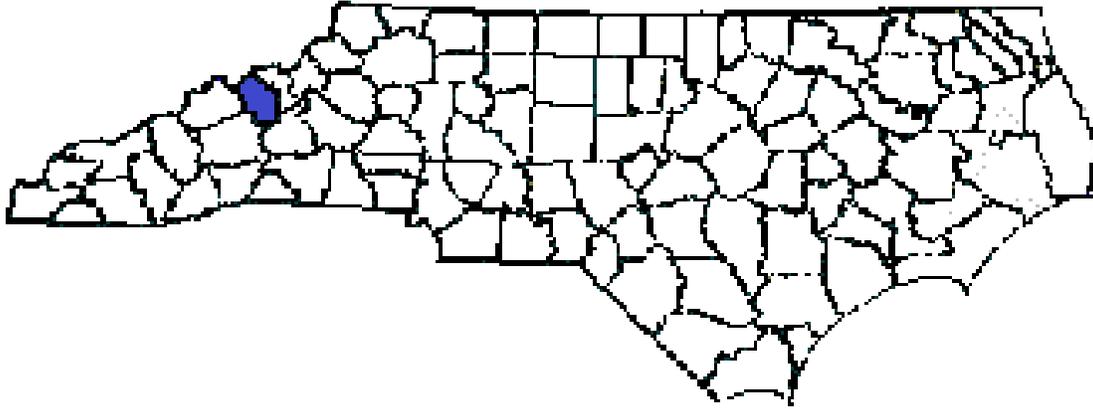


ANNUAL REPORT FOR 2014



Georges Fork Site #26 Mitigation Site
Yancey County
TIP No. R-2519A
COE Action ID: SAW-2007-2197-357/300
DWR #: 2007-1134V.4



Prepared By:
Natural Environment Section & Roadside Environmental Unit
North Carolina Department of Transportation
December 2014

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SUMMARY

The following report summarizes the stream monitoring activities that have occurred during the Year 2014 at the Georges Fork Site #26 Mitigation Site in Yancey County. The North Carolina Department of Transportation (NCDOT) completed this project in the fall of 2013. This report provides the monitoring results for the first formal year of monitoring (Year 2014). The Year 2014 monitoring period was the first of five scheduled years of monitoring on the Georges Fork Site #26 Mitigation Site (See Success Criteria Section 2.1).

Based on the overall conclusions of monitoring at the Georges Fork Site #26, it has met the required monitoring protocols for the first formal year of monitoring on the stream. The channel throughout the stream site is stable at this time. The streambank and buffer area have not been planted for the first year of monitoring. NCDOT plans on planting the streambank and buffer area in 2015. NCDOT will monitor the planted vegetation once it is established.

NCDOT proposes to continue stream monitoring at the Georges Fork Site #26 Mitigation Site in 2015.

1.0 INTRODUCTION

1.1 Project Description

The following report summarizes the stream monitoring activities that have occurred during the Year 2014 at the Georges Fork Site #26 Mitigation Site. Site #26 is located on US 19 in Yancey County at Sta. 314+04 to 315+67 –L- Lt. (Figure 1). The Georges Fork Site #26 was constructed to provide mitigation for stream impacts associated with Transportation Improvement Program (TIP) number R-2519A in Yancey County.

The mitigation site provided approximately 580 linear feet of stream restoration. Construction was completed during the fall of 2013 by NCDOT. The restoration of the Georges Fork Site #26 Mitigation Site involved backfilling the existing channel so the roadway could be extended. A new floodplain and channel were excavated and several in-stream structures such as cross vanes and j-hooks were installed. The riparian buffer zone will also be planted.

1.2 Purpose

In order for a mitigation site to be considered successful, the site must meet the success criteria. This report details the monitoring in 2014 at the Georges Fork Site #26 Mitigation Site. Hydrologic monitoring was not required for this site.

1.3 Project History

Fall 2013	Construction Completed
January 2014	As-Built Survey Completed
November 2014	Stream Channel Monitoring (Year 1)

1.4 Debit Ledger

The entire Georges Fork Site #26 stream mitigation site was used for the R-2519A project to compensate for unavoidable stream impacts.

