601 North II
Stream Restoration Site
NCEEP Project Number: 95025
Monitoring Contract Number: 003991
Monitoring Year 2
2014

Prepared for:
Environmental Banc and Exchange

909 Capability Drive, Suite 3100
Raleigh, NC 27606

Prepared by:
Equinox Environmental Consultation and Design, Inc.

37 Haywood Street, Suite 100
Asheville, NC 28801

Submitted to:
NCDENR - Ecosystem Enhancement Program

1652 Mail Service Center
Raleigh, NC 27699

601 North II
Stream Restoration Site
2014 Monitoring Report (MY 2)

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Appendices

1.0 EXECUTIVE SUMMARY/PROJECT ABSTRACT

The goals and objectives stated in the 601 North II Restoration Plan (NCEEP 2013) are as follows:

Project Goals

- Re-establish the capacity to store and transport watershed flows and sediment loads by restoring stable dimension, pattern, and profile
- Reduce sediment within on-site and downstream receiving waters through the stabilization of eroding stream banks, introduction of livestock exclusion fencing and responsible grazing techniques, and restoration of a forested riparian buffer
- Elevate the water table and introduce surface water flood hydrodynamics within the floodplain by re-establishing characteristic bankfull dimensions and flood frequency
- Remove non-point sources of pollution associated with pesticides, herbicides, fertilizer, and livestock waste by filtering sheet flow through a restored riparian buffer and installed Riparian Best Management Practice (RBMP) detention devices
- Improve aquatic habitat by reducing sedimentation, removing in-stream culverts, enhancing stream bed variability, and introducing shading, woody debris, and detritus from riparian planting
- Enhance terrestrial wildlife habitat by extending a terrestrial wildlife corridor and refuge to connect with the existing and adjacent 601 North Site, as well as to the downstream reaches of Wicker Branch and Lanes Creek
- Improve water quality for two populations of freshwater mussels documented to occur in Lanes Creek (Savannah Lilliput (*Toxolasma pullus*) and Carolina creekshell (*Villosa vaughniana*), both state listed and Federal Species of Concern)
- Expand on and integrate the restoration and enhancement work with the adjacently positioned, companion 601 North Restoration Site

Project Objectives

- Restoration (Priority 1 and 2) of approximately 3,354 linear feet of perennial stream channel (3,169 linear feet of credited stream) to reconnect the floodplain and restore stable channel dimension, pattern, and profile
- Enhancement (Level I) of approximately 225 linear feet of perennial stream channel by stream bank grading, and slight adjustments to either stream pattern or dimension
- Enhancement (Level II) of approximately 615 linear feet of perennial stream channel by restoring a minimum 50 foot planted buffer
- Removal of an existing culvert on Wicker Branch
- Installation of Riparian Best Management Practice (RBMP) detention devices, and livestock exclusion fencing to prohibit grazing on the floodplain and hoof shear on stream banks
- Re-vegetating floodplains adjacent to streams
- Providing a permanent conservation easement on approximately 12.3 acres of riparian buffer along approximately 4,194 feet of restored and enhanced stream channels

The monitoring year two (MY2) vegetation plot data was collected during September 2014. Data indicated the average planted stem density across all plots to be 408 stems/acre; a 13% decrease in stem density between MY1 and MY2 (Table 9). The decline was mainly due to 25 missing stems and 15 dead stems found in the plots. With the exception of Plot 12, all monitoring plots met the success criteria for MY2. However plots 2, 9, 10, and 11 have a stem density of 324 stems/acre, which is only slightly higher than the MY3 interim success criteria of 320 stems/acre. Missing stems and low stem densities in these plots may be a result of dense herbaceous vegetation.

Regarding invasive exotic vegetation, the area of Chinese privet (*Ligustrum sinensis*) located at the eastern (downstream end) of the easement, totaling approximately 0.25 acres was treated in March of 2014 and a follow up treatment was performed in September 2014 (Figure 2). A comprehensive invasive exotic plant inventory of the entire site (approximately 12.30 acres) was also completed in September 2014.

Field visits were conducted on June 18th and 19th 2014 to collect stream morphological data. Stream longitudinal profiles have remained relatively stable from MY1 to MY2 (Appendix D). One new pool formed at station 1+97 due to bed scour. Another area of note is the riffle at station 3+50, which has degraded from MY1 to MY2. Pools in Reach 2 and 5 have scoured slightly between MY1 and MY2; however, this is expected during the early years of the project. This explains the 0.2 feet increase in pool max depth from MY1 to MY2. Although the areas presented above represent change from the baseline, they are considered insignificant. No significant areas of instability in the stream channel were identified. MY2 cross-section data showed little change between MY1 and MY2 (Appendix D). As in MY1, no water was present in the majority of the reaches during the MY2 morphological surveys. As a result, water surface and riffle slope values were not generated for MY2. Dimensioning of the longitudinal profile was performed based solely on bedform.

One bankfull event was documented during a September 2014 field visit (Table 12). The suspected date, based on precipitation data, is July 22, 2014 (Figure 3). This is the second bankfull event since construction was completed.

Beaver activity was documented on the mainstem, at the confluence of 601 North II and the companion site 601 North (Figure 2). This information was conveyed to EBX, who hired a private trapper to address the issue. The dam was removed during spring of this year (2014). The stream channel was not affected by the impoundment and herbaceous vegetation has since re-established in impounded areas. Additionally, two areas of encroachment were noted on the left descending bank of the easement along Reach 4 as well as Reach 2. Encroachment consisted of mowed areas where tractors from the neighboring property turned into the easement. EBX is coordinating with the adjacent landowner to avoid future encroachment and effected areas will be replanted in the spring (2015).

Summary information/data related to the occurrence of items such as easement encroachment and statistics related to performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the restoration plan on EEP's

website (NCEEP 2007). All raw data supporting tables and figures in the appendices are available from EEP upon request.

2.0 Methodology

The stream monitoring methodologies utilized in MY2 were intended to replicate those employed during the previous monitoring year (MY0) and are based on standard guidance and procedures documents (Rosgen 1996; USACE 2003). Vegetation monitoring data were collected following the standard CVS-EEP Protocol for Recording Vegetation, Level II, Version 4.2 (Lee et al. 2008).

3.0 References

Lee, M.T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation. Version 4.2. The University of North Carolina at Chapel Hill, Department of Biology.

NCEEP (North Carolina Ecosystem Enhancement Program). 2013. 601 North II Restoration Site Baseline Monitoring Document and As-Build Baseline Report. NCEEP Project No. 95025/Contract No. 003991. Raleigh.

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

USACE (U.S. Army Corps of Engineers). 2003. Stream Mitigation Guidelines. U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, North Carolina Wildlife Resources Commission, North Carolina Department of Environment and Natural Resources-Division of Water Quality. Wilmington District.

Appendix A
Project Vicinity Map and Background Tables

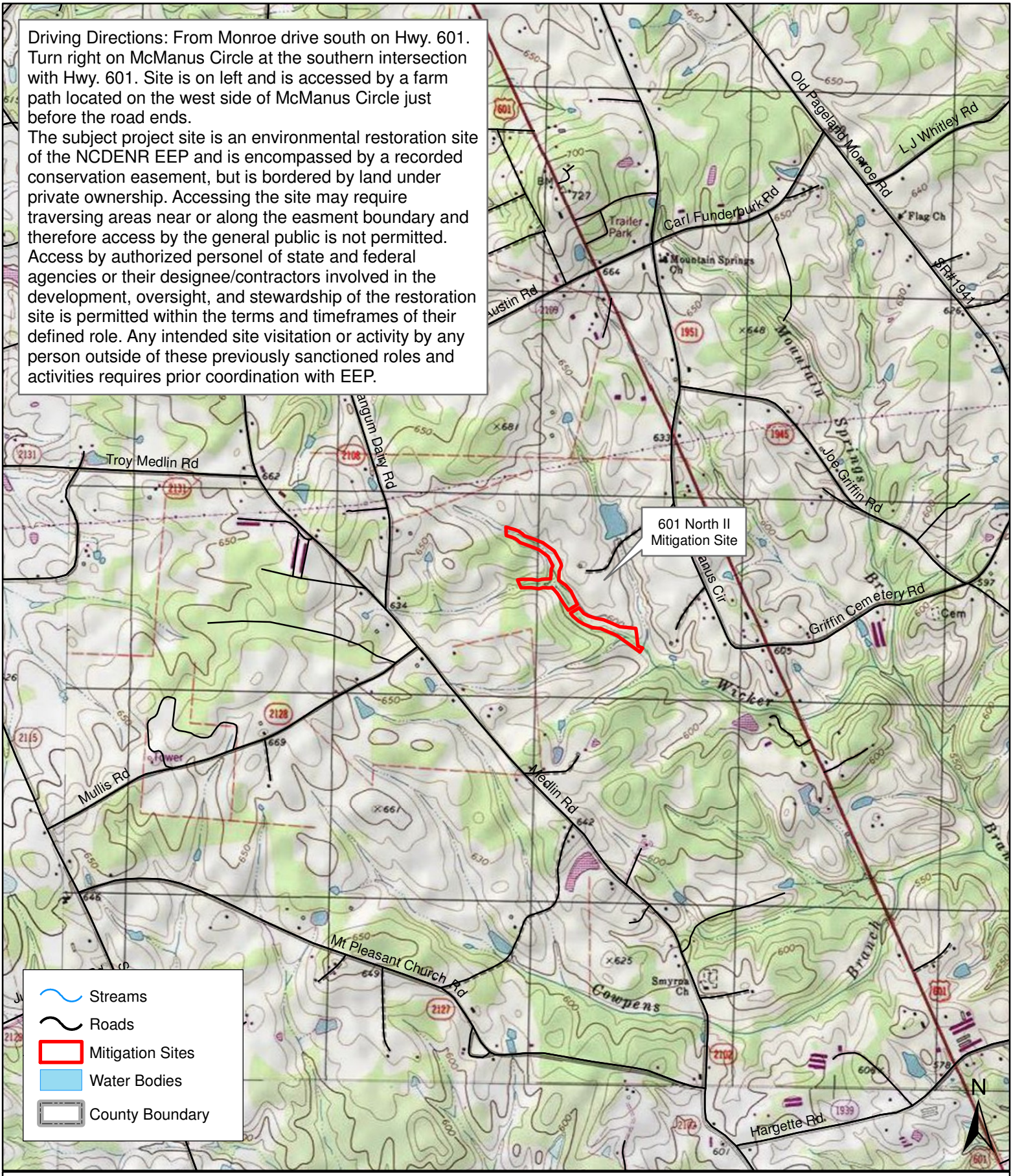


Figure 1
601 North II Mitigation Site
Project Vicinity Map

0 0.25 0.5 1 Miles

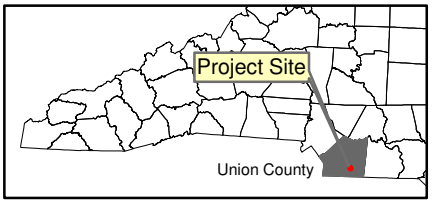


Table 1. Project Components and Mitigation Credits
601 North II Stream Restoration Site – Project No. 95025

Mitigation Credits

	Stream		Riparian Wetland	Non-riparian Wetland	Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	R	RE					
Totals	3169	396					

Project Components

Project Component - Reach ID	Stationing /Location	Existing Footage	Approach	Restoration -or- Restoration Equivalent	Restoration Footage	Mitigation Ratio
Wicker Branch (Reach 1)	00+00-06+60	630[1]	P1	Restoration	660	1:01
Wicker Branch (Reach 2)	06+60-24+35	1356	P1, P2	Restoration	1713[2]	1:01
Wicker Branch (Reach 3)	24+35-27+08	414	P2	Restoration	150[3]	1:01
UT to Wicker Branch (Reach 4)	00+00-02+25	218	EI	Restoration Equivalent	225	01:01.5
	02+25-08+40	608	EII	Restoration Equivalent	615	01:02.5
UT to Wicker Branch (Reach 5)	08+40-14+86	534	P1	Restoration	646	1:01

Component Summation

Restoration Level	Stream (linear feet)	Riparian Wetland (acres)		Non-riparian Wetland (acres)	Buffer (square feet)	Upland (acres)
		Riverine	Non-Riverine			
Restoration	3169	--	--	--	--	12.3
Enhancement I	225	--	--	--	--	
Enhancement II	615	--	--	--	--	

BMP Elements

Element	Location	Purpose/Function	Notes
Vernal Pools (12)	See as-built plans	Treat on-site storm water from adjacent agricultural fields. Remove suspended solids, help infiltration of water and remove excess nutrients prior to entering stream. Will reduce livestock waste in on-site streams	Target at base of drainages coming from adjacent agricultural fields.
Farm Crossing Improvements	See as-built plans	Two off-site farm crossings located above the restored streams will be improved at their existing location and incorporated into the restoration design.	
Cattle Exclusion Fencing	Along the western site boundary	Will eliminate hoof shear on banks and livestock waste into on-site streams	To be installed in 2013

[1]Includes 169 feet of hydrologic connectivity through a linear wetland persisting in the location of the relic channel.

[2]Does not include the restored portion of Wicker Branch located outside of the conservation easement (Station 11+63-12+25).

[3]Does not include the restored portion of Wicker Branch located outside of the conservation easement (Station 25+85-27+08).

Table 2. Project Activity and Reporting History 601 North II Stream Restoration Site – Project No. 95025		
Activity Report	**Data Collection Complete**	**Completion or Delivery**
Final Mitigation Plan	N/A	Oct-12
Final Design (90 percent)	N/A	Nov-12
Construction	N/A	Apr-13
Temporary S&E mix applied to entire project area	N/A	February-April 2013
Permanent seed mix applied to reach/segments	N/A	Apr-13
Bare Root Seedling Installation	N/A	Apr-13
Installation of permanent cross-sections and vegetation plots	N/A	May-13
Baseline Monitoring Report	Jun-13	Jun-13
Year 1 Vegetation Monitoring	Dec-13	Dec-13
Year 1 Stream Monitoring	Nov-13	Dec-13
Year 2 Vegetation Monitoring	Sep-14	Nov-14
Year 2 Stream Monitoring	Jun-14	Nov-14
Year 3 Vegetation Monitoring		
Year 3 Stream Monitoring		
Year 4 Vegetation Monitoring		
Year 4 Stream Monitoring		
Year 5 Vegetation Monitoring		
Year 5 Stream Monitoring		
*N/A- Activities and reporting history for these items are not applicable to this restoration project		

Table 3. Project Contacts 601 North II Stream Restoration Site – Project No. 95025	
Prime Contractor	Environmental Banc & Exchange, LLC
	909 Capability Drive, Suite 3100
	Raleigh NC 27606
	Phone: (919) 829-9909
	Contact: David Godley
Designer	Atkins North America, Inc.
	1616 East Millbrook Road, Suite 310
	Raleigh, NC 27609
	(919) 876-6888
	Contact: Jens Geratz or Michael Gloden
Construction Contractor	Wright Contracting
	PO Box 545
	Siler City, NC 27344
	(919) 663-0810
	Contact: Stephen James
Planting Contractor	KBS Earthworks
	5616 Cable Church Road
	Julian, NC 27283
	(336) 314-2935
	Contact: Keneth Strader
As-built Surveys	Kee Mapping and Surveying
	PO Box 2566
	Ashville, NC 28802
	Contact: Phillip Kee
Seeding Mix Source	Evergreen Seed
	Fuquay Varina, NC
	(919) 567-1333
	Contact: Wistar Taylor
Nursery Stock Suppliers	Arbor Gen Super Tree Nursery
	(800) 222-1290
	Contact: Polly Creech
Monitoring Performers (Y0) - 2013	Atkins North America, Inc.
	1616 East Millbrook Road, Suite 310
	Raleigh, NC 27609
	(919) 876-6888
	Contact: Jim Cooper
Monitoring Performers (Y1-Y2) 2013-2014	Equinox Environmental Consultation and Design, Inc.
	37 Haywood Street, Suite 100
	Asheville, NC
Stream Monitoring POC	Hunter Terrell (828) 253-6856
Vegetation Monitoring POC	Hunter Terrell (828) 253-6857

