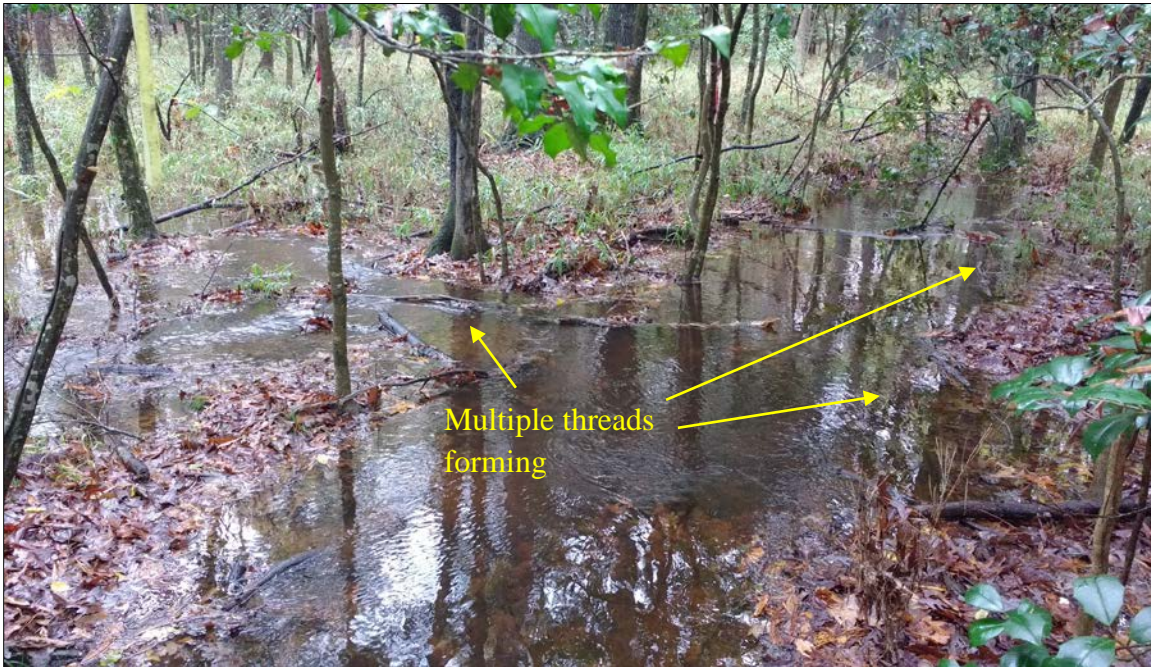
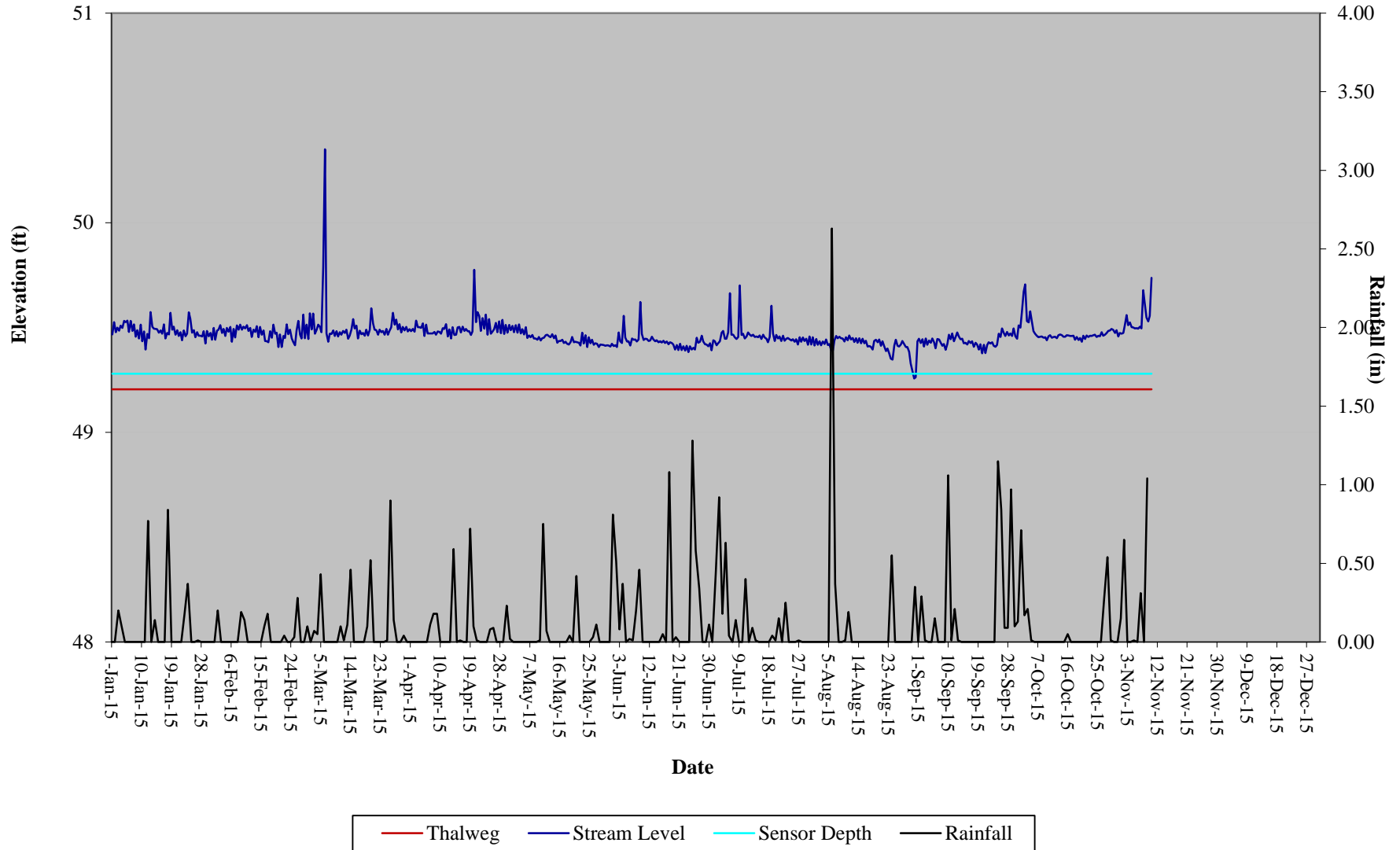
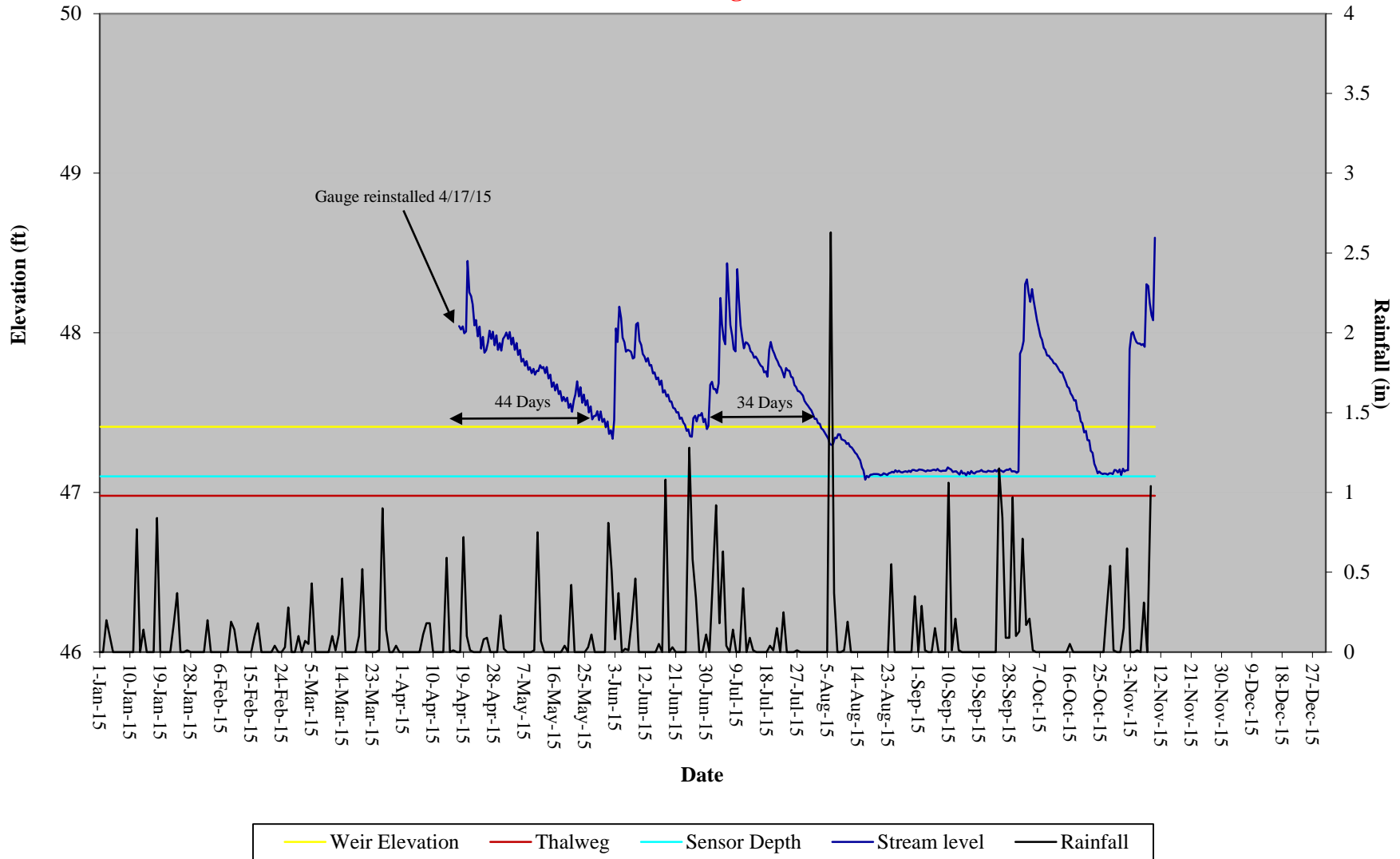