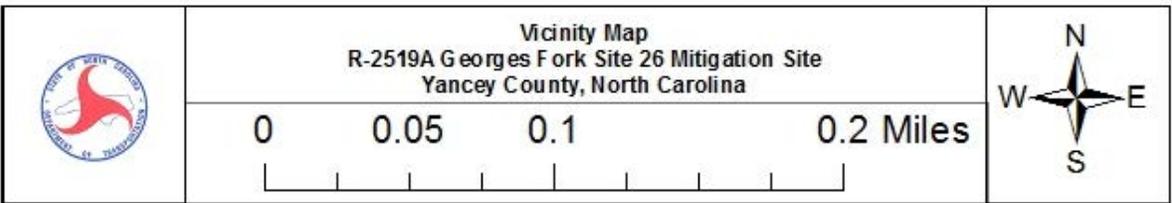


Figure 1. Vicinity Map

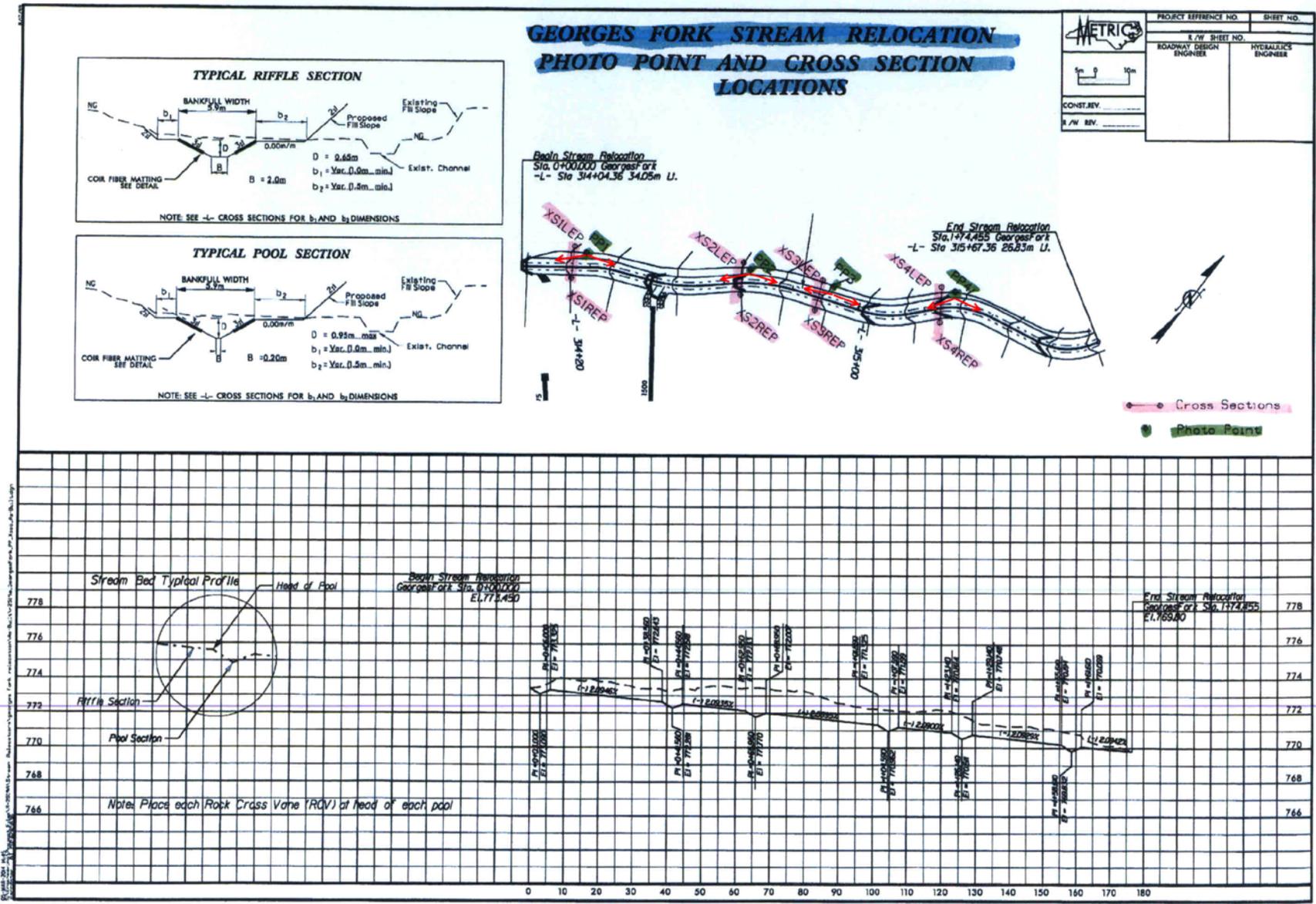


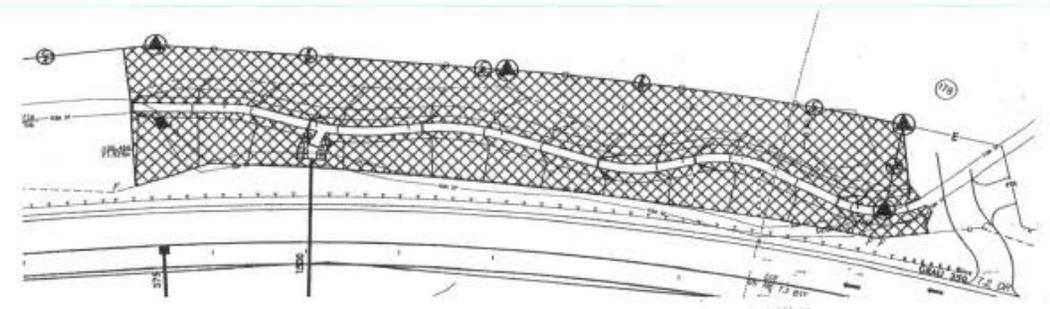
Figure 2. Site #26 Map

0.40 HECTARE STREAMBANK REFORESTATION

Site 26



PROJECT REFERENCE NO. H-25/DA	SHEET NO. EC-32/CONTR.
R/W SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	



SEE RF-2, RF-3 AND PROJECT SPECIAL PROVISIONS

Figure 3. Site #26 Reforestation Plan

2.0 STREAM ASSESSMENT

2.1 Success Criteria

The permittee shall monitor the stream relocation sites following the Level 1 protocols outlined in the Stream Mitigation Guidelines date April 2003 with the following exceptions:

1. Pebble counts shall not be conducted.
2. Two cross sections shall be conducted for streams less than 500 linear feet and five (5) cross sections shall be conducted for streams greater than 500 linear feet.
3. Riparian success shall be by visual inspection of plant survival. Photos will be taken and comments noted on plant survival.

The monitoring shall be conducted annually for a minimum of five (5) years after final planting. The monitoring results shall be submitted to DWR in a final report within sixty (60) days after completing monitoring. After 5 years the NCDOT shall contact the DWR to schedule a site visit to “close out” the mitigation site.

2.2 Stream Description

2.2.1 Post-Construction Conditions