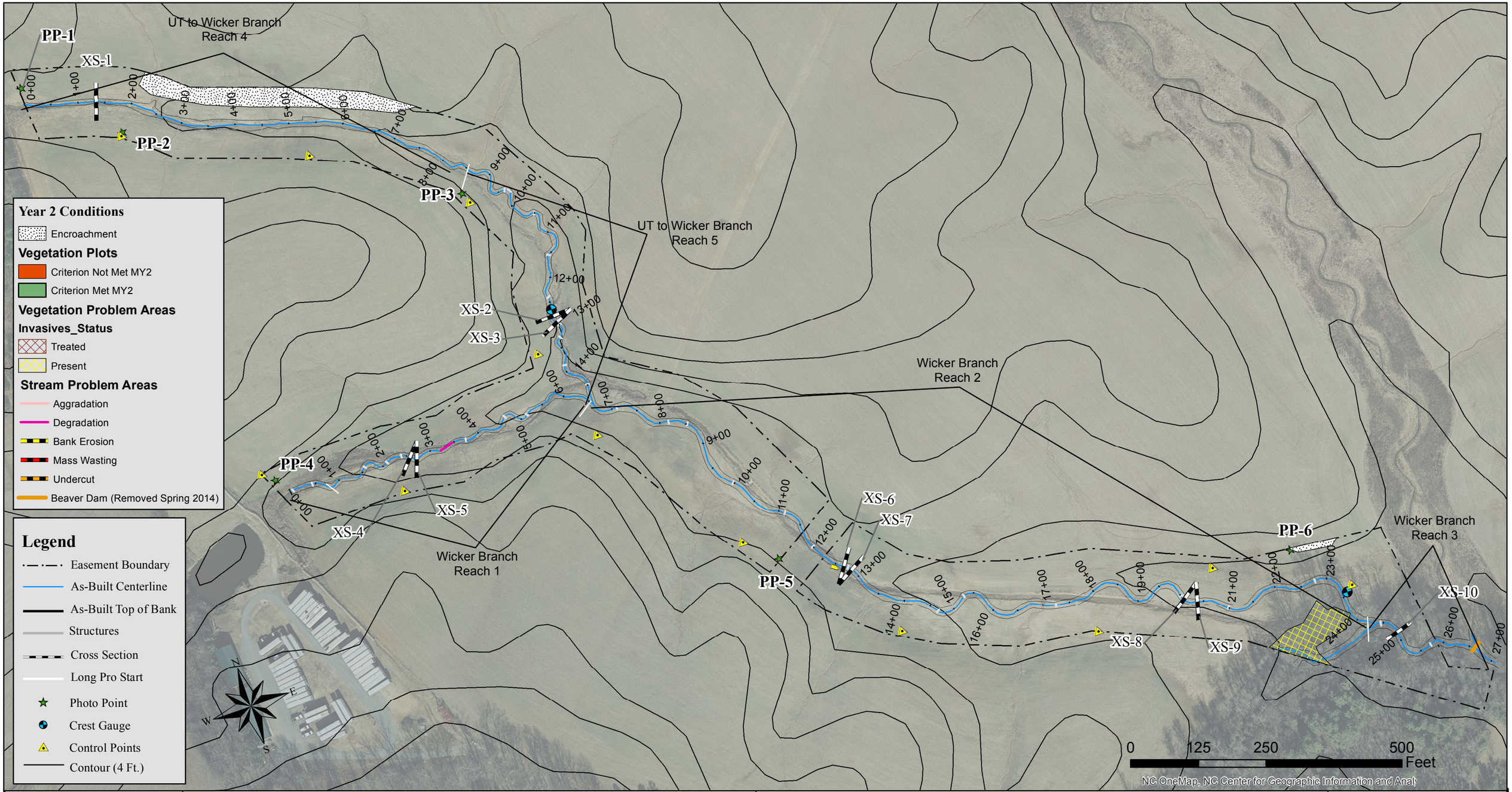
Table 4. Project Baseline Information and Attributes 601 North II Stream Restoration Site – Project No. 95025					
Project Information					
Project Name	601 North II Stream Restoration Site				
County	Union County				
Project Area (acres)	12.3				
Project Coordinates (latitude and longitude)	34.897274, -80.473416				
Project Watershed Summary Information					
Physiographic Province	Piedmont				
River Basin	Yadkin				
USGS Hydrologic Unit 8-digit	3040105				
USGS Hydrologic Unit 14-digit	3040105081010				
DWQ Sub-basin	3/7/2014				
Project Drainage Area (acres)	453				
Project Drainage Area Percent Impervious Area	<1%				
CGIA Land Use Classification	Cultivated, Managed Herbaceous Cover, Mixed Hardwood				
Reach Summary Information					
Parameters	**Wicker Branch (Reach 1)**	**Wicker Branch (Reach 2)**	**Wicker Branch (Reach 3)**	**UT to Wicker Branch (Reach 4)**	**UT to Wicker Branch (Reach 5)**
Length of reach (linear feet)	630	1356	414	826	534
Valley classification	VIII	VIII	VIII	VIII	VIII
Drainage area (acres)	169	286	365	85	88
NCDWQ stream identification score	23.5	35	35	23	23
NCDWQ Water Quality Classification	WS-V	WS-V	WS-V	WS-V	WS-V
Morphological Description (stream type)	F6	E1/C1	G4	B4	B4
Evolutionary trend	E-G-F	E-G-C-E	E-G	E-G-B	E-G-B
Underlying mapped soils	Cid channery silt loam (CmB)	Cid channery silt loam (CmB)	Cid channery silt loam (CmB)	Badin channery silty clay loam (BdB2), Cid channery silt loam (CmB)	Badin channery silty clay loam (BdB2), Cid channery silt loam (CmB)
Drainage class	Moderately well drained	Moderately well drained	Moderately well drained	BdB2: Well drained, CmB: Moderately well drained	BdB2: Well drained, CmB: Moderately well drained
Soil Hydric status	Not hydric	Not hydric	Not hydric	Not hydric	Not hydric
Valley Slope	0.0095	0.0098	0.0165	0.013	0.0124
FEMA classification	Project streams are not located within a FEMA regulated area				
Native vegetation community	N/A (cultivated land)	N/A (cultivated land)	Mesic Mixed Hardwood Forest	N/A (cultivated land)	N/A (cultivated land)
Percent composition of exotic invasive vegetation	0%	0%	60% (Chinese privet)	0%	0%

Wetland Summary Information	
Parameters	**Wetland 1**
Size of Wetland (acres)	0.05
Wetland Type	Palustrine emergent
Mapped Soil Series	Cid channery silt loam (CmB)
Drainage class	Moderately well drained
Soil Hydric Status	Not hydric
Source of Hydrology	Groundwater
Hydrologic Impairment	NA
Native vegetation community	N/A (cultivated land)
Percent composition exotic invasive vegetation	0%

Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Documentation**
Waters of the United States – Section 404	Yes	Yes	JD Notification / NWP27
Waters of the United States – Section 401	Yes	Yes	401 Water Quality Certification
Endangered Species Act	Yes	Yes	CE Documentation (Mitigation Plan, Appendix B)
Historic Preservation Act	No	NA	CE Documentation (Mitigation Plan, Appendix B)
Coastal Zone Management Act (CZMA)/ Coastal Area Management Act (CAMA)	No	NA	NA
FEMA Floodplain Compliance	No	NA	FEMA Floodplain Checklist (Mitigation Plan, Appendix B)
Essential Fisheries Habitat	No	NA	NA

Appendix B
Visual Assessment Data

Figure 2. Integrated Current Condition Plan View



Prepared for Ecosystem Enhancement Program	**Project:** 601 North II Current Condition Plan View Year 2 Monitoring Union County, North Carolina	Notes: 1) Base Map Data Provided by Akins North America, INC. 2) 2010 Aerial Photo	Prepared by EQUINOX
	Sheet 1 of 1		
	Date November 2014	Project Number NCEEP # 95925	

Table 5. Visual Stream Morphology Stability Assessment
601 North II / Project No. 95025 - Wicker Branch Reach 1
Assessed Length 660 feet

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	25	96%			
	2. Riffle Condition	1. Texture/Substrate - Riffle maintains coarser substrate.	22	22			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6).	19	19			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	19	19			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	21	21			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	21	21			100%			
2. Bank	1. Scoured / Eroding	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	1. Overall Integrity	Structures physically intact with no dislodged boulders or logs.	8	8			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	8	8			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	8	8			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	8	8			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	8	8			100%			

N/A - Item does not apply.

Table 5 cont'd. Visual Stream Morphology Stability Assessment
601 North II / Project No. 95025 - Wicker Branch Reach 2
Assessed Length 1,775 feet

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.	33	33			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6).	32	33			97%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	33	33			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	33	33			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	33	33			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			1	10	99%	0	0	98%
	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%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	1	10	99%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	13	13			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	13	13			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	13	13			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	13	13			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	13	13			100%			

N/A - Item does not apply.

Table 5 cont'd. Visual Stream Morphology Stability Assessment
601 North II / Project No. 95025 - Unnamed Tributary - Wicker Branch Reach 3
Assessed Length 273 feet

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.	5	5			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6).	5	5			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	5	5			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	5	5			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	5	5			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
3. Engineered Structures	**1. Overall Integrity**	Structures physically intact with no dislodged boulders or logs.	2	2			100%			
	2. Grade Control	Grade control structures exhibiting maintenance of grade across the sill.	2	2			100%			
	2a. Piping	Structures lacking any substantial flow underneath sills or arms.	2	2			100%			
	3. Bank Protection	Bank erosion within the structures extent of influence does NOT exceed 15%.	2	2			100%			
	4. Habitat	Pool forming structures maintaining ~ Max Pool Depth : Mean Bankfull Depth Ratio ≥ 1.6. Rootwads/logs providing some cover at base-flow.	2	2			100%			

N/A - Item does not apply.

Table 5 cont'd. Visual Stream Morphology Stability Assessment
601 North II / Project No. 95025 - Unnamed Tributary - Wicker Branch Reach 5
Assessed Length 646 feet

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.	18	18			100%			
	3. Meander Pool Condition	1. Depth Sufficient (Max Pool Depth : Mean Bankfull Depth ≥ 1.6).	19	19			100%			
		2. Length appropriate (>30% of centerline distance between tail of upstream riffle and head of downstream riffle).	19	19			100%			
	4. Thalweg Position	1. Thalweg centering at upstream of meander bend (Run).	19	19			100%			
		2. Thalweg centering at downstream of meander bend (Glide).	19	19			100%			
2. Bank	**1. Scoured / Eroding**	Bank lacking vegetative cover resulting simply from poor growth and/or scour and erosion.			0	0	100%	0	0	100%
	2. Undercut	Banks undercut/overhanging to the extent that mass wasting appears likely. Does NOT include undercuts that are modest, appear sustainable and are providing habitat.			0	0	100%	N/A	N/A	N/A
	3. Mass Wasting	Bank slumping, calving, or collapse.			0	0	100%	N/A	N/A	N/A
				Totals	0	0	100%	N/A	N/A	N/A
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%			

N/A - Item does not apply.

Table 6. Vegetation Condition Assessment 601 North II / Project No. 95025 Planted Acreage 12.3					
Vegetation Category	**Definitions**	**CCPV Depiction**	**Number of Polygons**	**Combined Acreage**	**% of Planted Acreage**
1. Bare Areas	Very limited cover of both woody and herbaceous material.	N/A	0	0.00	0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.	N/A	0	0.00	0%
		Totals	0	0.00	0%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size class that are obviously small given the monitoring year.	N/A	0	0.00	0%
		Cumulative Totals	0	0.00	0%
Easement Acreage 12.3					
Vegetation Category	**Definitions**	**CCPV Depiction**	**Number of Polygons**	**Combined Acreage**	**% of Easement Acreage**
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale).	Cross Hatch (Red - Dense/Yellow - Present)	2	0.19	2%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale).	N/A	2	0.25	2%

601 North II – Permanent Photo Station 1
Looking Downstream

601 North II – Permanent Photo Station 2
Looking Downstream

601 North II – Permanent Photo Station 2
Looking Upstream

601 North II – Permanent Photo Station 3
Looking Upstream

601 North II – Permanent Photo Station 4
Looking Downstream

601 North II – Permanent Photo Station 5
Looking Downstream

601 North II – Permanent Photo Station 5
Looking Upstream

601 North II – Permanent Photo Station 6
Looking Downstream

601 North II -Permanent Photo Station 6
Looking Upstream

Appendix C
Vegetation Plot Data

Table 7. Vegetation Plot Criteria Attainment		
601 North II / Project No. 95025		
Vegetation Plot ID	Vegetation Survival Threshold Met?	Tract Mean
1	Yes	92%
2	Yes	
3	Yes	
4	Yes	
5	Yes	
6	Yes	
7	Yes	
8	Yes	
9	Yes	
10	Yes	
11	Yes	
12	No	

601 North II-Vegetation Monitoring Plot 1
September 30, 2014

601 North II-Vegetation Monitoring Plot 2
September 30, 2014

601 North II-Vegetation Monitoring Plot 3
September 30, 2014

601 North II-Vegetation Monitoring Plot 4
September 30, 2014

601 North II-Vegetation Monitoring Plot 5
September 30, 2014

601 North II-Vegetation Monitoring Plot 6
September 30, 2014

601 North II-Vegetation Monitoring Plot 7
September 30, 2014

601 North II-Vegetation Monitoring Plot 8
September 30, 2014

601 North II-Vegetation Monitoring Plot 9
September 30, 2014

601 North II-Vegetation Monitoring Plot 10
September 30, 2014

601 North II-Vegetation Monitoring Plot 11
September 30, 2014

601 North II-Vegetation Monitoring Plot 12
September 30, 2014

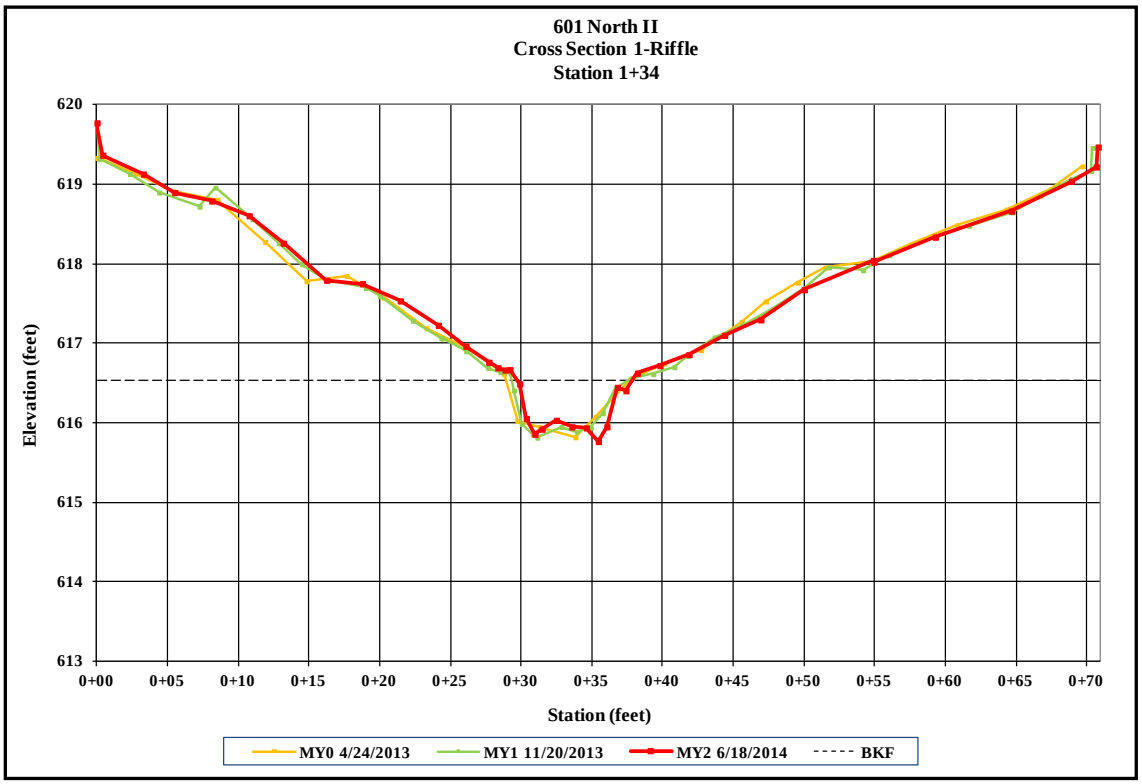
Table 8. CVS Vegetation Plot Metadata 601 North II / Project No. 95025	
Report Prepared By	Owen Carson
Date Prepared	10/1/2014 13:13
database name	601_N_II_MY2_A_2014.mdb
database location	Z:\ES\NRI&M\EBX Monitoring\601_N_II\601N-II-MY2-2014\Data\Veg
computer name	FIELDTECH3-PC
file size	37040128
DESCRIPTION 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	95025
project Name	601 North II Stream Restoration Site
Description	Stream Restoration Site
River Basin	Yadkin-Pee Dee
length(ft)	4248
stream-to-edge width (ft)	350
area (sq m)	47348.22
Required Plots (calculated)	12
Sampled Plots	12

Table 9. Planted Total Stem Counts (Species by Plot with Annual Means)
EEP Project Code 95025. Project Name: 601 North II Stream Restoration Site

			Current Plot Data (MY2 2014)																															Annual Means								
			95925-01-0001			95925-01-0002			95925-01-0003			95925-01-0004			95925-01-0005			95925-01-0006			95925-01-0007			95925-01-0008			95925-01-0009			95925-01-0010			95925-01-0011			95925-01-0012			MY2 (2014)			MY1 (2013)			MY0 (2013)		
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	Pno	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Betula nigra	river birch	Tree	3	3	3	3	3	3	2	2	2	1	1	1	3	3	3	4	4	4				2	2	2	3	3	3	3	3	3	4	4	4	1	1	1	29	29	29	31	31	31	51	51	51
Campsis radicans	trumpet creeper	Vine																			1																				1						
Celtis laevigata	sugarberry	Tree																																												2
Cercis canadensis	eastern redbud	Tree										2	2	2	2	2	2							2	2	2				1	1	1							7	7	7	11	11	11	19	19	19
Fraxinus pennsylvanica	green ash	Tree	1	1	1				1	1	1						1	1	1	2	2	2	2	1	1	1	2	2	2							2	2	2	10	10	12	9	9	9	10	10	10
Liquidambar styraciflua	sweetgum	Tree																											6			2								8					
Nyssa sylvatica	blackgum	Tree																																		1	1	1	1	1	1	3	3	3	7	7	7
Platanus occidentalis	American sycamore	Tree	1	1	1	4	4	4	2	2	2				5	5	5				5	5	5				2	2	2							2	2	2	21	21	21	22	22	22	19	19	19
Platanus occidentalis var.	Sycamore, Plane-tree	Tree	1	1	1			1	1	1	1						1												1										2	2	5						
Quercus michauxii	swamp chestnut oak	Tree	3	3	3	1	1	1	3	3	3	6	6	6	3	3	3	4	4	4	1	1	1				1	1	1	1	1	1							23	23	23	31	31	31	44	44	44
Quercus phellos	willow oak	Tree	1	1	1							2	2	2				5	5	5	2	2	2	2	2	2				2	2	2	4	4	4				18	18	18	19	19	19	27	27	27
Quercus rubra	northern red oak	Tree	1	1	1										1	1	1	1	1	1	3	3	3	2	2	2				1	1	1							9	9	9	13	13	13	14	14	14
Quercus velutina	black oak	Tree	1	1	1																																		1	1	1						
Salix nigra	black willow	Tree																											2												2					
	Stem count		12	12	12	8	8	9	9	9	9	11	11	11	14	14	16	15	15	16	13	13	14	9	9	9	8	8	17	8	8	8	8	8	10	6	6	6	121	121	137	139	139	139	191	191	193
	size (ares)		1			1			1			1			1			1			1			1			1			1			1			1			12			12			12		
	size (ACRES)		0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.30			0.30			0.30		
	Species count		8	8	8	3	3	4	5	5	5	4	4	4	5	5	7	5	5	5	5	5	6	5	5	5	4	4	7	5	5	5	2	2	3	4	4	4	10	10	13	8	8	8	8	8	9
	Stems per ACRE		485.6	486	486	323.7	324	364	364.2	364	364	445.2	445	445	566.6	567	647	607	607	647	526	526.0913	566.5599	364.2171	364.2171	364.2171	323.7485	323.7485	687.9656	323.7485	323.7485	323.7485	323.7485	323.7485	404.6856	242.8114	242.8114	242.8114	408.058	408.058	462.0161	468.7609	468.7609	468.7609	644.1246	644.1246	650.8694

