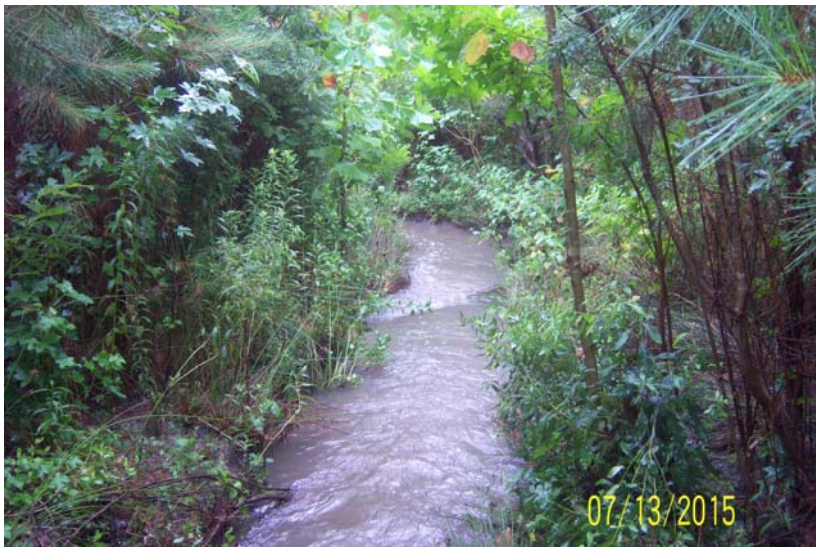
Jacksonville Country Club
Stream Restoration and Enhancement Project

SCO No. 070715501
DEQ Contract No. D08049S
DMS Project No. 194
Action ID# 2006-40325-067
Onslow County, North Carolina

Year 2 of 5 Monitoring Report
Data Collection: January through December 2015
Submission Date: April 13, 2016



Prepared for:

North Carolina Department of Environmental Quality
Division of Mitigation Services
2728 Capital Boulevard, Suite 1H-103 Raleigh, NC 27606

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Prepared by:

Land Management Group, Inc.
3805 Wrightsville Avenue; Suite 15
Wilmington, NC 28403
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3.0 EXECUTIVE SUMMARY/PROJECT ABSTRACT

3.1 Goals and Objectives

The overall goal of the Jacksonville Country Club project is to facilitate the development of a natural system which will exhibit desired functions appropriate to the geomorphic setting of the site (EEP, 2006). Specific goals include: 1) water quality improvement; and 2) natural community improvement. To achieve these specific goals, the following objectives have been pursued:

- Form and/or reform stream dimension, pattern, and profile for a stable system
- Generate aquatic and terrestrial habitat elements
- Implement pollutant removal features

3.2 Project Success Criteria

The final vegetative success criterion is the survival of 320 planted woody stems per acre at the end of the Year 3 monitoring period and 260 planted woody stems per acre at the end of the Year 5 monitoring period, which is based on the US Army Corps of Engineers Stream Mitigation Guidelines (COE 2003). In order for the stream mitigation to be successful, the overall cross section geometry of the reaches should remain consistent without significant sediment aggradation or degradation. The hydrologic success criterion will be the documentation of two bankfull flow events over the five year monitoring period. The bankfull events must occur during separate monitoring years (USACE, 2003). Observations of wrack and deposition may serve to augment gauge observations when necessary.

3.3 Site Location and History

The Jacksonville Country Club Stream Restoration and Enhancement Site is located northwest of the intersection of Country Club Road and Country Club Drive in Jacksonville, Onslow County, North Carolina within the White Oak River Basin #03030001 Cataloging Unit (Figure 1). It is located within an active country club and a golf course traverses either side of the stream channel project area. The stream network within the project area consists of a main channel with four tributaries (Figure 2). Prior to mitigation, the channels were characterized by sparse woody vegetation and by steep eroding banks.

3.4 Project Components

The project includes 3,109 linear feet (LF) of stream restoration and 376 LF of stream enhancement. Reach 1A is the main channel through the project area and begins at the upstream end of the channel restoration. The reach crosses through the golf course as a priority 1 restoration. Reach 2A is priority 1 in most sections and priority 2 when necessary to tie into the existing channel. Reach B is priority 1 restoration. Reach C is approximately half priority 1 restoration and half priority 2 restoration. Refer to Table 1 and Figure 2 in Appendix A for a table and detailed plan view of the project components.

3.5 Project Design/Approach

To accomplish the above-stated goals, the dimension, pattern and profile of the channel was restored and enhanced. Where possible, fifty-foot vegetative buffers have been added to each side of the channel. The provision of a wider floodplain, the retrofitting of an existing stormwater wetland and the addition of stormwater BMPs (best management practice) helps to maintain the integrity of the designed project. In addition, the project replaces habitat to a system relatively void in plant community diversity. Refer to Tables 2-4 in Appendix A for additional project and contact details.

3.6 Project Performance

Vegetation monitoring is conducted on an annual basis using nine (9) permanent vegetation plots (Figure 2). Monitoring Year 2 (MY2 2015) observed a mean stem density of 409 planted stems per acre in the plots. When volunteer stems were included, the site had an overall mean stem density of 2,446 stems per acre. As in MY1, Plots #2, #6, and #8 did not meet the vegetation success criterion in MY2 2015. Plots #2 and #6 appeared to have been mowed in 2014 and very few planted stems remain within these plots. During the vegetation monitoring, herbaceous vegetation had volunteered into these areas.

Stream monitoring in MY2 (2015) consisted of both visual and morphological (i.e. survey) assessment of the channels. A visual inspection of the restored and enhanced stream channels and the BMP areas was conducted in September and November of 2015. Please see Appendix B for stream morphology assessment tables and photos. The BMP areas were stable. However, the BMP along the north side of 2A is actively managed because of the playover and trees are kept to a minimum height.

As observed in the baseline and MY1 evaluations, many problem areas were identified along the four restored stream reaches (1A, 2A, B & C) and the enhancement reach during the visual inspection. Appendix B contains photographs of the problem areas and Figure 2 depicts the GPS location of specific points noted below.

Reach 1A

A total of 24 problem areas were noted within Reach 1A (compared to 22 areas in MY1). These included 6 undercuts, 13 areas of degradation, 3 scour holes, one area of mass wasting, and one area of aggradation. This area of aggradation appears to be causing a new channel to form at the very top of the reach.

Reach 2A

Twenty-six problem areas were noted within this reach during the visual inspection (compared to 22 areas in MY1). These included 4 bank undercuts, 8 areas of degradation, 10 scour holes (compared to 3 last year), and 4 areas of mass wasting (compared to 1 last year).

Reach B

As observed during the baseline and MY1 monitoring, some water was bypassing the constructed channel and forming another, more direct route to the main channel (Pt 51). This was again classified as aggradation. Additionally, two bank undercuts, one area of degradation, and one area of mass wasting were noted within this reach. Several grade controls features were not observed and it was assumed that they have been buried by sediment. However, the stream appeared to be functioning properly in these areas.

Reach C

Vegetation clearing and earthwork had caused sediment to enter the stream channel at the top of this reach. Several grade controls features were not observed and it was assumed that they have been buried by sediment. However, the stream appeared to be functioning properly in these areas.

Enhancement Reach

The enhancement reach is a small channel and it contains a great deal of vegetative debris. Two areas of aggradation were also noted within this channel.

A longitudinal profile and cross sectional survey (nine cross sections) was performed by Paramounte Engineering in November of 2015. Please see Appendix D for summary tables and plots of longitudinal profiles and cross sections for each reach. Based on the MY2 survey data, reaches remain fairly consistent with MY1 and baseline data. While many problem areas were noted along the reaches during the visual inspection, there was no significant channel aggradation or degradation.

The on-site occurrence of bankfull events is documented using two stream gauges (Figure 2). Both stream gauges documented many occurrences of overbank flooding in 2015 (Table 16; Appendix E).

It should also be noted that several survey markers were missing or were unstable. The upstream start pin of Reach C was buried in gravel sediment washed in from road and could not be located. At Plot 2, the southwest plot marker is missing and may have been mowed down. At Plot 7, the northeast plot marker is in danger of eroding into the channel (mass wasting area). At Plot 8, the northeast origin marker is missing and may have washed into the stream.

4.0 METHODOLOGY

Nine (9) permanent vegetation plots are used for vegetation monitoring. All vegetation monitoring was completed in September 2015 utilizing the Carolina Vegetation Survey (CVS) – EEP protocol Level 2 (version 4.2)

Stream morphological monitoring will occur annually. Elevation data will be collected at nine permanent cross section stations located along each channel. Width/depth ratio, entrenchment ratio, and low bank height ratio is measured and compared with the constructed stream geomorphology (the as-builts) for dimension and profile. Longitudinal profile data will be collected and analyzed to identify bankfull slope, pool-to-pool spacing, pool length, riffle length, max-pool depth and other parameters. Plan views will be evaluated for sinuosity, meander width ratio, radius of curvature and compared with the post construction as-builts.

The on-site occurrence of bankfull events is monitored with two stream gauges (Figure 2). Gauges were downloaded monthly utilizing Remote Data Systems data loggers and software.

Photo monitoring was conducted by walking the entire site. A digital camera was used to take photos at each predetermined photo point location.

Summary information/data related to the occurrence of items such as beaver or 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 mitigation and restoration plan documents available on EEP's website. All raw data supporting the tables and figures in the appendices are available from EEP upon request.

5.0 REFERENCES

NCEEP. 2015. Jacksonville Country Club Stream Restoration and Enhancement Project Year One Monitoring Report. North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program. Raleigh, NC. March, 2015.

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Schafale, M.P. and A.S. Weakley. 1990. Classification of the natural communities of North Carolina, Third Approximation. Prepared for North Carolina Natural Heritage Program and Division of Parks and Recreation. Raleigh, NC.

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US Army Corps Of Engineers. 2003. U.S. Army Corps. of Engineers. Stream Mitigation Guidelines. Wilmington Regulatory Field Office.

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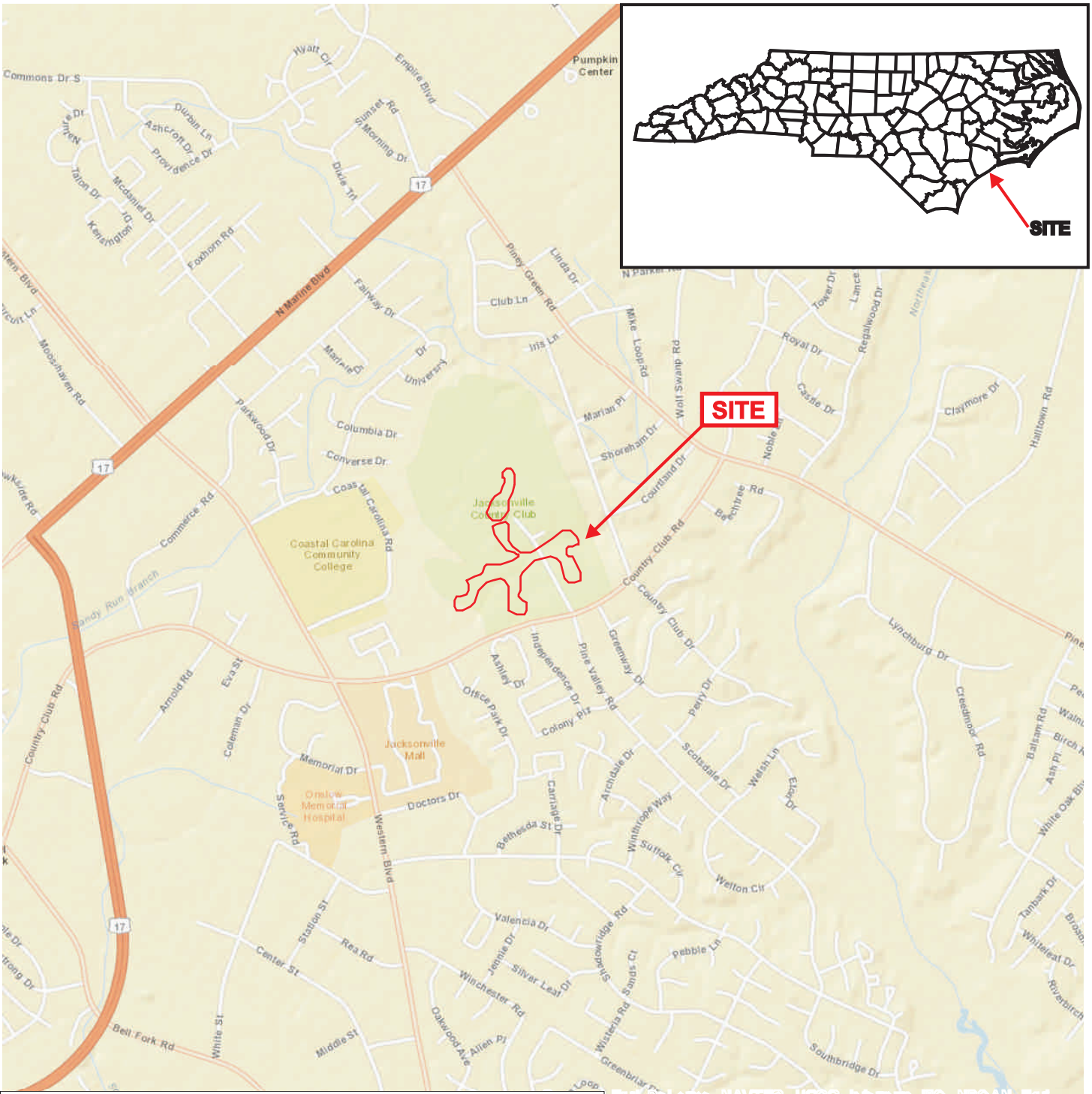
6.0 PROJECT CONDITION AND MONITORING DATA APPENDICES

Appendix A.
Project Background Data and Maps



Directions to Site: Directions to Site: From Wilmington, take US 17 North toward Jacksonville. Turn right on Western Blvd. Turn left on Country Club Drive. Turn left on Pine Valley Rd. This will take you into the Jacksonville Country Club. Project site is located within the country club.

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.

*Boundaries are approximate and are not meant to be absolute.

Map Source: ArcGIS World Street Map

N

SCALE 1" = 2,000'

Jacksonville Country Club
Stream Restoration & Enhancement Project
Onslow County, NC

LMG Project No. 40-08-189
DMS Project No. 194

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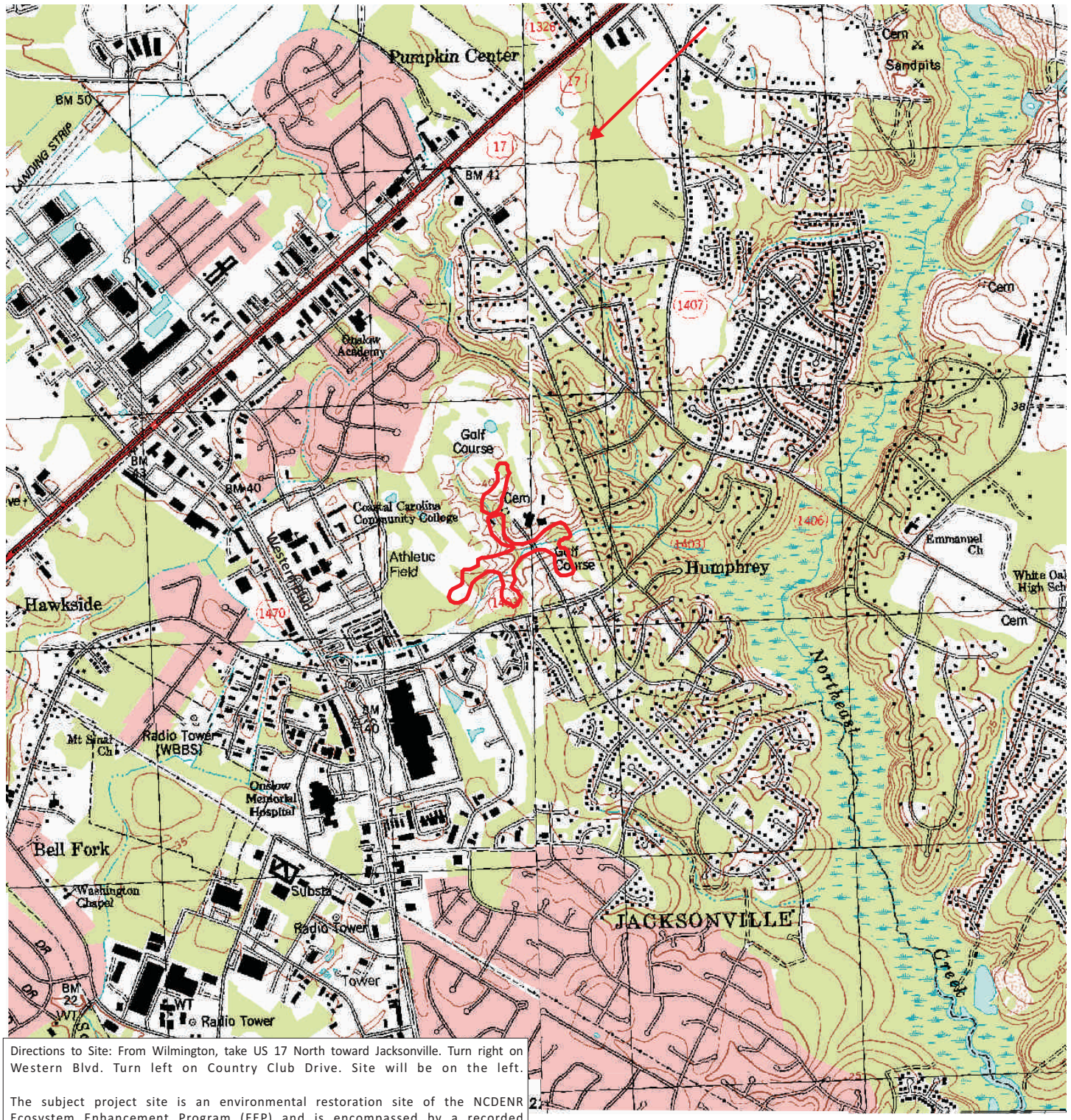
Figure 1a
Site Vicinity Map



Directions to Site: From Wilmington, take US 17 North toward Jacksonville. Turn right on Western Blvd. Turn left on Country Club Drive. Site will be on the left.

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.

*Boundaries are approximate and are not meant to be absolute.

Map Source: USGS Kellum/Jacksonville NorthQuadrangle 7.5 minute

N

SCALE 1" = 2,000'

Jacksonville Country Club
Stream Restoration & Enhancement Project
Onslow County, NC

LMG Project No. 40-08-189
DMS Project No. 194

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Figure 1b
Topographic Map

Table 1. Project Components and Mitigation Credits

Jacksonville Country Club Stream Restoration & Enhancement Project, DMS No. 194

Mitigation Credits

	Stream		Riparian Wetland		Non-Riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorus Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	3,109	376							

Project Components

Project Component	Stationing/ Location	Existing Footage/ Acreage	Priority Approach	Restoration or Restoration Equivalent	Restoration Footage or Acreage	Mitigation Ratio
Stream Restoration	1A	1,388	P1	Restoration	1307 LF	1:1
Stream Restoration	2A	772	P1 and P2	Restoration	711 LF	1:1
Stream Restoration	B	403	P1 and P2	Restoration	478 LF	1:1
Stream Restoration	C	556	P1	Restoration	613 LF	1:1
Stream Enhancement	E	376	Enhancement	Enhancement (RE)	376	2:1

Component Summation

Restoration Level	Stream (lf)	Riparian Wetland (ac)	Non-Riparian Wetland (ac)	Buffer (sq ft)	Upland (ac)
Restoration	3,109				
Enhancement					
Enhancement I					
Enhancement II	376				
Creation					
Preservation					
HQ Preservation					

BMP Elements*

Element	Location	Purpose/Function	Notes
BR	North Side of Reach 2A	Collect and treat runoff before entering stream system	See Figure 2
SW	North Side of Reach 2A	Collect and treat runoff before entering stream system	See Figure 2
SW	South Side of Reach 2A	Collect and treat runoff before entering stream system	See Figure 2
SW	Near Fairway #11	Collect and treat runoff before entering stream system	See Figure 2
SW	Upper end of Reach C	Collect and treat runoff before entering stream system	See Figure 2

Table 2. Project Activity and Reporting History Jacksonville Country Club Stream Restoration and Enhancement Project -DMS Project No. 194		
Activity or Report	**Data Collection Complete**	**Actual Completion or Delivery**
Restoration Plan	NA	Jun-07
Final Design – Construction Plans	NA	
Construction	NA	Aug-10
Temporary S&E mix applied to entire project area	NA	Aug-10
Containerized and B&B plantings	NA	Apr-10 & Apr-11
Temporary repairs to site	NA	Jan-11
Permanent repairs to stream & culvert/headwall	NA	Jun-13
Baseline Monitoring Document (Year 0 Monitoring - baseline)	November-13	June-14
Year 1 Monitoring	December-14	March-15
Year 2 Monitoring	December-15	December-15
Year 3 Monitoring		
Year 4 Monitoring		
Year 5 Monitoring		

Table 3. Project Contacts Table Jacksonville Country Club Stream Restoration & Enhancement Project	
DMS Project No. 194	
Designer Primary project design POC	BLWI; 295 Becky Branch Rd; Southern Pines, NC Stantec; 801 Jones Franklin Rd #300; Raleigh, NC (919) 851-6866
Construction Contractor Construction contractor POC	Charles Hughes Construction; 4675 Ben Dail Rd, La Grange, NC (252) 566-5040
Live Staking & Seeding Contractor	Charles Hughes Construction; 4675 Ben Dail Rd, La Grange, NC
Seeding Contractor POC	(252) 566-5040
Planting Contractor	Backwater Environmental; 119 Ilex Ct, Pittsboro, NC
Planting Contractor POC	(919) 523-4375
Seed Mix Sources	Unknown
Nursery Stock Suppliers	Unknown
Construction Contractor (Repairs) Construction contractor POC	NorthState Environmental; 2889 Lowery Street, Winston-Salem, NC (336) 725-2010
Baseline Monitoring Performers (MY0) Stream Monitoring POC Vegetation Monitoring POC Wetland Monitoring POC	Land Management Group, Inc. 3805 Wrightsville Avenue, Suite 15; Wilmington, NC 28403 Kim Williams (910) 452-0001 Kim Williams (910) 452-0001 N/A
Monitoring Performers (MY1 - MY5) Stream Monitoring POC Vegetation Monitoring POC	Land Management Group, Inc. 3805 Wrightsville Avenue, Suite 15; Wilmington, NC 28403 Kim Williams (910) 452-0001 Kim Williams (910) 452-0001

Table 4. Project Baseline Information and Attributes
Jacksonville Country Club Stream Restoration & Enhancement Project
DMS Project No. 194

Project Information				
Project Name	Jacksonville Country Club Stream Restoration & Enhancement Project			
Project County	Onslow			
Project Area	9.34 acres			
Project Coordinates (Lat and Long)	34° 46', -77° 22'			
Project Watershed Summary Information				
Physiographic Region	Coastal Plain			
River Basin	White Oak			
USGS HUC 8 Digit 03030001	USGS HUC 14 Digit 03030001020010			
NCDWQ Subbasin	03-05-02			
Project Drainage Area	253 ac			
Project Drainage impervious cover estimate (%)	< 5%			
CGIA Land Use Classification				
Reach Summary Information				
Parameters	**Reach 1A**	**Reach 2A**	**Reach B**	**Reach C**
Length of Reach	1429 LF	743 LF	512 LF	558 LF
Valley Classification	unknown	unknown	unknown	unknown
Drainage Area	99 ac	253 ac	55 ac	79 ac
NCDWQ Stream Identification Score	N/A	N/A	N/A	N/A
NCDWQ Water Quality Classification	SC NSW	SC NSW	SC NSW	SC NSW
Morphological Description (stream type)	C5/E5	C5/E5	C5/E5	C5/E5
Evolutionary Trend	N/A	N/A	N/A	N/A
Underlying Mapped Soils	Craven	Craven	Craven	Craven
Drainage Class	Moderately Well Drained	Moderately Well Drained	Moderately Well Drained	Moderately Well Drained
Soil Hydric Status	Hydric B	Hydric B	Hydric B	Hydric B
Slope	0-1%	0-1%	0-1%	0-1%
FEMA Classification	Zone X	Zone X	Zone X	Zone X
Native Vegetation Community	N/A	N/A	N/A	N/A
Percent Composition Exotic Invasive Vegetation	< 1%	< 1%	< 1%	< 1%
Regulatory Considerations				
Regulation		**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the US – Section 404		Yes	Yes	Upon Request
Waters of the US – Section 401		Yes	Yes	Upon Request
Endangered Species Act		Yes	Yes	Upon Request
Historic Preservation Act		Yes	Yes	Upon Request
Coastal Zone Management Act (CZMA) Coastal Area Management Act (CAMA)		Yes	Yes	Upon Request
FEMA Floodplain Compliance		Yes	Yes	Upon Request
Essential Fisheries Habitat		No	N/A	N/A

Appendix B.
Visual Assessment Data

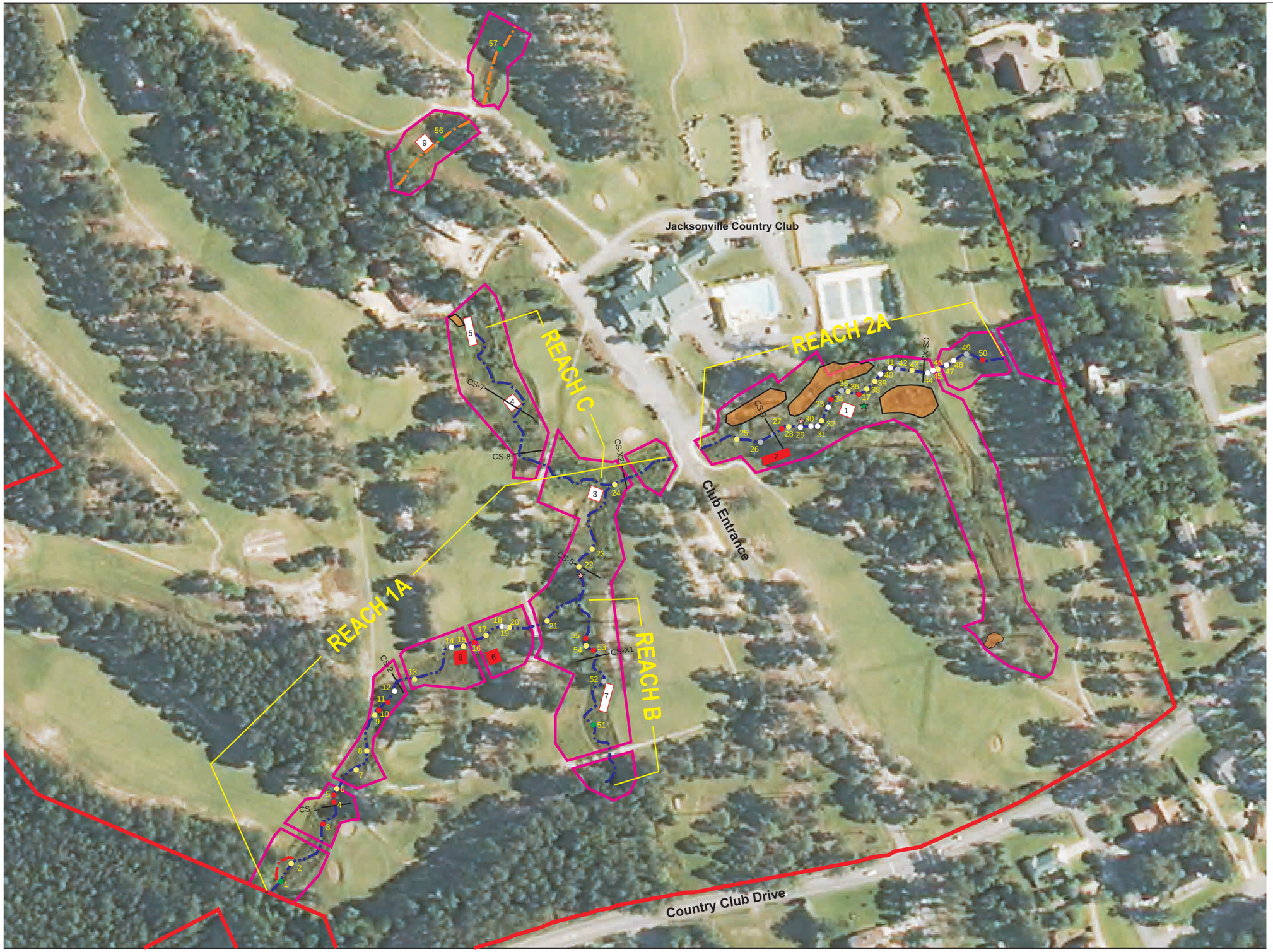


FIGURE 2.

