YEAR 1 (2016) MONITORING REPORT
AYCOCK SPRINGS
STREAM AND WETLAND MITIGATION SITE

ALAMANCE COUNTY, NORTH CAROLINA
DMS PROJECT NO. 96312
FULL DELIVERY CONTRACT NO. 5791

CAPE FEAR RIVER BASIN
CATALOGING UNIT 03030002

Data Collection – May-October 2016

PREPARED FOR:

N.C. DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF MITIGATION SERVICES
1601 MAIL SERVICE CENTER
RALEIGH, NORTH CAROLINA 27699-1601

December 2016

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PREPARED BY:

RESTORATION SYSTEMS, LLC
1101 HAYNES STREET, SUITE 211
RALEIGH, NORTH CAROLINA 27604

AND

AXIOM ENVIRONMENTAL, INC.
218 SNOW AVENUE
RALEIGH, NORTH CAROLINA 27603

December 2016

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1.0 PROJECT SUMMARY

The Aycock Springs Stream and Wetland Mitigation Site (Site) encompasses approximately 13 acres located roughly 1.5 miles north of Elon and Gibsonville in western Alamance County within 14-digit Cataloging Unit and Targeted Local Watershed 03030002030010 of the Cape Fear River Basin (Figure 1, Appendix B and Table 4, Appendix A). Prior to construction, the Site consisted of agricultural land used for livestock grazing, hay production, and timber harvest. Streams were cleared, trampled by livestock, eroded vertically and laterally, and received extensive sediment and nutrient inputs from livestock and timber harvest activities. Stream impacts in Travis Creek also occurred due to a breached dam that impounded water during storm events. In addition, streamside wetlands were drained by channel incision, soil compaction, the loss of forest vegetation, and land uses. Completed project activities, reporting history, completion dates, project contacts, and project attributes are summarized in Tables 1-4 (Appendix A).

Positive aspects supporting mitigation activities at the Site include the following.

- Streams have a Best Usage Classification of WS-V, NSW
- Located in a Targeted Local Watershed and within the NCDMS Travis, Tickle, Little Alamance Local Watershed Planning (LWP) Area
- Travis Creek is listed on the NCDENR 2012 303(d) list for ecological/biological integrity
- Immediately south and abutting the Site is a property identified in the *Little Alamance, Travis, & Tickle Creek Watersheds Restoration Plan* (PTCOG 2008) as a target property for wetland restoration and streambank enhancement/conservation
- Immediately west of the Site is a large tract associated with Guilford County open space

Based on the *Cape Fear River Basin Restoration Priorities Report 2009* (NCEEP 2009) and the *Little Alamance, Travis, & Tickle Creek Watersheds Restoration Plan* (PTCOG 2008), Targeted Local Watershed 03030002030010 is not meeting its designated use of supporting aquatic life. Agricultural land use appears to be the main source of stress in the Hydrologic Unit, as well as land clearing and poor riparian management. This project will meet the eight priority goals of the Travis, Tickle, Little Alamance Local Watershed Plan (LWP) including the following.

1) Reduce sediment loading
2) Reduce nutrient loading
3) Manage stormwater runoff
4) Reduce toxic inputs
5) Provide and improve instream habitat
6) Provide and improve terrestrial habitat
7) Improve stream stability
8) Improve hydrologic function

The following six goals were identified by the Stakeholder group of the Travis, Tickle, Little Alamance LWP Phase I assessment which address the water quality impacts and watershed needs in all of the Little Alamance, Travis, Tickle watersheds in 2006.

1) Increase local government awareness of the impacts of urban growth on water resources
2) Strengthen watershed protection standards
3) Improve water quality through stormwater management
4) Identify and rank parcels for retrofits, stream repair, preservation, and/or conservation
5) Assess aquatic health to identify stressors that are the most likely causes of poor biological conditions

6) Meet requirements of outside funding sources for implementation of projects

The following table summarizes the project goals/objectives and proposed functional uplift based on restoration activities and observations of two reference areas located in the vicinity of the Site. Goals and objectives target functional uplift identified in the Travis, Tickle, Little Alamance LWP and based on stream/wetland functional assessments developed by the regulatory agencies.

Project Goals and Objectives

Project Goal/Objective	How Goal/Objective will be Accomplished
Improve Hydrology	
Restore Floodplain Access	Building a new channel at the historic floodplain elevation to restore overbank flows
Restore Wooded Riparian Buffer	Planting a woody riparian buffer
Restore Stream Stability	Providing proper channel width and depth, stabilizing channel banks, providing gravel/cobble substrate, planting a woody riparian buffer, and removing cattle
Improve Sediment Transport to Convert the UTs from Sand/Silt Dominated to Gravel/Cobble Dominated Streams	
Improve Stream Geomorphology	
Increase Surface Storage and Retention	Building a new channel at the historic floodplain elevation restoring overbank flows, removing cattle, scarifying compacted soils, and planting woody vegetation
Restore Appropriate Inundation/Duration	
Increase Subsurface Storage and Retention	Raising the stream bed elevation and rip compacted soils
Improve Water Quality	
Increase Upland Pollutant Filtration	Planting a native, woody riparian buffer
Increase Thermoregulation	Planting a native, woody riparian buffer
Reduce Stressors and Sources of Pollution	Removing cattle and other agricultural inputs
Increase Removal and Retention of Pathogens, Particulates (Sediments), Dissolved Materials (Nutrients), and Toxins from the Water Column	Raising the stream bed elevation, restoring overbank flows, planting with woody vegetation, removing cattle, increasing surface storage and retention, and restoring appropriate inundation/duration
Increase Energy Dissipation of Overbank/Overland Flows/Stormwater Runoff	Raising the stream bed elevation, restoring overbank flows, and planting with woody vegetation
Restore Habitat	
Restore In-stream Habitat	Building a stable channel with a cobble/gravel bed and planting a woody riparian buffer
Restore Stream-side Habitat	Planting a woody riparian buffer
Improve Vegetation Composition and Structure	

Project construction was completed April 6, 2016 and planting was completed April 8, 2016. Site activities included the restoration of perennial and intermittent stream channels, enhancement (Level II) of perennial stream channel, and re-establishment of riparian wetlands. Priority I restoration of intermittent channels at the Site is imperative to provide significant functional uplift to Site hydrology, water quality, and habitat, in addition to restore adjacent streamside, riparian wetlands. A total of **3581.1 Stream Mitigation Units (SMUs) and 0.5 Riparian Wetland Mitigation Units (WMUs)** are being provided as depicted in the following table.

Stream Mitigation Type	Perennial Stream (linear feet)	Intermittent Stream (linear feet)	Ratio	Stream Mitigation Units
Restoration	**3147**	**90**	1:1	**3237**
Restoration (See Notes below)**		**122**	1:5:1	**81.3**
Enhancement (Level II)	**657**	--	2.5:1	**262.8**
TOTAL	**3804**	**212**		**3581.1**
Wetland Mitigation Type	**Acreage**	**Ratio**	**Riparian Wetland Mitigation Units**	
Riparian Re-establishment	0.5	1:1	0.5	
Riparian Enhancement	1.5*		--	
TOTAL	**2.0**		**0.5**	

* Wetland enhancement acreage is not included in mitigation credit calculations as per RFP 16-005568 requirements.

** Prior to Site selection, the landowner received a violation for unauthorized discharge of fill material into Waters of the United States. Fill resulted from unpermitted upgrades to a farm pond dam, including widening the dam footprint, dredging stream channel, and casting spoil material adjacent to the stream channel on jurisdictional wetlands. Prior to restoration activities the landowner was required to obtain an after-the-fact permit to resolve the violations of Section 301 of the Clean Water Act (Action ID:SAW-2014-00665). In addition, stream reaches and wetland areas associated with the violation have been removed from credit generation.

In addition, the landowner received a violation for riparian buffer impacts due to clearing of trees adjacent to streams draining to Jordan Lake (NOV-2013-BV-0001). As a result of this violation, the upper 122 linear feet of UT 3 has a reduced credit ratio (1.5:1). On-site visits conducted with USACE representatives determined that the functional uplift of project restoration to UT 3 would be satisfactory to generate credit at this ratio.

Stream Success Criteria

Monitoring and success criteria for stream restoration should relate to project goals and objectives. From a mitigation perspective, several of the goals and objectives are assumed to be functionally elevated by restoration activities without direct measurement. Other goals and objectives will be considered successful upon achieving vegetation success criteria. The following summarizes stream success criteria related to goals and objectives.

Project Goal/Objective	Stream Success Criteria
Improve Hydrology	
Restore Floodplain Access	Two overbank events in separate monitoring years will be documented during the monitoring period.
Restore Wooded Riparian Buffer	Attaining Vegetation Success Criteria.
Restore Stream Stability	Cross-sections, monitored annually, will be compared to as-built measurements to determine channel stability and maintenance of channel geomorphology.
Improve Stream Geomorphology	Convert stream channels from unstable G- and F-type channels to stable E- and C- type stream channels.
Increase Surface Storage and Retention	Two overbank events in separate monitoring years, and attaining Wetland and Vegetation Success Criteria.
Restore Appropriate Inundation/Duration	
Increase Subsurface Storage and Retention	Two overbank events will be documented, in separate years, during the monitoring period and documentation of an elevated groundwater table (within 12 inches of the soil surface) for greater than 10 percent of the growing season during average climatic conditions.
Improve Sediment Transport to Convert the UTs from Sand/Silt Dominated to Gravel/Cobble Dominated Streams	Pebble counts documenting coarsening of bed material from pre-existing conditions of sand and silt to post restoration conditions of gravel and cobble.
Improve Water Quality	
Increase Upland Pollutant Filtration	Attaining Wetland and Vegetation Success Criteria (Sections 2.3 and 2.2)
Increase Thermoregulation	Attaining Vegetation Success Criteria (Section 2.2).
Reduce Stressors and Sources of Pollution	Fencing maintained throughout the monitoring period and encroachment within the easement eliminated.
Increase Removal and Retention of Pathogens, Particulates (Sediments), Dissolved Materials (Nutrients), and Toxins from the Water Column	Removal of cattle, documentation of two overbank events in separate monitoring years, and attaining Vegetation Success Criteria (Section 2.2)
Increase Energy Dissipation of Overbank/Overland Flows/Stormwater Runoff	Documentation of two overbank events in separate monitoring years and attaining Vegetation Success Criteria (Section 2.2)
Restore Habitat	
Restore In-stream Habitat	Pebble counts documenting coarsening of bed material from pre-existing conditions of sand and silt to post restoration conditions of gravel and cobble, and attaining Vegetation Success Criteria (Section 2.2)
Restore Stream-side Habitat	Attaining Vegetation Success Criteria (Section 2.2)
Improve Vegetation Composition and Structure	Attaining Vegetation Success Criteria (Section 2.2)

Vegetation Success Criteria

An average density of 320 planted stems per acre must be surviving in the first three monitoring years. Subsequently, 290 planted stems per acre must be surviving in year 4, 260 planted stems per acre in year 5, and 210 planted stems per acre in year 7. In addition, planted vegetation must average 10 feet in height in each plot at year 7 since this Site is located in the Piedmont. Volunteer stems may be considered on a case-by-case basis in determining overall vegetation success; however, volunteer stems should be counted separately from planted stems.

Wetland Success Criteria

Monitoring and success criteria for wetland re-establishment should relate to project goals and objectives. From a mitigation perspective, several of the goals and objectives are assumed to be functionally elevated by restoration activities without direct measurement. Other goals and objectives will be considered successful upon achieving vegetation success criteria. The following summarizes wetland success criteria related to goals and objectives.

Wetland Goals and Success Criteria

Project Goal/Objective	Wetland Success Criteria
Improve Hydrology	
Restore Wooded Riparian Buffer	Attaining Vegetation Success Criteria.
Increase Surface Storage and Retention	Two overbank events in separate monitoring years, and attaining Wetland and Vegetation Success Criteria.
Restore Appropriate Inundation/Duration	
Increase Subsurface Storage and Retention	
Improve Water Quality	
Increase Upland Pollutant Filtration	Attaining Wetland and Vegetation Success Criteria.
Reduce Stressors and Sources of Pollution	Fencing maintained throughout the monitoring period and encroachment within the easement eliminated.
Increase Removal and Retention of Pathogens, Particulates (Sediments), Dissolved Materials (Nutrients), and Toxins from the Water Column	Removal of cattle, documentation of two overbank events in separate monitoring years, and attaining Vegetation Success Criteria.
Increase Energy Dissipation of Overbank/Overland Flows/Stormwater Runoff	Documentation of two overbank events in separate monitoring years, and attaining Vegetation Success Criteria.
Restore Habitat	
Restore Stream-side Habitat	Attaining Vegetation Success Criteria.
Improve Vegetation Composition and Structure	

According to the *Soil Survey of Alamance County*, the growing season for Alamance County is from April 17 – October 22 (USDA 1960). However, the start date for the growing season is not typical for the Piedmont region; therefore, for purposes of this project gauge hydrologic success will be determined using data from February 1 - October 22 to more accurately represent the period of biological activity. This will be confirmed annually by soil temperatures and/or bud burst. The growing season will be initiated each year on the documented date of biological activity. Photographic evidence of bud burst and field logs of date and temperature will be included in the annual monitoring reports.

Target hydrological characteristics include saturation or inundation for 10 percent of the monitored period (February 1-October 22), during average climatic conditions. During years with atypical climatic conditions, groundwater gauges in reference wetlands may dictate threshold hydrology success criteria (75 percent of reference). These areas are expected to support hydrophytic vegetation. If wetland parameters are marginal as indicated by vegetation and/or hydrology monitoring, a jurisdictional determination will be performed.

Summary of Monitoring Period/Hydrology Success Criteria by Year

Year	Soil Temperatures/Date Bud Burst Documented	Monitoring Period Used for Determining Success	10 Percent of Monitoring Period
2016 (Year 1)	--	April 17*-October 22 (198 days)	19 days
2017 (Year 2)			
2018 (Year 3)			
2019 (Year 4)			
2020 (Year 5)			

*Gauges were installed on May 5 during year 1 (2016), so April 17 was used as the start of the growing season (NRCS).

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 tables and figures within this report's appendices. Narrative background and supporting information formerly found in these reports can be found in the Baseline Monitoring Report (formerly Mitigation Plan) and in the Mitigation Plan (formerly the Restoration Plan) documents available on the NC Division of Mitigation Services (NCDMS)

website. All raw data supporting the tables and figures in the appendices are available from NCDMS upon request.

2.0 METHODOLOGY

Monitoring requirements and success criteria outlined in the latest guidance by US Army Corps of Engineers (USACE) in April 2003 (*Stream Mitigation Guidelines*) will be followed and are briefly outlined below. Monitoring data collected at the Site should include reference photos, plant survival analysis, channel stability analysis, and biological data, if specifically required by permit conditions.

Wetland hydrology is proposed to be monitored for a period of seven years (years 1-7). Riparian vegetation and stream morphology is proposed to be monitored for a period of seven years with measurements completed in years 1-3, year 5, and year 7. Monitoring reports for years 4 and 6 will include photo documentation of stream stability and wetland hydrology monitoring data. If monitoring demonstrates the Site is successful by year 5 and no concerns have been identified, Restoration Systems (RS) may propose to terminate monitoring at the Site and forego monitoring requirements for years 6 and 7. Early closure will only be provided through written approval from the USACE in consultation with the Interagency Review Team (NC IRT). Monitoring will be conducted by Axiom Environmental, Inc (AXE). Annual monitoring reports of the data collected will be submitted to the NCDMS by RS no later than December 31 of each monitoring year data is collected.

2.1 Streams

Annual monitoring will include development of channel cross-sections and substrate on riffles and pools. Data to be presented in graphic and tabular format will include 1) cross-sectional area, 2) bankfull width, 3) average depth, 4) maximum depth, 5) width-to-depth ratio, 6) bank height ratio, and 7) entrenchment ratio. Longitudinal profiles will not be measured routinely unless monitoring demonstrates channel bank or bed instability, in which case, longitudinal profiles may be required by the USACE along reaches of concern to track changes and demonstrate stability.

Visual assessment of in-stream structures will be conducted to determine if failure has occurred. Failure of a structure may be indicated by collapse of the structure, undermining of the structure, abandonment of the channel around the structure, and/or stream flow beneath the structure. In addition, visual assessments of the entire channel will be conducted in years 1-3, 5, and 7 of monitoring as outlined in NCDMS *Monitoring Requirements and Reporting Standards for Stream and/or Wetland Mitigation*. Areas of concern will be depicted on a plan view figure identifying the location of concern along with a written assessment and photograph of the area.

Year 1 (2016) Stream measurements were performed October 17-18, 2016. As a whole, monitoring measurements indicate minimal changes in the cross-sections as compared to as-built data. The channel geometry compares favorably with the proposed conditions as set forth in the detailed mitigation plan and as constructed.

Immediately after construction, before ground cover was fully established, multiple heavy rain events (2+ inches) caused some sedimentation in the streambed. This aggradation can be seen in several Year 1 (2016) cross-sections, however it is expected that the stream will naturally transport the sediment, and the aggradation is not of concern at this time.

The year 1 (2016) measurements for cross-sections 9 and 10 on UT-1 show stream bed erosion when compared with as-built data. Stream bed erosion was noted shortly after as-built measurements were taken, and were the resulted of the above mentioned rain events. It is evident bed material used during construction in this area was finer than it should have been. Two riffles show bed erosion, totaling approximately 50 feet

in length (approximately 1 percent of the project length). The area has remained stable throughout the year. RS has created a remedial action plan for this area that will be implemented during late winter of 2016/2017 (Section 3.0).

Across the site, all in-stream structures are intact and functioning as designed. No stream areas of concern other and then the two riffles noted above were identified during year 1 (2016) monitoring. Tables for year 1 data and annual quantitative assessments are included in Appendix D.

2.2 Vegetation

After planting was completed on April 8, 2016, an initial evaluation was performed to verify planting methods and to determine initial species composition and density. Supplemental planting and additional Site modifications will be implemented, if necessary.

During quantitative vegetation sampling, 14 sample plots (10-meter by 10-meter) were installed within the Site as per guidelines established in *CVS-EEP Protocol for Recording Vegetation*, *Version 4.2* (Lee et al. 2008). In each sample plot, vegetation parameters to be monitored include species composition and species density. Visual observations of the percent cover of shrub and herbaceous species will also be documented by photograph.

Year 1 (2016) stem count measurements were performed on October 13, 2016 and indicate an average of 332 planted stems per acre (excluding livestakes) across the Site; therefore, the Site is technically meeting vegetation success criteria. However, with monitoring data and on-site observations, it is clear planted stem density across the site is low. Six of the fourteen individual vegetation plots met success criteria based on planted stems alone. When including naturally recruited stems of green ash (*Fraxinus pennsylvanica*) and red maple (*Acer rubrum*) in plot 5; green ash and American beautyberry (*Callicarpa americana*) in plot 12; and American elm (*Ulmus americana*) and box elder (*Acer negundo*) in plot 13, plots 5, 12, and 13 were above success criteria. Low stem survival can be attributed to multiple factors, most notablely the initial site planting occurring very close to the beginning of the growing season, vigorous herbaceous completion, and sporadic rain events which left upland areas of the site dry for extended periods of the growing season. A remedial action plan has been developed and will be implemented before the end of 2016. Year 1 (2016) vegetation plot information can be found in Appendix C.

2.3 Wetland Hydrology

Three groundwater monitoring gauges were installed to take measurements after hydrological modifications were performed at the Site. Hydrological sampling will continue throughout the growing season at intervals necessary to satisfy jurisdictional hydrology success criteria (USEPA 1990). In addition, a surface water gauge has been installed in Tributary 3 to monitor flow regime of the tributary. Approximate locations of gauges are depicted on Figure 2 (Appendix A).

Hydrological sampling will continue throughout the growing season at intervals necessary to satisfy jurisdictional hydrology success criteria (USEPA 1990). In addition, an on-site rain gauge will document rainfall data for comparison of groundwater conditions with extended drought conditions and floodplain crest gauges will confirm overbank flooding events. All groundwater gauges were successful in year 1 (2016) (Appendix E).

3.0 REMEDIAL ACTION PLAN

A remedial action plan has been developed in order to address stream and vegetation problem areas observed during Year 1 (2016) monitoring (Figure 3, Appendix C). A completion report will be provided to NCDMS once the work has occurred.

3.1 Stream

The observed degradation in and adjacent to cross-sections 9 and 10 on UT-1 encompasses approximately 50 linear feet of stream (1 percent of the project length). As noted above, bed material placed during construction was too fine. All of UT-1 used bed material harvested on-site. It is uncommon for us not to catch too fine of material during the harvesting and placing of bed material however it does happen. In this case, it appears that an oversight did occur and too fine of material was used along this stretch. Fine materials washed from the riffle during heavy rainfall events, resulting in minor bed scour and a small, less than 6 inch head cut beginning to develop at the top of riffle. Suitable sized channel bed material is proposed to be installed at the proper elevation in two riffles within UT-1. Bed material will be installed such that bank toe protection is provided and planting with willow stakes will occur. Bank toe protection designates that channel bed material will extend up the lower one-third of the bank. The riffle will be monitored by established cross-sections 9 and 10. This work will occur in winter of 2016/2-17 and will be done by hand in order to minimize impact within the conservation easement.

3.2 Vegetation

Multiple factors are contributing to poor vegetative success; a later than desired initial bare-root planting, heavy herbaceous competition primarily from fescue (Site was previously a cattle pasture), and sporadic rain events which left upland areas of the site dry for extended periods of the growing season. On site observation do indicate a greater survival of planted species within riparian areas. Uplands areas of the site are where survival rates were low.

The remedial action plan is to supplement the bare-root planting over 4.27 acres with 840 additional trees (590 1-gallon and 250 3-gallon species). Figure 3 (Appendix C) details the areas which will receive remedial planting along with density and number of species being placed into vegetation plots. Working with Carolina Silvics, RS has acquired and scheduled to re-planted identified areas in December of 2016. Insuring the highest degree of transplant survival. Species of trees will include willow oak, northern and south red oak, and pin oak. Mapped areas to be replanted are based on field observations.

The goal of the remedial action plan is to increase planted stem density across the remedial area site by 100 to 200 stems per acre. Although some vegetation plots are currently meeting success criteria, areas adjacent to them are not; these areas will still require supplemental planting. Stems added to vegetation plots will be flagged during planting and included in the year 2 (2017) annual monitoring report vegetation data. Once the replant has been completed, a final remedial planting figure will be provided.

It should be noted that RS is not proposing to bring up the density of vegetation plot 13 to success standards. This plot is within an existing wooded area and has a number of large natural recruit species (boxelder and American elm). An on-site determination will be made if any additional planted stems are warranted for this area. For now, we have proposed two additional stems be added to plot 13.

An herbicide treatment will be applied in order to suppress competition between the planted stems an herbaceous species such as fescue (*Festuca* sp.). This treatment is expected to occur in March/April 2017 and will be a one-time application.

4.0 REFERENCES

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. United States Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.

Environmental Laboratory. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0). United States Army Engineer Research and Development Station, Vicksburg, Mississippi.

Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation. Version 4.2. North Carolina Department of Environment and Natural Resources, Ecosystem Enhancement Program. Raleigh, North Carolina.

North Carolina Division of Water Quality (NCDWQ). 2001. Benthic Macroinvertebrate Monitoring Protocols for Compensatory Mitigation. 401/Wetlands Unit, Department of Environment and Natural Resources. Raleigh, North Carolina.

North Carolina Division of Water Quality (NCDWQ). 2006. Standard Operating Procedures for Benthic Macroinvertebrates. Biological Assessment Unit, North Carolina Department of Environment and Natural Resources. Raleigh, North Carolina.

North Carolina Division of Mitigation Services (NCDMS 2009). Cape Fear River Basin Restoration Priorities 2009 (online). Available: http://portal.ncdenr.org/c/document_library/get_file?uuid=864e82e8-725c-415e-8ed9-c72dfcb55012&groupId=60329

Schafale, M.P. and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina: Third Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation, North Carolina Department of Environment, Health, and Natural Resources. Raleigh, North Carolina.

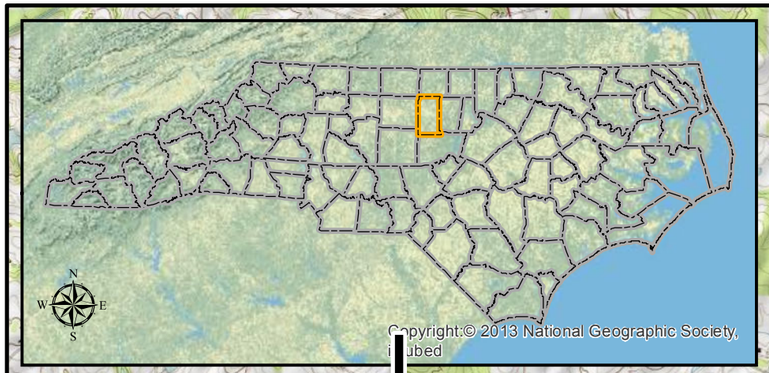
United States Department of Agriculture (USDA). 1960. Soil Survey of Alamance County, North Carolina. Soil Conservation Service.

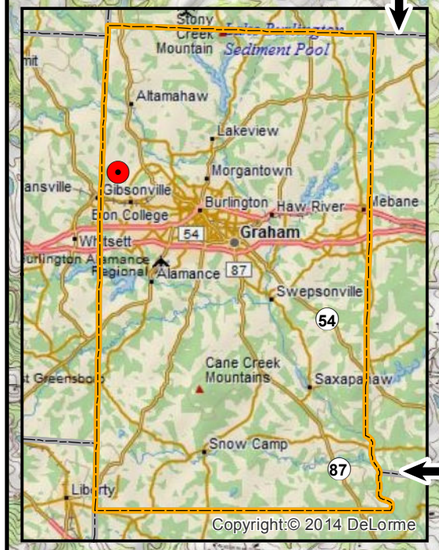
United States Environmental Protection Agency (USEPA). 1990. Mitigation Site Type Classification (MiST). EPA Workshop, August 13-15, 1989. EPA Region IV and Hardwood Research Cooperative, NCSU, Raleigh, North Carolina.

APPENDIX A

PROJECT BACKGROUND DATA AND MAPS

Directions to the Site from Interstates 40/85 in Burlington/Elon, NC:
- Exit onto University Drive (I-40/85 Exit 140) and travel north (toward Elon)
- Travel north for 2.8 miles and merge with NC 100
- Continue on University Drive (NC 100) for 0.5 mile and turn left onto Manning Street (SR 1503)
- Travel northwest for 0.8 mile and turn right onto Gibsonville-Ossipee Road (SR 1500)
- Travel north for 0.7 mile and Site is on the right





Aycock Springs Stream and Wetland Mitigation Site

36.127271 N
-79.525214 W

GUILFORD COUNTY
ALAMANCE COUNTY
Gibsonville-Ossipee Road

GIBSONVILLE
WHITSETT
ELON
BURLINGTON

Legend
- Aycock Springs Stream and Wetland Mitigation Site
- County lines

1 0.5 0 1 2 3 Miles

Axiom Environmental, Inc.

Prepared for:
RESTORATION SYSTEMS LLC

Project:
Aycock Springs Stream and Wetland Mitigation Site
Alamance County, NC

Title:
Project Location

Notes:
Background Imagery sources (provided by ESRI Data and Maps):
1. Physical Map of the United States (2009) created by the U.S. Park Service (upper inset).
2. Delorme World Basemap digital mapping (2010, lower inset).
3. Burlington, NC (1980), Lake Burlington, NC (1969), Gibsonville, NC (1970), and Ossipee, NC (1970) 7.5-minute topographic quadrangles provided by the U.S. Geological Survey.

Drawn by:	SGD
Date:	May 2016
Scale:	As Shown
Project No.:	14-006

FIGURE
1

Table 1. Project Components and Mitigation Credits
Aycock Springs Mitigation Site

Mitigation Credits			
Stream	**Stream**	**Riparian Wetland**	**Nonriparian Wetland**
Restoration	**Enhancement**	**Re-establishment**	**Re-establishment**
3237	**344.1**	**0.5**	**--**

Projects Components							
Station Range	**Existing Linear Footage/ Acreage**	**Priority Approach**	**Restoration/ Restoration Equivalent**	**Restoration Linear Footage/ Acreage**	**Mitigation Ratio**	**Mitigation Credits**	**Comment**
UT 1 Station 10+04 to 23+21	1173	PI	Restoration	1317-24= 1293	1:1	1293	24 lf of UT 1 is located outside of easement and is not credit generating
UT 2 Station 10+00 to 16+75	723	PI	Restoration	675	1:1	675	
UT 3 Station 10+00 to 11+22	147	PI	Restoration	122	1.5:1	81.3	*** The upper 122 linear feet of channel is in a violation area and is generating credit at a reduced ratio of 1.5:1
UT 3 Station 11+22 to 12+12	16	PI	Restoration	90	1:1	90	
UT 4 Station 10+00 to 14+13	448	PI	Restoration	413-107= 306	1:1	306	****The upper 107 linear feet of channel is in a violation area and is not credit generating
Travis Creek Station 10+00 to 15+78	578		EII	578-20= 558	2.5:1	223.2	The upper 20 linear feet of Travis Creek is within a powerline easement and is not credit generating
Travis Creek Station 15+78 to 17+87	274	PII	Restoration	209	1:1	209	
Travis Creek Station 17+87 to 18+86	99		EII	99	2.5:1	39.6	
Travis Creek Station 23+71 to 30+35	936	PI	Restoration	664	1:1	664	

Table 1. Project Components and Mitigation Credits (continued)
Aycock Springs Mitigation Site

Component Summation			
Restoration Level	**Stream (linear footage)**	**Riparian Wetland (acreage)**	**Nonriparian Wetland (acreage)**
Restoration	3237	0.5	--
Enhancement (Level 1)	122	--	--
Enhancement (Level II)	657	--	
Enhancement	--	1.5**	
Totals	**4016**	**--**	**--**
Mitigation Units	**3581.1 SMUs**	**0.5 Riparian WMUs**	**0.00 Nonriparian WMUs**

**Wetland enhancement acreage is not included in mitigation credit calculations as per RFP 16-005568 requirements.

***Prior to Site selection, the landowner received a violation for riparian buffer impacts due to clearing of trees adjacent to streams draining to Jordan Lake (NOV-2013-BV-0001). As a result of this violation, the upper 122 linear feet of UT 3 has a reduced credit ratio of 1.5:1. On-site visits conducted with USACE representatives determined that the functional uplift of project restoration to UT 3 would be satisfactory to generate credit at this ratio.

**** Prior to Site selection, the landowner received a violation for unauthorized discharge of fill material into Waters of the United States. Fill resulted from unpermitted upgrades to a farm pond dam, including widening the dam footprint, dredging stream channel, and casting spoil material adjacent to the stream channel on jurisdictional wetlands. Prior to restoration activities the landowner was required to obtain an after-the-fact permit to resolve the violations of Section 301 of the Clean Water Act (Action ID:SAW-2014-00665). In addition, stream reaches and wetland areas associated with the violation area have been removed from credit generation – UT 4 begins credit generation at Station 11+07).

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Table 2. Project Activity and Reporting History
Aycock Springs Mitigation Site

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Technical Proposal (RFP No. 16-005568)	--	October 2013
DMS Contract No. 5791	--	February 2014
Mitigation Plan	October 2014	May 2015
Construction Plans	--	June 2015
Construction Earthwork	--	April 6, 2016
Planting	--	April 8, 2016
As-Built Documentation	April 2016	May 2016
Year 1 Monitoring	October 2016	December 2016

Table 3. Project Contacts Table
Aycock Springs Mitigation Site

Full Delivery Provider	Restoration Systems 1101 Haynes Street, Suite 211 Raleigh, North Carolina 27604 Worth Creech 919-755-9490
Designer and Monitoring Provider	Axiom Environmental, Inc. 218 Snow Avenue Raleigh, NC 27603 Grant Lewis 919-215-1693

Table 4. Project Attribute Table
Aycock Springs Mitigation Site

Project Information	
Project Name	Aycock Springs Restoration Site
Project County	Alamance County, North Carolina
Project Area (acres)	15
Project Coordinates (latitude & latitude)	36.127271ºN, 79.525214ºW
Project Watershed Summary Information	
Physiographic Province	Piedmont
Project River Basin	Cape Fear
USGS HUC for Project (14-digit)	03030002030010
NCDEQ Sub-basin for Project	03-06-02
Project Drainage Area (acres)	26-3008
Project Drainage Area Percentage of Impervious Area	<2%

Table 4. Project Attribute Table (continued)
Aycock Springs Mitigation Site

Reach Summary Information				
Parameters	**Travis Cr**	**UT 1/UT2**	**UT 3**	**UT 4**
Length of reach (linear feet)	1550	1966	212	413
Valley Classification	alluvial			
Drainage Area (acres)	3008	68	26	119
NCDWQ Stream ID Score	--	30.75/25.5	26.75	27.5
NCDWR Water Quality Classification	WS-V, NSW			
Existing Morphological Description (Rosgen 1996)	Cg 5/6-, Eg 5-, and Fc 5-type			
Existing Evolutionary Stage (Simon and Hupp 1986)	IV	IV	III	III
Underlying Mapped Soils	Cecil, Helena, Mixed Alluvial Land, Severely Gullied Land, Worsham			
Drainage Class	Well-drained, moderately well-drained, poorly drained, variable, poorly drained			
Hydric Soil Status	Nonhydric and Hydric			
Slope	0.0023	0.0249	0.0153	0.0093
FEMA Classification	AE	Special Hazard Flood Area		
Native Vegetation Community	Piedmont Alluvial Forest/Dry-Mesic Oak-Hickory Forest			
Watershed Land Use/Land Cover (Site)	42% forest, 53% agricultural land, <5% low density residential/impervious surface			
Watershed Land Use/Land Cover (Cedarock Reference Channel)	65% forest, 30% agricultural land, <5% low density residential/impervious surface			
Percent Composition of Exotic Invasive Vegetation	< 5%			

Wetland Summary Information	
Parameters	**Wetlands**
Wetland acreage	1.6
Wetland Type	Riparian
Mapped Soil Series	Worsham and Mixed Alluvial Land
Drainage Class	Poorly drained
Hydric Soil Status	Hydric
Source of Hydrology	Groundwater, stream overbank
Hydrologic Impairment	Incised streams, compacted soils, livestock
Native Vegetation Community	Piedmont/Low Mountain Alluvial Forest
Percent Composition of Exotic Invasive Vegetation	<5%

Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the United States-Section 401	Yes	Resolved	404 Permit
Waters of the United States-Section 404	Yes	Resolved	401 Certification
Endangered Species Act	No	--	CE Doc.
Historic Preservation Act	No	--	CE Doc.
Coastal Zone Management Act	No	--	NA
FEMA Floodplain Compliance	Yes	In progress	CLOMR/LOMR
Essential Fisheries Habitat	No	--	NA

APPENDIX B

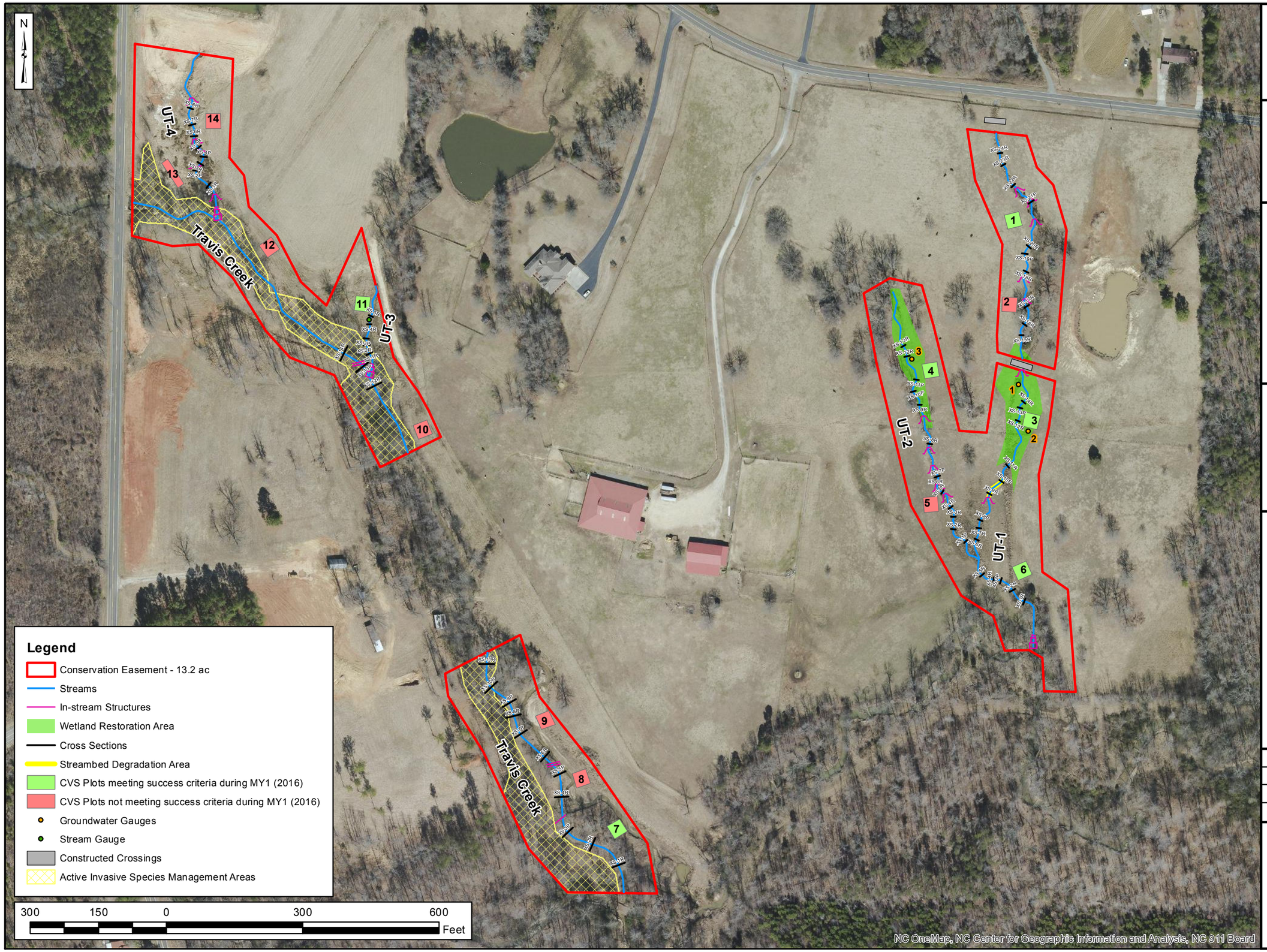
VISUAL ASSESSMENT DATA

Figure 2. Current Conditions Plan View (CCPV)

Tables 5A-5E. Visual Stream Morphology Stability Assessment

Table 6. Vegetation Condition Assessment

Vegetation Plot Photographs



Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS LLC

Project:

Aycock Springs Stream and Wetland Mitigation Site

Alamance County, NC

Title:

Current Conditions Plan View

Notes:

1. Background Imagery source: 2014 aerial photography provided by the NC OneMap Program (online, supported by the NC Geographic Information Coordination Council).

Drawn by:	KRJ
Date:	NOV 2016
Scale:	1:2400
Project No.:	14-006

FIGURE

2

Table 5A **Visual Stream Morphology Stability Assessment**
Reach ID **Aycock Springs - Travis Creek**
Assessed Length **2128**

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)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	10	10			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	9	9			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	9	9			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	9	9			100%			
		2. Thalweg centering at downstream of meander (Glide)	9	9			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.	9	9			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	9	9			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	9	9			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	9	9			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	9	9			100%			

Table 5B **Visual Stream Morphology Stability Assessment**
Reach ID **Aycock Springs UT1**
Assessed Length **1317**

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)			0	0	100%			
		2. Degradation - Evidence of downcutting			1	50	96%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	44	45			98%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	43	44			98%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	44	44			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	44	44			100%			
		2. Thalweg centering at downstream of meander (Glide)	44	44			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.	10	10			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	10	10			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	10	10			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	10	10			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	10	10			100%			

Table 5C **Visual Stream Morphology Stability Assessment**
Reach ID **Aycock Springs UT2**
Assessed Length **675**

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)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	25	25			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	24	24			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	24	24			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	24	24			100%			
		2. Thalweg centering at downstream of meander (Glide)	24	24			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.	6	6			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	6	6			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	6	6			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	6	6			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	6	6			100%			

Table 5D **Visual Stream Morphology Stability Assessment**
Reach ID **Aycock Springs UT3**
Assessed Length **212**

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)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	9	9			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	8	8			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	8	8			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	8	8			100%			
		2. Thalweg centering at downstream of meander (Glide)	8	8			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.	1	1			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	1	1			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	1	1			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	1	1			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	1	1			100%			

Table 5E **Visual Stream Morphology Stability Assessment**
Reach ID **Aycock Springs UT4**
Assessed Length **413**

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)			0	0	100%			
		2. Degradation - Evidence of downcutting			0	0	100%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate	9	9			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6)	8	8			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstrem riffle)	8	8			100%			
	4.**Thalweg Position**	1. Thalweg centering at upstream of meander bend (Run)	8	8			100%			
		2. Thalweg centering at downstream of meander (Glide)	8	8			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.	5	5			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	5	5			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	5	5			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does not exceed 15%.	5	5			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth ratio ≥ 1.6 Rootwads/logs providing some cover at base-flow.	5	5			100%			

Table 6 — Vegetation Condition Assessment

Aycock Springs

Planted Acreage[1] **11.9**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	None	0.1 acres	none	0	0.00	0.0%
2. Low Stem Density Areas	A high rate of planted stem mortality was observed throughout the planting area, causing low stem density sitewide.	0.1 acres	none	0	11.90	100.0%
2B. Low Planted Stem Density Areas	A high rate of planted stem mortality was observed throughout the planting area, causing low stem density sitewide.	0.1 acres	none	0	11.90	100.0%
			Total	0	11.90	100.0%
3. Areas of Poor Growth Rates or Vigor	None	0.25 acres	none	0	0.00	0.0%
			Cumulative Total	0	11.90	100.0%

Easement Acreage[2] **13.3**

Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Easement Acreage
4. Ongoing Invasive Species Management Areas[4]	Management of Chinese privet and multiflora rose is active and ongoing along Travis Creek.	1000 SF	none	2	2.38	17.9%
5. Easement Encroachment Areas[3]	None	none	none	0	0.00	0.0%

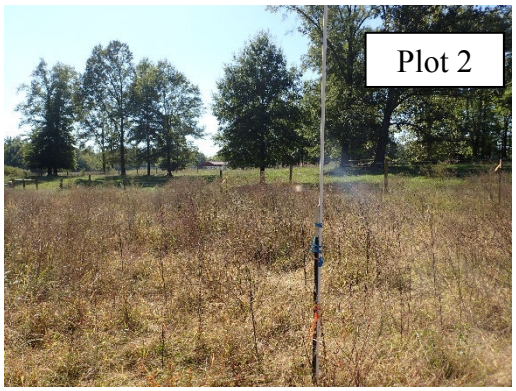
1 = Enter the planted acreage within the easement. This number is calculated as the easement acreage minus any existing mature tree stands that were not subject to supplemental planting of the understory, the channel acreage, crossings or any other elements not directly planted as part of the project effort.