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%

Appendix D
Stream Survey Data

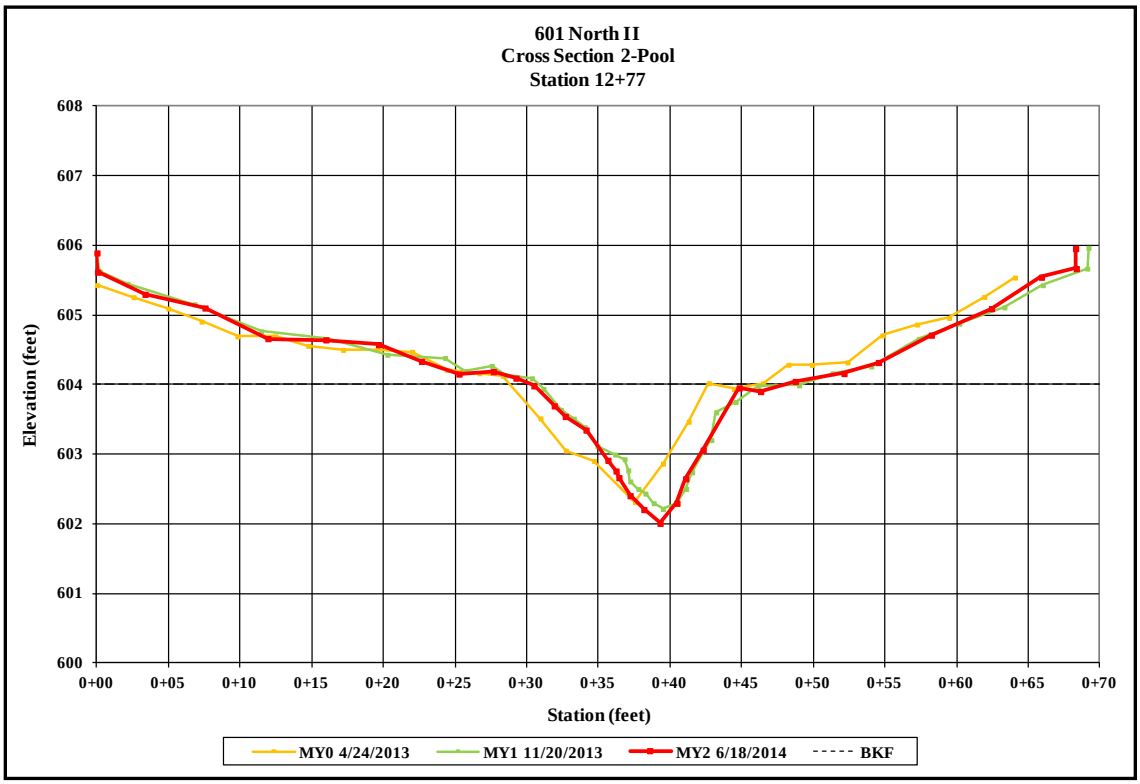


Left Descending Bank

Right Descending Bank

Upstream

Downstream

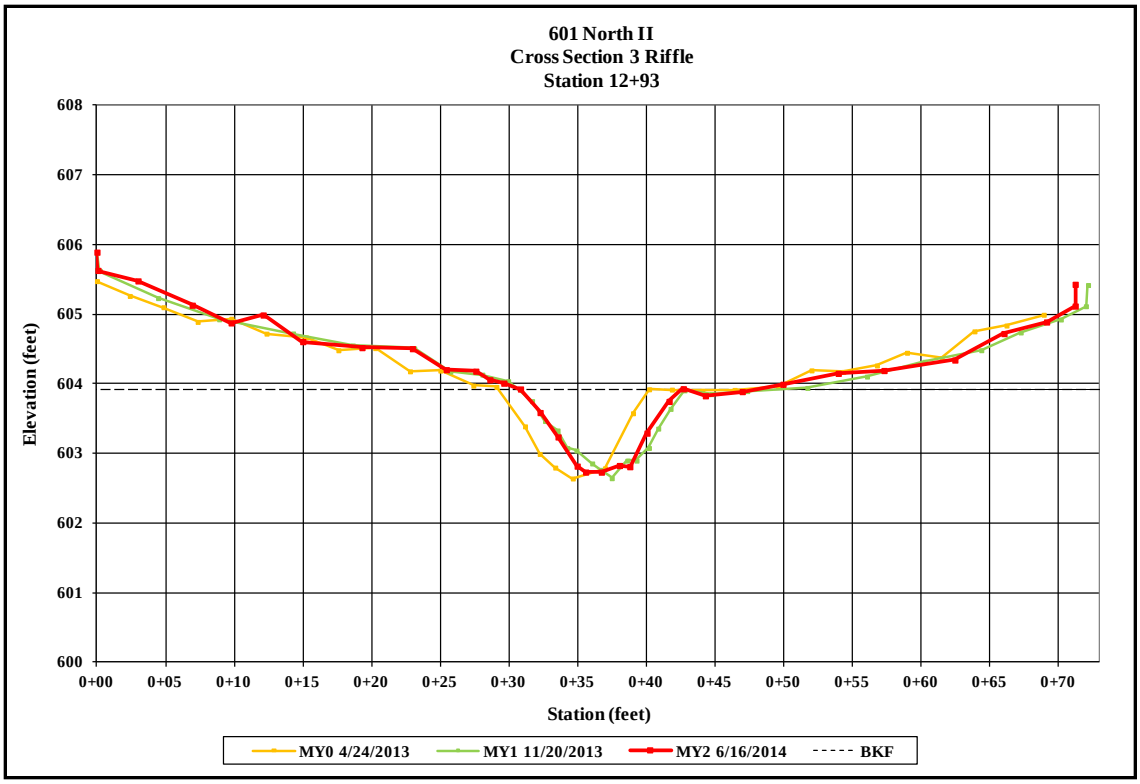


Left Descending Bank

Right Descending Bank

Upstream

Downstream

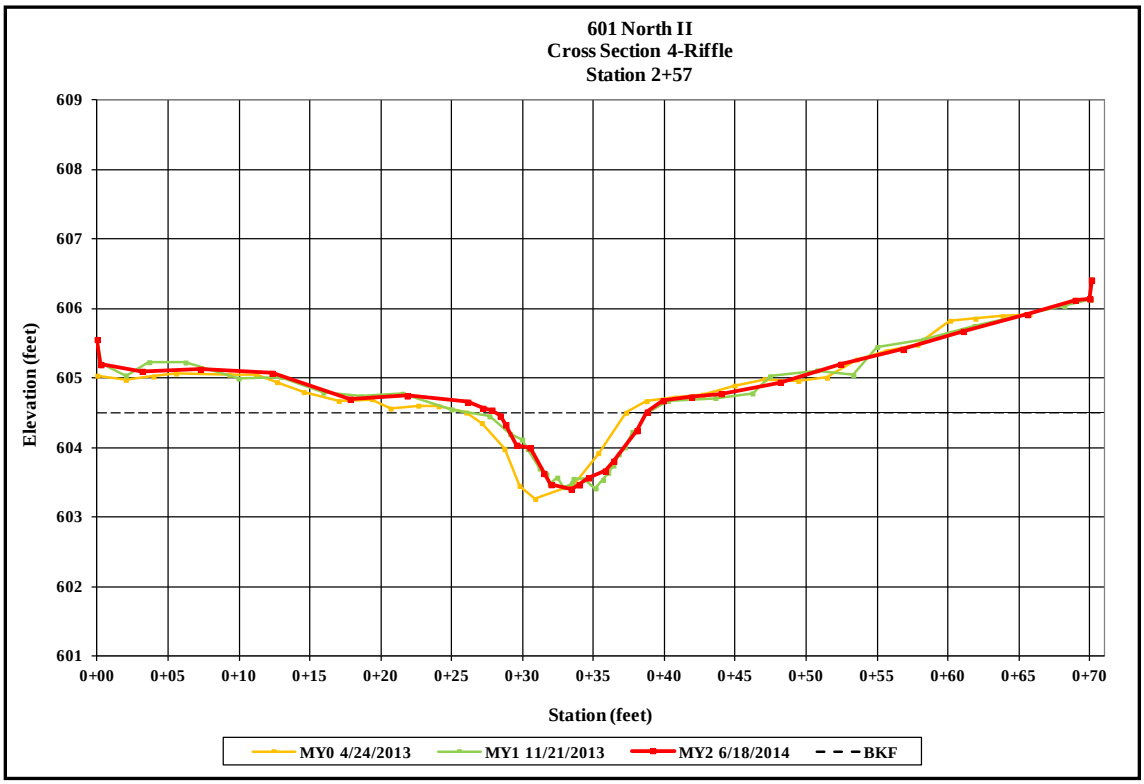


Left Descending Bank

Right Descending Bank

Upstream

Downstream

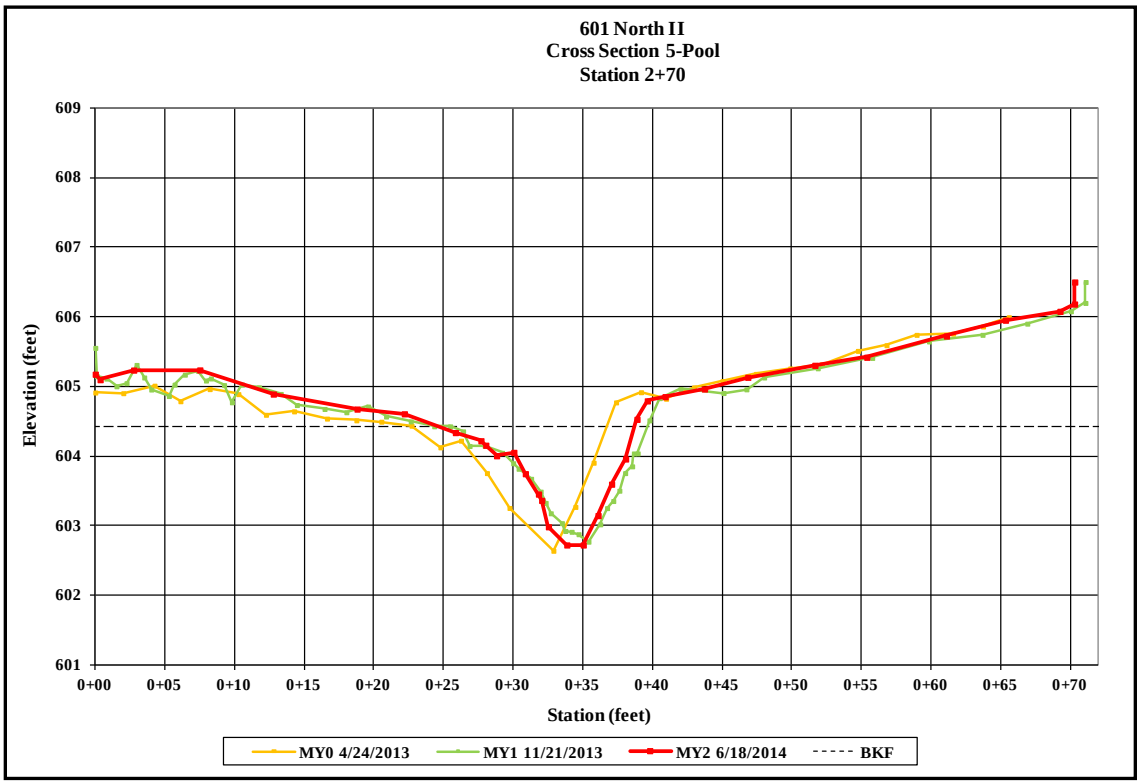


Left Descending Bank

Right Descending Bank

Upstream

Downstream

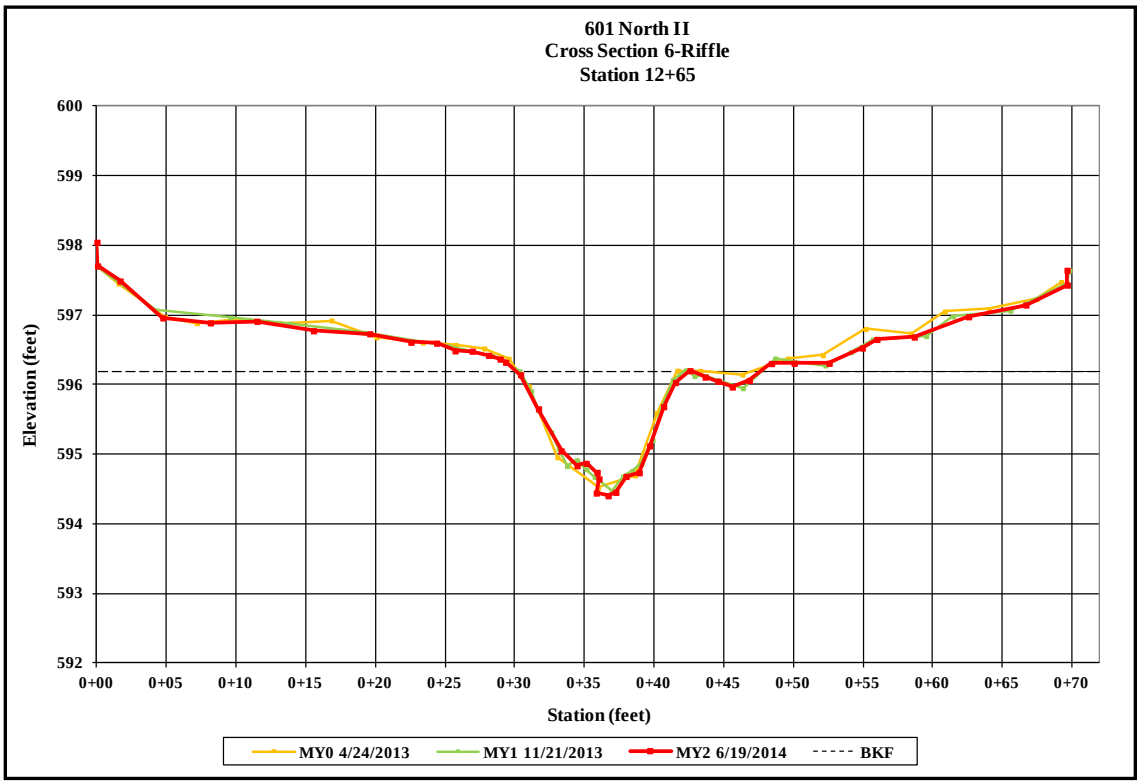


Left Descending Bank

Right Descending Bank

Upstream

Downstream

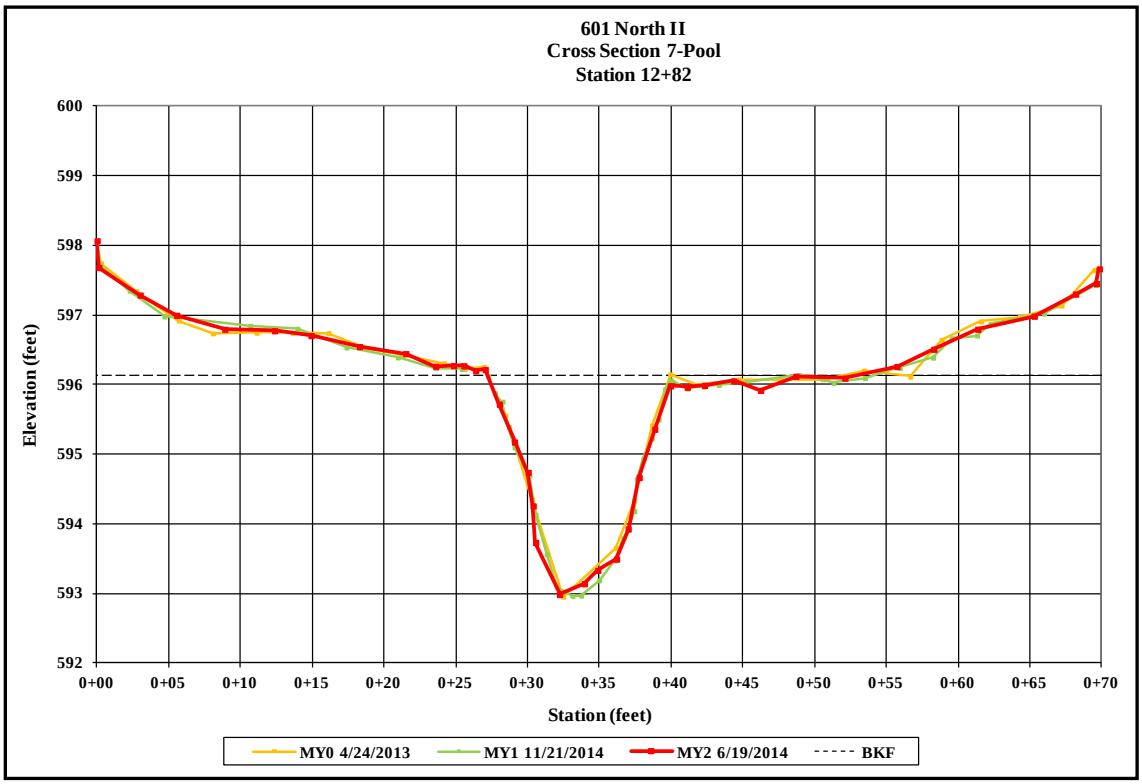