The restoration of the Georges Fork Site #26 Mitigation Site involved backfilling the existing channel so the roadway could be extended. A new floodplain and channel were excavated and several in-stream structures such as cross vanes and j-hooks were installed. The riparian buffer zone will also be planted.

2.2.2 Monitoring Conditions

The objective of the Georges Fork Site #26 stream restoration was to restore a C4 stream as identified in Rosgen’s Applied River Morphology. A total of four cross sections (two in a riffle and two in a pool) were surveyed. For this report, only cross sections containing riffles were used in the comparison of channel morphology presented below in Table 1 (Site #26).

Table 1. Abbreviated Morphological Summary (Site #26 – Georges Fork Mitigation Site)

Variable	Proposed	Cross-Section #1 (Riffle)	Cross-Section #3 (Riffle)	Min. – Max Values (Riffle Sections Only)
		2014	2014	2014
Drainage Area (mi ²)	1.92	1.92	1.92	1.92
Bankfull Cross Sectional Area (ft ²)	27.6	26.06	26.64	26.06 – 26.64
Maximum Bankfull Depth (ft.)	2.13	2.48	2.62	2.48 – 2.62
Width of the Floodprone Area (ft.)	43 – 63	30.1	30	30 – 30.1
Bankfull Mean Depth (ft.)	1.41	1.42	1.39	1.39 – 1.42
Width/Depth Ratio	13.7	12.95	13.78	12.95 – 13.78
Entrenchment Ratio	2.2 – 3.3	1.64	1.57	1.57 – 1.64
Bankfull Width (ft.)	19.3	18.39	19.16	18.39 – 19.16

* Riffle values are used for classification purposes, pool values are shown in Appendix A.