Photo 3. Development of multi-thread channel system

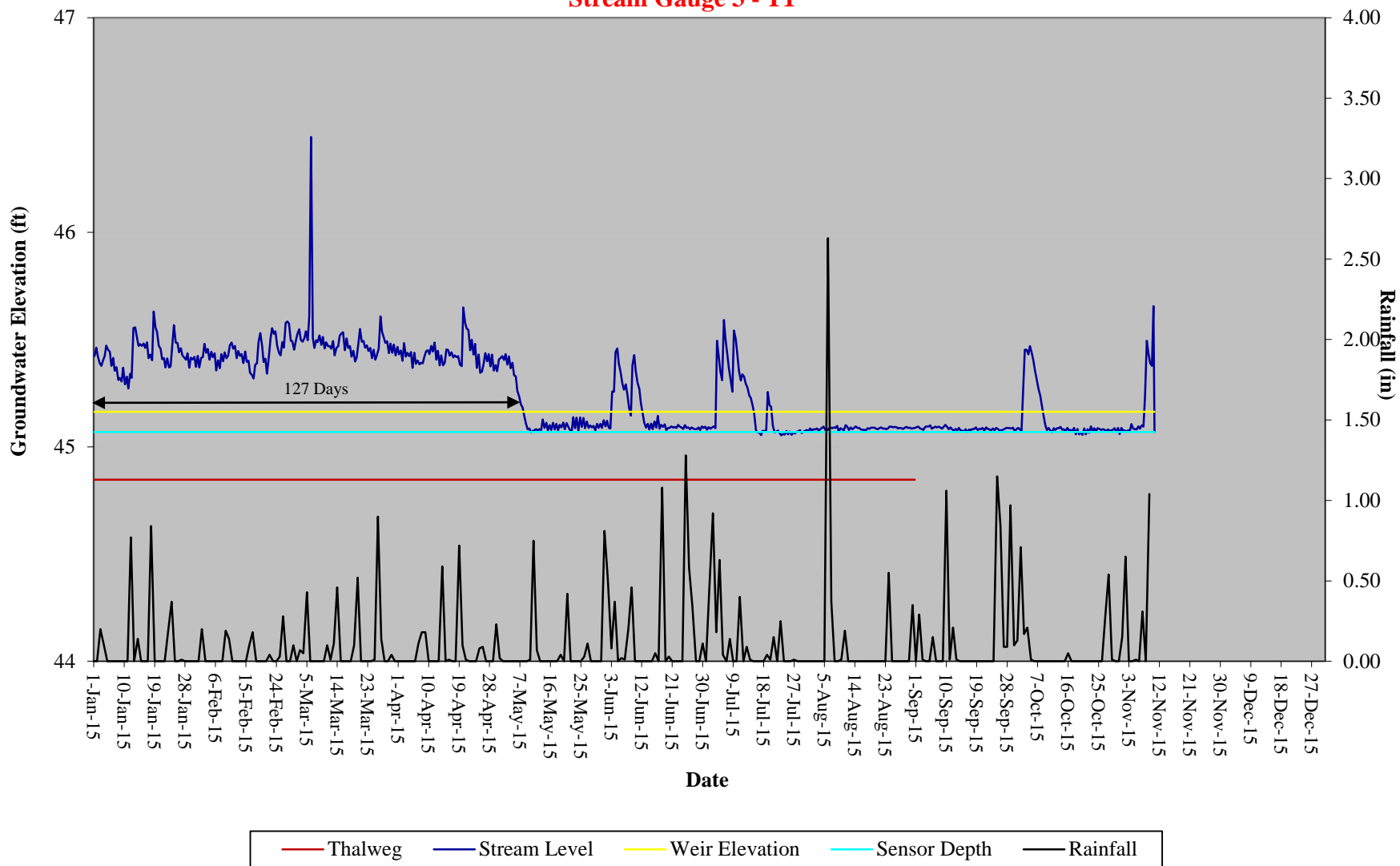
**Stanley's Restoration Site
Hydrograph
Stream Gauge 1 - T1**



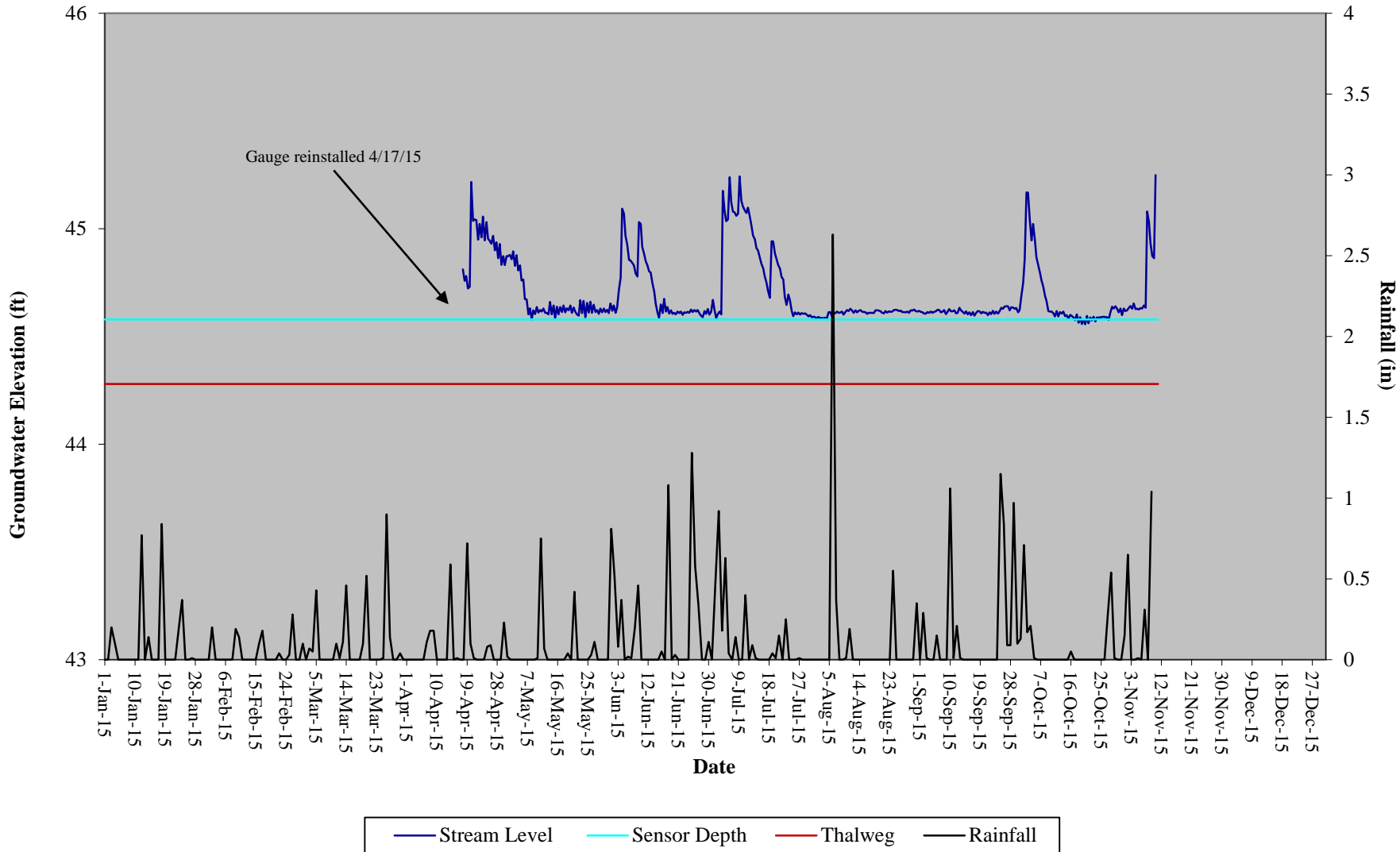
**Stanley's Restoration Site
Hydrograph
Stream Gauge 2 - T1**