Left Descending Bank

Right Descending Bank

Upstream

Downstream

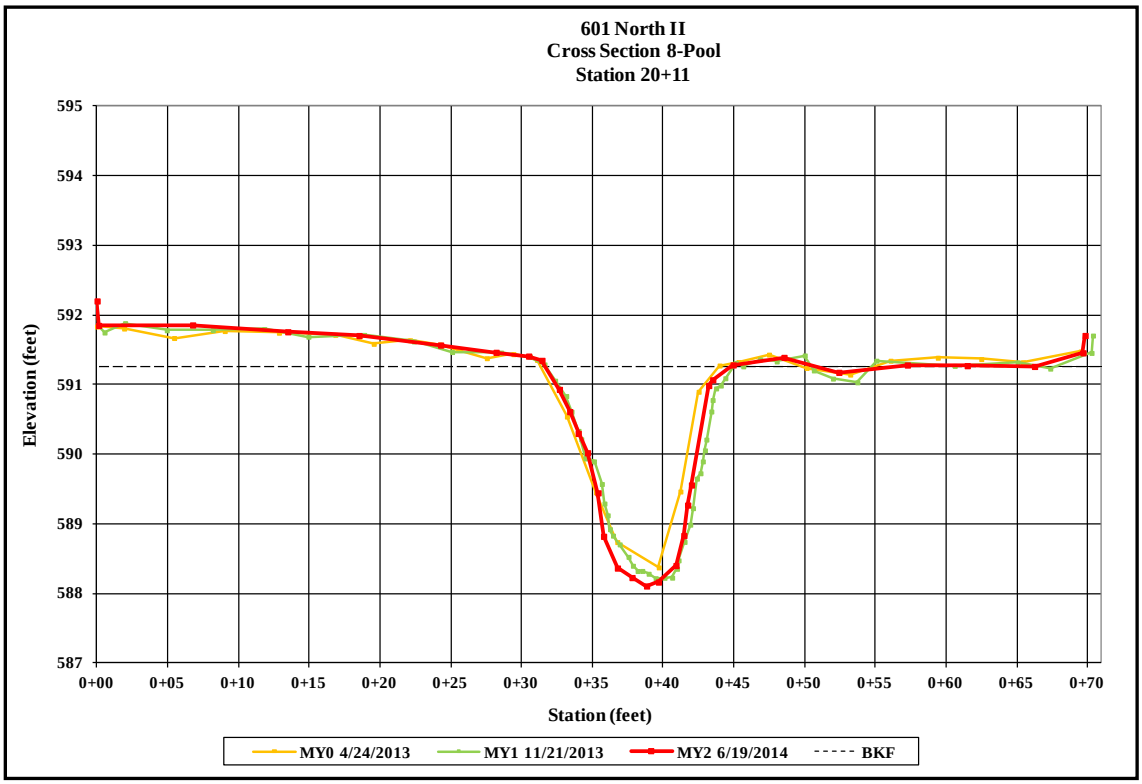


Left Descending Bank

Right Descending Bank

Upstream

Downstream

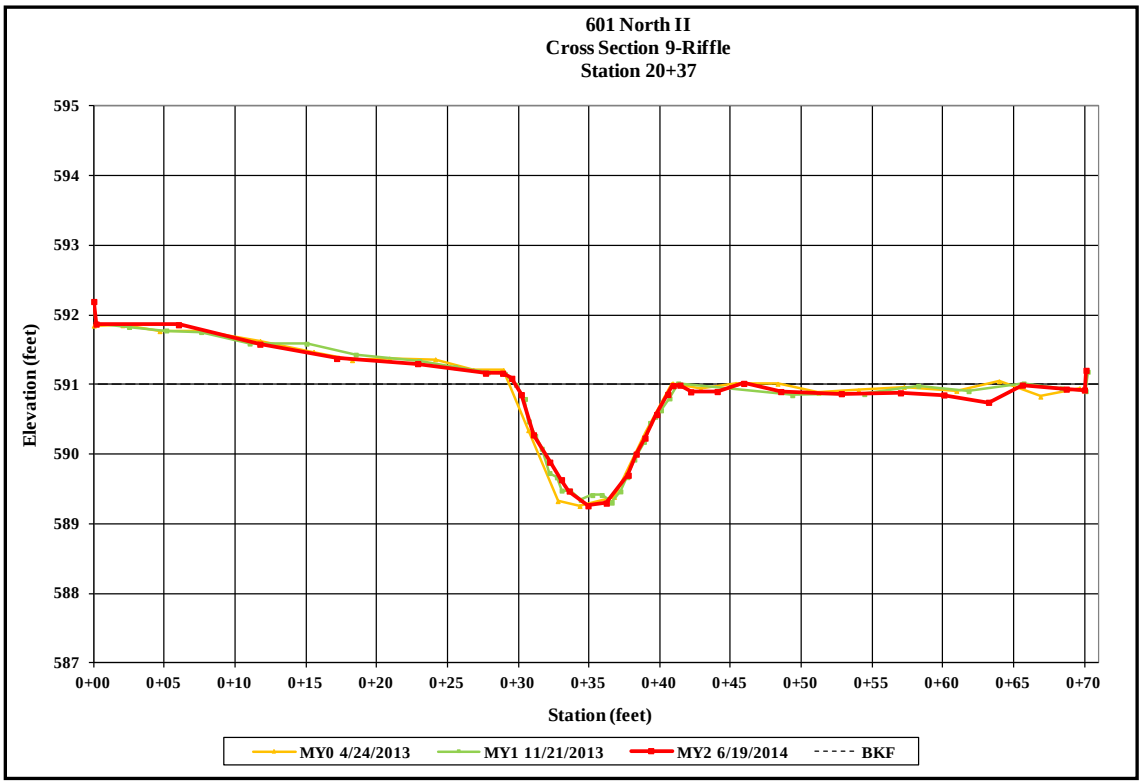


Left Descending Bank

Right Descending Bank

Upstream

Downstream

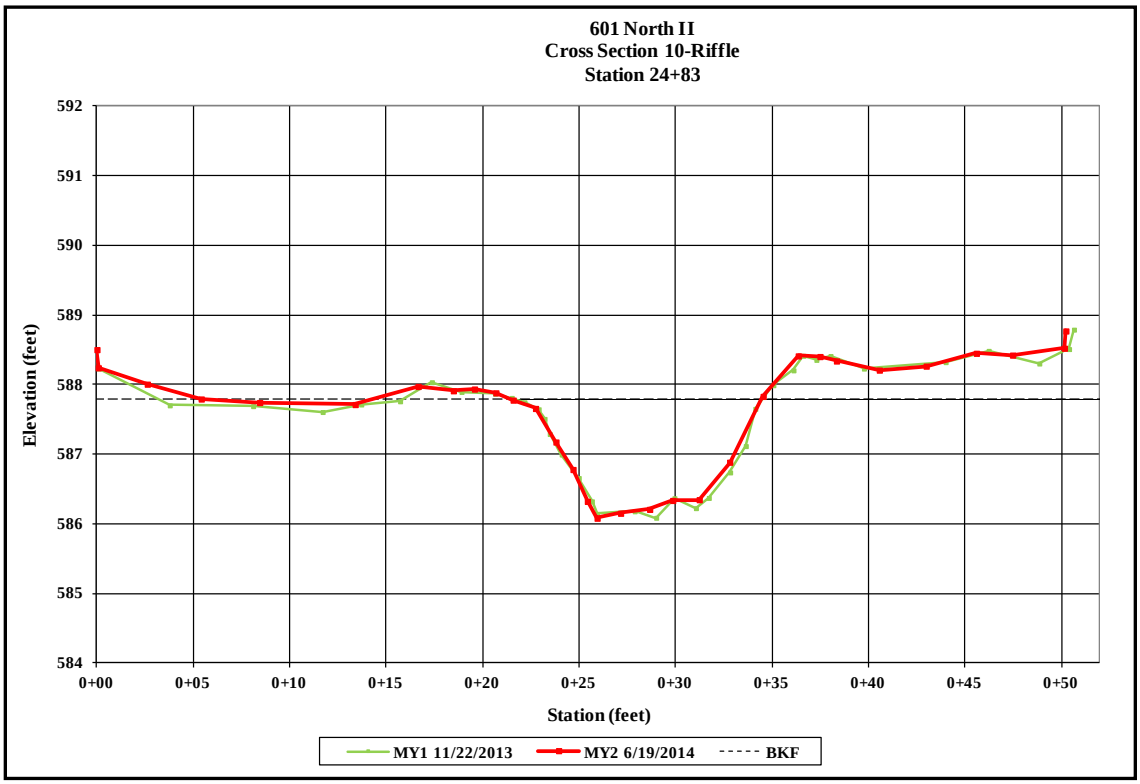


Left Descending Bank

Right Descending Bank

Upstream

Downstream



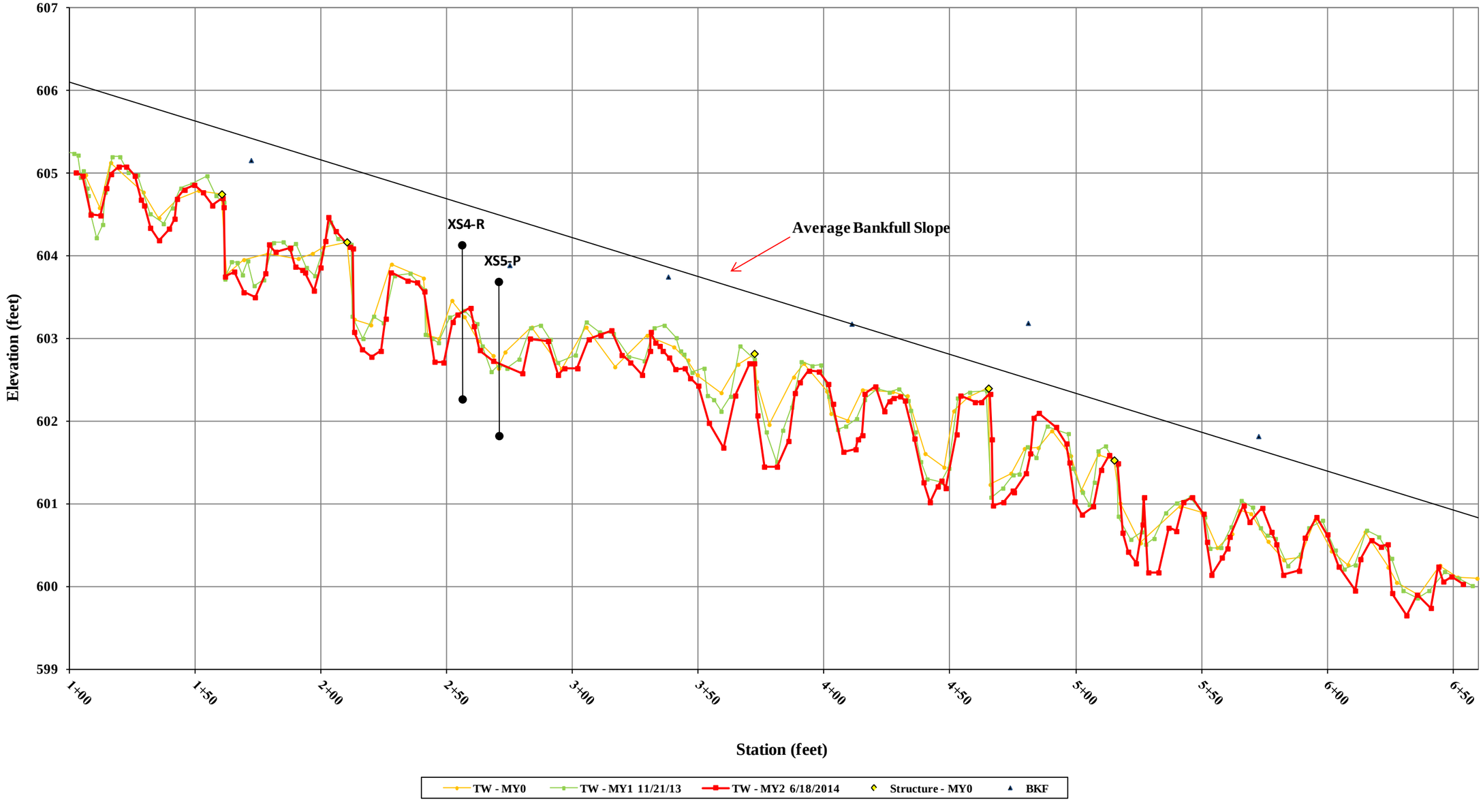
Left Descending Bank

Right Descending Bank

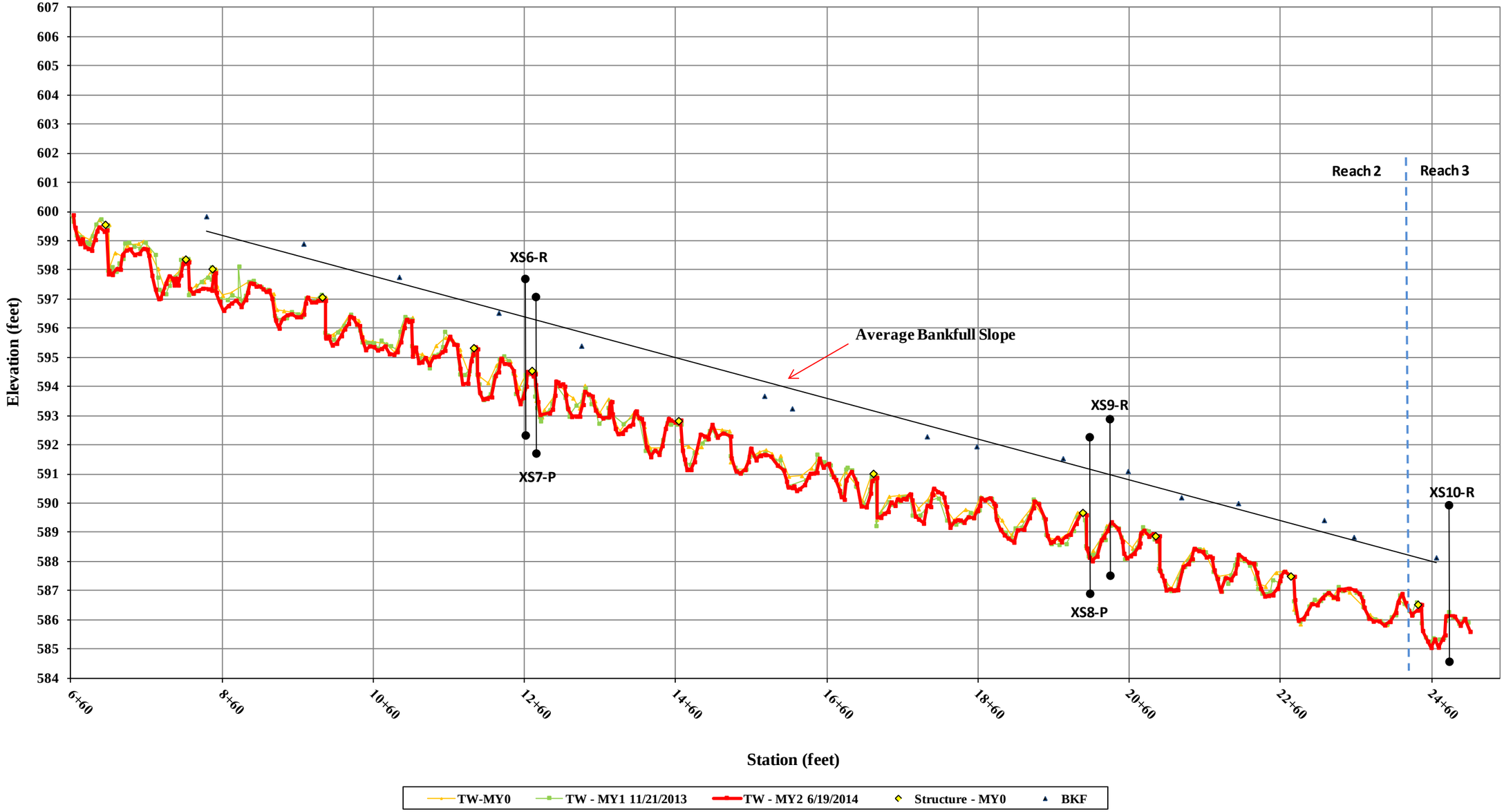
Upstream

Downstream

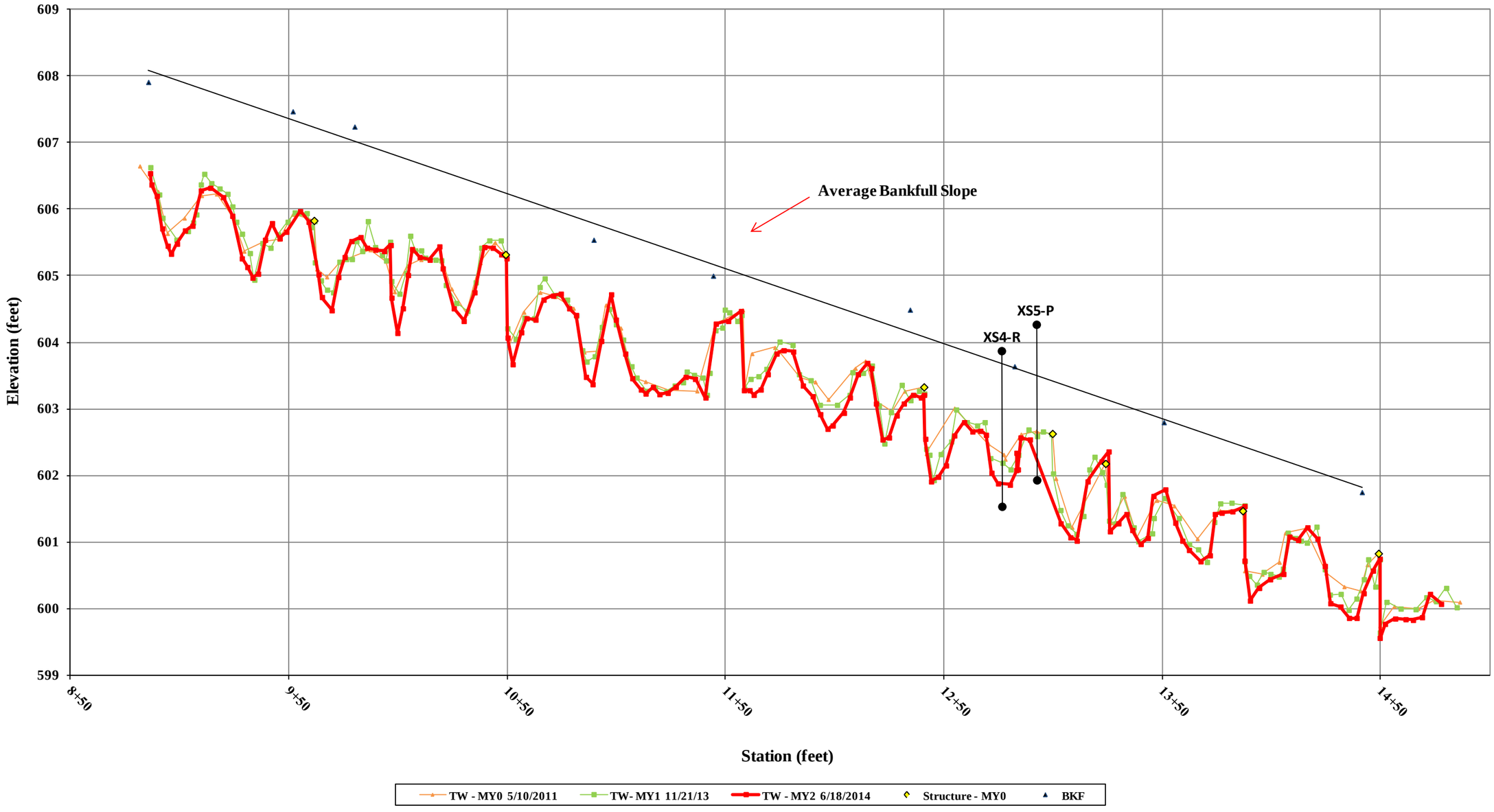
601 North II Wicker Branch
Reach 1
Longitudinal Profile
Staioning 1+00 to 6+60