2.3 Results of the Stream Assessment

2.3.1 Site Data

The assessment included the survey of four cross sections and the longitudinal profile of the Georges Fork Site #26 Mitigation Site established by NCDOT after construction. The length of the profile along the Georges Fork Site #26 Mitigation Site was approximately 576 linear feet. Four cross sections were established during the as-built monitoring year. Cross section locations were subsequently based on the stationing of the longitudinal profile and are presented below. The location of the cross sections and longitudinal profile are shown in Appendix A.

Georges Fork Site #26 Cross-Sections:

- ◆ Cross-Section #1: Georges Fork Site #26, Station 60+00, midpoint of riffle
- ◆ Cross-Section #2: Georges Fork Site #26, Station 224+00, midpoint of pool
- ◆ Cross-Section #3: Georges Fork Site #26, Station 300+00, midpoint of riffle
- ◆ Cross-Section #4: Georges Fork Site #26, Station 420+00, midpoint of pool

Based on comparisons of the As-Built to the monitoring data, all of the cross sections appear stable with little or no active bank erosion. Graphs of the cross sections are presented in Appendix A. Future survey data will vary depending on actual location of rod placement and alignment; however, this information should remain similar in appearance. The longitudinal profile showed that the channel was stable for the 2014 monitoring evaluation. Pebble counts were not required per the permit conditions and therefore were not completed. One bankfull event was documented visually by a noted wrack line at Site #26 during the 2014 monitoring year.

3.0 VEGETATION: GEORGES FORK SITE #26

3.1 Description of Species

The following tree species were planted on the streambank:

Salix sericea, Silky Willow

Cornus amomum, Silky Dogwood

The following tree species were planted in the buffer area:

Liriodendron tulipifera, Yellow Poplar

Platanus occidentalis, Sycamore

Fraxinus pennsylvanica, Green Ash

Quercus alba, White Oak

3.2 Results of Vegetation Monitoring

Streambank & Buffer Vegetation: Reforestation has not been completed as of the Year 1 monitoring evaluation.

3.3 Conclusions

NCDOT plans on planting the streambank and buffer area in 2015. NCDOT will monitor the planted vegetation once it is established.

4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS

The Georges Fork Site #26 Mitigation Site has met the required monitoring protocols for the first formal year of monitoring. The channel throughout the stream site is stable at this time. NCDOT plans on planting the streambank and buffer in 2015. NCDOT will monitor the planted vegetation once it is established.

NCDOT proposes to continue monitoring the Georges Fork Site #26 Mitigation Site in 2015.

5.0 REFERENCES

R-2519A, US 19 from East of SR 1336 (Jacks Creek Road) to SR 1186 (Old US 19), Yancey County, Division 13: Natural Stream Design For: Site 26, Georges Fork –L- Sta. 314+04 to Sta. 315+67 Lt

Permit Mod. R-2519A, Yancey County from SR 1336 (Jacks Creek Road) to SR 1186 (Old US 19) west of Micaville, Action ID No. SAW-2007-2197-357/300 and DWQ Project No. 2007-1134V.4, February 4, 2010

As-Built Report for Stream Relocations on R-2519A, Yancey County, TIP Project No. R-2519A, USACE Permit No. 2007-2197-357/300, WQC#3706, DWQ Project #20071134V.4