Current Conditions Plan View

Jacksonville Country Club
Stream Restoration
and Enhancement Site

Project No: D08049S
DMS No. 194
Onslow County, NC

LEGEND

- Stream Restoration (3109 LF) (taken from 2010 as-built survey)
- Stream Enhancement (376 LF) (approximated on map)
- Easement Boundary
- Property Boundary
- Stream Cross Section (9)
- Vegetation Monitoring Plot (9)
- Plot that did not meet success criterion
- Stream Gauge (2)
- Rain Gauge (1)
- BMP (approximated on map)

Bed/Bank Problem Areas

- Undercut
- Degradation
- Scour
- Mass Wasting
- Aggradation
- New Channel Formation

N

SCALE 1" = 200'

LMG
LAND MANAGEMENT GROUP INC.
Environmental Consultants

April 2016

Table 5a **Visual Stream Morphology Stability Assessment**
Reach ID **Reach 1A**
Assessed Length **1307**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. **Vertical Stability** (Riffle and Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			1	40	97%			
		2. Degradation - Evidence of downcutting			13	190	85%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	34	34			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth> 1.6)	34	34			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	34	34			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	34	34			100%			
		2. Thalweg centering at downstream of meander (Glide)	34	34			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			3	30	99%	0	0	99%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			6	60	98%	0	0	98%
	3. Mass Wasting	Bank slumping, calving, or collapse			1	10	100%			100%
				Totals	10	100	96%	0	0	96%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	14	14			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	13	14			93%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	14	14			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence doesnot exceed 15%. (See guidance for this table in EEP monitoring guidance document)	11	14			79%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio > 1.6 Rootwads/logs providing some cover at base-flow.	14	14			100%			

Table 5b **Visual Stream Morphology Stability Assessment**
Reach ID **Reach 2A**
Assessed Length **711**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)					100%			
		2. Degradation - Evidence of downcutting			8	120	83%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	12	12			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth > 1.6)	11	11			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	11	11			100%			
	4.Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	11	11			100%			
		2. Thalweg centering at downstream of meander (Glide)	11	11			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			10	100	93%	0	0	93%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			4	40	97%	0	0	97%
	3. Mass Wasting	Bank slumping, calving, or collapse			4	40	97%	0	0	97%
				Totals	18	180	87%	0	0	87%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	14	14			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	12	14			86%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	14	14			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	11	14			79%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio > 1.6 Rootwads/logs providing some cover at base-flow.	14	14			100%			

Table 5c **Visual Stream Morphology Stability Assessment**
Reach ID **Reach B**
Assessed Length **478**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			1	15	97%			
		2. Degradation - Evidence of downcutting			1	10	98%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	11	11			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth > 1.6)	10	10			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	10	10			100%			
	4.Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	10	10			100%			
		2. Thalweg centering at downstream of meander (Glide)	10	10			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			2	20	98%			98%
	3. Mass Wasting	Bank slumping, calving, or collapse			1	10	99%			99%
				Totals	3	30	97%	0	0	97%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	7	7			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	7	7			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	7	7			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	7	7			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio > 1.6 Rootwads/logs providing some cover at base-flow.	7	7			100%			

Table 5d **Visual Stream Morphology Stability Assessment**
Reach ID **Reach C**
Assessed Length **613**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)					100%			
		2. Degradation - Evidence of downcutting					100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	12	12			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth > 1.6)	11	11			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	11	11			100%			
	4.Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	11	11			100%			
		2. Thalweg centering at downstream of meander (Glide)	11	11			100%			
2. Bank	**1. Scoured/Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%			100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%			100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%			100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	8	8			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	8	8			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	8	8			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	8	8			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio > 1.6 Rootwads/logs providing some cover at base-flow.	8	8			100%			

Table 5e **Visual Stream Morphology Stability Assessment**
Reach ID **Enhancement**
Assessed Length **376**

Major Channel Category	Channel Sub-Category	Metric	Number Stable, Performing as Intended	Total Number in As-built	Number of Unstable Segments	Amount of Unstable Footage	% Stable, Performing as Intended	Number with Stabilizing Woody Vegetation	Footage with Stabilizing Woody Vegetation	Adjusted % for Stabilizing Woody Vegetation
1. Bed	1. Vertical Stability (Riffle and Run units)	1. Aggradation - Bar formation/growth sufficient to significantly deflect flow laterally (not to include point bars)			2	20	95%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	10	N/A			N/A			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth > 1.6)	10	N/A			N/A			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	10	N/A			N/A			
	4.Thalweg Position	1. Thalweg centering at upstream of meander bend (Run)	N/A	N/A			N/A			
		2. Thalweg centering at downstream of meander (Glide)	N/A	N/A			N/A			
2. Bank	1. Scoured/Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	0	0	100%
	3. Mass Wasting	Bank slumping, calving, or collapse			0	0	100%	0	0	100%
				Totals	0	0	100%	0	0	100%
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	N/A	N/A			N/A			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	N/A	N/A			N/A			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	N/A	N/A			N/A			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%. (See guidance for this table in EEP monitoring guidance document)	N/A	N/A			N/A			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio > 1.6 Rootwads/logs providing some cover at base-flow.	N/A	N/A			N/A			

Table 6 Vegetation Condition Assessment

Planted Acreage[1] **8.1**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons
1. Bare Areas	Very limited cover of both woody and herbaceous material.	N/A	N/A	0
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	0.1 acres	Red Square	3
			Total	3
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	0.25 acres	N/A	0
			Cumulative Total	3

Easement Acreage[2] **14**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons
4. Invasive Areas of Concern[4]	Areas or points (if too small to render as polygons at map scale).	1000 SF	N/A	0
5. Easement Encroachment Areas[3]	Areas or points (if too small to render as polygons at map scale).	none	Blue Dotted	1

Vegetation Plot Photos (recorded on 9/18/2015 and 9/23/2015)

Vegetation Plot 1 - X-axis

Vegetation Plot 1 - diagonal

Photos recorded on Sept. 18 & Sept. 24, 2015

Vegetation Plot 2 - X-axis

Vegetation Plot 2 - diagonal

Photos recorded on Sept. 18 & Sept. 24, 2015

Vegetation Plot 3 - X-axis

Vegetation Plot 3 - diagonal

Photos recorded on Sept. 18 & Sept. 24, 2015

Vegetation Plot 4 - X-axis

Vegetation Plot 4 - diagonal

Photos recorded on Sept. 18 & Sept. 24, 2015

Vegetation Plot 5 - X-axis

Vegetation Plot 5 - diagonal

Photos recorded on Sept. 18 & Sept. 24, 2015

Vegetation Plot 6 - X-axis

Vegetation Plot 6 - diagonal

Photos recorded on Sept. 18 & Sept. 23, 2015

Vegetation Plot 7 - X-axis

Vegetation Plot 7 - diagonal

Photos recorded on Sept. 18 & Sept. 24, 2015

Vegetation Plot 8 - X-axis

Vegetation Plot 8 - diagonal

Photos recorded on Sept. 18 & Sept. 24, 2015

Vegetation Plot 9 - X-axis

Vegetation Plot 9 - diagonal

Photos recorded on Sept. 18 & Sept. 24, 2015

BMP: Top of Reach B

BMP: Top of Reach C

Photos recorded on Sept. 18 & Sept. 24, 2015

BMP: Reach 2A (northwest)

BMP: Middle of Reach 2A

Photos recorded on Sept. 18 & Sept. 24, 2015

BMP: South of Reach 2A

Reach 1A: Cross Section #1

Photos recorded on Sept. 18 & Nov 23, 2015

Reach 1A: Cross Section #2

Reach 1A: Cross Section #5

Photos recorded on Nov. 23, 2015

Reach 1A: Cross Section #X2

Reach 2A: Cross Section #9

Photos recorded on Nov. 23, 2015

Reach 2A: Cross Section #X3

Reach B: Cross Section #X1

Photos recorded on Nov. 23 and Dec. 2, 2015

Reach C: Cross Section #7

Reach C: Cross Section #8

Photos recorded on Nov. 23, 2015

Stream Enhancement Reach - Looking North Along Channel

Stream Enhancement Reach

Photos recorded on Nov. 23, 2015

Stream Problem Area Photos

Reach 1A - Stream Problem Area 1; Aggradation; New Channel Forming

Reach 1A - Stream Problem Area 2; Degradation

Photos recorded on Nov. 23, 2015

Stream Problem Area Photos

Reach 1A - Stream Problem Area #3; bank undercut

Reach 1A - Stream Problem Area #4; bank undercut

Photos recorded on Nov. 23, 2015

Reach 1A - Stream Problem Area #5; bank undercut

Reach 1A - Stream Problem Area #6; degradation

Photos recorded on Nov. 23, 2015

Reach 1A - Stream Problem Area #7; degradation

Reach 1A - Stream Problem Area #8; degradation

Photos recorded on Nov. 23, 2015

Reach 1A - Stream Problem Area #9; Degradation

Reach 1A - Stream Problem Areas #10; Log Vane Undercut

Photos recorded on Nov. 23, 2015

Reach 1A - Stream Problem Area #11; Log Vane Undercut

Reach 1A - Stream Problem Area #12; Scour

Photos recorded on Nov. 23, 2015

Reach 1A - Stream Problem Area #13; Degradation

Reach 1A - Stream Problem Area #14; Scour

Photos recorded on Nov. 23, 2015

Reach 1A - Stream Problem Area #15; Degradation

Reach 1A - Stream Problem Area #16; Bank Undercut

Photos recorded on November 23, 2015

Reach 1A - Stream Problem Area #17; Degradation

Reach 1A - Stream Problem Area #18; Scour

Photos recorded on November 23, 2015

Reach 1A - Stream Problem Area #19; Mass Wasting

Reach 1A - Stream Problem Area #20; Degradation

Photos recorded on November 23, 2015

Reach 1A - Stream Problem Area #21; Degradation

Reach 1A - Stream Problem Area #22; Degradation

Photos recorded on November 23, 2015

Reach 1A - Stream Problem Area #23; Degradation

Reach 1A - Stream Problem Area #24; Degradation

Photos recorded on November 23, 2015

Reach 2A - Stream Problem Area #25; Degradation

Reach 2A - Stream Problem Area #26; Scour

Photos recorded on September 24, 2015

Reach 2A - Stream Problem Area #27; Undercut

Reach 2A - Stream Problem Area #28: Degradation

Photos recorded on September 24, 2015

Reach 2A - Stream Problem Area #29; Scour

Reach 2A - Stream Problem Area #30; Log Vane Scour

Photos recorded on September 24, 2015

Reach 2A - Stream Problem Area #31; Scour

Reach 2A - Stream Problem Area #32; Degradation

Photos recorded on September 24, 2015

Reach 2A - Stream Problem Area #33; Scour

Reach 2A - Stream Problem Area #34; Log Vane Undercut

Photos recorded on September 24, 2015

Reach 2A - Stream Problem Area #35; Log Vane Mass Wasting

Reach 2A - Stream Problem Area #36; Degradation

Photos recorded on September 24, 2015

Reach 2A - Stream Problem Area #37; Undercut

Reach 2A - Stream Problem Area #38; Degradation

Photos recorded on September 24, 2015

Reach 2A - Stream Problem Area #39; Undercut

Reach 2A - Stream Problem Area #40; Log Vane Scour

Photos recorded on September 24, 2015

Reach 2A - Stream Problem Area #41; Scour

Reach 2A - Stream Problem Area #42; Mass Wasting

Photos recorded on September 24, 2015

Reach 2A - Stream Problem Area #43; Degradation

Reach 2A - Stream Problem Area #44; Log Vane Scour

Photos recorded on September 24, 2015

Reach 2A - Stream Problem Area #45; Scour

Reach 2A - Stream Problem Area #46; Degradation

Photos recorded on September 24, 2015

Reach 2A - Stream Problem Area #47; Log Vane Scour

Reach 2A - Stream Problem Area #48; Scour

Photos recorded on September 24, 2015

Reach 2A - Stream Problem Area #49; Mass Wasting

Reach 2A - Stream Problem Area #50; Undercut

Photos recorded on September 24, 2015

Reach B - Stream Problem Area #51; Aggradation

Reach B - Stream Problem Area #52; Mass Wasting

Photos recorded on November 23, 2015

Reach B - Stream Problem Area #53; Undercut

Reach B - Stream Problem Area #54; Degradation

Photos recorded on November 23, 2015

Reach B - Stream Problem Area #55; Undercut

Enhancement Reach - Stream Problem Area #56; Aggradation

Photos recorded on November 23, 2015

Enhancement Reach - Stream Problem Area #57; Aggradation

Photos recorded on November 23, 2015

Appendix C.
Vegetation Plot Data

Table 7. Vegetation data by plot

			Current Plot Data (MY2 2015)																				
			194-01-0001			194-01-0002			194-01-0003			194-01-0004			194-01-0005			194-01-0006			194-01-0007		
Scientific Name	**Common Name**	**Species Type**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**	**PnoLS**	**P-all**	**T**
Acer rubrum	red maple	Tree																					
Baccharis halimifolia	eastern baccharis	Shrub			12			44			18			1			1			10			7
Betula nigra	river birch	Tree	3	3	3				2	2	2				2	2	2				3	3	4
Cephalanthus occidentalis	common buttonbush	Shrub							1	1	1	6	6	6	3	3	3						
Clethra alnifolia	sweet pepperbush	Shrub																					
Fraxinus pennsylvanica	green ash	Tree							1	1	1										2	2	2
Hamamelis virginiana	American witchhazel	Tree																					
Ilex glabra	inkberry	Shrub				1	1	4										3	3	3			
Itea virginica	Virginia sweetspire	Shrub							4	4	4	6	6	6							3	3	3
Juniperus virginiana	eastern redcedar	Tree															1						
Ligustrum sinense	Chinese privet	Exotic															2						
Liquidambar styraciflua	sweetgum	Tree			16			6						8			32						5
Liriodendron tulipifera	tuliptree	Tree																					
Magnolia virginiana	sweetbay	Tree													1	1	1						
Malus angustifolia	southern crabapple	Tree	1	1	1										1	1	2						
Morella cerifera	wax myrtle	shrub	8	8	8				1	1	1			3	8	8	11				5	5	5
Nyssa sylvatica	blackgum	Tree																					
Pinus taeda	loblolly pine	Tree			38			5			40												2
Platanus occidentalis	American sycamore	Tree							2	2	2				5	5	5						
Quercus michauxii	swamp chestnut oak	Tree													1	1	1						
Quercus pagoda	cherrybark oak	Tree															1						
Quercus phellos	willow oak	Tree							1	1	1				1	1	1						
Salix nigra	black willow	Tree															1				2	2	13
		Stem count	12	12	78	1	1	59	12	12	70	12	12	24	22	22	64	3	3	13	15	15	41
		size (ares)	1			1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	3	3	6	1	1	4	7	7	9	2	2	5	8	8	14	1	1	2	5	5	8
		Stems per ACRE	485.6	485.6	3157	40.47	40.47	2388	485.6	485.6	2833	485.6	485.6	971.2	890.3	890.3	2590	121.4	121.4	526.1	607	607	1659

Color for Density

Exceeds requirements by at least 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%

Table 7 contd. Vegetation data by plot

Scientific Name	Common Name	Species Type	194-01-0008			194-01-0009			Annual Means								
									MY2 (2015)			MY1 (2014)			MY0 (2013)		
			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			3			2			5			1			16
Baccharis halimifolia	eastern baccharis	Shrub			4						97			47			41
Betula nigra	river birch	Tree	1	1	1				11	11	12	12	12	12	11	11	11
Cephalanthus occidentalis	common buttonbush	Shrub		2	3				10	12	13	9	11	11	9	11	11
Clethra alnifolia	sweet pepperbush	Shrub													2	2	2
Fraxinus pennsylvanica	green ash	Tree							3	3	3	3	3	3	3	3	3
Hamamelis virginiana	American witchhazel	Tree													2	2	2
Ilex glabra	inkberry	Shrub							4	4	7	6	6	6	9	9	9
Itea virginica	Virginia sweetspire	Shrub	3	3	3	10	10	10	26	26	26	27	27	27	51	51	51
Juniperus virginiana	eastern redcedar	Tree									1			1			
Ligustrum sinense	Chinese privet	Exotic			2						4						
Liquidambar styraciflua	sweetgum	Tree						14			81			38			274
Liriodendron tulipifera	tuliptree	Tree															2
Magnolia virginiana	sweetbay	Tree							1	1	1	1	1	1	1	1	1
Malus angustifolia	southern crabapple	Tree							2	2	3	2	2	2			1
Morella cerifera	wax myrtle	shrub						14	22	22	42	22	22	38	22	22	41
Nyssa sylvatica	blackgum	Tree						4			4	1	1	1	1	1	16
Pinus taeda	loblolly pine	Tree			33			100			218			464			1346
Platanus occidentalis	American sycamore	Tree							7	7	7	7	7	7	7	7	7
Quercus michauxii	swamp chestnut oak	Tree							1	1	1	1	1	1	1	1	1
Quercus pagoda	cherrybark oak	Tree									1	1	1	1	1	1	1
Quercus phellos	willow oak	Tree							2	2	2	2	2	2	2	2	2
Salix nigra	black willow	Tree						2	2	2	16			24			
		Stem count	4	6	49	10	10	146	91	93	544	94	96	687	122	124	1838
		size (ares)	1			1			9			9			9		
		size (ACRES)	0.02			0.02			0.22			0.22			0.22		
		Species count	2	3	7	1	1	7	12	12	20	13	13	19	14	14	20
		Stems per ACRE	161.9	242.8	1983	404.7	404.7	5908	409.2	418.2	2446	422.7	431.7	3089	548.6	557.6	8265

Color for Density

Exceeds requirements by at least 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%

Table 8. CVS Vegetation Plot Metadata
Jacksonville Country Club Project DMS No. 194

Report Prepared By	Kim Williams
Date Prepared	12/31/2015 10:00
Database Name	JacksonvilleCountryClub_194_MY22015.mdb
Database Location	L:\Wetlands\2008\Jacksonville Country Club/Annual Monitoring Report\Year 2
Computer Name	KWILLIAMS
Description Worksheets in This Document	
Metadata	Description of database file, the report worksheets, and a summary of project and project data.
Proj Planted	Each project is listed with its PLANTED stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
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.
Project Summary	
Project Code	194
Project Name	Jacksonville Country Club
Description	Stream Restoration and Enhancement Project
River Basin	White Oak
Length (ft)	3521
Stream-to-Edge Width (ft)	
Area (sq m)	
Required Plots (calculated)	9

Table 9. CVS Vegetation Vigor by Species

	Species	CommonName	4	3	2	1	0	Missing	Unknown
	Betula nigra	river birch	4	6		1	1		
	Cephalanthus occidentalis	common buttonbush	1	6	4	1			
	Fraxinus pennsylvanica	green ash	2			1			
	Ilex glabra	inkberry	4					2	
	Itea virginica	Virginia sweetspire	6	19	1				
	Nyssa sylvatica	blackgum							
	Quercus michauxii	swamp chestnut oak	1						
	Quercus pagoda	cherrybark oak					1		
	Quercus phellos	willow oak	2						
	Salix nigra	black willow	2						
	Morella cerifera	wax myrtle	22						
	Malus angustifolia	southern crabapple	2						
	Magnolia virginiana	sweetbay		1					
	Platanus occidentalis	American sycamore	6	1					
TOT:	**14**	**14**	**52**	**33**	**5**	**3**	**2**	**2**	

Table 10. CVS Vegetation Damage by Species

	Species	CommonName	Count of Damage Categories	(no damage)	_Enter other damage_	Insects	Mowing	Vine Strangulation
	Betula nigra	river birch	8	4	2	3	1	2
	Cephalanthus occidentali	common but	11	1	2	7		2
	Fraxinus pennsylvanica	green ash	2	1	1		1	
	Ilex glabra	inkberry	6				6	
	Itea virginica	Virginia swee	6	20	3	3		
	Magnolia virginiana	sweetbay	1		1			
	Malus angustifolia	southern cra	0	2				
	Morella cerifera	wax myrtle	0	22				
	Nyssa sylvatica	blackgum	1		1			
	Platanus occidentalis	American syc	1	6		1		
	Quercus michauxii	swamp chest	1		1			
	Quercus pagoda	cherrybark oa	0	1				
	Quercus phellos	willow oak	0	2				
	Salix nigra	black willow	0	2				
TOT:	**14**	**14**	**37**	**61**	**11**	**14**	**8**	**4**

Table 11. CVS Vegetation Damage by Plot

	plot	Count of Damage Categories	(no damage)	_Enter other damage_	Insects	Mowing	Vine Strangulation
	194-01-0001-year:2	3	9		3		
	194-01-0002-year:2	3				3	
	194-01-0003-year:2	3	10	1	2		
	194-01-0004-year:2	8	4	3	5		
	194-01-0005-year:2	5	17	3			2
	194-01-0006-year:2	3				3	
	194-01-0007-year:2	7	10	2	1	2	2
	194-01-0008-year:2	3	3	1	2		
	194-01-0009-year:2	2	8	1	1		
TOT:	**9**	**37**	**61**	**11**	**14**	**8**	**4**

Table 12. CVS Vegetation Planted Stems by Plot and Species

	Comment	Species	SpType	CommonName	Total Planted Stems	# plots	avg# stems	plot 194-01-0001-year:2	plot 194-01-0002-year:2	plot 194-01-0003-year:2	plot 194-01-0004-year:2	plot 194-01-0005-year:2	plot 194-01-0006-year:2	plot 194-01-0007-year:2	plot 194-01-0008-year:2	plot 194-01-0009-year:2
		Betula nigra	Tree	river birch	11	5	2.2	3		2		2		3	1	
		Cephalanthus occidentalis	Tree	common buttonbush	12	4	3			1	6	3			2	
		Fraxinus pennsylvanica	Tree	green ash	3	2	1.5			1				2		
		Ilex glabra	Shrub	inkberry	4	2	2		1				3			
		Itea virginica	Shrub	Virginia sweetspire	26	5	5.2			4	6			3	3	10
		Magnolia virginiana	Shrub	sweetbay	1	1	1					1				
		Malus angustifolia	Shrub	southern crabapple	2	2	1	1				1				
		Morella cerifera	Shrub	wax myrtle	22	4	5.5	8		1		8		5		
		Platanus occidentalis	Tree	American sycamore	7	2	3.5			2		5				
		Quercus michauxii	Tree	swamp chestnut oak	1	1	1					1				
		Quercus phellos	Tree	willow oak	2	2	1			1		1				
		Salix nigra	Tree	black willow	2	1	2							2		
TOT:	**0**	**12**	**12**	**12**	**93**	**12**		**12**	**1**	**12**	**12**	**22**	**3**	**15**	**6**	**10**

Appendix D.
Stream Geomorphology Data

Table 13a. Baseline Stream Data Summary
Jacksonville Country Club (DMS# 194) Segment/Reach: 1A (1307 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Dimension and Substrate - Riffle Only																									
Bankfull Width (ft)				4.1								15.5						10		3.8	4.3		4.8		
Floodprone Width (ft)												200						n/a		20.3	36.5		52.8		
Bankfull Mean Depth (ft)				1.7								1.54						0.83		0.3	0.5		0.7		
[1]Bankfull Max Depth (ft)												n/a						1.2		0.8	0.9		1		
Bankfull Cross Sectional Area (ft^2)				16.2								23.9						8.33		1.5	2		2.5		
Width/Depth Ratio												10.05						12		5.8	10.7		15.5		
Entrenchment Ratio												12.9						n/a		4.2	9		13.8		
[1]Bank Height Ratio												**n/a**						**n/a**		**1.3**	**1.45**		**1.6**		
Profile																									
Riffle Length (ft)												30						33		2.6	8		40.5		
Riffle Slope (ft/ft)												0.002						n/a		0	1		6.9		
Pool Length (ft)											22.5	26.3		30				24		4	16.8		54.8		
Pool Max depth (ft)												3						2.1		1.2	1.2		1.3		
Pool Spacing (ft)											26.4	43.4		60.5				52.5		9.5	33.3		143.4		
Pattern																									
Channel Beltwidth (ft)											45	57.4		69.8			20	35	50	8	22		34		
Radius of Curvature (ft)											10.9	25.6		40.3			20	27.5	35	8.3	22.7		32.4		
Rc:Bankfull width (ft/ft)											**0.7**	**1.7**		**2.6**			**2**	**2.8**	**3.5**	**2.2**	**5.3**		**6.8**		
Meander Wavelength (ft)											63.6	84.5		105.4			70	105	140	64	108		140		
Meander Width Ratio											2.9	3.7		4.5			2	3.5	5	2.1	5.1		7.1		
Transport parameters																									
Reach Shear Stress (competency) lb/f^2																		0.01			0.207				
Max part size (mm) mobilized at bankfull																					10.2				
Stream Power (transport capacity) W/m^2																					24.6				
Additional Reach Parameters																									
Rosgen Classification	C5/E5											E5						C5			C5				
Bankfull Velocity (fps)																									
Bankfull Discharge (cfs)				23																					
Valley length (ft)																									
Channel Thalweg length (ft)																									
Sinuosity (ft)						1.1						1.2						1.2			1.2				
Water Surface Slope (Channel) (ft/ft)												0.0012						n/a							
BF slope (ft/ft)																									
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Table 13b. Baseline Stream Data Summary
Jacksonville Country Club (DMS# 194) Segment/Reach: 2A (711 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)				4.1								15.5						12.9			5.7				
Floodprone Width (ft)												200						n/a			34.3				
Bankfull Mean Depth (ft)				1.7								1.54						0.89			0.4				
[1]Bankfull Max Depth (ft)												n/a						1.3			0.9				
Bankfull Cross Sectional Area (ft^2)				16.2								23.9						11.5			2.4				
Width/Depth Ratio												10.05						14.47			13.8				
Entrenchment Ratio												12.9						n/a			6				
[1]Bank Height Ratio												**n/a**						**n/a**			**1.2**				
Profile																									
Riffle Length (ft)												30						38		6.2	20.8		42.7		
Riffle Slope (ft/ft)												0.002						n/a		0	1		3.5		
Pool Length (ft)											22.5	26.3		30				22		13.1	20		29.8		
Pool Max depth (ft)												3						2.4		2.9	2.9		2.9		
Pool Spacing (ft)											26.4	43.4		60.5			40	60	80	18.6	56.3		103		
Pattern																									
Channel Beltwidth (ft)											45	57.4		69.8			25	40	55	11	23.5		33		
Radius of Curvature (ft)											10.9	25.6		40.3			25	30	35	20.7	24.7		29.5		
Rc:Bankfull width (ft/ft)											**0.7**	**1.7**		**2.6**			**1.9**	**2.3**	**2.7**	**3.6**	**4.3**		**5.2**		
Meander Wavelength (ft)											63.6	84.5		105.4			80	120	160	59	116		140		
Meander Width Ratio											2.9	3.7		4.5			1.9	3.1	4.3	1.9	4.1		5.8		
Transport parameters																									
Reach Shear Stress (competency) lb/f^2																					0.25				
Max part size (mm) mobilized at bankfull																					12.3				
Stream Power (transport capacity) W/m^2																					22.3				
Additional Reach Parameters																									
Rosgen Classification												E5 and C5						C5			C5				
Bankfull Velocity (fps)																		n/a							
Bankfull Discharge (cfs)				23																					
Valley length (ft)																									
Channel Thalweg length (ft)																									
Sinuosity (ft)																		1.2			1.2				
Water Surface Slope (Channel) (ft/ft)												0.0037						n/a							
BF slope (ft/ft)																									
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Table 13c. Baseline Stream Data Summary
Jacksonville Country Club (DMS# 194) Segment/Reach: B (478 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)				2.3	3.32	3.65		3.97			10.4	10.95		11.5				6			4				
Floodprone Width (ft)					45	68.5		92			199.7	199.9		200				n/a			46.8				
Bankfull Mean Depth (ft)				1.1	1.17	1.21		1.25			0.83	1.19		1.56				0.5			0.68				
[1]Bankfull Max Depth (ft)					1.8	1.96		2.11			n/a	n/a		n/a				0.7			1.4				
Bankfull Cross Sectional Area (ft^2)				5.5	3.88	4.42		4.95			8.6	13.2		17.9				3			2.7				
Width/Depth Ratio					2.84	3.01		3.18			7.39	10		12.58				12			5.9				
Entrenchment Ratio					13.55	18.36		23.17			17.39	18.3		19.2				n/a			11.7				
[1]Bank Height Ratio					**1.66**	**1.7**		**1.74**													**1.1**				
Profile																									
Riffle Length (ft)											13.4	17.7		22				14		6.3	12.5		22		
Riffle Slope (ft/ft)											0.004	0.005		0.006				n/a		0	1.6		4.5		
Pool Length (ft)											10.6	15.4		20.2				18		6.3	10.7		14.5		
Pool Max depth (ft)											1.7	2.1		2.5				1.3							
Pool Spacing (ft)											13.75	33.1		52.5			25	35	45	24.7	31.9		36.8		
Pattern																									
Channel Beltwidth (ft)					6.25	7.32		8.38			17.7	45.2		72.9			18	24	30	9	16.4		23		
Radius of Curvature (ft)					12.68	15.52		18.36			7.6	14.1		20.6			12	15	18	8.1	11.8		12.5		
Rc:Bankfull width (ft/ft)					**3.82**	**4.22**		**4.62**			**0.47**	**1.3**		**1.9**			**2**	**2.5**	**3**	**2.0**	**3.0**		**3.1**		
Meander Wavelength (ft)					14.02	15.61		17.2			23.1	51		78.8			50	70	90	46	54		80		
Meander Width Ratio					1.88	2		2.11			2.1	4.6		7.1			1.2	3	5	2.3	4.1		5.8		
Transport parameters																									
Reach Shear Stress (competency) lb/f^2																				0.3					
Max part size (mm) mobilized at bankfull																				14.7					
Stream Power (transport capacity) W/m^2																				48.1					
Additional Reach Parameters																									
Rosgen Classification																				E5					
Bankfull Velocity (fps)																				8.2					
Bankfull Discharge (cfs)				7.1																					
Valley length (ft)																									
Channel Thalweg length (ft)																									
Sinuosity (ft)							1.15													1.3					
Water Surface Slope (Channel) (ft/ft)							1.7																		
BF slope (ft/ft)																									
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Table 13d. Baseline Stream Data Summary
Jacksonville Country Club (DMS# 194) Segment/Reach: C (613 feet)

Parameter	Gauge[2]	Regional Curve			Pre-Existing Condition						Reference Reach(es) Data						Design			Monitoring Baseline					
Dimension and Substrate - Riffle Only		LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Med	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)				2.3							1.01	1.1		1.18				7			4				
Floodprone Width (ft)											199.7	199.9		200				n/a			7.8				
Bankfull Mean Depth (ft)				1.1							0.83	1.19		1.56				0.7			0.2				
[1]Bankfull Max Depth (ft)											n/a	n/a		n/a				1.1			0.4				
Bankfull Cross Sectional Area (ft^2)				5.5							8.6	13.2		17.9				4.9			0.6				
Width/Depth Ratio											7.39	10		12.58				10			25.4				
Entrenchment Ratio											17.39	18.3		19.2				n/a			2				
[1]Bank Height Ratio																		**n/a**			**2.1**				
Profile																									
Riffle Length (ft)											13.4	17.7		22				20		4.6	10.5		20		
Riffle Slope (ft/ft)											0.004	0.005		0.006				n/a		0	0.7		3.4		
Pool Length (ft)											10.6	15.4		20.2				12		0	9.9		14.8		
Pool Max depth (ft)											1.7	2.1		2.5				1.8		1.1	1.1		1.1		
Pool Spacing (ft)											13.75	33.1		52.5			25	33.75	42.5	4.5	32.3		71.9		
Pattern																									
Channel Beltwidth (ft)											17.7	45.2		72.9			14	19.5	25	8	14.8		32		
Radius of Curvature (ft)											7.6	14.1		20.6			9	11.5	14	6.1	8.5		11.4		
Rc:Bankfull width (ft/ft)											**0.47**	**1.3**		**1.9**			**1.3**	**1.6**	**2**	**1.5**	**2.1**		**2.9**		
Meander Wavelength (ft)											23.1	51		78.8			50	67.5	85	43	65.7		89		
Meander Width Ratio											2.1	4.6		7.1			2	2.8	3.6	2	3.7		8		
Transport parameters																									
Reach Shear Stress (competency) lb/f^2																				0.041					
Max part size (mm) mobilized at bankfull																				2					
Stream Power (transport capacity) W/m^2																				2.96					
Additional Reach Parameters																									
Rosgen Classification																				C5					
Bankfull Velocity (fps)																									
Bankfull Discharge (cfs)				7.1																					
Valley length (ft)																									
Channel Thalweg length (ft)																									
Sinuosity (ft)																				1.3					
Water Surface Slope (Channel) (ft/ft)																									
BF slope (ft/ft)																									
[3]Bankfull Floodplain Area (acres)																									
[4]% of Reach with Eroding Banks																									
Channel Stability or Habitat Metric																									
Biological or Other																									