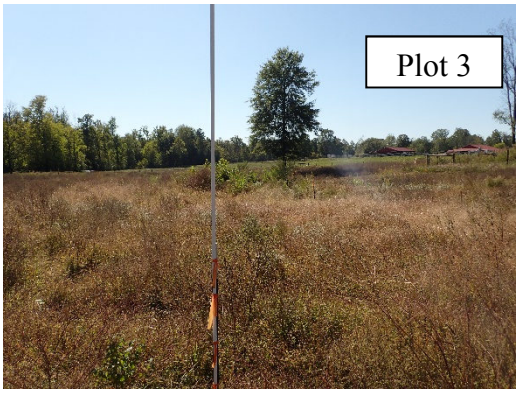
2 = The acreage within the easement boundaries.

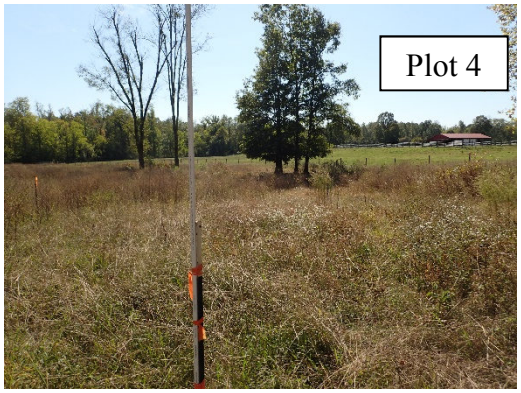
3 = Encroachment may occur within or outside of planted areas and will therefore be calculated against the overall easement acreage. In the event a polygon is cataloged into items 1, 2 or 3 in the table and is the result of encroachment, the associated acreage should be tallied in the relevant item (i.e., item 1,2 or 3) as well as a parallel tally in item 5.

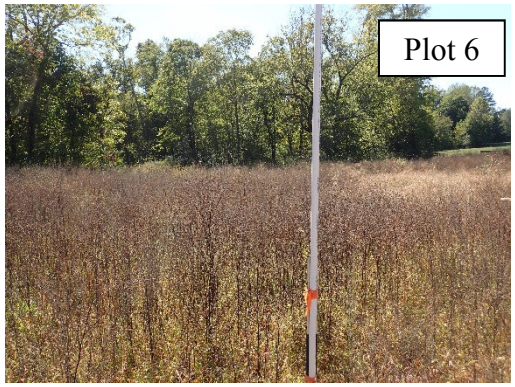
4 = Invasives may occur in or out of planted areas, but still within the easement and will therefore be calculated against the overall easement acreage. Invasives of concern/interest are listed below. The list of high concern spcies are those with the potential to directly outcompete native, young, woody stems in the short-term (e.g. monitoring period or shortly thereafter) or affect the community structure for existing, more established tree/shrub stands over timeframes that are slightly longer (e.g. 1-2 decades). The low/moderate concern group are those species that generally do not have this capacity over the timeframes discussed and therefore are not expected to be mapped with regularity, but can be mapped, if in the judgement of the observer their coverage, density or distribution is suppressing the viability, density, or growth of planted woody stems. Decisions as to whether remediation will be needed are based on the integration of risk factors by DMS such as species present, their coverage, distribution relative to native biomass, and the practicality of treatment. For example, even modest amounts of Kudzu or Japanese Knotweed early in the projects history will warrant control, but potentially large coverages of Microstegium in the herb layer will not likley trigger control because of the limited capacities to impact tree/shrub layers within the timeframes discussed and the potential impacts of treating extensive amounts of ground cover. Those species with the "watch list" designator in gray shade are of interest as well, but have yet to be observed across the state with any frequency. Those in *red italics* are of particular interest given their extreme risk/threat level for mapping as points where isolated specimens are found, particularly ealry in a projects monitoring history. However, areas of discreet, dense patches will of course be mapped as polygons. The symbology scheme below was one that was found to be helpful for symbolzing invasives polygons, particulalry for situations where the conditon for an area is somewhere between isolated specimens and dense, discreet patches. In any case, the point or polygon/area feature can be symbolized to describe things like high or low concern and species can be listed as a map inset, in legend items if the number of species are limited or in the narrative section of the executive summary.

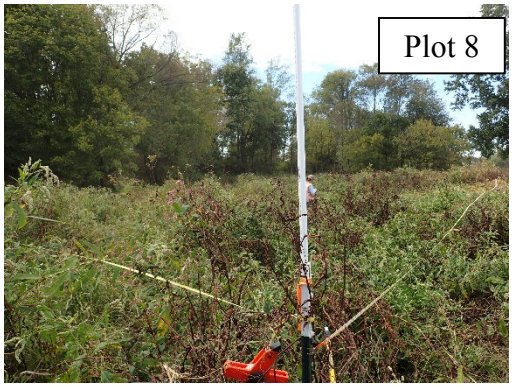
Aycock Springs
Year 1 Vegetation Monitoring Photographs
Taken October 2016



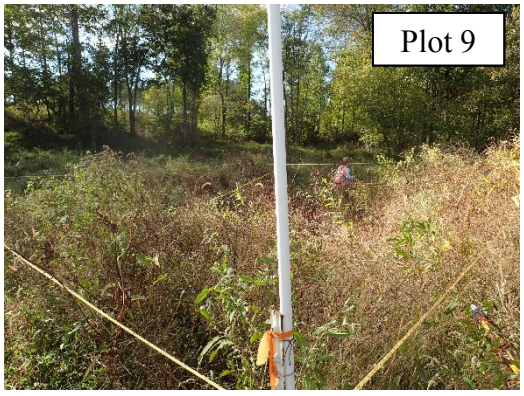


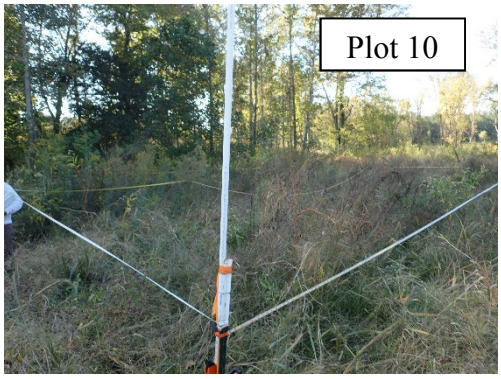


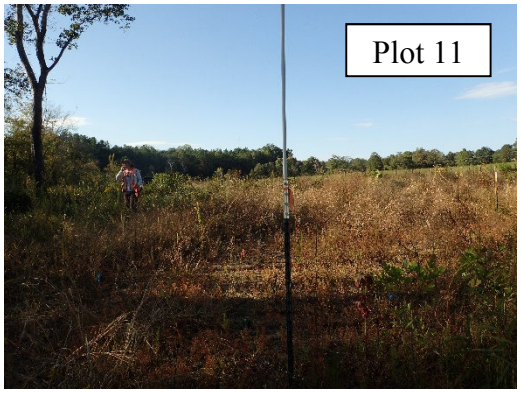




Aycock Springs
Year 1 Vegetation Monitoring Photographs
Taken October 2016
(continued)







APPENDIX C

VEGETATION PLOT DATA

Table 7. Vegetation Plot Criteria Attainment

Table 8. CVS Vegetation Plot Metadata

Table 9. Total and Planted Stems by Plot and Species

Figure 3. Remedial Action Plan

Table 7. Vegetation Plot Criteria Attainment Based on Planted Stems

Vegetation Plot ID	Vegetation Survival Threshold Met?	Tract Mean
1	Yes	43%
2	No	
3	Yes	
4	Yes	
5	No*	
6	Yes	
7	Yes	
8	No	
9	No	
10	No	
11	Yes	
12	No*	
13	No*	
14	No	

*These plots did not meet success criteria based on planted stems only; however, when including naturally recruited stems of green ash (*Fraxinus pennsylvanica*) and red maple (*Acer rubrum*) in plot 5; green ash and American beautyberry (*Callicarpa Americana*) in plot 12; and American elm (*Ulmus Americana*) and box elder (*Acer negundo*) in plot 13, plots 5, 12, and 13 were above success criteria.

Table 8. CVS Vegetation Plot Metadata

Report Prepared By	Corri Faquin
Date Prepared	10/26/2016 11:20
database name	RS-Aycock_2016-v2.3.1.mdb
database location	\\AE-FILE\Share\Business\Projects\14\14-006 Acyock Springs Detailed\YEAR-01\CVS
computer name	CORRI2-PC
file size	56627200
DESCRIPTION OF WORKSHEETS IN THIS DOCUMENT----------	
Metadata	Description of database file, the report worksheets, and a summary of project(s) and project data.
Proj, planted	Each project is listed with its PLANTED stems per acre, for each year. This excludes live stakes.
Proj, total stems	Each project is listed with its TOTAL stems per acre, for each year. This includes live stakes, all planted stems, and all natural/volunteer stems.
Plots	List of plots surveyed with location and summary data (live stems, dead stems, missing, etc.).
Vigor	Frequency distribution of vigor classes for stems for all plots.
Vigor by Spp	Frequency distribution of vigor classes listed by species.
Damage	List of most frequent damage classes with number of occurrences and percent of total stems impacted by each.
Damage by Spp	Damage values tallied by type for each species.
Damage by Plot	Damage values tallied by type for each plot.
Planted Stems by Plot and Spp	A matrix of the count of PLANTED living stems of each species for each plot; dead and missing stems are excluded.
ALL Stems by Plot and spp	A matrix of the count of total living stems of each species (planted and natural volunteers combined) for each plot; dead and missing stems are excluded.
PROJECT SUMMARY----------	
Project Code	14-006
project Name	Aycock Springs
Description	
River Basin	Cape Fear
length(ft)	
stream-to-edge width (ft)	
area (sq m)	
Required Plots (calculated)	
Sampled Plots	14

Table 9. Total and Planted Stems by Plot and Species
DMS Project Code 14.006. Project Name: Aycock Springs

			Current Plot Data (MY1 2016)																					
			14.006-01-0001			14.006-01-0002			14.006-01-0003			14.006-01-0004			14.006-01-0005			14.006-01-0006			14.006-01-0007			14.006-01-0008		
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	PnoLS	P-all	T
Acer negundo	boxelder	Tree																								
Acer rubrum	red maple	Tree															4			1						
Betula nigra	river birch	Tree													1	1	1	1	1	1				1	1	1
Callicarpa americana	American beautyberry	Shrub																								
Carpinus caroliniana	American hornbeam	Tree																3	3	3						
Cephalanthus occidentalis	common buttonbush	Shrub																		4						
Cornus amomum	silky dogwood	Shrub	8	8	8	3	3	3	3	3	3	3	3	3	3	3	3	10	10	10	8	8	8	4	4	4
Cornus florida	flowering dogwood	Tree																								
Diospyros virginiana	common persimmon	Tree																								
Fraxinus pennsylvanica	green ash	Tree						1			1	1	1	3	1	1	2									
Nyssa sylvatica	blackgum	Tree																			1	1	1			
Platanus occidentalis	American sycamore	Tree										1	1	1												
Quercus	oak	Tree							1	1	1													1	1	1
Quercus alba	white oak	Tree	1	1	1																					
Quercus michauxii	swamp chestnut oak	Tree							2	2	2	2	2	2												
Quercus pagoda	cherrybark oak	Tree																								
Quercus phellos	willow oak	Tree																								
Quercus rubra	northern red oak	Tree	4	4	4				2	2	2	2	2	2				2	2	2						
Sambucus canadensis	Common Elderberry	Shrub				2	2	2	2	2	2							1	1	1						
Ulmus alata	winged elm	Tree																								
Ulmus americana	American elm	Tree												1												
		Stem count	13	13	13	5	5	6	10	10	11	9	9	12	5	5	10	17	17	22	9	9	9	6	6	6
		size (ares)	1			1			1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	3	3	3	2	2	3	5	5	6	5	5	6	3	3	4	5	5	7	2	2	2	3	3	3
		Stems per ACRE	526.1	526.1	526.1	202.3	202.3	242.8	404.7	404.7	445.2	364.2	364.2	485.6	202.3	202.3	404.7	688	688	890.3	364.2	364.2	364.2	242.8	242.8	242.8

Color for Density

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

PnoLS = Planted excluding livestakes
P-all = Planting including livestakes
T = All planted and natural recruits including livestakes
T includes natural recruits

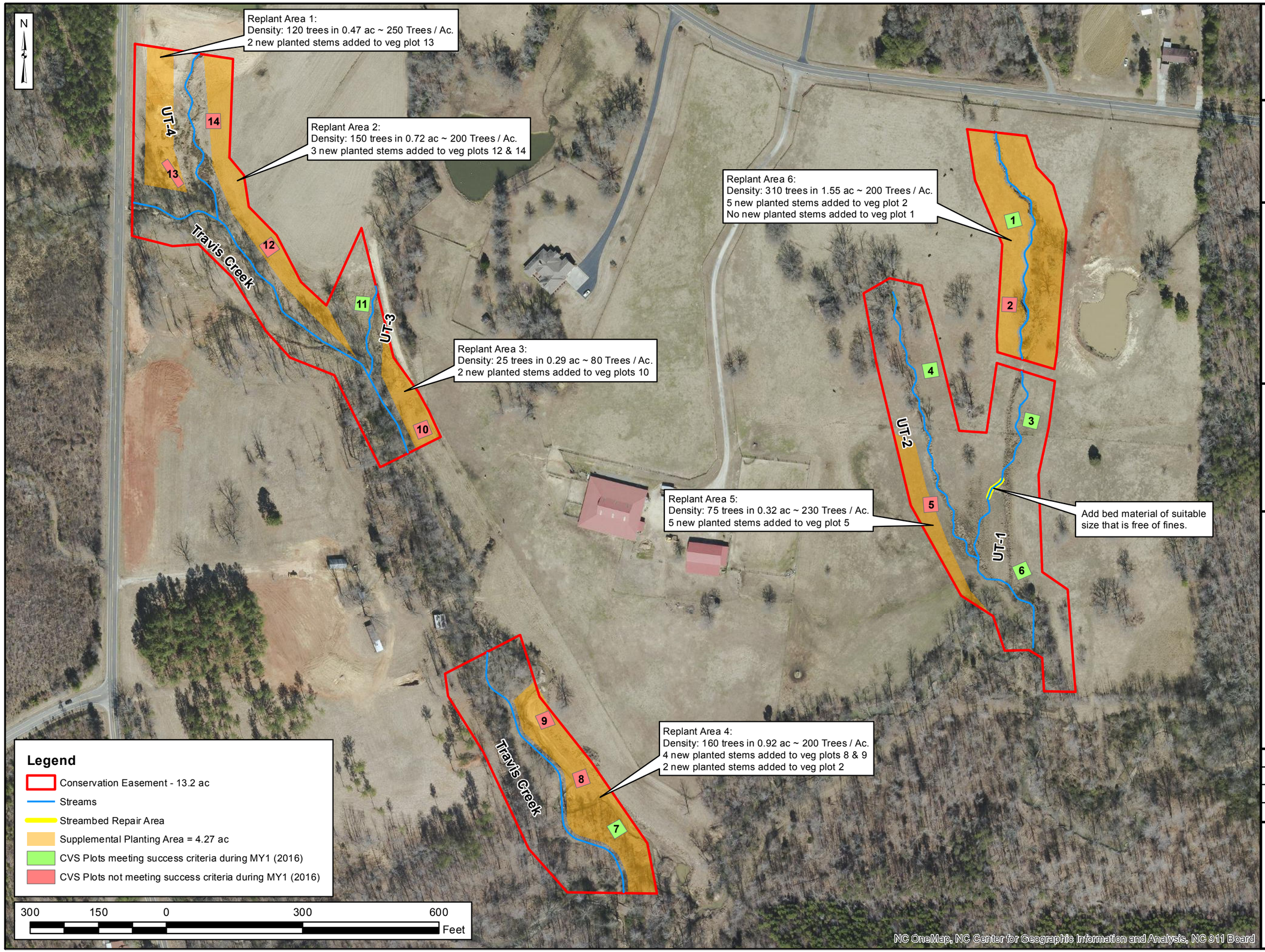
Table 9. Total and Planted Stems by Plot and Species (continued)
DMS Project Code 14.006. Project Name: Aycock Springs

			Current Plot Data (MY1 2016)																		Annual Means					
			14.006-01-0009			14.006-01-0010			14.006-01-0011			14.006-01-0012			14.006-01-0013			14.006-01-0014			MY1 (2016)			MY0 (2016)		
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	PnoLS	P-all	T
Acer negundo	boxelder	Tree															5						5			7
Acer rubrum	red maple	Tree																					5			
Betula nigra	river birch	Tree																2	2	2	5	5	5	9	9	9
Callicarpa americana	American beautyberry	Shrub												1									1			
Carpinus caroliniana	American hornbeam	Tree	1	1	1				1	1	1										5	5	5	7	7	7
Cephalanthus occidentalis	common buttonbush	Shrub																					4			
Cornus amomum	silky dogwood	Shrub	4	4	4	3	3	3	2	2	2				1	1	1				52	52	52	57	57	57
Cornus florida	flowering dogwood	Tree							4	4	4										4	4	4	4	4	4
Diospyros virginiana	common persimmon	Tree				1	1	1													1	1	1	2	2	2
Fraxinus pennsylvanica	green ash	Tree									2	2	2	3				1	1	1	5	5	13	3	3	5
Nyssa sylvatica	blackgum	Tree										2	2	2							3	3	3	6	6	6
Platanus occidentalis	American sycamore	Tree																			1	1	1	5	5	5
Quercus	oak	Tree				1	1	1										1	1	1	4	4	4	11	11	11
Quercus alba	white oak	Tree																			1	1	1	2	2	2
Quercus michauxii	swamp chestnut oak	Tree										1	1	1							5	5	5			
Quercus pagoda	cherrybark oak	Tree																1	1	1	1	1	1	6	6	6
Quercus phellos	willow oak	Tree				2	2	2	3	3	3				1	1	1				6	6	6	18	18	18
Quercus rubra	northern red oak	Tree																1	1	1	11	11	11	13	13	13
Sambucus canadensis	Common Elderberry	Shrub	1	1	1				2	2	2	2	2	2				1	1	1	11	11	11	62	62	62
Ulmus alata	winged elm	Tree																								2
Ulmus americana	American elm	Tree															2						3			
		Stem count	6	6	6	7	7	7	12	12	14	7	7	9	2	2	9	7	7	7	115	115	141	205	205	216
		size (ares)	1			1			1			1			1			1			14			14		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.35			0.35		
		Species count	3	3	3	4	4	4	5	5	6	4	4	5	2	2	4	6	6	6	15	15	20	14	14	16
		Stems per ACRE	242.8	242.8	242.8	283.3	283.3	283.3	485.6	485.6	566.6	283.3	283.3	364.2	80.94	80.94	364.2	283.3	283.3	283.3	332.4	332.4	407.6	592.6	592.6	624.4

Color for Density

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

PnoLS = Planted excluding livestakes
P-all = Planting including livestakes
T = All planted and natural recruits including livestakes
T includes natural recruits



Axiom Environmental, Inc.

Prepared for:

RESTORATION SYSTEMS LLC

Project:

Aycock Springs Stream and Wetland Mitigation Site

Alamance County, NC

Title:

Remedial Action Plan

Notes:

1. Background Imagery source: 2014 aerial photography provided by the NC OneMap Program (online, supported by the NC Geographic Information Coordination Council).

Drawn by:	KRJ
Date:	NOV 2016
Scale:	1:2400
Project No.:	14-006

FIGURE

3

APPENDIX D

STREAM SURVEY DATA

Cross-section Plots

Substrate Plots

Tables 10a-e. Baseline Stream Data Summary

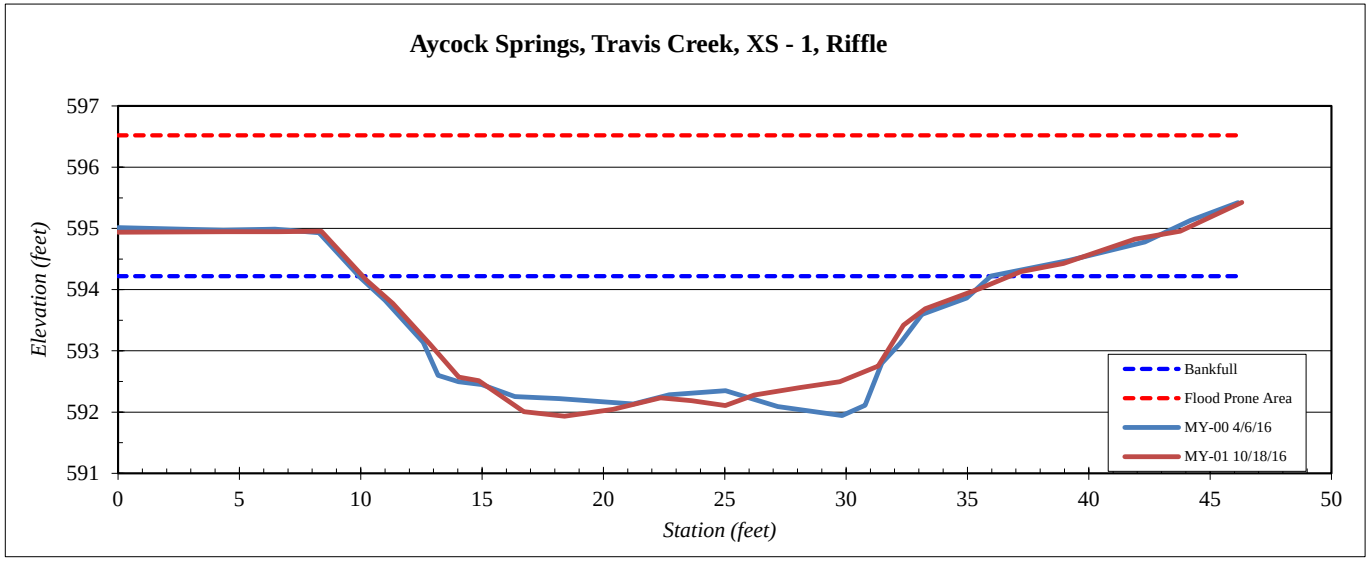
Tables 11a-l. Monitoring Data

Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 1, Riffle
Feature	Riffle
Date:	10/17/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	594.94
4.5	594.95
6.6	594.95
8.4	594.95
10.2	594.15
11.3	593.78
12.9	593.11
14.0	592.57
14.9	592.51
16.7	592.01
18.4	591.93
20.4	592.04
22.3	592.23
23.6	592.19
25.0	592.11
26.2	592.28
28.1	592.40
29.7	592.50
31.3	592.75
32.4	593.42
33.3	593.7
35.5	594.0
37.2	594.3
39.0	594.4
41.9	594.8
43.8	595.0
46.3	595.4

SUMMARY DATA	
Bankfull Elevation:	594.2
Bankfull Cross-Sectional Area:	40.0
Bankfull Width:	26.7
Flood Prone Area Elevation:	596.5
Flood Prone Width:	150.0
Max Depth at Bankfull:	2.3
Mean Depth at Bankfull:	1.5
W / D Ratio:	17.8
Entrenchment Ratio:	5.6
Bank Height Ratio:	1.0

Stream Type	C/E

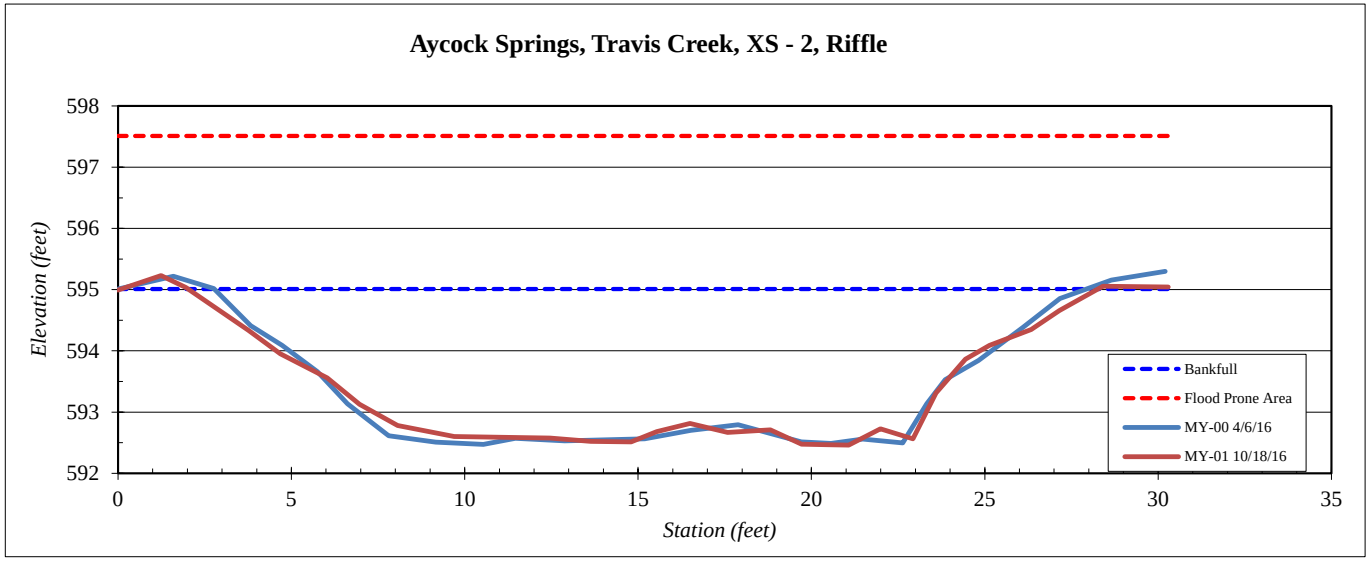


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 2, Riffle
Feature	Riffle
Date:	10/17/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	594.99
1.2	595.23
2.0	595.04
3.8	594.34
4.7	593.95
6.0	593.56
7.0	593.13
8.1	592.78
9.7	592.60
11.1	592.59
12.5	592.58
13.6	592.52
14.8	592.51
15.5	592.68
16.5	592.81
17.6	592.67
18.8	592.71
19.7	592.47
20.4	592.47
21.1	592.46
22.0	592.7
22.9	592.6
23.6	593.3
24.4	593.9
25.1	594.1
26.3	594.3
27.2	594.7
28.4	595.1
30.3	595.0

SUMMARY DATA	
Bankfull Elevation:	595.0
Bankfull Cross-Sectional Area:	47.4
Bankfull Width:	26.2
Flood Prone Area Elevation:	597.5
Flood Prone Width:	150.0
Max Depth at Bankfull:	2.5
Mean Depth at Bankfull:	1.8
W / D Ratio:	14.5
Entrenchment Ratio:	5.7
Bank Height Ratio:	1.0

Stream Type	C/E

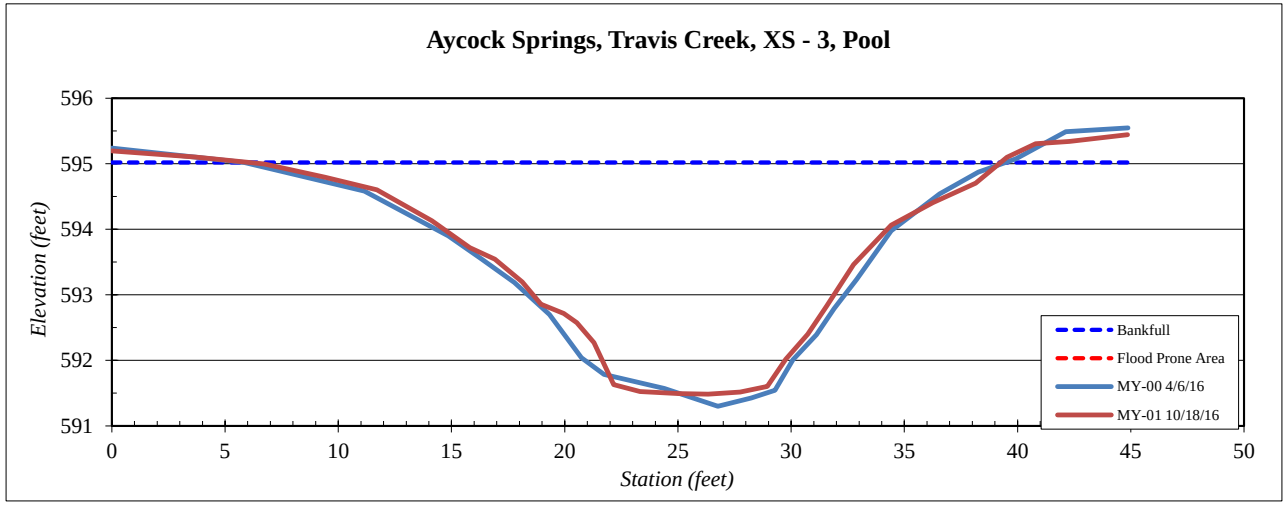


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 3, Pool
Feature	Pool
Date:	10/17/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	595.2
3.7	595.1
6.7	595.0
9.4	594.8
11.7	594.6
14.1	594.1
15.8	593.7
16.9	593.5
18.1	593.2
18.9	592.9
20.0	592.7
20.5	592.6
21.3	592.3
22.2	591.6
23.3	591.5
25.0	591.5
26.3	591.5
27.8	591.5
28.9	591.6
29.8	592.0
30.7	592.4
31.6	592.8
32.8	593.5
34.4	594.1
36.3	594.4
38.1	594.7
39.5	595.1
40.8	595.3
42.3	595.3
44.9	595.4

SUMMARY DATA	
Bankfull Elevation:	595.0
Bankfull Cross-Sectional Area:	55.8
Bankfull Width:	33.2
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	3.5
Mean Depth at Bankfull:	1.7
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

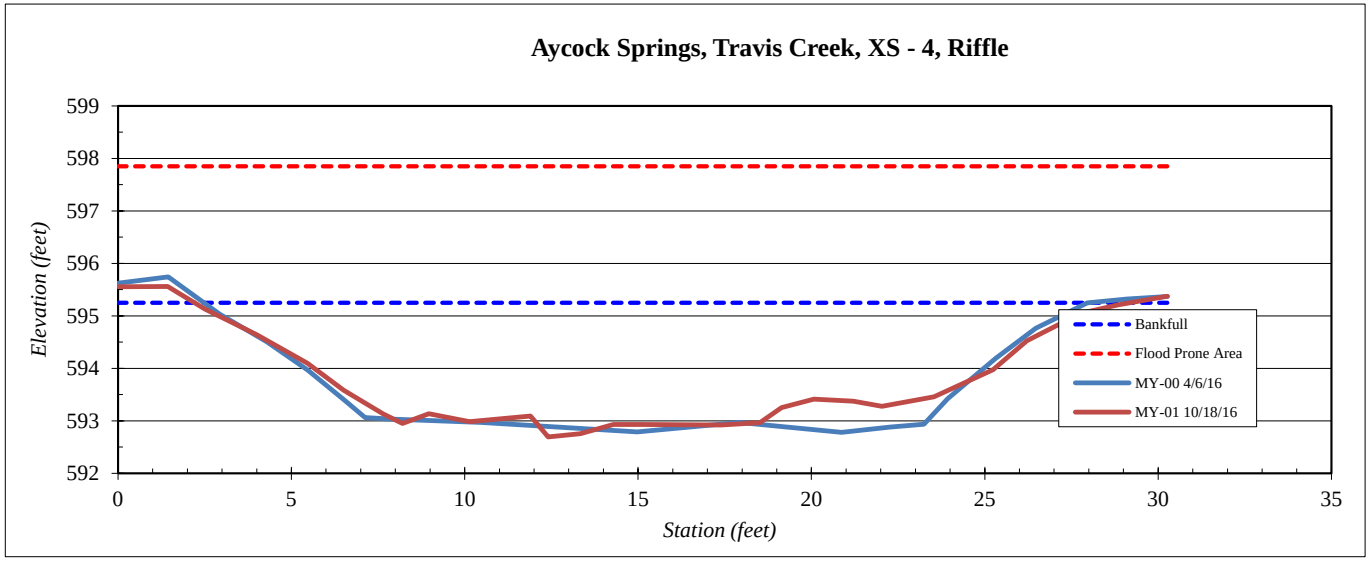


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 4, Riffle
Feature	Riffle
Date:	10/17/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	595.56
1.4	595.56
2.5	595.13
4.0	594.64
5.5	594.10
6.5	593.58
7.6	593.13
8.2	592.95
9.0	593.13
10.1	592.98
11.9	593.09
12.4	592.69
13.3	592.76
14.3	592.93
15.1	592.93
17.4	592.92
18.5	592.97
19.1	593.25
20.1	593.42
21.2	593.38
22.0	593.3
23.5	593.5
25.2	594.0
26.2	594.5
27.8	595.0
28.8	595.2
30.3	595.4

SUMMARY DATA	
Bankfull Elevation:	595.3
Bankfull Cross-Sectional Area:	44.6
Bankfull Width:	27.0
Flood Prone Area Elevation:	597.9
Flood Prone Width:	150.0
Max Depth at Bankfull:	2.6
Mean Depth at Bankfull:	1.7
W / D Ratio:	16.3
Entrenchment Ratio:	5.6
Bank Height Ratio:	1.0

Stream Type	C/E

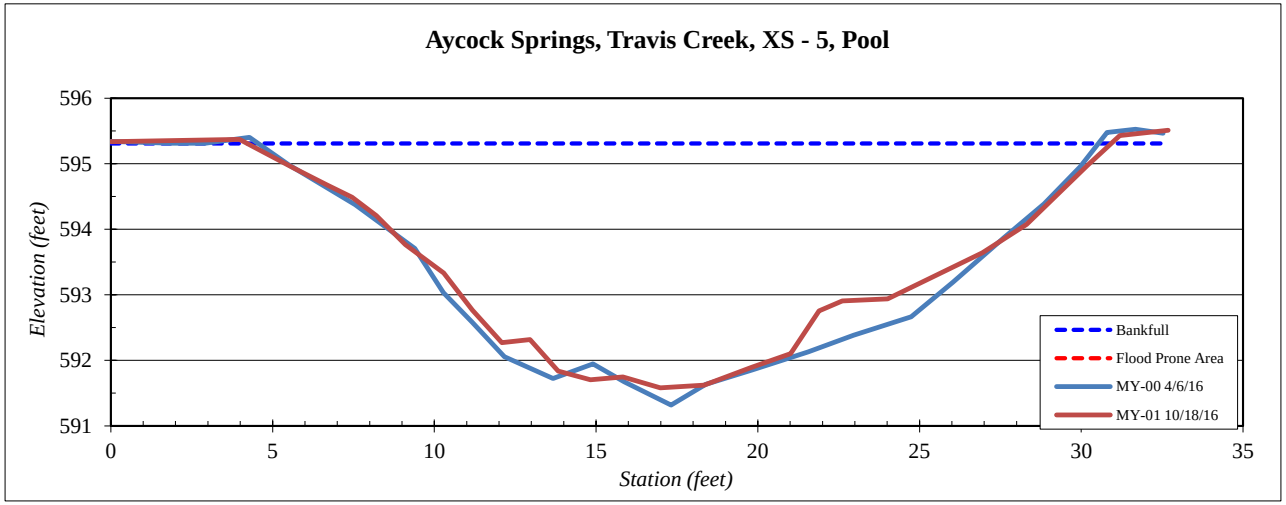


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 5, Pool
Feature	Pool
Date:	10/17/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	595.3
4.0	595.4
5.7	594.9
6.7	594.7
7.5	594.5
8.2	594.2
9.1	593.8
10.3	593.3
11.2	592.8
12.1	592.3
13.0	592.3
13.8	591.8
14.8	591.7
15.8	591.7
17.0	591.6
18.3	591.6
19.8	591.9
21.0	592.1
21.9	592.8
22.6	592.9
24.0	592.9
26.9	593.6
28.3	594.1
30.2	595.0
31.2	595.4
32.7	595.5

SUMMARY DATA	
Bankfull Elevation:	595.3
Bankfull Cross-Sectional Area:	58.1
Bankfull Width:	26.7
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	3.7
Mean Depth at Bankfull:	2.2
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

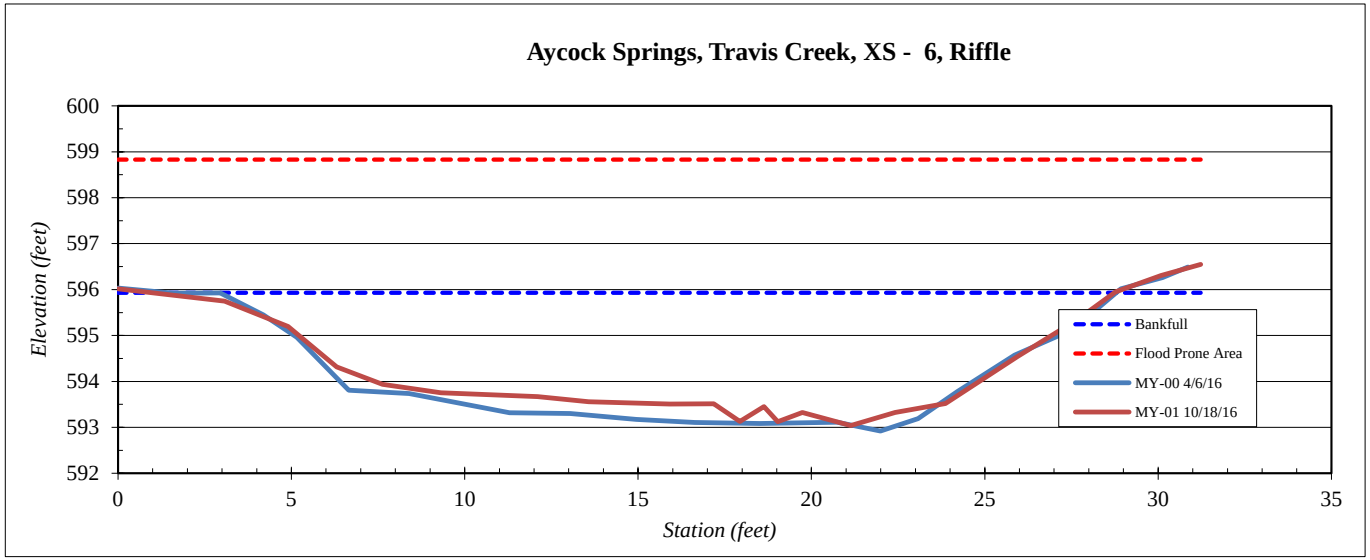


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 6, Riffle
Feature	Riffle
Date:	10/17/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	596.02
3.1	595.75
4.9	595.19
6.3	594.32
7.6	593.93
9.3	593.75
12.1	593.67
13.6	593.56
15.9	593.51
17.2	593.51
17.9	593.13
18.6	593.45
19.0	593.12
19.7	593.33
21.1	593.04
22.4	593.33
23.9	593.52
24.9	594.02
25.9	594.54
27.7	595.35
28.8	595.9
30.1	596.3
31.2	596.5

SUMMARY DATA	
Bankfull Elevation:	595.9
Bankfull Cross-Sectional Area:	50.6
Bankfull Width:	27.7
Flood Prone Area Elevation:	598.8
Flood Prone Width:	150.0
Max Depth at Bankfull:	2.9
Mean Depth at Bankfull:	1.8
W / D Ratio:	15.2
Entrenchment Ratio:	5.4
Bank Height Ratio:	1.0

Stream Type	C/E

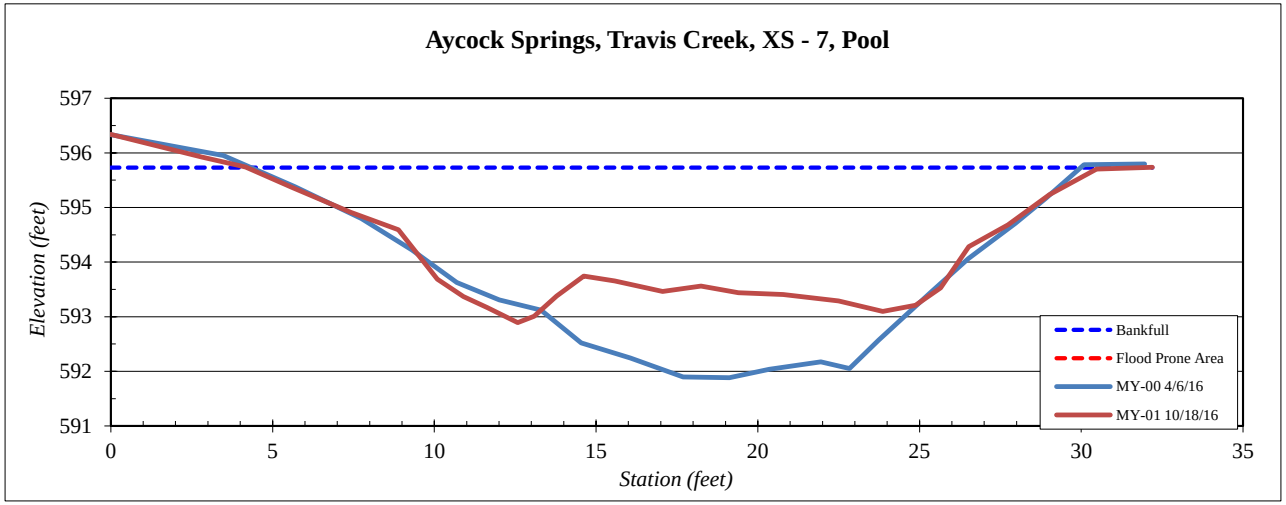


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 7, Pool
Feature	Pool
Date:	10/17/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	596.3
2.8	595.9
4.2	595.7
5.6	595.4
7.4	594.9
8.9	594.6
10.1	593.7
10.9	593.4
11.6	593.2
12.6	592.9
13.1	593.0
13.8	593.4
14.6	593.7
15.6	593.7
17.1	593.5
18.2	593.6
19.4	593.4
20.8	593.4
22.5	593.3
23.9	593.1
24.9	593.2
25.7	593.5
26.5	594.3
27.7	594.7
29.0	595.2
30.5	595.7
32.2	595.7

SUMMARY DATA	
Bankfull Elevation:	595.7
Bankfull Cross-Sectional Area:	45.8
Bankfull Width:	27.7
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	2.8
Mean Depth at Bankfull:	1.7
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