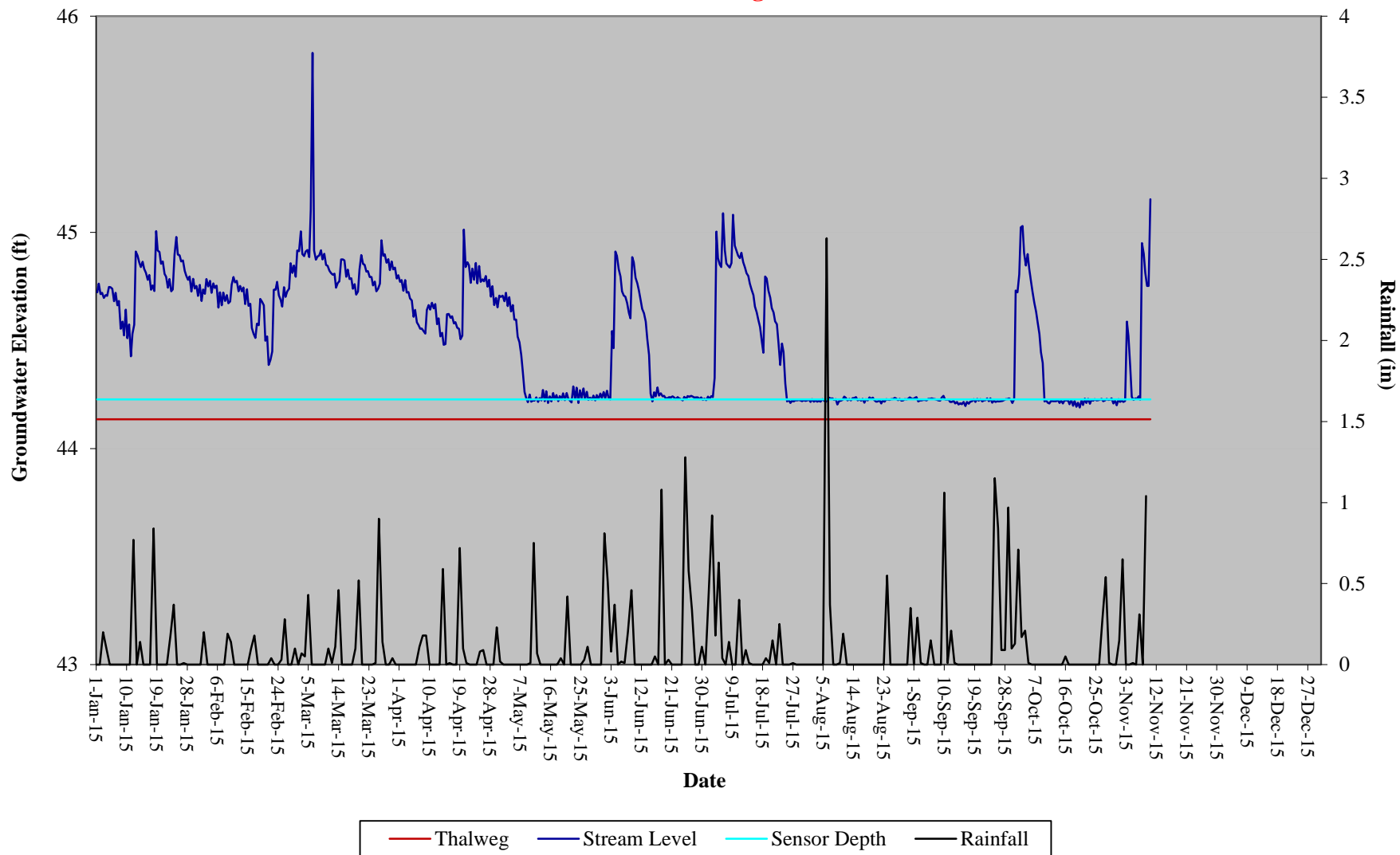
**Stanley's Restoration Site
Hydrograph
Stream Gauge 3 - T1**



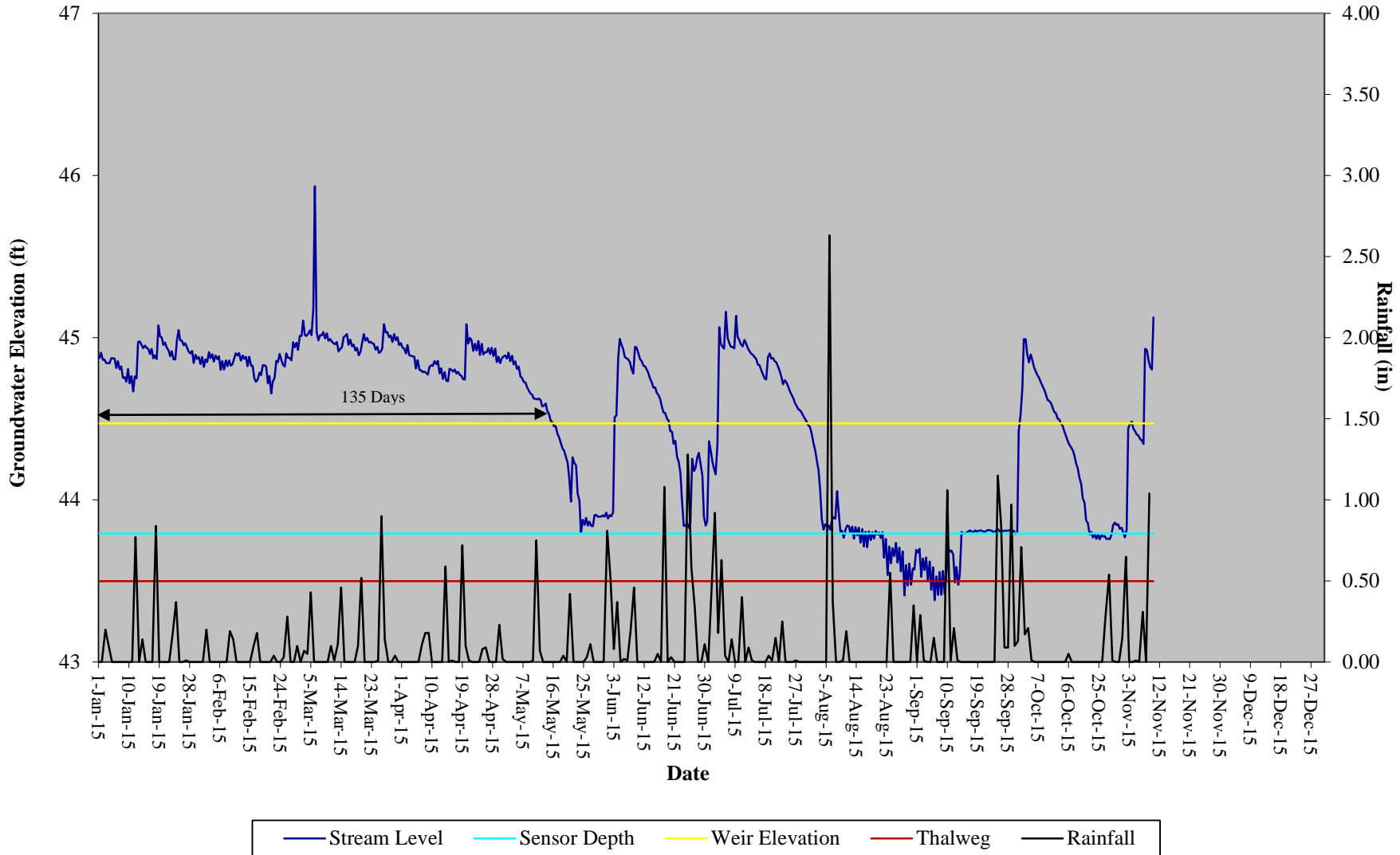
**Stanley's Restoration Site
Hydrograph
Stream Gauge 4 - T2**