Table 14a. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)
Jacksonville Country Club (DMS# 194) Segment/Reach: 1A (1307 feet)

	Cross Section 1 (Riffle)							Cross Section 2 (Pool)							Cross Section 5 (Riffle)							Cross Section X2 (Pool)													
Based on fixed baseline bankfull elevation [1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used																																			
Bankfull Width (ft)	4.8	5.4	6.2					6.4	6	7.4					3.8	5.3	6.5					3.2	3.2	6.9											
Floodprone Width (ft)	20.3	34.3	37.1												52.8	65.6	76.4																		
Bankfull Mean Depth (ft)	0.3	0.4	0.6					0.7	1	1.3					0.7	0.9	1.2					0.7	0.7	1											
Bankfull Max Depth (ft)	0.8	0.8	1					1.3	1.5	2					1	1.5	2.1					1.2	1.2	2.3											
Bankfull Cross Sectional Area (ft^2)	1.5	2.3	3.7					4.5	5.9	9.6					2.5	4.6	7.6					2.4	2.4	6.6											
Bankfull Width/Depth Ratio	15.5	12.5	10.4					9.3	6.2	5.8					5.8	6	5.5					4.4	4.4	7.2											
Bankfull Entrenchment Ratio	4.2	6.4	5.9												13.8	12.4	11.8																		
Bankfull Bank Height Ratio	1.6	1	1					1.3	1.2						1.3	1.2	1					1.1	1.1	1											
Based on current/developing bankfull feature [2]																																			
Record elevation (datum) used																																			
Bankfull Width (ft)																																			
Floodprone Width (ft)																																			
Bankfull Mean Depth (ft)																																			
Bankfull Max Depth (ft)																																			
Bankfull Cross Sectional Area (ft^2)																																			
Bankfull Width/Depth Ratio																																			
Bankfull Entrenchment Ratio																																			
Bankfull Bank Height Ratio																																			
Cross Sectional Area between end pins (ft^2)																																			
d50 (mm)																																			

These cells may or may not require population in any given year. See footnote 2 below

	Cross Section 6 (Riffle)							Cross Section 7 (Pool)							Cross Section 8 (Riffle)							Cross Section 9 (Riffle)							Cross Section 10 (Pool)						
Based on fixed baseline bankfull elevation [1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used																																			
Bankfull Width (ft)																																			
Floodprone Width (ft)																																			
Bankfull Mean Depth (ft)																																			
Bankfull Max Depth (ft)																																			
Bankfull Cross Sectional Area (ft^2)																																			
Bankfull Width/Depth Ratio																																			
Bankfull Entrenchment Ratio																																			
Bankfull Bank Height Ratio																																			
Based on current/developing bankfull feature [2]																																			
Record elevation (datum) used																																			
Bankfull Width (ft)																																			
Floodprone Width (ft)																																			
Bankfull Mean Depth (ft)																																			
Bankfull Max Depth (ft)																																			
Bankfull Cross Sectional Area (ft^2)																																			
Bankfull Width/Depth Ratio																																			
Bankfull Entrenchment Ratio																																			
Bankfull Bank Height Ratio																																			
Cross Sectional Area between end pins (ft^2)																																			
d50 (mm)																																			

1 = Widths and depths for monitoring resurvey will be based on the baseline bankfull datum regardless of dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannot acquire the datum u
for prior years this must be discussed with EEP. If this cannot be resolved in time for a given years report submission a footnote in this should be included that states: "It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a pr
performer is being acquired to provide confirmation. Values will be recalculated in a future submission based on a consistent datum if determined to be necessary."
2 = Based on the elevation of any dominant depositional feature that develops and is observed at the time of survey. If the baseline datum remains the only significant depositional featu
then these two sets of dimensional parameters will be equal, however, if another depositional feature of significance develops above or below the baseline bankfull datum then this should be tracked and quantified in these cells

Table 14b. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)

Jacksonville Country Club (DMS# 194) Segment/Reach: 2A (711 feet)

	Cross Section 9 (Riffle)							Cross Section X3 (Pool)																		Cross Section 5 (Riffle)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used																																		
Bankfull Width (ft)	5.7	6.7	12.3					8.4	8.1	11.4																								
Floodprone Width (ft)	34.3	65.2	78.4																															
Bankfull Mean Depth (ft)	0.4	0.5	1					1.7	2.2	2.4																								
Bankfull Max Depth (ft)	0.9	1.1	2					2.9	3.3	4.4																								
Bankfull Cross Sectional Area (ft^2)	2.4	3.1	12.5					14.5	17.9	27.2																								
Bankfull Width/Depth Ratio	13.8	14.4	12.1					4.8	3.6	4.7																								
Bankfull Entrenchment Ratio	6	9.7	6.4																															
Bankfull Bank Height Ratio	1.2	1.3	1					1.3	1.1	1																								
Based on current/developing bankfull feature[2]																																		
Record elevation (datum) used																																		
Bankfull Width (ft)																																		
Floodprone Width (ft)																																		
Bankfull Mean Depth (ft)																																		
Bankfull Max Depth (ft)																																		
Bankfull Cross Sectional Area (ft^2)																																		
Bankfull Width/Depth Ratio																																		
Bankfull Entrenchment Ratio																																		
Bankfull Bank Height Ratio																																		
Cross Sectional Area between end pins (ft^2)																																		
d50 (mm)																																		

These cells may or may not require population in any given year. See footnote 2 below

	Cross Section 6 (Riffle)							Cross Section 7 (Pool)							Cross Section 8 (Riffle)							Cross Section 9 (Riffle)							Cross Section 10 (Pool)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used																																		
Bankfull Width (ft)																																		
Floodprone Width (ft)																																		
Bankfull Mean Depth (ft)																																		
Bankfull Max Depth (ft)																																		
Bankfull Cross Sectional Area (ft^2)																																		
Bankfull Width/Depth Ratio																																		
Bankfull Entrenchment Ratio																																		
Bankfull Bank Height Ratio																																		
Based on current/developing bankfull feature[2]																																		
Record elevation (datum) used																																		
Bankfull Width (ft)																																		
Floodprone Width (ft)																																		
Bankfull Mean Depth (ft)																																		
Bankfull Max Depth (ft)																																		
Bankfull Cross Sectional Area (ft^2)																																		
Bankfull Width/Depth Ratio																																		
Bankfull Entrenchment Ratio																																		
Bankfull Bank Height Ratio																																		
Cross Sectional Area between end pins (ft^2)																																		
d50 (mm)																																		

1 = Widths and depths for monitoring resurvey will be based on the baseline bankfull datum regardless of dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannot acquire the datum used for prior years this must be discussed with EEP. If this cannot be resolved in time for a given years report submission a footnote in this should be included that states: "It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in a future submission based on a consistent datum if determined to be necessary."

2 = Based on the elevation of any dominant depositional feature that develops and is observed at the time of survey. If the baseline datum remains the only significant depositional feature then these two sets of dimensional parameters will be equal, however, if another depositional feature of significance develops above or below the baseline bankfull datum then this should be tracked and quantified in these cells.

Table 14c. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)

Jacksonville Country Club (DMS# 194) Segment/Reach: B (478 feet)

	Cross Section X1 (Riffle)							Cross Section (Riffle)							Cross Section (Riffle)							Cross Section (Pool)							Cross Section 5 (Riffle)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used																																				
Bankfull Width (ft)	4	5	6.9																																	
Floodprone Width (ft)	46.8	53.8	56.3																																	
Bankfull Mean Depth (ft)	0.68	0.8	1.1																																	
Bankfull Max Depth (ft)	1.4	1.6	1.7																																	
Bankfull Cross Sectional Area (ft^2)	2.7	3.8	7.2																																	
Bankfull Width/Depth Ratio	5.9	6.6	6.5																																	
Bankfull Entrenchment Ratio	11.7	10.8	8.2																																	
Bankfull Bank Height Ratio	**1.1**	1	1																																	
Based on current/developing bankfull feature[2]																																				
Record elevation (datum) used																																				
Bankfull Width (ft)																																				
Floodprone Width (ft)																																				
Bankfull Mean Depth (ft)																																				
Bankfull Max Depth (ft)																																				
Bankfull Cross Sectional Area (ft^2)																																				
Bankfull Width/Depth Ratio																																				
Bankfull Entrenchment Ratio																																				
Bankfull Bank Height Ratio																																				
Cross Sectional Area between end pins (ft^2)																																				
d50 (mm)																																				

These cells may or may not require population in any given year. See footnote 2 below

	Cross Section 6 (Riffle)							Cross Section 7 (Pool)							Cross Section 8 (Riffle)							Cross Section 9 (Riffle)							Cross Section 10 (Pool)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used																																				
Bankfull Width (ft)																																				
Floodprone Width (ft)																																				
Bankfull Mean Depth (ft)																																				
Bankfull Max Depth (ft)																																				
Bankfull Cross Sectional Area (ft^2)																																				
Bankfull Width/Depth Ratio																																				
Bankfull Entrenchment Ratio																																				
Bankfull Bank Height Ratio																																				
Based on current/developing bankfull feature[2]																																				
Record elevation (datum) used																																				
Bankfull Width (ft)																																				
Floodprone Width (ft)																																				
Bankfull Mean Depth (ft)																																				
Bankfull Max Depth (ft)																																				
Bankfull Cross Sectional Area (ft^2)																																				
d50 (mm)																																				

1 = Widths and depths for monitoring resurvey will be based on the baseline bankfull datum regardless of dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannot acquire the datum used for prior years this must be discussed with EEP. If this cannot be resolved in time for a given years report submission a footnote in this should be included that states: "It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in a future submission based on a consistent datum if determined to be necessary."

2 = Based on the elevation of any dominant depositional feature that develops and is observed at the time of survey. If the baseline datum remains the only significant depositional feature then these two sets of dimensional parameters will be equal, however, if another depositional feature of significance develops above or below the baseline bankfull datum then this should be tracked and quantified in these cells.

Table 14d. Monitoring Data - Dimensional Morphology Summary (Dimensional Parameters – Cross Sections)

Jacksonville Country Club (DMS# 194) Segment/Reach: C (613 feet)

	Cross Section 7 (Riffle)							Cross Section 8 (Pool)							Cross Section (Riffle)							Cross Section (Pool)							Cross Section 5 (Riffle)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used																																			
Bankfull Width (ft)	4	3.9	5.6					4.1	4.8	6.3																									
Floodprone Width (ft)	7.8	17.4	94.8																																
Bankfull Mean Depth (ft)	0.2	0.2	0.5					0.4	0.5	0.7																									
Bankfull Max Depth (ft)	0.4	0.7	1.2					1.1	1	1.2																									
Bankfull Cross Sectional Area (ft^2)	0.6	0.9	2.8					1.8	2.4	4.1																									
Bankfull Width/Depth Ratio	25.4	16	11.1					9.6	9.7	9.5																									
Bankfull Entrenchment Ratio	2	4.5	16.9																																
Bankfull Bank Height Ratio	2.1	1.6	1					1.4	1.3	1																									
Based on current/developing bankfull feature[2]																																			
Record elevation (datum) used																																			
Bankfull Width (ft)																																			
Floodprone Width (ft)																																			
Bankfull Mean Depth (ft)																																			
Bankfull Max Depth (ft)																																			
Bankfull Cross Sectional Area (ft^2)																																			
Bankfull Width/Depth Ratio																																			
Bankfull Entrenchment Ratio																																			
Bankfull Bank Height Ratio																																			
Cross Sectional Area between end pins (ft^2)																																			
d50 (mm)																																			

These cells may or may not require population in any given year. See footnote 2 below

	Cross Section 6 (Riffle)							Cross Section 7 (Pool)							Cross Section 8 (Riffle)							Cross Section 9 (Riffle)							Cross Section 10 (Pool)						
Based on fixed baseline bankfull elevation[1]	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+	Base	MY1	MY2	MY3	MY4	MY5	MY+
Record elevation (datum) used																																			
Bankfull Width (ft)																																			
Floodprone Width (ft)																																			
Bankfull Mean Depth (ft)																																			
Bankfull Max Depth (ft)																																			
Bankfull Cross Sectional Area (ft^2)																																			
Bankfull Width/Depth Ratio																																			
Bankfull Entrenchment Ratio																																			
Bankfull Bank Height Ratio																																			
Based on current/developing bankfull feature[2]																																			
Record elevation (datum) used																																			
Bankfull Width (ft)																																			
Floodprone Width (ft)																																			
Bankfull Mean Depth (ft)																																			
Bankfull Max Depth (ft)																																			
Bankfull Cross Sectional Area (ft^2)																																			
Bankfull Width/Depth Ratio																																			
Bankfull Entrenchment Ratio																																			
Bankfull Bank Height Ratio																																			
Cross Sectional Area between end pins (ft^2)																																			
d50 (mm)																																			

1 = Widths and depths for monitoring resurvey will be based on the baseline bankfull datum regardless of dimensional/depositional development. Input the elevation used as the datum, which should be consistent and based on the baseline datum established. If the performer has inherited the project and cannot acquire the datum used for prior years this must be discussed with EEP. If this cannot be resolved in time for a given years report submission a footnote in this should be included that states: "It is uncertain if the monitoring datum has been consistent over the monitoring history, which may influence calculated values. Additional data from a prior performer is being acquired to provide confirmation. Values will be recalculated in a future submission based on a consistent datum if determined to be necessary."

2 = Based on the elevation of any dominant depositional feature that develops and is observed at the time of survey. If the baseline datum remains the only significant depositional feature then these two sets of dimensional parameters will be equal, however, if another depositional feature of significance develops above or below the baseline bankfull datum then this should be tracked and quantified in these cells.

Table 15a. Monitoring Data - Stream Reach Data Summary
Jacksonville Country Club (DMS# 194) Segment/Reach: 1A (1307 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
only	Min	n	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n	Min	Mean	Med	Max	SD[4]	n
Bankfull Width (ft)	3.8	4.3		4.8			5.3	5.4		5.4		2	6.2	6.4		6.5																				
Floodprone Width (ft)	20.3	36.5		52.8			34.3	50		65.6		2	37.1	56.7		76.4																				
Bankfull Mean Depth (ft)	0.3	0.5		0.7			0.4	0.7		0.9		2	0.6	0.89		1.2																				
[1]Bankfull Max Depth (ft)	0.8	0.9		1			0.8	1.2		1.5		2	1	1.6		2.1																				
Bankfull Cross Sectional Area (ft^2)	1.5	2		2.5			2.3	3.5		4.6		2	3.7	5.7		7.6																				
Width/Depth Ratio	5.8	10.7		15.5			6	9.3		12.5		2	5.5	7.1		10.4																				
Entrenchment Ratio	4.2	9		13.8			6.4	9.4		12.4		2	5.8	8.9		12																				
[1]Bank Height Ratio	**1.3**	**1.45**		**1.6**			**1**	**1.1**		**1.2**		**2**	**0.6**	**1**		**1.4**																				
Profile																																				
Riffle Length (ft)	2.6	8		40.5			3.7	16.6		50.6			6.6	27.9		78.9																				
Riffle Slope (ft/ft)	0	1		6.9			0	1.7		7.5			0	1.1		9.2																				
Pool Length (ft)	4	16.8		54.8			4.7	15.7		31.9			7.1	13.7		33.1																				
Pool Max depth (ft)	1.2	1.2		1.3			1.12	2.08		3.3			0.9	2.77		4.36																				
Pool Spacing (ft)	9.5	33.3		143			8	29.4		67.2			11.1	44.1		103																				
Pattern																																				
Channel Beltwidth (ft)	8	22		34																																
Radius of Curvature (ft)	8.3	22.7		32.4																																
Rc:Bankfull width (ft/ft)	**2.2**	**5.3**		**6.8**																																
Meander Wavelength (ft)	64	108		140																																
Meander Width Ratio	2.1	5.1		7.1																																

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Additional Reach Parameters																																				
Rosgen Classification	C5						E5/C5						E5/C5																							
Channel Thalweg length (ft)							1403						1424																							
Sinuosity (ft)	1.2						1.2						1.2																							
Water Surface Slope (Channel) (ft/ft)																																				
BF slope (ft/ft)																																				
[3]Ri% / Ru% / P% / G% / S%	0.21	0.08	0.5	0.21																																
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile. 2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave; 4. = Of value/needed only if the n exceeds 3

Table 15b. Monitoring Data - Stream Reach Data Summary
Jacksonville Country Club (DMS# 194) Segment/Reach: 2A (711 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	n	Med	Max	SD[4]	n	Min	n	Med	Max	SD[4]	n	Min	n	Med	Max	SD[4]	n	Min	n	Med	Max	SD[4]	n	Min	n	Med	Max	SD[4]	n	Min	n	Med	Max	SD[4]	n
Bankfull Width (ft)		5.7						6.7						12.3																						
Floodprone Width (ft)		34.3						65.2						78.4																						
Bankfull Mean Depth (ft)		0.4						0.5						1.02																						
[1]Bankfull Max Depth (ft)		0.9						1.1						2																						
Bankfull Cross Sectional Area (ft^2)		2.4						3.1						12.5																						
Width/Depth Ratio		13.8						14.4						12.1																						
Entrenchment Ratio		6						1.3						6.4																						
[1]Bank Height Ratio		**1.2**						**1.2**						**1**																						
Profile																																				
Riffle Length (ft)	6.2	20.8		42.7			4.1	19		37.4			10.7	25.5		43.9																				
Riffle Slope (ft/ft)	0	1		3.5			0	1.4		5.5			0	1.4		3.7																				
Pool Length (ft)	13.1	20		29.8			3.5	15		41.8			2.5	14.3		32.1																				
Pool Max depth (ft)	1.4	2.09		3.39			1.56	2.7		4.43			2.68	3.8		5.75																				
Pool Spacing (ft)	18.6	56.3		103			6.8	30.9		73.5			9.8	39.8		72.9																				
Pattern																																				
Channel Beltwidth (ft)	11	23.5		33																																
Radius of Curvature (ft)	20.7	24.7		29.5																																
Rc:Bankfull width (ft/ft)	**3.63**	**4.33**		**5.18**																																
Meander Wavelength (ft)	59	116		140																																
Meander Width Ratio	1.93	4.12		5.79																																

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Additional Reach Parameters																																				
Rosgen Classification	E5/C5						E5/C5						C5																							
Channel Thalweg length (ft)																																				
Sinuosity (ft)	1.1						1.1						1.1																							
Water Surface Slope (Channel) (ft/ft)																																				
BF slope (ft/ft)																																				
[3]Ri% / Ru% / P% / G% / S%	0.33	0.08	0.29	0.3																																
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

Table 15c. Monitoring Data - Stream Reach Data Summary
Jacksonville Country Club (DMS# 194) Segment/Reach: B (478 feet)

Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	n	Med	Max	SD[4]	n	Min	n	Med	Max	SD[4]	n	Min	n	Med	Max	SD[4]	n	Min	n	Med	Max	SD[4]	n	Min	n	Med	Max	SD[4]	n	Min	n	Med	Max	SD[4]	n
Bankfull Width (ft)		4						5						6.9																						
Floodprone Width (ft)		46.8						53.8						56.3																						
Bankfull Mean Depth (ft)		0.68						0.8						1.05																						
[1]Bankfull Max Depth (ft)		1.4						1.6						1.7																						
Bankfull Cross Sectional Area (ft^2)		2.7						3.8						7.2																						
Width/Depth Ratio		5.9						6.6						6.5																						
Entrenchment Ratio		11.7						10.8						8.2																						
[1]Bank Height Ratio		**1.1**						1						**1**																						
Profile																																				
Riffle Length (ft)	6.3	12.5		22			6.5	20.5		52.5			8	17.9		55.2																				
Riffle Slope (ft/ft)	0	1.6		4.5			0	0.25		1.8			0	1.8		5																				
Pool Length (ft)	6.3	10.7		14.5			10.5	20.4		46.4			5	14.5		26.5																				
Pool Max depth (ft)	0.85	1.51		2.41			0.86	1.61		2.46			1.31	2.08		3.14																				
Pool Spacing (ft)	24.7	31.9		36.8			20.3	39.6		64			17.3	37.1		70.2																				
Pattern																																				
Channel Beltwidth (ft)	9	16.4		23																																
Radius of Curvature (ft)	8.1	11.8		12.5																																
Rc:Bankfull width (ft/ft)	**2.03**	**2.95**		**3.13**																																
Meander Wavelength (ft)	46	54		80																																
Meander Width Ratio	2.25	4.1		5.75																																

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

Additional Reach Parameters	Baseline	MY-1	MY-2	MY- 3	MY- 4	MY- 5
Rosgen Classification	E5	E5	E5			
Channel Thalweg length (ft)						
Sinuosity (ft)	1.1	1.3	1.3			
Water Surface Slope (Channel) (ft/ft)						
BF slope (ft/ft)						
[3]Ri% / Ru% / P% / G% / S%						
[3]SC% / Sa% / G% / C% / B% / Be%						
[3]d16 / d35 / d50 / d84 / d95 /						
[2]% of Reach with Eroding Banks						
Channel Stability or Habitat Metric						
Biological or Other						

Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3

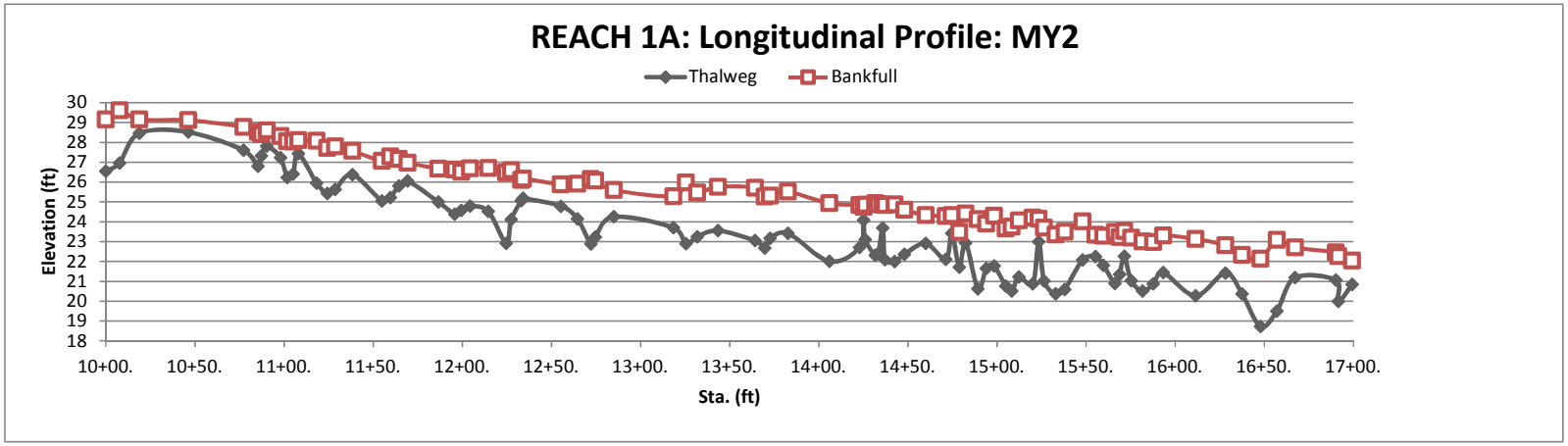
Table 15d. Monitoring Data - Stream Reach Data Summary
Jacksonville Country Club (DMS# 194) Segment/Reach: C (613 feet)

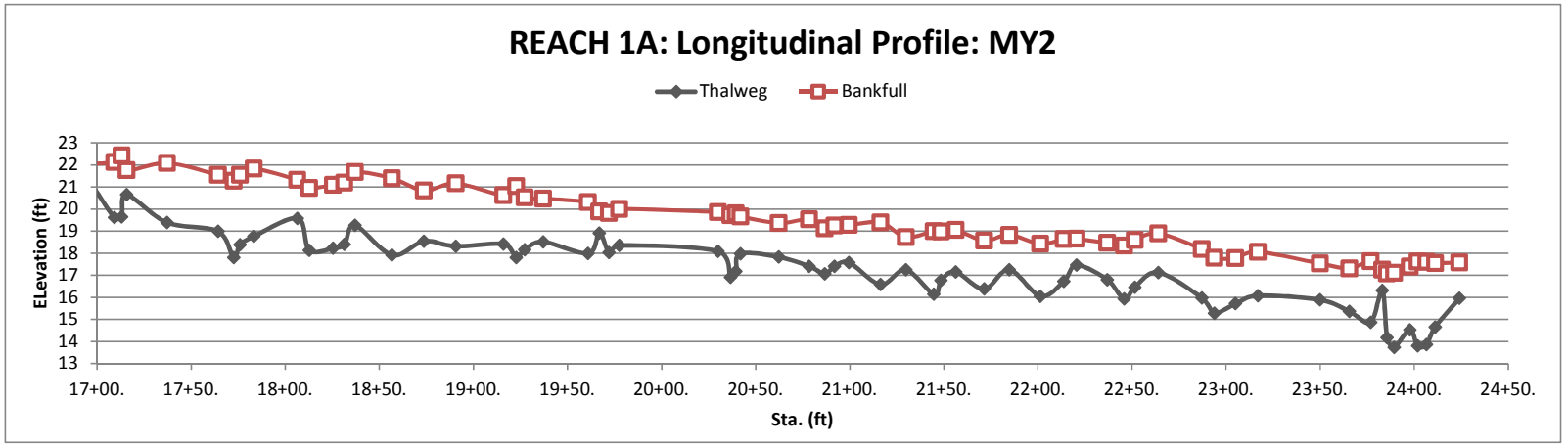
Parameter	Baseline						MY-1						MY-2						MY- 3						MY- 4						MY- 5					
Dimension and Substrate - Riffle only	Min	n	Med	Max	SD[4]	n	Min	n	Med	Max	SD[4]	n	Min	n	Med	Max	SD[4]	n	Min	n	Med	Max	SD[4]	n	Min	n	Med	Max	SD[4]	n	Min	n	Med	Max	SD[4]	n
Bankfull Width (ft)		4						3.9						5.6																						
Floodprone Width (ft)		7.8						17.4						94.8																						
Bankfull Mean Depth (ft)		0.2						0.2						0.51																						
[1]Bankfull Max Depth (ft)		0.4						0.7						1.2																						
Bankfull Cross Sectional Area (ft^2)		0.6						0.9						2.8																						
Width/Depth Ratio		25.4						16						11.1																						
Entrenchment Ratio		2						4.5						16.9																						
[1]Bank Height Ratio		**2.1**						**1.6**						**1**																						
Profile																																				
Riffle Length (ft)	4.6	10.5		20			3.4	21.8		52.8			2.7	15.8		48.9																				
Riffle Slope (ft/ft)	0	0.71		3.4			0	0.92		2.9			0	1.4		4.5																				
Pool Length (ft)	6.3	10.7		14.5			10.6	17		23.4			4	11.7		35.7																				
Pool Max depth (ft)	0.46	1.29		2.11			0.56	1.32		1.73			0.92	1.61		2.38																				
Pool Spacing (ft)	13.4	34.1		71.9			15.2	38.8		73.3			19.4	34.1		68.3																				
Pattern																																				
Channel Beltwidth (ft)	8	14.8		32																																
Radius of Curvature (ft)	6.1	8.5		11.4																																
Rc:Bankfull width (ft/ft)	**1.53**	**2.13**		**2.85**																																
Meander Wavelength (ft)	43	65.7		89																																
Meander Width Ratio	2	3.7		8																																

Pattern data will not typically be collected unless visual data, dimensional data or profile data indicate significant shifts from baseline

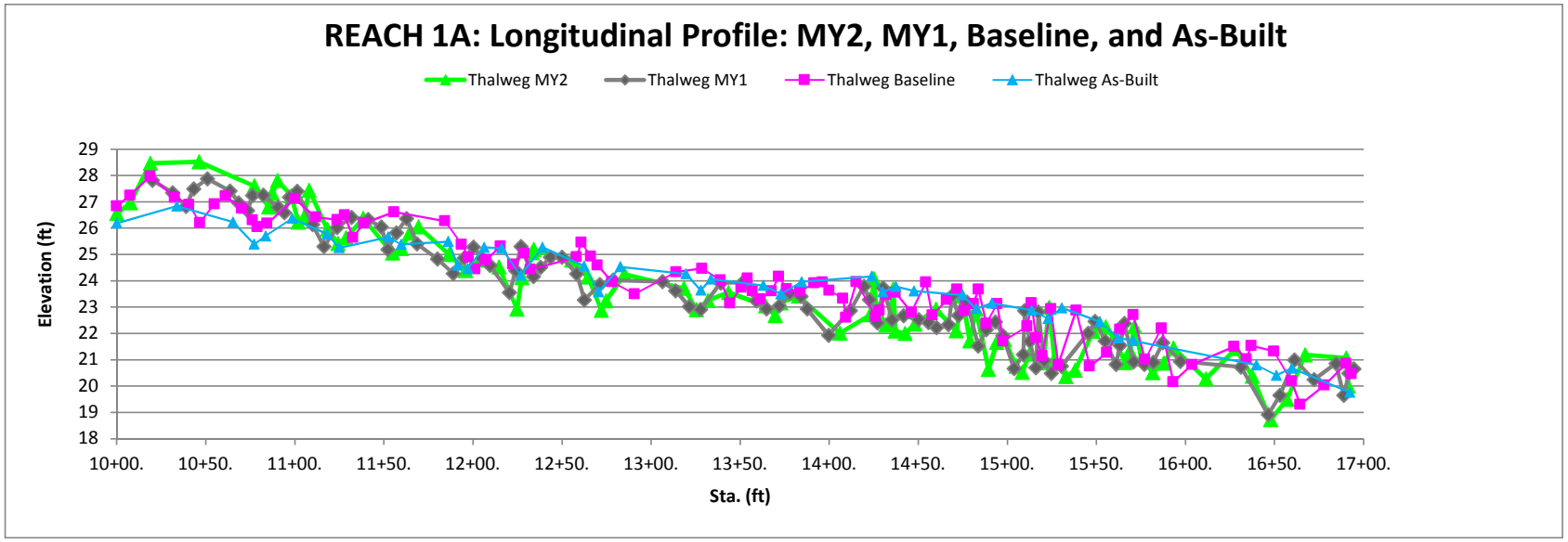
Additional Reach Parameters																																				
Rosgen Classification	C5						C5						E5/C5																							
Channel Thalweg length (ft)																																				
Sinuosity (ft)	1.1						1.3						1.3																							
Water Surface Slope (Channel) (ft/ft)																																				
BF slope (ft/ft)																																				
[3]Ri% / Ru% / P% / G% / S%																																				
[3]SC% / Sa% / G% / C% / B% / Be%																																				
[3]d16 / d35 / d50 / d84 / d95 /																																				
[2]% of Reach with Eroding Banks																																				
Channel Stability or Habitat Metric																																				
Biological or Other																																				