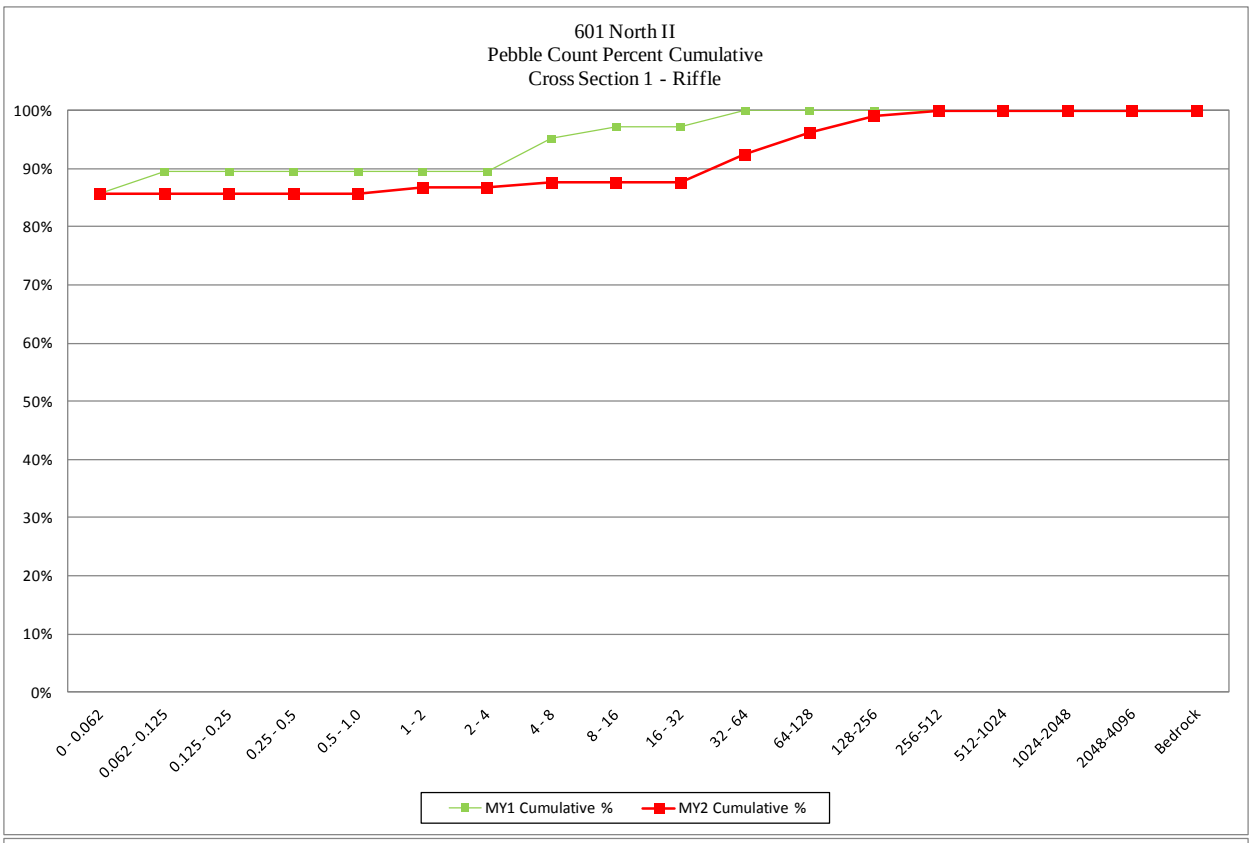
601 North II Reach 2/3
Longitudinal Profile
Reach 2 - Stationing 6+60 to 24+35
Reach 3 - Stationing 24+35 to 25+08

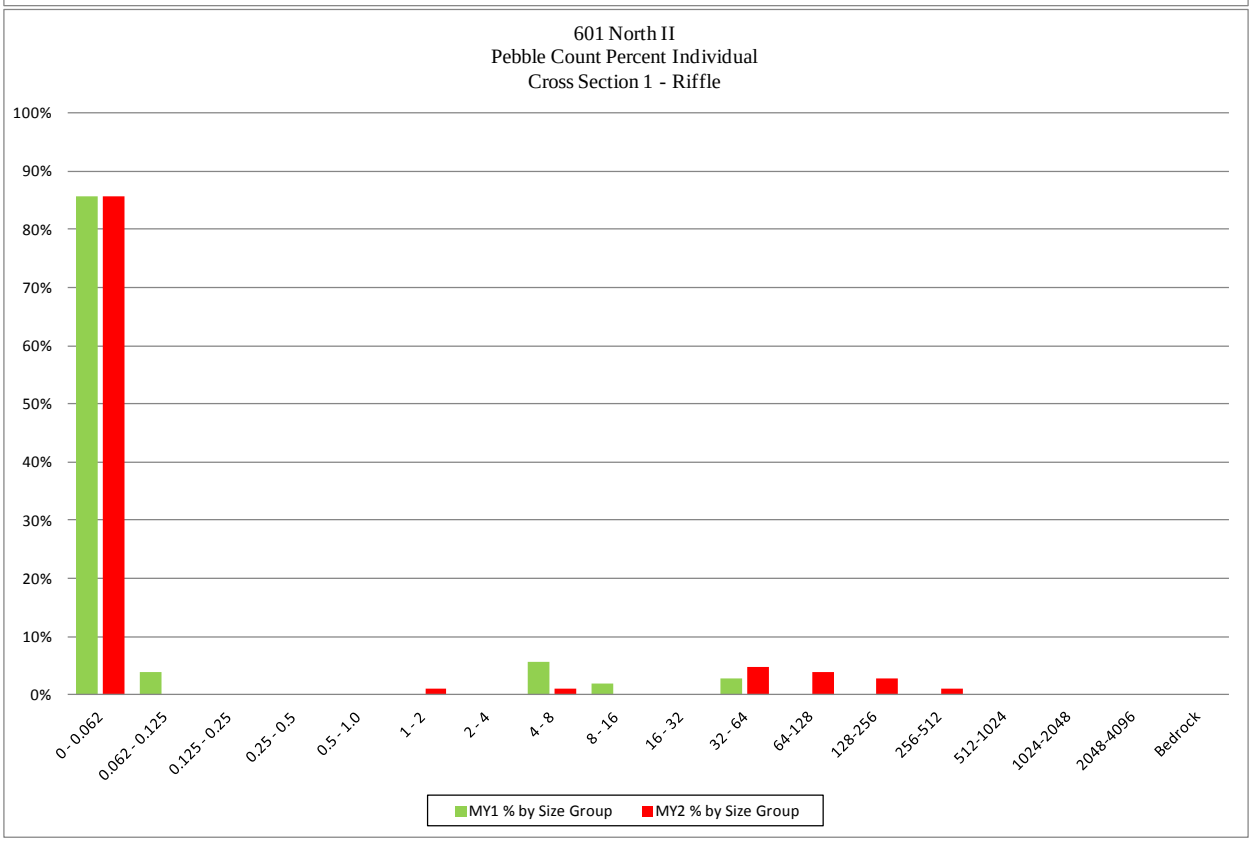


601 North II UT-Wicker Branch
Reach 5
Longitudinal Profile
Stationing 8+86 to 14+84

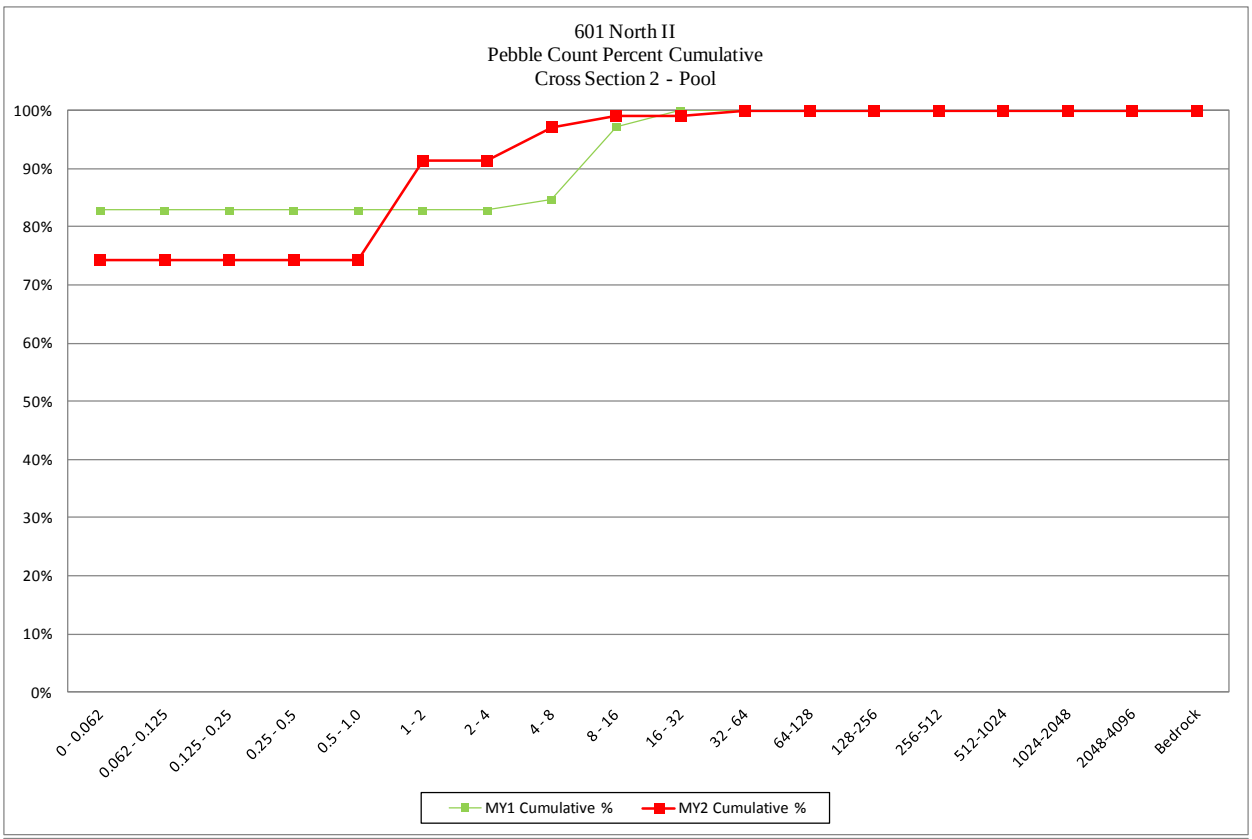


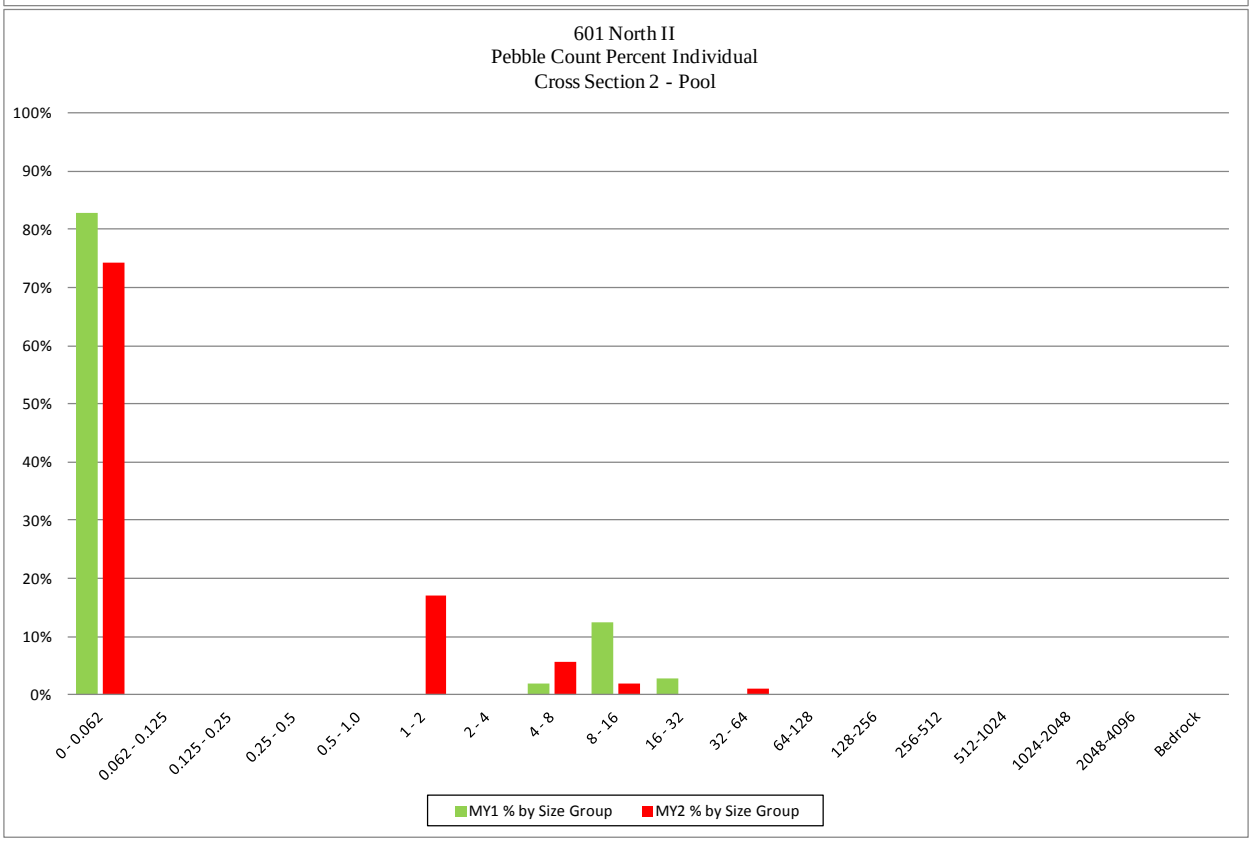
601N II			
Cross Section 1 - Riffle			
Monitoring Year - 2014; MY2			
Bed Surface Material Particle Size Class (mm)	**Number**	**% Individual**	**% Cumulative**
0 - 0.062	90	85.7%	86%
0.062 - 0.125	0	0.0%	86%
0.125 - 0.25	0	0.0%	86%
0.25 - 0.5	0	0.0%	86%
0.5 - 1.0	0	0.0%	86%
1 - 2	1	1.0%	87%
2 - 4	0	0.0%	87%
4 - 8	1	1.0%	88%
8 - 16	0	0.0%	88%
16 - 32	0	0.0%	88%
32 - 64	5	4.8%	92%
64-128	4	3.8%	96%
128-256	3	2.9%	99%
256-512	1	1.0%	100%
512-1024	0	0.0%	100%
1024-2048	0	0.0%	100%
2048-4096	0	0.0%	100%
Bedrock	0	0.0%	100%
Total	**105**	**100%**	**100%**
		Summary Data	
		D50	**0.062**
		D84	**0.062**
		D95	**100**


601 North II
Pebble Count Percent Cumulative
Cross Section 1 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 Cumulative %
MY2 Cumulative %

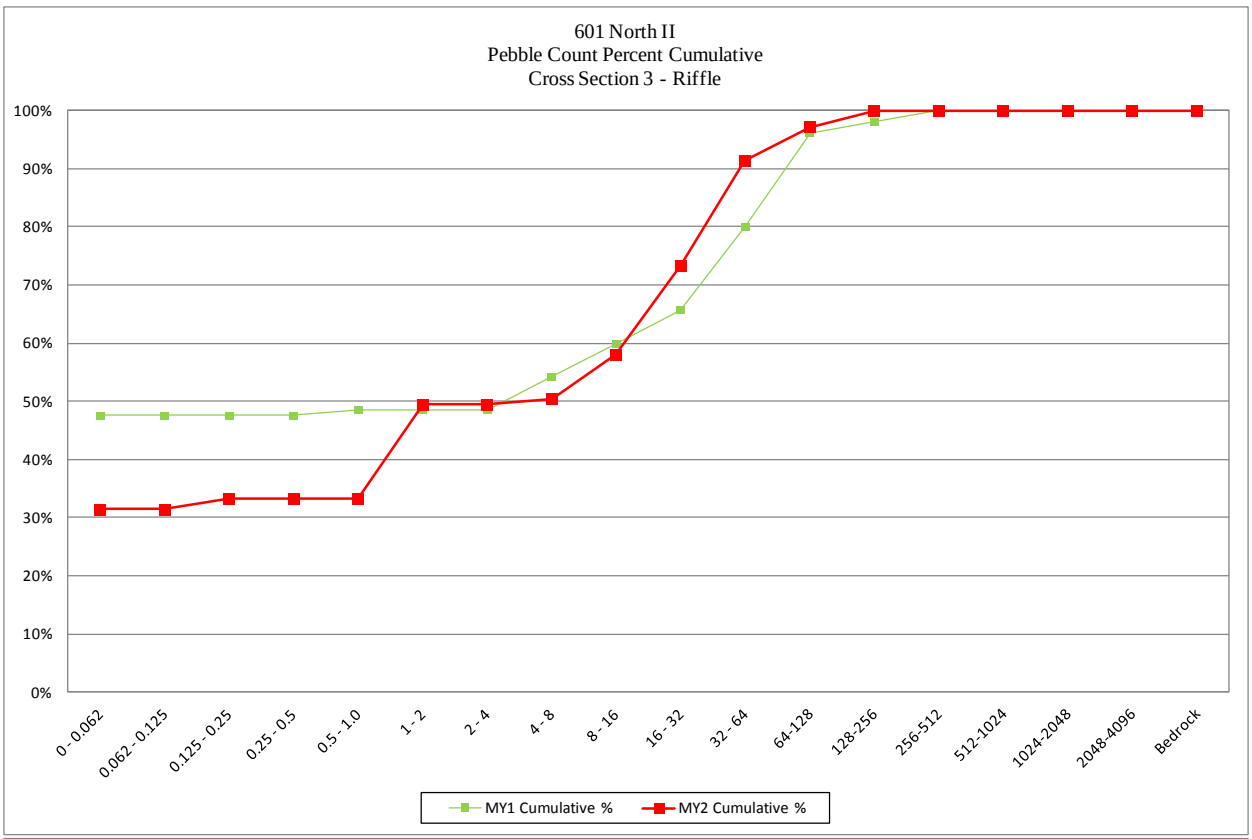

601 North II
Pebble Count Percent Individual
Cross Section 1 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 % by Size Group
MY2 % by Size Group