**Stanley's Restoration Site
Hydrograph
Stream Gauge 5 - T2**



**Stanley's Restoration Site
Hydrograph
Stream Gauge 18 - T2**

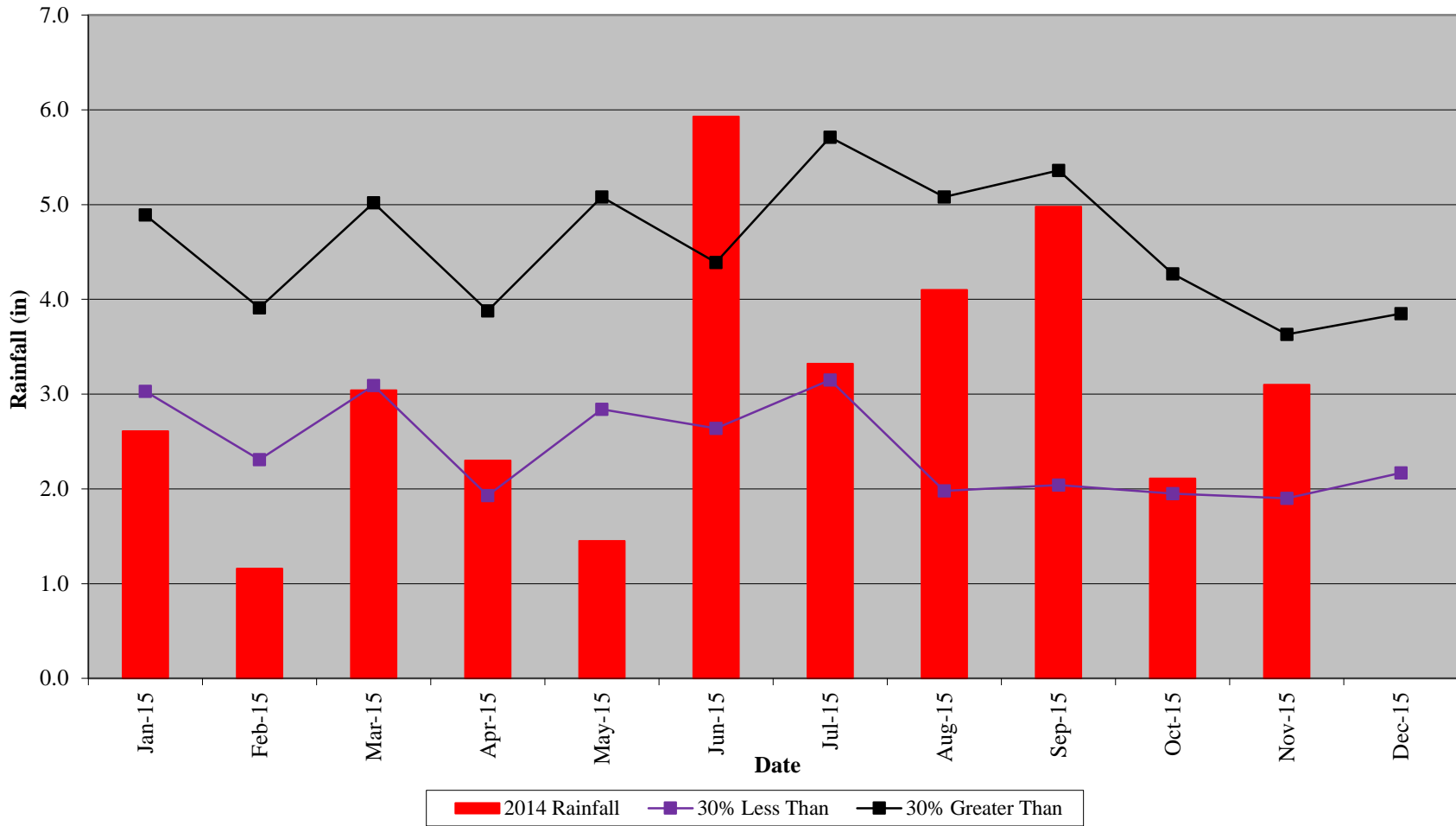


**Table 10. Wetland Hydrology Criteria Attainment
Stanley's Slough and Stanley's Slough II Restoration Sites, DMS Project Number 95356/95838**

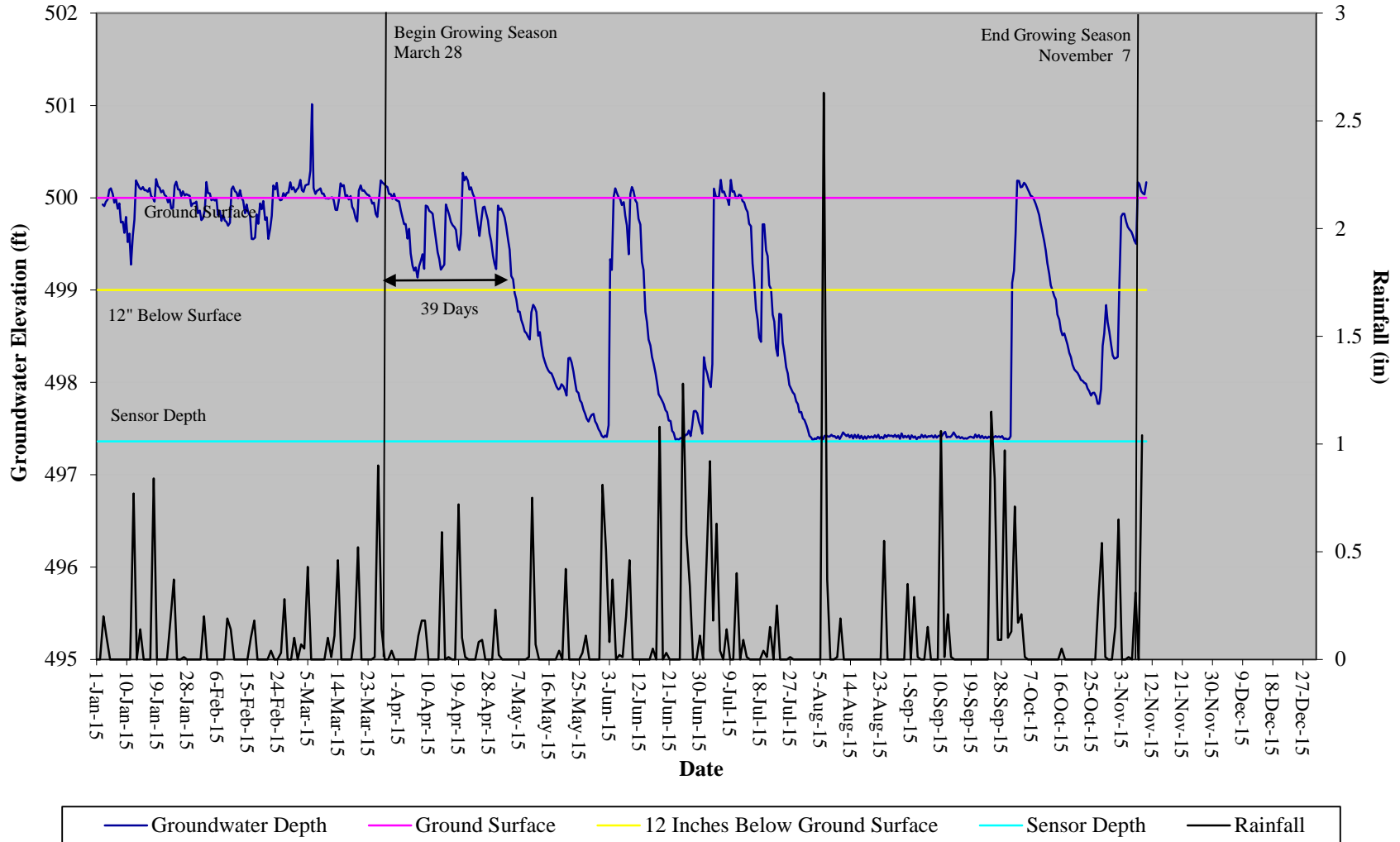
		Success Criteria Achieved/Max Consecutive Days During Growing Season (Percentage)						
Location	Gauge	MY01 (2014)	MY02 (2015)	MY03 (2016)	MY04 (2017)	MY05 (2018)	MY06 (2019)	MY07 (2020)
SII Res.	6	No/10 (4.2%)	Yes/39 (17.2%)					
SII Res.	7	No/12 (5.1%)	No/8 (3.3%)					
SII Res.	8	Yes/44 (19.4%)	Yes/43 (19.0%)					
SII Reh.	9	Yes/62 (27.5%)	Yes/80 (35.7%)					
SII Res.	10	Yes/48 (21.2%)	Yes/47 (21.0%)					
SII Res.	11	Yes/44 (19.4%)	Yes/28 (12.5%)					
SSS Res.	12	Yes/44 (19.4%)	Yes/38 (16.7%)					
SSS Res.	13	Yes/58 (25.7%)	Yes/46 (20.3%)					
SSS Res.	14	Yes/44 (19.4%)	Yes/37 (16.5%)					
SSS Reh.	15	Yes/61 (27.2%)	Yes/52 (23.0%)					
SII Res.	16	Yes/56 (24.8%)	Yes/47 (20.8%)					
SII Res.	17	Yes/47 (20.8%)	Yes/39 (17.2%)					

Res. = Wetland Reestablishment, Reh. = Wetland Rehabilitation

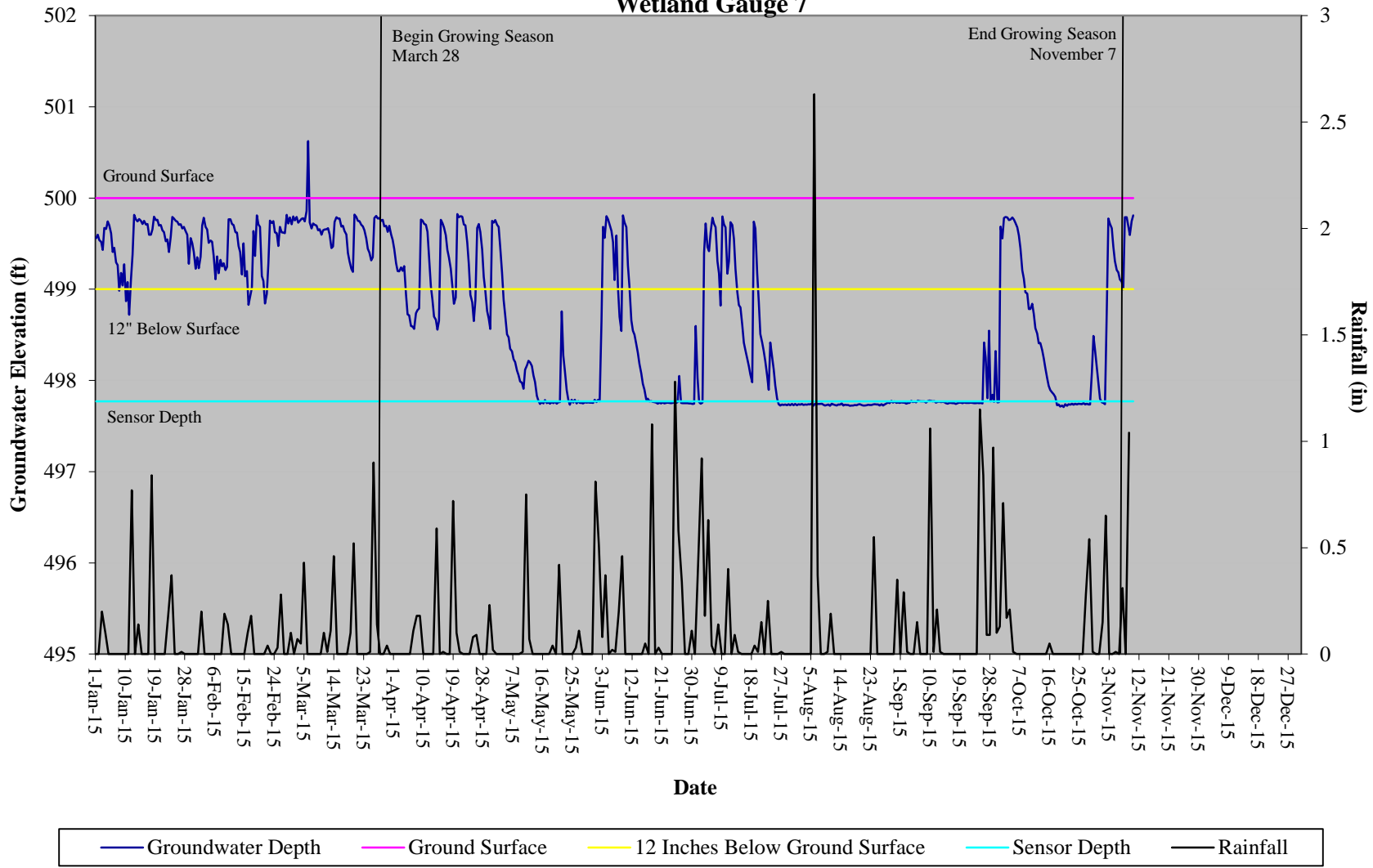
**Stanley's Slough/Stanley's II Restoration Site
30-70 Percentile Graph
WETS Station Name: Emporia Greenville Regional Airport**