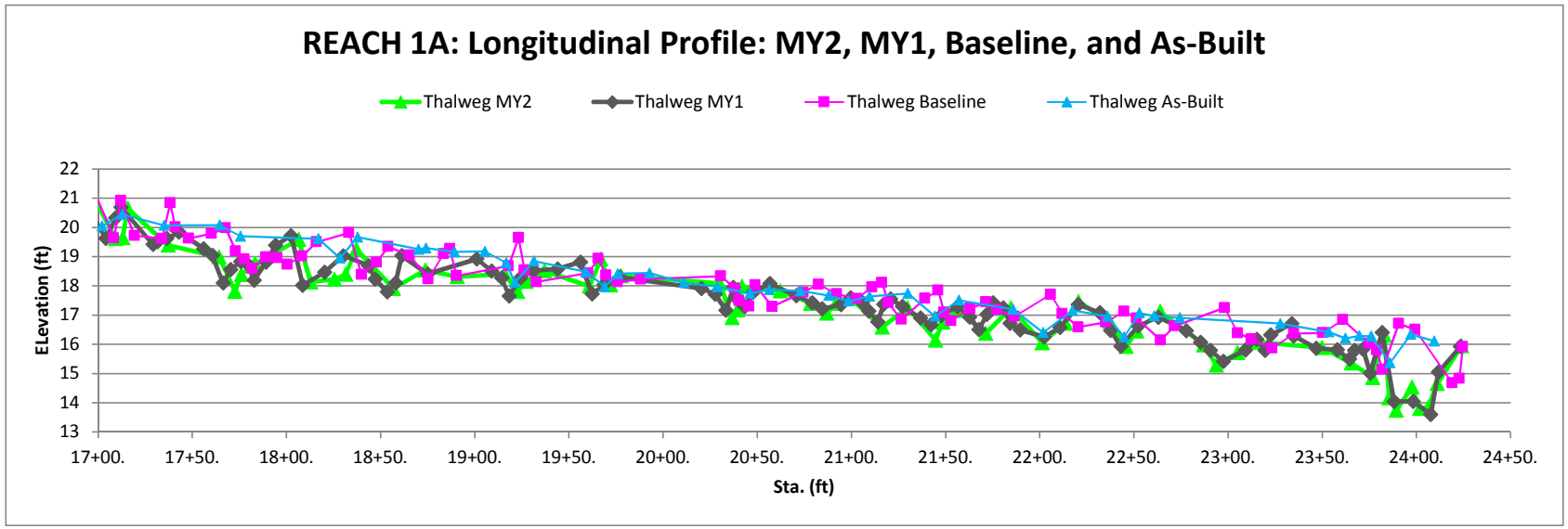
Shaded cells indicate that these will typically not be filled in.
1 = The distributions for these parameters can include information from both the cross-section surveys and the longitudinal profile.
2 = Proportion of reach exhibiting banks that are eroding based on the visual survey from visual assessment table
3 = Riffle, Run, Pool, Glide, Step; Silt/Clay, Sand, Gravel, Cobble, Boulder, Bedrock; dip = max pave, disp = max subpave
4. = Of value/needed only if the n exceeds 3





	Minimum	Mean	Max
Bankfull Slope		0.0083	
Pool-Pool Spacing (ft)	11.1	44.1	103.2
Pool Length (ft)	7.1	13.7	33.1
Riffle Length (ft)	6.6	27.9	78.9
Dmax Riffle (ft)	0.68	1.48	2.55
Dmax Pool (ft)	0.9	2.77	4.36


REACH 1A: Longitudinal Profile: MY2, MY1, Baseline, and As-Built
Thalweg MY2
Thalweg MY1
Thalweg Baseline
Thalweg As-Built
Elevation (ft)
29
28
27
26
25
24
23
22
21
20
19
18
10+00.
10+50.
11+00.
11+50.
12+00.
12+50.
13+00.
13+50.
14+00.
14+50.
15+00.
15+50.
16+00.
16+50.
17+00.
Sta. (ft)


REACH 1A: Longitudinal Profile: MY2, MY1, Baseline, and As-Built
Thalweg MY2
Thalweg MY1
Thalweg Baseline
Thalweg As-Built
ELevation (ft)
22
21
20
19
18
17
16
15
14
13
17+00.
17+50.
18+00.
18+50.
19+00.
19+50.
20+00.
20+50.
21+00.
21+50.
22+00.
22+50.
23+00.
23+50.
24+00.
24+50.
Sta. (ft)

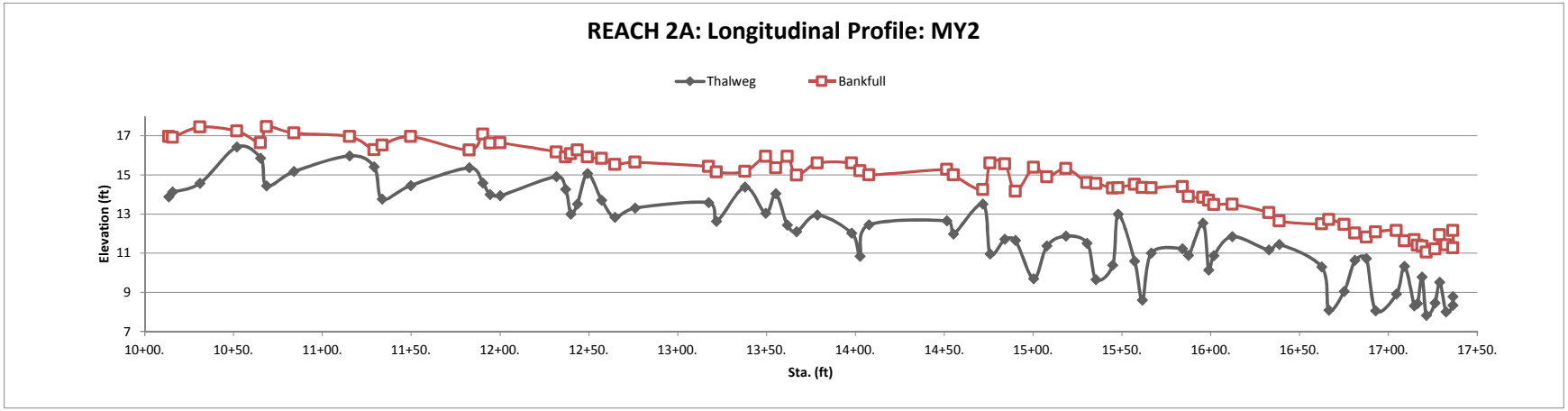
REACH 1A: MY2 LONGITUDINAL PROFILE DATA - UPSTREAM REACH

Sta.	Distance	ELEV-TW	BKF
10+00.	0	26.55042	29.14579
10+07.67	7.667223	26.96068	29.6161
10+18.82	18.81689	28.46073	29.1527
10+46.29	46.29218	28.51656	29.11515
10+77.36	77.35583	27.59832	28.77929
10+85.35	85.35166	26.80593	28.52642
10+87.31	87.31175	27.31586	28.41399
10+90.34	90.34028	27.8047	28.59907
10+97.99	97.99107	27.21941	28.31067
11+01.81	101.8129	26.23017	28.05672
11+05.1	105.1038	26.41074	28.02819
11+08.02	108.0217	27.43284	28.1165
11+18.25	118.2511	25.95113	28.07233
11+24.23	124.2323	25.41711	27.72088
11+28.72	128.7181	25.62546	27.79965
11+38.33	138.3328	26.37291	27.56836
11+54.87	154.872	25.0499	27.06302
11+59.67	159.6688	25.21856	27.28842
11+64.36	164.365	25.80562	27.15663
11+69.4	169.4048	26.04849	26.97276
11+86.6	186.5997	24.99699	26.67833
11+95.78	195.7835	24.38434	26.63065
11+99.41	199.4051	24.5717	26.51168
12+04.4	204.3958	24.7849	26.68292
12+14.59	214.594	24.52375	26.70021
12+24.64	224.6412	22.91682	26.48878
12+27.45	227.4457	24.11531	26.601
12+33.15	233.1529	25.0637	26.10686
12+34.16	234.1591	25.18285	26.16715
12+55.28	255.2779	24.78378	25.88942
12+64.65	264.6519	24.13835	25.90699
12+72.1	272.0979	22.87271	26.14692
12+74.64	274.6418	23.23389	26.06916
12+85.01	285.0085	24.2504	25.59889
13+18.47	318.4708	23.70656	25.27986
13+25.48	325.4774	22.89431	25.97305
13+31.87	331.8705	23.25063	25.46916
13+43.45	343.4547	23.55298	25.75798
13+64.34	364.3408	23.04965	25.71414
13+69.7	369.7001	22.67711	25.26031
13+72.75	372.7507	23.16053	25.31243
13+82.67	382.6697	23.41996	25.51127

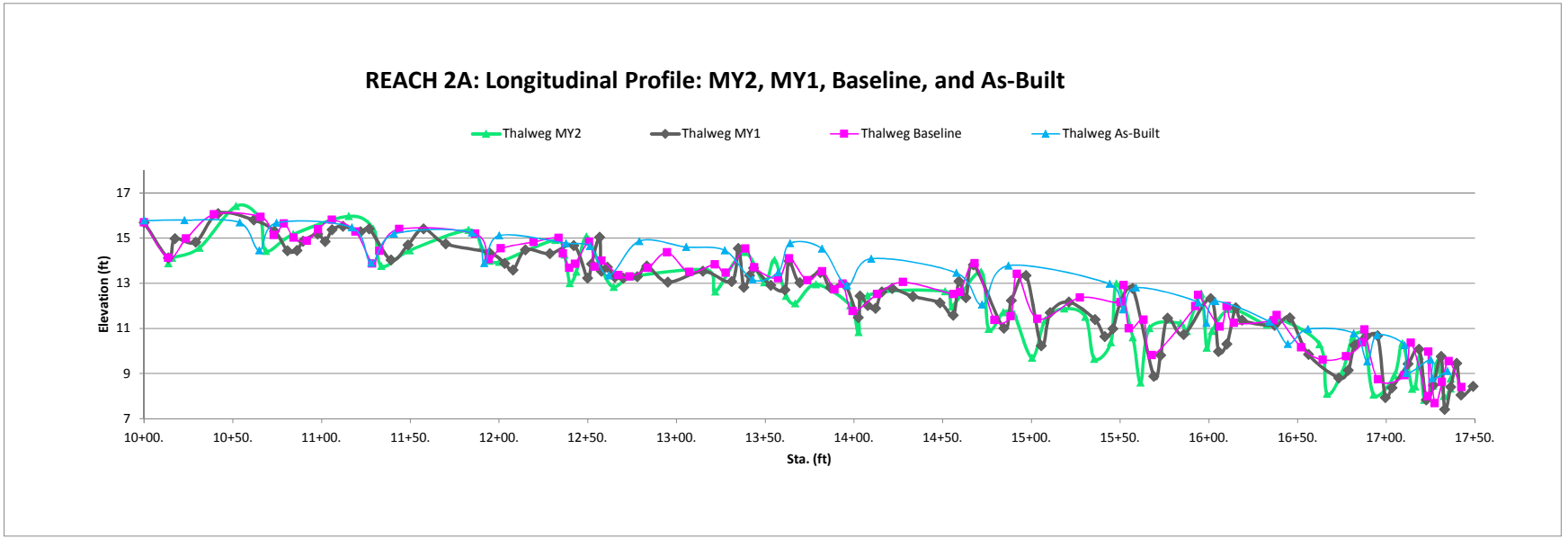
Sta.	Distance	ELEV-TW	BKF
14+05.95	405.9463	22.00856	24.93319
14+22.9	422.9036	22.70183	24.84018
14+25.08	425.0822	24.08357	24.74248
14+26.08	426.083	23.09435	24.85144
14+31.66	431.6598	22.31682	24.93863
14+33.37	433.3693	22.40197	24.89415
14+35.94	435.9424	23.68793	24.85909
14+37.14	437.1358	22.08394	24.8375
14+42.57	442.5731	21.99954	24.87635
14+48.06	448.0595	22.35522	24.59922
14+59.94	459.9434	22.91647	24.33267
14+71.33	471.3348	22.09953	24.29044
14+74.66	474.6639	23.42202	24.33037
14+78.88	478.8841	21.71299	23.47301
14+82.45	482.4466	22.9203	24.42014
14+89.33	489.3348	20.62643	24.1301
14+94.04	494.0447	21.65501	23.91352
14+98.36	498.3645	21.77051	24.30741
15+04.98	504.9829	20.75752	23.65897
15+08.34	508.3368	20.51748	23.75493
15+12.38	512.3834	21.21859	24.07192
15+20.15	520.1476	20.87849	24.20566
15+23.46	523.4631	22.98846	24.15014
15+26.42	526.4207	21.01475	23.69705
15+32.91	532.9072	20.36324	23.3615
15+37.95	537.9453	20.59499	23.50389
15+48.06	548.0628	22.0798	24.02297
15+55.23	555.2284	22.24905	23.34082
15+59.76	559.757	21.81067	23.29159
15+66.16	566.1578	20.88507	23.48418
15+68.79	568.7945	21.34394	23.23103
15+71.45	571.4493	22.25974	23.53041
15+75.28	575.2831	21.03779	23.20105
15+81.62	581.6161	20.50956	22.99938
15+87.72	587.7192	20.8688	22.9685
15+93.31	593.3144	21.43765	23.31349
16+11.38	611.3765	20.27035	23.12536
16+28.14	628.142	21.41738	22.81554
16+37.44	637.4408	20.37568	22.3304
16+47.81	647.808	18.72285	22.13307
16+57.02	657.0156	19.49124	23.07793
16+67.18	667.1787	21.18314	22.71425
16+90.18	690.1819	21.06004	22.4474

REACH 1A: MY2 LONGITUDINAL PROFILE DATA - UPSTREAM REACH

Sta.	Distance	ELEV-TW	BKF
16+91.47	691.4674	19.99493	22.26825
16+99.29	699.2924	20.83518	22.05061
17+09.2	709.2017	19.61623	22.13089
17+13.04	713.0418	19.64807	22.42554
17+15.73	715.7346	20.64598	21.7512
17+37.14	737.145	19.38738	22.07776
17+64.24	764.2406	18.98508	21.54058
17+72.64	772.6367	17.80654	21.27726
17+75.97	775.9742	18.38556	21.54977
17+83.35	783.3452	18.75896	21.82838
18+06.49	806.4851	19.57899	21.31271
18+12.79	812.7888	18.12891	20.9514
18+25.45	825.4516	18.2247	21.08827
18+31.42	831.4249	18.39229	21.19101
18+37.1	837.0955	19.25738	21.67366
18+56.74	856.7424	17.90926	21.39018
18+73.74	873.7359	18.5378	20.83423
18+90.68	890.6796	18.31254	21.15719
19+15.98	915.9823	18.40931	20.626
19+22.71	922.7121	17.80401	21.03411
19+27.23	927.2257	18.15458	20.52469
19+37.02	937.0176	18.5165	20.46723
19+60.94	960.9419	17.98658	20.3064
19+66.93	966.928	18.91324	19.89008
19+72.05	972.0463	18.03069	19.81116
19+77.57	977.5687	18.34803	19.99976
20+29.97	1029.972	18.08319	19.85481
20+36.66	1036.662	16.90662	19.72058
20+39.51	1039.513	17.17171	19.79897
20+41.92	1041.924	17.97581	19.65861
20+62.31	1062.305	17.82303	19.36183
20+78.39	1078.392	17.40326	19.52674
20+86.78	1086.78	17.06086	19.12337
20+91.82	1091.819	17.39702	19.24784
20+99.49	1099.488	17.5728	19.27493
21+16.35	1116.349	16.58601	19.38422
21+29.79	1129.793	17.24367	18.72829
21+44.7	1144.698	16.13968	18.9984
21+48.55	1148.547	16.76155	18.98012
21+56.22	1156.219	17.15067	19.0498
21+71.36	1171.365	16.37782	18.57125
21+84.73	1184.732	17.24644	18.8276
22+01.29	1201.286	16.04873	18.42259
22+13.75	1213.746	16.71818	18.63493
22+20.59	1220.593	17.45617	18.64438
22+36.92	1236.923	16.79537	18.46186
22+45.86	1245.856	15.92778	18.34388
22+51.43	1251.433	16.45663	18.59565
22+63.93	1263.925	17.12475	18.88778
22+87.07	1287.071	15.97713	18.18229
22+93.85	1293.852	15.28377	17.78739
23+04.94	1304.939	15.71032	17.77932
23+16.83	1316.827	16.07192	18.0617
23+49.85	1349.845	15.8823	17.52969
23+65.51	1365.506	15.3557	17.31138
23+76.78	1376.778	14.86218	17.63746
23+82.94	1382.942	16.31624	17.25063
23+85.54	1385.543	14.16792	17.07312
23+89.32	1389.322	13.73848	17.11286
23+97.63	1397.632	14.52972	17.38602
24+01.8	1401.796	13.80001	17.62274
24+06.44	1406.439	13.85868	17.60039
24+11.12	1411.121	14.65681	17.55099
24+23.95	1423.948	15.95109	17.57456

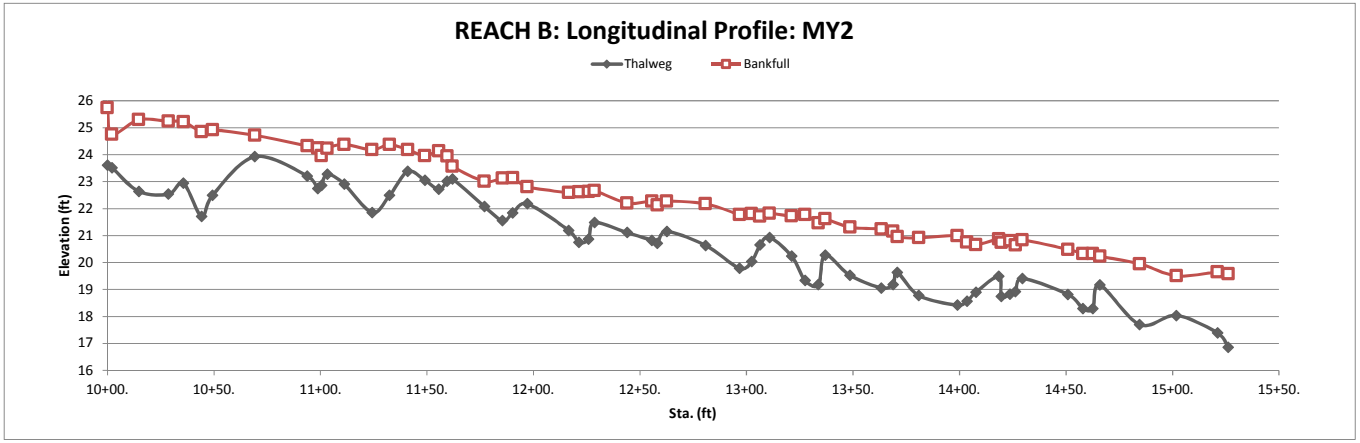


	Minimum	Mean	Max
Bankfull Slope		0.0078	
Pool-Pool Spacing (ft)	9.8	39.8	72.9
Pool Length (ft)	2.5	14.3	32.1
Riffle Length (ft)	10.7	25.5	43.9
Dmax Riffle	0.82	2.03	3.44
Dmax Pool (ft)	2.68	3.8	5.75

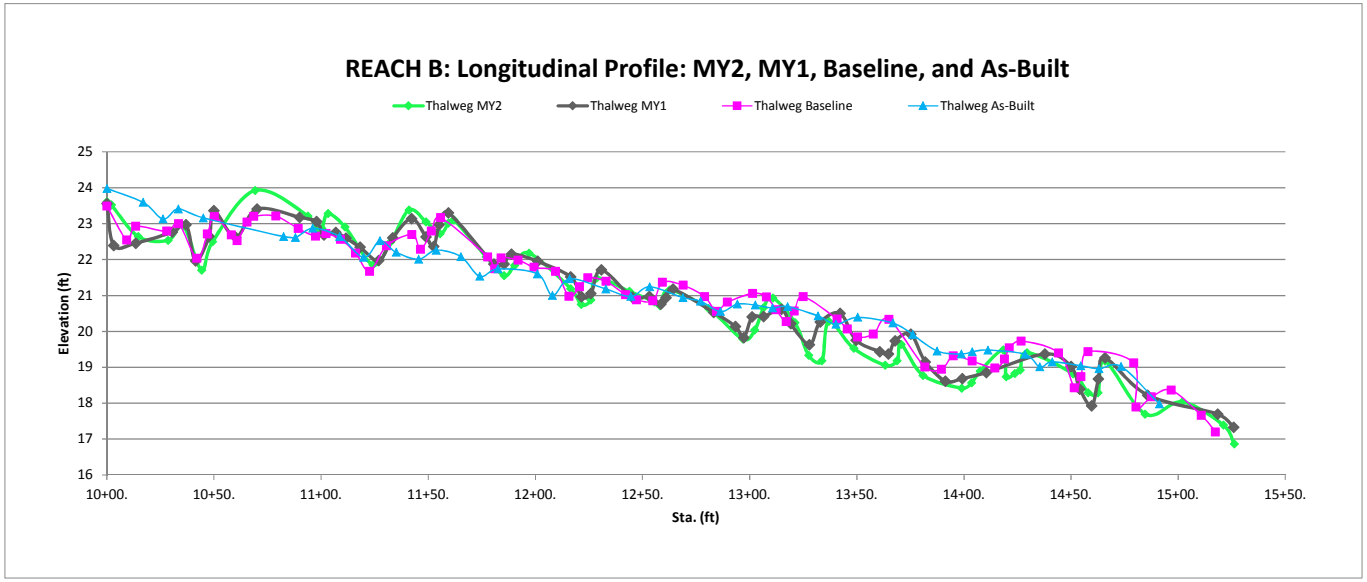


REACH 2A: MY 2 LONGITUDINAL PROFILE DATA - DOWNSTREAM REACH

Sta.	Distance	ELEV-TW	BKF		Sta.	Distance	ELEV-TW	BKF
10+13.68	13.67974	13.8784	16.95217		15+18.5	518.4958	11.87529	15.31895
10+15.74	15.74422	14.128	16.917		15+30.41	530.4126	11.51098	14.59318
10+31.11	31.11154	14.56957	17.43885		15+35.42	535.4153	9.649402	14.56058
10+51.84	51.83521	16.418	17.23924		15+44.76	544.7578	10.3809	14.31768
10+65.28	65.27518	15.85559	16.63243		15+47.93	547.9255	12.98973	14.34054
10+68.65	68.64741	14.43345	17.45905		15+57.15	557.1531	10.59946	14.50704
10+84.1	84.09615	15.17019	17.13528		15+61.48	561.4768	8.596663	14.34798
11+15.3	115.2967	15.97225	16.95261		15+66.55	566.5515	11.01174	14.33062
11+29.13	129.1287	15.411	16.27223		15+83.98	583.9772	11.23072	14.39784
11+33.68	133.6823	13.76399	16.51895		15+87.51	587.5111	10.88732	13.88769
11+49.73	149.7349	14.45858	16.94797		15+95.61	595.6113	12.53692	13.84124
11+82.75	182.7451	15.35862	16.25715		15+98.8	598.8019	10.14056	13.69578
11+90.28	190.2784	14.58897	17.06791		16+01.71	601.7073	10.87926	13.47854
11+94.37	194.3724	14.00067	16.61648		16+12.21	612.2077	11.85017	13.48854
12+00.15	200.1535	13.939	16.63396		16+32.68	632.6772	11.15946	13.07027
12+31.79	231.7856	14.91478	16.16682		16+38.62	638.6214	11.45283	12.63454
12+36.94	236.9374	14.26404	15.91464		16+62.39	662.3934	10.29829	12.49183
12+39.9	239.9005	12.99939	16.07506		16+66.48	666.4763	8.095374	12.71157
12+43.55	243.5548	13.51005	16.25981		16+75.05	675.0522	9.051728	12.45855
12+49.19	249.1864	15.07064	15.90667		16+81.12	681.1228	10.63084	12.02823
12+57.23	257.2253	13.70748	15.82909		16+87.51	687.5142	10.71925	11.82099
12+64.59	264.5864	12.82976	15.52193		16+92.85	692.8541	8.062958	12.07303
12+75.97	275.9717	13.3026	15.64089		17+04.54	704.5443	8.909429	12.14967
13+17.38	317.3782	13.58417	15.41932		17+09.06	709.0551	10.33399	11.62266
13+21.86	321.8642	12.62871	15.13903		17+14.58	714.5803	8.312904	11.68789
13+37.84	337.8445	14.37697	15.17219		17+16.38	716.3754	8.422996	11.40824
13+49.46	349.4639	13.04216	15.93658		17+18.88	718.8773	9.788182	11.35843
13+55.19	355.1876	14.03367	15.34701		17+21.39	721.3894	7.828299	11.0506
13+61.69	361.6947	12.43559	15.93332		17+26.15	726.1494	8.459915	11.21383
13+66.98	366.976	12.10095	14.98424		17+28.87	728.8691	9.512561	11.92838
13+78.55	378.5514	12.94994	15.6001		17+32.43	732.4335	7.996612	11.42016
13+97.97	397.972	12.01782	15.59443		17+36.22	736.216	8.333834	11.26522
14+02.64	402.6364	10.83603	15.20715		17+36.22	736.216	8.776519	12.16061
14+07.6	407.598	12.44878	14.99261					
14+51.47	451.4732	12.64732	15.27703					
14+55.14	455.1363	11.97142	14.99518					
14+71.69	471.6906	13.51092	14.23819					
14+75.82	475.8237	10.96641	15.5978					
14+84.12	484.116	11.71222	15.55732					
14+90.09	490.0894	11.64573	14.15218					
15+00.28	500.281	9.700392	15.37337					
15+07.8	507.8018	11.36662	14.88649					

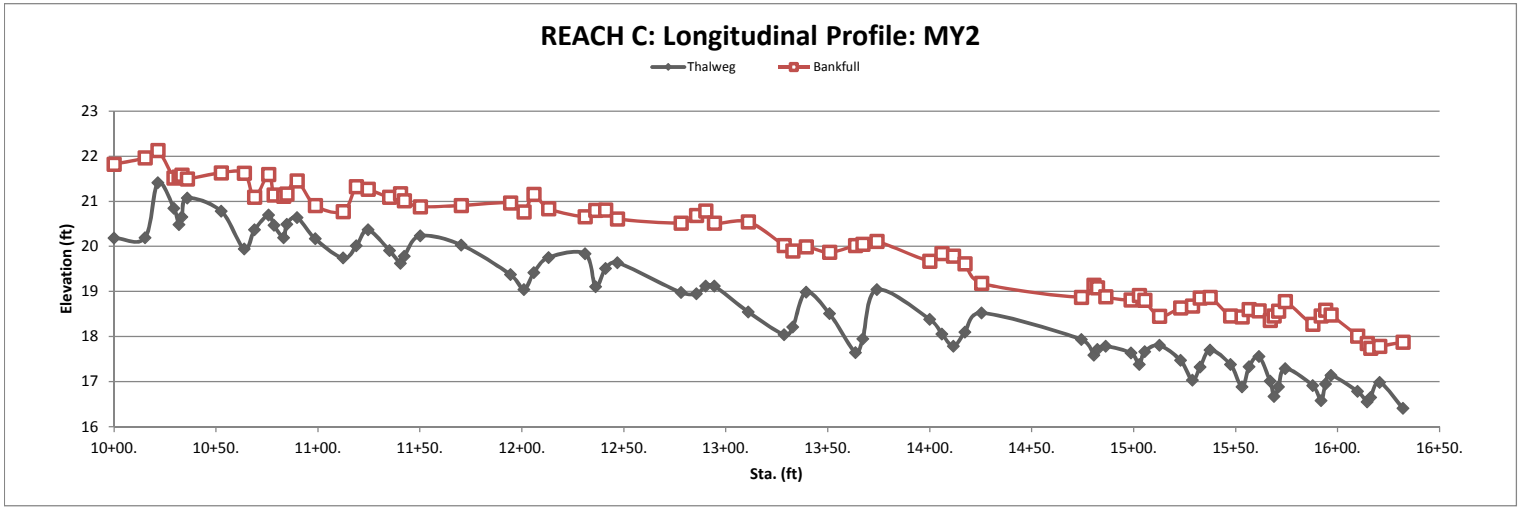


	Minimum	Mean	Max
Bankfull Slope		0.0113	
Pool-Pool Spacing (ft)	17.3	37.1	70.2
Pool Length (ft)	5	14.5	26.5
Riffle Length (ft)	8	17.9	55.2
Dmax Riffle (ft)	0.47	1.07	1.76
Dmax Pool (ft)	1.31	2.08	3.14