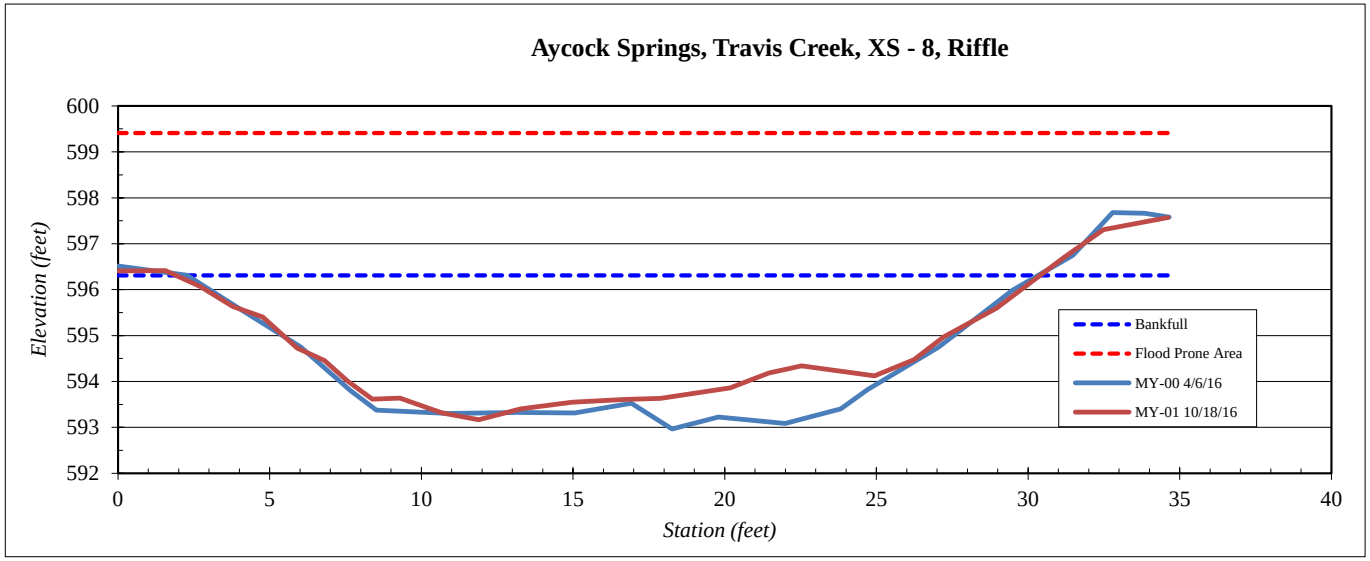


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 8, Riffle
Feature	Riffle
Date:	10/17/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	596.41
1.6	596.41
2.7	596.07
3.8	595.63
4.8	595.40
5.9	594.73
6.8	594.46
7.6	594.01
8.4	593.61
9.3	593.64
10.7	593.31
11.9	593.17
13.3	593.40
15.0	593.55
16.7	593.61
17.9	593.63
20.2	593.86
21.5	594.18
22.5	594.34
24.9	594.12
26.2	594.5
27.2	595.0
29.0	595.6
31.2	596.7
32.5	597.3
34.6	597.6

SUMMARY DATA	
Bankfull Elevation:	596.3
Bankfull Cross-Sectional Area:	57.4
Bankfull Width:	28.5
Flood Prone Area Elevation:	599.4
Flood Prone Width:	150.0
Max Depth at Bankfull:	3.1
Mean Depth at Bankfull:	2.0
W / D Ratio:	14.2
Entrenchment Ratio:	5.3
Bank Height Ratio:	1.0

Stream Type	C/E

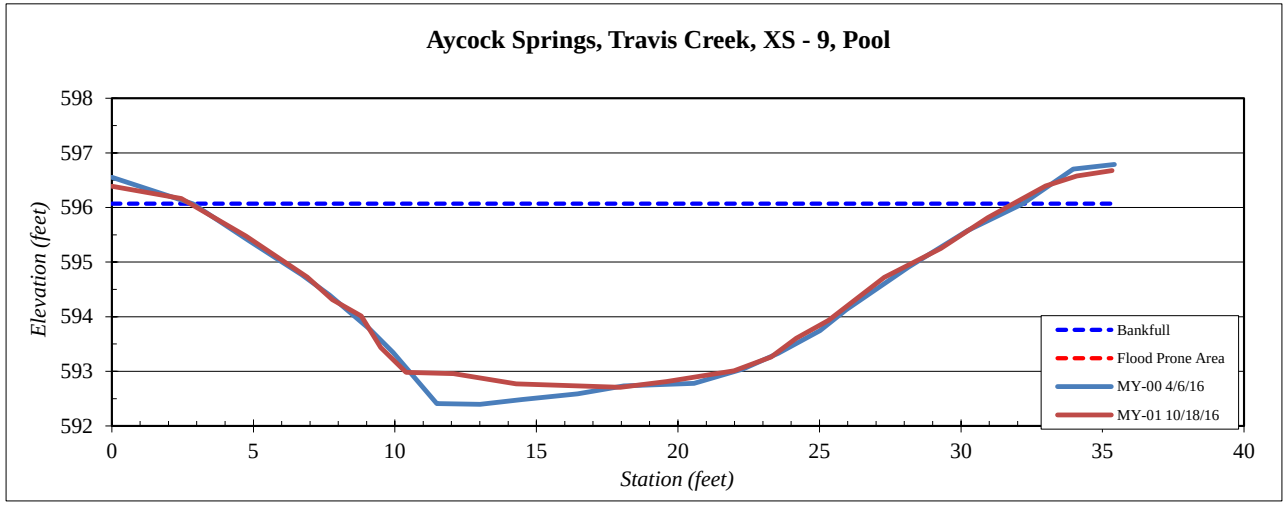


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 9, Pool
Feature	Pool
Date:	10/17/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	596.4
2.4	596.2
4.7	595.5
6.9	594.7
7.8	594.3
8.8	594.0
9.5	593.4
10.4	593.0
12.1	593.0
14.3	592.8
16.2	592.7
18.0	592.7
19.6	592.8
22.0	593.0
23.3	593.3
24.2	593.6
25.3	593.9
27.3	594.7
29.3	595.3
30.9	595.8
33.0	596.4
34.1	596.6
35.3	596.7

SUMMARY DATA	
Bankfull Elevation:	596.1
Bankfull Cross-Sectional Area:	63.1
Bankfull Width:	29.1
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	3.4
Mean Depth at Bankfull:	2.2
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

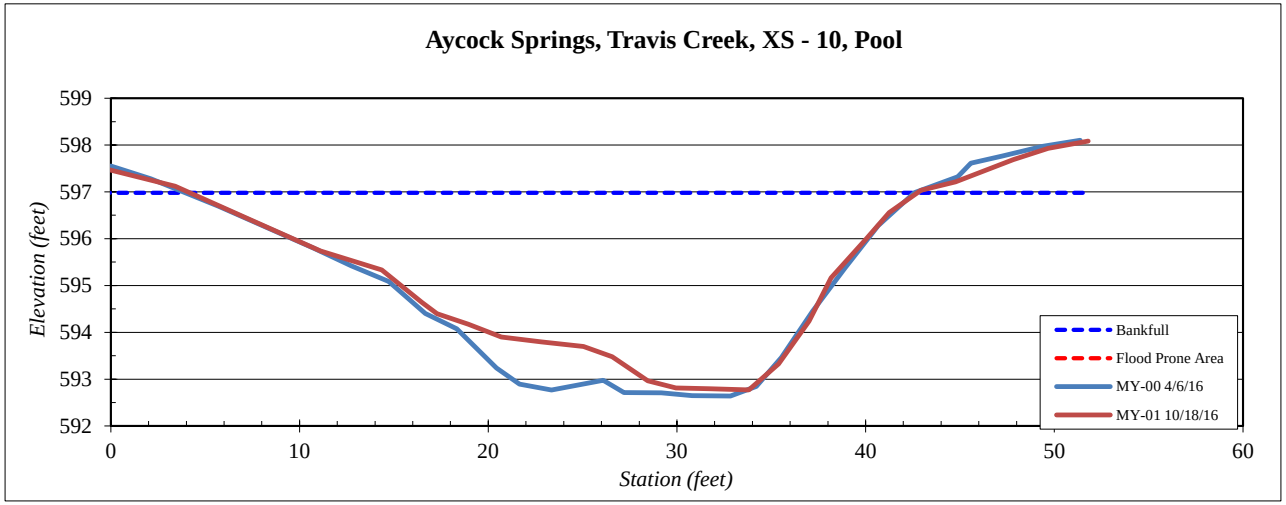


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 10, Pool
Feature	Pool
Date:	10/17/2016
Field Crew:	Perkinson, Keith

Station	Elevation
-0.5	597.5
3.4	597.1
7.2	596.4
11.1	595.7
14.4	595.3
16.5	594.6
17.3	594.4
18.9	594.2
20.7	593.9
22.8	593.8
25.0	593.7
26.6	593.5
28.4	593.0
29.9	592.8
31.7	592.8
33.8	592.8
35.4	593.3
37.0	594.2
38.2	595.2
40.0	596.0
41.3	596.6
42.9	597.0
44.8	597.2
47.8	597.7
49.7	597.9
51.8	598.1

SUMMARY DATA	
Bankfull Elevation:	597.0
Bankfull Cross-Sectional Area:	91.0
Bankfull Width:	38.6
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	4.2
Mean Depth at Bankfull:	2.4
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

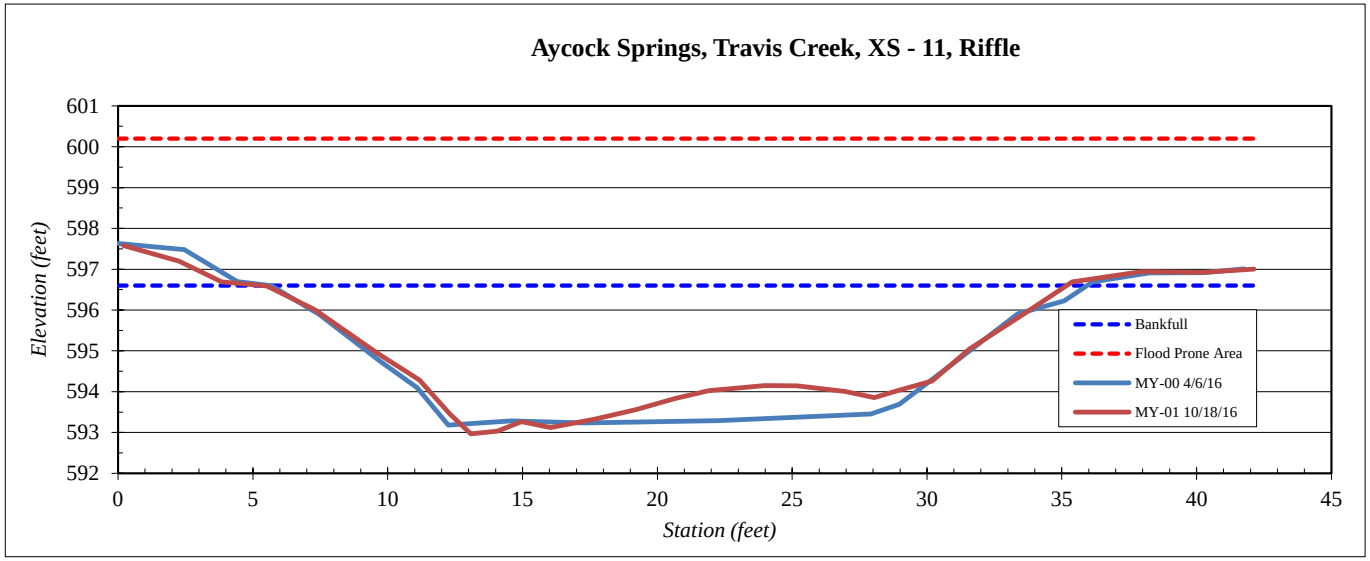


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 11, Riffle
Feature	Riffle
Date:	10/17/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.2	597.58
2.3	597.20
3.8	596.69
5.5	596.59
7.3	596.01
9.6	594.94
11.2	594.29
12.3	593.45
13.1	592.97
14.1	593.03
15.0	593.27
16.0	593.12
17.7	593.33
19.2	593.56
20.6	593.83
21.9	594.03
24.0	594.15
25.2	594.14
27.0	594.00
28.0	593.86
28.9	594.0
30.2	594.3
31.6	595.0
33.6	595.9
35.4	596.7
38.0	596.9
40.2	596.9
42.1	597.0

SUMMARY DATA	
Bankfull Elevation:	596.6
Bankfull Cross-Sectional Area:	66.6
Bankfull Width:	29.8
Flood Prone Area Elevation:	600.2
Flood Prone Width:	150.0
Max Depth at Bankfull:	3.6
Mean Depth at Bankfull:	2.2
W / D Ratio:	13.3
Entrenchment Ratio:	5.0
Bank Height Ratio:	1.0

Stream Type	C/E

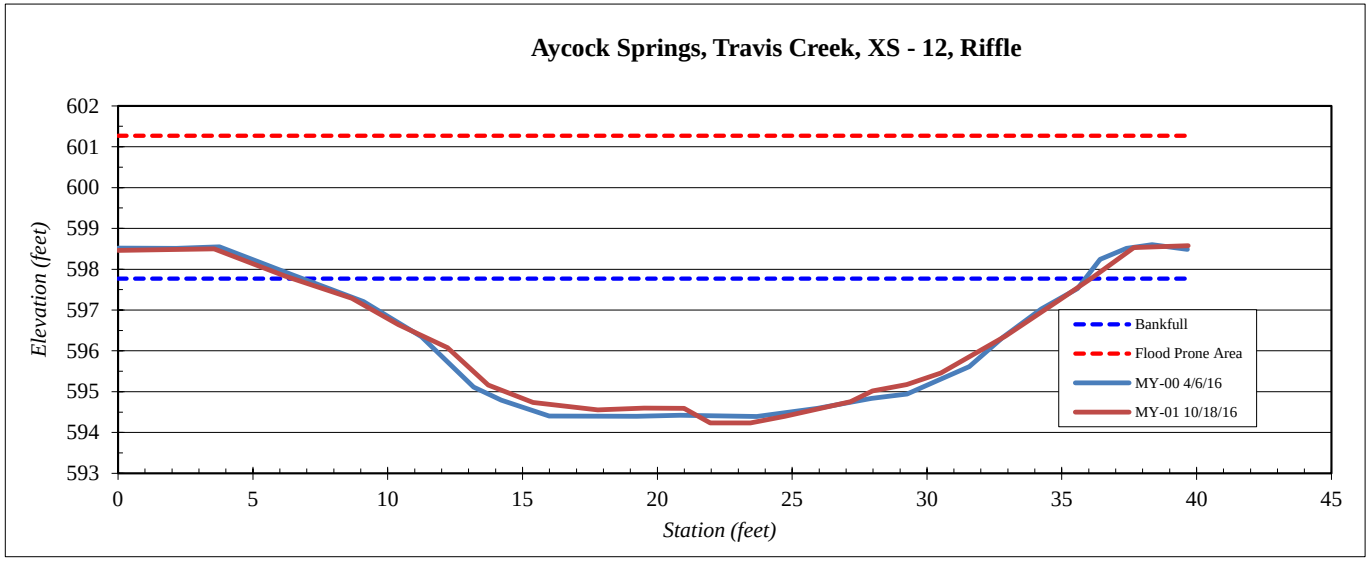


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 12, Riffle
Feature	Riffle
Date:	10/17/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	598.46
3.6	598.50
6.2	597.83
8.7	597.29
10.4	596.64
12.2	596.08
13.7	595.16
15.4	594.74
17.8	594.55
19.5	594.60
21.0	594.59
22.0	594.24
23.4	594.24
24.7	594.40
27.2	594.76
28.0	595.02
29.3	595.18
30.5	595.46
32.9	596.36
34.9	597.23
36.1	597.8
37.7	598.5
39.7	598.6

SUMMARY DATA	
Bankfull Elevation:	597.8
Bankfull Cross-Sectional Area:	66.4
Bankfull Width:	29.6
Flood Prone Area Elevation:	601.3
Flood Prone Width:	150.0
Max Depth at Bankfull:	3.5
Mean Depth at Bankfull:	2.2
W / D Ratio:	13.2
Entrenchment Ratio:	5.1
Bank Height Ratio:	1.0

Stream Type	C/E

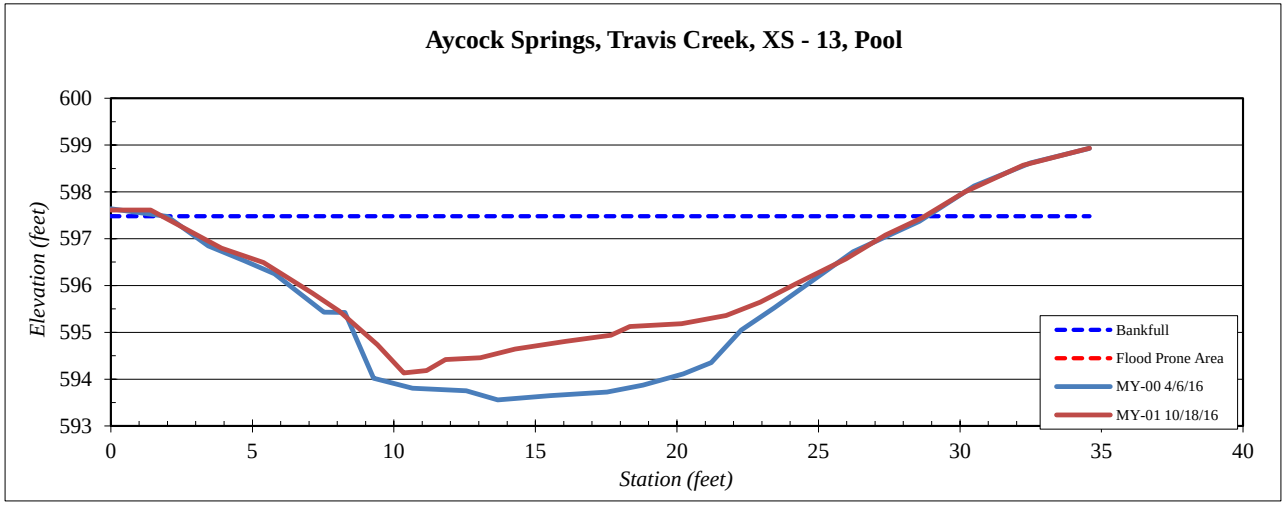


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 13, Pool
Feature	Pool
Date:	10/17/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	597.6
1.4	597.6
3.9	596.8
5.4	596.5
7.1	595.8
8.1	595.5
9.4	594.7
10.3	594.1
11.2	594.2
11.8	594.4
13.0	594.5
14.3	594.6
16.1	594.8
17.7	594.9
18.3	595.1
20.2	595.2
21.7	595.4
22.9	595.6
24.2	596.0
26.0	596.6
27.4	597.1
28.7	597.4
30.2	598.0
32.2	598.6
34.6	598.9

SUMMARY DATA	
Bankfull Elevation:	597.5
Bankfull Cross-Sectional Area:	50.3
Bankfull Width:	26.9
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	3.3
Mean Depth at Bankfull:	1.9
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

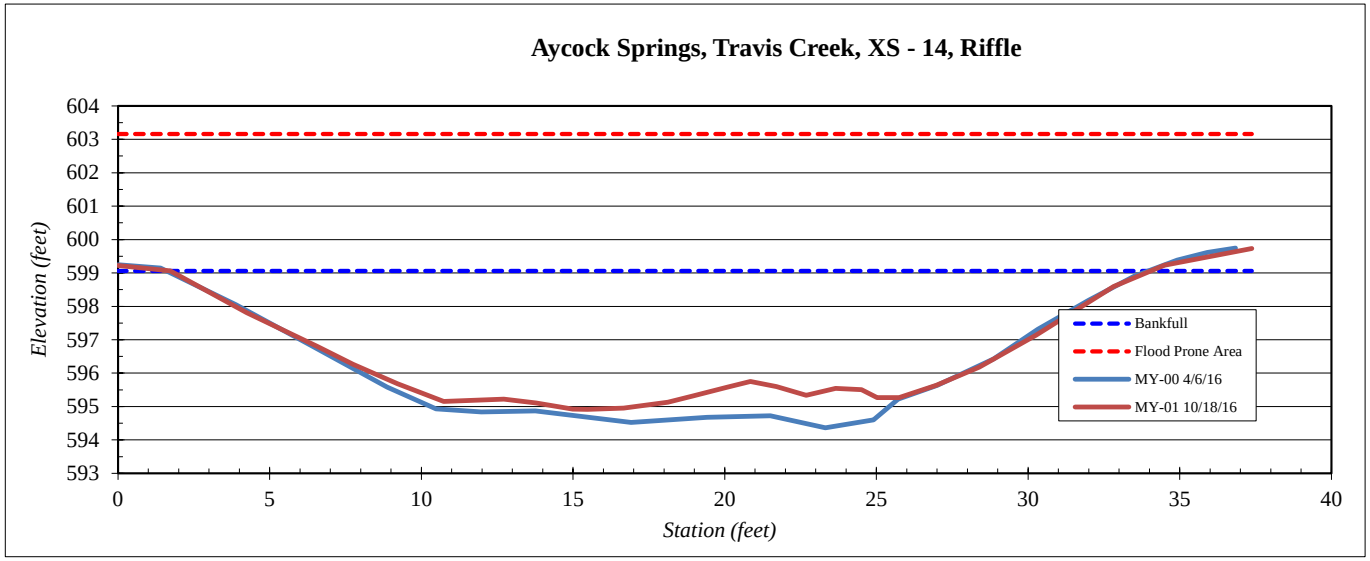


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	Travis Creek, XS - 14, Riffle
Feature	Riffle
Date:	10/17/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	599.22
1.7	599.06
4.2	597.82
6.6	596.80
7.7	596.27
9.2	595.68
10.7	595.15
12.7	595.22
13.8	595.11
15.0	594.92
15.5	594.92
16.7	594.95
18.1	595.13
18.9	595.32
20.1	595.58
20.8	595.75
21.7	595.59
22.7	595.33
23.7	595.54
24.5	595.51
25.0	595.3
25.7	595.3
27.0	595.6
28.4	596.2
30.3	597.1
32.8	598.6
34.5	599.2
37.4	599.7

SUMMARY DATA	
Bankfull Elevation:	599.1
Bankfull Cross-Sectional Area:	92.4
Bankfull Width:	32.3
Flood Prone Area Elevation:	603.2
Flood Prone Width:	150.0
Max Depth at Bankfull:	4.1
Mean Depth at Bankfull:	2.9
W / D Ratio:	11.3
Entrenchment Ratio:	4.6
Bank Height Ratio:	1.0

Stream Type	C/E

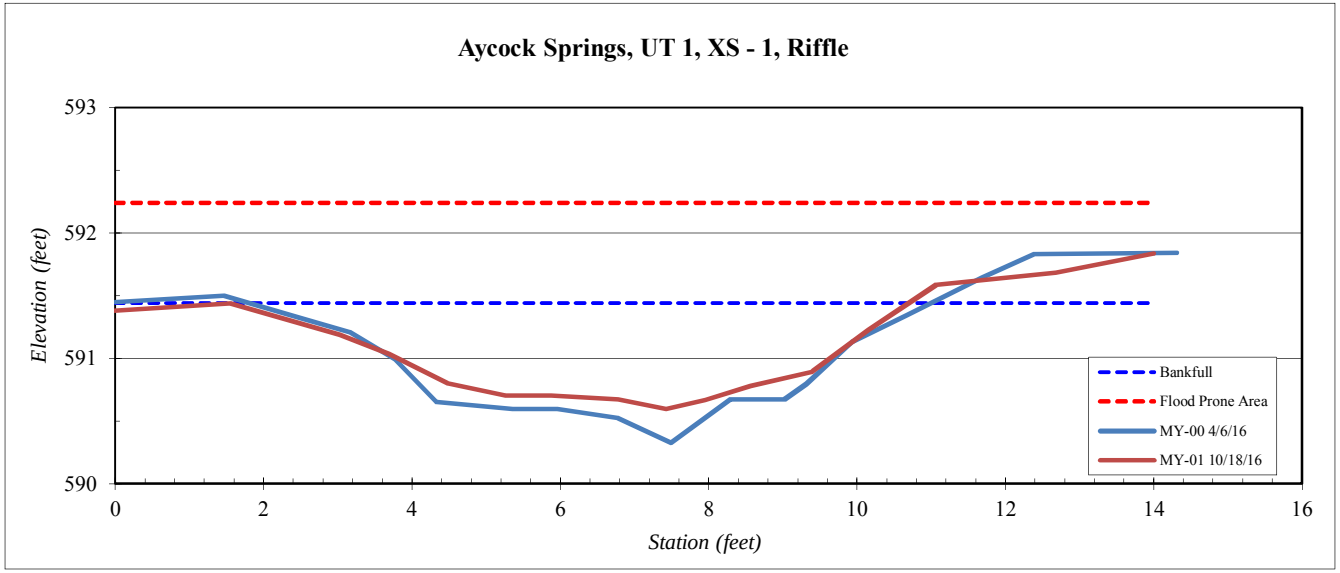


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 1, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
-5.0	591.33
-1.4	591.33
1.5	591.44
3.0	591.19
3.7	591.04
4.5	590.80
5.3	590.70
5.9	590.70
6.8	590.67
7.4	590.60
8.0	590.67
8.6	590.78
9.4	590.89
10.2	591.22
11.1	591.59
12.7	591.68
14.0	591.84

SUMMARY DATA	
Bankfull Elevation:	591.4
Bankfull Cross-Sectional Area:	4.7
Bankfull Width:	9.2
Flood Prone Area Elevation:	592.2
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.8
Mean Depth at Bankfull:	0.5
W / D Ratio:	18.0
Entrenchment Ratio:	9.8
Bank Height Ratio:	1.0

Stream Type	C/E

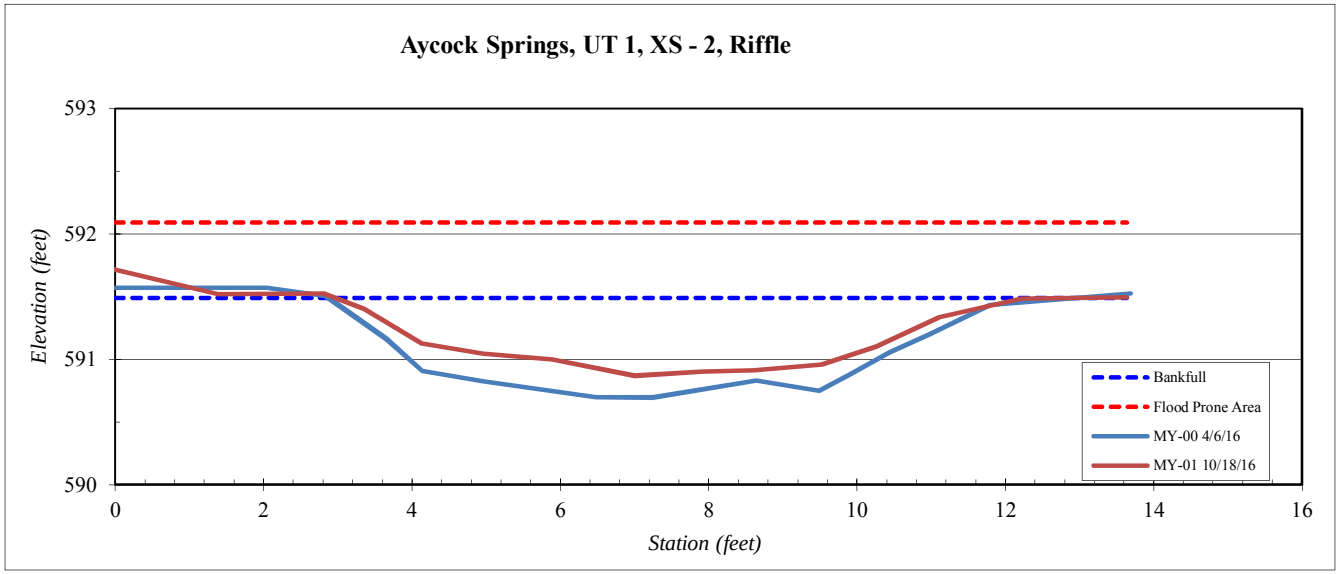


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 2, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
-0.1	591.73
1.4	591.52
2.8	591.52
3.4	591.40
4.1	591.12
5.0	591.04
5.9	591.00
7.0	590.87
7.9	590.90
8.6	590.91
9.5	590.96
10.3	591.10
11.1	591.34
12.2	591.49
13.6	591.49

SUMMARY DATA	
Bankfull Elevation:	591.5
Bankfull Cross-Sectional Area:	3.7
Bankfull Width:	9.3
Flood Prone Area Elevation:	592.1
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.6
Mean Depth at Bankfull:	0.4
W / D Ratio:	23.4
Entrenchment Ratio:	9.7
Bank Height Ratio:	1.0

Stream Type	C/E

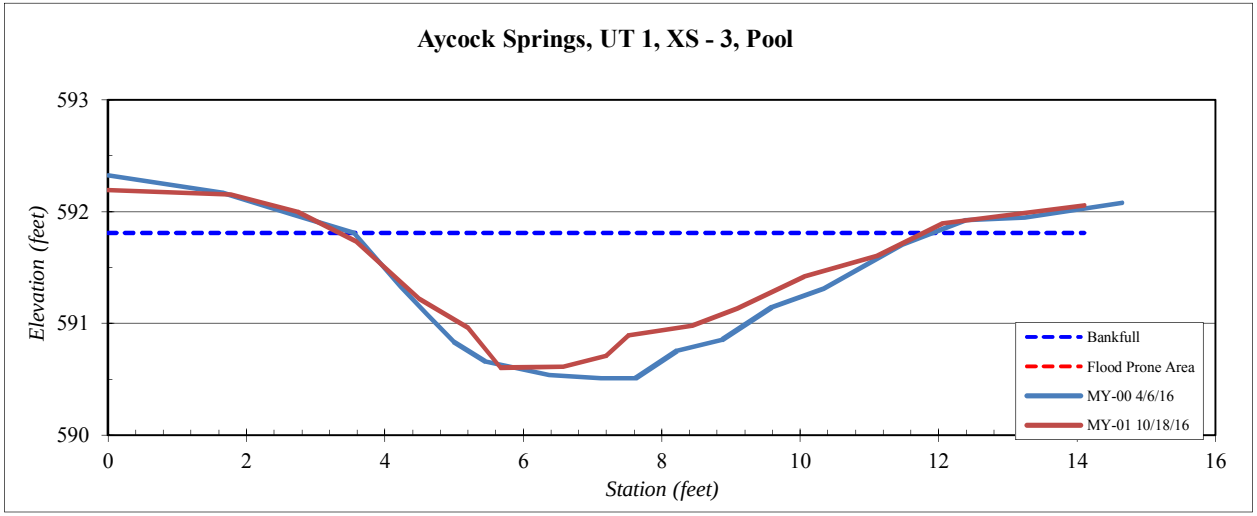


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 3, Pool
Feature	Pool
Date:	10/18/2016
Field Crew:	Perkinson, Keith

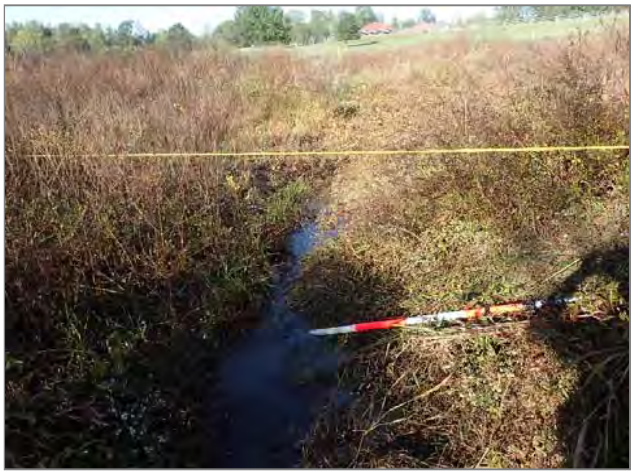
Station	Elevation
0.0	592.2
1.8	592.2
2.7	592.0
3.6	591.7
4.5	591.2
5.2	591.0
5.7	590.6
6.6	590.6
7.2	590.7
7.5	590.9
8.4	591.0
9.1	591.1
10.1	591.4
11.1	591.6
12.1	591.9
14.1	592.1

SUMMARY DATA	
Bankfull Elevation:	591.8
Bankfull Cross-Sectional Area:	5.6
Bankfull Width:	8.4
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	1.2
Mean Depth at Bankfull:	0.7
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E



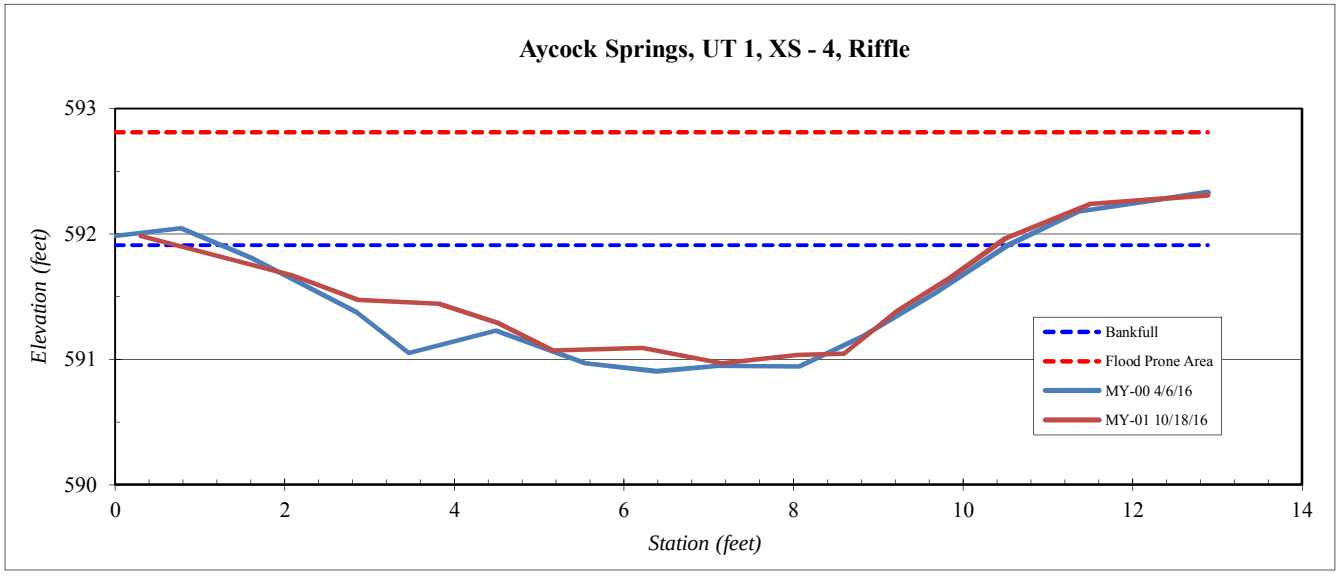
Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 4, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith



Station	Elevation
0.3	591.99
2.1	591.67
2.9	591.47
3.8	591.44
4.5	591.29
5.2	591.07
6.2	591.09
7.2	590.97
8.0	591.04
8.6	591.05
9.2	591.39
9.9	591.65
10.5	591.96
11.5	592.24
12.9	592.31

SUMMARY DATA	
Bankfull Elevation:	591.9
Bankfull Cross-Sectional Area:	5.5
Bankfull Width:	9.7
Flood Prone Area Elevation:	592.8
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.9
Mean Depth at Bankfull:	0.6
W / D Ratio:	17.1
Entrenchment Ratio:	9.3
Bank Height Ratio:	1.0

Stream Type	C/E

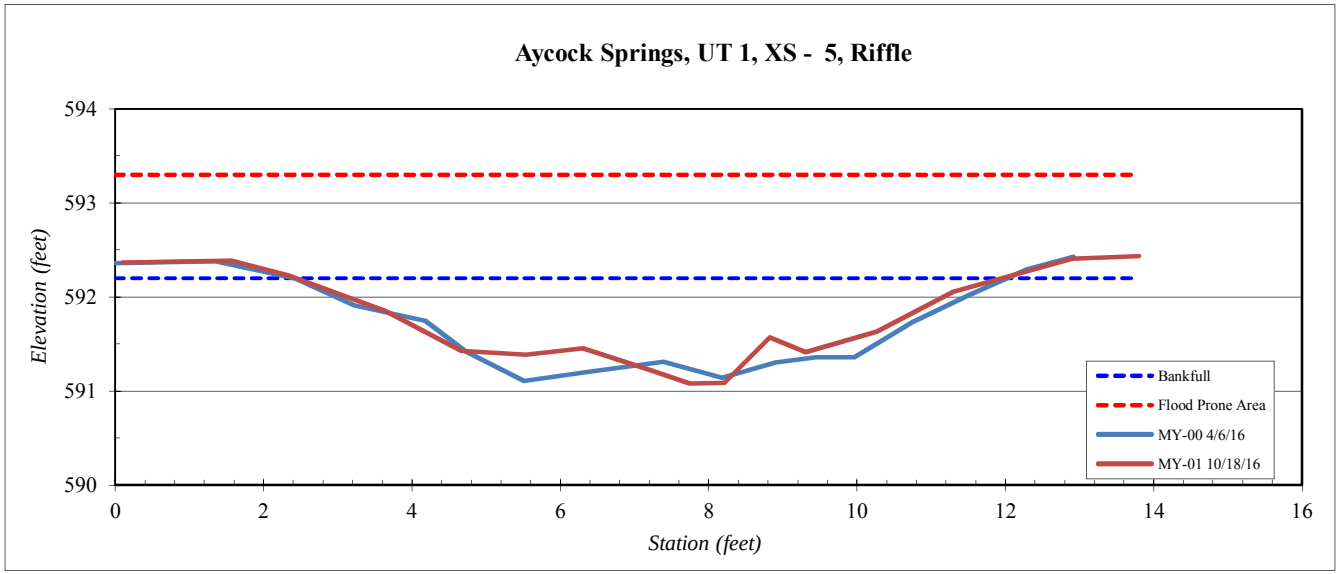


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 5, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.1	592.37
1.6	592.38
2.3	592.23
3.7	591.85
4.7	591.43
5.5	591.39
6.3	591.45
7.2	591.24
7.7	591.08
8.2	591.08
8.8	591.57
9.3	591.42
10.3	591.63
11.3	592.06
12.3	592.28
12.9	592.41
13.8	592.44

SUMMARY DATA	
Bankfull Elevation:	592.2
Bankfull Cross-Sectional Area:	5.9
Bankfull Width:	9.5
Flood Prone Area Elevation:	593.3
Flood Prone Width:	90.0
Max Depth at Bankfull:	1.1
Mean Depth at Bankfull:	0.6
W / D Ratio:	15.3
Entrenchment Ratio:	9.5
Bank Height Ratio:	1.0

Stream Type	C/E

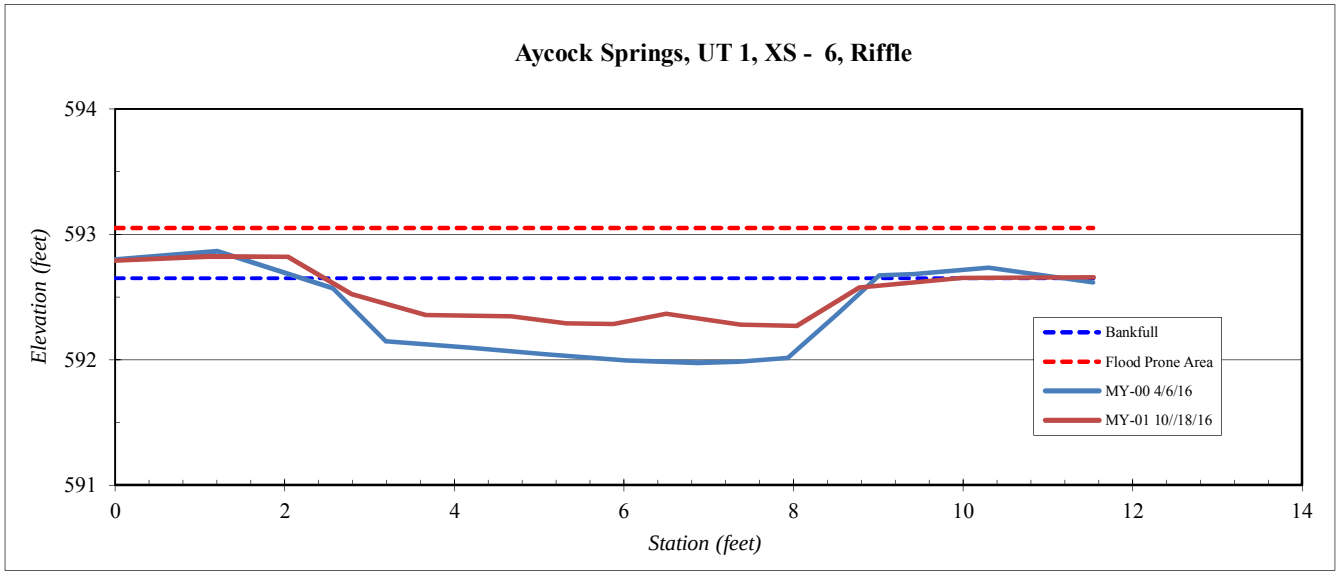


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 6, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	592.79
1.1	592.82
2.0	592.82
2.8	592.53
3.7	592.36
4.7	592.35
5.3	592.29
5.9	592.29
6.5	592.36
7.4	592.28
8.0	592.27
8.8	592.57
10.0	592.65
11.5	592.65

SUMMARY DATA	
Bankfull Elevation:	592.7
Bankfull Cross-Sectional Area:	1.9
Bankfull Width:	7.5
Flood Prone Area Elevation:	593.1
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.4
Mean Depth at Bankfull:	0.3
W / D Ratio:	29.6
Entrenchment Ratio:	12.0
Bank Height Ratio:	1.0

Stream Type	C/E

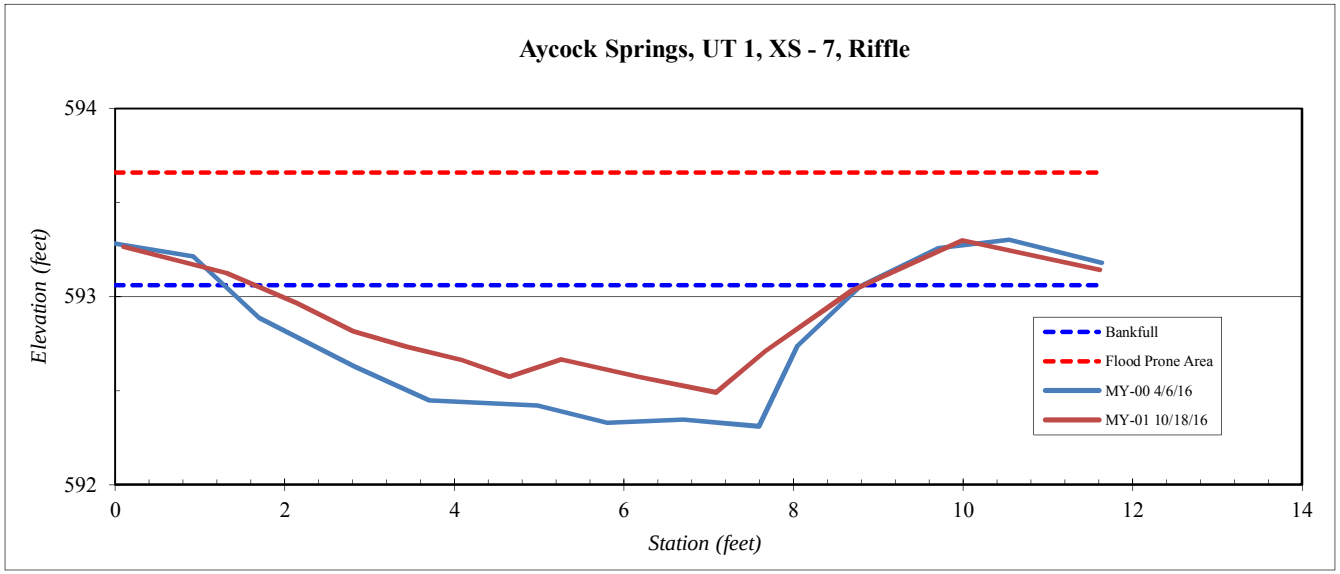


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 7, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.1	593.27
1.3	593.12
2.1	592.97
2.8	592.81
3.4	592.73
4.1	592.66
4.7	592.57
5.3	592.67
6.2	592.57
7.1	592.49
7.7	592.71
8.7	593.04
10.0	593.30
11.6	593.14