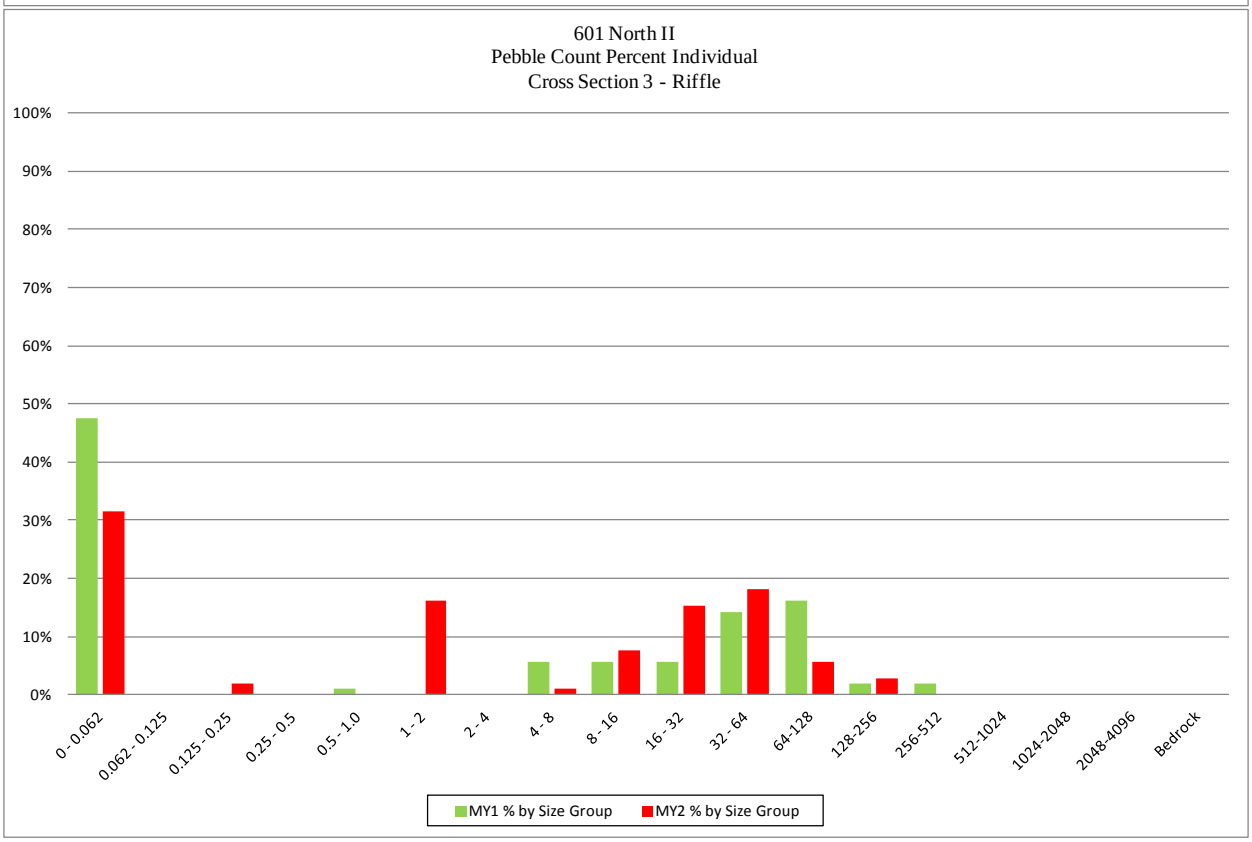
601N II			
Cross Section 2 - Pool			
Monitoring Year - 2014; MY2			
Bed Surface Material Particle Size Class (mm)	**Number**	**% Individual**	**% Cumulative**
0 - 0.062	78	74.3%	74%
0.062 - 0.125	0	0.0%	74%
0.125 - 0.25	0	0.0%	74%
0.25 - 0.5	0	0.0%	74%
0.5 - 1.0	0	0.0%	74%
1 - 2	18	17.1%	91%
2 - 4	0	0.0%	91%
4 - 8	6	5.7%	97%
8 - 16	2	1.9%	99%
16 - 32	0	0.0%	99%
32 - 64	1	1.0%	100%
64-128	0	0.0%	100%
128-256	0	0.0%	100%
256-512	0	0.0%	100%
512-1024	0	0.0%	100%
1024-2048	0	0.0%	100%
2048-4096	0	0.0%	100%
Bedrock	0	0.0%	100%
Total	**105**	**100%**	**100%**
		Summary Data	
		D50	**0.062**
		D84	**1.5**
		D95	**7**


601 North II
Pebble Count Percent Cumulative
Cross Section 2 - Pool
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 Cumulative %
MY2 Cumulative %

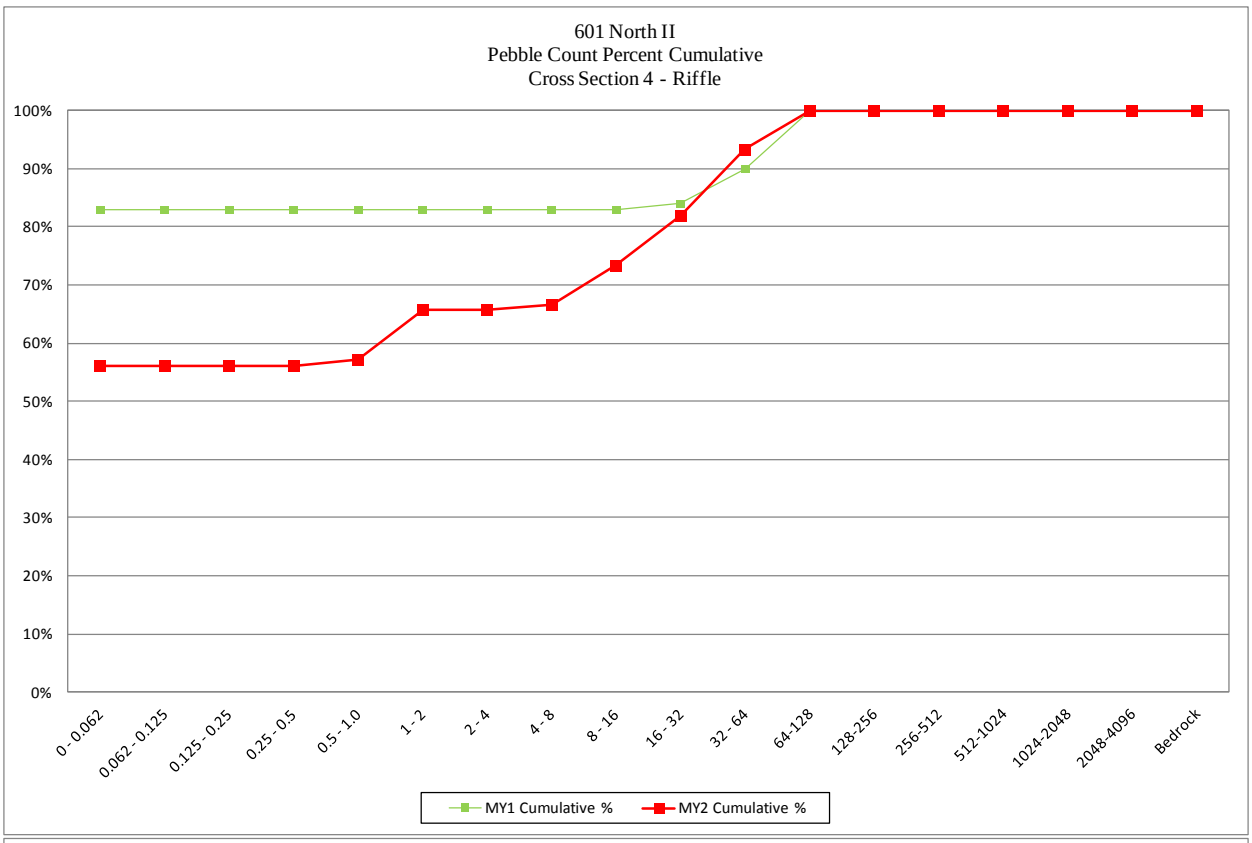

601 North II
Pebble Count Percent Individual
Cross Section 2 - Pool
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 % by Size Group
MY2 % by Size Group

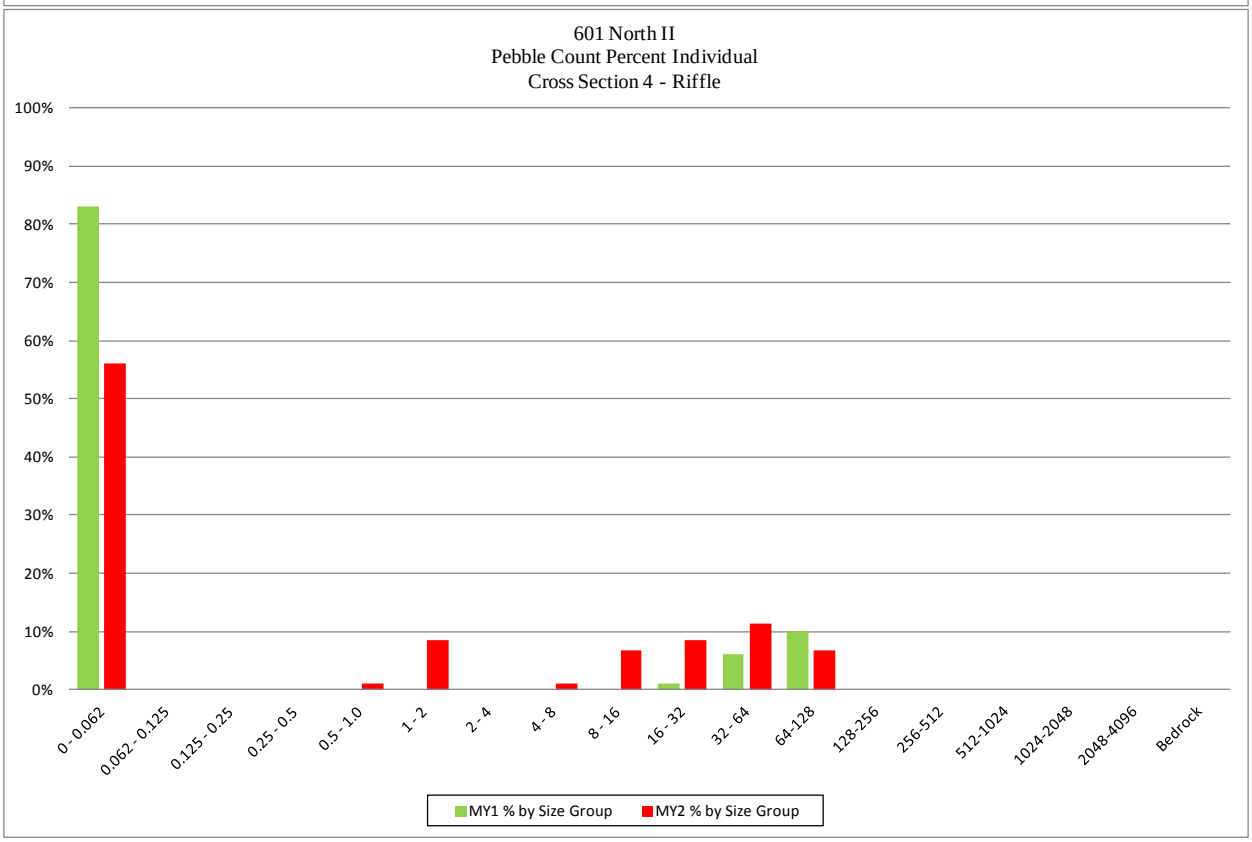
601N II			
Cross Section 3 - Riffle			
Monitoring Year - 2014; MY2			
Bed Surface Material Particle Size Class (mm)	**Number**	**% Individual**	**% Cumulative**
0 - 0.062	33	31.4%	31%
0.062 - 0.125	0	0.0%	31%
0.125 - 0.25	2	1.9%	33%
0.25 - 0.5	0	0.0%	33%
0.5 - 1.0	0	0.0%	33%
1 - 2	17	16.2%	50%
2 - 4	0	0.0%	50%
4 - 8	1	1.0%	50%
8 - 16	8	7.6%	58%
16 - 32	16	15.2%	73%
32 - 64	19	18.1%	91%
64-128	6	5.7%	97%
128-256	3	2.9%	100%
256-512	0	0.0%	100%
512-1024	0	0.0%	100%
1024-2048	0	0.0%	100%
2048-4096	0	0.0%	100%
Bedrock	0	0.0%	100%
Total	**105**	**100%**	**100%**
		Summary Data	
		D50	**6.9**
		D84	**44**
		D95	**110**


601 North II
Pebble Count Percent Cumulative
Cross Section 3 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 Cumulative %
MY2 Cumulative %

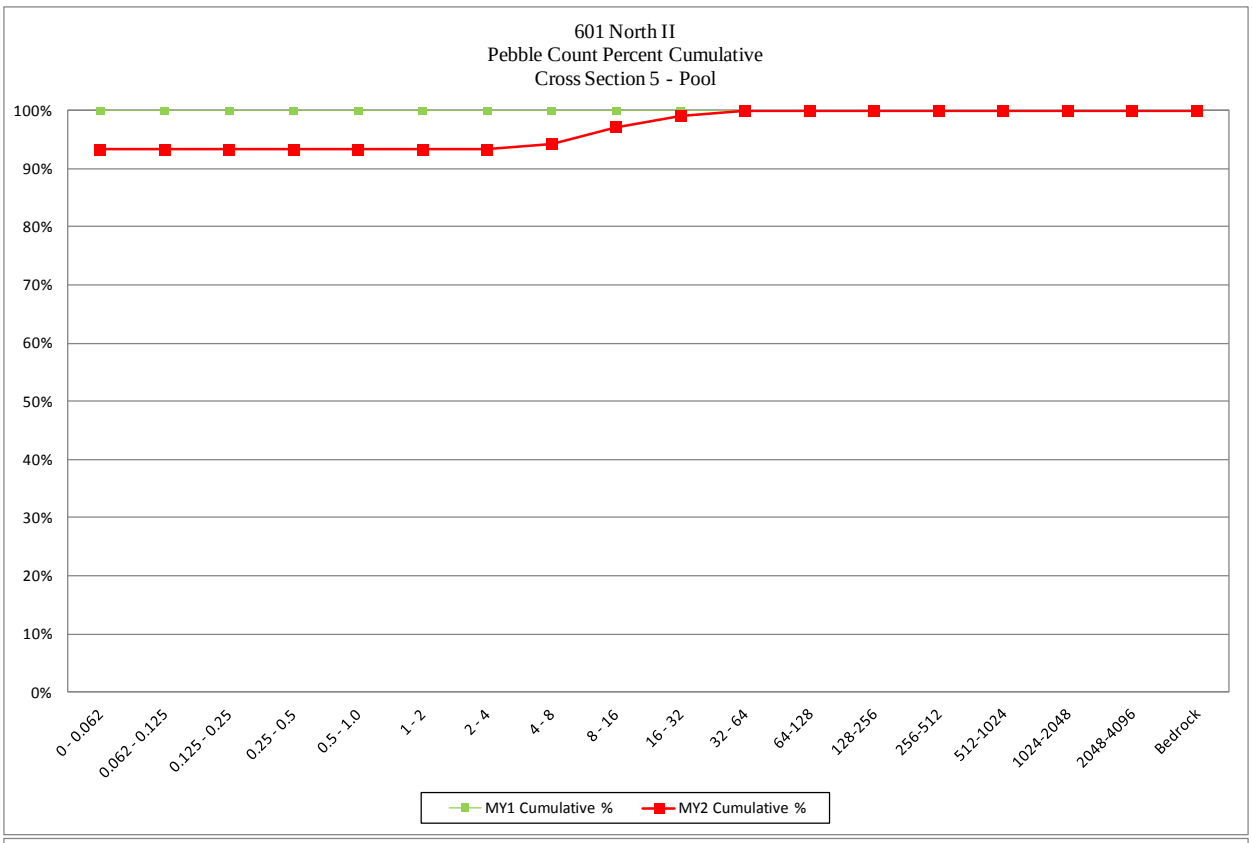

601 North II
Pebble Count Percent Individual
Cross Section 3 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 % by Size Group
MY2 % by Size Group

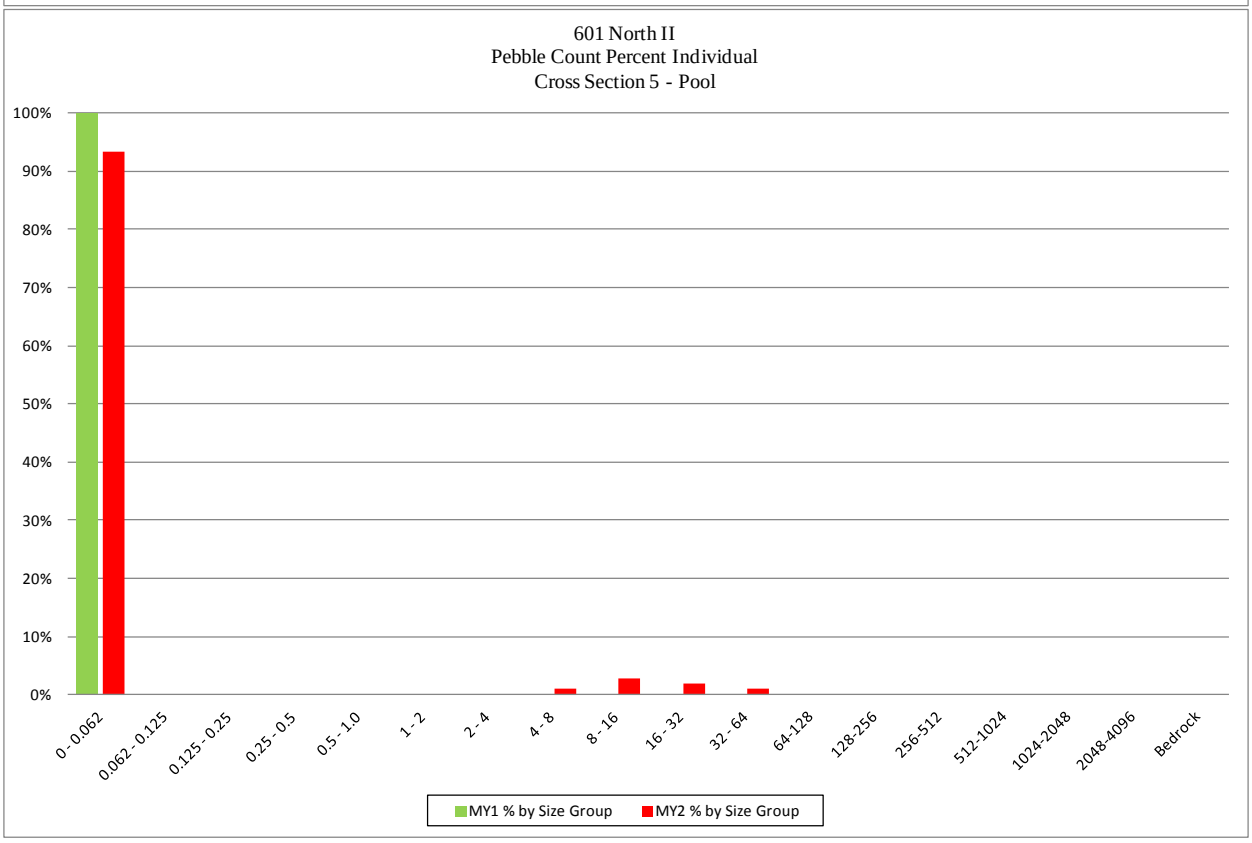
601N II			
Cross Section 4 - Riffle			
Monitoring Year - 2014; MY2			
Bed Surface Material Particle Size Class (mm)	**Number**	**% Individual**	**% Cumulative**
0 - 0.062	59	56.2%	56%
0.062 - 0.125	0	0.0%	56%
0.125 - 0.25	0	0.0%	56%
0.25 - 0.5	0	0.0%	56%
0.5 - 1.0	1	1.0%	57%
1 - 2	9	8.6%	66%
2 - 4	0	0.0%	66%
4 - 8	1	1.0%	67%
8 - 16	7	6.7%	73%
16 - 32	9	8.6%	82%
32 - 64	12	11.4%	93%
64-128	7	6.7%	100%
128-256	0	0.0%	100%
256-512	0	0.0%	100%
512-1024	0	0.0%	100%
1024-2048	0	0.0%	100%
2048-4096	0	0.0%	100%
Bedrock	0	0.0%	100%
Total	**105**	**100%**	**100%**
		Summary Data	
		D50	**0.062**
		D84	**36**
		D95	**74**