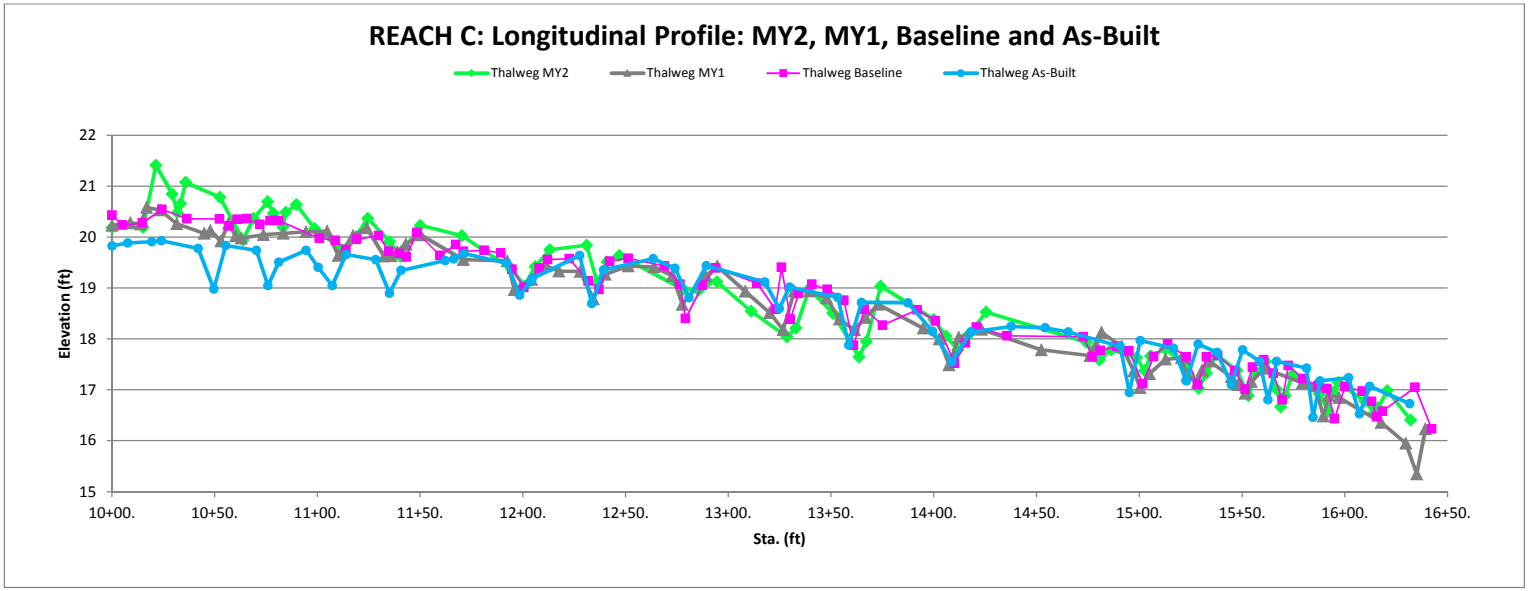


REACH B: MY2 LONGITUDINAL PROFILE DATA

Sta.	Distance	TW	BKF		Sta.	Distance	TW	BKF
10+00.	0	23.60904	25.73928		13+48.57	348.5675	19.52536	21.31016
10+02.08	2.075354	23.51839	24.74997		13+63.34	363.3406	19.0563	21.24525
10+14.7	14.70009	22.63969	25.29634		13+68.8	368.8023	19.18135	21.15781
10+28.6	28.60024	22.5356	25.23764		13+70.82	370.8188	19.63262	20.95416
10+35.65	35.64717	22.93986	25.21907		13+80.94	380.9384	18.77536	20.91572
10+44.19	44.18758	21.7052	24.84963		13+99.01	399.0149	18.41979	20.99698
10+49.36	49.35653	22.49882	24.92494		14+03.55	403.5503	18.56719	20.75801
10+69.17	69.16935	23.92597	24.71598		14+07.69	407.6902	18.89906	20.65774
10+93.82	93.81962	23.20969	24.32643		14+18.44	418.4406	19.48514	20.87097
10+98.77	98.76842	22.73883	24.24248		14+19.68	419.681	18.74004	20.74648
11+00.48	100.4846	22.86626	23.95914		14+23.75	423.75	18.82092	20.80209
11+03.2	103.2015	23.28271	24.22964		14+26.31	426.3054	18.92246	20.65407
11+11.15	111.1541	22.90606	24.37949		14+29.5	429.5001	19.40855	20.83254
11+24.19	124.1929	21.85418	24.18509		14+50.94	450.9383	18.81678	20.4877
11+32.42	132.4202	22.49049	24.37315		14+58.	457.9979	18.29463	20.32828
11+41.	140.9955	23.37818	24.18162		14+62.54	462.5413	18.2882	20.33019
11+49.02	149.0173	23.04708	23.9579		14+65.94	465.9402	19.16837	20.23218
11+55.55	155.5549	22.71537	24.14086		14+84.6	484.596	17.69629	19.95226
11+59.46	159.4626	23.01727	23.94453		15+01.82	501.8171	18.03659	19.50635
11+61.96	161.9631	23.10211	23.57173		15+21.13	521.1301	17.38841	19.64583
11+76.97	176.9731	22.07563	23.01291		15+26.17	526.1657	16.86093	19.57456
11+85.42	185.4193	21.55257	23.13137					
11+90.29	190.2908	21.83709	23.14436					
11+97.11	197.1146	22.17991	22.81319					
12+16.53	216.5315	21.18796	22.58971					
12+21.37	221.3654	20.74568	22.62312					
12+25.83	225.8307	20.87212	22.63257					
12+28.63	228.6323	21.482	22.67134					
12+43.94	243.9356	21.1122	22.20673					
12+55.6	255.597	20.82233	22.27939					
12+58.13	258.1315	20.71525	22.12599					
12+62.56	262.5597	21.15171	22.27081					
12+80.81	280.8084	20.63395	22.17586					
12+96.78	296.7784	19.78441	21.77532					
13+02.41	302.4132	20.03598	21.80825					
13+06.35	306.3479	20.65111	21.7167					
13+10.86	310.8555	20.93138	21.82285					
13+21.21	321.2122	20.2388	21.72235					
13+27.51	327.5144	19.33519	21.77922					
13+33.75	333.7509	19.18106	21.46627					
13+36.94	336.9408	20.27426	21.61712					



	Minimum	Mean	Max
Bankfull Slope		0.0061	
Pool-Pool Spacing (ft)	19.4	34.1	68.3
Pool Length (ft)	4	11.7	35.7
Riffle Length (ft)	2.7	15.8	48.9
Dmax Riffle (ft)	0.43	0.96	1.49
Dmax Pool (ft)	0.92	1.61	2.38



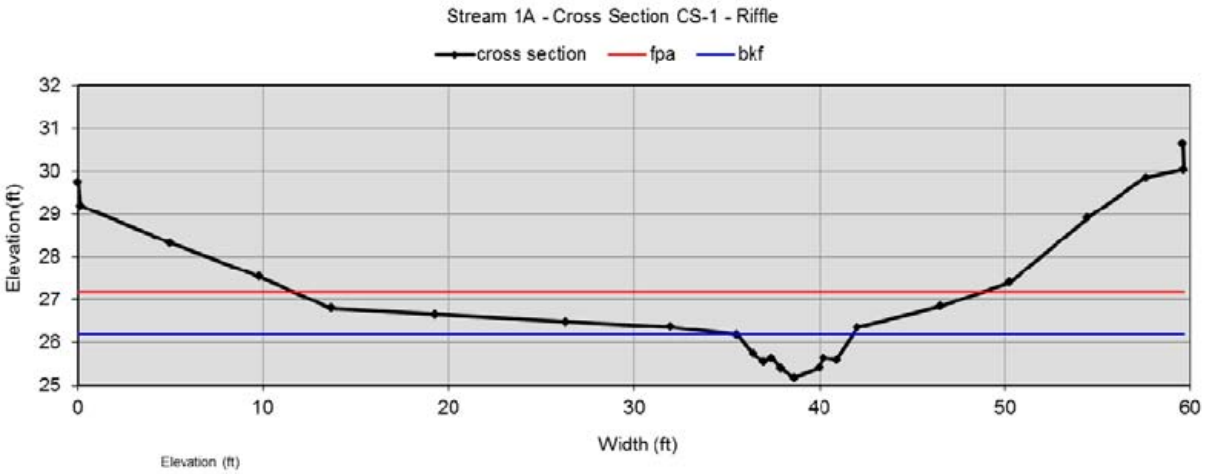
REACH C: MY2 LONGITUDINAL PROFILE DATA

Sta.	Distance	ELEV-TW	BKF		Sta.	Distance	ELEV-TW	BKF
10+00.	0.00	20.1899	21.82644		13+63.48	363.48	17.64924	20.0247
10+15.17	15.17	20.19319	21.96833		13+67.05	367.05	17.94873	20.05192
10+21.41	21.41	21.41451	22.13305		13+74.08	374.08	19.04168	20.11444
10+29.31	29.31	20.84949	21.52598		13+99.94	399.94	18.38575	19.6791
10+31.79	31.79	20.48708	21.54122		14+05.93	405.93	18.06091	19.84664
10+33.3	33.30	20.65925	21.58941		14+11.6	411.60	17.78874	19.78998
10+35.86	35.86	21.07847	21.50409		14+17.21	417.21	18.10012	19.61949
10+52.52	52.52	20.78466	21.63735		14+25.35	425.35	18.52929	19.18443
10+63.77	63.77	19.94422	21.63214		14+74.25	474.25	17.94043	18.87595
10+68.84	68.84	20.37167	21.09457		14+80.44	480.44	17.58999	19.14663
10+75.8	75.80	20.70024	21.60369		14+82.12	482.12	17.7185	19.08778
10+78.45	78.45	20.46931	21.14473		14+86.28	486.28	17.78899	18.88619
10+83.14	83.14	20.19313	21.11803		14+98.64	498.64	17.63754	18.81405
10+84.67	84.67	20.4906	21.16918		15+02.62	502.62	17.38176	18.9197
10+89.75	89.75	20.64232	21.45914		15+05.31	505.31	17.66545	18.81241
10+98.63	98.63	20.17072	20.91085		15+12.57	512.57	17.80606	18.45387
11+12.29	112.29	19.74626	20.77624		15+22.88	522.88	17.47692	18.63773
11+18.82	118.82	20.01502	21.32852		15+28.68	528.68	17.03604	18.67943
11+24.48	124.48	20.37018	21.27435		15+32.57	532.57	17.32745	18.86066
11+35.02	135.02	19.91153	21.09746		15+37.44	537.44	17.70012	18.87243
11+40.4	140.40	19.62975	21.17809		15+47.36	547.36	17.38545	18.45944
11+42.35	142.35	19.78286	21.02028		15+53.06	553.06	16.88604	18.44228
11+50.08	150.08	20.23581	20.88614		15+56.58	556.58	17.33406	18.60691
11+70.2	170.20	20.03428	20.91154		15+61.36	561.36	17.55891	18.57345
11+94.33	194.33	19.37737	20.96811		15+66.81	566.81	17.0124	18.36146
12+00.89	200.89	19.04264	20.76855		15+68.82	568.82	16.67027	18.46583
12+05.86	205.86	19.42105	21.1602		15+70.97	570.97	16.88809	18.57003
12+13.02	213.02	19.75827	20.84252		15+74.31	574.31	17.29351	18.78153
12+30.91	230.91	19.84132	20.66172		15+87.68	587.68	16.91762	18.27618
12+36.07	236.07	19.1083	20.80468		15+91.83	591.83	16.57932	18.46067
12+40.94	240.94	19.51567	20.80964		15+93.95	593.95	16.95164	18.59022
12+46.81	246.81	19.64398	20.61585		15+96.72	596.72	17.14382	18.48501
12+77.95	277.95	18.97805	20.52403		16+09.77	609.77	16.78323	18.01774
12+85.55	285.55	18.95375	20.68997		16+14.37	614.37	16.55009	17.85146
12+90.08	290.08	19.12424	20.79372		16+16.11	616.11	16.65244	17.74598
12+94.34	294.34	19.12391	20.51823		16+20.55	620.55	16.98814	17.78557
13+10.95	310.95	18.55087	20.54876		16+31.99	631.99	16.41071	17.88078
13+28.49	328.49	18.04612	20.02421					
13+32.81	332.81	18.2163	19.90216					
13+39.28	339.28	18.9875	19.9947					
13+50.81	350.81	18.50976	19.87292					

Jacksonville Country Club

Reach 1A – Permanent Cross Section CS1

(MY2 – November 2015)



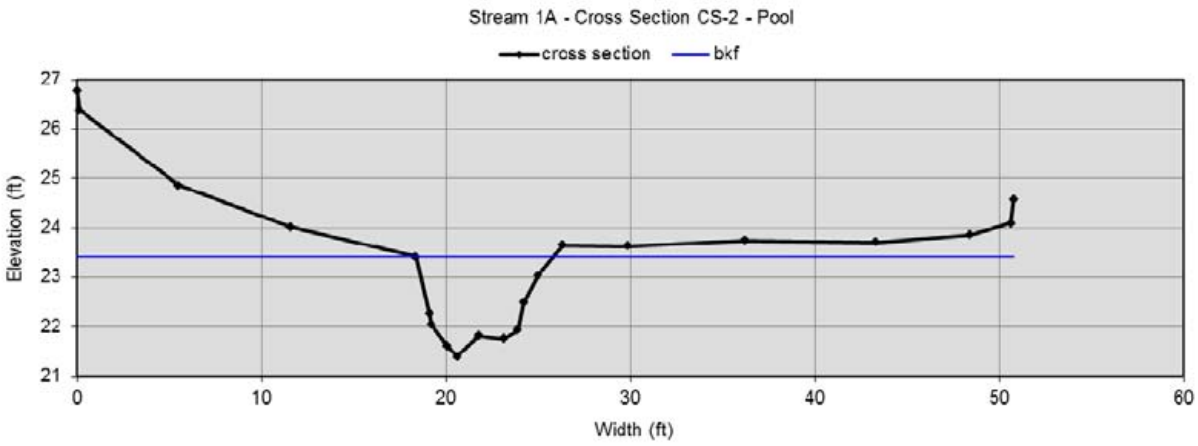
Bankfull Dimensions	
3.7	x-section area (ft.sq.)
6.2	width (ft)
0.6	mean depth (ft)
1.0	max depth (ft)
6.8	wetted parimeter (ft)
0.6	hyd radi (ft)
10.4	width-depth ratio

Flood Dimensions	
37.1	W flood prone area (ft)
5.9	entrenchment ratio
1.0	low bank height (ft)
1.0	low bank height ratio

Jacksonville Country Club

Reach 1A – Permanent Cross Section CS2

(MY2 – November 2015)

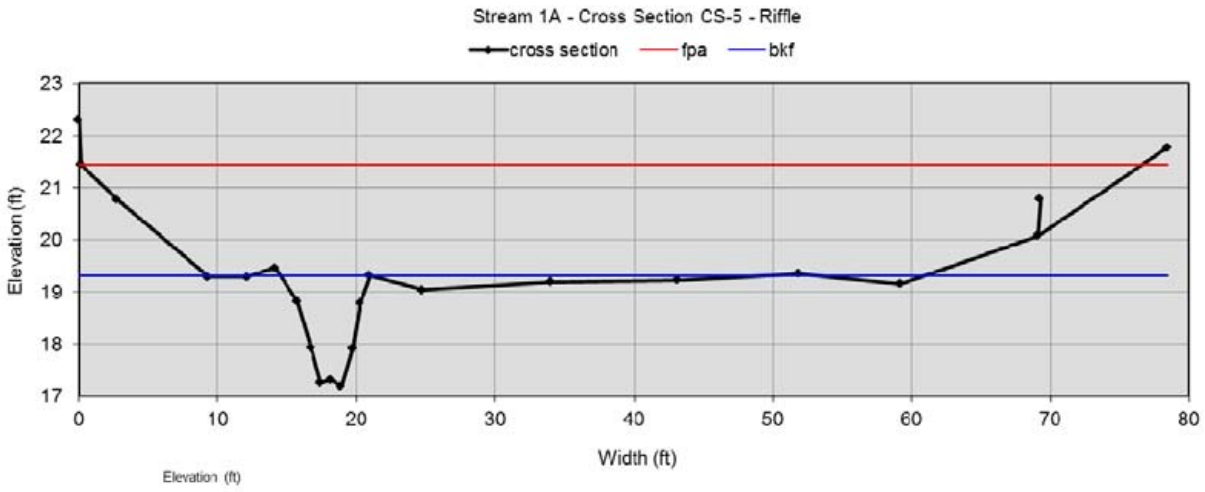


Bankfull Dimensions		Flood Dimensions	
9.6	x-section area (ft.sq.)	---	W flood prone area (ft)
7.4	width (ft)	---	entrenchment ratio
1.3	mean depth (ft)	2.0	low bank height (ft)
2.0	max depth (ft)	1.0	low bank height ratio
9.0	wetted parimeter (ft)		
1.1	hyd radi (ft)		
5.8	width-depth ratio		

Jacksonville Country Club

Reach 1A – Permanent Cross Section CS5

(MY2 – November 2015)



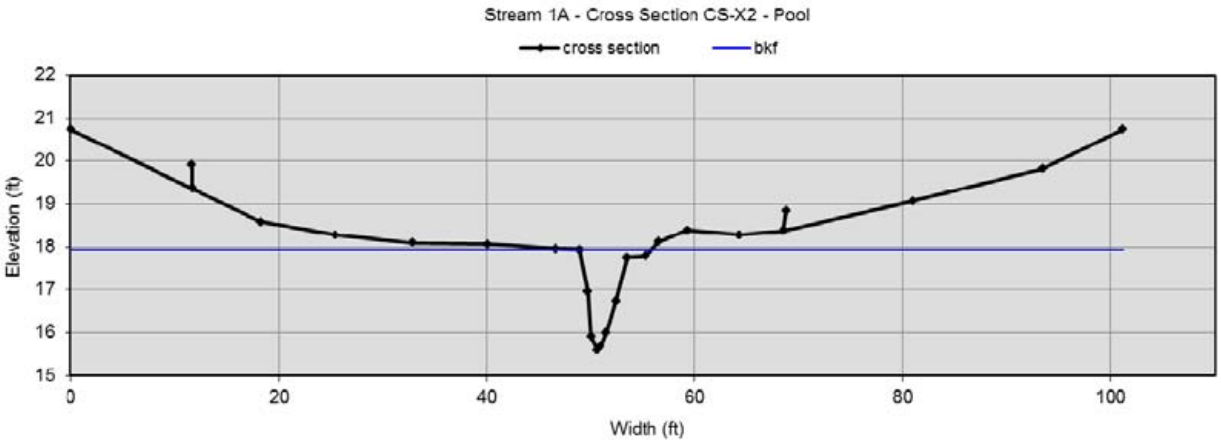
Bankfull Dimensions	
7.6	x-section area (ft.sq.)
6.5	width (ft)
1.2	mean depth (ft)
2.1	max depth (ft)
8.1	wetted parimeter (ft)
0.9	hyd radi (ft)
5.5	width-depth ratio

Flood Dimensions	
76.4	W flood prone area (ft)
11.8	entrenchment ratio
2.1	low bank height (ft)
1.0	low bank height ratio

Jacksonville Country Club

Reach 1A – Permanent Cross Section CS-X2

(MY2 – November 2015)



Bankfull Dimensions		Flood Dimensions	
6.6	x-section area (ft.sq.)	---	W flood prone area (ft)
6.9	width (ft)	---	entrenchment ratio
1.0	mean depth (ft)	2.3	low bank height (ft)
2.3	max depth (ft)	1.0	low bank height ratio
9.0	wetted parimeter (ft)		
0.7	hyd radi (ft)		
7.2	width-depth ratio		

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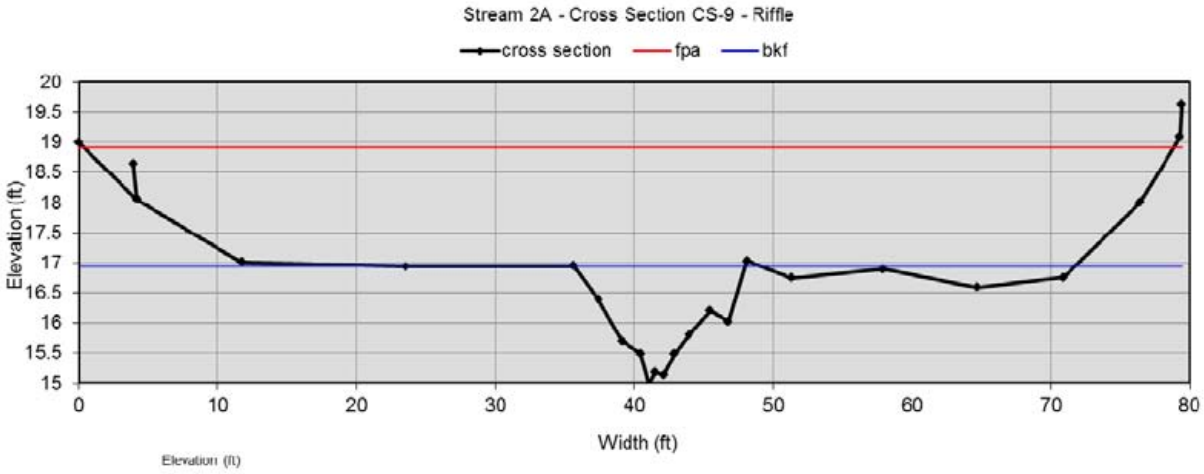
Reach 2A – Permanent Cross Section CS-9

(MY2 – November 2015)



Bankfull Dimensions	
12.5	x-section area (ft.sq.)
12.3	width (ft)
1.0	mean depth (ft)
2.0	max depth (ft)
13.3	wetted parimeter (ft)
0.9	hyd radi (ft)
12.1	width-depth ratio

Flood Dimensions	
78.4	W flood prone area (ft)
6.4	entrenchment ratio
2.0	low bank height (ft)
1.0	low bank height ratio

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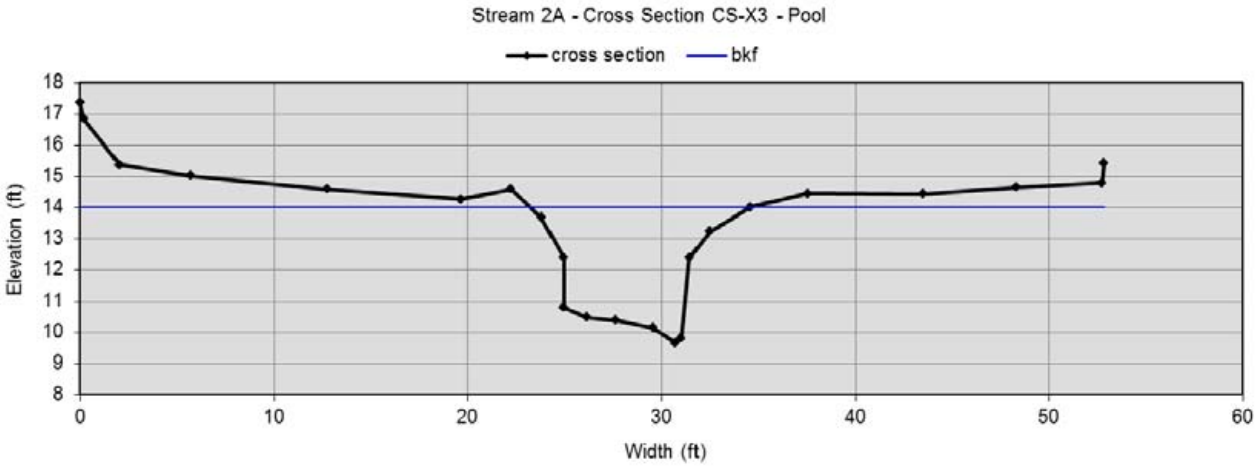
Reach 2A – Permanent Cross Section CS-X3

(MY2 – November 2015)



Bankfull Dimensions		Flood Dimensions	
27.2	x-section area (ft.sq.)	---	W flood prone area (ft)
11.4	width (ft)	---	entrenchment ratio
2.4	mean depth (ft)	4.4	low bank height (ft)
4.4	max depth (ft)	1.0	low bank height ratio
16.4	wetted parimeter (ft)		
1.7	hyd radi (ft)		
4.7	width-depth ratio		

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Reach B – Permanent Cross Section CS-X1

(MY2 – November 2015)

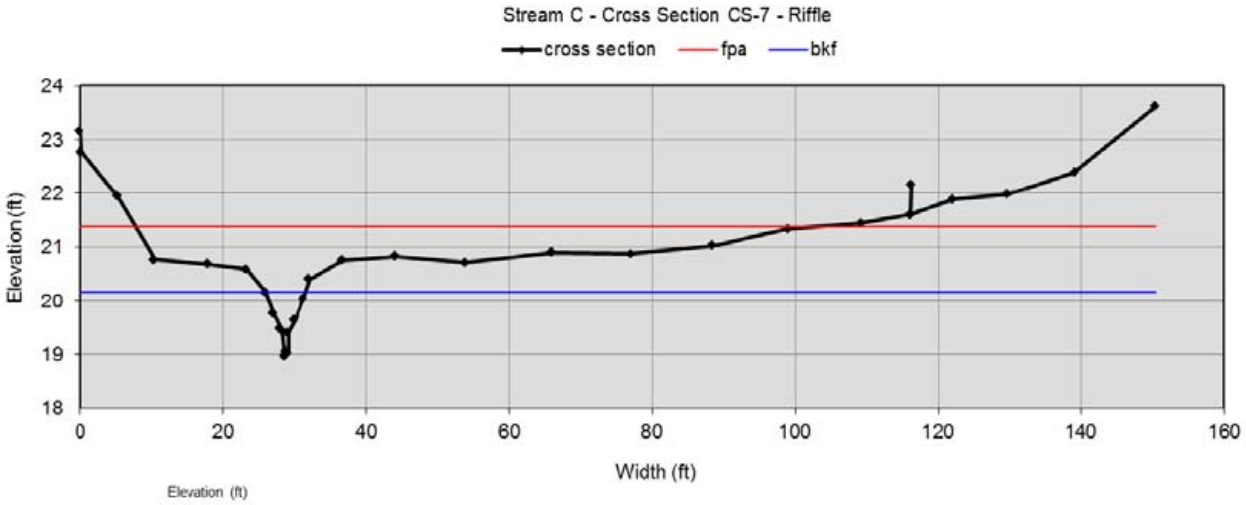
Bankfull Dimensions	
7.2	x-section area (ft.sq.)
6.9	width (ft)
1.1	mean depth (ft)
1.7	max depth (ft)
8.1	wetted parimeter (ft)
0.9	hyd radi (ft)
6.5	width-depth ratio

Flood Dimensions	
56.3	W flood prone area (ft)
8.2	entrenchment ratio
1.7	low bank height (ft)
1.0	low bank height ratio

Jacksonville Country Club

Reach C – Permanent Cross Section CS-7

(MY2 – November 2015)



Bankfull Dimensions	
2.8	x-section area (ft.sq.)
5.6	width (ft)
0.5	mean depth (ft)
1.2	max depth (ft)
6.5	wetted parimeter (ft)
0.4	hyd radi (ft)
11.1	width-depth ratio

Flood Dimensions	
94.8	W flood prone area (ft)
16.9	entrenchment ratio
1.2	low bank height (ft)
1.0	low bank height ratio

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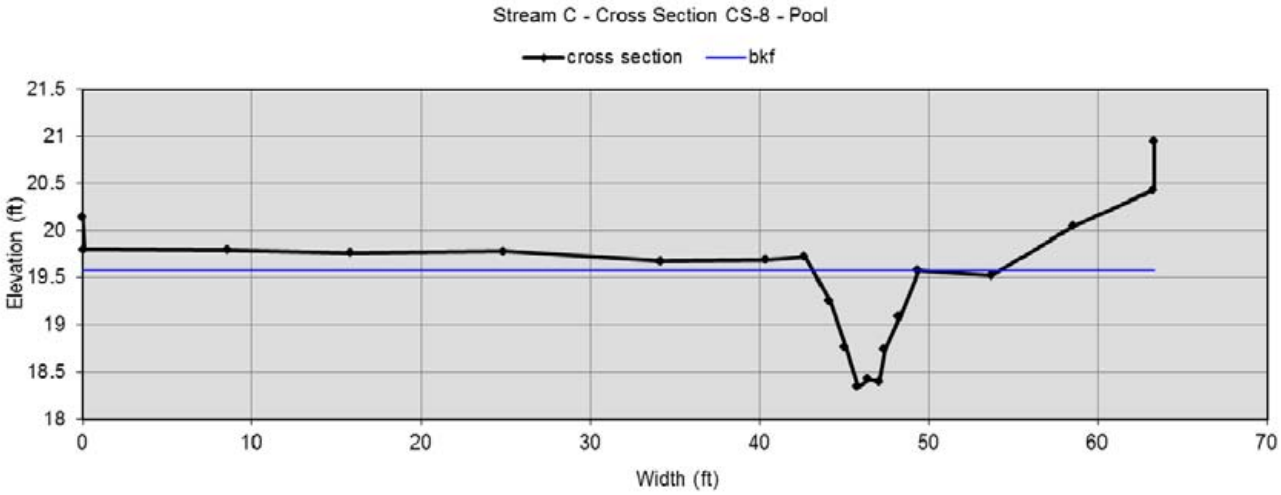
Reach C – Permanent Cross Section CS-8

(MY2 – November 2015)



Bankfull Dimensions		Flood Dimensions	
4.1	x-section area (ft.sq.)	---	W flood prone area (ft)
6.3	width (ft)	---	entrenchment ratio
0.7	mean depth (ft)	1.2	low bank height (ft)
1.2	max depth (ft)	1.0	low bank height ratio
6.9	wetted parimeter (ft)		
0.6	hyd radi (ft)		
9.5	width-depth ratio		