SUMMARY DATA	
Bankfull Elevation:	593.1
Bankfull Cross-Sectional Area:	2.4
Bankfull Width:	7.2
Flood Prone Area Elevation:	593.7
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.6
Mean Depth at Bankfull:	0.3
W / D Ratio:	21.6
Entrenchment Ratio:	12.5
Bank Height Ratio:	1.0

Stream Type	C/E

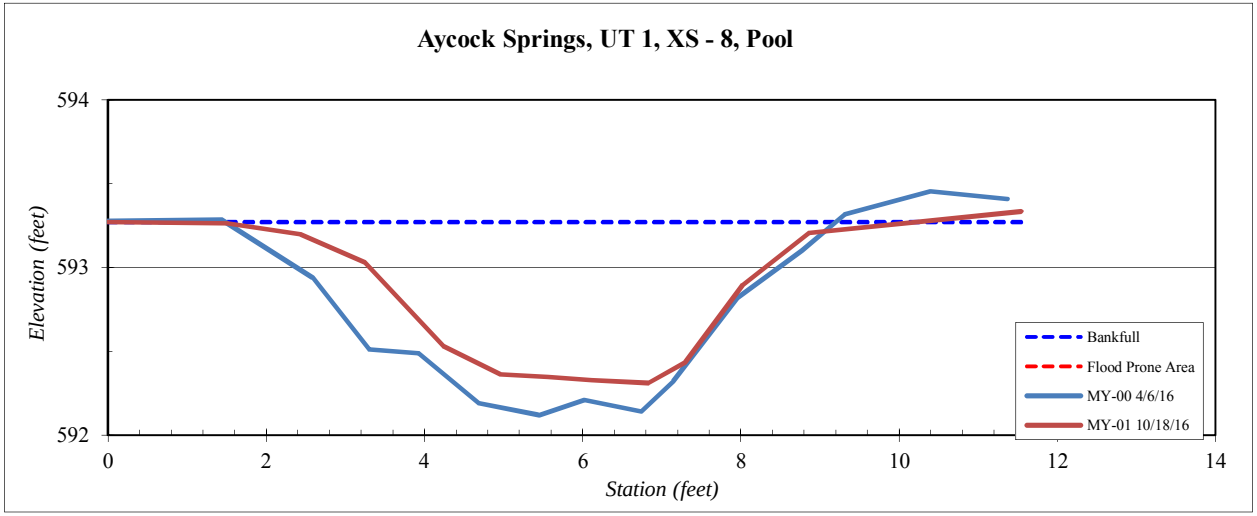


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 8, Pool
Feature	Pool
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	593.3
1.5	593.3
2.4	593.2
3.2	593.0
4.2	592.5
5.0	592.4
5.6	592.3
6.1	592.3
6.8	592.3
7.3	592.4
8.0	592.9
8.9	593.2
11.5	593.3

SUMMARY DATA	
Bankfull Elevation:	593.3
Bankfull Cross-Sectional Area:	4.1
Bankfull Width:	8.7
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	1.0
Mean Depth at Bankfull:	0.5
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

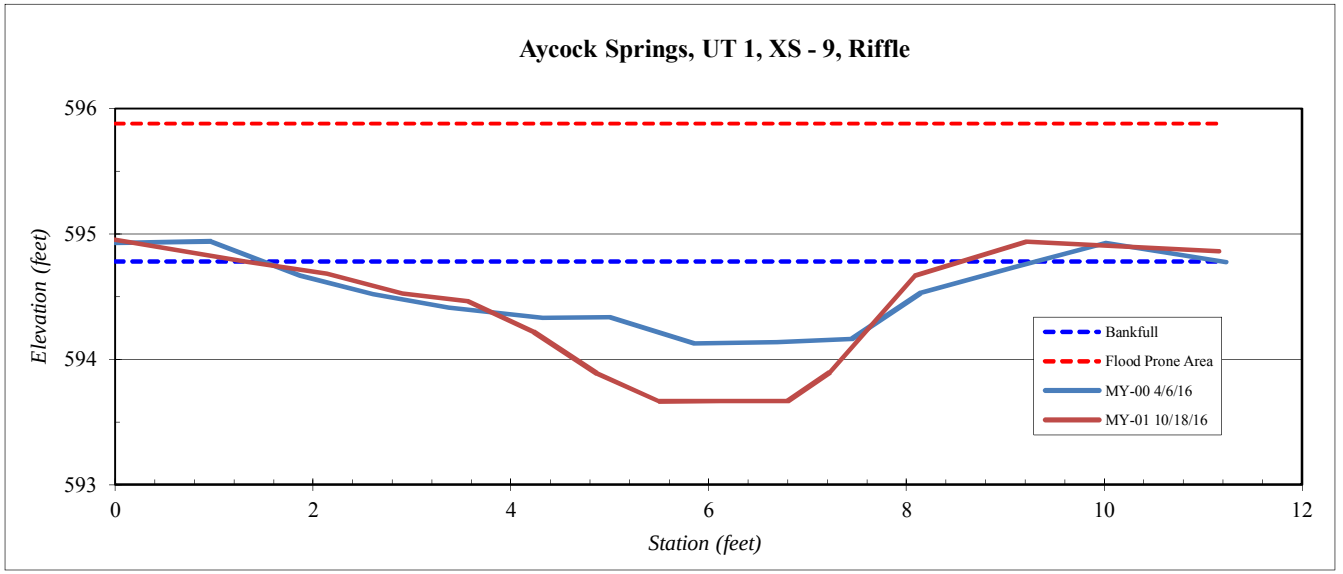


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 9, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	594.95
1.3	594.78
2.1	594.68
2.9	594.53
3.6	594.47
4.2	594.22
4.9	593.89
5.5	593.66
6.1	593.66
6.8	593.67
7.2	593.90
8.1	594.67
9.2	594.94
11.2	594.86

SUMMARY DATA	
Bankfull Elevation:	594.8
Bankfull Cross-Sectional Area:	4.1
Bankfull Width:	7.2
Flood Prone Area Elevation:	595.9
Flood Prone Width:	90.0
Max Depth at Bankfull:	1.1
Mean Depth at Bankfull:	0.6
W / D Ratio:	12.6
Entrenchment Ratio:	12.5
Bank Height Ratio:	1.0

Stream Type	C/E

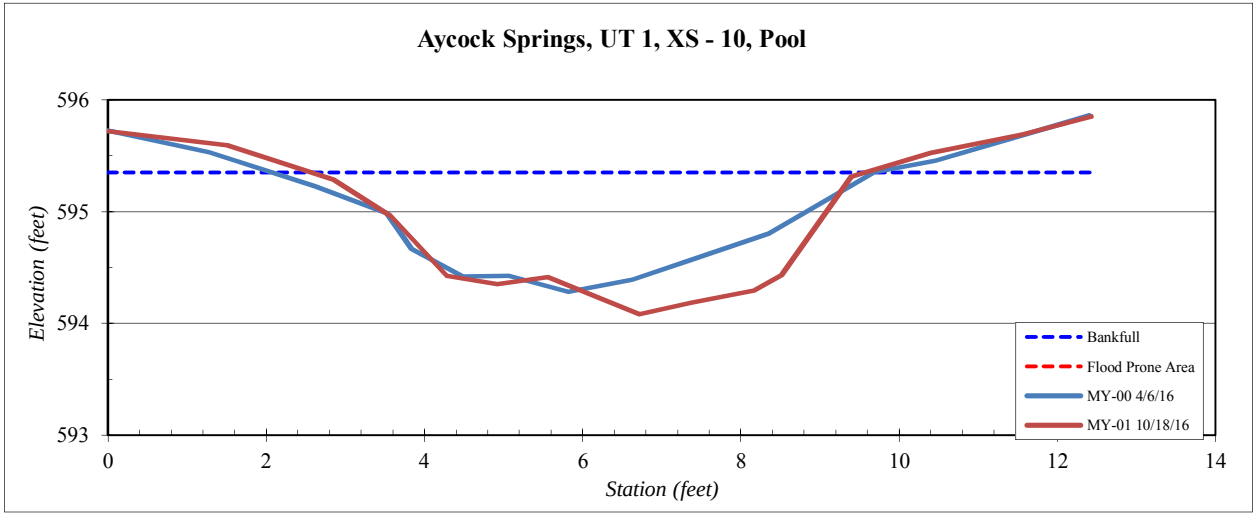


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 10, Pool
Feature	Pool
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	595.7
1.5	595.6
2.9	595.3
3.6	595.0
4.3	594.4
4.9	594.4
5.6	594.4
6.7	594.1
7.4	594.2
8.2	594.3
8.5	594.4
9.4	595.3
10.4	595.5
11.6	595.7
12.4	595.9

SUMMARY DATA	
Bankfull Elevation:	595.4
Bankfull Cross-Sectional Area:	5.6
Bankfull Width:	7.0
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	1.3
Mean Depth at Bankfull:	0.8
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

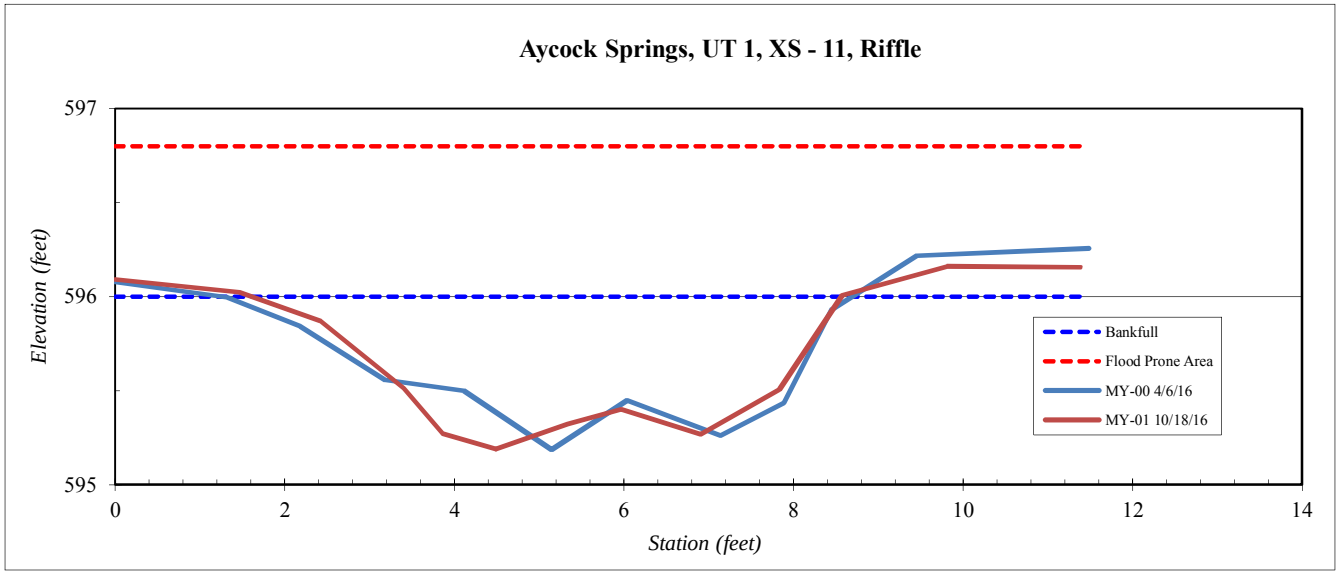


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 11, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	596.09
1.5	596.02
2.4	595.87
3.4	595.51
3.9	595.27
4.5	595.19
5.3	595.32
6.0	595.40
6.9	595.27
7.8	595.51
8.6	596.01
9.8	596.16
11.4	596.16

SUMMARY DATA	
Bankfull Elevation:	596.0
Bankfull Cross-Sectional Area:	3.5
Bankfull Width:	7.0
Flood Prone Area Elevation:	596.8
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.8
Mean Depth at Bankfull:	0.5
W / D Ratio:	14.0
Entrenchment Ratio:	12.9
Bank Height Ratio:	1.0

Stream Type	C/E

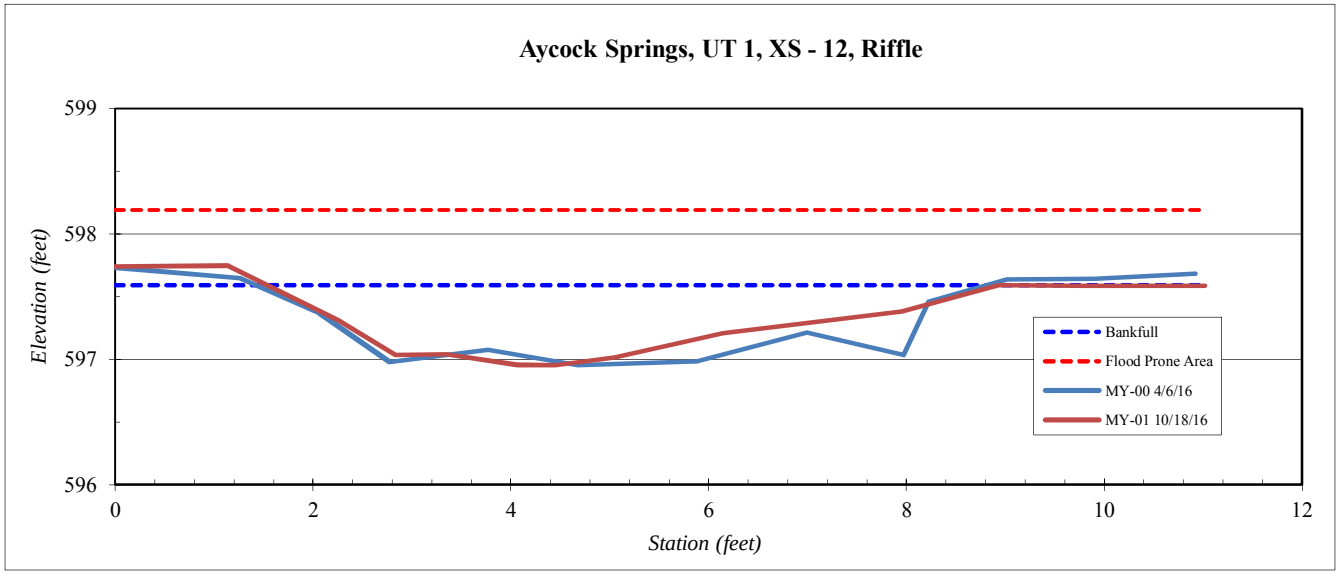


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 12, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
-0.2	597.74
1.1	597.75
2.3	597.31
2.8	597.04
3.3	597.04
4.1	596.95
4.5	596.96
5.0	597.01
6.1	597.21
8.0	597.38
8.9	597.59
9.8	597.59
11.0	597.59

SUMMARY DATA	
Bankfull Elevation:	597.6
Bankfull Cross-Sectional Area:	2.8
Bankfull Width:	7.4
Flood Prone Area Elevation:	598.2
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.6
Mean Depth at Bankfull:	0.4
W / D Ratio:	19.6
Entrenchment Ratio:	12.2
Bank Height Ratio:	1.0

Stream Type	C/E

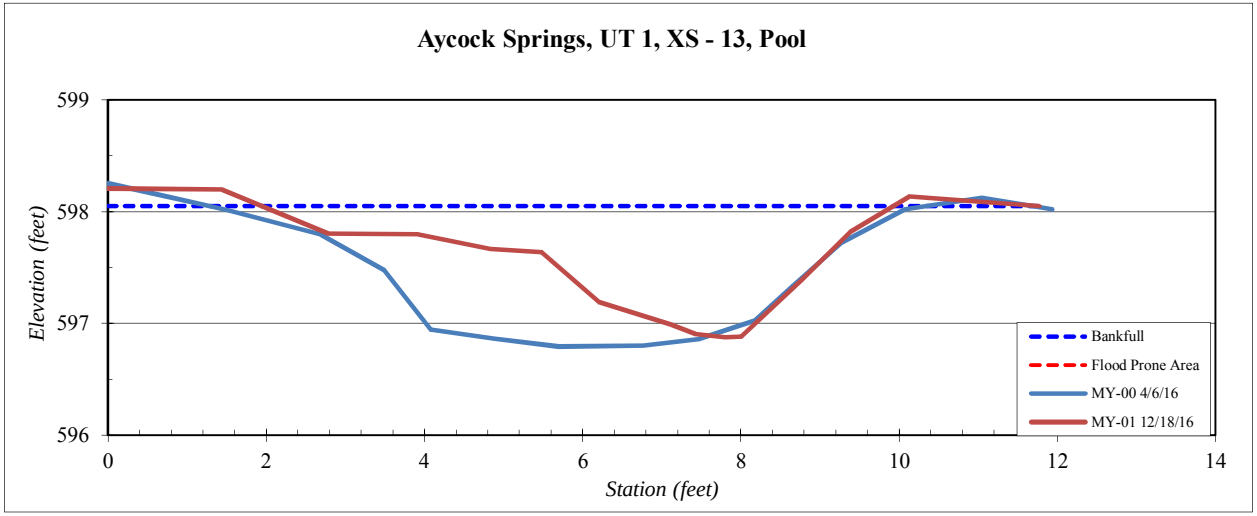


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 13, Pool
Feature	Pool
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	598.2
1.4	598.2
2.8	597.8
3.9	597.8
4.8	597.7
5.5	597.6
6.2	597.2
7.1	597.0
7.4	596.9
7.8	596.9
8.0	596.9
8.8	597.4
9.4	597.8
10.1	598.1
11.8	598.0

SUMMARY DATA	
Bankfull Elevation:	598.1
Bankfull Cross-Sectional Area:	4.3
Bankfull Width:	8.0
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	1.2
Mean Depth at Bankfull:	0.5
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

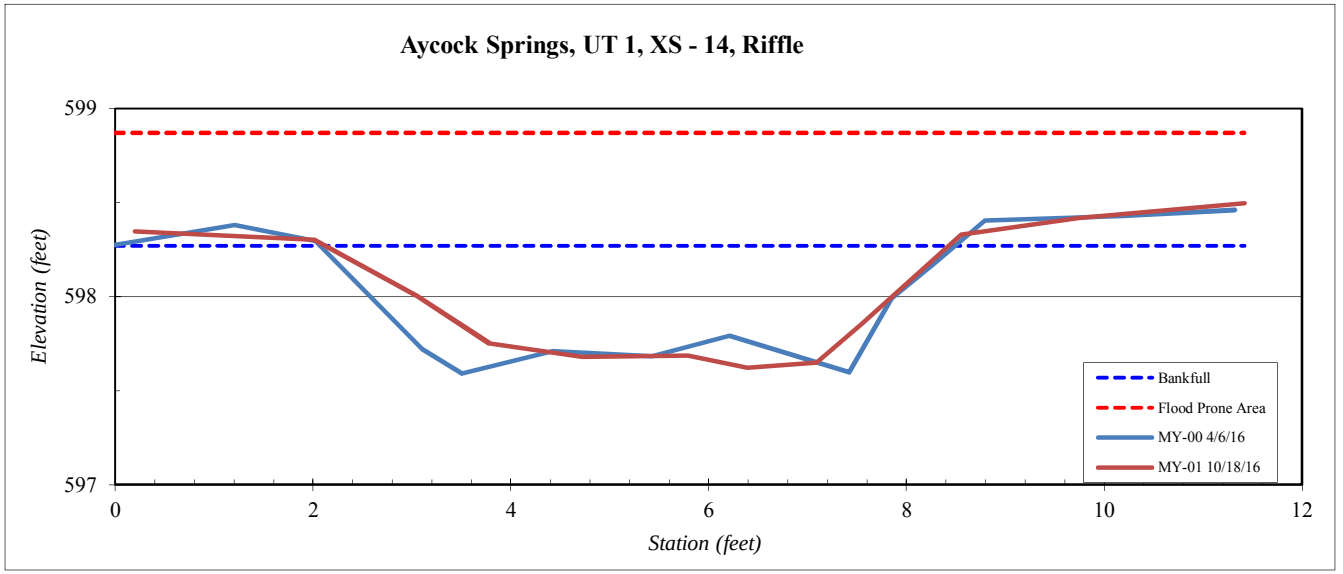


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 14, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.2	598.35
2.0	598.30
3.1	598.00
3.8	597.75
4.7	597.68
5.8	597.69
6.4	597.62
7.1	597.65
7.5	597.85
8.6	598.33
9.7	598.42
11.4	598.50

SUMMARY DATA	
Bankfull Elevation:	598.3
Bankfull Cross-Sectional Area:	2.8
Bankfull Width:	6.3
Flood Prone Area Elevation:	598.9
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.6
Mean Depth at Bankfull:	0.4
W / D Ratio:	14.2
Entrenchment Ratio:	14.3
Bank Height Ratio:	1.0

Stream Type	C/E

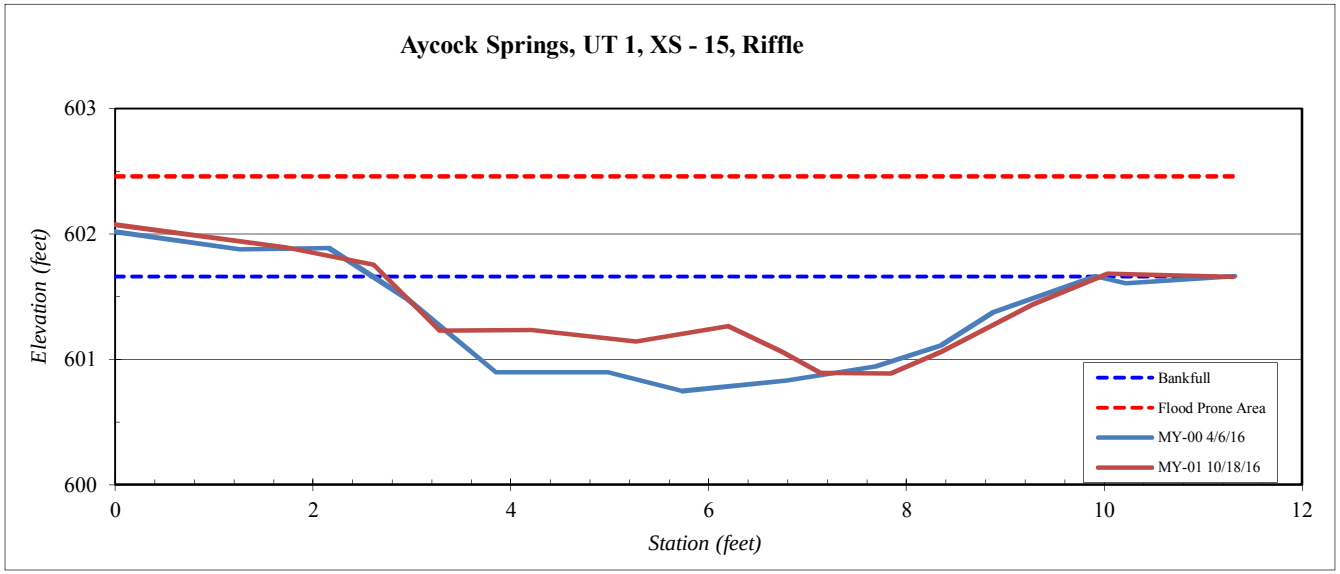


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 15, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	602.07
1.7	601.89
2.6	601.76
3.3	601.23
4.2	601.23
5.3	601.14
6.2	601.27
6.7	601.06
7.1	600.89
7.8	600.89
8.4	601.06
9.3	601.44
10.0	601.68
11.3	601.66

SUMMARY DATA	
Bankfull Elevation:	601.7
Bankfull Cross-Sectional Area:	3.3
Bankfull Width:	7.2
Flood Prone Area Elevation:	602.5
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.8
Mean Depth at Bankfull:	0.5
W / D Ratio:	15.7
Entrenchment Ratio:	12.5
Bank Height Ratio:	1.0

Stream Type	C/E

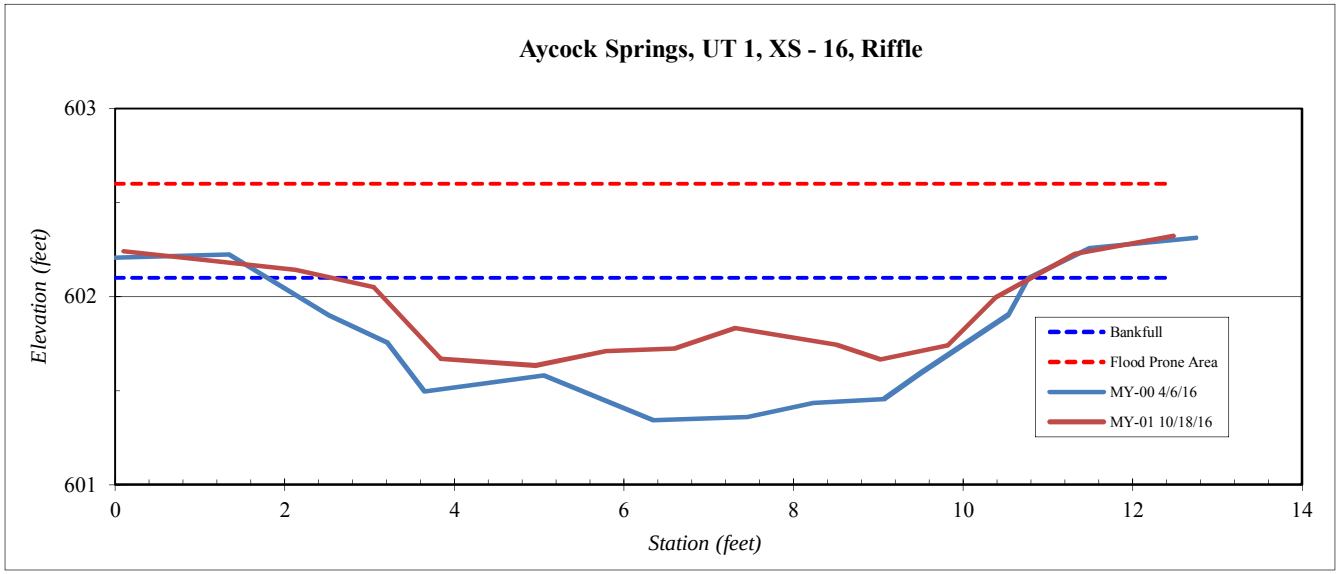


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 16, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.1	602.24
2.1	602.14
3.1	602.05
3.8	601.67
5.0	601.63
5.8	601.71
6.6	601.72
7.3	601.83
8.5	601.74
9.0	601.67
9.8	601.74
10.4	602.00
11.3	602.23
12.5	602.32

SUMMARY DATA	
Bankfull Elevation:	602.1
Bankfull Cross-Sectional Area:	2.6
Bankfull Width:	8.3
Flood Prone Area Elevation:	602.6
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.5
Mean Depth at Bankfull:	0.3
W / D Ratio:	26.5
Entrenchment Ratio:	10.8
Bank Height Ratio:	1.0

Stream Type	C/E

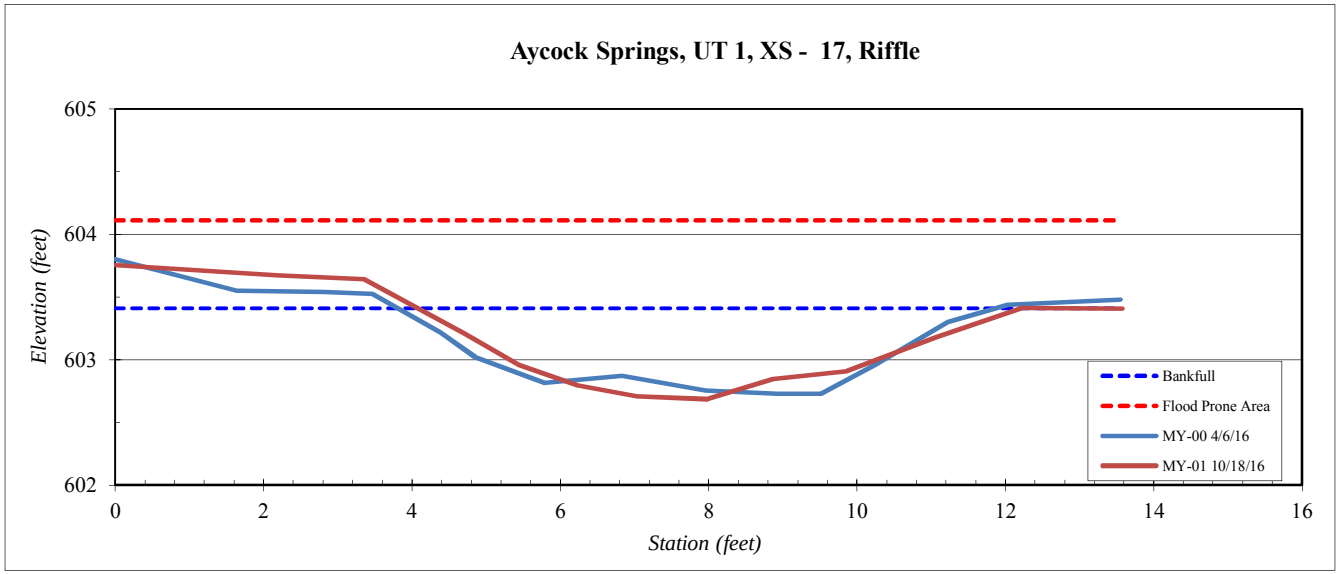


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 17, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	603.75
2.2	603.67
3.4	603.64
4.7	603.21
5.4	602.96
6.2	602.80
7.0	602.71
8.0	602.69
8.9	602.84
9.9	602.90
11.1	603.18
12.2	603.41
13.6	603.41

SUMMARY DATA	
Bankfull Elevation:	603.4
Bankfull Cross-Sectional Area:	3.6
Bankfull Width:	8.1
Flood Prone Area Elevation:	604.1
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.7
Mean Depth at Bankfull:	0.4
W / D Ratio:	18.2
Entrenchment Ratio:	11.1
Bank Height Ratio:	1.0

Stream Type	C/E

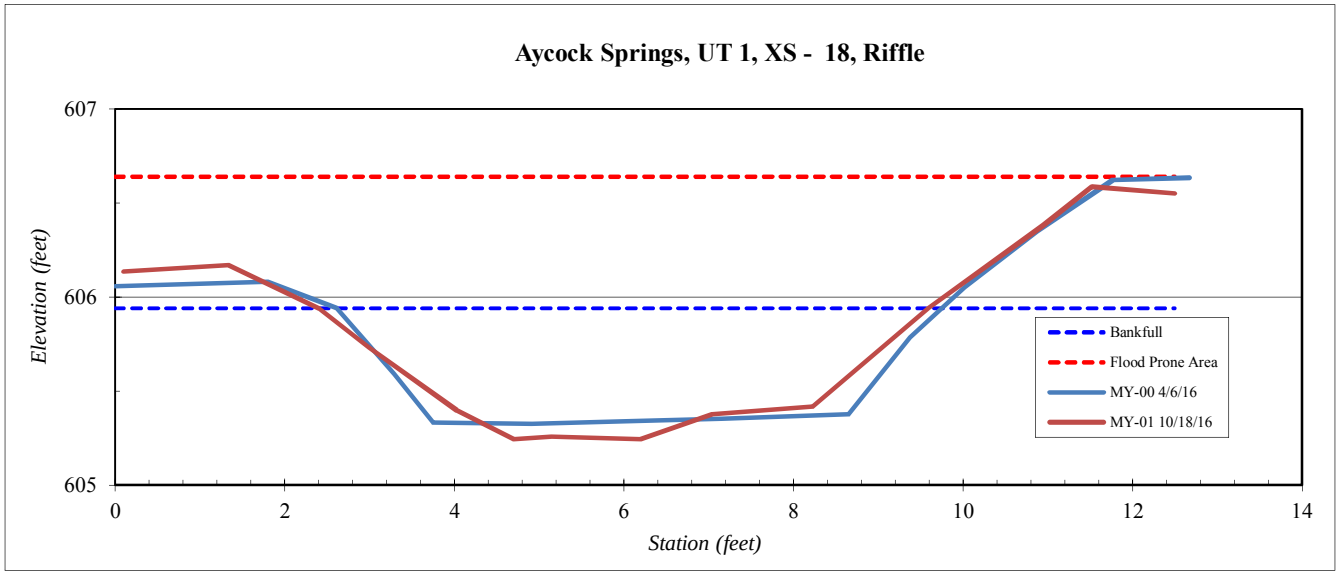


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 18, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.1	606.14
1.3	606.17
2.4	605.94
3.0	605.73
4.0	605.40
4.7	605.24
5.1	605.26
6.2	605.24
7.0	605.38
8.2	605.42
9.6	605.94
10.9	606.38
11.5	606.59
12.5	606.55

SUMMARY DATA	
Bankfull Elevation:	605.9
Bankfull Cross-Sectional Area:	3.4
Bankfull Width:	7.2
Flood Prone Area Elevation:	606.6
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.7
Mean Depth at Bankfull:	0.5
W / D Ratio:	15.2
Entrenchment Ratio:	12.5
Bank Height Ratio:	1.0

Stream Type	C/E

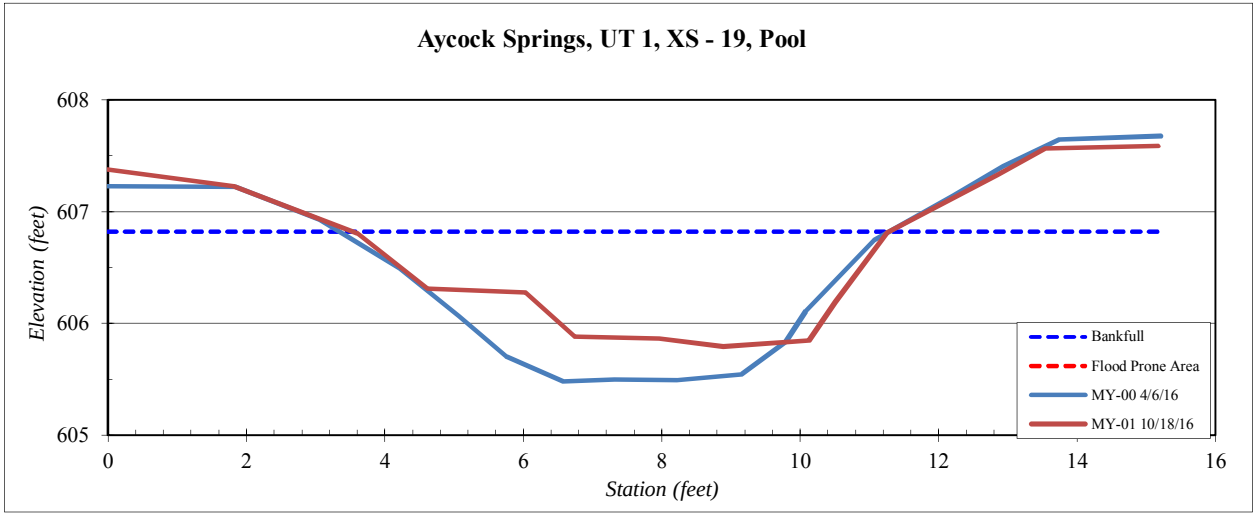


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 19, Pool
Feature	Pool
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	607.4
1.8	607.2
3.6	606.8
4.6	606.3
6.0	606.3
6.7	605.9
8.0	605.9
8.9	605.8
10.1	605.8
10.5	606.2
11.3	606.8
12.9	607.3
13.5	607.6
15.2	607.6

SUMMARY DATA	
Bankfull Elevation:	606.8
Bankfull Cross-Sectional Area:	5.4
Bankfull Width:	7.7
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	1.0
Mean Depth at Bankfull:	0.7
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

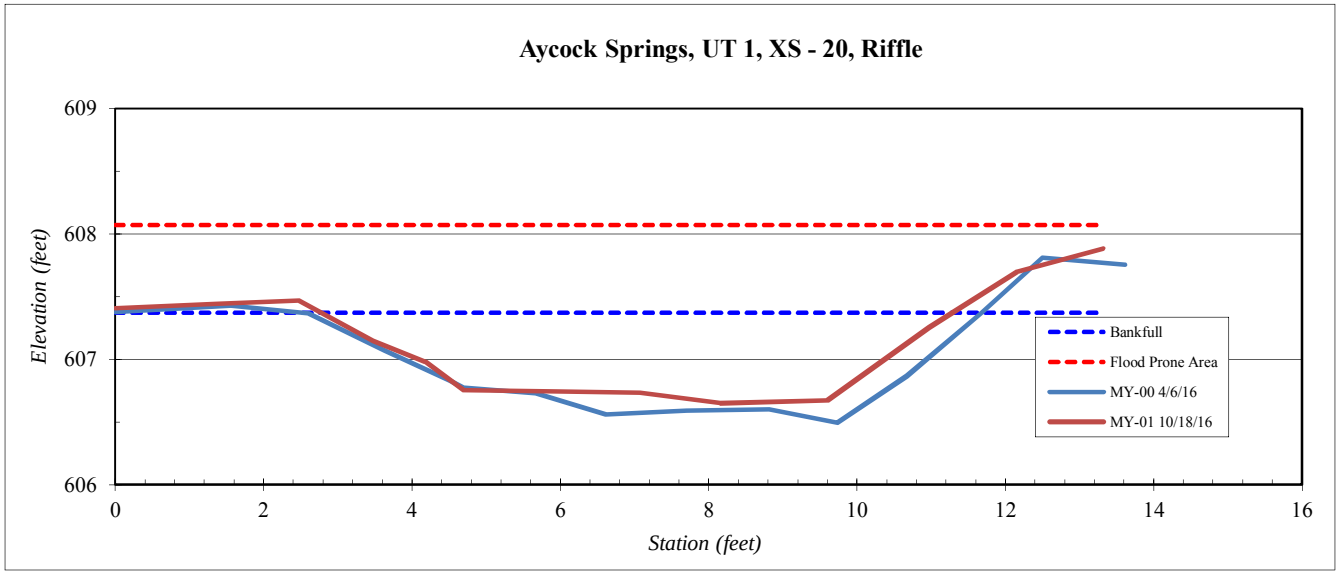


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 20, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	607.41
1.4	607.44
2.5	607.47
3.5	607.15
4.2	606.98
4.7	606.75
6.0	606.75
7.1	606.74
8.2	606.65
9.6	606.67
11.0	607.25
12.2	607.70
13.3	607.88

SUMMARY DATA	
Bankfull Elevation:	607.4
Bankfull Cross-Sectional Area:	4.4
Bankfull Width:	8.5
Flood Prone Area Elevation:	608.1
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.7
Mean Depth at Bankfull:	0.5
W / D Ratio:	16.4
Entrenchment Ratio:	10.6
Bank Height Ratio:	1.0

Stream Type	C/E

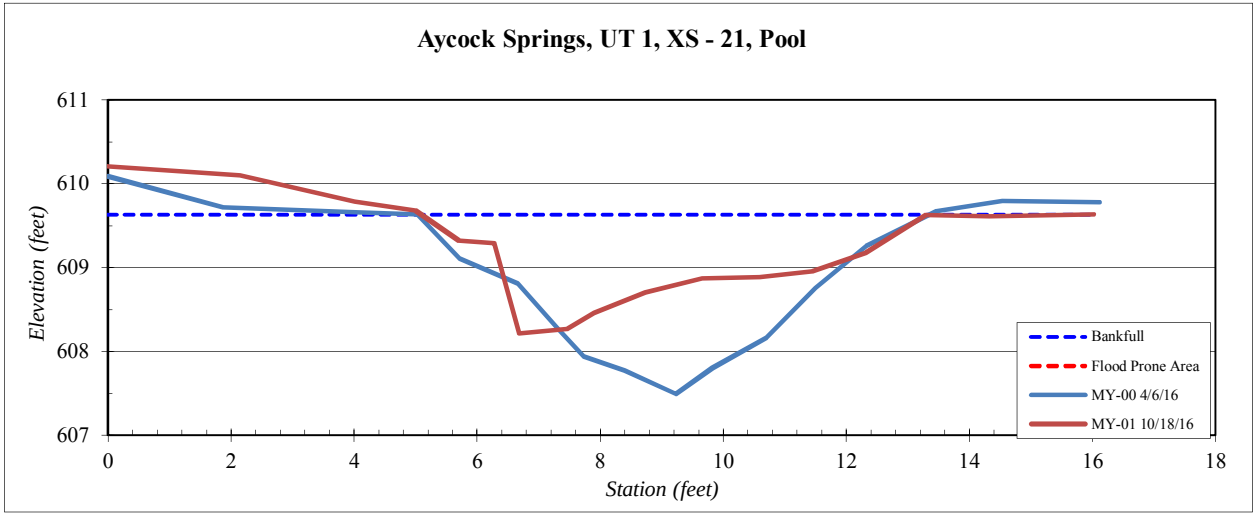


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 21, Pool
Feature	Pool
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	610.2
2.2	610.1
4.0	609.8
5.0	609.7
5.7	609.3
6.3	609.3
6.7	608.2
7.5	608.3
7.9	608.5
8.7	608.7
9.7	608.9
10.6	608.9
11.4	609.0
12.3	609.2
13.3	609.6
14.3	609.6
16.0	609.6

SUMMARY DATA	
Bankfull Elevation:	609.6
Bankfull Cross-Sectional Area:	5.9
Bankfull Width:	8.2
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	1.4
Mean Depth at Bankfull:	0.7
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

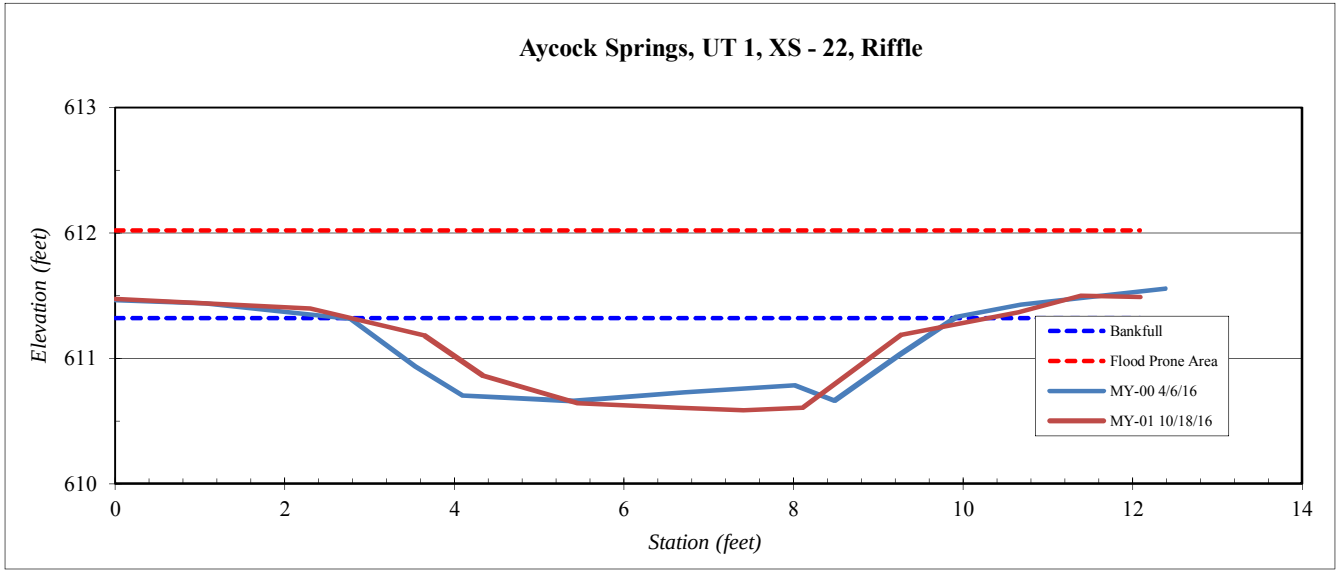


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 22, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	611.47
2.3	611.40
3.6	611.18
4.3	610.86
5.5	610.64
6.6	610.61
7.4	610.59
8.1	610.61
9.3	611.19
10.7	611.37
11.4	611.50
12.1	611.49