601 North II
Pebble Count Percent Cumulative
Cross Section 4 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 Cumulative %
MY2 Cumulative %

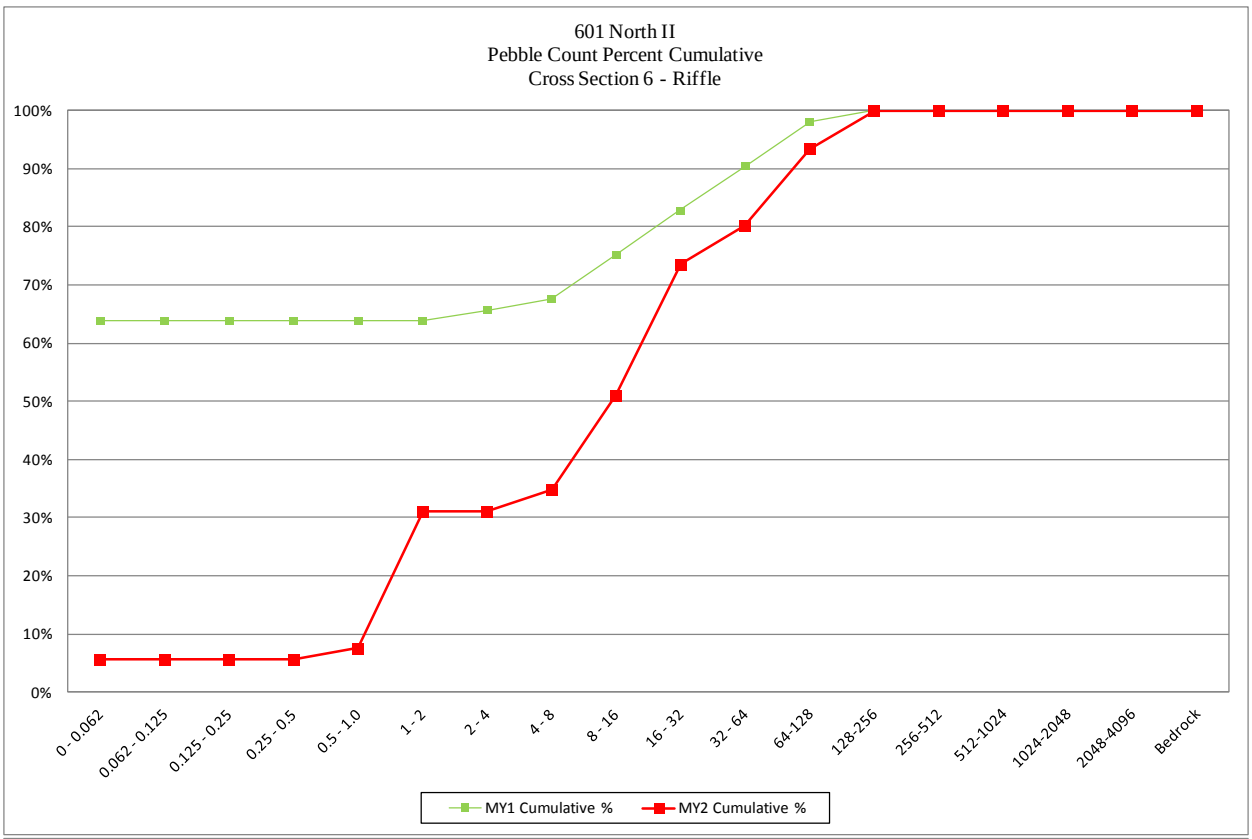

601 North II
Pebble Count Percent Individual
Cross Section 4 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 % by Size Group
MY2 % by Size Group

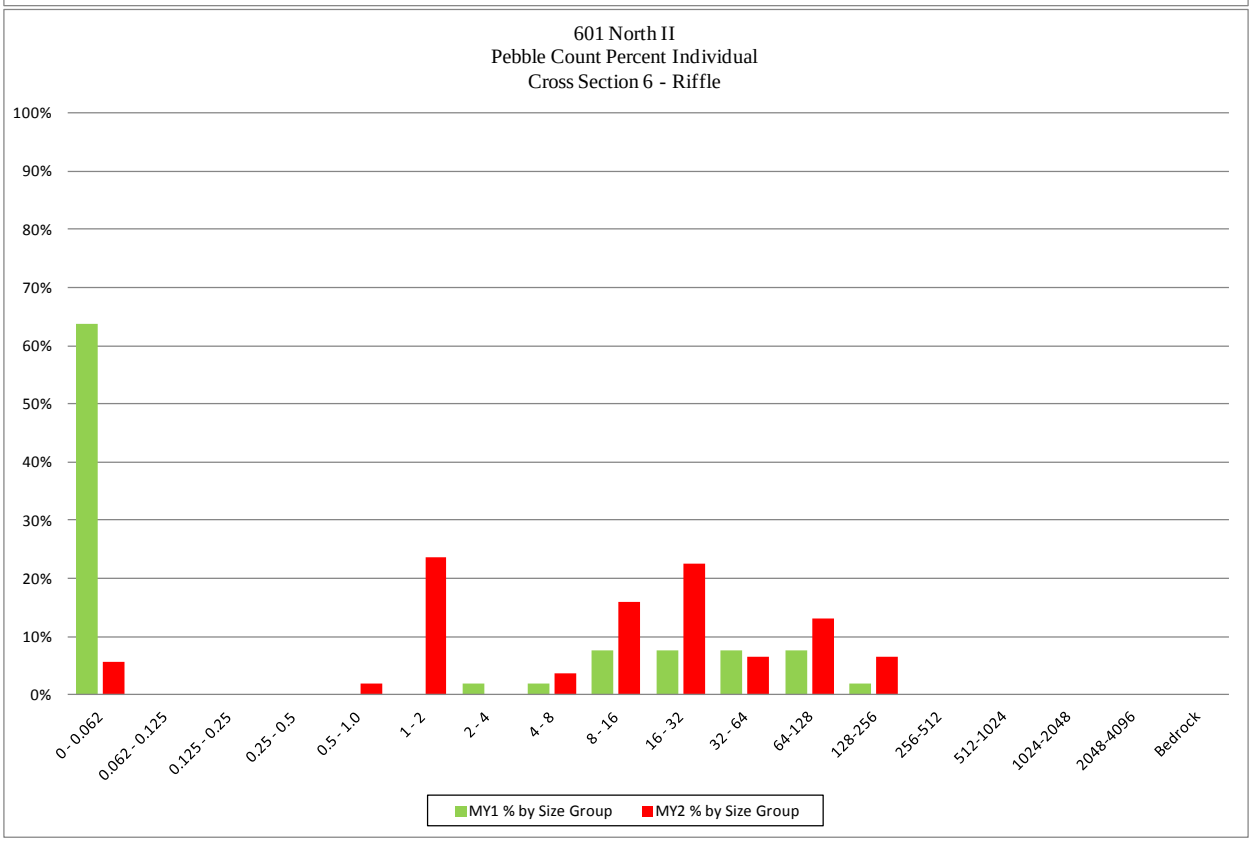
601N II			
Cross Section 5 - Pool			
Monitoring Year - 2014; MY2			
Bed Surface Material Particle Size Class (mm)	**Number**	**% Individual**	**% Cumulative**
0 - 0.062	98	93.3%	93%
0.062 - 0.125	0	0.0%	93%
0.125 - 0.25	0	0.0%	93%
0.25 - 0.5	0	0.0%	93%
0.5 - 1.0	0	0.0%	93%
1 - 2	0	0.0%	93%
2 - 4	0	0.0%	93%
4 - 8	1	1.0%	94%
8 - 16	3	2.9%	97%
16 - 32	2	1.9%	99%
32 - 64	1	1.0%	100%
64-128	0	0.0%	100%
128-256	0	0.0%	100%
256-512	0	0.0%	100%
512-1024	0	0.0%	100%
1024-2048	0	0.0%	100%
2048-4096	0	0.0%	100%
Bedrock	0	0.0%	100%
Total	**105**	**100%**	**100%**
		Summary Data	
		D50	**0.062**
		D84	**0.062**
		D95	**10**


601 North II
Pebble Count Percent Cumulative
Cross Section 5 - Pool
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 Cumulative %
MY2 Cumulative %

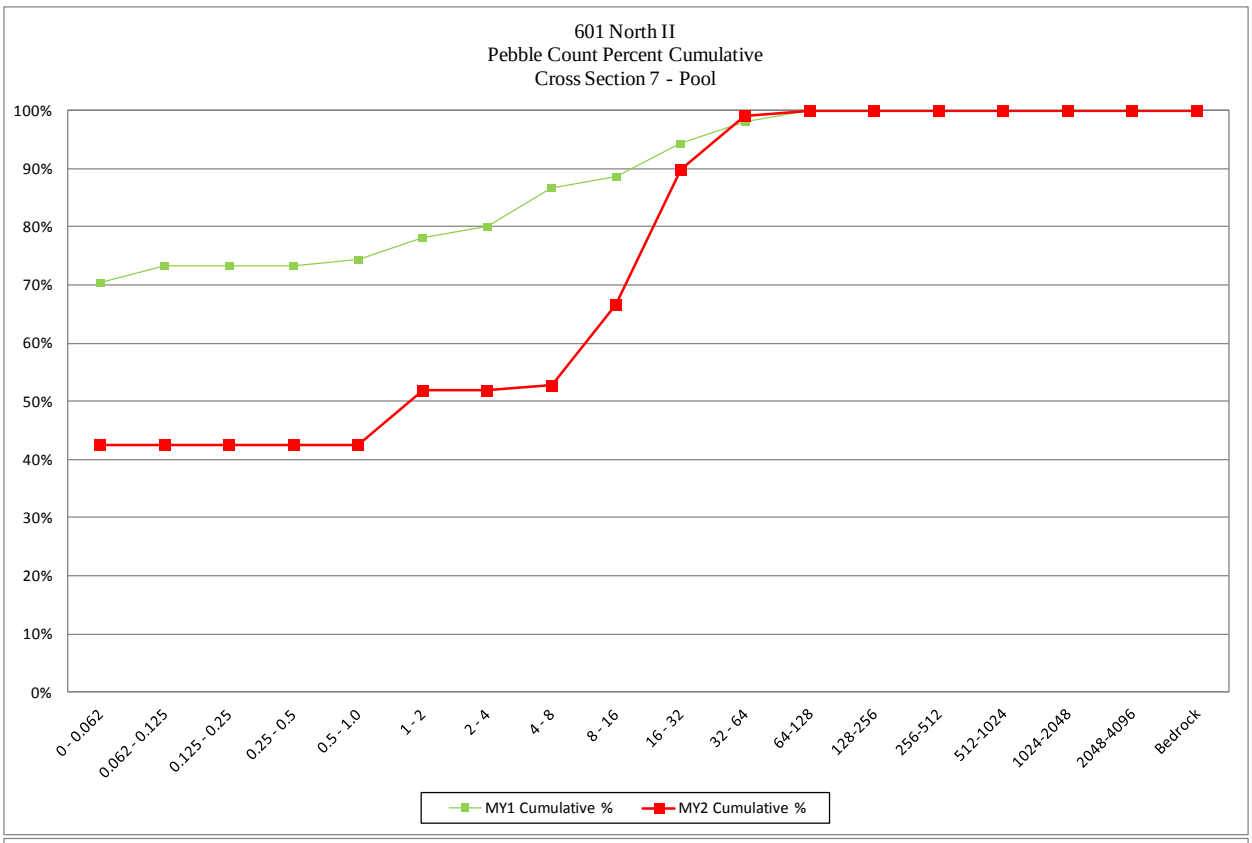

601 North II
Pebble Count Percent Individual
Cross Section 5 - Pool
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 % by Size Group
MY2 % by Size Group

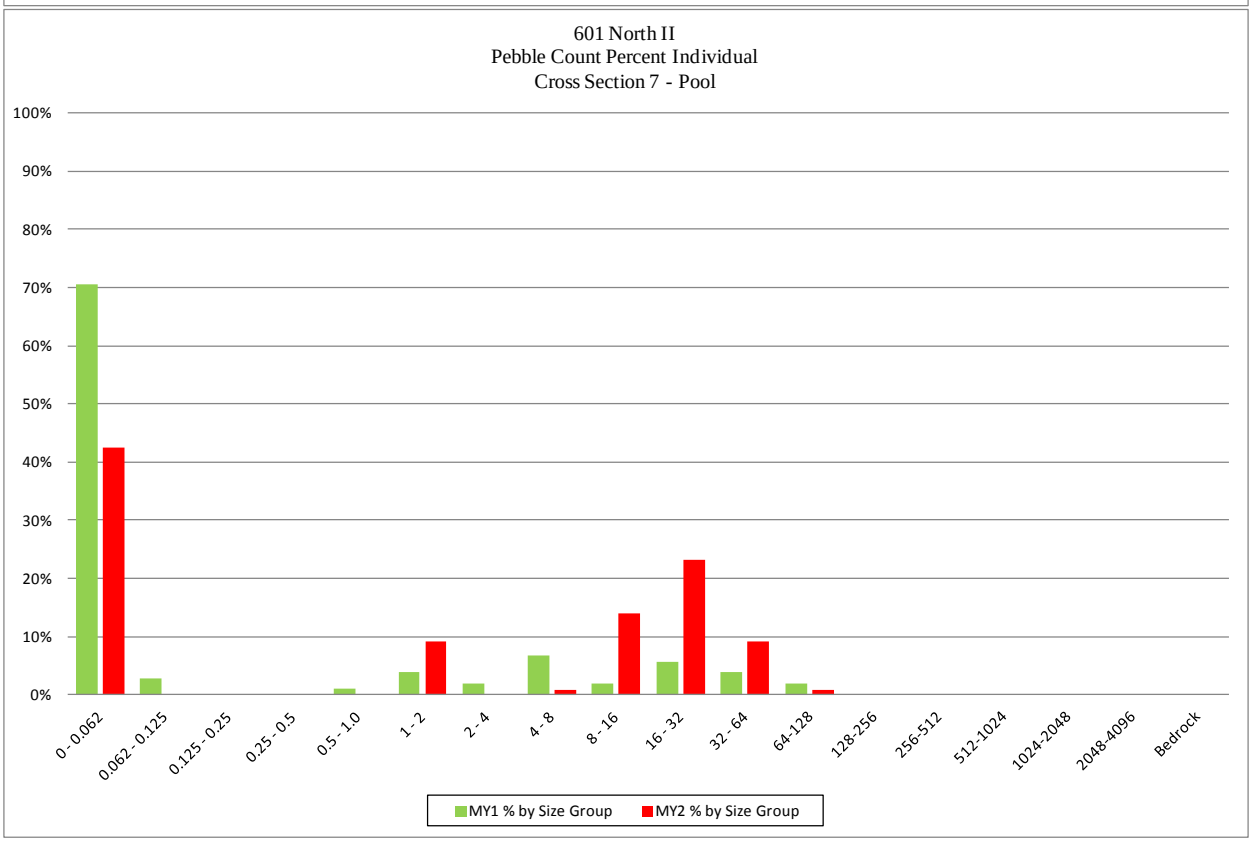
601N II			
Cross Section 6 - Riffle			
Monitoring Year - 2014; MY2			
Bed Surface Material Particle Size Class (mm)	**Number**	**% Individual**	**% Cumulative**
0 - 0.062	6	5.7%	6%
0.062 - 0.125	0	0.0%	6%
0.125 - 0.25	0	0.0%	6%
0.25 - 0.5	0	0.0%	6%
0.5 - 1.0	2	1.9%	8%
1 - 2	25	23.6%	31%
2 - 4	0	0.0%	31%
4 - 8	4	3.8%	35%
8 - 16	17	16.0%	51%
16 - 32	24	22.6%	74%
32 - 64	7	6.6%	80%
64-128	14	13.2%	93%
128-256	7	6.6%	100%
256-512	0	0.0%	100%
512-1024	0	0.0%	100%
1024-2048	0	0.0%	100%
2048-4096	0	0.0%	100%
Bedrock	0	0.0%	100%
Total	**106**	**100%**	**100%**
		Summary Data	
		D50	**15**
		D84	**75**
		D95	**140**


601 North II
Pebble Count Percent Cumulative
Cross Section 6 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 Cumulative %
MY2 Cumulative %