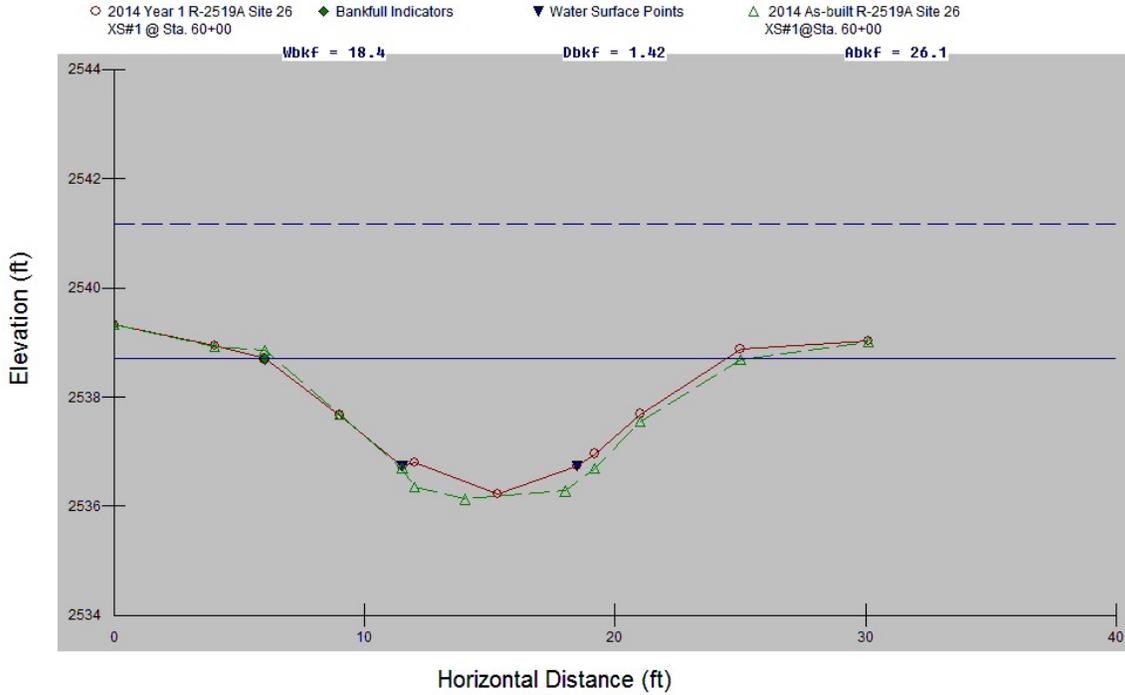
Rosgen, D.L, 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, Colorado.

US Army Corps of Engineers (USACE), 2003. Stream Mitigation Guidelines. Prepared with cooperation from the US Environmental Protection Agency, NC Wildlife Resources Commission, and the NC Division of Water Resources.