SUMMARY DATA	
Bankfull Elevation:	611.3
Bankfull Cross-Sectional Area:	3.4
Bankfull Width:	7.5
Flood Prone Area Elevation:	612.0
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.7
Mean Depth at Bankfull:	0.5
W / D Ratio:	16.5
Entrenchment Ratio:	12.0
Bank Height Ratio:	1.0

Stream Type	C/E

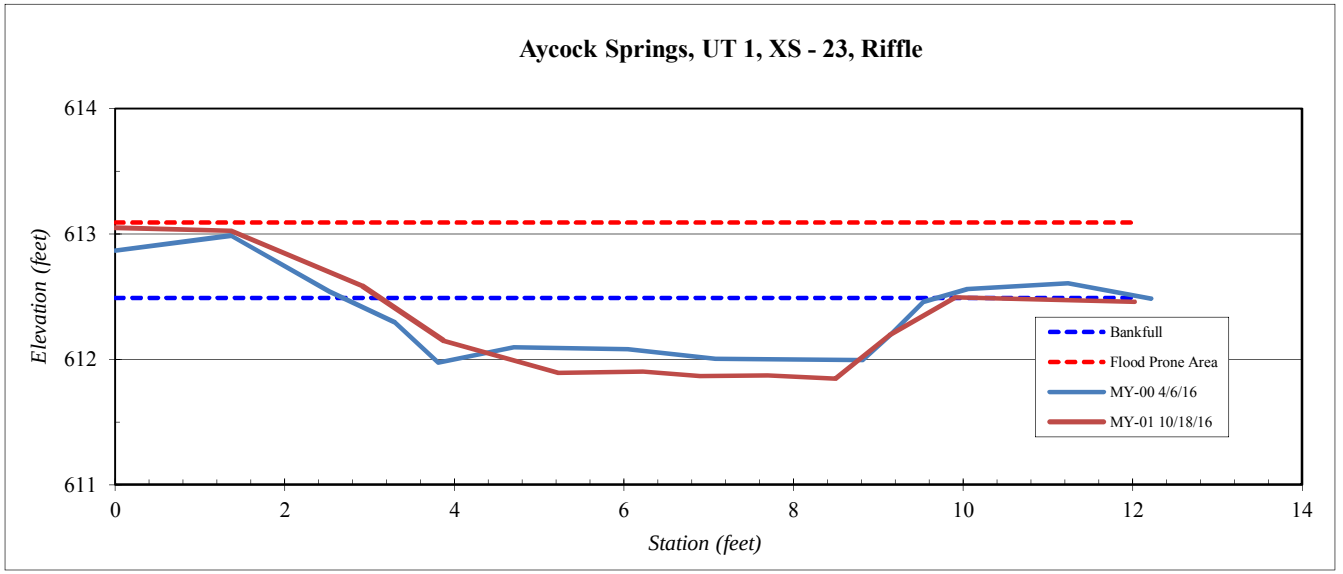


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 23, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
-0.5	613.06
1.4	613.02
2.9	612.59
3.9	612.15
5.2	611.89
6.2	611.90
6.9	611.87
7.7	611.87
8.5	611.84
9.1	612.19
9.9	612.49
10.8	612.48
12.0	612.46

SUMMARY DATA	
Bankfull Elevation:	612.5
Bankfull Cross-Sectional Area:	3.2
Bankfull Width:	6.8
Flood Prone Area Elevation:	613.1
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.6
Mean Depth at Bankfull:	0.5
W / D Ratio:	14.5
Entrenchment Ratio:	13.2
Bank Height Ratio:	1.0

Stream Type	C/E

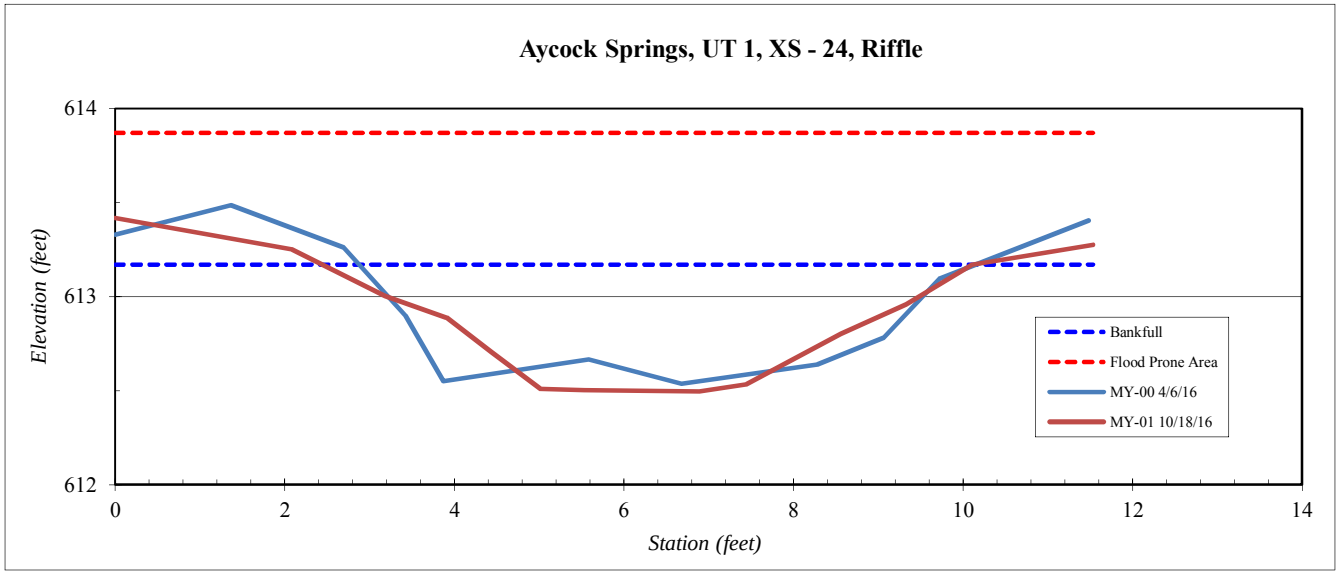


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 1, XS - 24, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	613.42
2.1	613.25
3.2	613.00
3.9	612.89
4.4	612.70
5.0	612.51
5.5	612.50
6.9	612.50
7.4	612.53
8.6	612.80
9.3	612.96
10.1	613.17
11.5	613.27

SUMMARY DATA	
Bankfull Elevation:	613.2
Bankfull Cross-Sectional Area:	3.2
Bankfull Width:	7.7
Flood Prone Area Elevation:	613.9
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.7
Mean Depth at Bankfull:	0.4
W / D Ratio:	18.5
Entrenchment Ratio:	11.7
Bank Height Ratio:	1.0

Stream Type	C/E

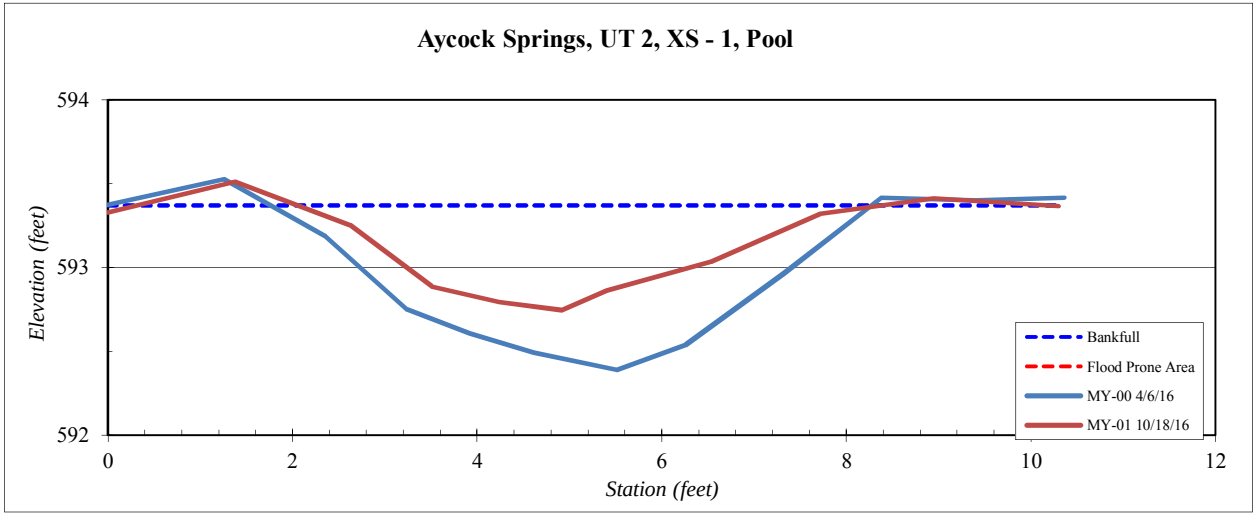


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 2, XS - 1, Pool
Feature	Pool
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	593.3
1.4	593.5
2.6	593.3
3.5	592.9
4.2	592.8
4.9	592.7
5.4	592.9
6.5	593.0
7.7	593.3
8.9	593.4
10.3	593.4

SUMMARY DATA	
Bankfull Elevation:	593.4
Bankfull Cross-Sectional Area:	2.1
Bankfull Width:	6.3
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	0.6
Mean Depth at Bankfull:	0.3
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

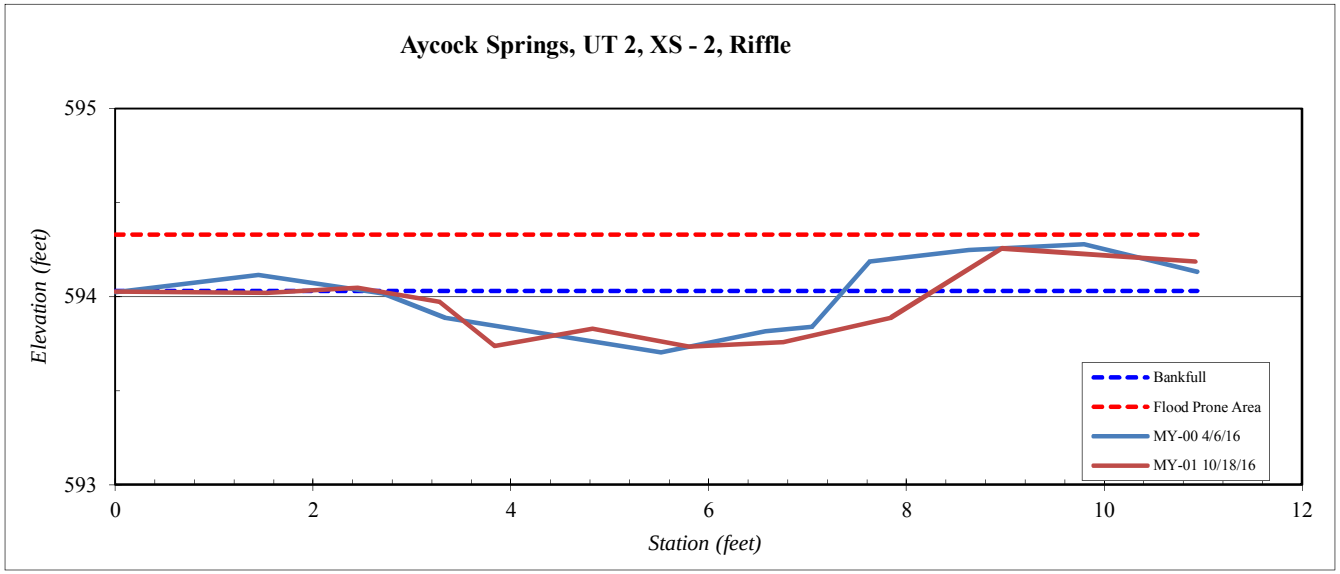


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 2, XS - 2, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	594.03
1.5	594.02
2.4	594.05
3.3	593.97
3.8	593.74
4.8	593.83
5.8	593.73
6.8	593.76
7.8	593.89
9.0	594.26
10.9	594.19

SUMMARY DATA	
Bankfull Elevation:	594.0
Bankfull Cross-Sectional Area:	1.1
Bankfull Width:	5.6
Flood Prone Area Elevation:	594.3
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.3
Mean Depth at Bankfull:	0.2
W / D Ratio:	28.5
Entrenchment Ratio:	16.1
Bank Height Ratio:	1.0

Stream Type	C/E

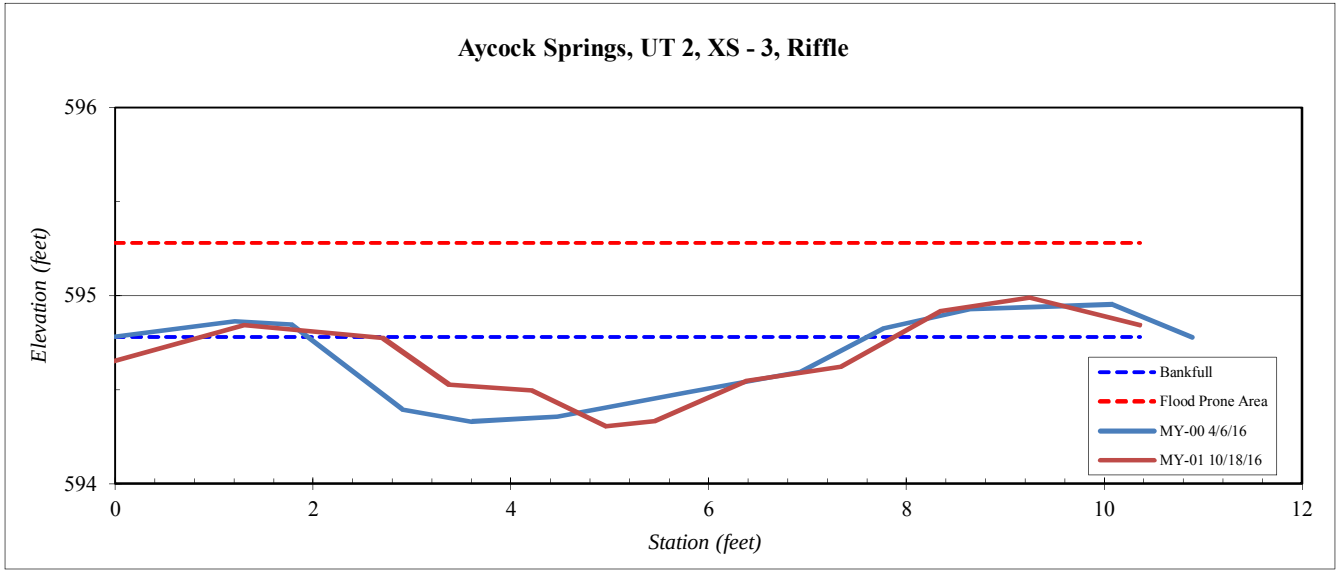


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 2, XS - 3, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
-0.1	594.64
1.3	594.84
2.7	594.77
3.4	594.53
4.2	594.50
5.0	594.30
5.5	594.33
6.4	594.55
7.3	594.62
8.3	594.92
9.2	594.99
10.4	594.84

SUMMARY DATA	
Bankfull Elevation:	594.8
Bankfull Cross-Sectional Area:	1.4
Bankfull Width:	5.3
Flood Prone Area Elevation:	595.3
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.5
Mean Depth at Bankfull:	0.3
W / D Ratio:	20.1
Entrenchment Ratio:	17.0
Bank Height Ratio:	1.0

Stream Type	C/E

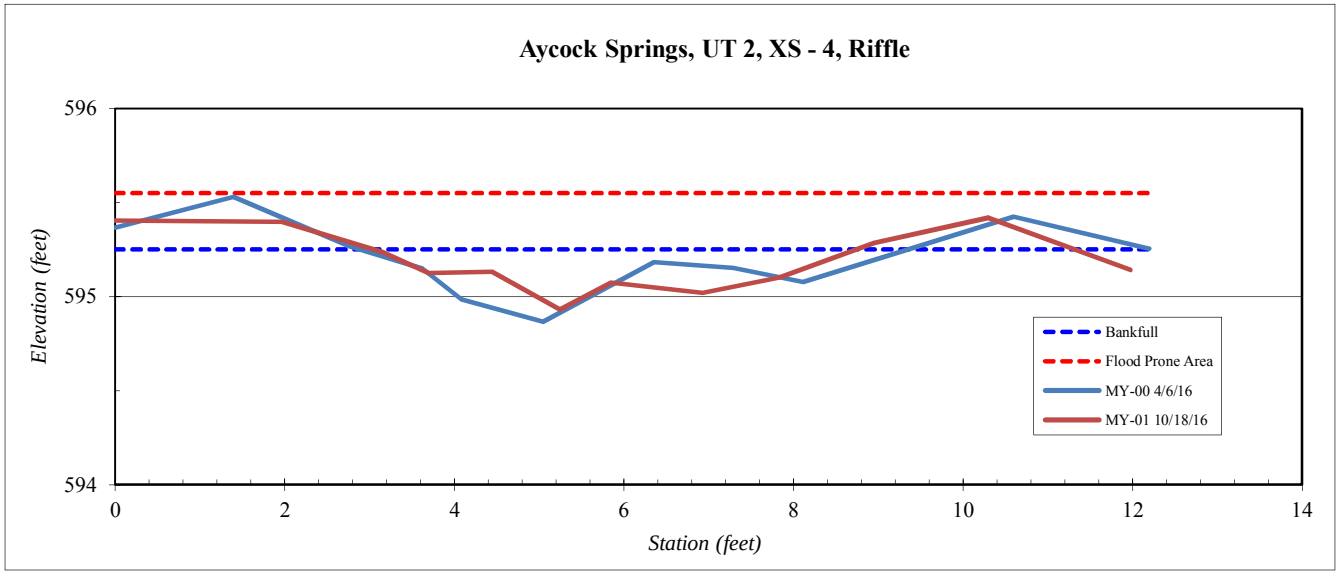


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 2, XS - 4, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	595.40
2.0	595.40
3.1	595.24
3.7	595.13
4.4	595.13
5.2	594.93
5.8	595.07
6.9	595.02
7.8	595.10
9.0	595.29
10.3	595.42
12.0	595.14

SUMMARY DATA	
Bankfull Elevation:	595.3
Bankfull Cross-Sectional Area:	0.9
Bankfull Width:	5.7
Flood Prone Area Elevation:	595.6
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.3
Mean Depth at Bankfull:	0.2
W / D Ratio:	36.1
Entrenchment Ratio:	15.8
Bank Height Ratio:	1.0

Stream Type	C/E

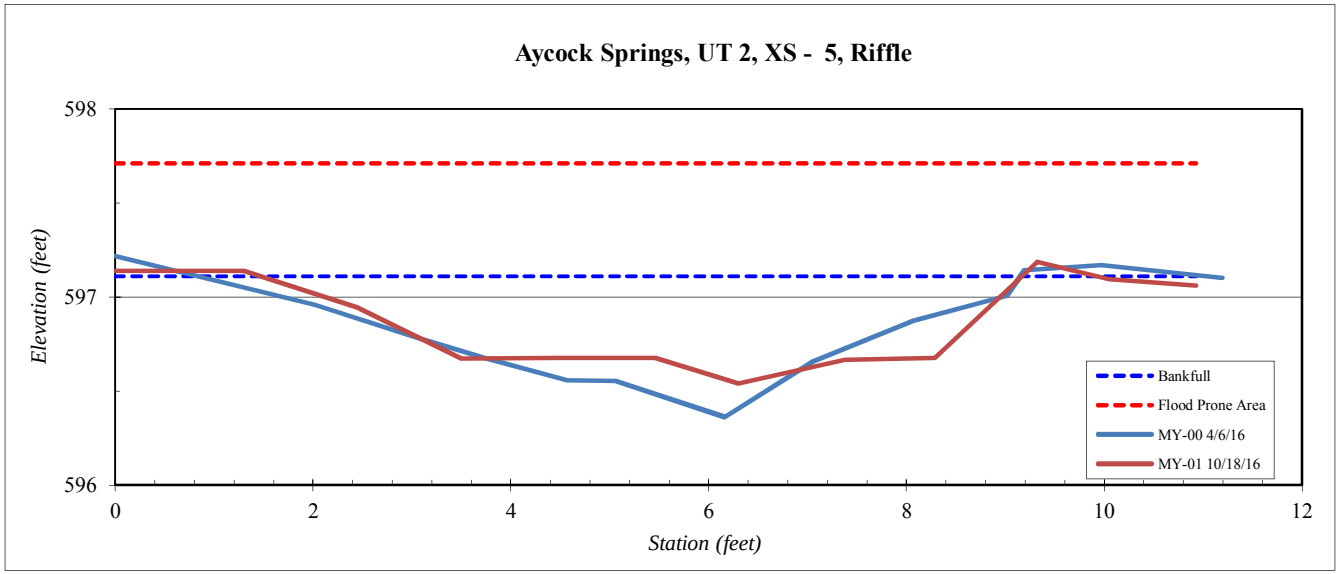


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 2, XS - 5, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	597.14
1.3	597.14
2.4	596.94
3.5	596.67
4.5	596.68
5.5	596.68
6.3	596.54
7.4	596.67
8.3	596.68
9.3	597.19
10.0	597.09
10.9	597.06

SUMMARY DATA	
Bankfull Elevation:	597.1
Bankfull Cross-Sectional Area:	2.8
Bankfull Width:	7.7
Flood Prone Area Elevation:	597.7
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.6
Mean Depth at Bankfull:	0.4
W / D Ratio:	21.2
Entrenchment Ratio:	11.7
Bank Height Ratio:	1.0

Stream Type	C/E

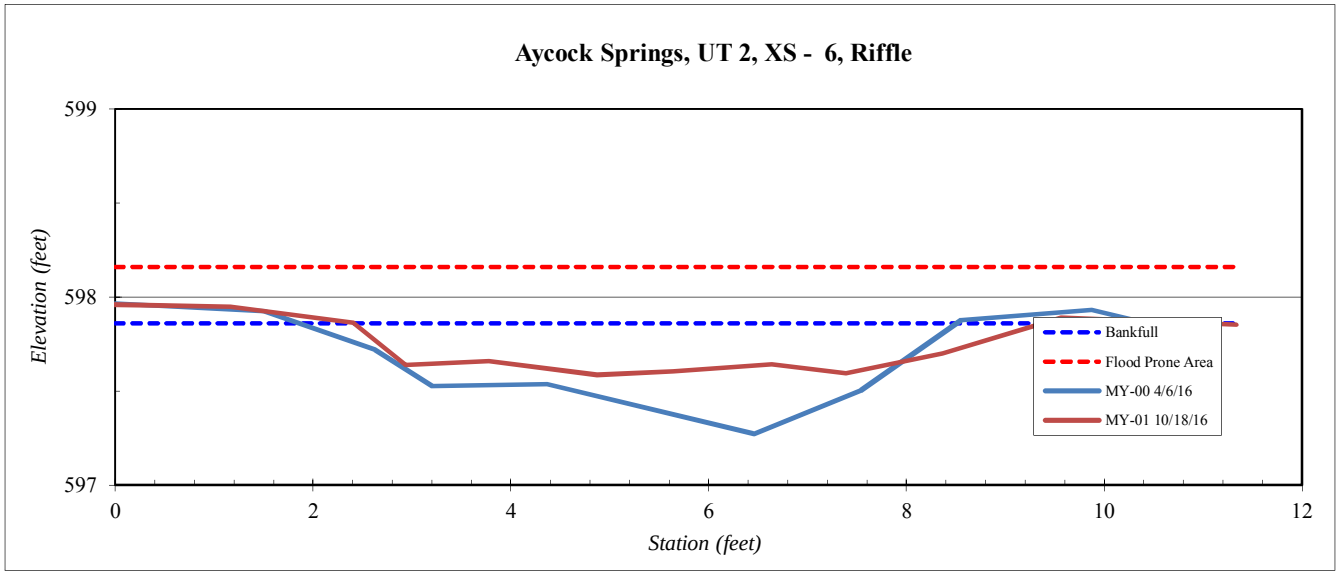


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 2, XS - 6, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
-0.1	597.96
1.2	597.95
2.4	597.86
2.9	597.64
3.8	597.66
4.9	597.59
5.6	597.61
6.6	597.64
7.4	597.59
8.4	597.70
9.6	597.89
11.3	597.85

SUMMARY DATA	
Bankfull Elevation:	597.9
Bankfull Cross-Sectional Area:	1.4
Bankfull Width:	7.0
Flood Prone Area Elevation:	598.2
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.3
Mean Depth at Bankfull:	0.2
W / D Ratio:	35.0
Entrenchment Ratio:	12.9
Bank Height Ratio:	1.0

Stream Type	C/E

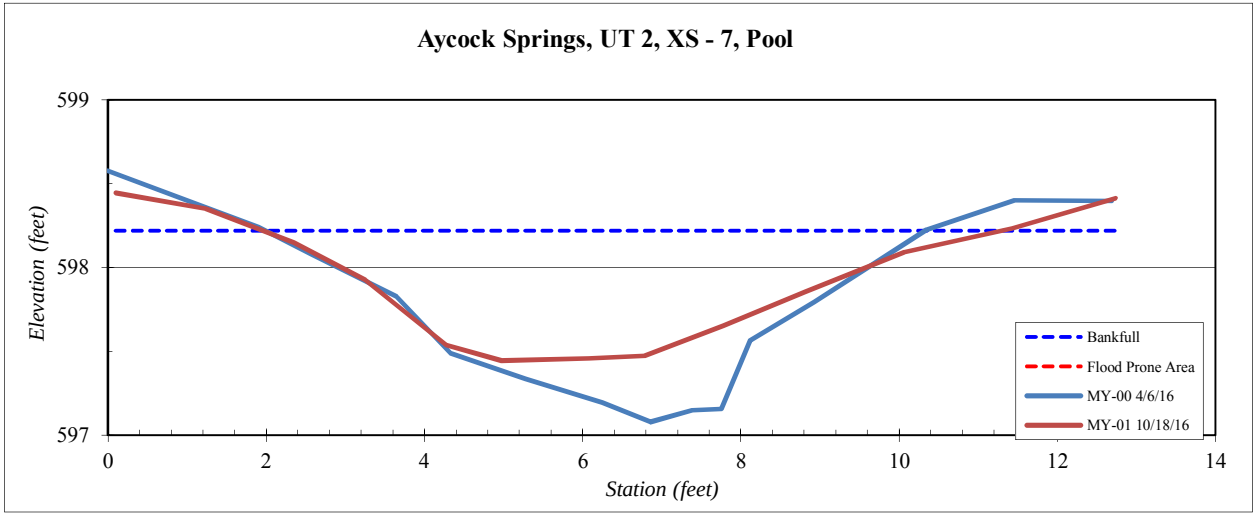


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 2, XS - 7, Pool
Feature	Pool
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.1	598.4
1.2	598.4
2.3	598.1
3.2	597.9
4.3	597.5
5.0	597.4
6.1	597.5
6.8	597.5
7.8	597.7
8.8	597.9
10.1	598.1
11.4	598.2
12.7	598.4

SUMMARY DATA	
Bankfull Elevation:	598.2
Bankfull Cross-Sectional Area:	4.1
Bankfull Width:	9.4
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	0.8
Mean Depth at Bankfull:	0.4
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

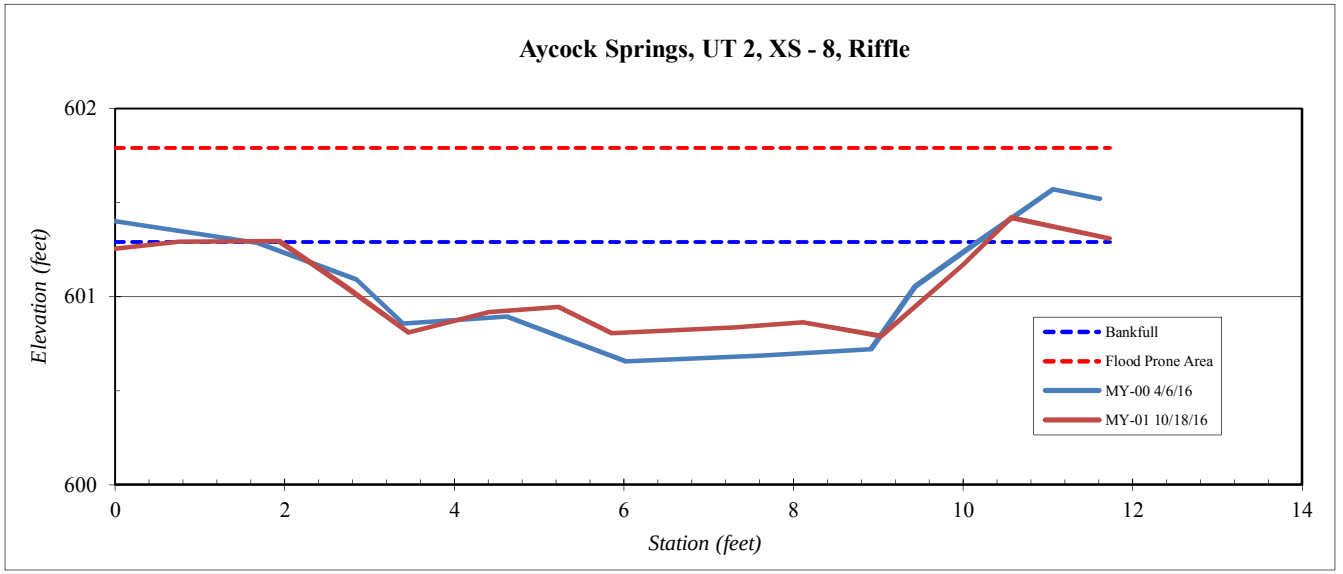


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 2, XS - 8, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	601.25
0.8	601.29
1.9	601.29
2.7	601.05
3.5	600.81
4.4	600.92
5.2	600.95
5.9	600.80
7.3	600.84
8.1	600.86
9.0	600.79
10.0	601.17
10.6	601.42
11.7	601.31

SUMMARY DATA	
Bankfull Elevation:	601.3
Bankfull Cross-Sectional Area:	3.1
Bankfull Width:	8.3
Flood Prone Area Elevation:	601.8
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.5
Mean Depth at Bankfull:	0.4
W / D Ratio:	22.2
Entrenchment Ratio:	10.8
Bank Height Ratio:	1.0

Stream Type	C/E

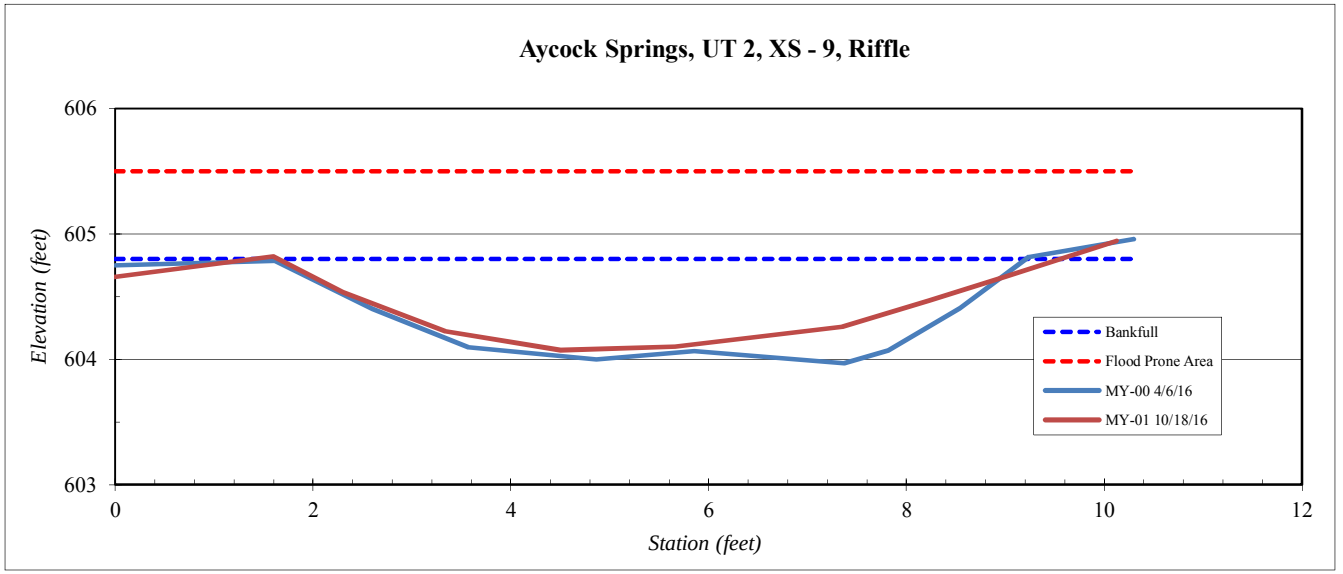


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 2, XS - 9, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
-0.2	604.64
1.6	604.82
2.3	604.54
3.3	604.23
4.5	604.07
5.7	604.10
7.3	604.26
8.2	604.47
9.0	604.66
10.1	604.94

SUMMARY DATA	
Bankfull Elevation:	604.8
Bankfull Cross-Sectional Area:	3.8
Bankfull Width:	7.9
Flood Prone Area Elevation:	605.5
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.7
Mean Depth at Bankfull:	0.5
W / D Ratio:	16.4
Entrenchment Ratio:	11.4
Bank Height Ratio:	1.0

Stream Type	C/E

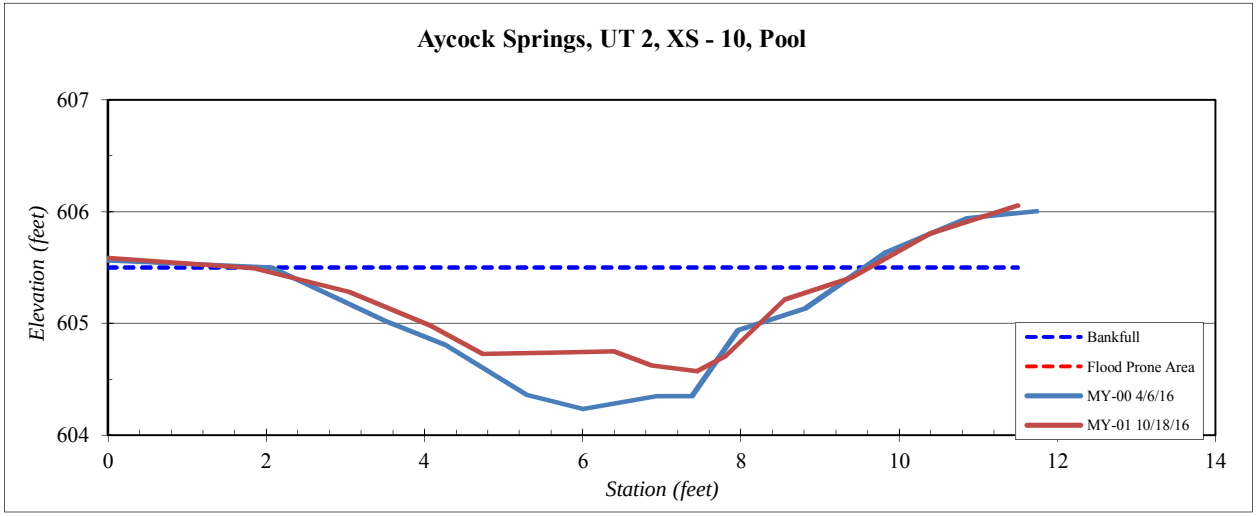


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 2, XS - 10, Pool
Feature	Pool
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	605.6
1.8	605.5
3.0	605.3
4.1	605.0
4.7	604.7
5.6	604.7
6.4	604.8
6.9	604.6
7.4	604.6
7.8	604.7
8.6	605.2
9.4	605.4
10.4	605.8
11.5	606.1

SUMMARY DATA	
Bankfull Elevation:	605.5
Bankfull Cross-Sectional Area:	4.0
Bankfull Width:	7.8
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	0.9
Mean Depth at Bankfull:	0.5
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

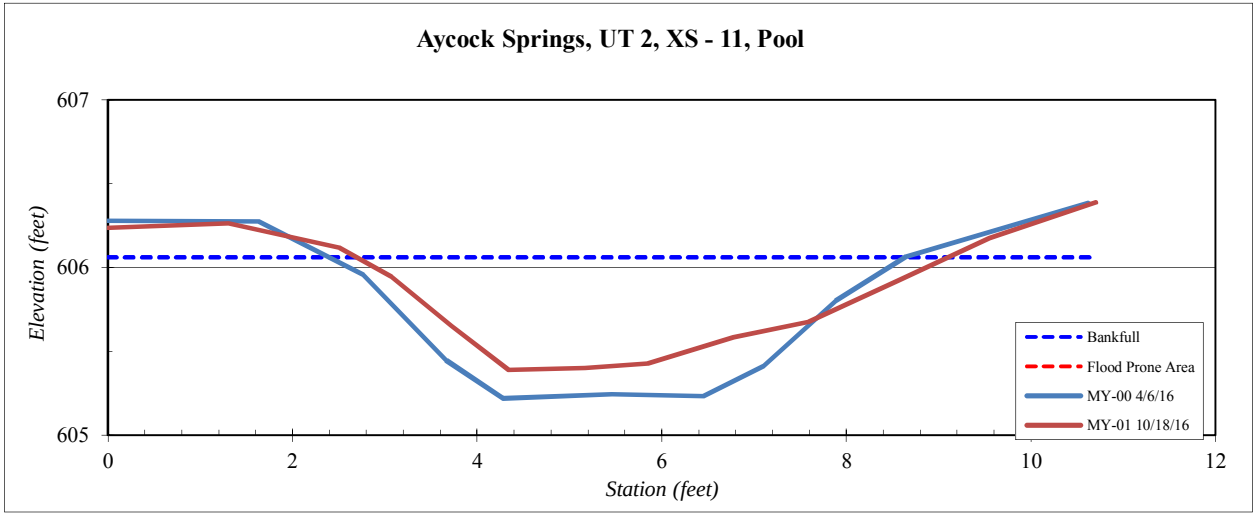


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 2, XS - 11, Pool
Feature	Pool
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	606.2
1.3	606.3
2.5	606.1
3.1	605.9
3.7	605.7
4.3	605.4
5.2	605.4
5.8	605.4
6.8	605.6
7.6	605.7
8.6	605.9
9.5	606.2
10.7	606.4

SUMMARY DATA	
Bankfull Elevation:	606.1
Bankfull Cross-Sectional Area:	2.7
Bankfull Width:	6.4
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	0.7
Mean Depth at Bankfull:	0.4
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

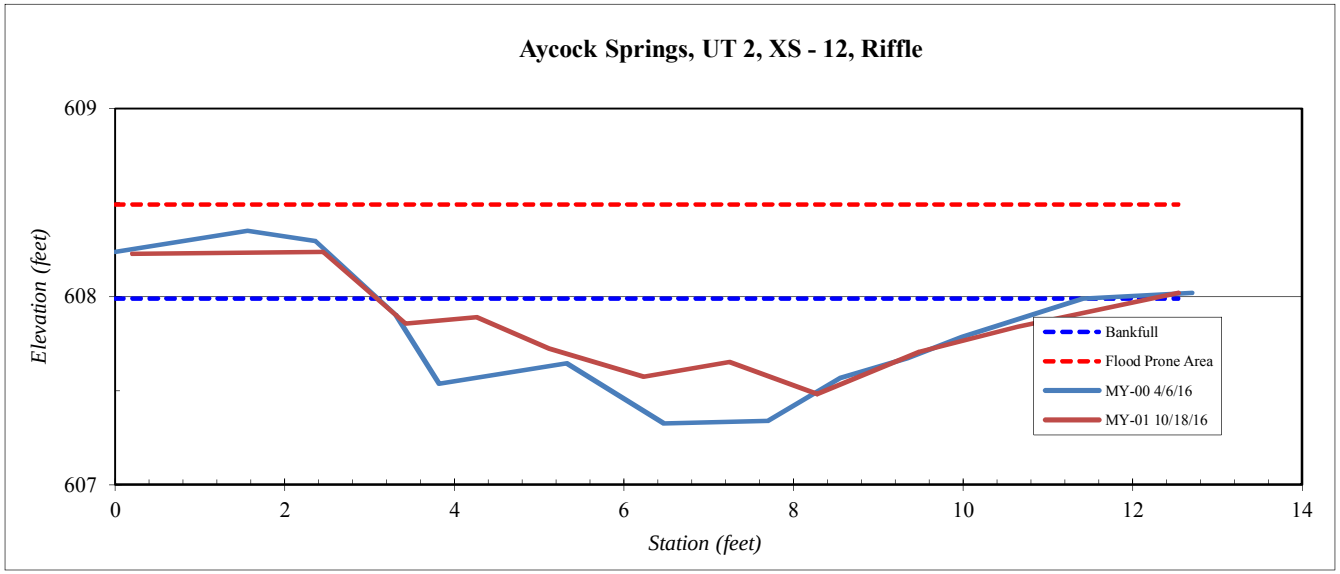


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 2, XS - 12, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.2	608.23
2.5	608.24
3.4	607.86
4.3	607.89
5.1	607.72
6.2	607.57
7.2	607.65
8.3	607.48
9.5	607.71
10.6	607.84
12.5	608.02

SUMMARY DATA	
Bankfull Elevation:	608.0
Bankfull Cross-Sectional Area:	2.3
Bankfull Width:	9.2
Flood Prone Area Elevation:	608.5
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.5
Mean Depth at Bankfull:	0.3
W / D Ratio:	36.8
Entrenchment Ratio:	9.8
Bank Height Ratio:	1.0

Stream Type	C/E

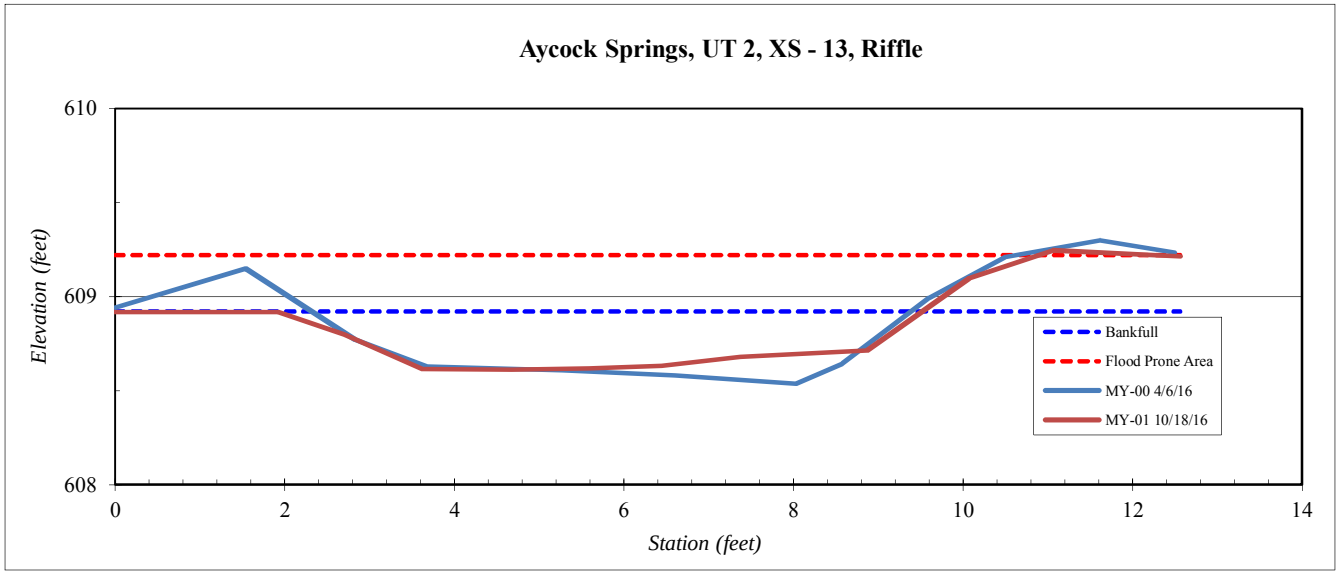


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 2, XS - 13, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
-0.1	608.92
1.9	608.92
2.7	608.80
3.6	608.62
4.7	608.61
5.6	608.62
6.4	608.63
7.4	608.68
8.9	608.71
10.1	609.10
11.1	609.25
12.6	609.21