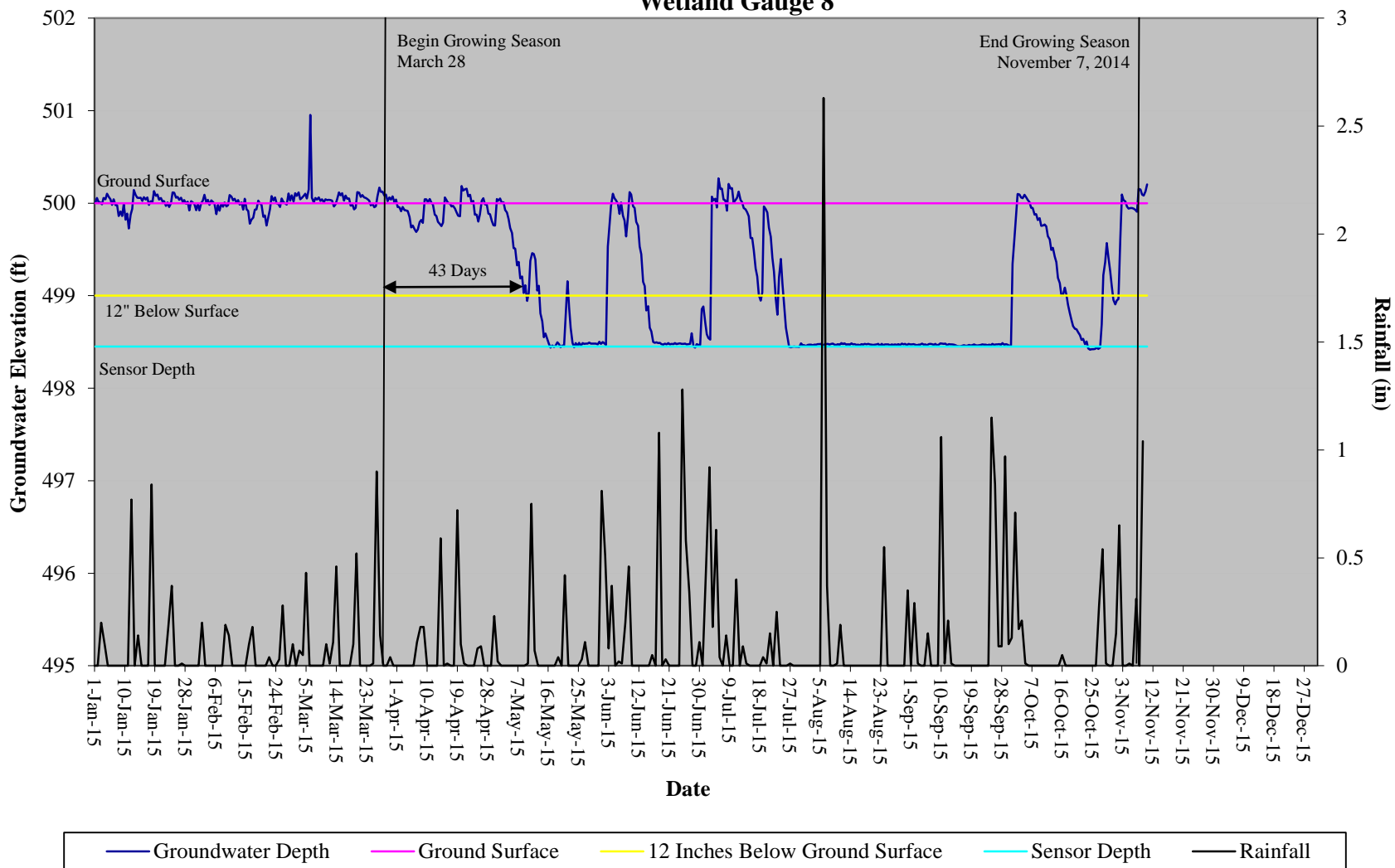
Stanley's Restoration Site Hydrograph Wetland Gauge 6



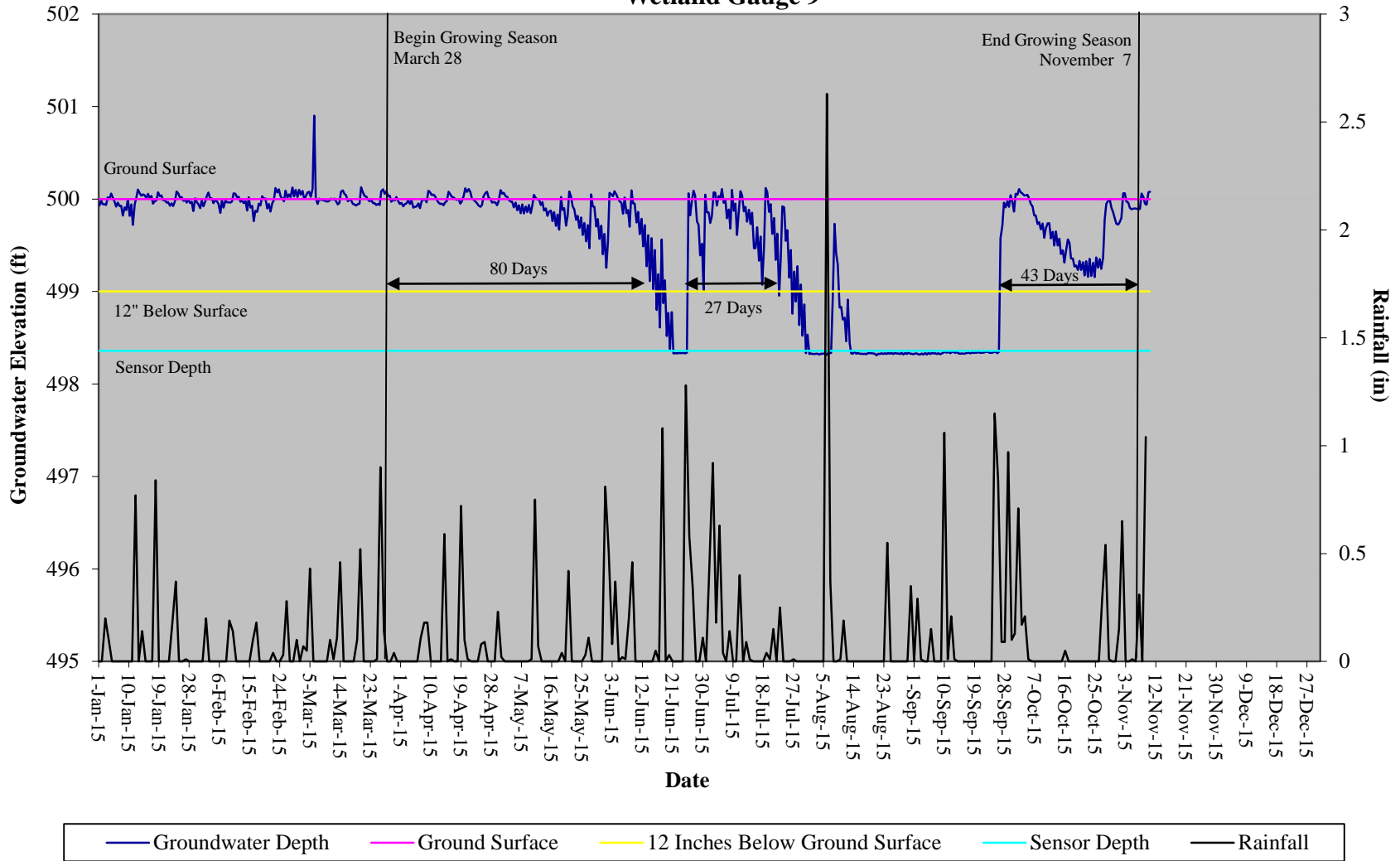
Stanley's Restoration Site Hydrograph Wetland Gauge 7