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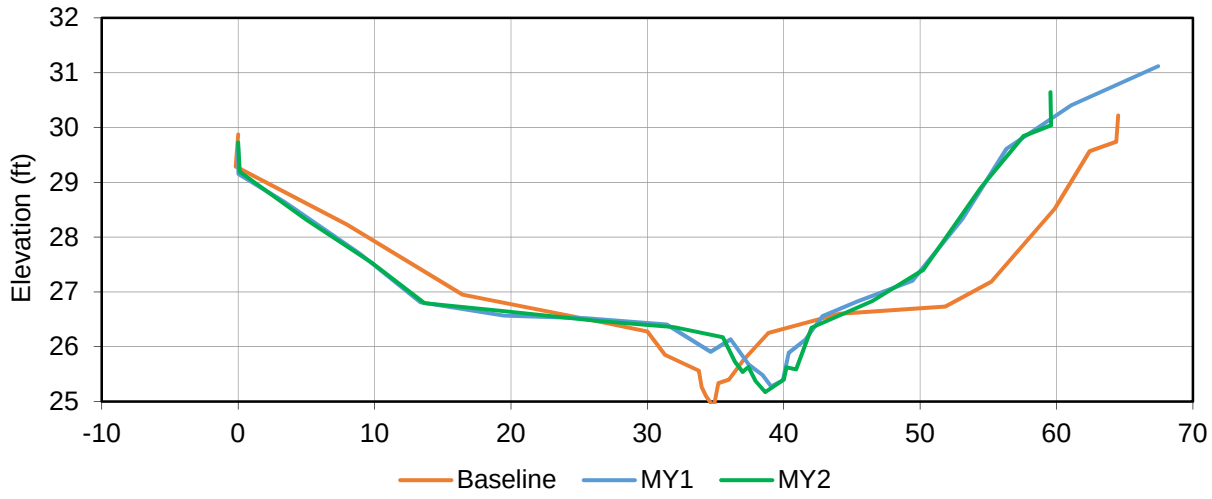
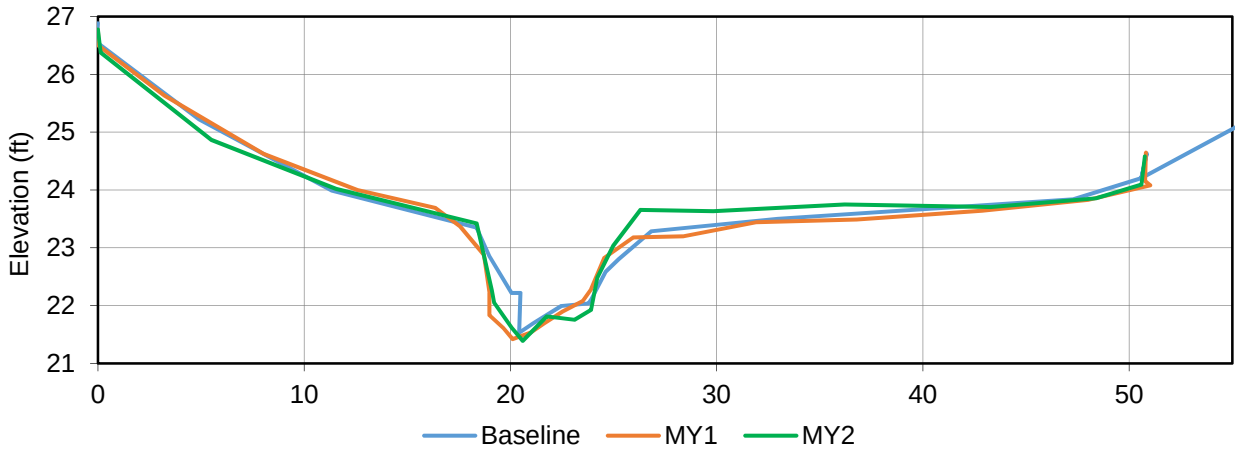
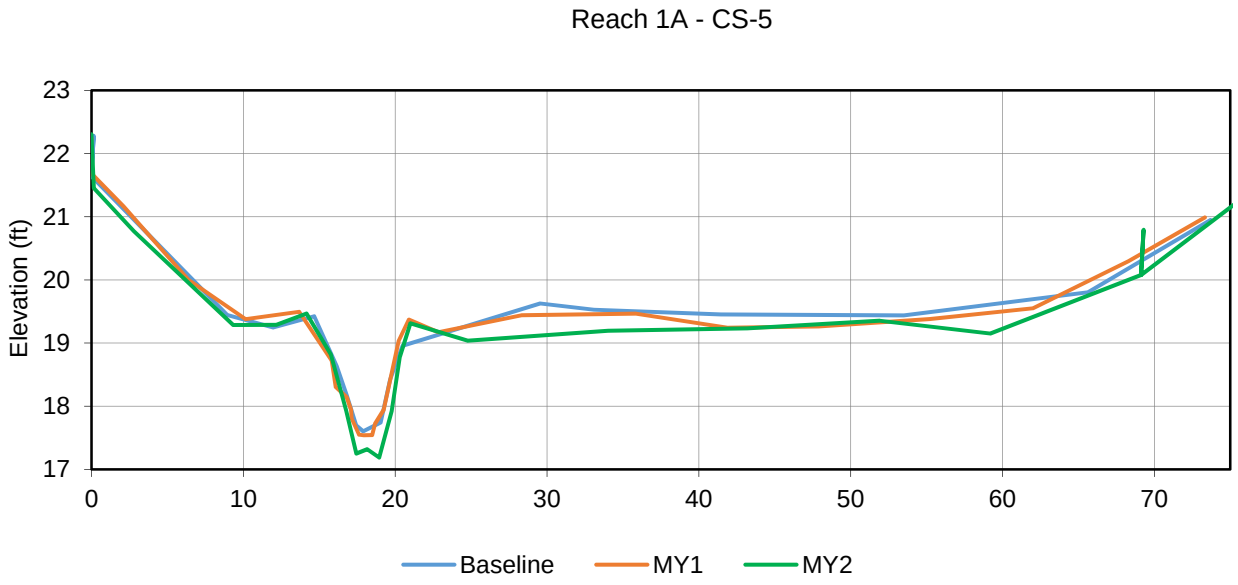
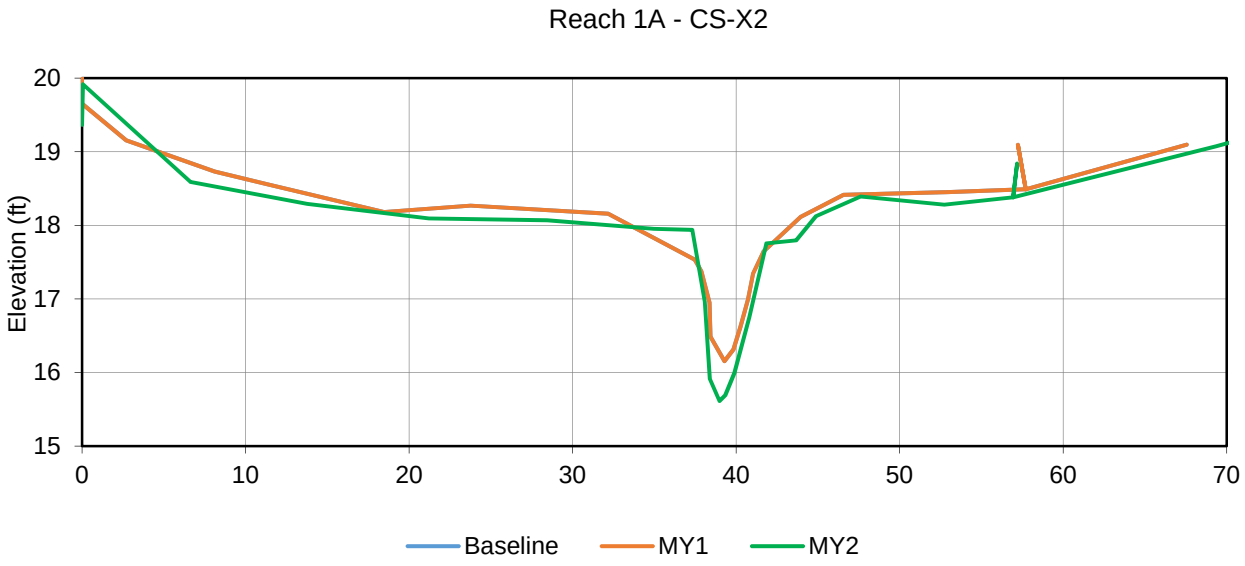
Reach 1A - CS-1

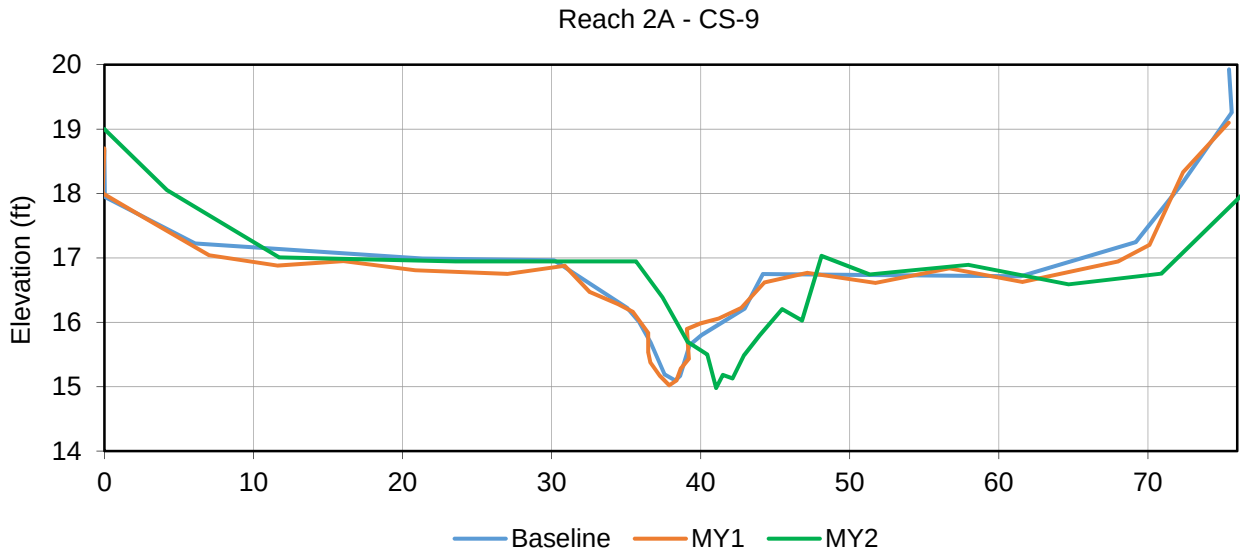


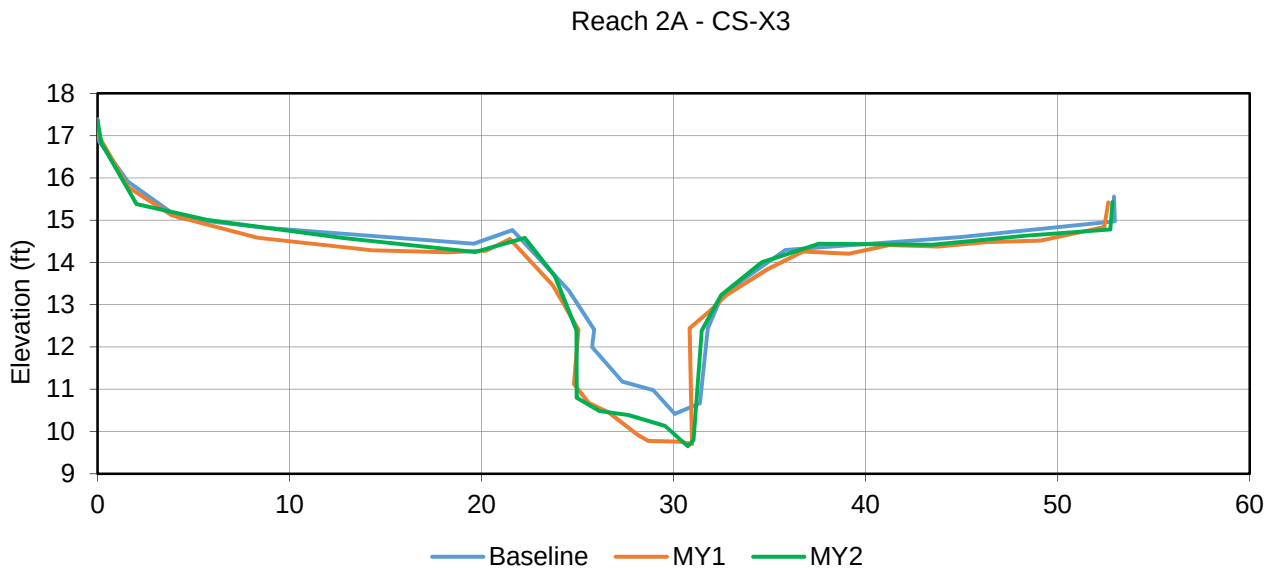
Reach 1A - CS-2

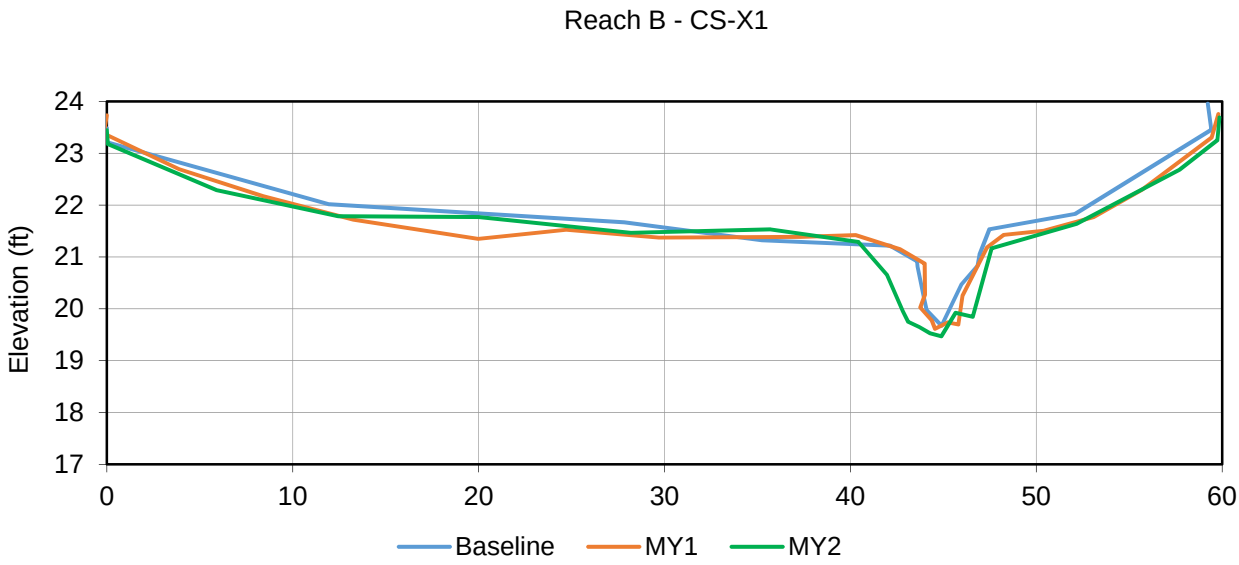



Reach 1A - CS-5
Elevation (ft)
23
22
21
20
19
18
17
0
10
20
30
40
50
60
70
Baseline
MY1
MY2

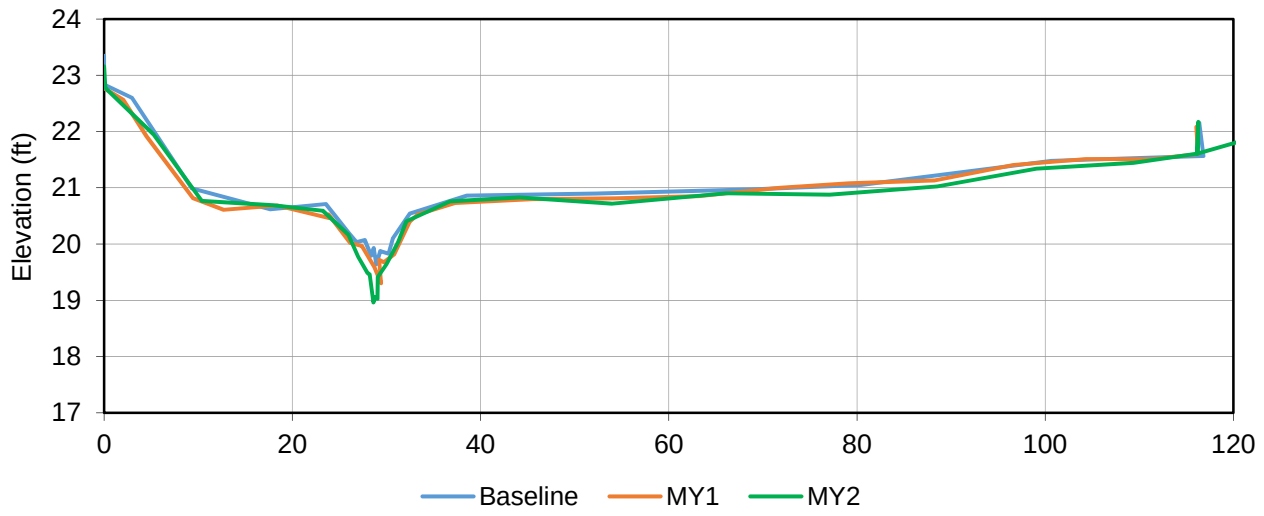

Reach 1A - CS-X2
Elevation (ft)
20
19
18
17
16
15
0
10
20
30
40
50
60
70
Baseline
MY1
MY2


Reach 2A - CS-9
Elevation (ft)
20
19
18
17
16
15
14
0
10
20
30
40
50
60
70
Baseline
MY1
MY2

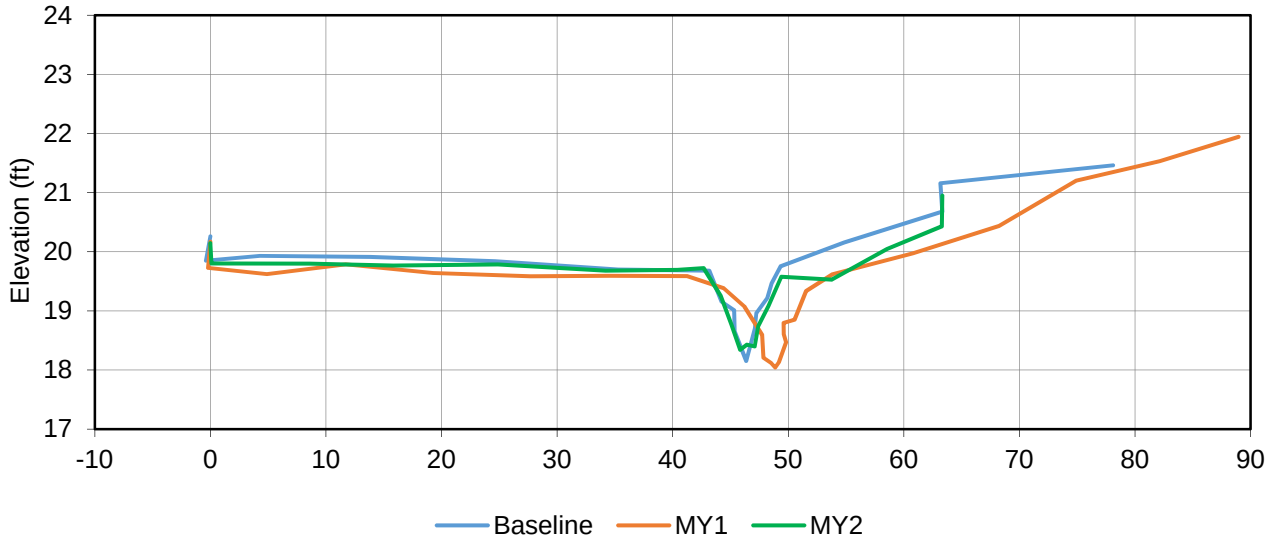

Reach 2A - CS-X3
Elevation (ft)
18
17
16
15
14
13
12
11
10
9
0
10
20
30
40
50
60
Baseline
MY1
MY2


Reach B - CS-X1
Elevation (ft)
24
23
22
21
20
19
18
17
0
10
20
30
40
50
60
Baseline
MY1
MY2

Reach C - CS-7



Reach C - CS-8



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Appendix E.
Hydrologic Data

Table 16. Documentation of Bankfull Events in 2015.

Stream Gauge No.	#1		#2	
Location	Reach 2A		Reach 1A	
Date of Occurrence	1/4/2015	9/28/2015	1/4/2015	8/31/2015
	1/12/2015	10/2/15 - 10/3/15	1/12/2015	9/3/2015
	1/18/2015	10/4/2015	1/18/2015	9/7/2015
	1/23/2015	10/5/2015	1/23/2015	9/25/2015
	2/2/2015	10/12/2015	2/2/2015	9/27/2015
	2/2/2015	11/2/2015	2/2/2015	9/27/2015
	2/5/2015	11/3/2015	2/5/2015	9/28/2015
	2/17/2015	11/7/2015	2/17/2015	10/2/15 - 10/3/15
	2/23/2015	11/9/2015	2/23/2015	10/4/2015
	2/23/2015	11/10/2015	2/25/15 - 2/26/15	10/5/2015
	2/24/2015	11/19/2015	3/5/2015	10/5/2015
	2/25/2015	11/22/2015	3/14/2015	10/10/2015
	2/25/15 - 2/26/15	12/7/2015	3/20/2015	10/12/2015
	3/5/2015	12/14/2015	3/27/2015	11/2/2015
	3/14/2015		4/18/2015	11/3/2015
	3/20/2015		4/18/2015	11/7/2015
	3/27/2015		4/19/2015	11/9/2015
	4/9/2015		4/20/2015	11/10/2015
	4/18/2015		5/10/15 - 5/11/15	11/19/2015
	4/18/2015		5/21/2015	11/22/2015
	4/19/2015		6/3/2015	12/2/2015
	4/20/2015		6/4/2015	12/7/2015
	5/10/15 - 5/11/15		6/9/2015	12/14/2015
	6/3/2015		6/19/2015	
	6/4/2015		6/19/15 - 6/20/15	
	6/9/2015		6/20/2015	
	6/18/2015		6/26/2015	
	6/19/2015		6/28/2015	
	6/20/2015		7/3/2015	
	6/26/2015		7/13/2015	
	7/13/2015		7/22/2015	
	7/23/2015		7/23/2015	
	7/31/2015		7/31/2015	
	8/3/2015		8/3/2015	
	8/7/2015		8/4/2015	
	8/11/15 - 8/12/15		8/7/2015	
	8/19/2015		8/11/15 - 8/12/15	
	8/19/2015		8/19/2015	
	8/25/2015		8/19/2015	
	8/27/2015		8/21/2015	
	8/31/2015		8/25/2015	
	9/25/2015		8/27/2015	
TOTAL NUMBER	**56**		**65**	

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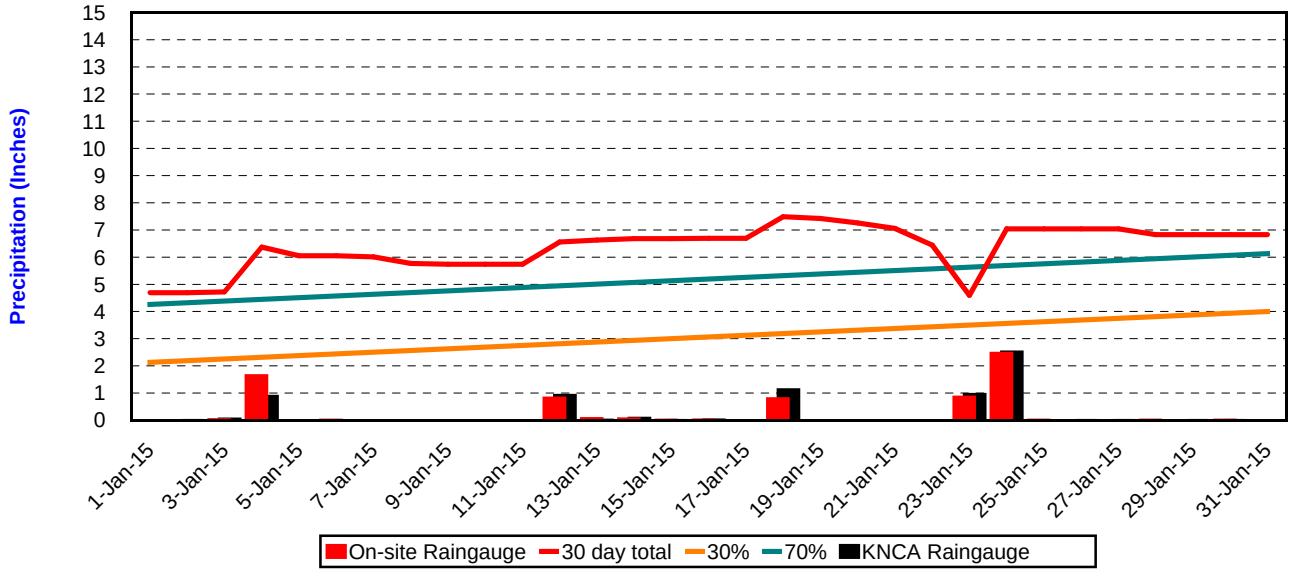
Hydrology Assessment

January 2015

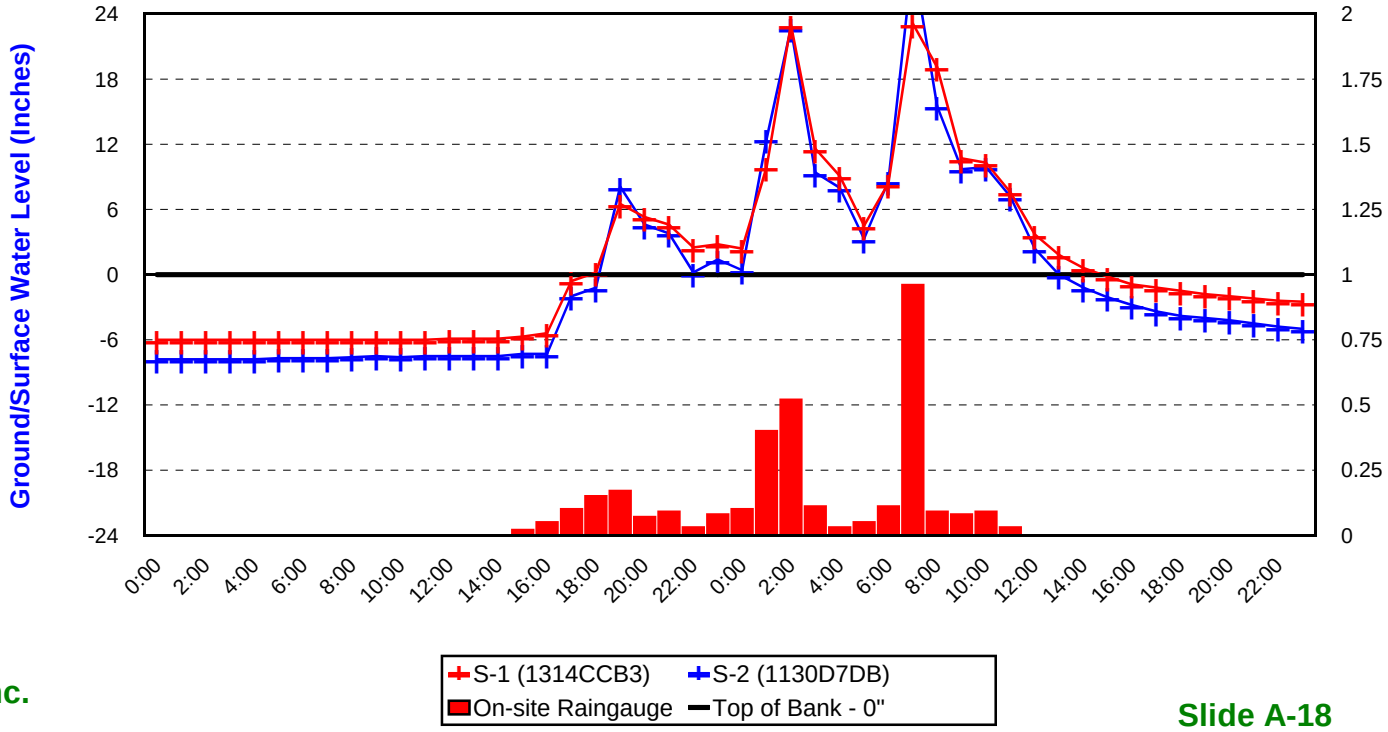
Precipitation data obtained from: On-site rain gauge and New River MCAS (KNCA) (www.nc-climate.ncsu.edu)

30% & 70% precipitation data obtained from WETS Station : HOFFMANN FOREST, NC4144 (wcc.nrcs.usda.gov)



Monitoring Well Record

- EEP Jacksonville CC
- Onslow County, NC
- 40-08-189
- Stream Wells 1 & 2
- Ecotone WM 40
- January 23, 2015 to January 24, 2015
- One reading per hour

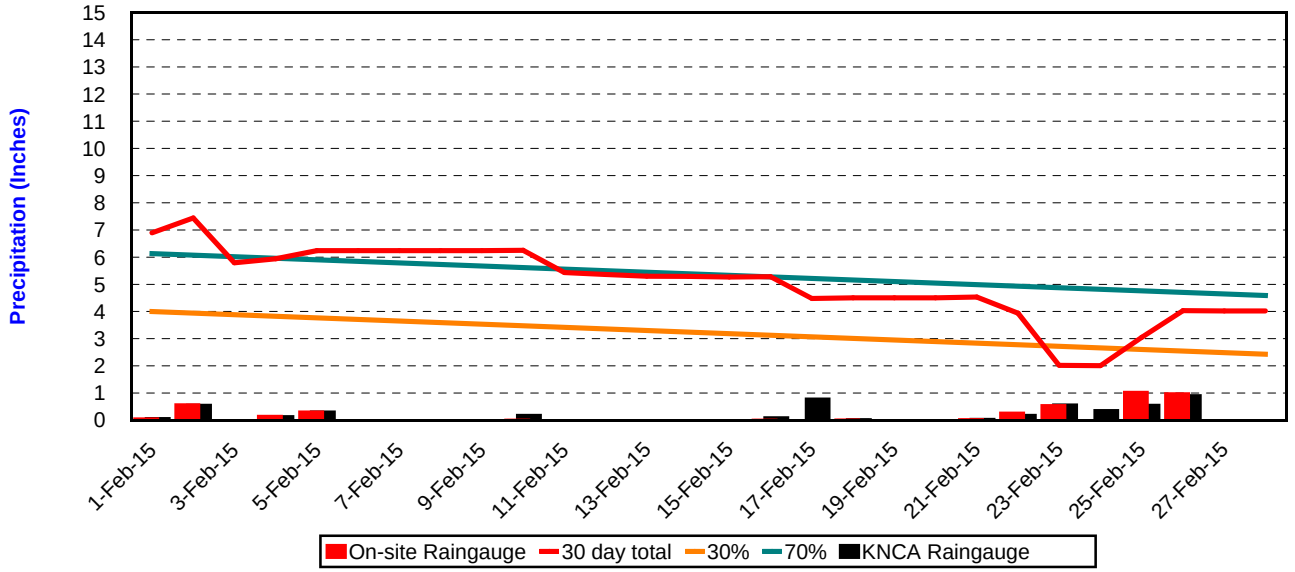


Hydrology Assessment

February 2015

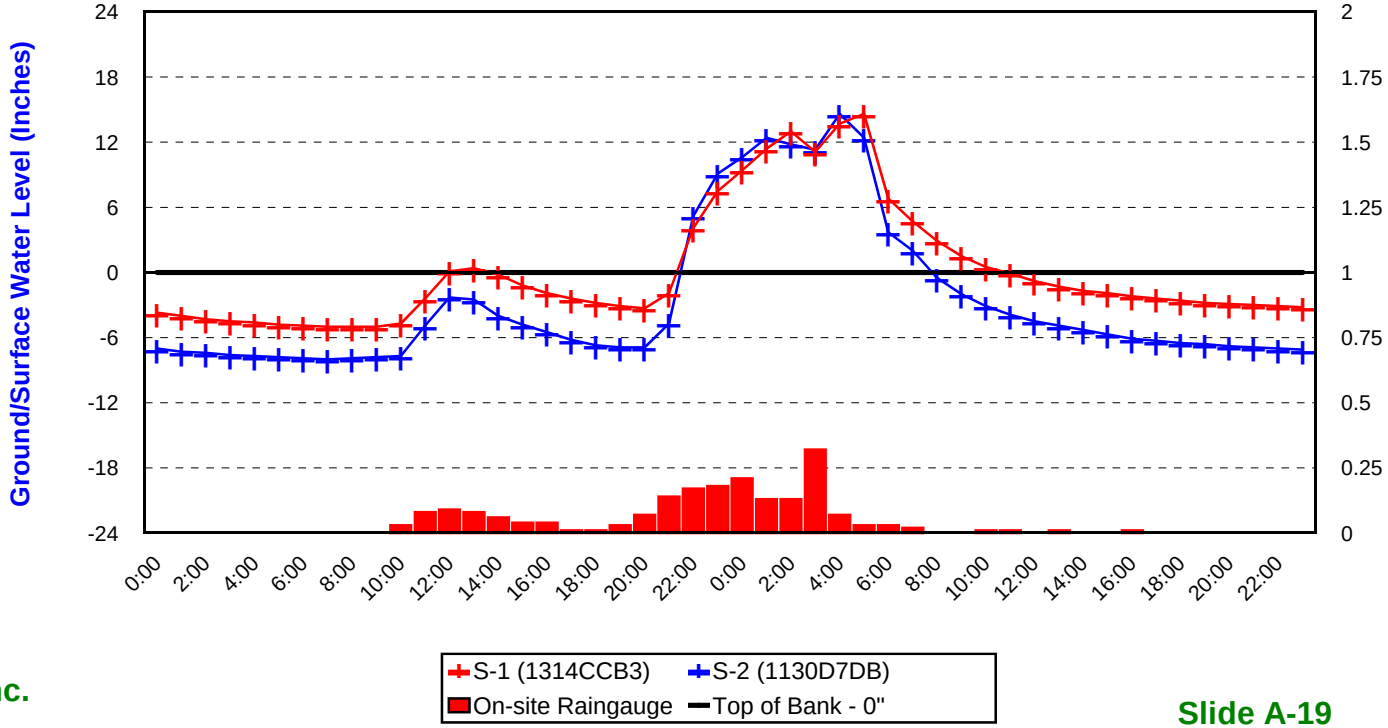
Precipitation data obtained from: On-site rain gauge and New River MCAS (KNCA) (www.nc-climate.ncsu.edu)