SUMMARY DATA	
Bankfull Elevation:	608.9
Bankfull Cross-Sectional Area:	1.7
Bankfull Width:	7.6
Flood Prone Area Elevation:	609.2
Flood Prone Width:	90.0
Max Depth at Bankfull:	0.3
Mean Depth at Bankfull:	0.2
W / D Ratio:	34.0
Entrenchment Ratio:	11.8
Bank Height Ratio:	1.0

Stream Type	C/E

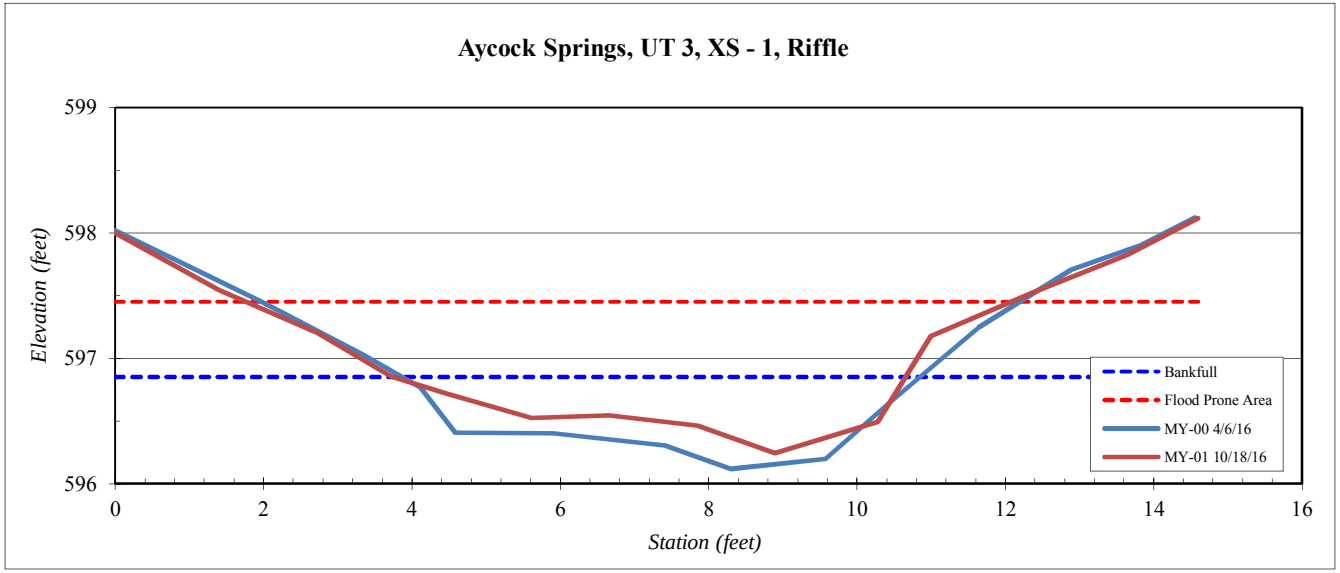


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 3, XS - 1, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	598.00
1.4	597.55
2.7	597.20
3.7	596.85
4.5	596.72
5.6	596.52
6.7	596.55
7.9	596.46
8.9	596.24
10.3	596.49
11.0	597.18
12.4	597.53
13.7	597.82
14.6	598.12

SUMMARY DATA	
Bankfull Elevation:	596.9
Bankfull Cross-Sectional Area:	2.3
Bankfull Width:	6.9
Flood Prone Area Elevation:	597.5
Flood Prone Width:	11.0
Max Depth at Bankfull:	0.6
Mean Depth at Bankfull:	0.3
W / D Ratio:	20.7
Entrenchment Ratio:	1.6
Bank Height Ratio:	1.0

Stream Type	C/E

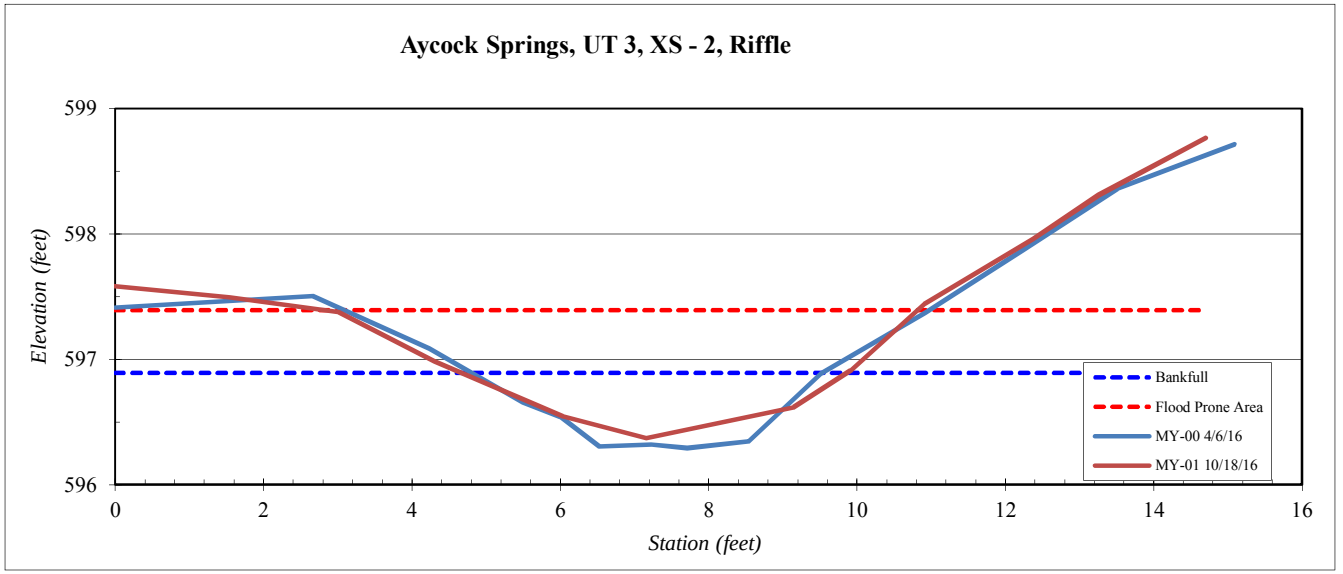


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 3, XS - 2, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
-0.2	597.59
1.5	597.50
3.0	597.38
4.3	596.98
6.0	596.55
7.2	596.37
9.1	596.62
9.9	596.91
10.9	597.44
12.4	597.96
13.3	598.31
14.7	598.77

SUMMARY DATA	
Bankfull Elevation:	596.9
Bankfull Cross-Sectional Area:	1.6
Bankfull Width:	5.2
Flood Prone Area Elevation:	597.4
Flood Prone Width:	8.0
Max Depth at Bankfull:	0.5
Mean Depth at Bankfull:	0.3
W / D Ratio:	16.9
Entrenchment Ratio:	1.5
Bank Height Ratio:	1.0

Stream Type	C/E

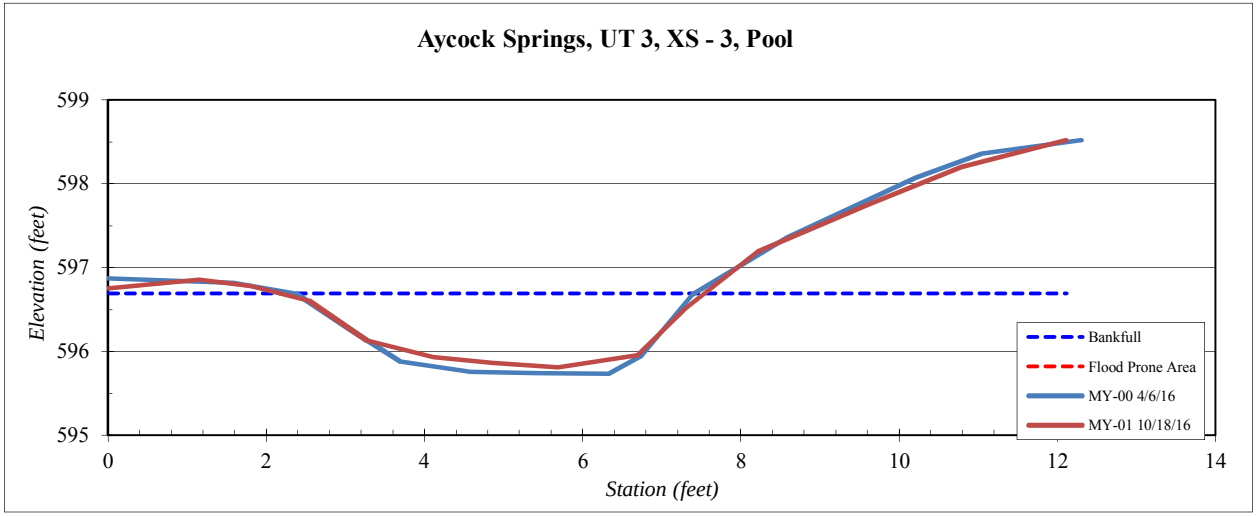


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 3, XS - 3, Pool
Feature	Pool
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
-0.2	596.7
1.1	596.9
1.8	596.8
2.5	596.6
3.3	596.1
4.1	595.9
4.9	595.9
5.7	595.8
6.7	596.0
7.3	596.5
8.2	597.2
9.6	597.8
10.8	598.2
12.1	598.5

SUMMARY DATA	
Bankfull Elevation:	596.7
Bankfull Cross-Sectional Area:	3.2
Bankfull Width:	5.4
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	0.9
Mean Depth at Bankfull:	0.6
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

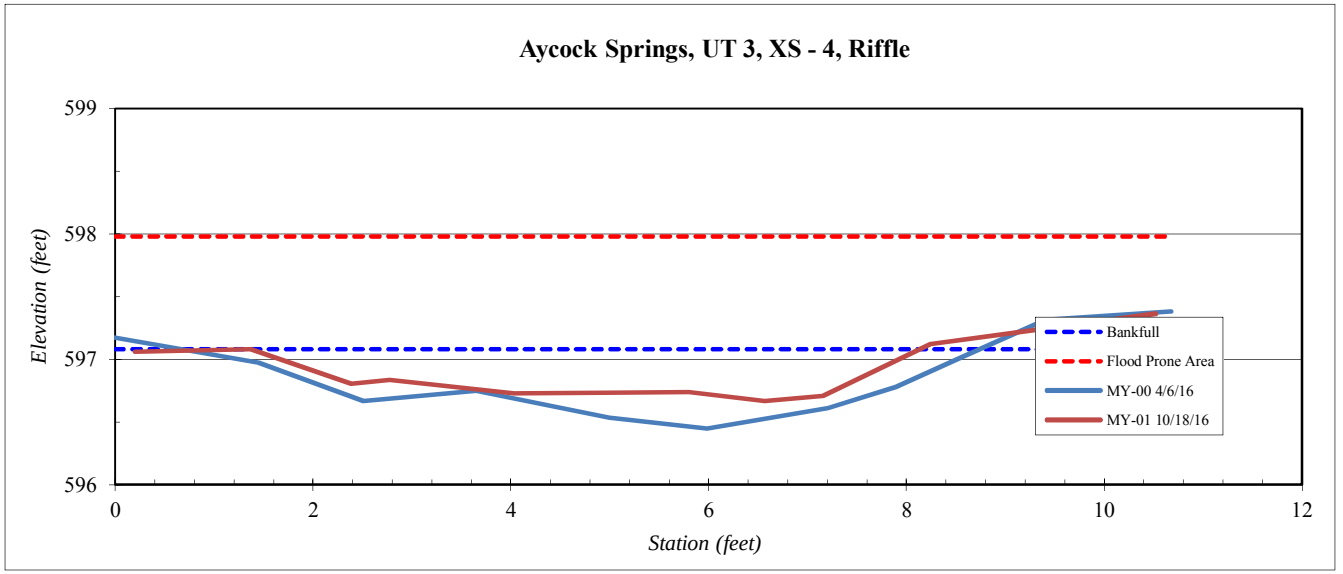


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 3, XS - 4, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

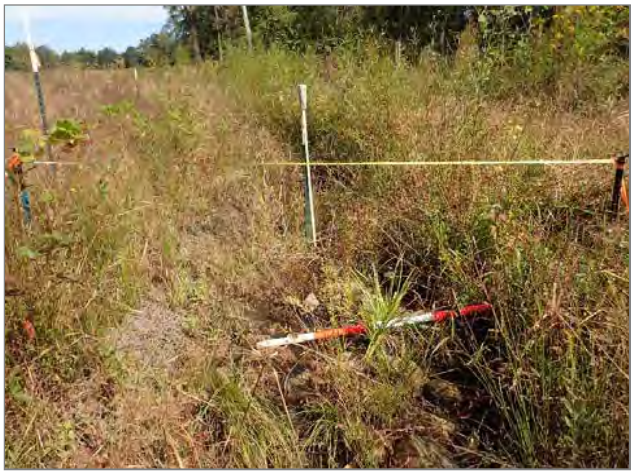
Station	Elevation
0.2	597.06
1.4	597.08
2.4	596.80
2.8	596.84
4.0	596.73
5.0	596.73
5.8	596.74
6.6	596.67
7.2	596.71
8.2	597.12
10.5	597.36

SUMMARY DATA	
Bankfull Elevation:	597.1
Bankfull Cross-Sectional Area:	3.2
Bankfull Width:	5.4
Flood Prone Area Elevation:	598.0
Flood Prone Width:	20.0
Max Depth at Bankfull:	0.9
Mean Depth at Bankfull:	0.6
W / D Ratio:	9.1
Entrenchment Ratio:	3.7
Bank Height Ratio:	1.0

Stream Type	C/E



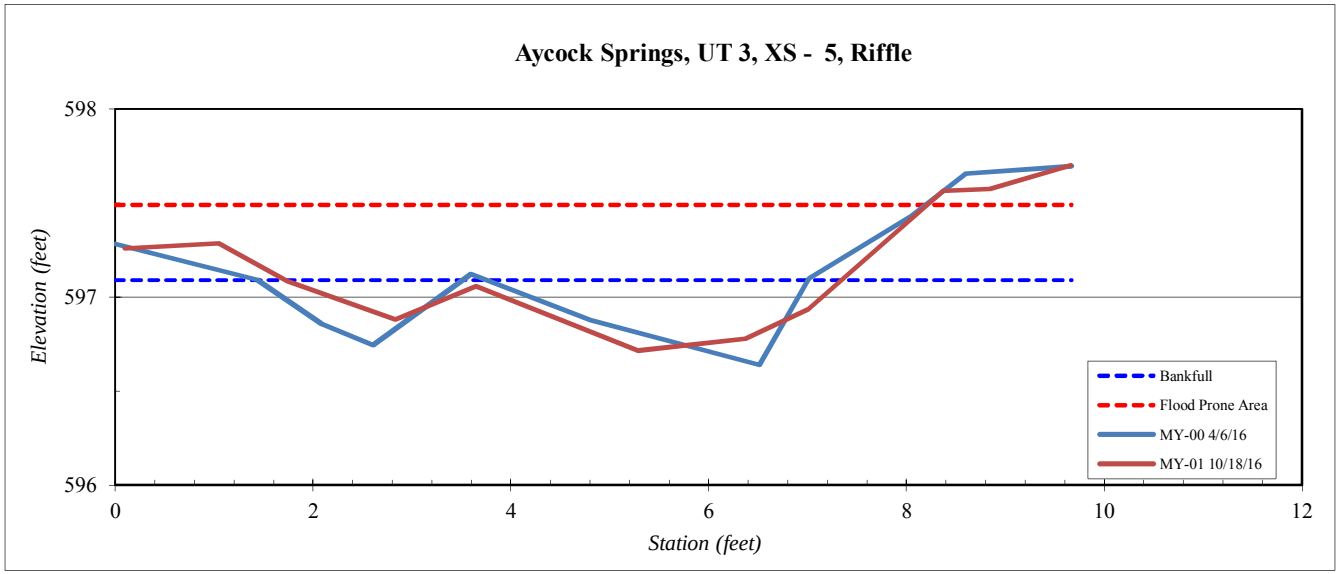
Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 3, XS - 5, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith



Station	Elevation
0.1	597.26
1.0	597.29
1.7	597.08
2.8	596.88
3.6	597.06
5.3	596.71
6.4	596.78
7.0	596.93
8.4	597.56
8.8	597.57
9.7	597.70

SUMMARY DATA	
Bankfull Elevation:	597.1
Bankfull Cross-Sectional Area:	1.1
Bankfull Width:	5.6
Flood Prone Area Elevation:	597.5
Flood Prone Width:	20.0
Max Depth at Bankfull:	0.4
Mean Depth at Bankfull:	0.2
W / D Ratio:	28.5
Entrenchment Ratio:	3.6
Bank Height Ratio:	1.0

Stream Type	C/E

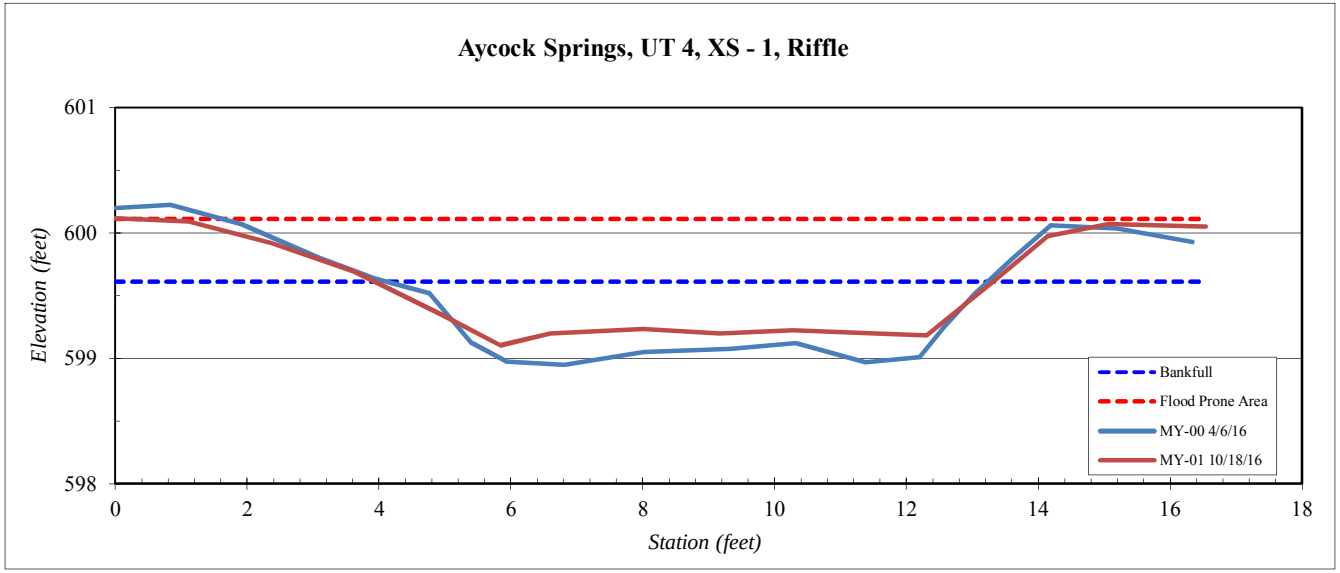


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 4, XS - 1, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	600.12
1.1	600.09
2.4	599.92
3.6	599.69
4.9	599.35
5.8	599.10
6.6	599.20
8.0	599.23
9.2	599.20
10.3	599.22
11.5	599.20
12.3	599.18
13.3	599.61
14.1	599.97
15.1	600.07
16.5	600.05

SUMMARY DATA	
Bankfull Elevation:	599.6
Bankfull Cross-Sectional Area:	3.3
Bankfull Width:	9.4
Flood Prone Area Elevation:	600.1
Flood Prone Width:	50.0
Max Depth at Bankfull:	0.5
Mean Depth at Bankfull:	0.4
W / D Ratio:	26.8
Entrenchment Ratio:	5.3
Bank Height Ratio:	1.0

Stream Type	C/E

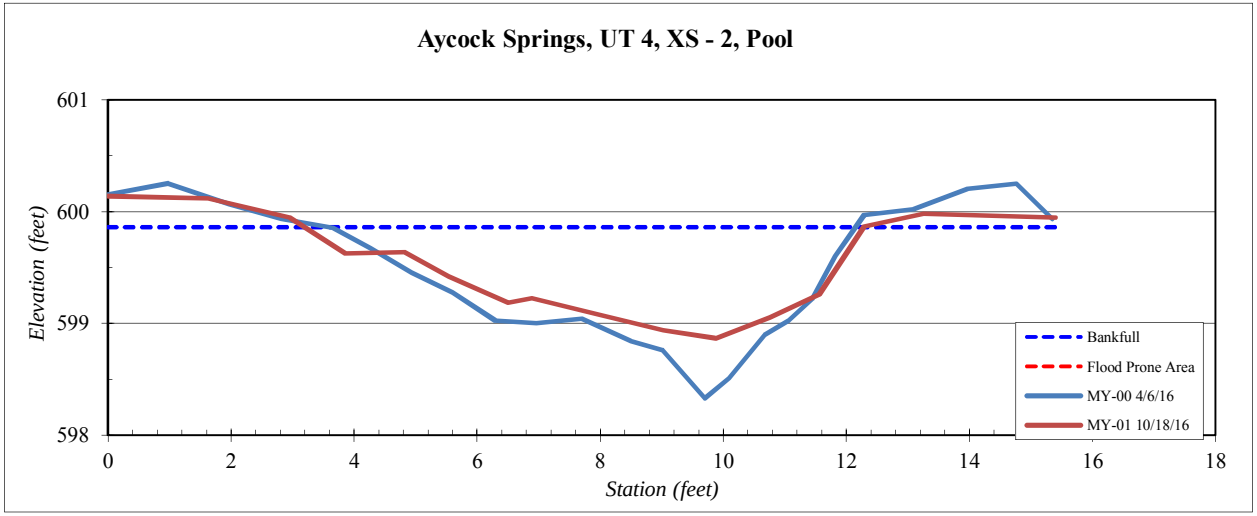


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 4, XS - 2, Pool
Feature	Pool
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	600.1
1.6	600.1
3.0	599.9
3.9	599.6
4.8	599.6
5.5	599.4
6.5	599.2
6.9	599.2
7.9	599.1
9.0	598.9
9.9	598.9
10.8	599.1
11.6	599.3
12.3	599.9
13.3	600.0
15.4	599.9

SUMMARY DATA	
Bankfull Elevation:	599.9
Bankfull Cross-Sectional Area:	5.4
Bankfull Width:	9.1
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	1.0
Mean Depth at Bankfull:	0.6
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

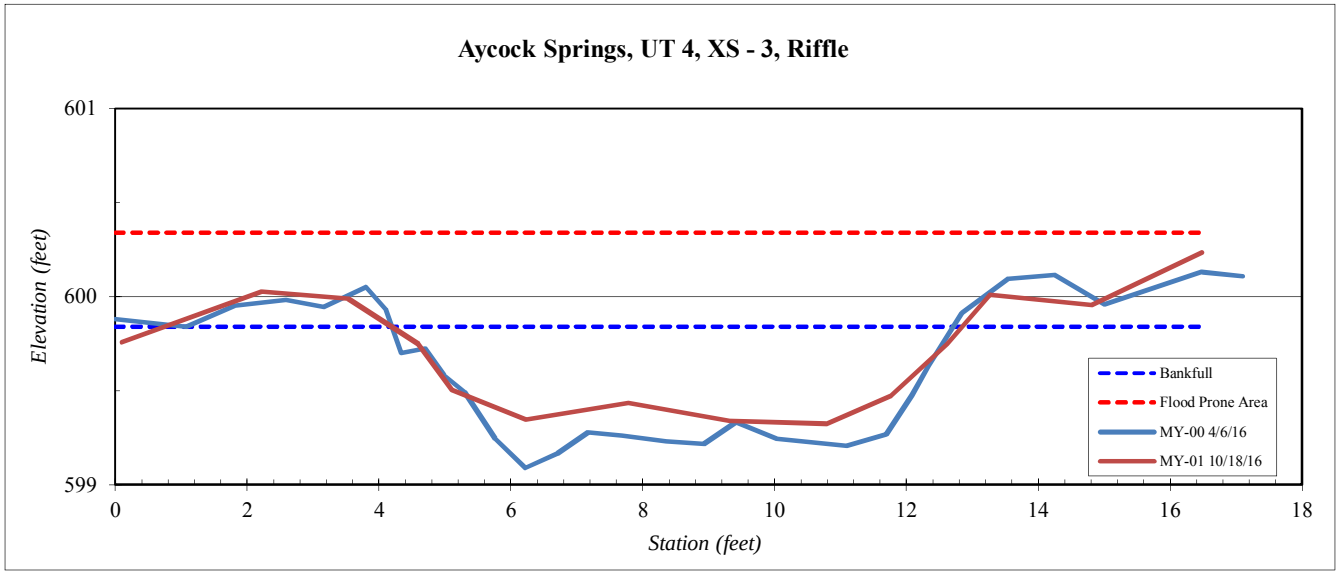


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 4, XS - 3, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.1	599.76
2.2	600.03
3.5	599.99
4.6	599.75
5.1	599.50
6.2	599.35
7.8	599.43
9.3	599.34
10.8	599.32
11.8	599.47
12.6	599.75
13.3	600.01
14.8	599.95
16.5	600.23

SUMMARY DATA	
Bankfull Elevation:	599.8
Bankfull Cross-Sectional Area:	3.4
Bankfull Width:	8.7
Flood Prone Area Elevation:	600.3
Flood Prone Width:	50.0
Max Depth at Bankfull:	0.5
Mean Depth at Bankfull:	0.4
W / D Ratio:	22.3
Entrenchment Ratio:	5.7
Bank Height Ratio:	1.0

Stream Type	C/E

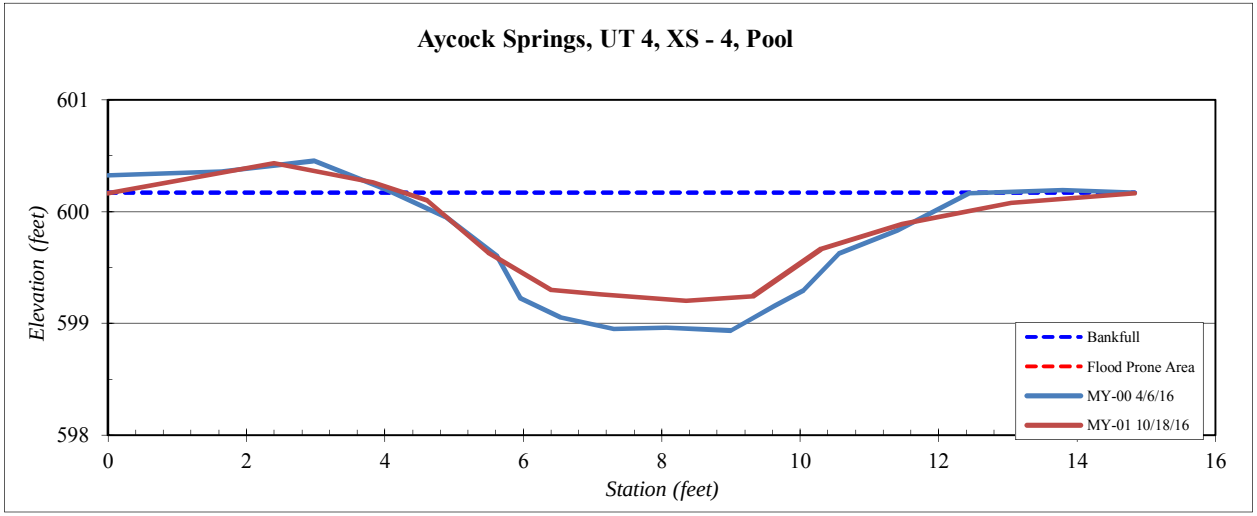


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 4, XS - 4, Pool
Feature	Pool
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	600.2
2.4	600.4
3.8	600.3
4.6	600.1
5.5	599.6
6.4	599.3
7.1	599.3
8.4	599.2
9.3	599.2
10.3	599.7
11.5	599.9
13.0	600.1
14.8	600.2

SUMMARY DATA	
Bankfull Elevation:	600.2
Bankfull Cross-Sectional Area:	5.2
Bankfull Width:	10.6
Flood Prone Area Elevation:	NA
Flood Prone Width:	NA
Max Depth at Bankfull:	1.0
Mean Depth at Bankfull:	0.5
W / D Ratio:	NA
Entrenchment Ratio:	NA
Bank Height Ratio:	1.0

Stream Type	C/E

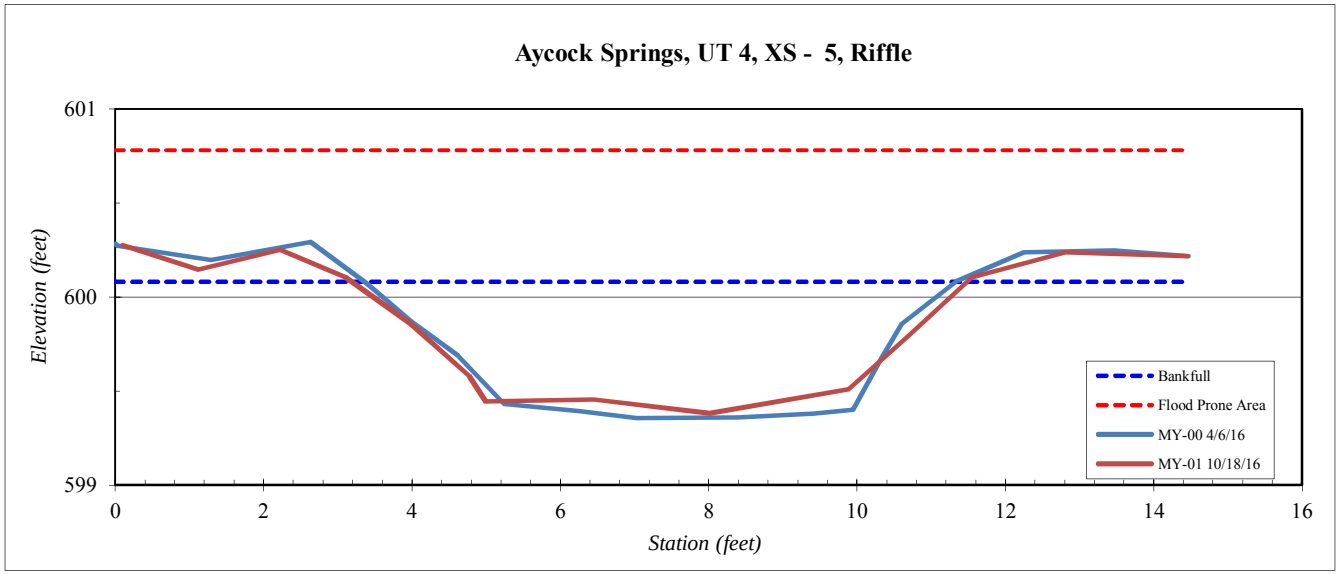


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 4, XS - 5, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.1	600.28
1.1	600.15
2.2	600.25
3.1	600.10
4.0	599.86
4.8	599.58
5.0	599.44
6.5	599.46
8.0	599.38
9.9	599.51
10.7	599.79
11.6	600.11
12.8	600.24
14.4	600.22

SUMMARY DATA	
Bankfull Elevation:	600.1
Bankfull Cross-Sectional Area:	4.1
Bankfull Width:	8.3
Flood Prone Area Elevation:	600.8
Flood Prone Width:	50.0
Max Depth at Bankfull:	0.7
Mean Depth at Bankfull:	0.5
W / D Ratio:	16.8
Entrenchment Ratio:	6.0
Bank Height Ratio:	1.0

Stream Type	C/E

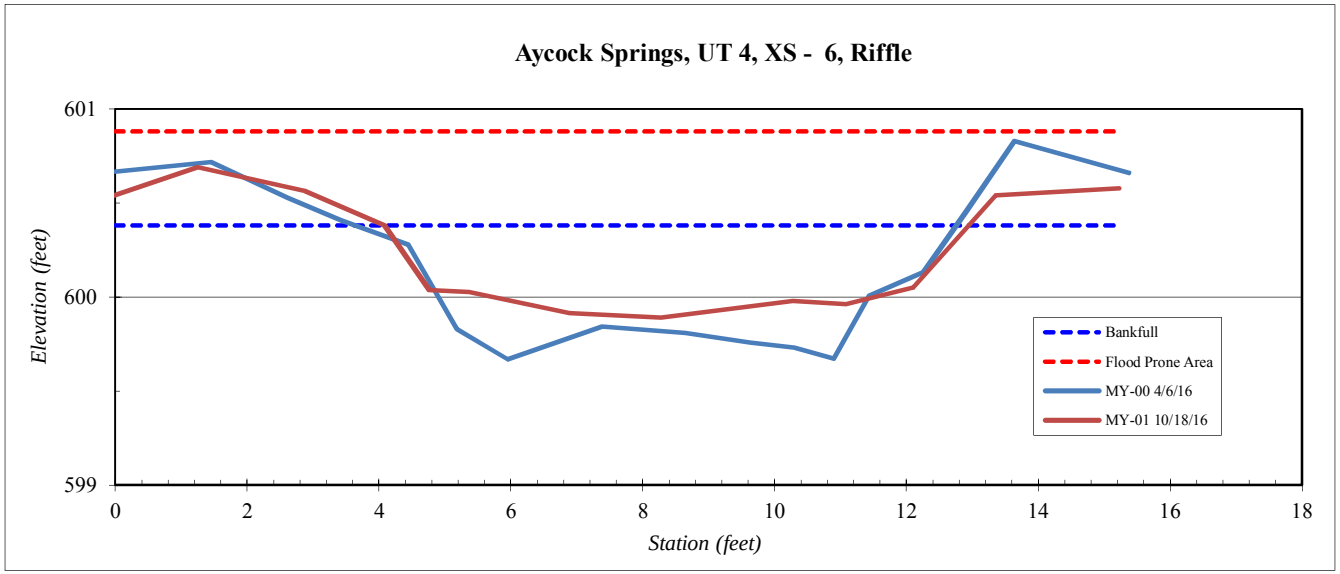


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 4, XS - 6, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
-0.1	600.53
1.3	600.69
2.9	600.57
4.1	600.38
4.8	600.04
5.4	600.03
6.9	599.92
8.3	599.89
10.3	599.98
11.1	599.96
12.1	600.05
13.4	600.54
15.2	600.58

SUMMARY DATA	
Bankfull Elevation:	600.4
Bankfull Cross-Sectional Area:	3.3
Bankfull Width:	8.9
Flood Prone Area Elevation:	600.9
Flood Prone Width:	50.0
Max Depth at Bankfull:	0.5
Mean Depth at Bankfull:	0.4
W / D Ratio:	24.0
Entrenchment Ratio:	5.6
Bank Height Ratio:	1.0

Stream Type	C/E

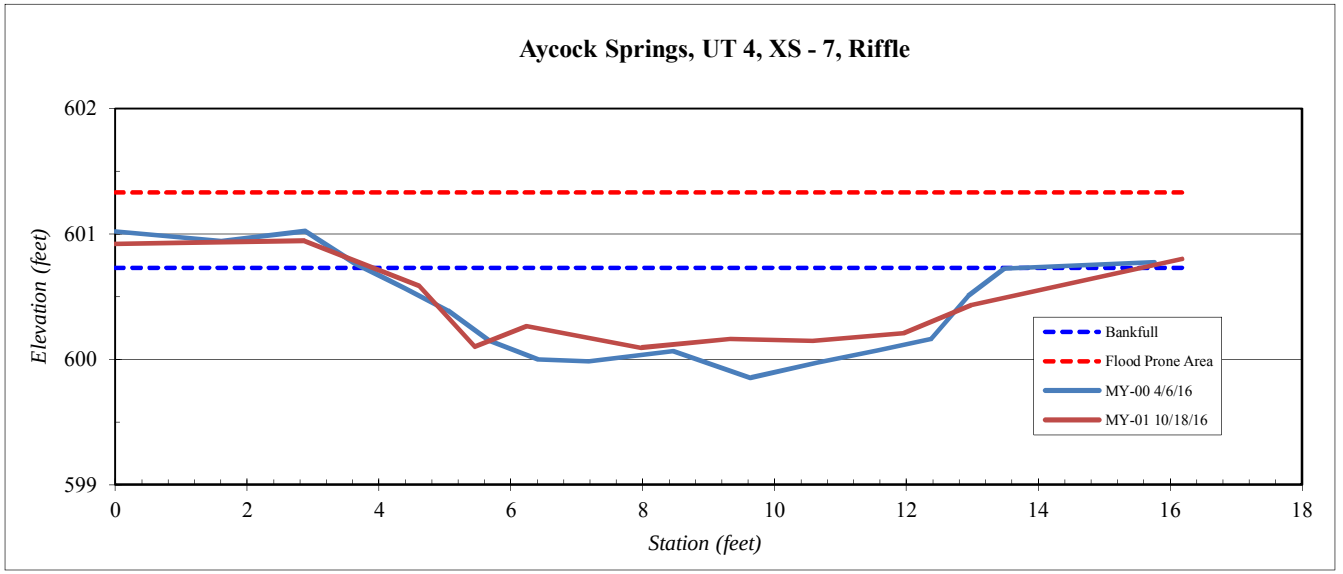


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 4, XS - 7, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
16.2	600.80
13.0	600.43
12.0	600.21
10.6	600.15
9.3	600.16
8.0	600.09
6.2	600.26
5.5	600.10
4.6	600.59
2.9	600.95
-0.3	600.92

SUMMARY DATA	
Bankfull Elevation:	600.7
Bankfull Cross-Sectional Area:	4.9
Bankfull Width:	11.7
Flood Prone Area Elevation:	601.3
Flood Prone Width:	50.0
Max Depth at Bankfull:	0.6
Mean Depth at Bankfull:	0.4
W / D Ratio:	27.9
Entrenchment Ratio:	4.3
Bank Height Ratio:	1.0

Stream Type	C/E

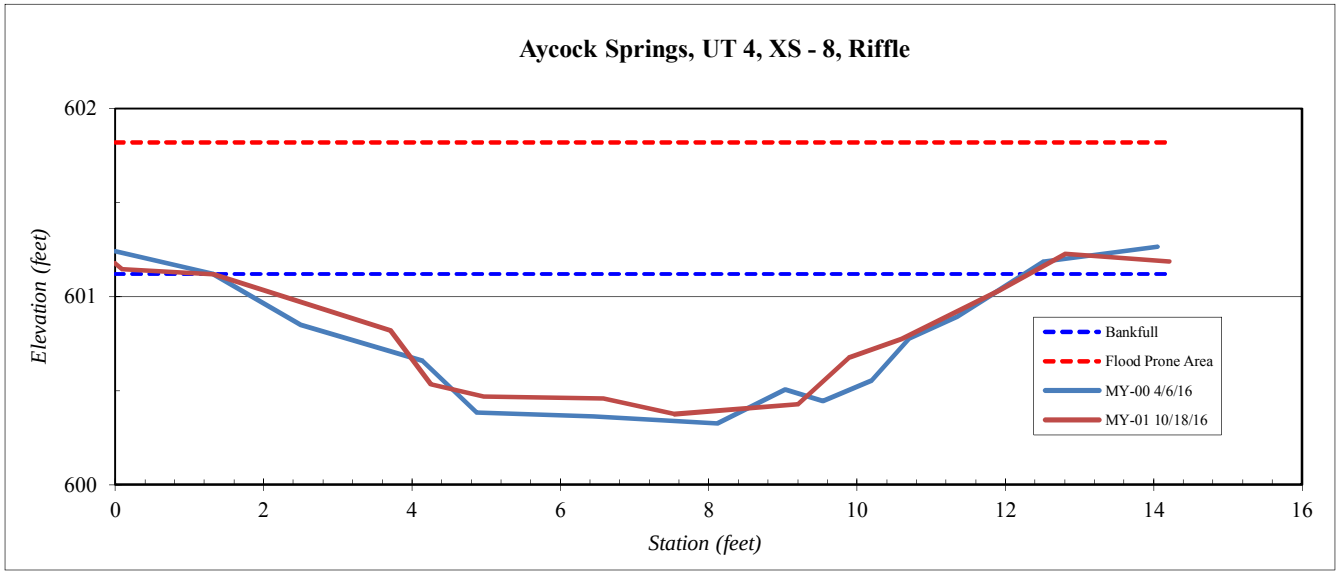


Site	Aycock Springs
Watershed:	Cape Fear, 0303002
XS ID	UT 4, XS - 8, Riffle
Feature	Riffle
Date:	10/18/2016
Field Crew:	Perkinson, Keith

Station	Elevation
0.0	601.18
0.1	601.15
1.3	601.12
3.7	600.82
4.3	600.53
5.0	600.47
6.6	600.46
7.5	600.38
9.2	600.43
9.9	600.68
10.6	600.77
11.9	601.03
12.8	601.23
14.2	601.19

SUMMARY DATA	
Bankfull Elevation:	601.1
Bankfull Cross-Sectional Area:	4.9
Bankfull Width:	11.1
Flood Prone Area Elevation:	601.8
Flood Prone Width:	50.0
Max Depth at Bankfull:	0.7
Mean Depth at Bankfull:	0.4
W / D Ratio:	25.1
Entrenchment Ratio:	4.5
Bank Height Ratio:	1.0