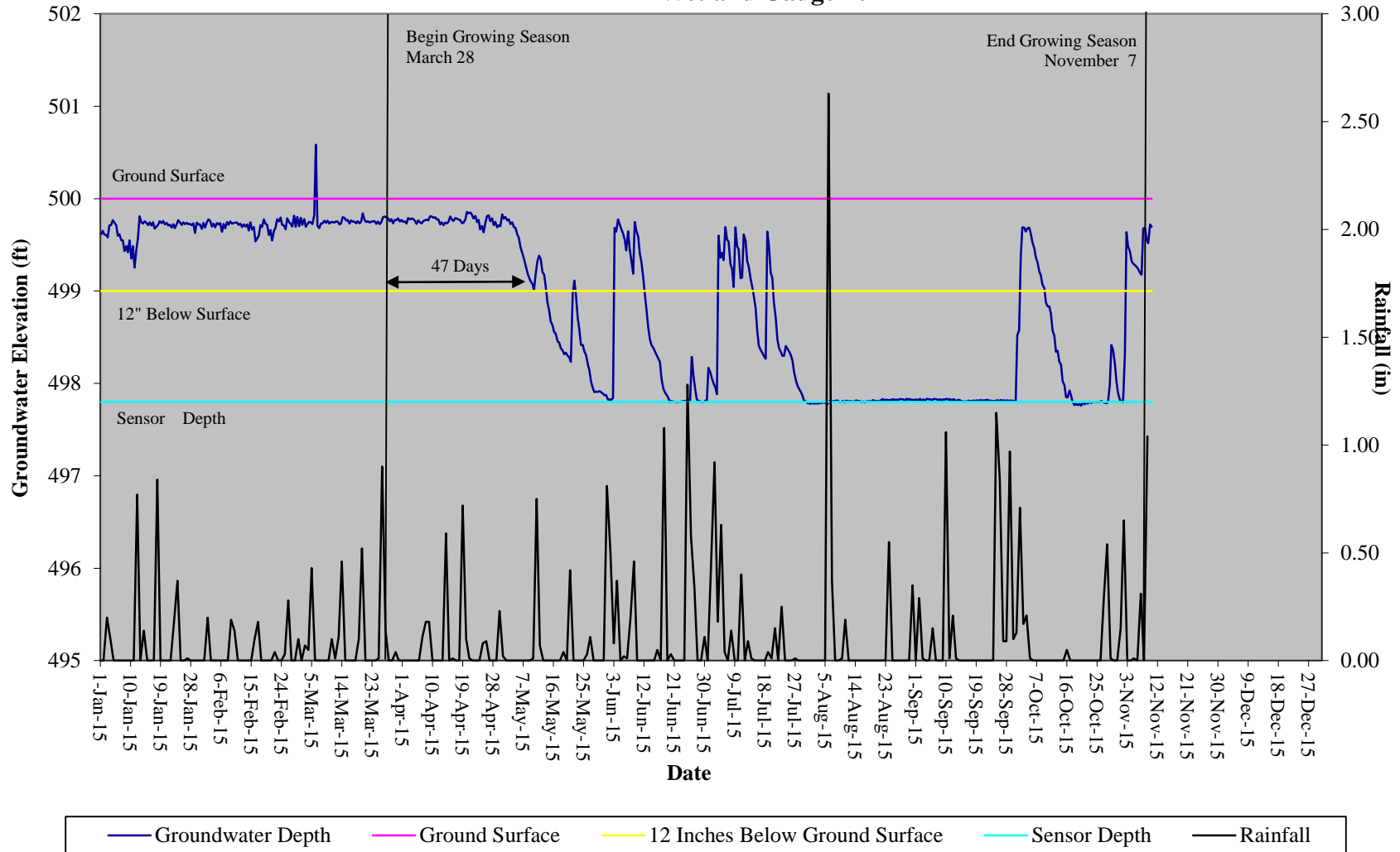
Stanley's Restoration Site Hydrograph Wetland Gauge 8



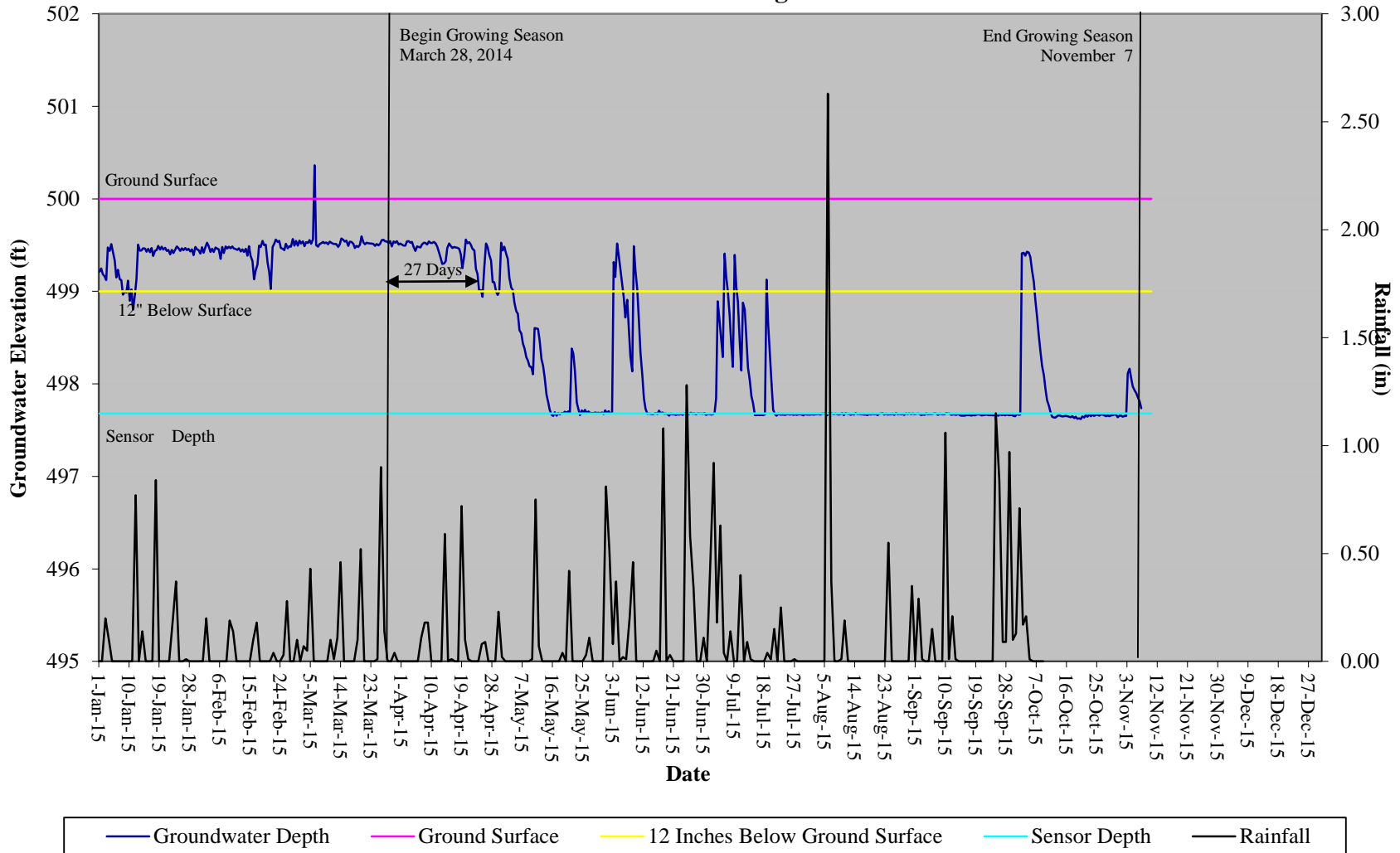
Stanley's Restoration Site Hydrograph Wetland Gauge 9