APPENDIX A

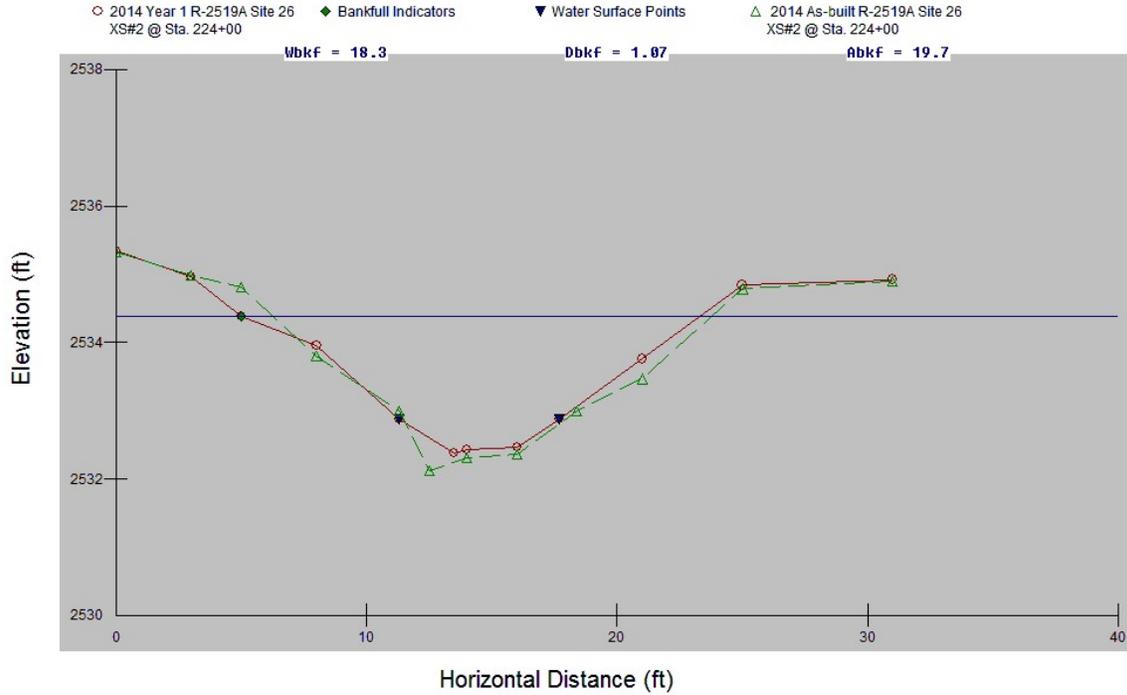
CROSS SECTIONS AND LONGITUDINAL PROFILE

R-2519A Site 26 XS#1 @ Sta. 60+00



Site #26: Cross-Section #1 (Riffle) Abbreviated Morphological Summary					
	2014	2015	2016	2017	2018
Bankfull Cross Sectional Area (ft ²)	26.06				
Maximum Bankfull Depth (ft.)	2.48				
Width of the Floodprone Area (ft.)	30.1				
Bankfull Mean Depth (ft.)	1.42				
Width/Depth Ratio	12.95				
Entrenchment Ratio	1.64				
Bankfull Width (ft.)	18.39				

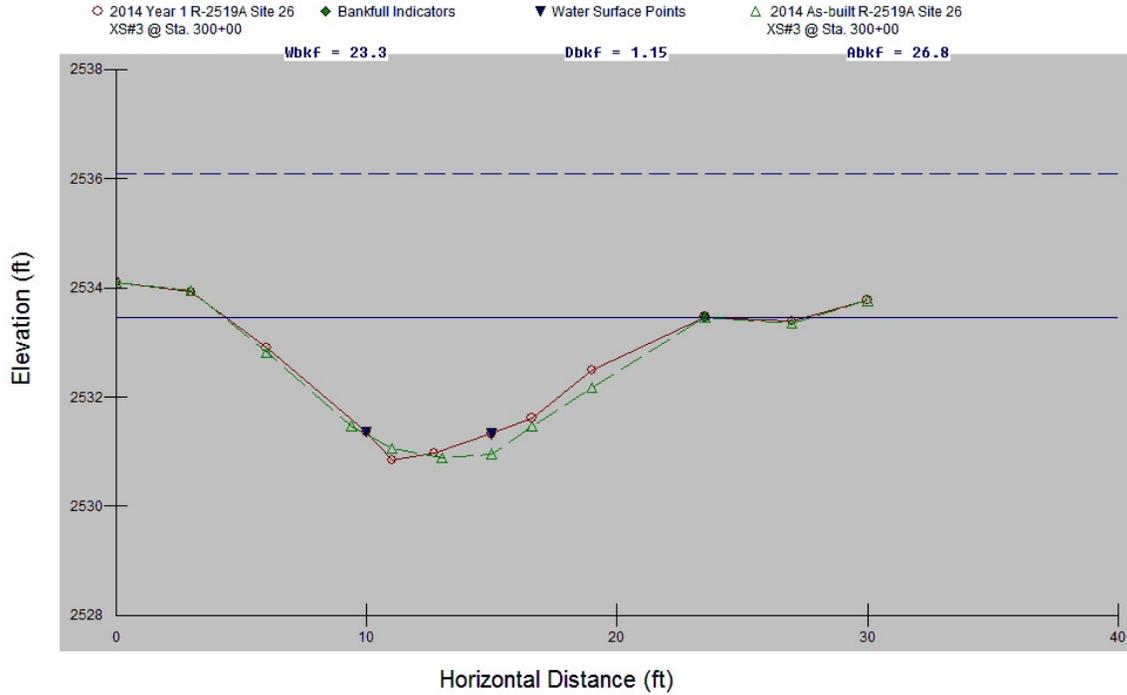
R-2519A Site 26 XS#2 @ Sta. 224+00



Site #26: Cross-Section #2 (Pool) Abbreviated Morphological Summary					
	2014	2015	2016	2017	2018
Bankfull Cross Sectional Area (ft ²)	19.66				
Maximum Bankfull Depth (ft.)	2				
Bankfull Mean Depth (ft.)	1.07				
Bankfull Width (ft.)	18.3				