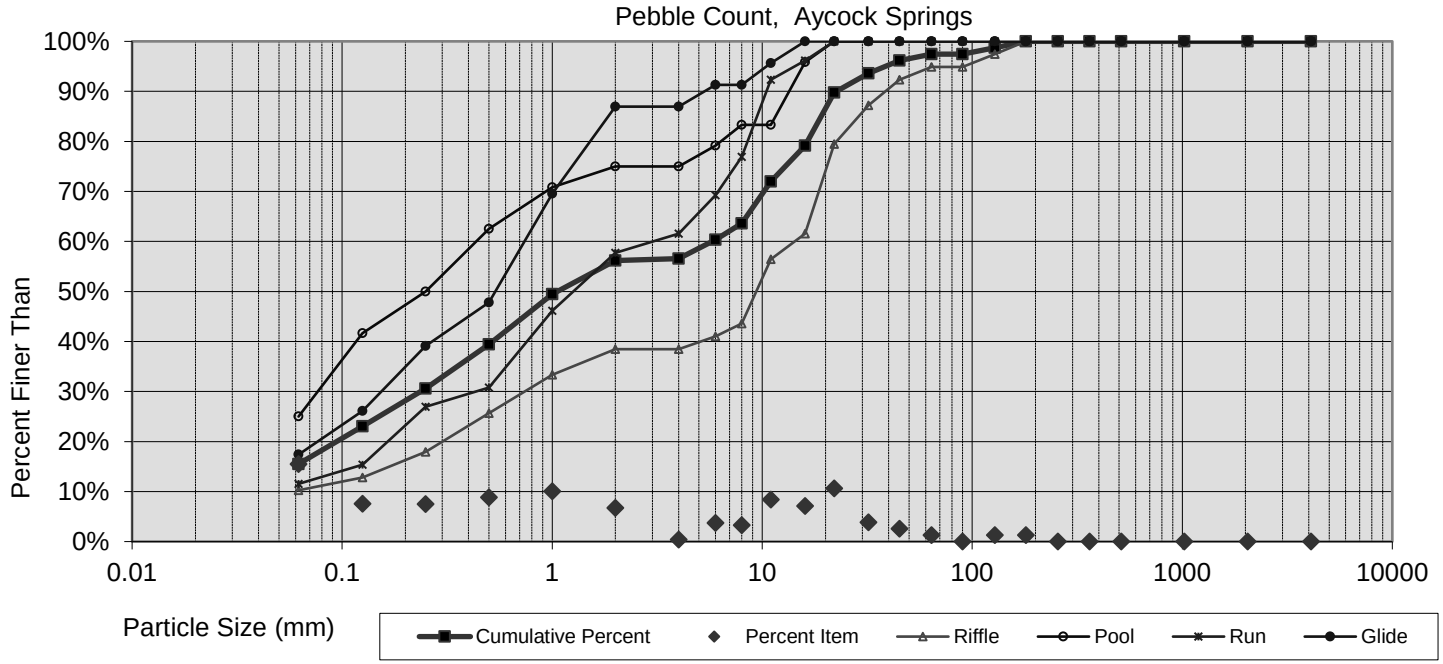
Stream Type	C/E



10	
10	Pebble Count,

	Aycock Springs
	Cape Fear

Note:	**UT-1 - Reach-wide**

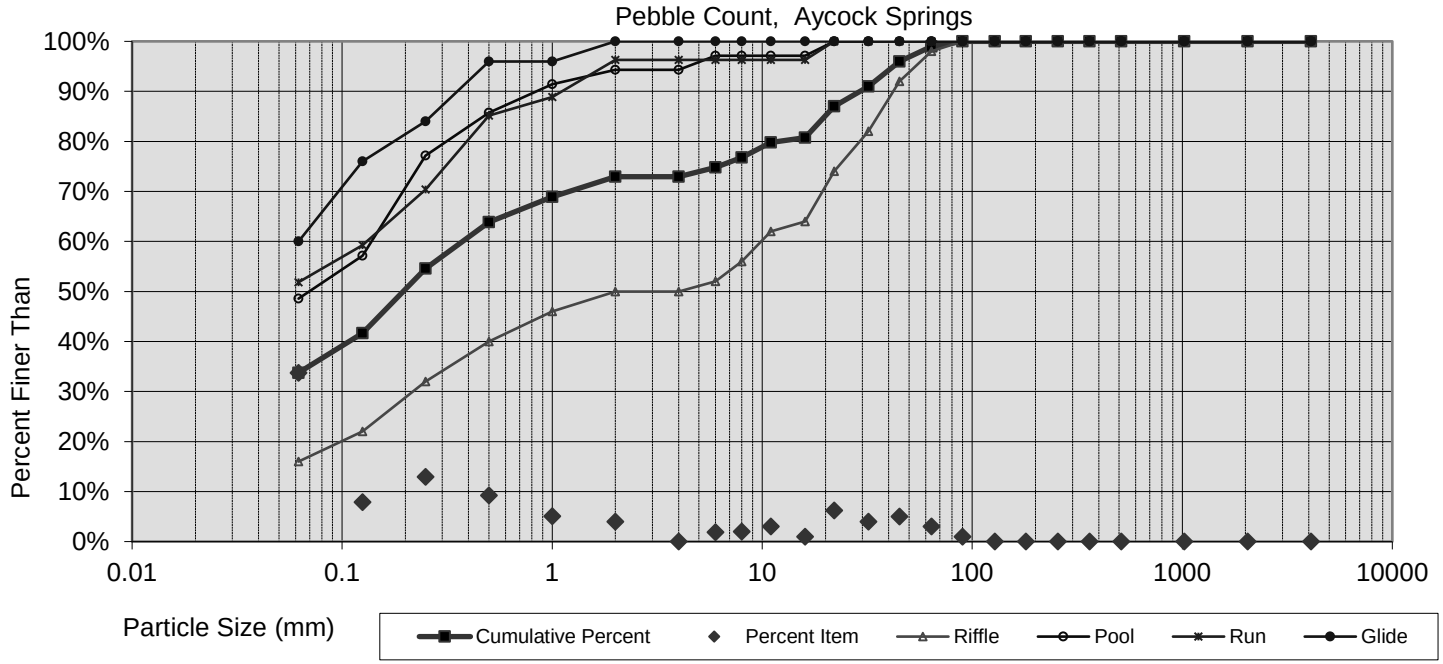


Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	silt/clay	sand	gravel	cobble	boulder	bedrock
0.065	0.35	1.1	19	39	16%	41%	41%	3%	0%	0%

10	
10	Pebble Count,

	Aycock Springs
	Cape Fear

Note:	**UT-2 - Reach-wide**

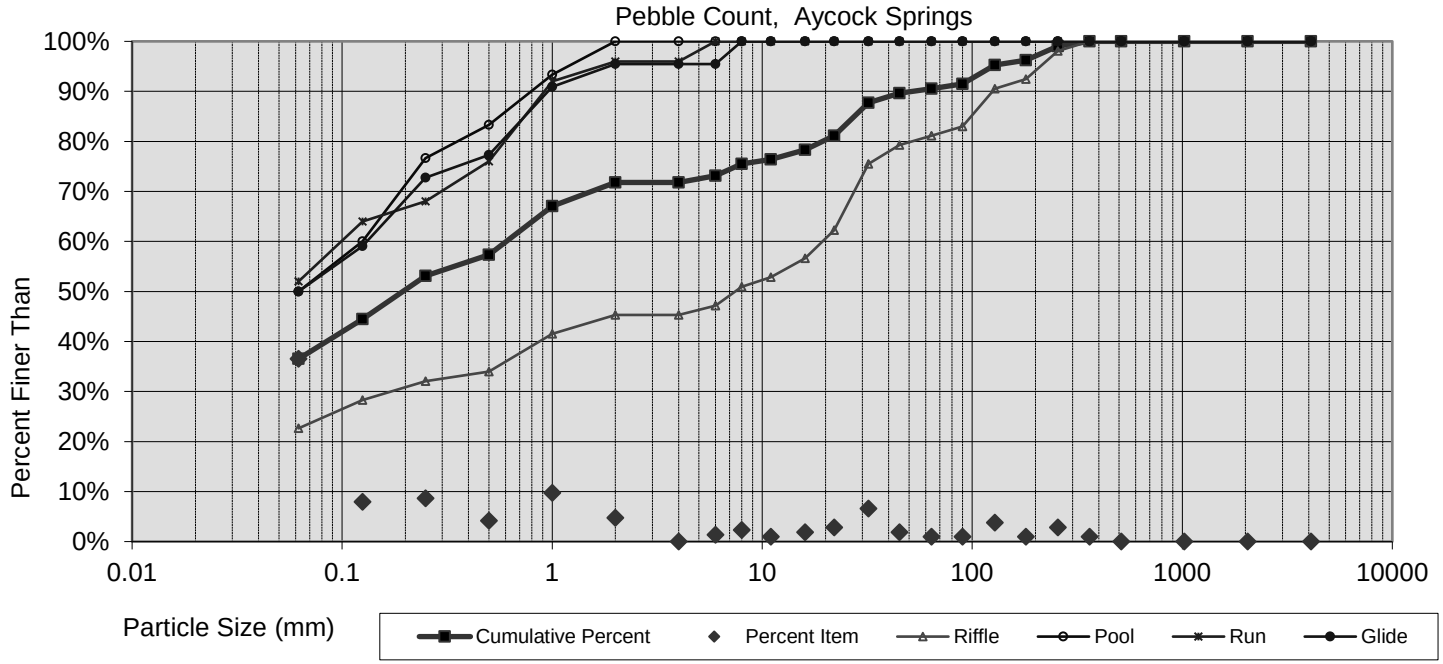


Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	silt/clay	sand	gravel	cobble	boulder	bedrock
#N/A	0.07	0.2	19	42	34%	39%	26%	1%	0%	0%

10	
10	Pebble Count,

	Aycock Springs
	Cape Fear

Note:	**UT-3 - Reach-wide**

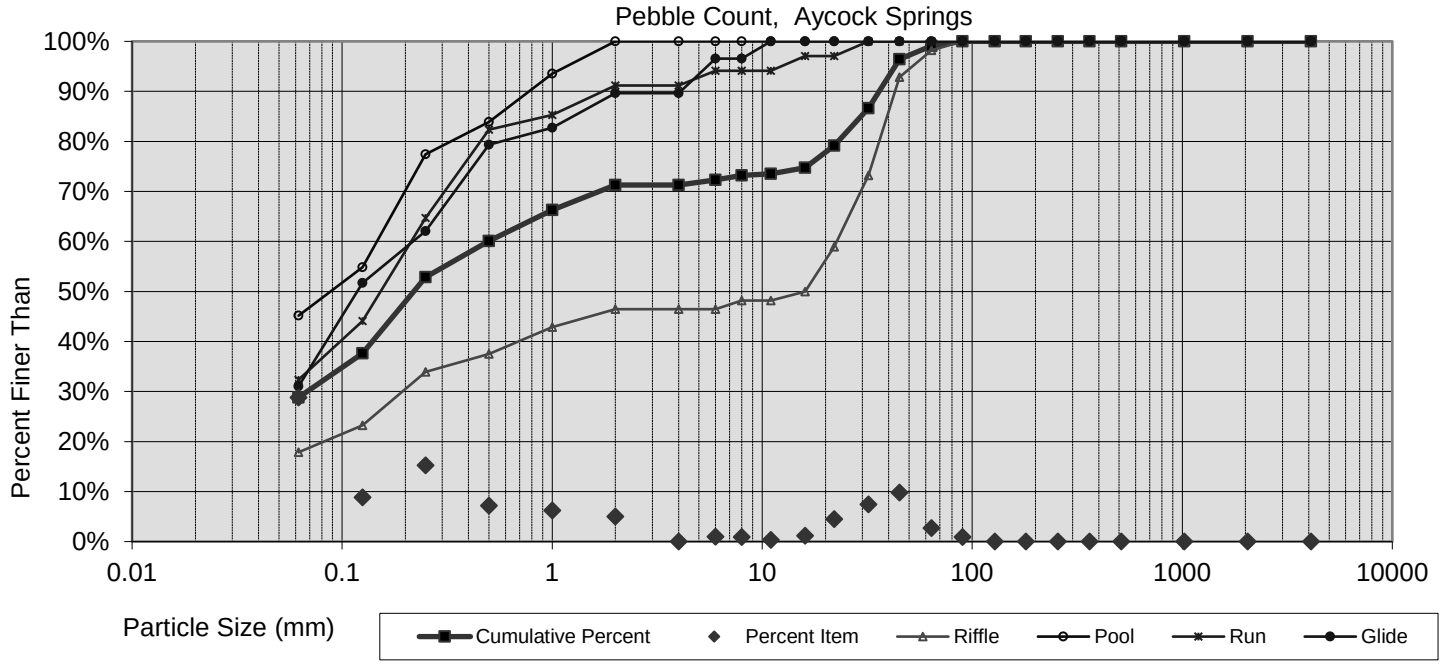


Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	silt/clay	sand	gravel	cobble	boulder	bedrock
#N/A	#N/A	0.2	26	125	37%	35%	19%	8%	1%	0%

10	
10	Pebble Count,

	Aycock Springs
	Cape Fear

Note:	**UT-4 - Reach-wide**

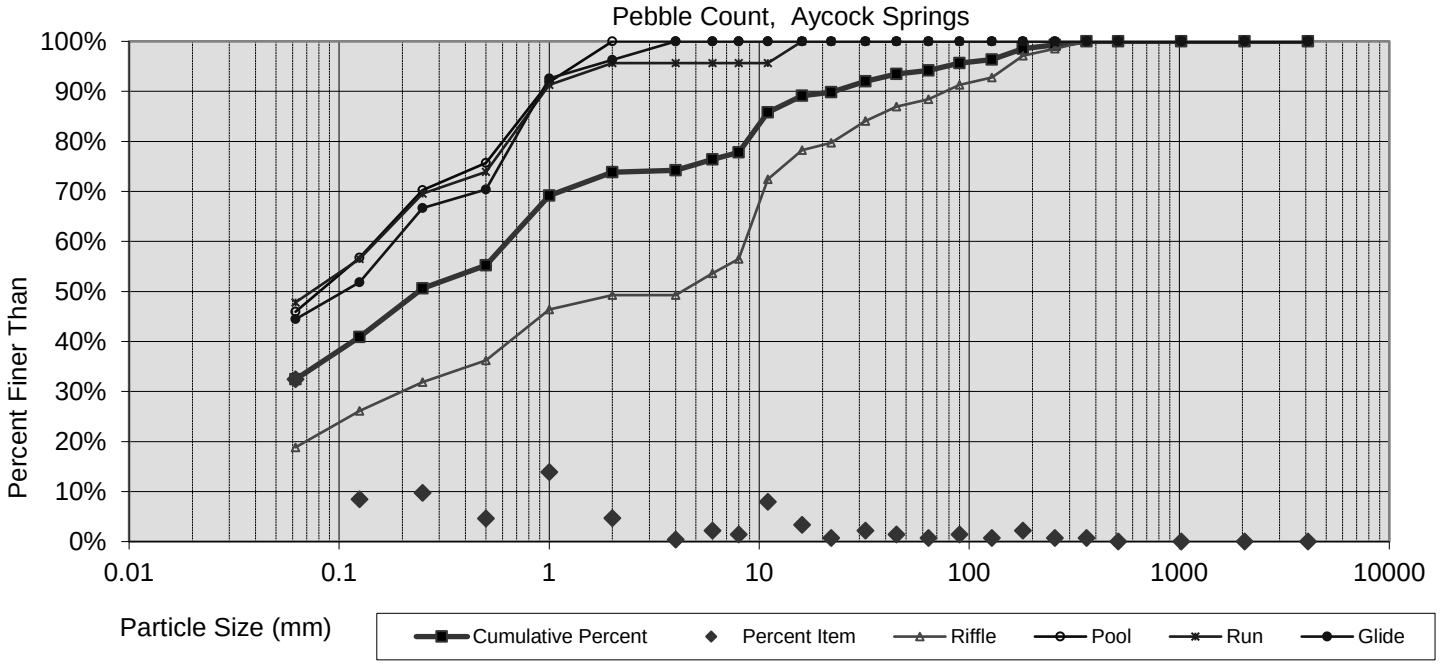


Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	silt/clay	sand	gravel	cobble	boulder	bedrock
#N/A	0.10	0.2	28	43	29%	42%	28%	1%	0%	0%

10	
10	Pebble Count,

	Aycock Springs
	Cape Fear

Note:	**Travis Cr - Reach-wide**



Size percent less than (mm)					Percent by substrate type					
D16	D35	D50	D84	D95	silt/clay	sand	gravel	cobble	boulder	bedrock
#N/A	0.08	0.2	10	77	32%	41%	20%	5%	1%	0%

Table 10A. Baseline Morphology and Hydraulic Summary
Aycock Springs UT 1

Parameter	USGS Gage Data			Pre-Existing Condition			Project Reference Cedarock Park			Project Reference Cripple Creek			Design			As-built		
Dimension	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**
BF Width (ft)	USGS gage data is unavailable for this project			3.8	9.6	6.7	8	12.1	8.1	3	6.1	4.6	7.2	8.3	7.8	6.4	9.6	8.0
Floodprone Width (ft)				8	73	30	15	25	18	150	150	150	20	70	50			90
BF Cross Sectional Area (ft2)						4.3			8			5.9			4.3	3	6.6	3.9
BF Mean Depth (ft)				0.8	1	0.8	0.8	1	0.8	0.7	1.5	1.1	0.5	0.7	0.6	0.4	0.7	0.5
BF Max Depth (ft)				1.1	1.4	1.4	1.1	1.4	1.4	1	2.3	1.7	0.7	0.9	0.8	0.6	1.1	0.7
Width/Depth Ratio				8	15.1	10.1	8	15.1	10.1	4	4.3	4.2	12	16	14	11	19	15
Entrenchment Ratio				1.9	2.2	2.1	1.9	2.2	2.1	24.6	50	37.3	2.6	9	6.4	9	14	11.3
Bank Height Ratio				1	1.8	1	1	1.8	1	1	1.5	1.3	1	1.2	1			1
Wetted Perimeter(ft)						===			===			===			===			===
Hydraulic radius (ft)						===			===			===			===			===
Pattern																		
Channel Beltwidth (ft)				No pattern of riffles and pools due to straightening activties			20	38	22.8	15.1	29.2	24.3	23	47	31	23	47	31
Radius of Curvature (ft)							11	27	16.5	8.9	19.4	13.2	14	31	23	14	31	23
Meander Wavelength (ft)							44	116	68.4	31	74	47.8	47	94	66	47	94	66
Meander Width ratio							2.4	4.7	2.8	2.1	4	3.4	3	6	4	3	6	4
Profile																		
Riffle length (ft)				No pattern of riffles and pools due to straightening activties					===			===			===	9	70	16
Riffle slope (ft/ft)							1.00%	5.76%	3.16%	0.00%	1.54%	0.83%	2.77%	6.47%	4.16%	0.01%	4.33%	2.23%
Pool length (ft)									===			===			===	4	23	9
Pool spacing (ft)							25	69	37.2	14	39.6	32.4	23	62	31	23	62	31
Substrate																		
d50 (mm)						===			===			===			===			===
d84 (mm)						===			===			===			===			===
Additional Reach Parameters																		
Valley Length (ft)						===			===			===			===			===
Channel Length (ft)						===			===			===			===			===
Sinuosity						1.02			1.2			1.22			1.1			1.1
Water Surface Slope (ft/ft)						1.37% - 3.61%			2.58%			0.50%			1.27% - 3.35%			1.89%
BF slope (ft/ft)						===			===			===			===			===
Rosgen Classification						Cg			E			E			E/C			E/C

Table 10B. Baseline Morphology and Hydraulic Summary
Aycock Springs UT 2

Parameter	USGS Gage Data			Pre-Existing Condition			Project Reference Cedarock Park			Project Reference Cripple Creek			Design			As-built		
Dimension	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**
BF Width (ft)	USGS gage data is unavailable for this project			3.8	9.6	6.7	8	12.1	8.1	3	6.1	4.6	7.2	8.3	7.8	4.8	8.6	7.2
Floodprone Width (ft)				8	73	30	15	25	18	150	150	150	20	70	50			90
BF Cross Sectional Area (ft2)						4.3			8			5.9			4.3	1	4.2	2.3
BF Mean Depth (ft)				0.8	1	0.8	0.8	1	0.8	0.7	1.5	1.1	0.5	0.7	0.6	0.2	0.6	0.3
BF Max Depth (ft)				1.1	1.4	1.4	1.1	1.4	1.4	1	2.3	1.7	0.7	0.9	0.8	0.3	0.8	0.6
Width/Depth Ratio				8	15.1	10.1	8	15.1	10.1	4	4.3	4.2	12	16	14	12	32	22
Entrenchment Ratio				1.9	2.2	2.1	1.9	2.2	2.1	24.6	50	37.3	2.6	9	6.4	11	19	13
Bank Height Ratio				1	1.8	1	1	1.8	1	1	1.5	1.3	1	1.2	1			1
Wetted Perimeter(ft)						===			===			===			===			===
Hydraulic radius (ft)						===			===			===			===			===
Pattern																		
Channel Beltwidth (ft)				No pattern of riffles and pools due to straightening activties			20	38	22.8	15.1	29.2	24.3	23	47	31	23	47	31
Radius of Curvature (ft)							11	27	16.5	8.9	19.4	13.2	14	31	23	14	31	23
Meander Wavelength (ft)							44	116	68.4	31	74	47.8	47	94	66	47	94	66
Meander Width ratio							2.4	4.7	2.8	2.1	4	3.4	3	6	4	3	6	4
Profile																		
Riffle length (ft)				No pattern of riffles and pools due to straightening activties					===			===			===	9	23	14
Riffle slope (ft/ft)							1.00%	5.76%	3.16%	0.00%	1.54%	0.83%	2.77%	6.47%	4.16%	0.00%	5.24%	2.88%
Pool length (ft)									===			===			===	5	17	10
Pool spacing (ft)							25	69	37.2	14	39.6	32.4	23	62	31	23	62	31
Substrate																		
d50 (mm)						===			===			===			===			===
d84 (mm)						===			===			===			===			===
Additional Reach Parameters																		
Valley Length (ft)						===			===			===			===			===
Channel Length (ft)						===			===			===			===			===
Sinuosity						1.02			1.2			1.22			1.1			1.1
Water Surface Slope (ft/ft)						1.37% - 3.61%			2.58%			0.50%			1.27% - 3.35%			3.01%
BF slope (ft/ft)						===			===			===			===			===
Rosgen Classification						Cg			E			E			E/C			E/C

Note: UT 2 is characterized by a spring/seep, with a very small watershed. The channel was constructed with a smaller Bankfull Cross Sectional area to account for the smaller stormwater pulses and controlled discharge. In addition, the lower reaches of the channel are low slope wetlands that elevate the width-to-depth ratio in post construction measurements.

Table 10C. Baseline Morphology and Hydraulic Summary
Aycock Springs UT 3

Parameter	USGS Gage Data			Pre-Existing Condition			Project Reference Cedarock Park			Project Reference Cripple Creek			Design			As-built		
Dimension	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**
BF Width (ft)	USGS gage data is unavailable for this project			4.1	5	4.5	8	12.1	8.1	3	6.1	4.6	7.2	8.3	7.8	4.7	7	5.9
Floodprone Width (ft)				7	18	12	15	25	18	150	150	150	20	70	50	10	20	20
BF Cross Sectional Area (ft2)						2.2			8			5.9			4.3	1.2	2.7	2.1
BF Mean Depth (ft)				0.4	0.5	0.5	0.8	1	0.8	0.7	1.5	1.1	0.5	0.7	0.6	0.2	0.4	0.4
BF Max Depth (ft)				0.8	1.1	1	1.1	1.4	1.4	1	2.3	1.7	0.7	0.9	0.8	0.5	0.6	0.6
Width/Depth Ratio				8.2	12.5	9.9	8	15.1	10.1	4	4.3	4.2	12	16	14	12	26	20
Entrenchment Ratio				1.7	3.6	2.5	1.9	2.2	2.1	24.6	50	37.3	2.6	9	6.4	2	4	3.3
Bank Height Ratio				1	3	2	1	1.8	1	1	1.5	1.3	1	1.2	1			1
Wetted Perimeter(ft)						===			===			===			===			===
Hydraulic radius (ft)						===			===			===			===			===
Pattern																		
Channel Beltwidth (ft)				No pattern of riffles and pools due to straightening activties			20	38	22.8	15.1	29.2	24.3	23	47	31	23	47	31
Radius of Curvature (ft)							11	27	16.5	8.9	19.4	13.2	14	31	23	14	31	23
Meander Wavelength (ft)							44	116	68.4	31	74	47.8	47	94	66	47	94	66
Meander Width ratio							2.4	4.7	2.8	2.1	4	3.4	3	6	4	3	6	4
Profile																		
Riffle length (ft)				No pattern of riffles and pools due to straightening activties					===			===			===	8	24	14
Riffle slope (ft/ft)							1.00%	5.76%	3.16%	0.00%	1.54%	0.83%	2.77%	6.47%	4.16%	0.52%	2.54%	1.71%
Pool length (ft)									===			===			===	6	10	8
Pool spacing (ft)							25	69	37.2	14	39.6	32.4	23	62	31	23	62	31
Substrate																		
d50 (mm)						===			===			===			===			===
d84 (mm)						===			===			===			===			===
Additional Reach Parameters																		
Valley Length (ft)						===			===			===			===			===
Channel Length (ft)						===			===			===			===			===
Sinuosity						1.01			1.2			1.22			1.1			1.1
Water Surface Slope (ft/ft)						1.53%			2.58%			0.50%			1.27% - 3.35%			0.92%
BF slope (ft/ft)						===			===			===			===			===
Rosgen Classification						Eg			E			E			E/C			E/C

Note: UT 3 is characterized by a pond in the headwaters; therefore, the channel was constructed with a smaller Bankfull Cross Sectional area than other tributaries associated with the project.

Table 10D. Baseline Morphology and Hydraulic Summary
Aycock Springs UT 4

Parameter	USGS Gage Data			Pre-Existing Condition			Project Reference Cedarock Park			Project Reference Cripple Creek			Design			As-built		
Dimension	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**
BF Width (ft)	USGS gage data is unavailable for this project			4.8	11.7	8.3	8	12.1	8.1	3	6.1	4.6	8.7	10	9.4	8	10.9	8.5
Floodprone Width (ft)				8	70	39	15	25	18	150	150	150	70	200	150			50
BF Cross Sectional Area (ft2)						6.3			8			5.9			6.3	3.5	5.6	4.3
BF Mean Depth (ft)				0.5	1.3	0.8	0.8	1	0.8	0.7	1.5	1.1	0.6	0.8	0.7	0.4	0.6	0.5
BF Max Depth (ft)				0.9	2	1.5	1.1	1.4	1.4	1	2.3	1.7	0.8	1.1	1	0.6	0.9	0.8
Width/Depth Ratio				3.7	23.4	12.4	8	15.1	10.1	4	4.3	4.2	12	16	14	16	22	19
Entrenchment Ratio				1.2	11.5	4.9	1.9	2.2	2.1	24.6	50	37.3	7.5	21.3	16	5	6	6
Bank Height Ratio				1.2	2.4	1.8	1	1.8	1	1	1.5	1.3	1	1.2	1			1
Wetted Perimeter(ft)						===			===			===			===			===
Hydraulic radius (ft)						===			===			===			===			===
Pattern																		
Channel Beltwidth (ft)				No pattern of riffles and pools due to straightening activties			20	38	22.8	15.1	29.2	24.3	28	56	38	28	56	38
Radius of Curvature (ft)							11	27	16.5	8.9	19.4	13.2	17	38	28	17	38	28
Meander Wavelength (ft)							44	116	68.4	31	74	47.8	56	113	80	56	113	80
Meander Width ratio							2.4	4.7	2.8	2.1	4	3.4	3	6	4	3	6	4
Profile																		
Riffle length (ft)				No pattern of riffles and pools due to straightening activties					===			===			===	12	35	16
Riffle slope (ft/ft)							1.00%	5.76%	3.16%	0.00%	1.54%	0.83%	1.12%	2.60%	1.67%	0.61%	2.42%	1.28%
Pool length (ft)									===			===			===	14	42	22
Pool spacing (ft)							25	69	37.2	14	39.6	32.4	28	75	38	28	75	38
Substrate																		
d50 (mm)						===			===			===			===			===
d84 (mm)						===			===			===			===			===
Additional Reach Parameters																		
Valley Length (ft)						===			===			===			===			===
Channel Length (ft)						===			===			===			===			===
Sinuosity						1.1			1.2			1.22			1.1			1.1
Water Surface Slope (ft/ft)						0.93%			2.58%			0.50%			0.93%			0.66%
BF slope (ft/ft)						===			===			===			===			===
Rosgen Classification						Eg			E			E			E/C			E/C

Table 10E. Baseline Morphology and Hydraulic Summary
Aycock Springs Travis Creek

Parameter	USGS Gage Data			Pre-Existing Condition			Project Reference Cedarock Park			Project Reference Cripple Creek			Design			As-built		
Dimension	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**	**Min**	**Max**	**Med**
BF Width (ft)	USGS gage data is			30	51.7	41.4	8	12.1	8.1	3	6.1	4.6	25.7	29.6	27.7	25.2	30.3	26.7
Floodprone Width (ft)	unavailable for this			68	160	122	15	25	18	150	150	150	200	300	250			150
BF Cross Sectional Area (ft2)	project					54.9			8			5.9			54.9	41.3	73.9	51.2
BF Mean Depth (ft)				1.1	1.8	1.4	0.8	1	0.8	0.7	1.5	1.1	1.9	2.1	2	1.6	2.4	2
BF Max Depth (ft)				3.3	4.1	3.7	1.1	1.4	1.4	1	2.3	1.7	2.7	3	2.8	2.3	3.4	2.8
Width/Depth Ratio				16.7	47	32.1	8	15.1	10.1	4	4.3	4.2	12	16	14	12	16	13
Entrenchment Ratio				1.6	5.3	3.2	1.9	2.2	2.1	24.6	50	37.3	7.2	10.8	9	5	6	5.6
Bank Height Ratio				1	1.1	1	1	1.8	1	1	1.5	1.3	1	1.2	1			1
Wetted Perimeter(ft)						===			===			===			===			===
Hydraulic radius (ft)						===			===			===			===			===
Pattern																		
Channel Beltwidth (ft)				No pattern of riffles			20	38	22.8	15.1	29.2	24.3	83	166	111	83	166	111
Radius of Curvature (ft)				and pools due to			11	27	16.5	8.9	19.4	13.2	55	111	83	55	111	83
Meander Wavelength (ft)				straightening activties			44	116	68.4	31	74	47.8	166	332	236	166	332	236
Meander Width ratio							2.4	4.7	2.8	2.1	4	3.4	3	6	4	3	6	4
Profile																		
Riffle length (ft)				No pattern of riffles					===			===			===	16	87	54
Riffle slope (ft/ft)				and pools due to			1.00%	5.76%	3.16%	0.00%	1.54%	0.83%	0.28%	0.64%	0.41%	0.00%	0.70%	0.19%
Pool length (ft)				straightening activties					===			===			===	27	70	43
Pool spacing (ft)							25	69	37.2	14	39.6	32.4	83	222	111	83	222	111
Substrate																		
d50 (mm)						===			===			===			===			===
d84 (mm)						===			===			===			===			===
Additional Reach Parameters																		
Valley Length (ft)						===			===			===			===			===
Channel Length (ft)						===			===			===			===			===
Sinuosity						1.05			1.2			1.22			1.05			1.05
Water Surface Slope (ft/ft)						NA			2.58%			0.50%			0.23%			0.10%
BF slope (ft/ft)						===			===			===			===			===
Rosgen Classification						Fc			E			E			E/C			E/C

Table 11A. Morphology and Hydraulic Monitoring Summary
Aycock Travis Creek (Downstream) - Stream and Wetland Restoration Site

Parameter	XS 1 Riffle (Travis Down)						XS 2 Riffle (Travis Down)						XS 3 Pool (Travis Down)						XS 4 Riffle (Travis Down)						XS 5 Pool (Travis Down)						XS 6 Riffle (Travis Down)					
Dimension	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
BF Width (ft)	26	26.7					25.2	26.2					33.7	33.2					25.5	27					26	26.7					27.3	27.7				
Floodprone Width (ft)	150	150					150	150					----	----					150	150					----	----					150	150				
BF Cross Sectional Area (ft2)	41.3	40					47.5	47.4					58.7	55.8					47.2	44.6					61.4	58.1					54.9	50.6				
BF Mean Depth (ft)	1.6	1.5					1.9	1.8					1.7	1.7					1.9	1.7					2.4	2.2					2.0	1.8				
BF Max Depth (ft)	2.3	2.3					2.5	2.5					3.7	3.5					2.5	2.6					4	3.7					3	2.9				
Width/Depth Ratio	16.4	17.8					13.4	14.5					----	----					13.8	16.3					----	----					13.6	15.2				
Entrenchment Ratio	5.8	5.6					6.0	5.7					----	----					5.9	5.6					----	----					5.5	5.4				
Bank Height Ratio	1.0	1.0					1.0	1.0					----	----					1.0	1.0					----	----					1.0	1.0				
Wetted Perimeter (ft)	27.1	27.4					26.4	27.5					34.8	34.4					26.6	28					27.6	28.2					28.7	29.1				
Hydraulic Radius (ft)	1.5	1.5					1.8	1.7					1.7	1.6					1.8	1.6					2.2	2.1					1.9	1.7				
Substrate																																				
d50 (mm)	----	----					----	----					----	----					----	----					----	----					----	----				
d84 (mm)	----	----					----	----					----	----					----	----					----	----					----	----				

Parameter	XS 7 Pool (Travis Down)						XS 8 Riffle (Travis Down)						XS 9 Pool (Travis Down)						XS 10 Pool (Travis Down)						XS 11 Riffle (Travis Down)					
Dimension	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
BF Width (ft)	25.9	27.7					28.1	28.5					29.3	29.1					38.6	38.6					30.3	29.8				
Floodprone Width (ft)	----	----					150	150					----	----					----	----					150	150				
BF Cross Sectional Area (ft2)	60	45.8					64.6	57.4					65.9	63.1					100	91					73.9	66.6				
BF Mean Depth (ft)	2.3	1.7					2.3	2.0					2.2	2.2					2.6	2.4					2.4	2.2				
BF Max Depth (ft)	3.9	2.8					3.3	3.1					3.7	3.4					4.3	4.2					3.4	3.6				
Width/Depth Ratio	----	----					12.2	14.2					----	----					----	----					12.4	13.3				
Entrenchment Ratio	----	----					5.3	5.3					----	----					----	----					5.0	5.0				
Bank Height Ratio	----	----					1	1					----	----					----	----					1	1				
Wetted Perimeter (ft)	27.5	29.1					29.5	29.7					30.6	30.3					40.2	40					31.8	31.4				
Hydraulic Radius (ft)	2.2	1.6					2.2	1.9					2.2	2.1					2.5	2.3					2.3	2.1				
Substrate																														
d50 (mm)	----	----					----	----					----	----					----	----					----	----				
d84 (mm)	----	----					----	----					----	----					----	----					----	----				

Table 11B. Morphology and Hydraulic Monitoring Summary
Aycock Travis Creek (Upstream) - Stream and Wetland Restoration Site

Parameter	XS 12 Riffle (Travis Up)						XS 13 Pool (Travis Up)						XS 14 Riffle (Travis Up)					
Dimension	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
BF Width (ft)	29	29.6					26.9	26.9					32.8	32.3				
Floodprone Width (ft)	----	----					----	----					150	150				
BF Cross Sectional Area (ft2)	68.7	66.4					64.0	50.3					104.5	92.4				
BF Mean Depth (ft)	2.4	2.2					2.4	1.9					3.2	2.9				
BF Max Depth (ft)	3.4	3.5					3.9	3.3					4.8	4.1				
Width/Depth Ratio	----	----					----	----					10.3	11.3				
Entrenchment Ratio	----	----					----	----					4.6	4.6				
Bank Height Ratio	----	----					----	----					1.0	1.0				
Wetted Perimeter (ft)	30.4	30.8					28.8	28.1					35.0	34.2				
Hydraulic Radius (ft)	2.3	2.2					2.2	1.8					3.0	2.7				
Substrate																		
d50 (mm)	----	----					----	----					----	----				
d84 (mm)	----	----					----	----					----	----				

Table 11C. Morphology and Hydraulic Monitoring Summary
Aycock UT-1 - Stream and Wetland Restoration Site

Parameter	XS 1 Riffle (UT 1)						XS 2 Riffle (UT 1)						XS 3 Pool (UT 1)						XS 4 Riffle (UT 1)						XS 5 Riffle (UT 1)					
Dimension	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
BF Width (ft)	9.3	9.2					8.8	9.3					8.4	8.4					9.3	9.7					9.6	9.5				
Floodprone Width (ft)	90	90					90	90					----	----					90	90					90	90				
BF Cross Sectional Area (ft2)	5.6	4.7					4.6	3.7					6.7	5.6					6.2	5.5					6.6	5.9				
BF Mean Depth (ft)	0.6	0.5					0.5	0.4					0.8	0.7					0.7	0.6					0.7	0.6				
BF Max Depth (ft)	1.1	0.8					0.7	0.6					1.3	1.2					1	0.9					1.1	1.1				
Width/Depth Ratio	15.4	18.0					16.8	23.4					----	----					14.0	17.1					14.0	15.3				
Entrenchment Ratio	9.7	9.8					10.2	9.7					----	----					9.7	9.3					9.4	9.5				
Bank Height Ratio	1.0	1.0					1.0	1.0					----	----					1.0	1.0					1.0	1.0				
Wetted Perimeter (ft)	9.7	9.4					9	9.4					8.9	8.9					9.7	10					10	10				
Hydraulic Radius (ft)	0.6	0.5					0.5	0.4					0.7	0.6					0.6	0.5					0.7	0.6				
Substrate																														
d50 (mm)	----	----					----	----					----	----					----	----					----	----				
d84 (mm)	----	----					----	----					----	----					----	----					----	----				

Parameter	XS 6 Riffle (UT 1)						XS 7 Riffle (UT 1)						XS 8 Pool (UT 1)						XS 9 Riffle (UT 1)						XS 10 Pool (UT 1)					
Dimension	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
BF Width (ft)	6.9	7.5					7.5	7.2					7.8	8.7					7.9	7.2					7.6	7				
Floodprone Width (ft)	90	90					90	90					----	----					90	90					----	----				
BF Cross Sectional Area (ft2)	3.6	1.9					3.9	2.4					5.7	4.1					3	4.1					4.7	5.6				
BF Mean Depth (ft)	0.5	0.3					0.5	0.3					0.7	0.5					0.4	0.6					0.6	0.8				
BF Max Depth (ft)	0.7	0.4					0.7	0.6					1.2	1					0.7	1.1					1.1	1.3				
Width/Depth Ratio	13.2	29.6					14.4	21.6					----	----					20.8	12.6					----	----				
Entrenchment Ratio	13.0	12.0					12.0	12.5					----	----					11.4	12.5					----	----				
Bank Height Ratio	1.0	1.0					1.0	1.0					----	----					1.0	1.0					----	----				
Wetted Perimeter (ft)	7.2	7.6					7.8	7.3					8.3	9.1					8	7.8					8	7.7				
Hydraulic Radius (ft)	0.5	0.2					0.5	0.3					0.7	0.4					0.4	0.5					0.6	0.7				
Substrate																														
d50 (mm)	----	----					----	----					----	----					----	----					----	----				
d84 (mm)	----	----					----	----					----	----					----	----					----	----				

Parameter	XS 11 Riffle (UT 1)						XS 12 Riffle (UT 1)						XS 13 Pool (UT 1)						XS 14 Riffle (UT 1)						XS 15 Riffle (UT 1)					
Dimension	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
BF Width (ft)	7.4	7					8	7.4					8.6	8					6.4	6.3					7.1	7.2				
Floodprone Width (ft)	90	90					90	90					----	----					90	90					90	90				
BF Cross Sectional Area (ft2)	3.5	3.5					3.7	2.8					6.5	4.3					3.1	2.8					4	3.3				
BF Mean Depth (ft)	0.5	0.5					0.5	0.4					0.8	0.5					0.5	0.4					0.6	0.5				
BF Max Depth (ft)	0.8	0.8					0.7	0.6					1.2	1.2					0.7	0.6					0.9	0.8				
Width/Depth Ratio	15.6	14.0					17.3	19.6					----	----					13.2	14.2					12.6	15.7				
Entrenchment Ratio	12.2	12.9					11.3	12.2					----	----					14.1	14.3					12.7	12.5				
Bank Height Ratio	1.0	1.0					1.0	1.0					----	----					1.0	1.0					1.0	1.0				
Wetted Perimeter (ft)	7.8	7.3					8.5	7.6					9.2	8.5					6.8	6.5					7.4	7.6				
Hydraulic Radius (ft)	0.4	0.5					0.4	0.4					0.7	0.5					0.5	0.4					0.5	0.4				
Substrate																														
d50 (mm)	----	----					----	----					----	----					----	----					----	----				
d84 (mm)	----	----					----	----					----	----					----	----					----	----				

Table 11C continued. Morphology and Hydraulic Monitoring Summary
Aycock UT-1 - Stream and Wetland Restoration Site

Parameter	XS 16 Riffle (UT 1)						XS 17 Riffle (UT 1)						XS 18 Riffle (UT 1)						XS 19 Pool (UT 1)						XS 20 Riffle (UT 1)					
Dimension	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
BF Width (ft)	9	8.3					8.5	8.1					7.1	7.2					7.6	7.7					9.1	8.5				
Floodprone Width (ft)	90	90					90	90					90	90					----	----					90	90				
BF Cross Sectional Area (ft2)	4.6	2.6					3.9	3.6					3.5	3.4					6.5	5.4					5.3	4.4				
BF Mean Depth (ft)	0.5	0.3					0.5	0.4					0.5	0.5					0.9	0.7					0.6	0.5				
BF Max Depth (ft)	0.8	0.5					0.7	0.7					0.6	0.7					1.3	1					0.9	0.7				
Width/Depth Ratio	17.6	26.5					18.5	18.2					14.4	15.2					----	----					15.6	16.4				
Entrenchment Ratio	10.0	10.8					10.6	11.1					12.7	12.5					----	----					9.9	10.6				
Bank Height Ratio	1.0	1.0					1.0	1.0					1.0	1.0					----	----					1.0	1.0				
Wetted Perimeter (ft)	9.3	8.4					8.7	8.3					7.4	7.4					8.2	8.3					9.4	8.7				
Hydraulic Radius (ft)	0.5	0.3					0.5	0.4					0.5	0.5					0.8	0.6					0.6	0.5				
Substrate																														
d50 (mm)	----						----	----					----	----					----	----					----	----				
d84 (mm)	----						----	----					----	----					----	----					----	----				

Parameter	XS 21 Pool (UT 1)						XS 22 Riffle (UT 1)						XS 23 Riffle (UT 1)						XS 24 Riffle (UT 1)					
Dimension	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
BF Width (ft)	8.3	8.2					7.2	7.5					7.6	6.8					8	7.7				
Floodprone Width (ft)	----	----					90	90					90	90					90	90				
BF Cross Sectional Area (ft2)	9.3	5.9					3.6	3.4					3.2	3.2					4	3.2				
BF Mean Depth (ft)	1.1	0.7					0.5	0.5					0.4	0.5					0.5	0.4				
BF Max Depth (ft)	2.1	1.4					0.7	0.7					0.6	0.6					0.7	0.7				
Width/Depth Ratio	----	----					14.4	16.5					18.1	14.5					16.0	18.5				
Entrenchment Ratio	----	----					12.5	12.0					11.8	13.2					11.3	11.7				
Bank Height Ratio	----	----					1.0	1.0					1.0	1.0					1.0	1.0				
Wetted Perimeter (ft)	9.5	9.2					7.5	7.8					9.3	7.0					9.3	7.8				
Hydraulic Radius (ft)	1	0.6					0.5	0.4					0.5	0.5					0.5	0.4				
Substrate																								
d50 (mm)	----	----					----	----					----	----					----	----				
d84 (mm)	----	----					----	----					----	----					----	----				