30% & 70% precipitation data obtained from WETS Station : HOFFMANN FOREST, NC4144 (wcc.nrcs.usda.gov)



Monitoring Well Record

- EEP Jacksonville CC
- Onslow County, NC
- 40-08-189
- Stream Wells 1 & 2
- Ecotone WM 40
- February 25, 2015 to February 26, 2015
- One reading per hour

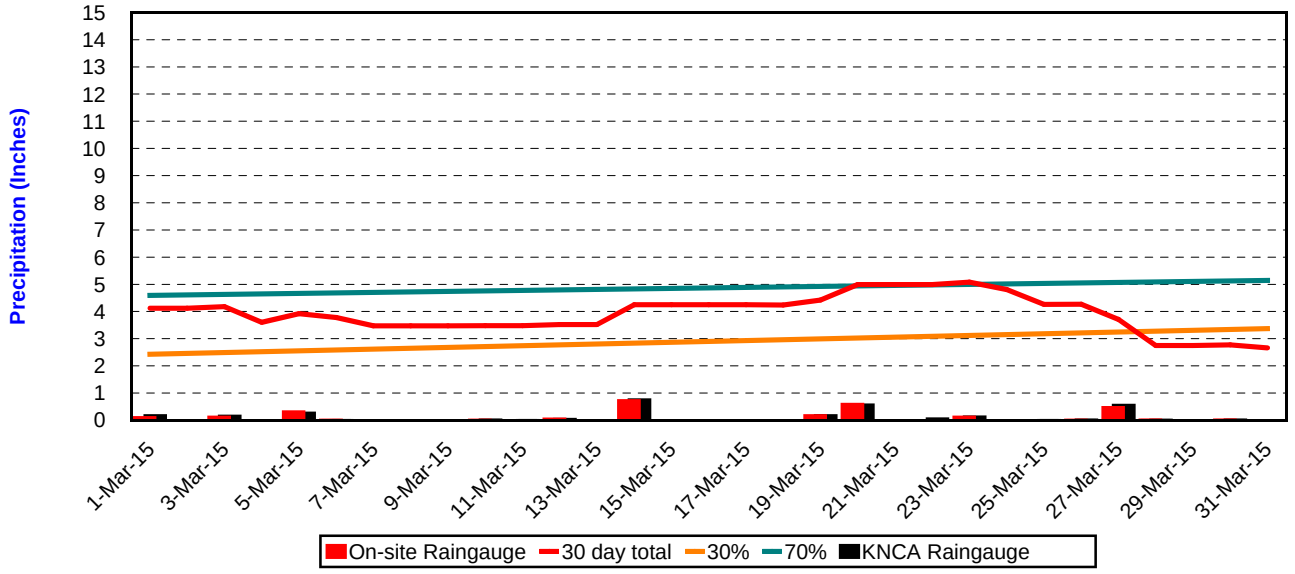


Hydrology Assessment

March 2015

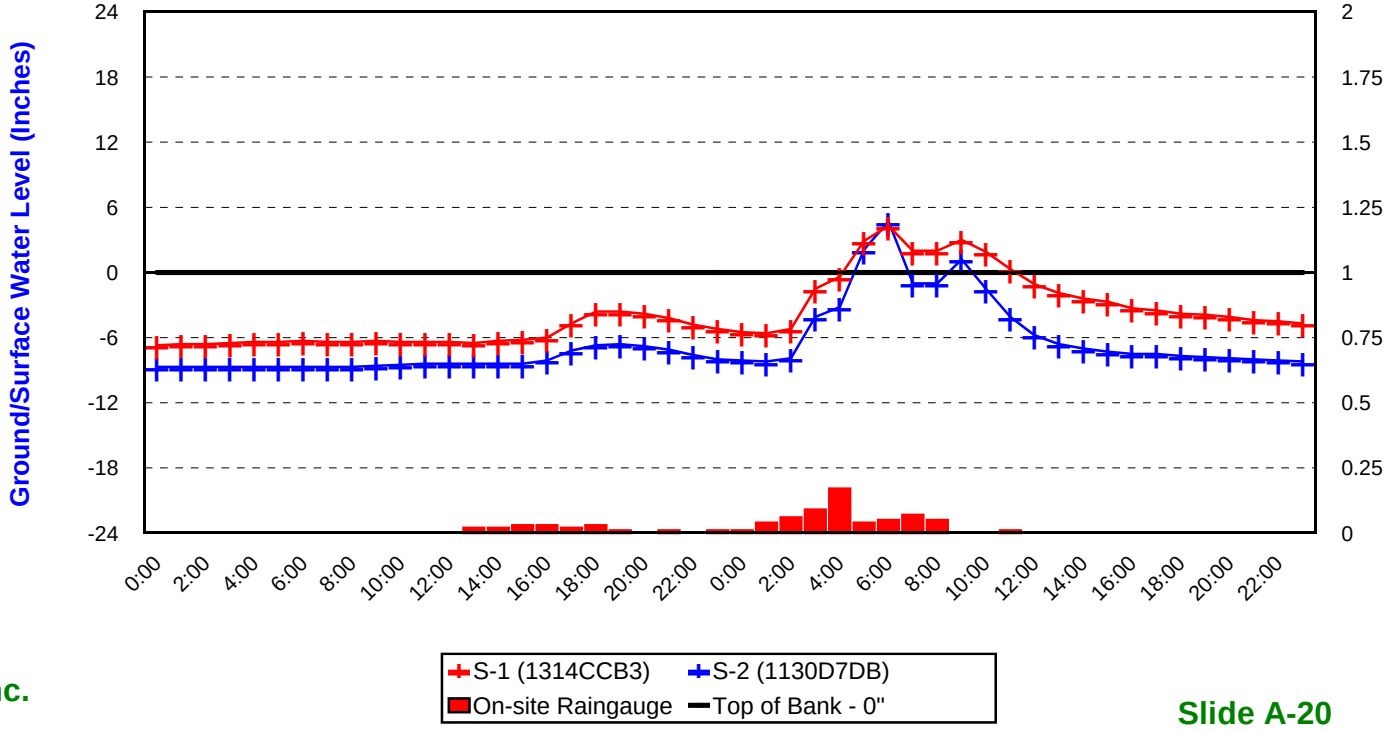
Precipitation data obtained from: On-site rain gauge and New River MCAS (KNCA) (www.nc-climate.ncsu.edu)

30% & 70% precipitation data obtained from WETS Station : HOFFMANN FOREST, NC4144 (wcc.nrcs.usda.gov)



Monitoring Well Record

- EEP Jacksonville CC
- Onslow County, NC
- 40-08-189
- Stream Wells 1 & 2
- Ecotone WM 40
- March 19, 2015 to March 20, 2015
- One reading per hour

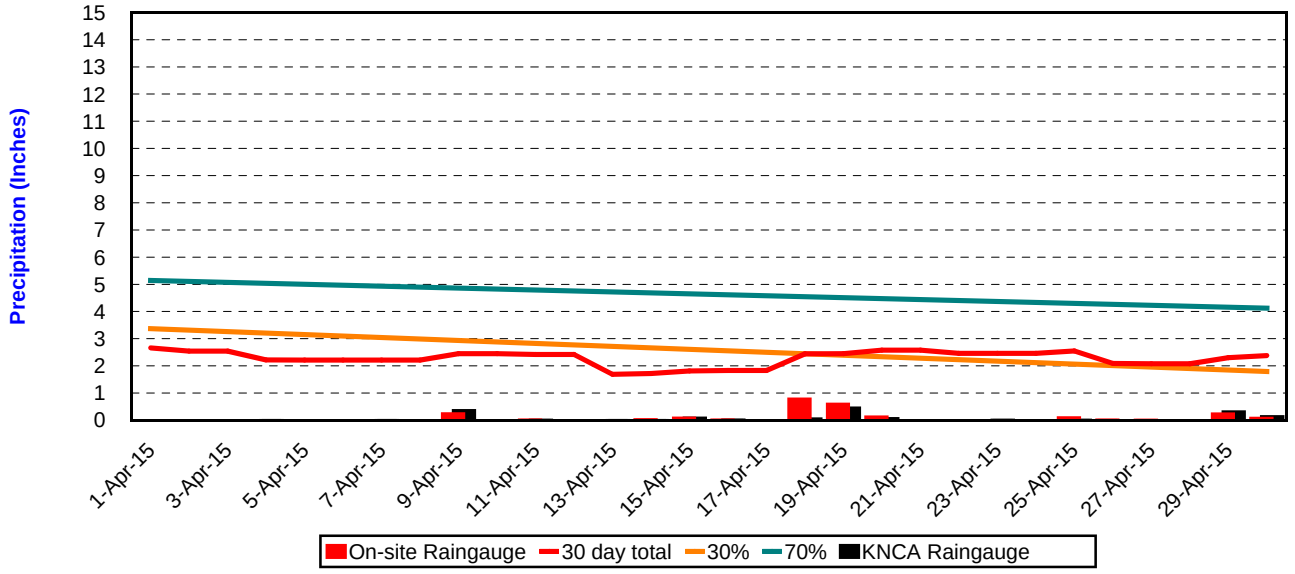


Hydrology Assessment

April 2015

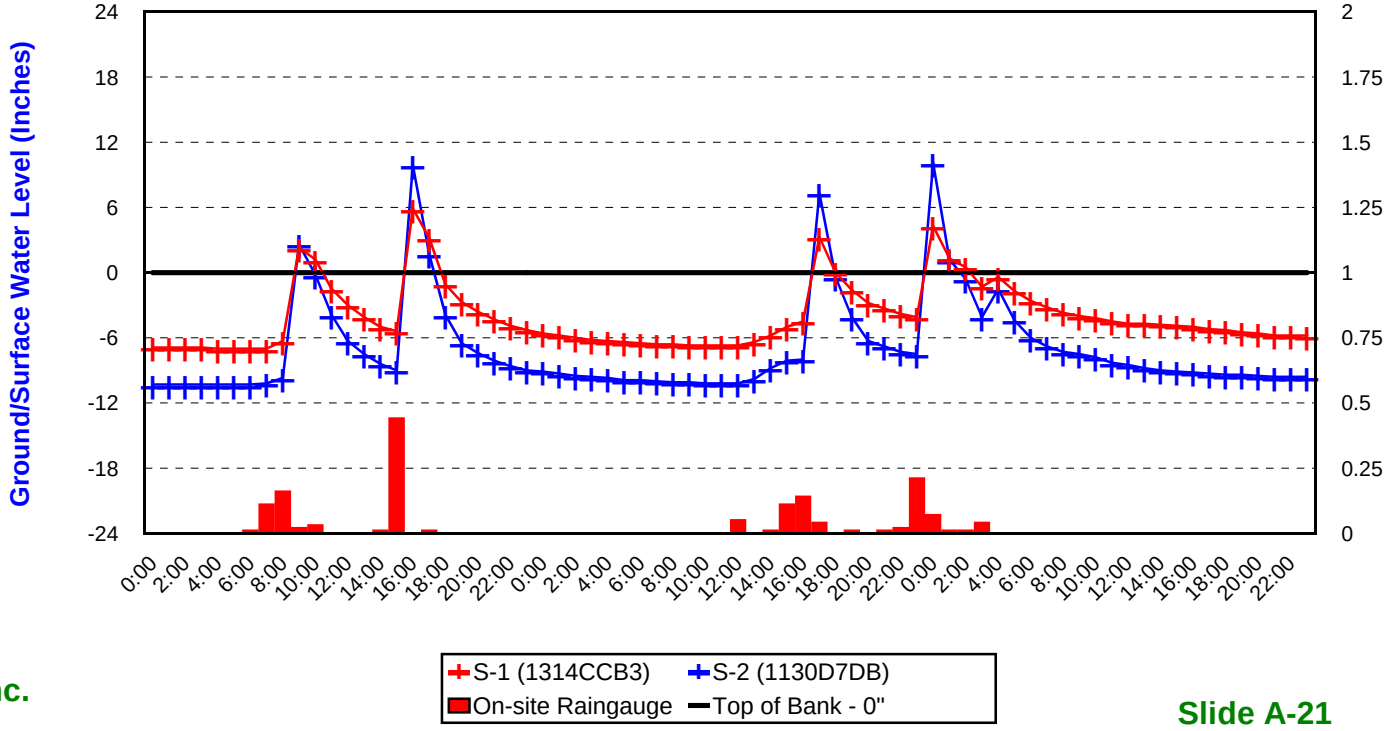
Precipitation data obtained from: On-site rain gauge and New River MCAS (KNCA) (www.nc-climate.ncsu.edu)

30% & 70% precipitation data obtained from WETS Station : HOFFMANN FOREST, NC4144 (wcc.nrcs.usda.gov)



Monitoring Well Record

- EEP Jacksonville CC
- Onslow County, NC
- 40-08-189
- Stream Wells 1 & 2
- Ecotone WM 40
- April 18, 2015 to April 20, 2015
- One reading per hour

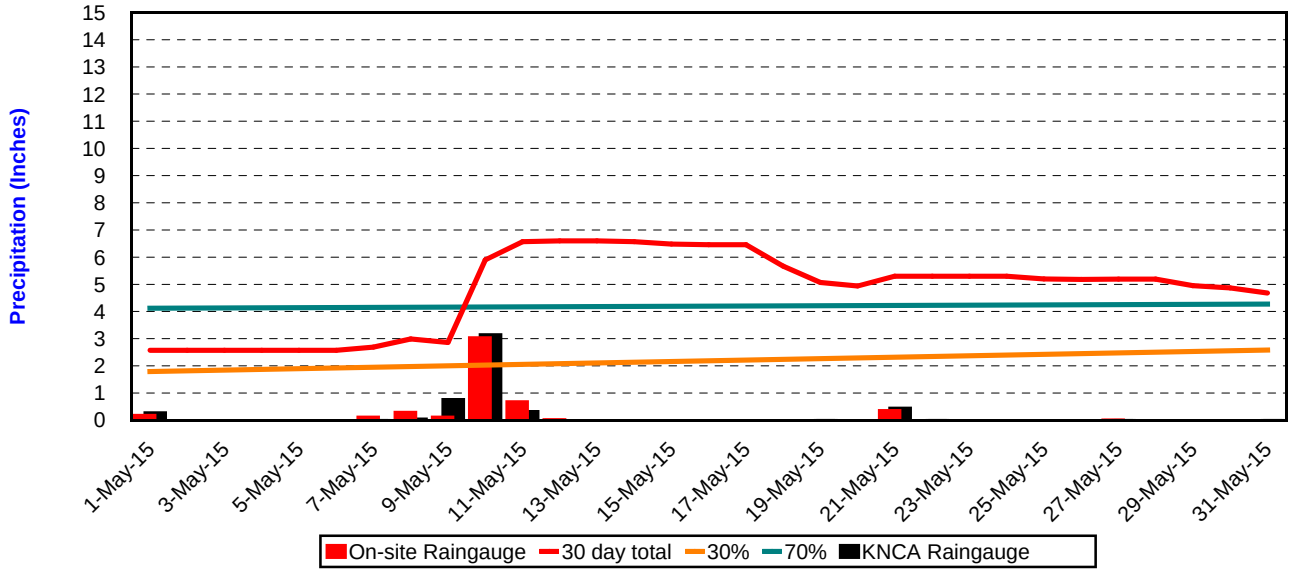


Hydrology Assessment

May 2015

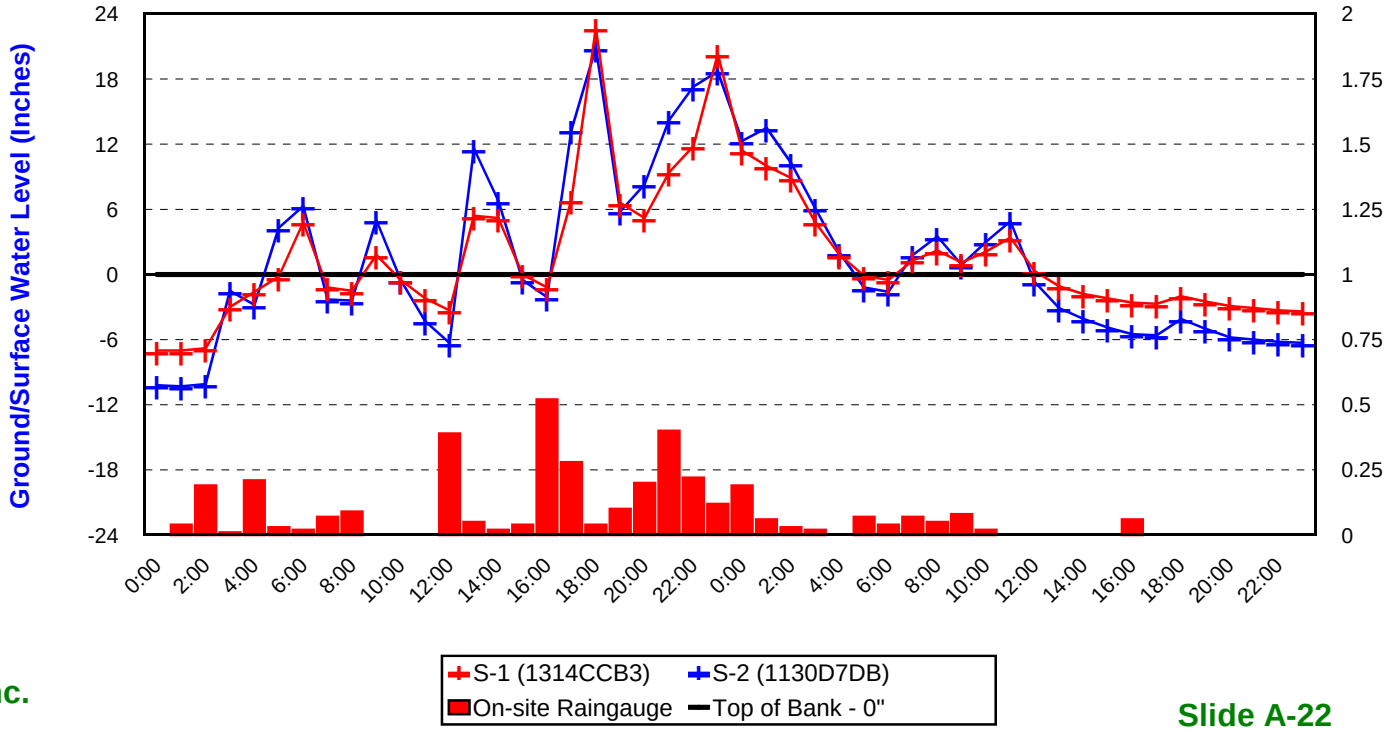
Precipitation data obtained from: On-site rain gauge and New River MCAS (KNCA) (www.nc-climate.ncsu.edu)

30% & 70% precipitation data obtained from WETS Station : HOFFMANN FOREST, NC4144 (wcc.nrcs.usda.gov)



Monitoring Well Record

- EEP Jacksonville CC
- Onslow County, NC
- 40-08-189
- Stream Wells 1 & 2
- Ecotone WM 40
- May 10, 2015 to May 11, 2015
- One reading per hour

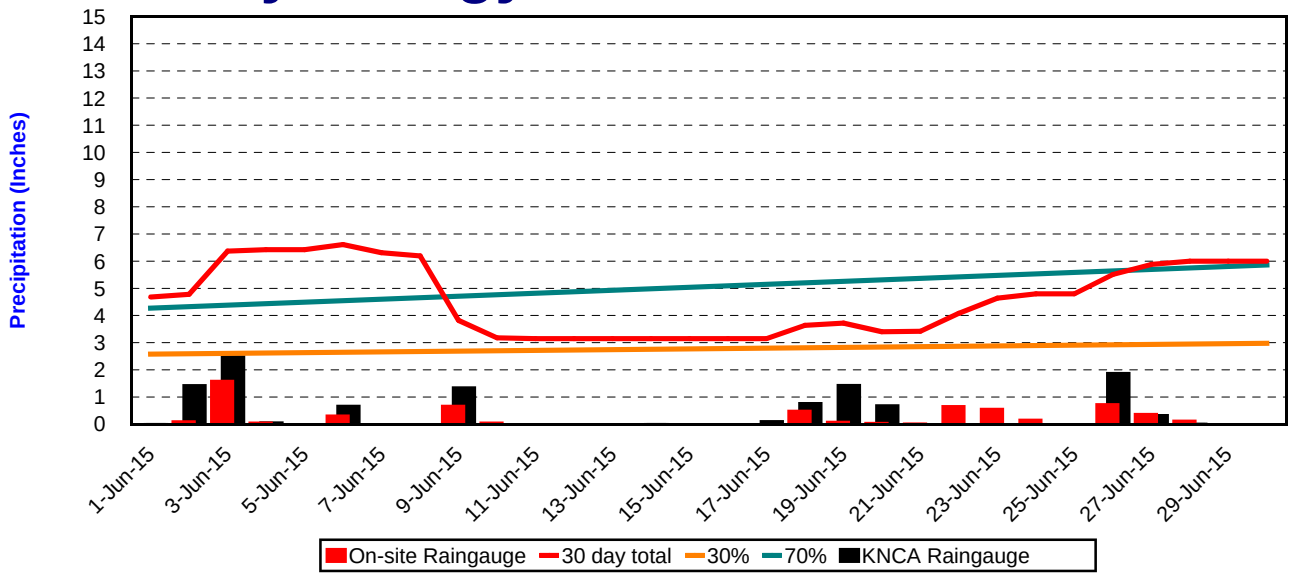


Hydrology Assessment

June 2015

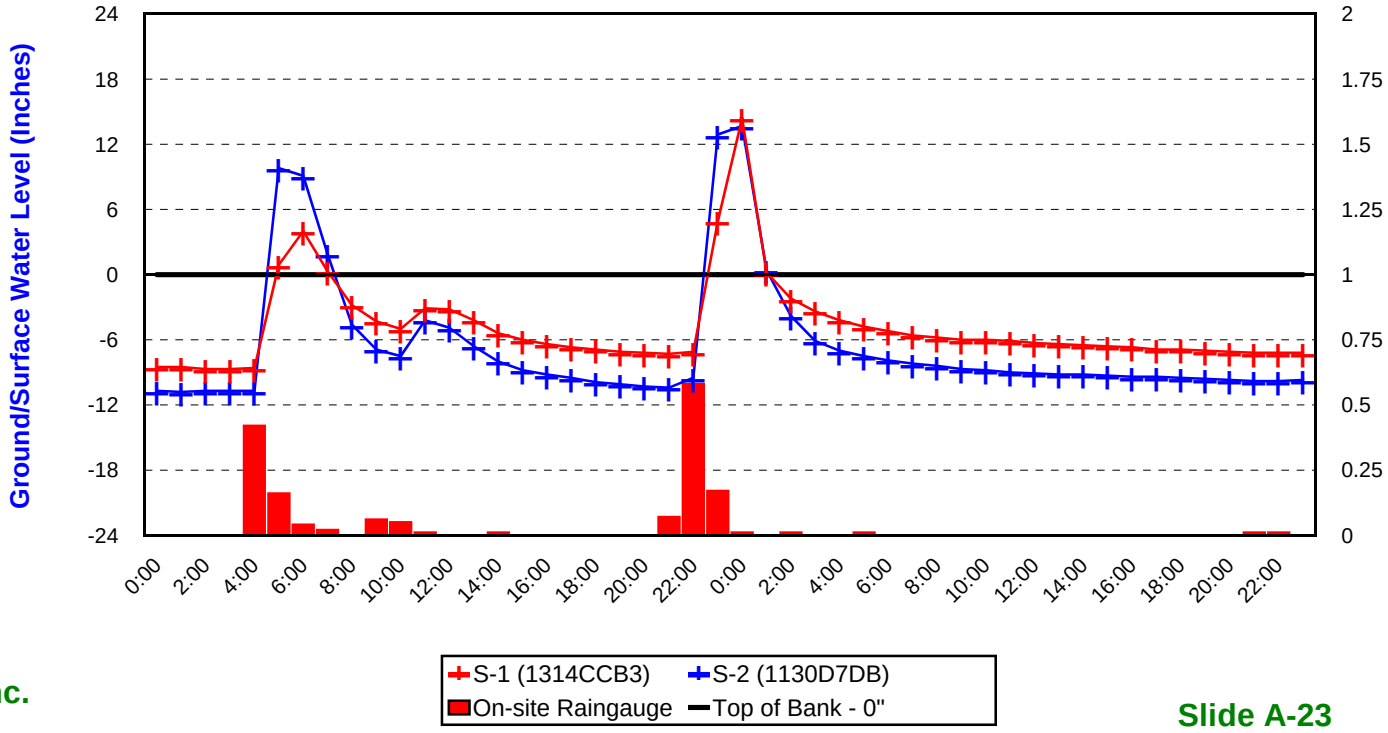
Precipitation data obtained from: On-site rain gauge and New River MCAS (KNCA) (www.nc-climate.ncsu.edu)

30% & 70% precipitation data obtained from WETS Station : HOFFMANN FOREST, NC4144 (wcc.nrcs.usda.gov)



Monitoring Well Record

- EEP Jacksonville CC
- Onslow County, NC
- 40-08-189
- Stream Wells 1 & 2
- Ecotone WM 40
- June 3, 2015 to June 4, 2015
- One reading per hour

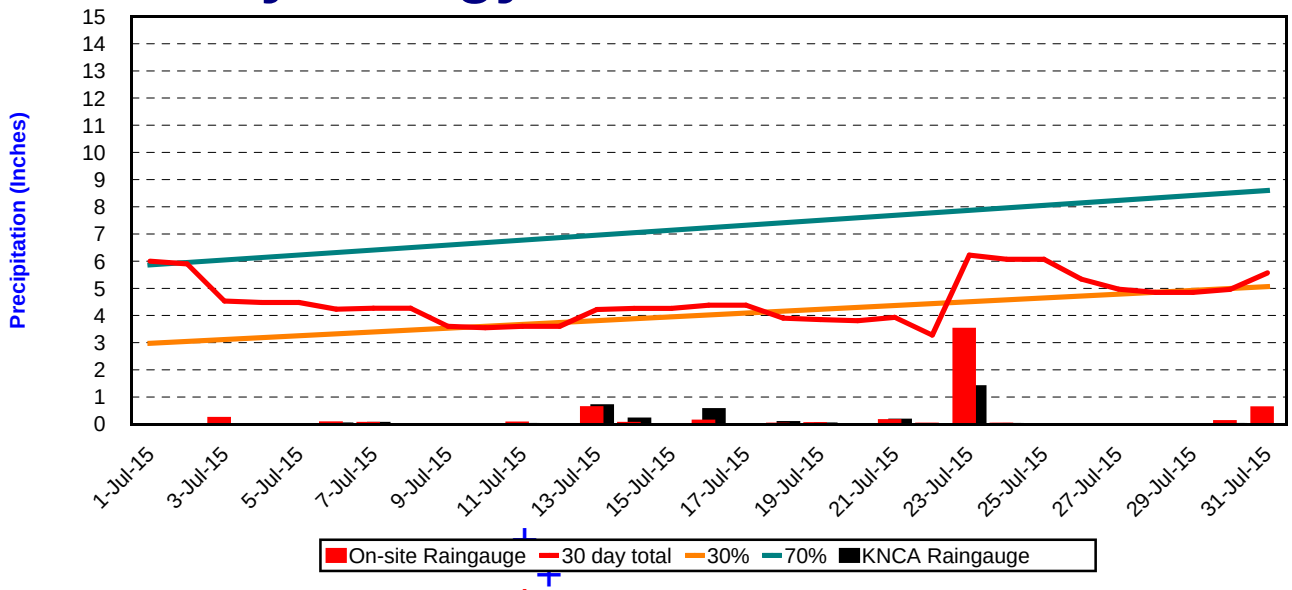


Hydrology Assessment

July 2015

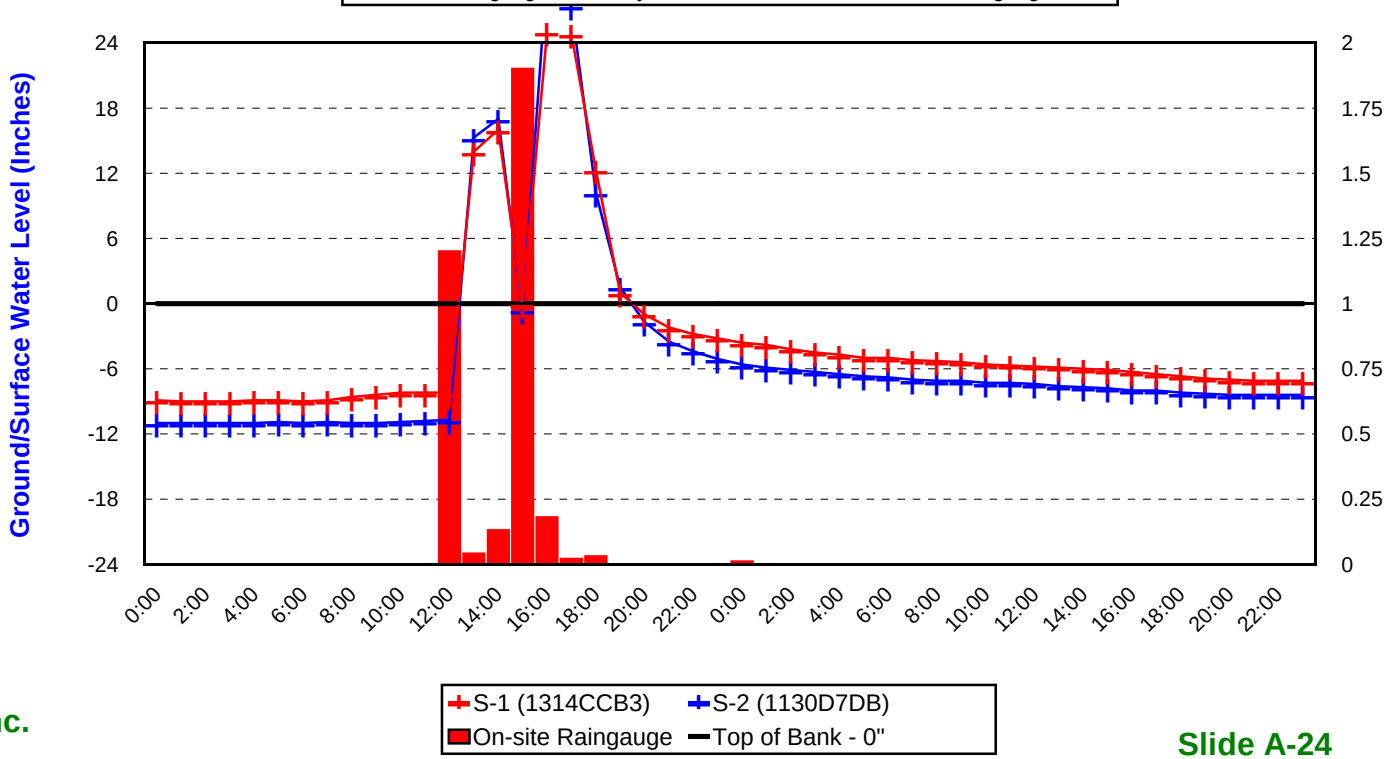
Precipitation data obtained from: On-site rain gauge and New River MCAS (KNCA) (www.nc-climate.ncsu.edu)