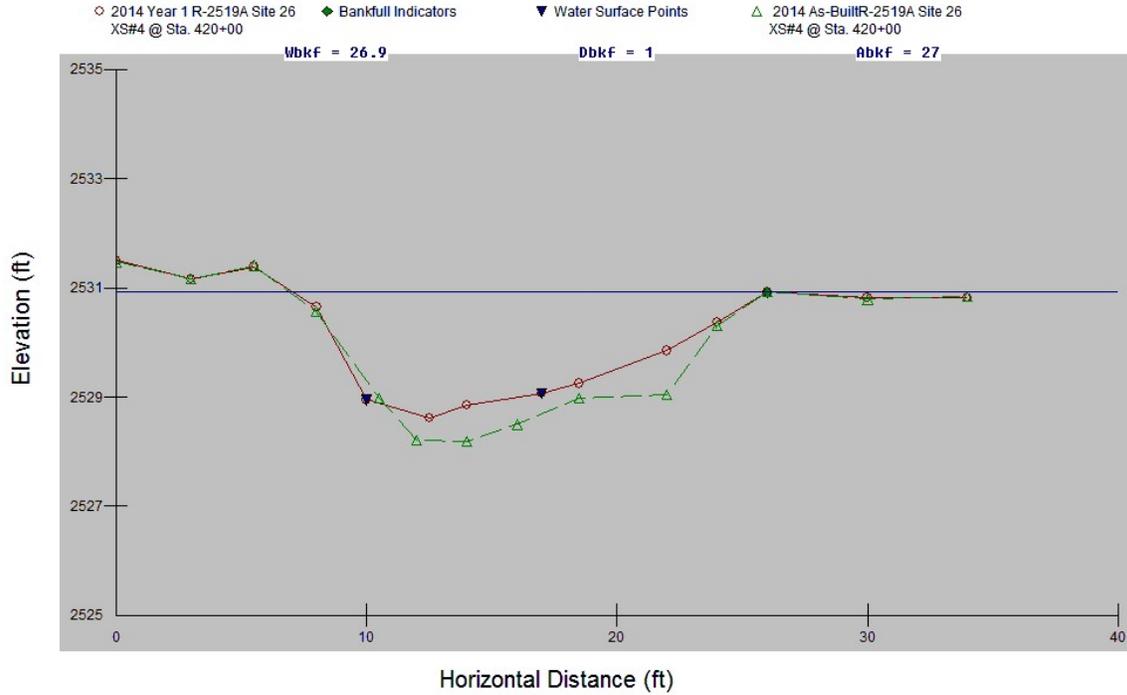
*According to the Rosgen Classification of Natural Rivers floodprone width, entrenchment ratio, and width depth ratio are not measured in pool, glide, or run features.

R-2519A Site 26 XS#3 @ Sta. 300+00



Site #26: Cross-Section #3 (Riffle) Abbreviated Morphological Summary					
	2014	2015	2016	2017	2018
Bankfull Cross Sectional Area (ft ²)	26.64				
Maximum Bankfull Depth (ft.)	2.62				
Width of the Floodprone Area (ft.)	30				
Bankfull Mean Depth (ft.)	1.39				
Width/Depth Ratio	13.78				
Entrenchment Ratio	1.57				
Bankfull Width (ft.)	19.16				