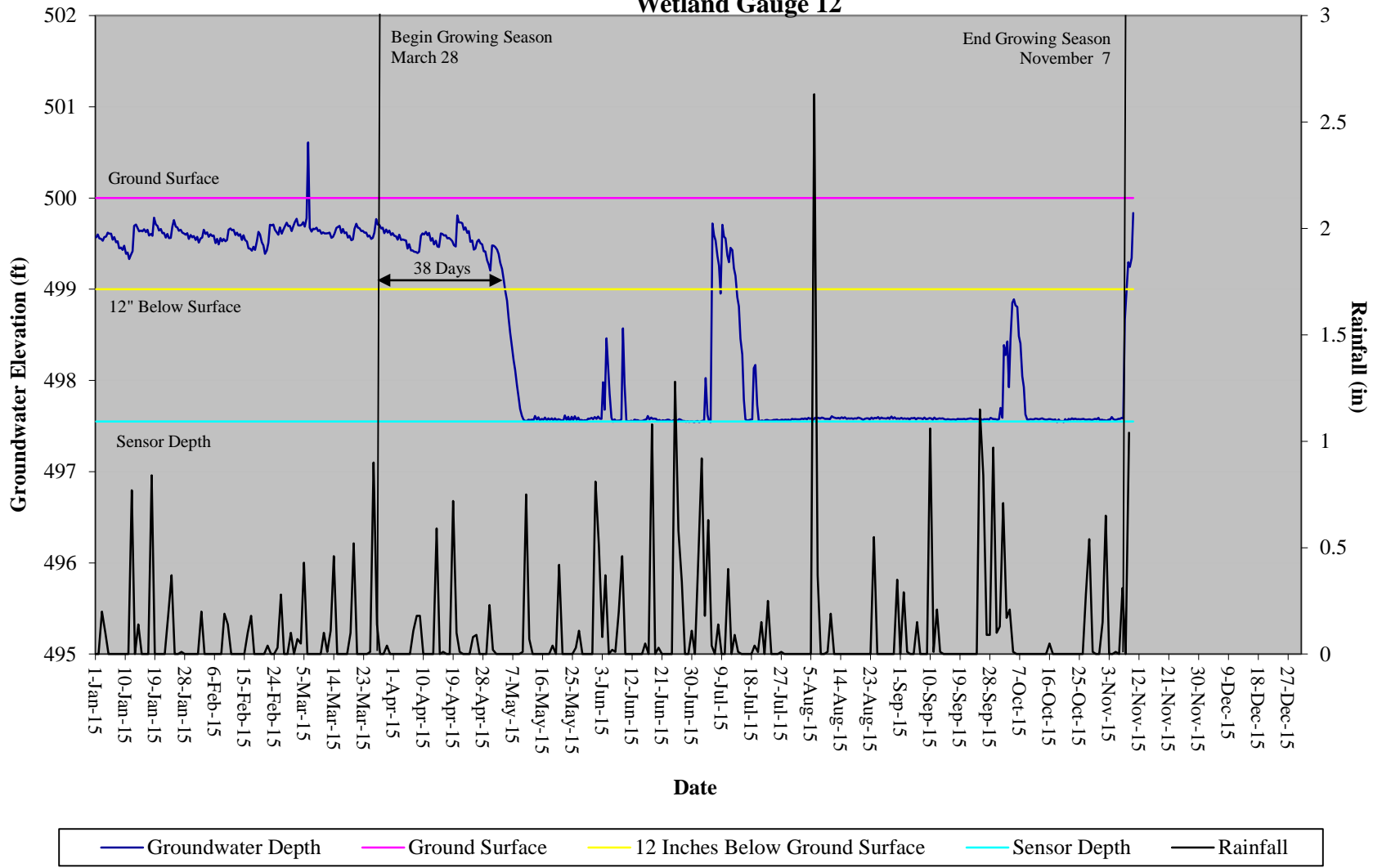
Stanley's Restoration Site Hydrograph Wetland Gauge 10



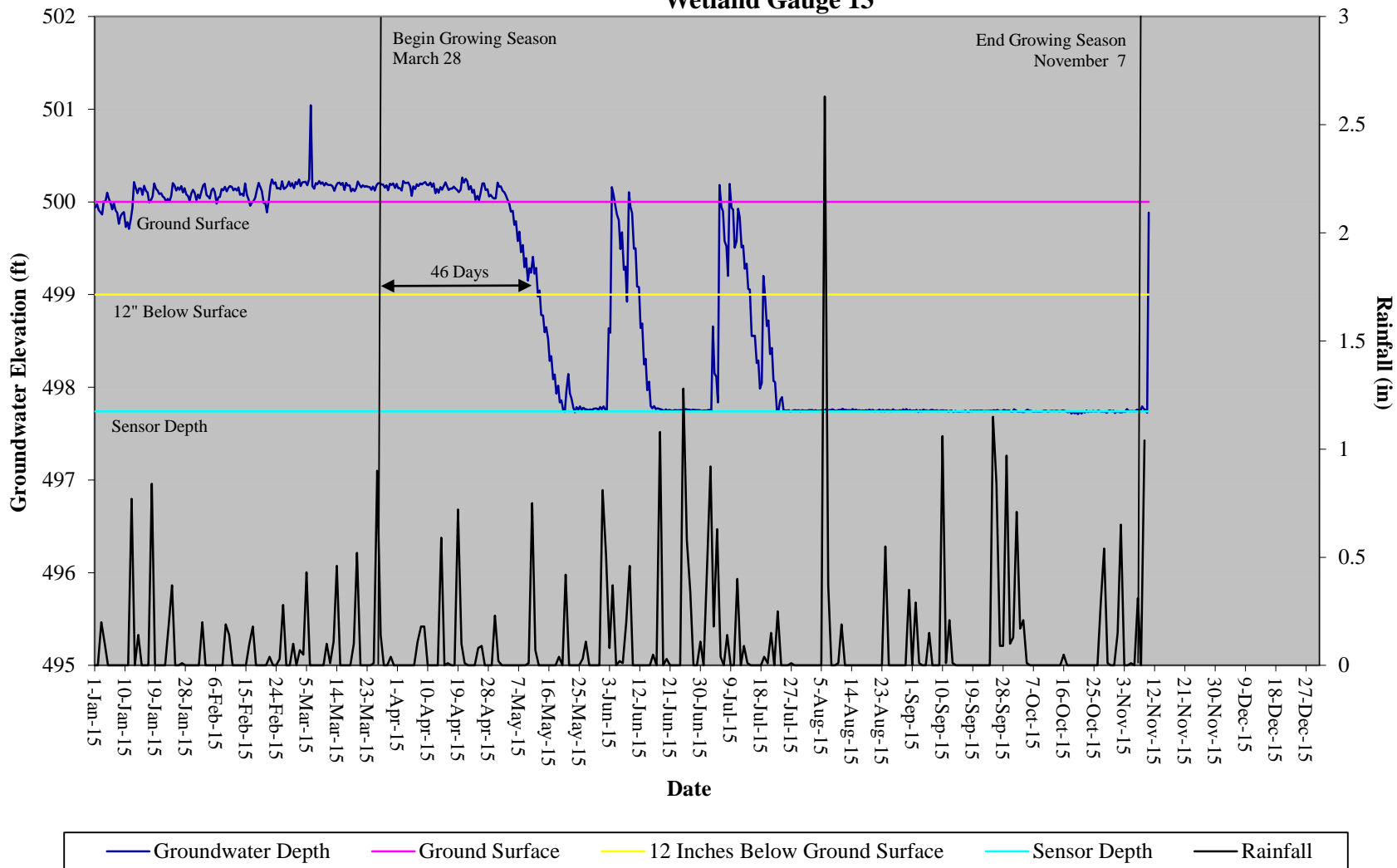
Stanley's Restoration Site Hydrograph Wetland Gauge 11



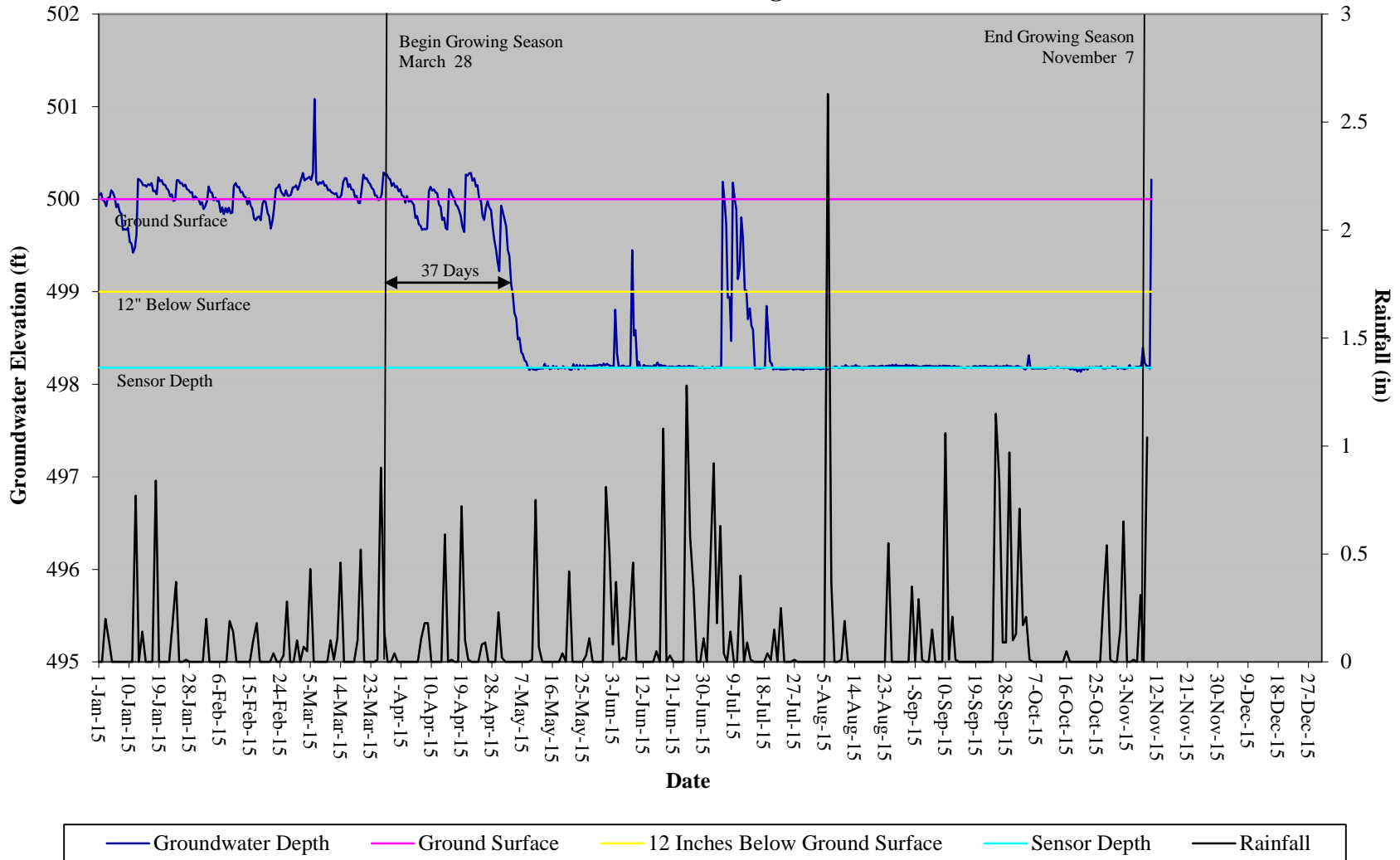
Stanley's Restoration Site Hydrograph Wetland Gauge 12