Table 11D. Morphology and Hydraulic Monitoring Summary
Aycock UT-2 - Stream and Wetland Restoration Site

Parameter	XS 1 Pool (UT 2)						XS 2 Riffle (UT 2)						XS 3 Riffle (UT 2)						XS 4 Riffle (UT 2)						XS 5 Riffle (UT 2)						XS 6 Riffle (UT 2)						XS 7 Pool (UT 2)					
Dimension	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
BF Width (ft)	6.5	6.3					4.8	5.6					5.7	5.3					6.4	5.7					8.4	7.7					6.9	7					8.3	9.4				
Floodprone Width (ft)	----	----					90	90					90	90					90	90					90	90					90	90					----	----				
BF Cross Sectional Area (ft2)	3.8	2.1					1	1.1					1.7	1.4					1	0.9					3.1	2.8					2.3	1.4					5.1	4.1				
BF Mean Depth (ft)	0.6	0.3					0.2	0.2					0.3	0.3					0.2	0.2					0.4	0.4					0.3	0.2					0.6	0.4				
BF Max Depth (ft)	1	0.6					0.3	0.3					0.5	0.5					0.4	0.3					0.7	0.6					0.6	0.3					1.1	0.8				
Width/Depth Ratio	----	----					23.0	28.5					19.1	20.1					41.0	36.1					22.8	21.2					20.7	35.0					----	----				
Entrenchment Ratio	----	----					18.8	16.1					15.8	17.0					14.1	15.8					10.7	11.7					13.0	12.9					----	----				
Bank Height Ratio	----	----					1.0	1.0					1.0	1.0					1.0	1.0					1.0	1.0					1.0	1.0					----	----				
Wetted Perimeter (ft)	6.9	6.5					4.9	5.7					5.8	5.4					6.5	5.7					8.6	7.9					7.0	7.0					8.8	9.5				
Hydraulic Radius (ft)	0.6	0.3					0.2	0.2					0.3	0.3					0.2	0.2					0.4	0.4					0.3	0.2					0.6	0.4				
Substrate																																											
d50 (mm)	----	----					----	----					----	----					----	----					----	----					----	----					----	----				
d84 (mm)	----	----					----	----					----	----					----	----					----	----					----	----					----	----				

Parameter	XS 8 Riffle (UT 2)						XS 9 Riffle (UT 2)						XS 10 Pool (UT 2)						XS 11 Pool (UT 2)						XS 12 Riffle (UT 2)						XS 13 Riffle (UT 2)					
Dimension	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
BF Width (ft)	8.6	8.3					7.4	7.9					7.5	7.8					6.2	6.4					8.3	9.2					7.2	7.6				
Floodprone Width (ft)	90	90					90	90					----	----					----	----					90	90					90	90				
BF Cross Sectional Area (ft2)	3.6	3.1					4.2	3.8					5.2	4					3.5	2.7					3.2	2.3					2.1	1.7				
BF Mean Depth (ft)	0.4	0.4					0.6	0.5					0.7	0.5					0.6	0.4					0.4	0.3					0.3	0.2				
BF Max Depth (ft)	0.6	0.5					0.8	0.7					1.3	0.9					0.8	0.7					0.7	0.5					0.4	0.3				
Width/Depth Ratio	20.5	22.2					13.0	16.4					----	----					----	----					21.5	36.8					24.7	34.0				
Entrenchment Ratio	10.5	10.8					12.2	11.4					----	----					----	----					10.8	9.8					12.5	11.8				
Bank Height Ratio	1.0	1.0					1.0	1.0					----	----					----	----					1.0	1.0					1.0	1.0				
Wetted Perimeter (ft)	8.8	8.5					7.7	8.1					8.1	8.2					6.6	6.6					8.6	9.3					7.3	7.7				
Hydraulic Radius (ft)	0.4	0.4					0.5	0.5					0.7	0.5					0.5	0.4					0.4	0.3					0.3	0.2				
Substrate																																				
d50 (mm)	----	----					----	----					----	----					----	----					----	----					----	----				
d84 (mm)	----	----					----	----					----	----					----	----					----	----					----	----				

Table 11E. Morphology and Hydraulic Monitoring Summary
Aycock UT-3 - Stream and Wetland Restoration Site

Parameter	XS 1 Riffle (UT 3)						XS 2 Riffle (UT 3)						XS 3 Pool (UT 3)						XS 4 Riffle (UT 3)						XS 5 Riffle (UT 3)					
Dimension	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
BF Width (ft)	6.5	6.9					4.7	5.2					5	5.4					7	6.8					5.3	5.6				
Floodprone Width (ft)	10	11					20	8					----	----					20	20					20	20				
BF Cross Sectional Area (ft2)	2.7	2.3					1.9	1.6					3.6	3.2					2.2	1.9					1.2	1.1				
BF Mean Depth (ft)	0.4	0.3					0.4	0.3					0.7	0.6					0.3	0.3					0.2	0.2				
BF Max Depth (ft)	0.6	0.6					0.6	0.5					1	0.9					0.5	0.4					0.5	0.4				
Width/Depth Ratio	15.6	20.7					11.6	16.9					----	----					22.3	24.3					23.4	28.5				
Entrenchment Ratio	1.5	1.6					4.3	1.5					----	----					2.9	2.9					3.8	3.6				
Bank Height Ratio	1.0	1.0					1.0	1.0					----	----					1.0	1.0					1.0	1.0				
Wetted Perimeter (ft)	6.8	7.1					5.0	5.3					5.7	5.8					7.1	6.9					5.7	5.8				
Hydraulic Radius (ft)	0.4	0.3					0.4	0.3					0.6	0.6					0.3	0.3					0.2	0.2				
Substrate	.						.																							
d50 (mm)	----	----					----	----					----	----					----	----					----	----				
d84 (mm)	----	----					----	----					----	----					----	----					----	----				

Table 11F. Morphology and Hydraulic Monitoring Summary
Aycock UT-4 - Stream and Wetland Restoration Site

Parameter	XS 1 Riffle (UT 4)						XS 2 Pool (UT 4)						XS 3 Riffle (UT 4)						XS 4 Pool (UT 4)						XS 5 Riffle (UT 4)					
Dimension	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
BF Width (ft)	8.3	9.4					8.5	9.1					8.6	8.7					8.5	10.6					8	8.3				
Floodprone Width (ft)	50	50					----	----					50	50					----	----					50	50				
BF Cross Sectional Area (ft2)	3.7	3.3					6.4	5.4					4.3	3.4					6.2	5.2					4.3	4.1				
BF Mean Depth (ft)	0.4	0.4					0.8	0.6					0.5	0.4					0.7	0.5					0.5	0.5				
BF Max Depth (ft)	0.6	0.5					1.5	1					0.8	0.5					1.2	1					0.7	0.7				
Width/Depth Ratio	18.6	26.8					----	----					17.2	22.3					----	----					14.9	16.8				
Entrenchment Ratio	6.0	5.3					----	----					5.8	5.7					----	----					6.3	6.0				
Bank Height Ratio	1.0	1.0					----	----					1.0	1.0					----	----					1.0	1.0				
Wetted Perimeter (ft)	8.6	9.5					9.2	9.5					9.0	8.8					9.1	10.9					8.3	8.5				
Hydraulic Radius (ft)	0.4	0.3					0.7	0.6					0.5	0.4					0.7	0.5					0.5	0.5				
Substrate																														
d50 (mm)	----	----					----	----					----	----					----	----					----	----				
d84 (mm)	----	----					----	----					----	----					----	----					----	----				

Parameter	XS 6 Riffle (UT 4)						XS 7 Riffle (UT 4)						XS 8 Riffle (UT 4)					
Dimension	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**MY 0**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
BF Width (ft)	8.1	8.9					9.9	11.7					10.9	11.1				
Floodprone Width (ft)	50	50					50	50					50	50				
BF Cross Sectional Area (ft2)	3.5	3.3					5.6	4.9					5.6	4.9				
BF Mean Depth (ft)	0.4	0.4					0.6	0.4					0.5	0.4				
BF Max Depth (ft)	0.6	0.5					0.9	0.6					0.8	0.7				
Width/Depth Ratio	18.7	24.0					17.5	27.9					21.2	25.1				
Entrenchment Ratio	6.2	5.6					5.1	4.3					4.6	4.5				
Bank Height Ratio	1.0	1.0					1.0	1.0					1.0	1.0				
Wetted Perimeter (ft)	8.4	9.0					10.2	11.9					11.1	11.3				
Hydraulic Radius (ft)	0.4	0.4					0.6	0.4					0.5	0.4				
Substrate																		
d50 (mm)	----	----					----	----					----	----				
d84 (mm)	----	----					----	----					----	----				

APPENDIX E

HYDROLOGY DATA

Table 12. UT3 Channel Evidence

Stream Gauge Graphs

Table 13. Verification of Bankfull Events

Groundwater Gauge Graphs

Table 14. Groundwater Hydrology Data

Table 12. UT3 Channel Evidence

UT3 Channel Evidence	Year 1 (2016)
Max consecutive days channel flow	37
Presence of litter and debris (wracking)	Yes
Leaf litter disturbed or washed away	Yes
Matted, bent, or absence of vegetation (herbaceous or otherwise)	Yes
Sediment deposition and/or scour indicating sediment transport	Yes
Water staining due to continual presence of water	Yes
Formation of channel bed and banks	Yes
Sediment sorting within the primary path of flow	Yes
Sediment shelving or a natural line impressed on the banks	Yes
Change in plant community (absence or destruction of terrestrial vegetation and/or transition to species adapted for flow or inundation for a long duration, including hydrophytes)	Yes
Development of channel pattern (meander bends and/or channel braiding) at natural topographic breaks, woody debris piles, or plant root systems	Yes
Exposure of woody plant roots within the primary path of flow	No
Other:	

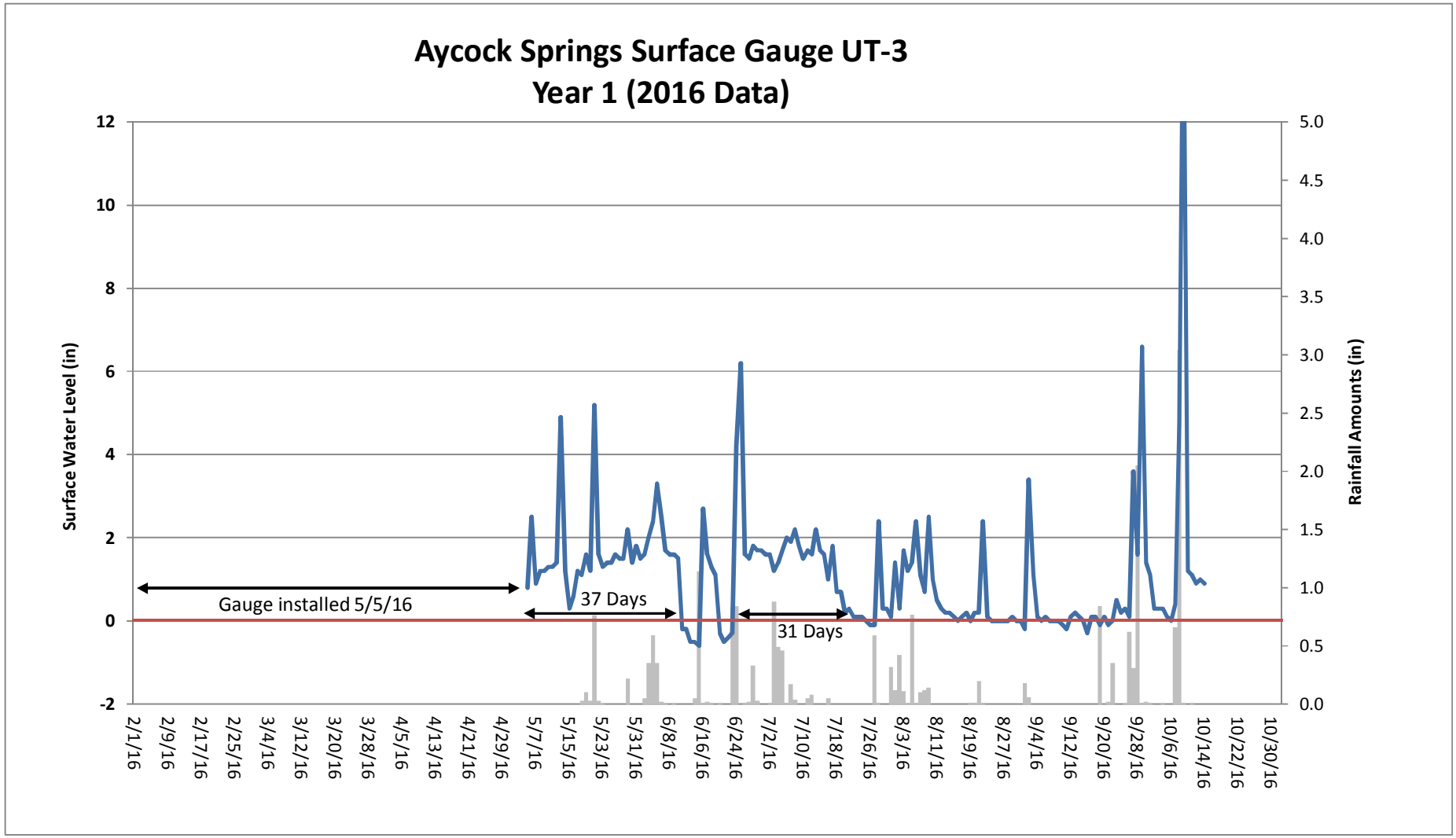
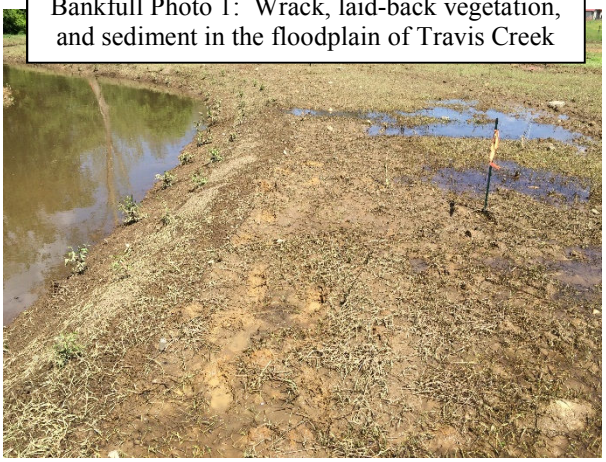

Aycock Springs Surface Gauge UT-3
Year 1 (2016 Data)
Surface Water Level (in)
Rainfall Amounts (in)
12
10
8
6
4
2
0
-2
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Gauge installed 5/5/16
37 Days
31 Days
2/1/16
2/9/16
2/17/16
2/25/16
3/4/16
3/12/16
3/20/16
3/28/16
4/5/16
4/13/16
4/21/16
4/29/16
5/7/16
5/15/16
5/23/16
5/31/16
6/8/16
6/16/16
6/24/16
7/2/16
7/10/16
7/18/16
7/26/16
8/3/16
8/11/16
8/19/16
8/27/16
9/4/16
9/12/16
9/20/16
9/28/16
10/6/16
10/14/16
10/22/16
10/30/16

Table 13. Verification of Bankfull Events

Date of Data Collection	Date of Occurrence	Method	Photo (if available)
May 5, 2016	May 3, 2016	Wrack, laid-back vegetation, sediment, and standing water observed in the floodplain after 1.55 inches of rain documented* on May 3, 2016 at a nearby rain gauge.	1
October 13, 2016	September 28, 2016	2.05 inches of rain was recorded on September 28, 2016 at an onsite rain gauge.	--
October 13, 2016	October 8, 2016	Wrack and laid-back vegetation observed on top of bank after 3.05 inches of rain was recorded on October 8, 2016 at an onsite rain gauge.	2

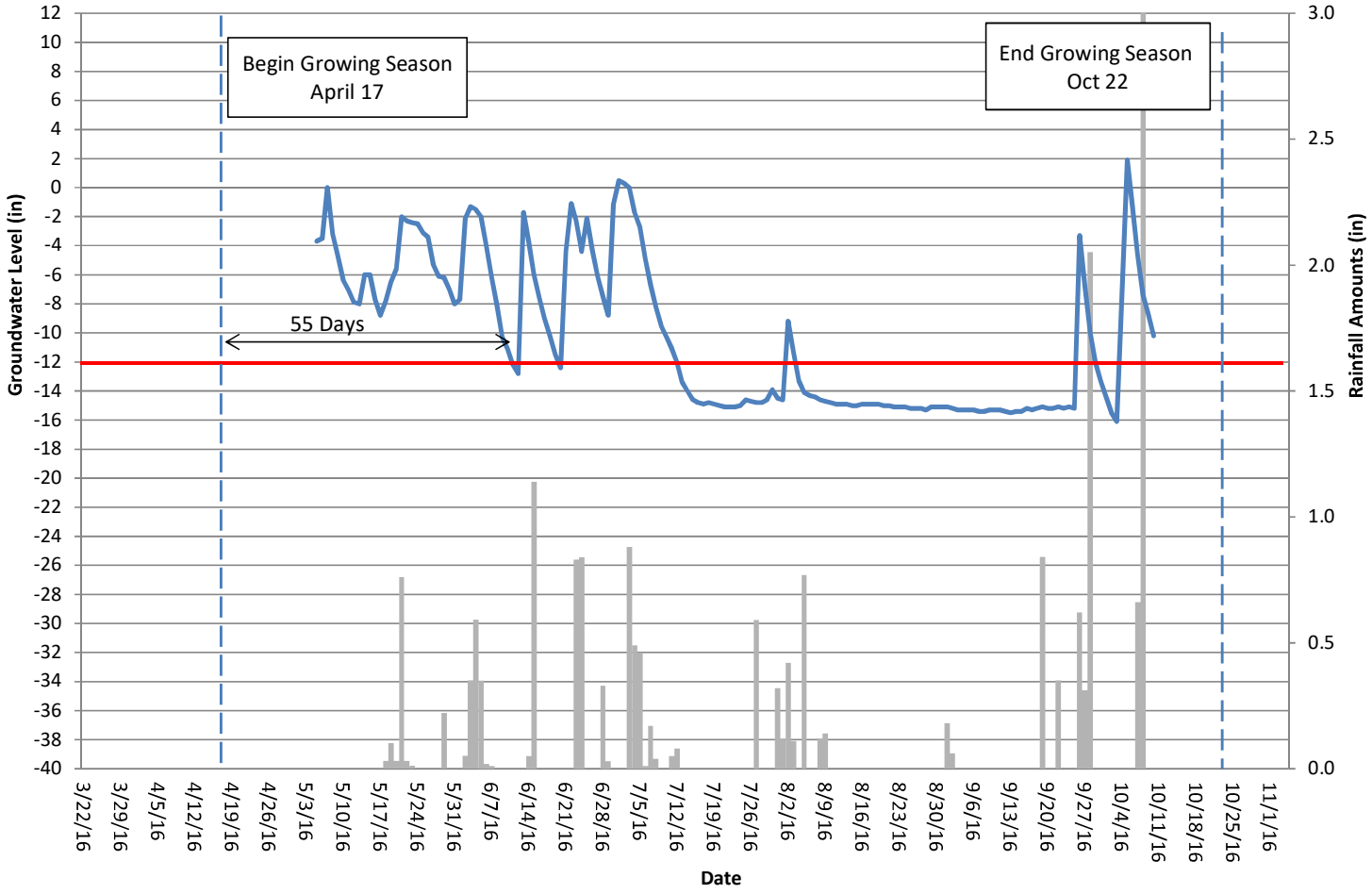
*The onsite rain gauge was installed on May 18, 2016, therefore rain data from a nearby Site (Abbey Lamm Stream and Wetland Mitigation Site) was used to confirm this bankfull event.

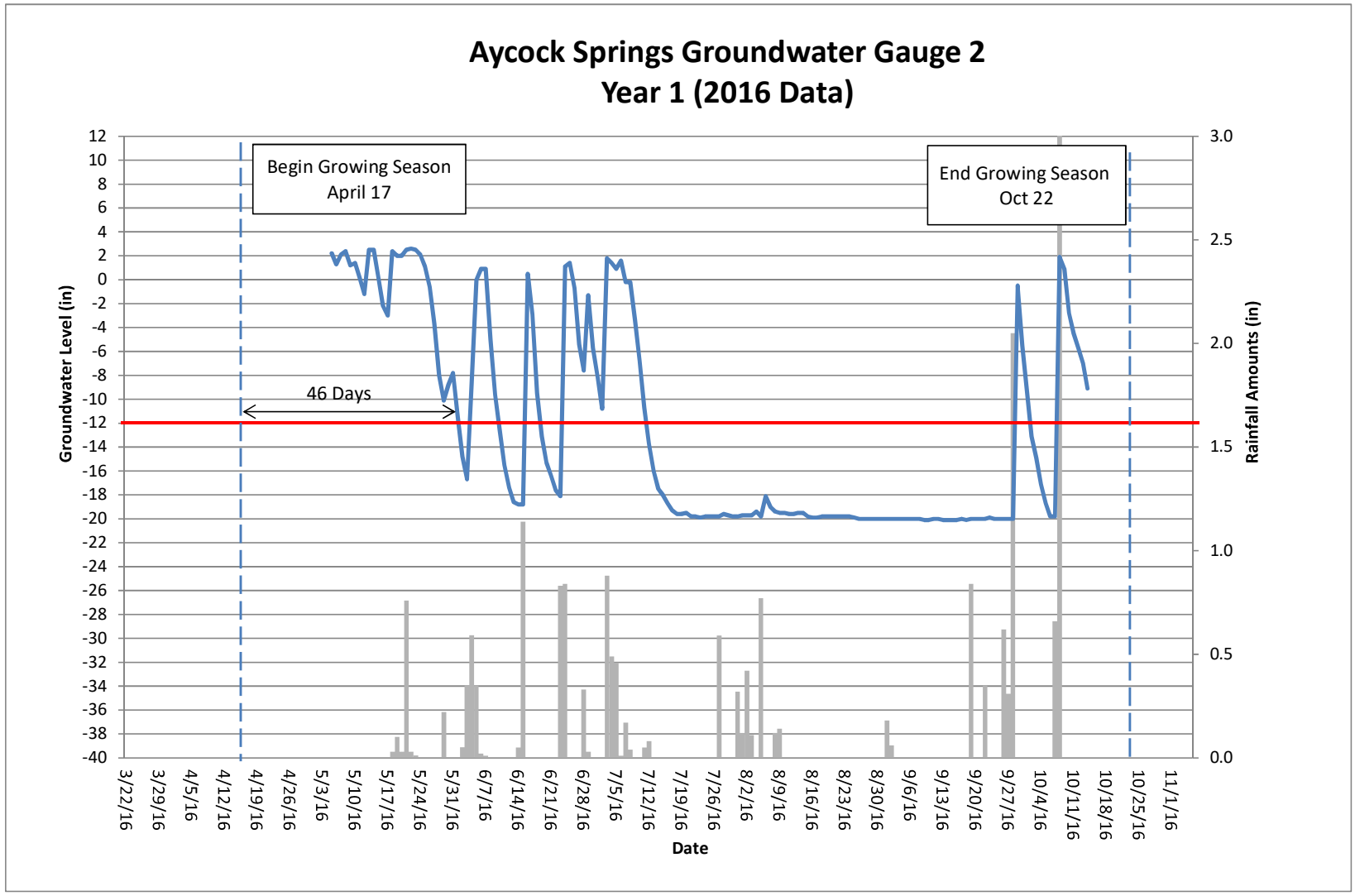
Bankfull Photo 1: Wrack, laid-back vegetation, and sediment in the floodplain of Travis Creek



Bankfull Photo 2: Wrack and laid-back vegetation on the top of bank of Travis Creek

Aycock Springs Groundwater Gauge 1
Year 1 (2016 Data)




Aycock Springs Groundwater Gauge 2
Year 1 (2016 Data)
Begin Growing Season
April 17
End Growing Season
Oct 22
46 Days
Groundwater Level (in)
Rainfall Amounts (in)
Date
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
3.0
2.5
2.0
1.5
1.0
0.5
0.0
3/22/16
3/29/16
4/5/16
4/12/16
4/19/16
4/26/16
5/3/16
5/10/16
5/17/16
5/24/16
5/31/16
6/7/16
6/14/16
6/21/16
6/28/16
7/5/16
7/12/16
7/19/16
7/26/16
8/2/16
8/9/16
8/16/16
8/23/16
8/30/16
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10/11/16
10/18/16
10/25/16
11/1/16

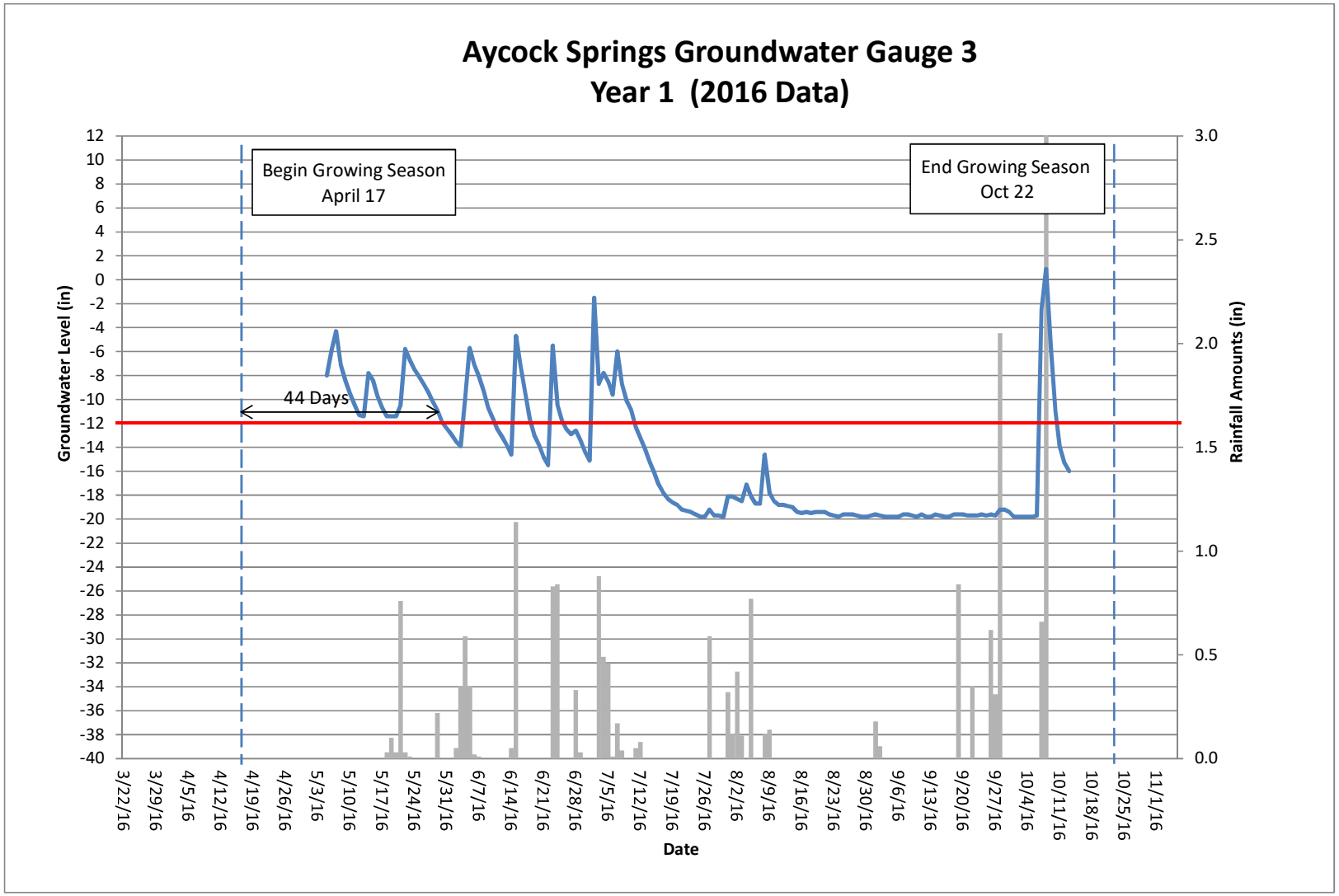

Aycock Springs Groundwater Gauge 3
Year 1 (2016 Data)
Begin Growing Season
April 17
End Growing Season
Oct 22
44 Days
Groundwater Level (in)
Rainfall Amounts (in)
Date
12
10
8
6
4
2
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
-22
-24
-26
-28
-30
-32
-34
-36
-38
-40
3.0
2.5
2.0
1.5
1.0
0.5
0.0
3/22/16
3/29/16
4/5/16
4/12/16
4/19/16
4/26/16
5/3/16
5/10/16
5/17/16
5/24/16
5/31/16
6/7/16
6/14/16
6/21/16
6/28/16
7/5/16
7/12/16
7/19/16
7/26/16
8/2/16
8/9/16
8/16/16
8/23/16
8/30/16
9/6/16
9/13/16
9/20/16
9/27/16
10/4/16
10/11/16
10/18/16
10/25/16
11/1/16

Table 14. Groundwater Hydrology Data

Gauge	Success Criteria Achieved/Max Consecutive Days During Growing Season (Percentage)						
	Year 1 (2016)	Year 2 (2017)	Year 3 (2018)	Year 4 (2019)	Year 5 (2020)	Year 6 (2021)	Year 7 (2022)
1	Yes/55 days (29.1 percent)						
2	Yes/46 days (24.3 percent)						
3	Yes/44 days (23.3 percent)						

*Due to Site construction activities, groundwater gauges were not installed until May 5, 2016; therefore, the growing season for Year 1 (2016) is based on the soil survey start date of April 17. It is expected that all gauges would meet success criteria at the beginning of the growing season.

REMEDIAL ACTION PLAN 2016-2017

Restoration Systems has implemented the proposed and discussed remedial action plan for Aycock Springs (Section 3.0 Year 1, 2016 Monitoring Report). The following pages include figures and photos indicating where work was performed and at what density / length.

During the week of December 20th, 2016 Carolina Silvics planted 1,030 containerized trees, 755 one gallon and 275 three gallon pots of the following species;

- Quercus phellos
- Quercus nigra
- Quercus rubra
- Quercus falcata
- Quercus palustris
- Betula nigra
- Platanus occidentalis
- Fraxinus pennsylvanica

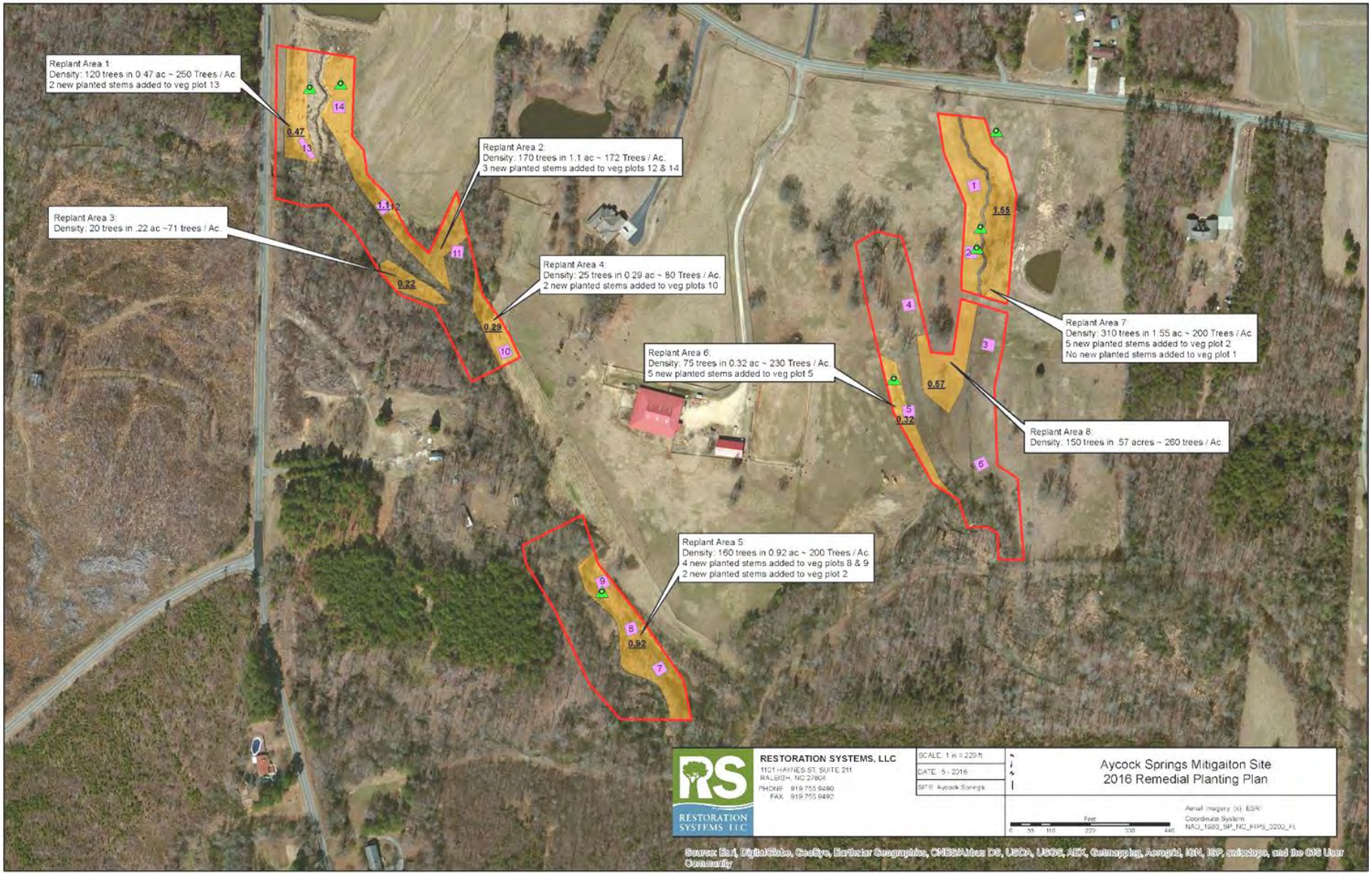
Density was determined by Yr. 1 monitoring data and infield observations. The goal of the remedial planting was to insuring a density of total planted vegetation (bare root and remedial planting) that would exceed Yr. 2 vegetation success standards, and insure the planted riparian corridor would once again track properly toward becoming a diverse hardwood forest.

Phase two of the remedial action plan was to replenish lost substrate within two riffles along UT-1 (XC 9 and 10). Work was completed on February 23, 2017 with minimal impact to the easement. Class A riprap was used as base and filled in with crush and run stone to meet as-built grades. In all, material was added to approximately 27 linear feet of UT 1 or 0.67% of the project's total linear feet. Continuous observations were made across the entire site during the 2016 growing season and 2016/17 dormant season, no other areas are of concern at this time.

Drone video of the site shot 2-23-2017 can be found online here:
https://www.youtube.com/watch?v=ppFLr_zOeCo&t=523s


Aycock Springs Stream and Wetland Mitigation Site
Remedial Action Update March 3, 2017
NC DMS Contract #5791

Aycock Springs– Remedial Action Plan - Vegetation Update



Map of Replant Areas- green dots indicate approximate location of where photos were taken.

Photo 1: Looking SW. along Replant Area -1

Photo Date: 1-13-2017

Photo 2: Looking S. in Replant Area 2, just N. of veg. plot 14

Photo Date: 1-13-2017

Photo 3: Looking SE. in Replant Area 4, near veg. plot 9

Photo Date: 1-13-2017

Photo 5: Looking S. in Replant Area 5, N. of veg. plot 5

Photo Date: 1-13-2017

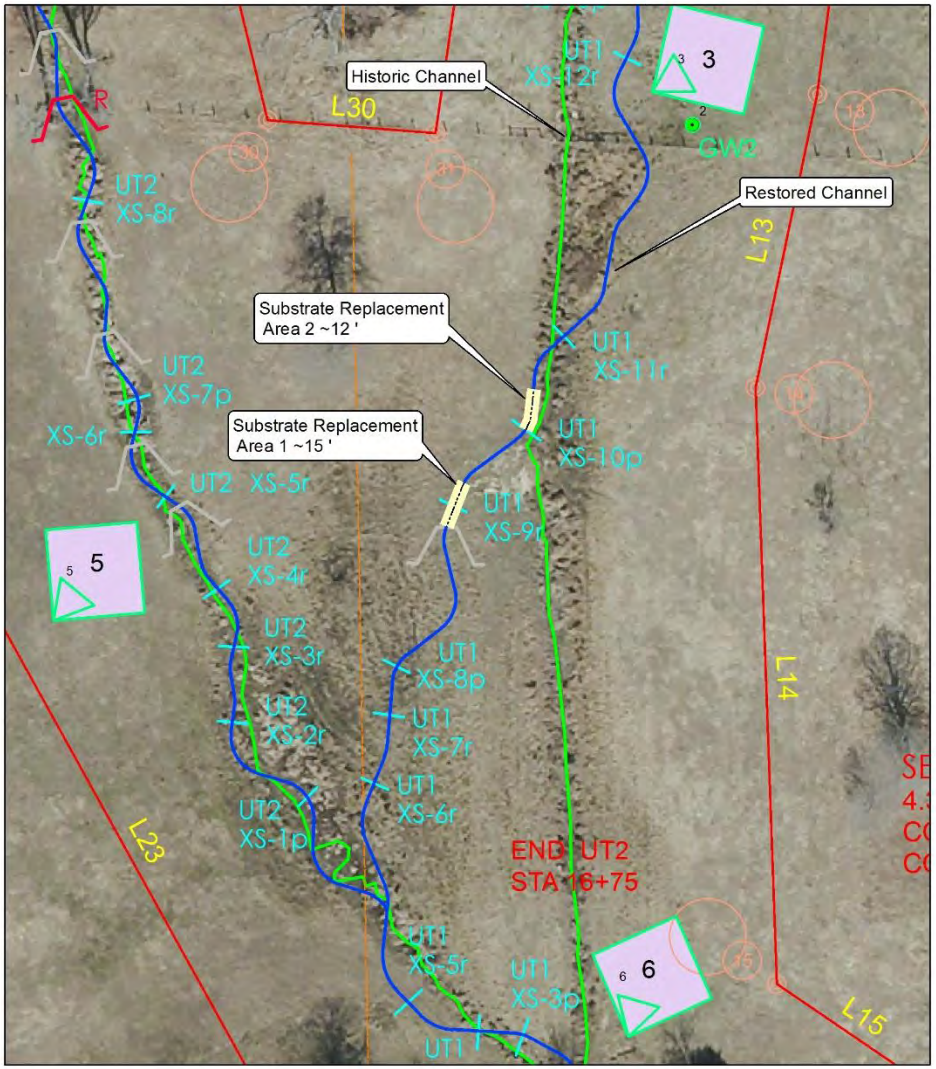
Photo 4: Looking S. in Replant Area 6, from outside of the easement

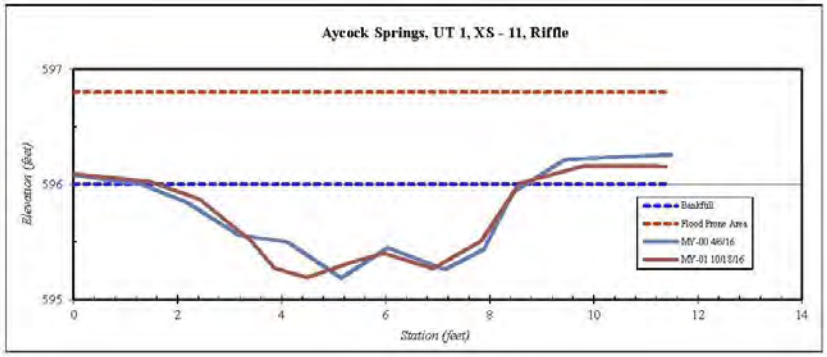
Photo Date: 1-13-2017

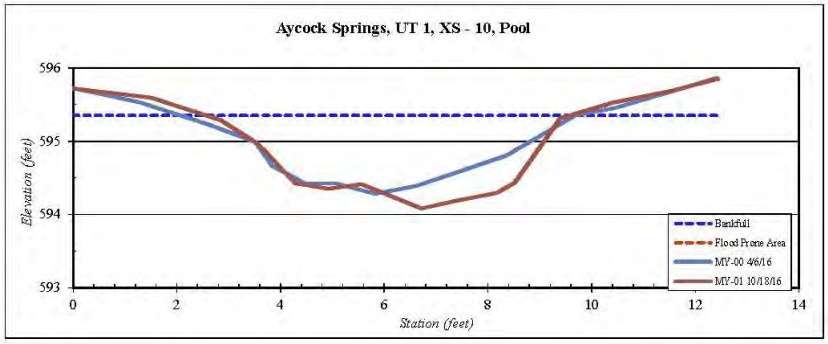
Photo 6 / 7: Live stake establishment on bank in Replant area 6

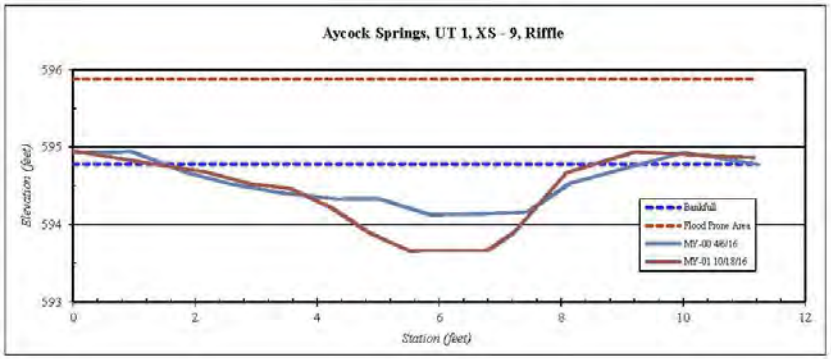
Photo Date: 1-13-2017

Aycock Springs– Remedial Action Plan Substrate Replacement - Update









RESTORATION SYSTEMS, LLC
1101 HAYNES ST, SUITE 211
RALEIGH, NC 27604
PHONE : 919.755.9490
FAX : 919.755.9492

SCALE: 1 in = 42 ft
DATE: 2 - 2017
SITE:

Aycock Springs
Substrate replacement - 2-23-2017

Feet
0 5 10 20 30 40

Aerial Imagery: (c) ESRI
Coordinate System:
NAD_1983_SP_NC_FIPS_3200_Ft.

Map of Area – UT 1, XC 9, 10, 11

Photo 1: Substrate loss, 6” head-cut at UT 1, XC 9

Photo 2: Pool, upstream of 6” head-cut at UT 1, XC 9 (XC 10 in background)

Photo 3: Substrate replacement at UT 1, XC 9

Photo 3: Substrate loss, upstream riffle of XC 10 (pool)

Photo 4: Substrate replaced, upstream riffle of XC 10 (pool)

Photo 5: post replacement overview

Photo 6: UT-1 looking downstream from XC-11

Photo 7: XC-9 – Post 3-1-2017 0.92 inch rain event (Per USGS Guage at BUFFALO CREEK (SR2819 NR MCLEANSVILLE, NC) ~ 7 miles from Site

Photo 7: XC-10 – Post 3-1-2017 0.92 inch rain event (Per USGS Guage at BUFFALO CREEK (SR2819 NR MCLEANSVILLE, NC) ~ 7 miles from Site