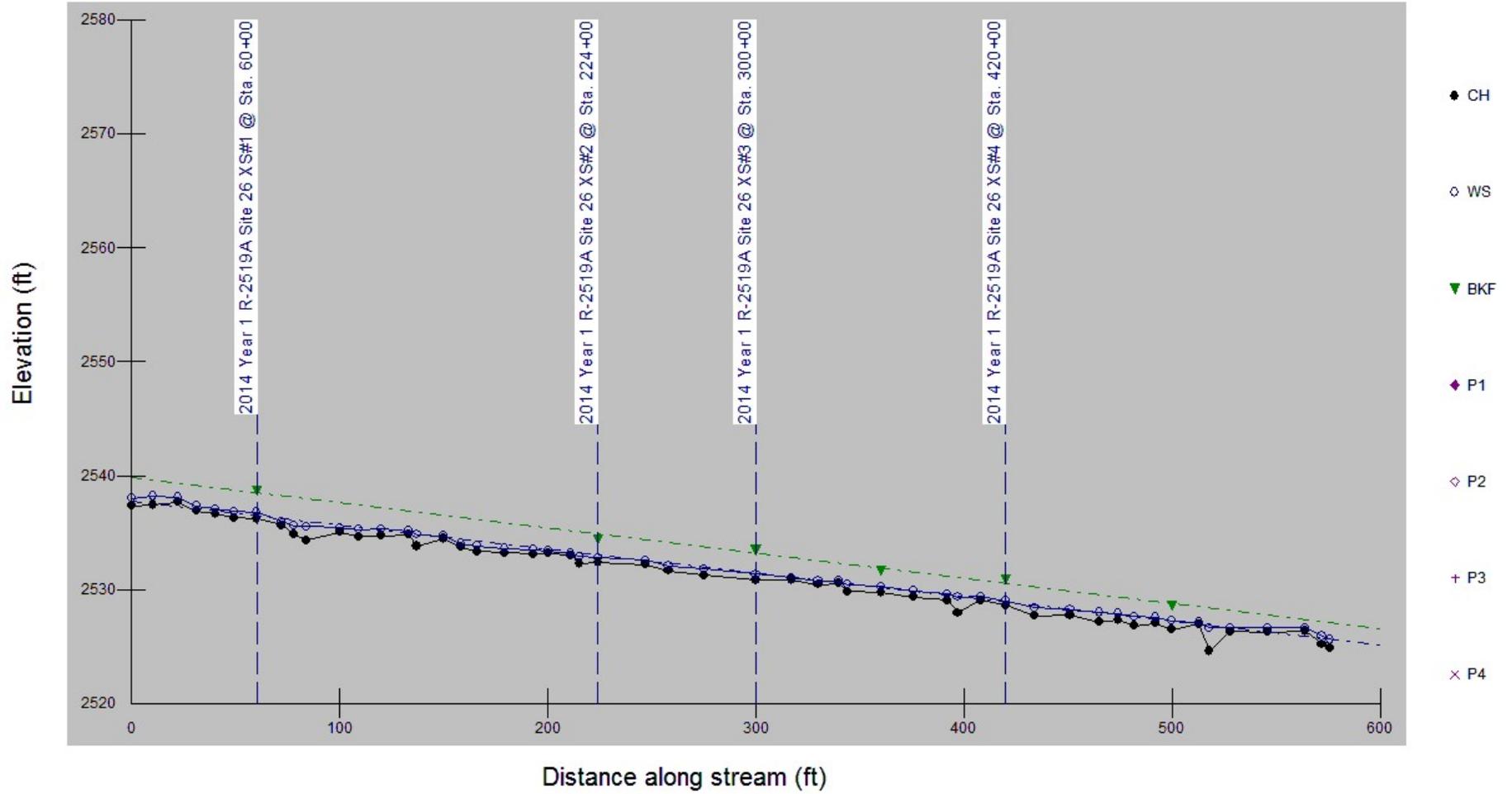
R-2519A Site 26 XS#4 @ Sta. 420+00



Site #26: Cross-Section #4 (Pool) Abbreviated Morphological Summary					
	2014	2015	2016	2017	2018
Bankfull Cross Sectional Area (ft ²)	26.46				
Maximum Bankfull Depth (ft.)	2.31				
Bankfull Mean Depth (ft.)	1.4				
Bankfull Width (ft.)	18.91				

*According to the Rosgen Classification of Natural Rivers floodprone width, entrenchment ratio, and width depth ratio are not measured in pool, glide, or run features.

2014 Year 1 R-2519A Site 26 Profile



APPENDIX B
SITE PHOTOGRAPHS

Georges Fork Site #26



Photo Point #1 (Upstream)



Photo Point #1 (Downstream)



Photo Point #2 (Upstream)



Photo Point #2 (Downstream)



Photo Point #3 (Upstream)



Photo Point #3 (Downstream)

November 2014

Georges Fork Site #26



Photo Point #4 (Upstream)



Photo Point #4 (Downstream)



Overview Photo

November 2014