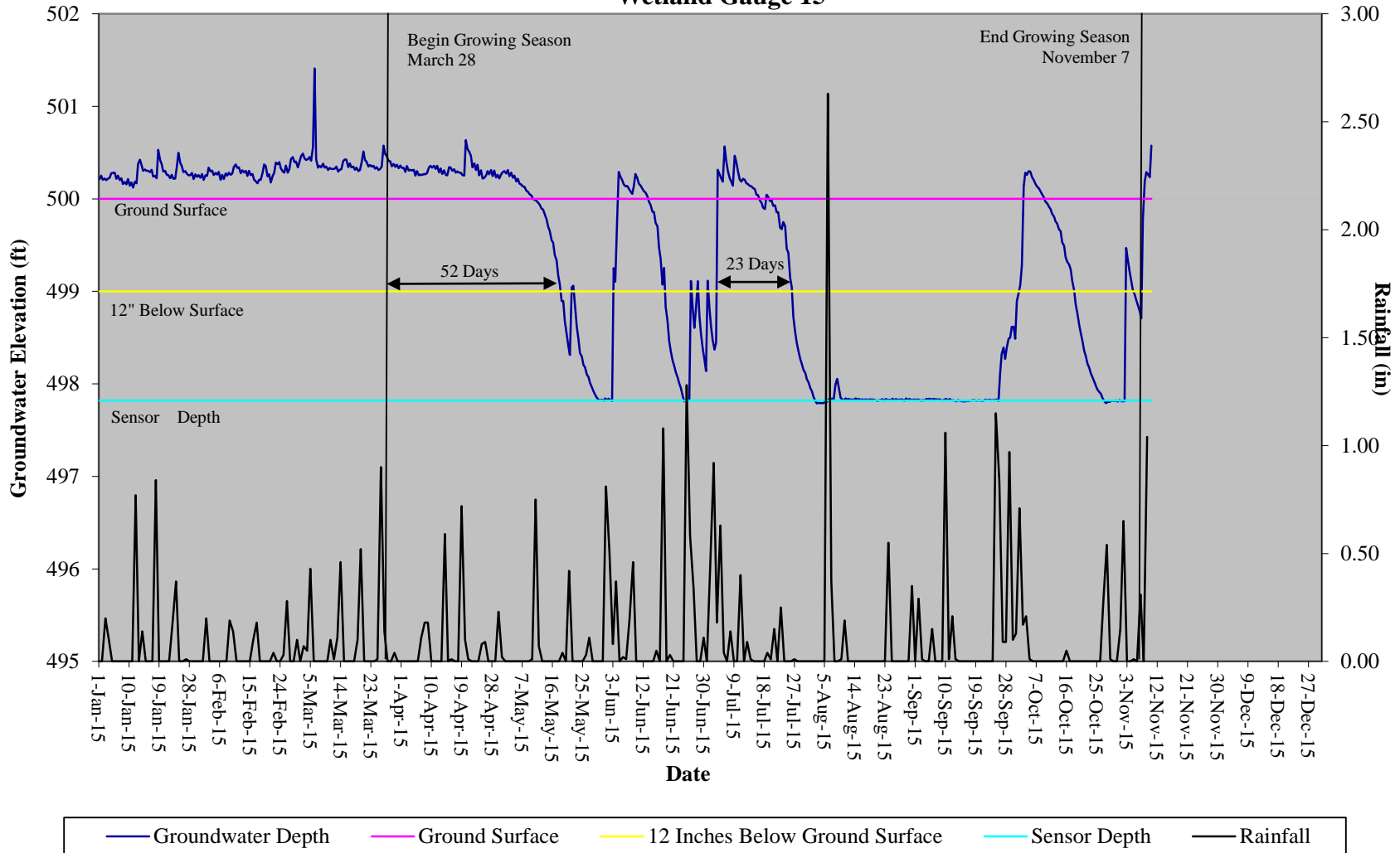
Stanley's Restoration Site Hydrograph Wetland Gauge 13



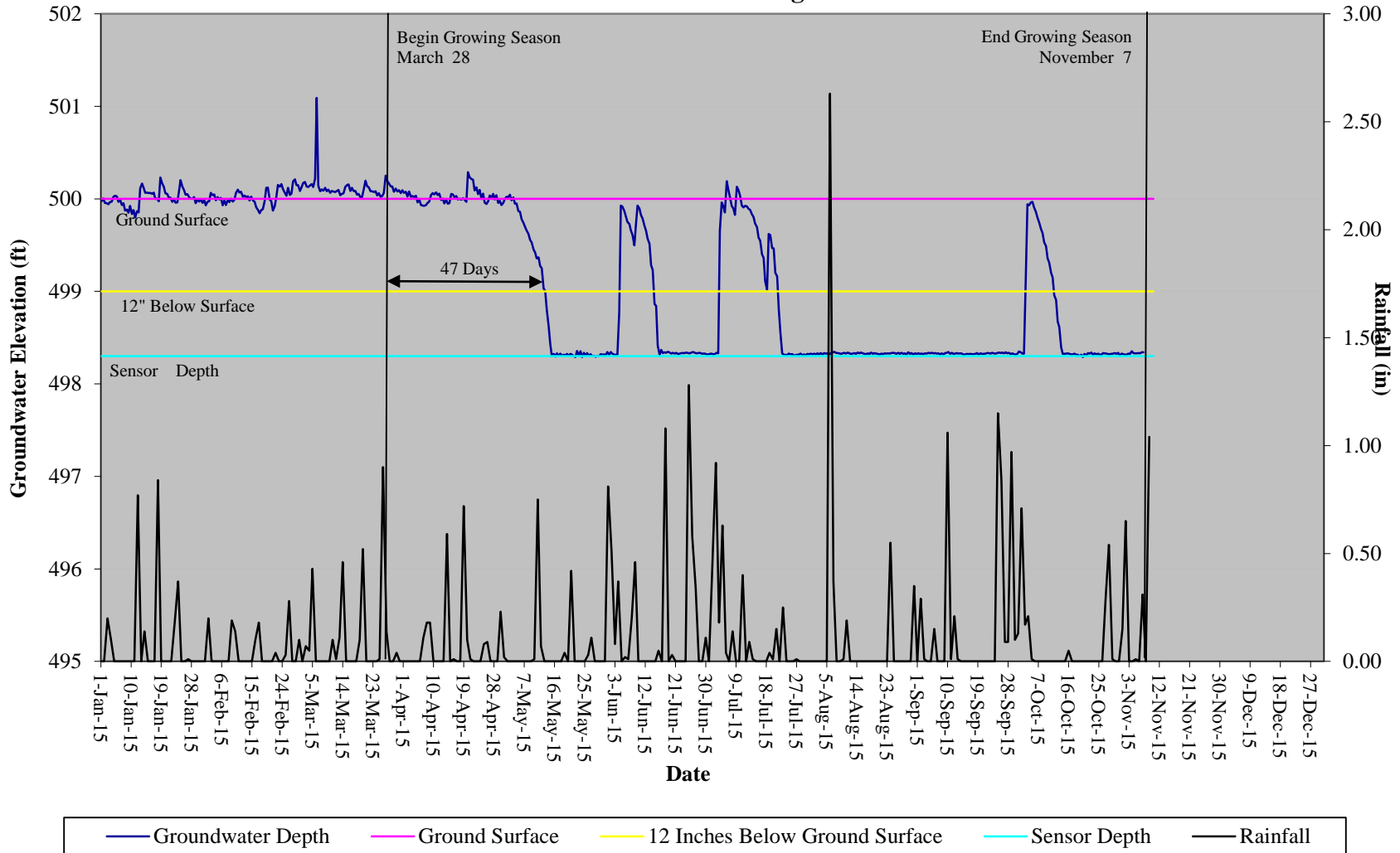
Stanley's Restoration Site Hydrograph Wetland Gauge 14



Stanley's Restoration Site Hydrograph Wetland Gauge 15



Stanley's Restoration Site Hydrograph Wetland Gauge 16



Stanley's Restoration Site Hydrograph Wetland Gauge 17