30% & 70% precipitation data obtained from WETS Station : HOFFMANN FOREST, NC4144 (wcc.nrcs.usda.gov)



Monitoring Well Record

- EEP Jacksonville CC
- Onslow County, NC
- 40-08-189
- Stream Wells 1 & 2
- Ecotone WM 40
- July 23, 2015 to July 24, 2015
- One reading per hour

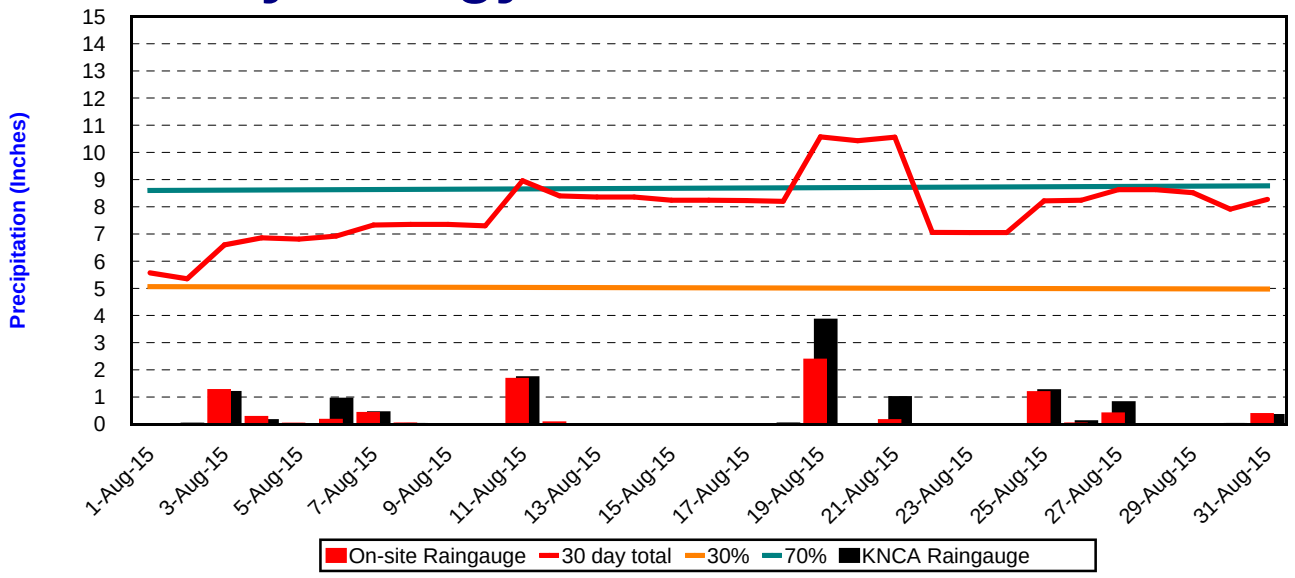


Hydrology Assessment

August 2015

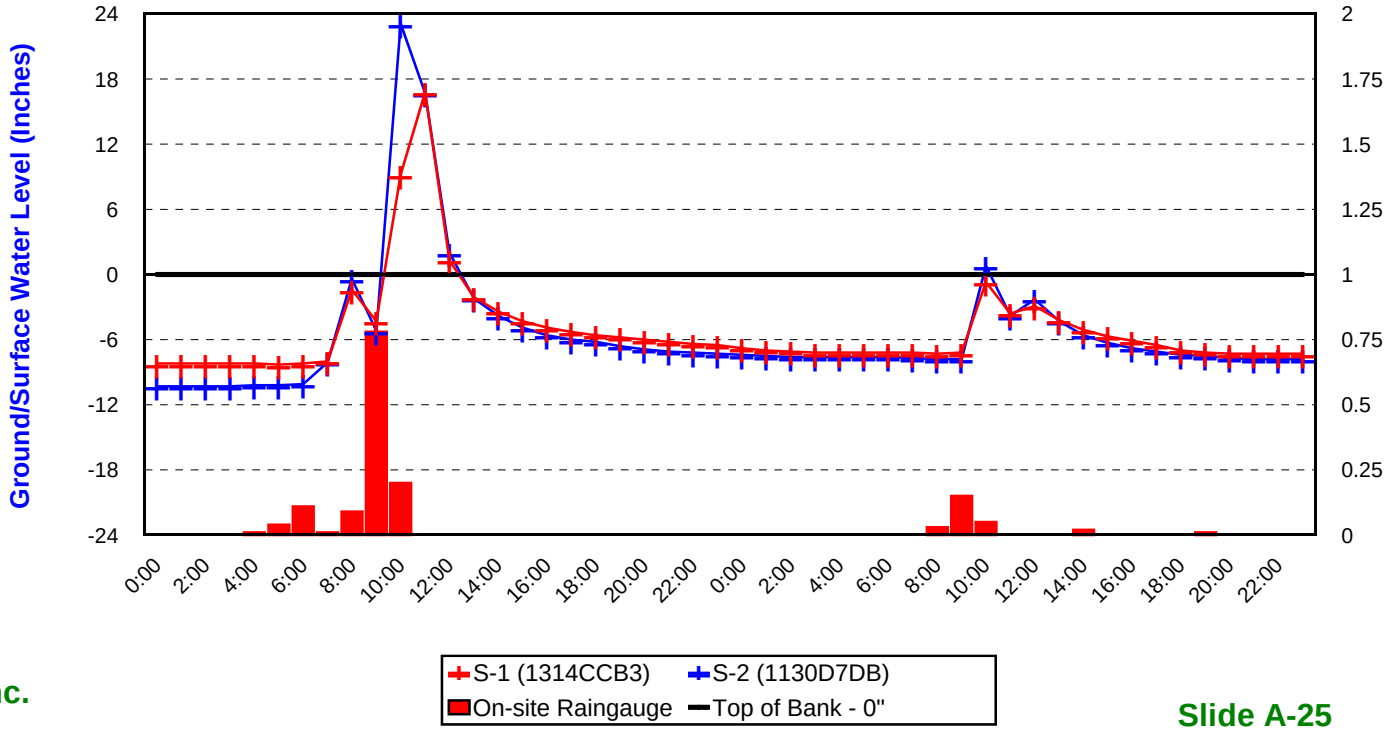
Precipitation data obtained from: On-site rain gauge and New River MCAS (KNCA) (www.nc-climate.ncsu.edu)

30% & 70% precipitation data obtained from WETS Station : HOFFMANN FOREST, NC4144 (wcc.nrcs.usda.gov)



Monitoring Well Record

- EEP Jacksonville CC
- Onslow County, NC
- 40-08-189
- Stream Wells 1 & 2
- Ecotone WM 40
- August 3, 2015 to August 4, 2015
- One reading per hour

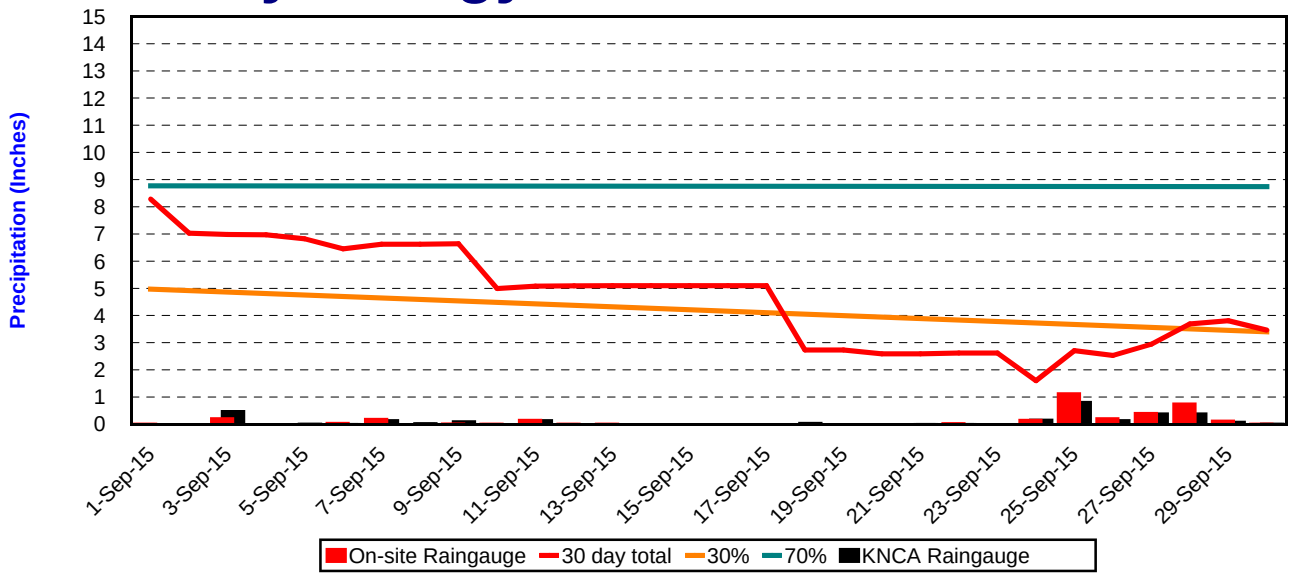


Hydrology Assessment

September 2015

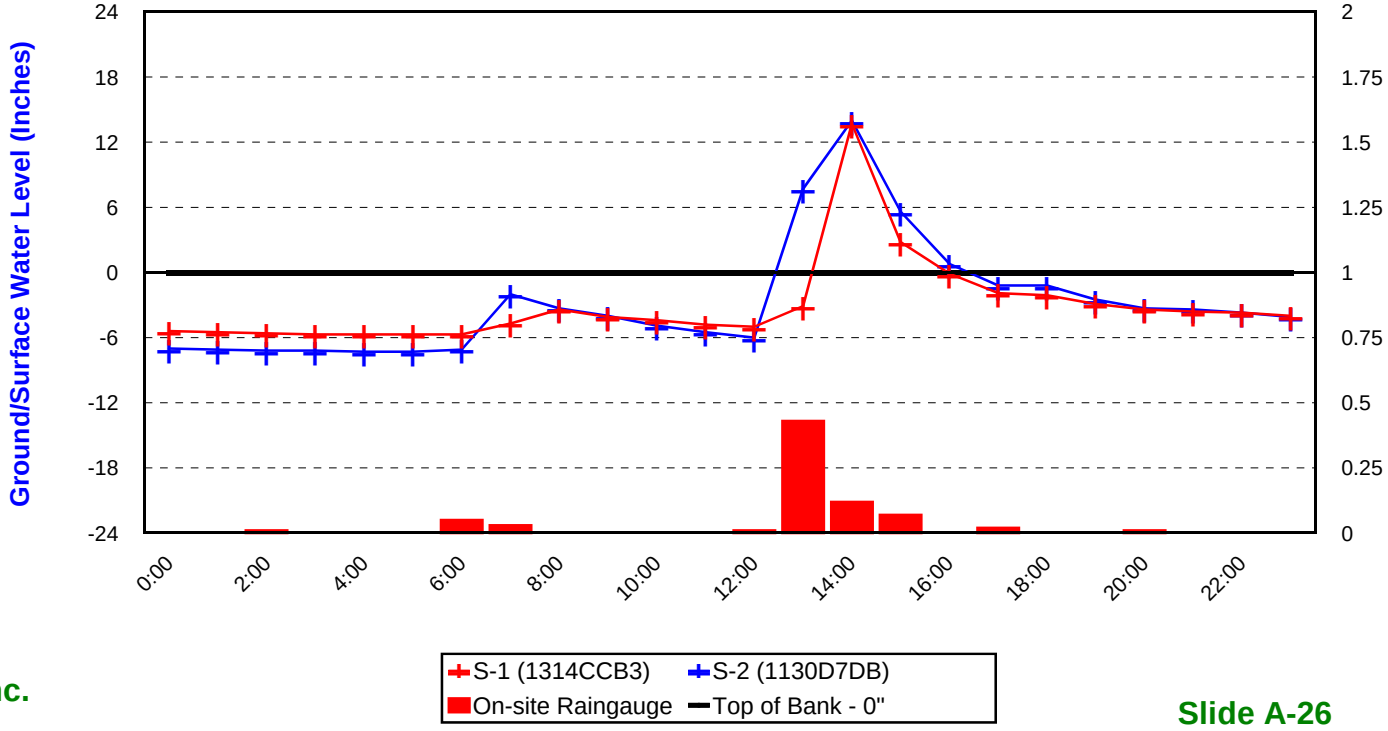
Precipitation data obtained from: On-site rain gauge and New River MCAS (KNCA) (www.nc-climate.ncsu.edu)

30% & 70% precipitation data obtained from WETS Station : HOFFMANN FOREST, NC4144 (wcc.nrcs.usda.gov)



Monitoring Well Record

- EEP Jacksonville CC
- Onslow County, NC
- 40-08-189
- Stream Wells 1 & 2
- Ecotone WM 40
- September 28, 2015
- One reading per hour

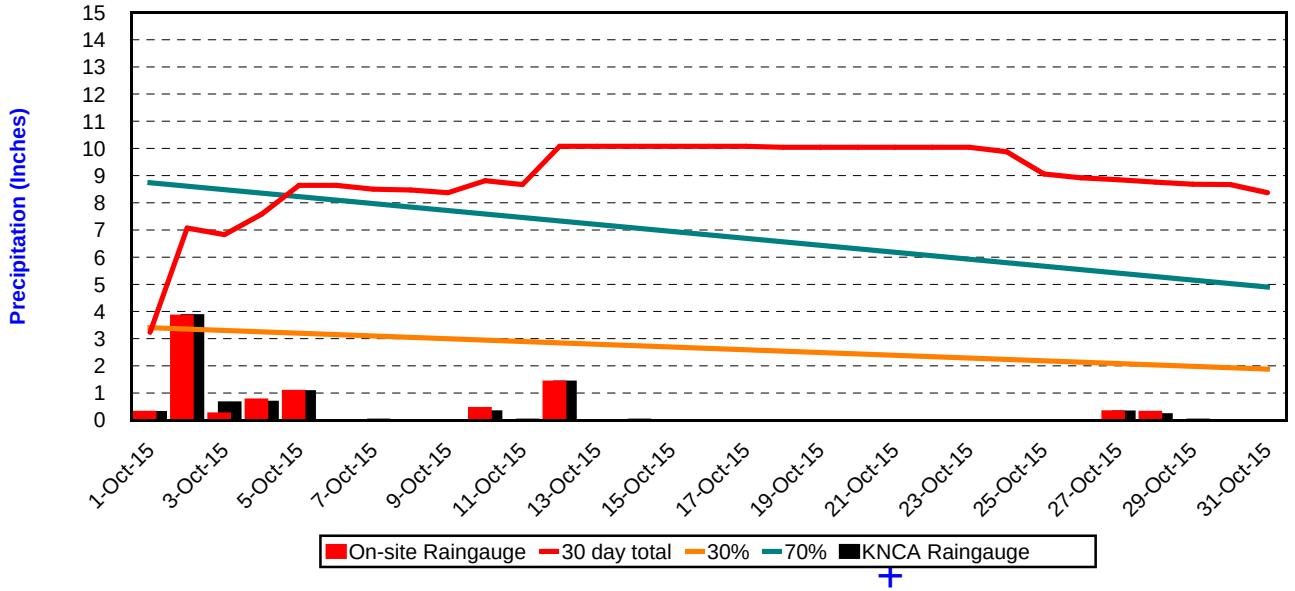


Hydrology Assessment

October 2015

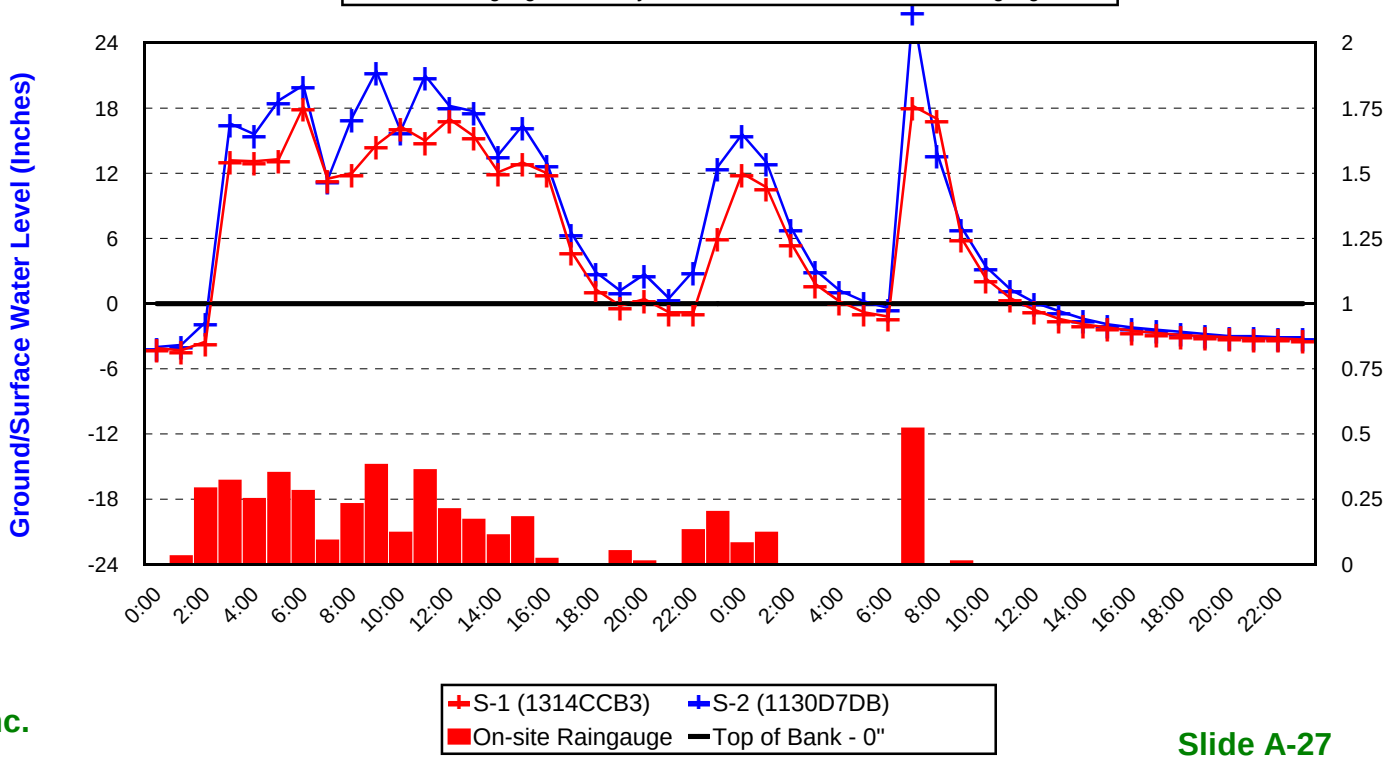
Precipitation data obtained from: On-site rain gauge and New River MCAS (KNCA) (www.nc-climate.ncsu.edu)

30% & 70% precipitation data obtained from WETS Station : HOFFMANN FOREST, NC4144 (wcc.nrcs.usda.gov)



Monitoring Well Record

- EEP Jacksonville CC
- Onslow County, NC
- 40-08-189
- Stream Wells 1 & 2
- Ecotone WM 40
- October 2, 2015 to October 3, 2015
- One reading per hour

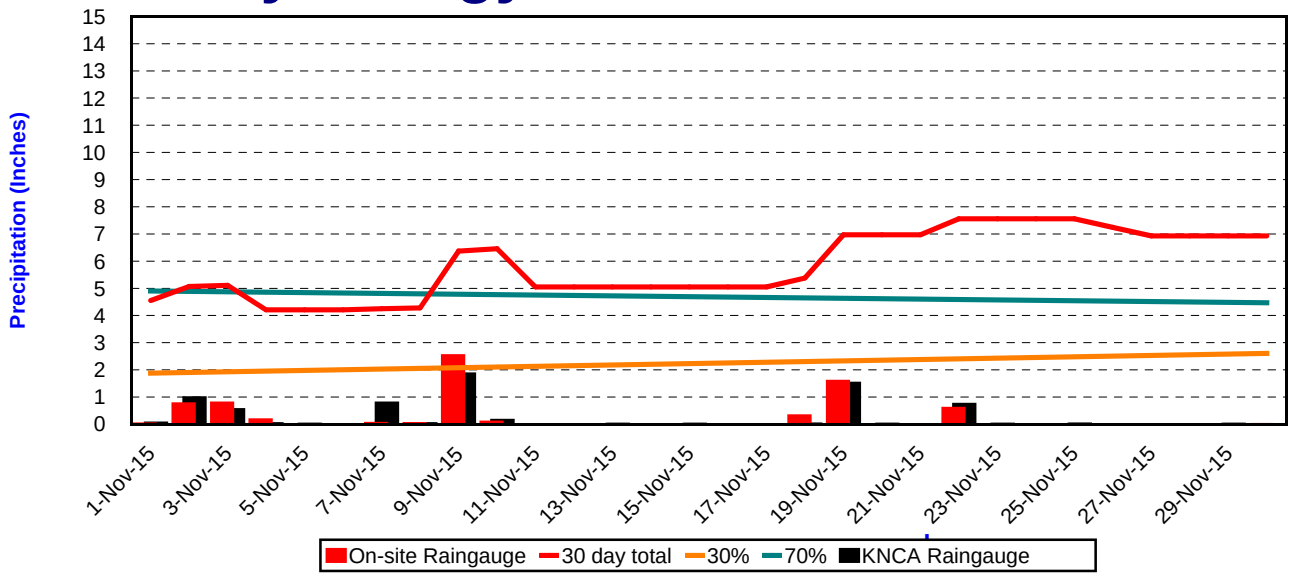


Hydrology Assessment

November 2015

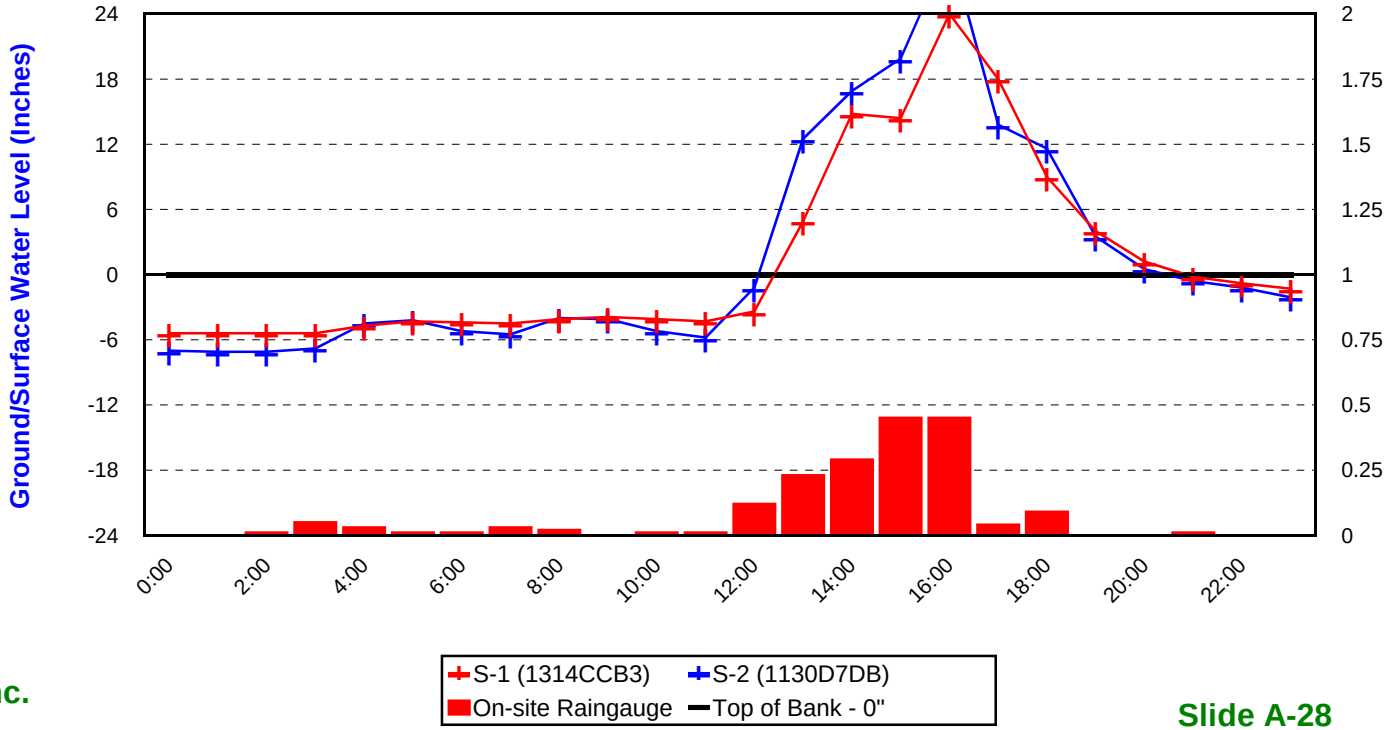
Precipitation data obtained from: On-site rain gauge and New River MCAS (KNCA) (www.nc-climate.ncsu.edu)

30% & 70% precipitation data obtained from WETS Station : HOFFMANN FOREST, NC4144 (wcc.nrcs.usda.gov)



Monitoring Well Record

- EEP Jacksonville CC
- Onslow County, NC
- 40-08-189
- Stream Wells 1 & 2
- Ecotone WM 40
- November 9, 2015
- One reading per hour

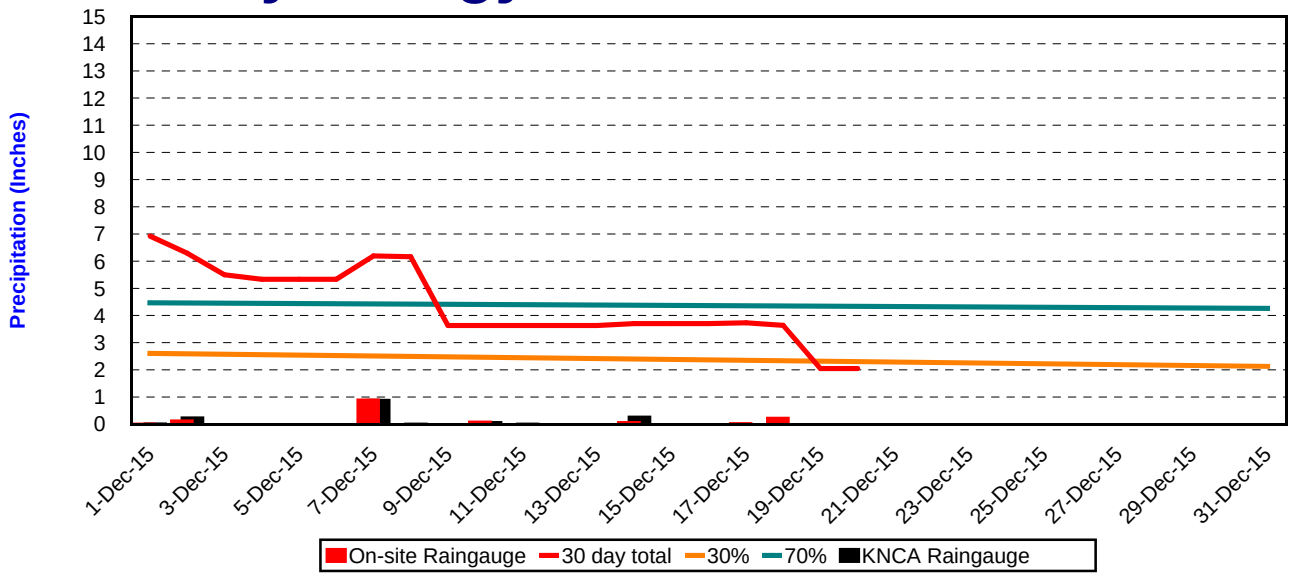


Hydrology Assessment

December 2015

Precipitation data obtained from: On-site rain gauge and New River MCAS (KNCA) (www.nc-climate.ncsu.edu)

30% & 70% precipitation data obtained from WETS Station : HOFFMANN FOREST, NC4144 (wcc.nrcs.usda.gov)



Monitoring Well Record

- EEP Jacksonville CC
- Onslow County, NC
- 40-08-189
- Stream Wells 1 & 2
- Ecotone WM 40
- December 7, 2015
- One reading per hour