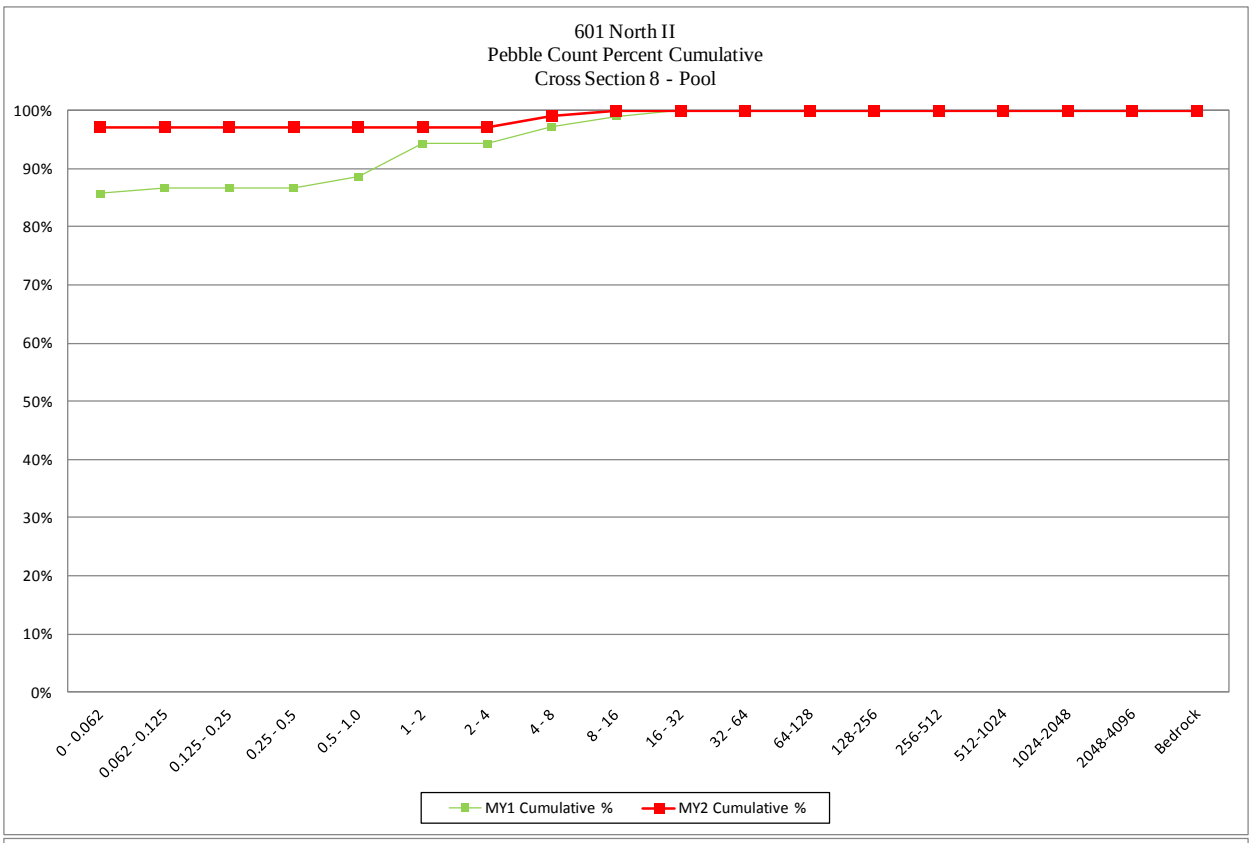

601 North II
Pebble Count Percent Individual
Cross Section 6 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 % by Size Group
MY2 % by Size Group

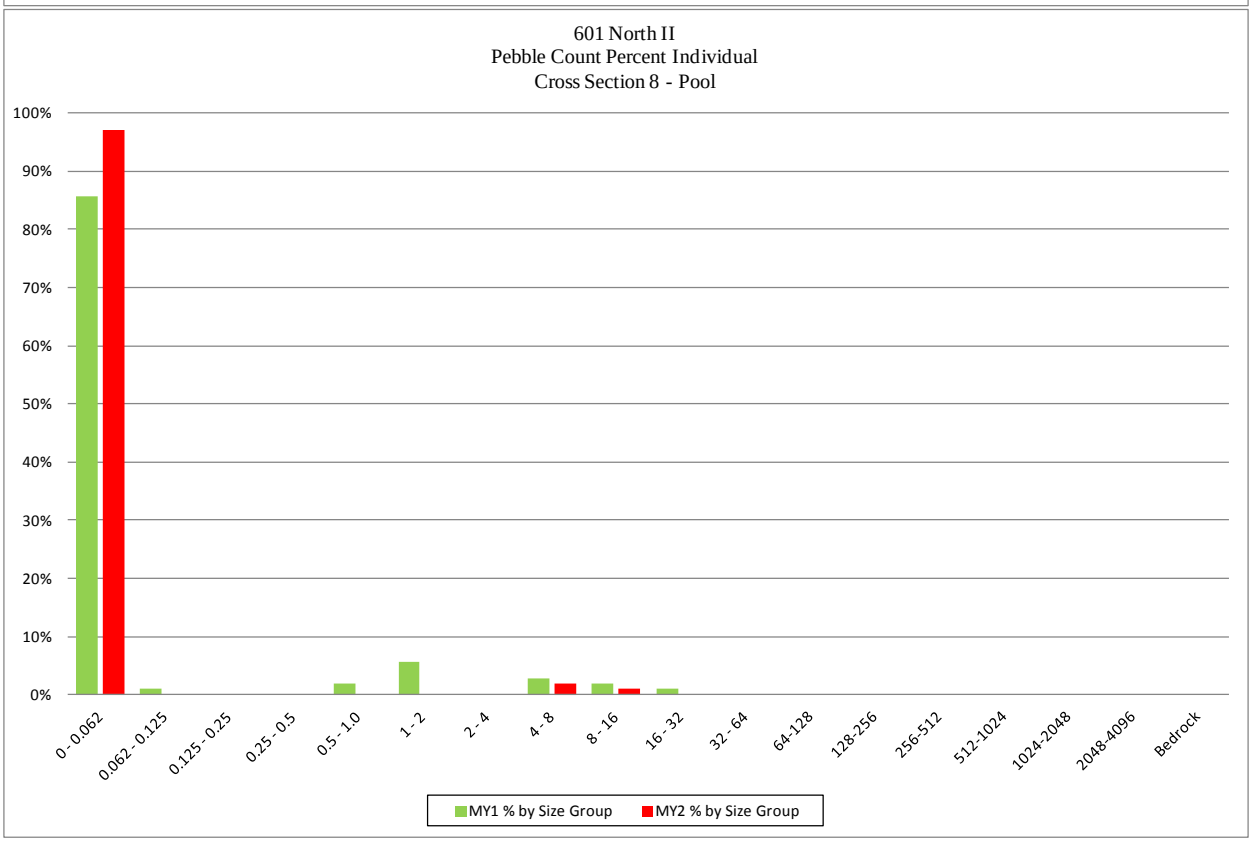
601N II			
Cross Section 7 - Pool			
Monitoring Year - 2014; MY2			
Bed Surface Material Particle Size Class (mm)	**Number**	**% Individual**	**% Cumulative**
0 - 0.062	46	42.6%	43%
0.062 - 0.125	0	0.0%	43%
0.125 - 0.25	0	0.0%	43%
0.25 - 0.5	0	0.0%	43%
0.5 - 1.0	0	0.0%	43%
1 - 2	10	9.3%	52%
2 - 4	0	0.0%	52%
4 - 8	1	0.9%	53%
8 - 16	15	13.9%	67%
16 - 32	25	23.1%	90%
32 - 64	10	9.3%	99%
64-128	1	0.9%	100%
128-256	0	0.0%	100%
256-512	0	0.0%	100%
512-1024	0	0.0%	100%
1024-2048	0	0.0%	100%
2048-4096	0	0.0%	100%
Bedrock	0	0.0%	100%
Total	**108**	**100%**	**100%**
		Summary Data	
		D50	**1.7**
		D84	**27**
		D95	**42**


601 North II
Pebble Count Percent Cumulative
Cross Section 7 - Pool
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 Cumulative %
MY2 Cumulative %

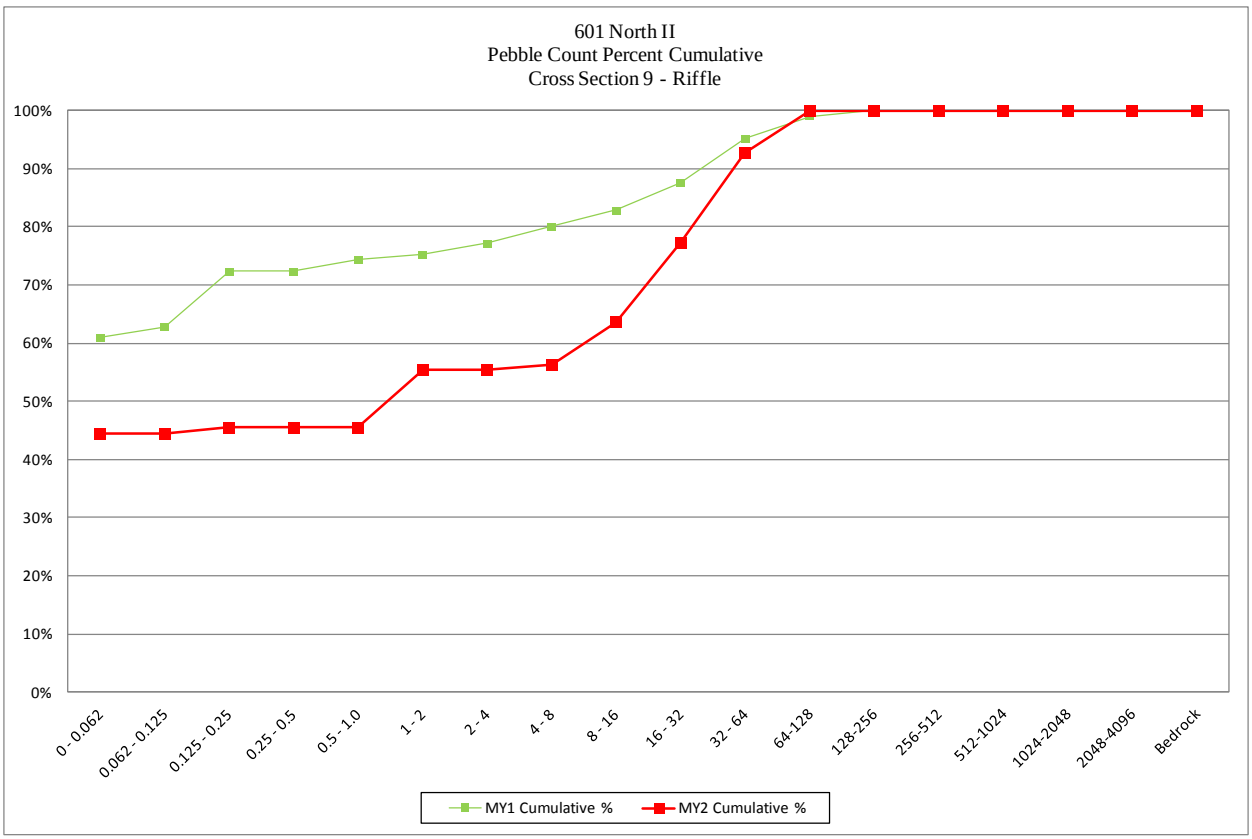

601 North II
Pebble Count Percent Individual
Cross Section 7 - Pool
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 % by Size Group
MY2 % by Size Group

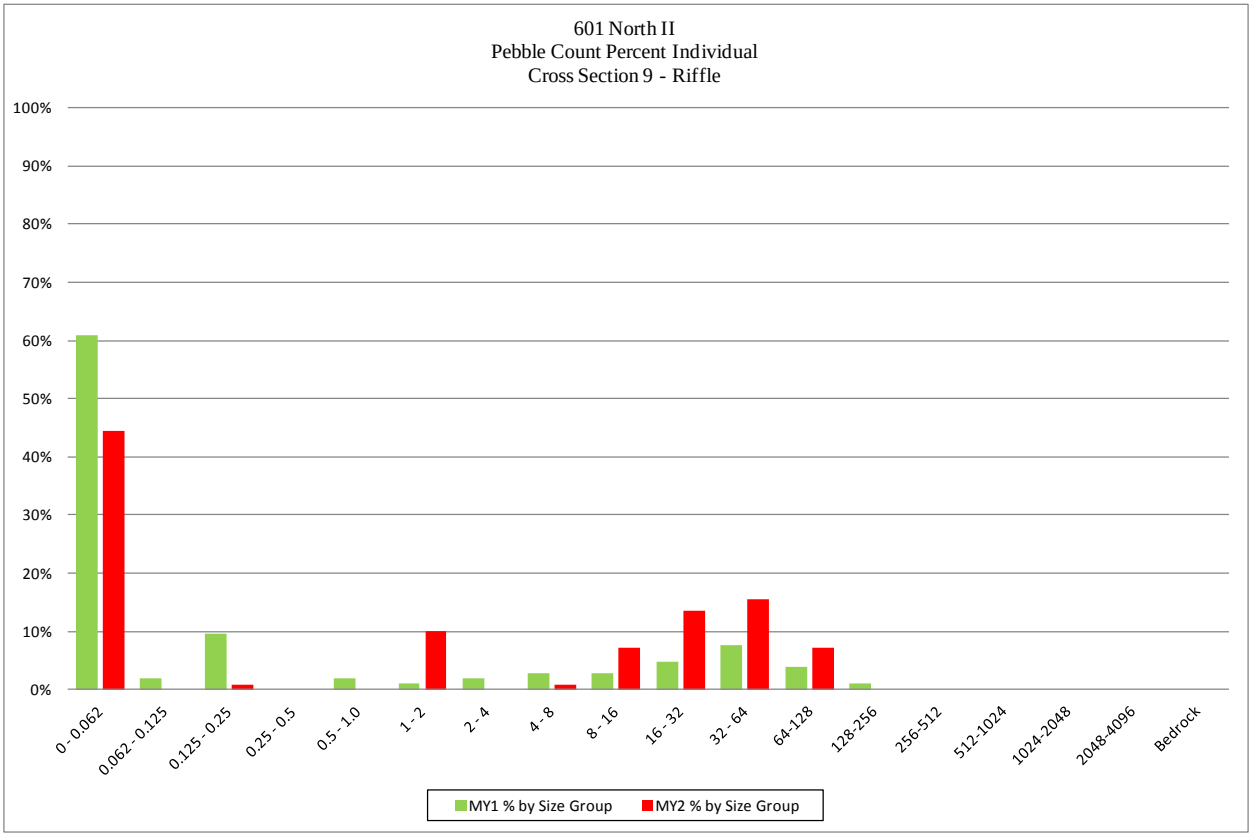
601N II			
Cross Section 8 - Pool			
Monitoring Year - 2014; MY2			
Bed Surface Material Particle Size Class (mm)	**Number**	**% Individual**	**% Cumulative**
0 - 0.062	102	97.1%	97%
0.062 - 0.125	0	0.0%	97%
0.125 - 0.25	0	0.0%	97%
0.25 - 0.5	0	0.0%	97%
0.5 - 1.0	0	0.0%	97%
1 - 2	0	0.0%	97%
2 - 4	0	0.0%	97%
4 - 8	2	1.9%	99%
8 - 16	1	1.0%	100%
16 - 32	0	0.0%	100%
32 - 64	0	0.0%	100%
64-128	0	0.0%	100%
128-256	0	0.0%	100%
256-512	0	0.0%	100%
512-1024	0	0.0%	100%
1024-2048	0	0.0%	100%
2048-4096	0	0.0%	100%
Bedrock	0	0.0%	100%
Total	**105**	**100%**	**100%**
		Summary Data	
		D50	**0.062**
		D84	**0.062**
		D95	**0.062**


601 North II
Pebble Count Percent Cumulative
Cross Section 8 - Pool
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 Cumulative %
MY2 Cumulative %

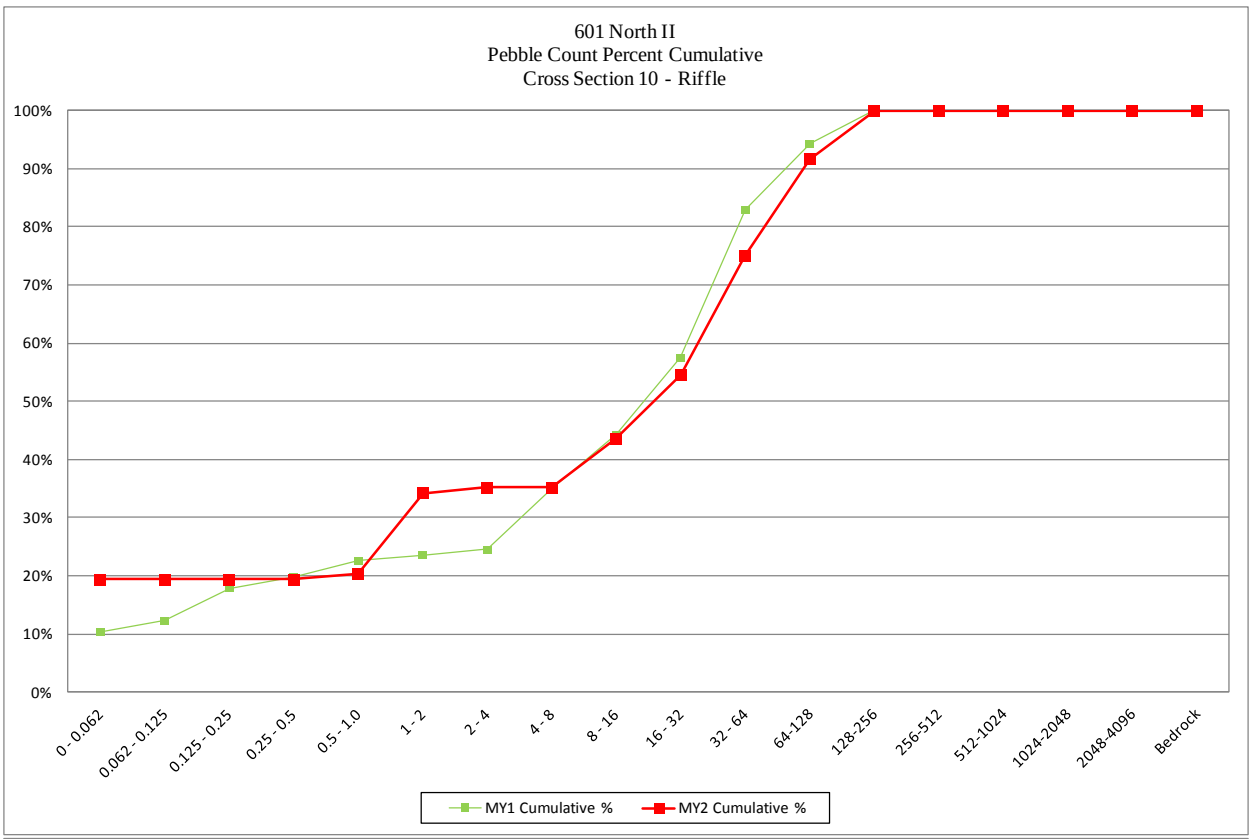

601 North II
Pebble Count Percent Individual
Cross Section 8 - Pool
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 % by Size Group
MY2 % by Size Group

601N II			
Cross Section 9 - Riffle			
Monitoring Year - 2014; MY2			
Bed Surface Material Particle Size Class (mm)	**Number**	**% Individual**	**% Cumulative**
0 - 0.062	49	44.5%	45%
0.062 - 0.125	0	0.0%	45%
0.125 - 0.25	1	0.9%	45%
0.25 - 0.5	0	0.0%	45%
0.5 - 1.0	0	0.0%	45%
1 - 2	11	10.0%	55%
2 - 4	0	0.0%	55%
4 - 8	1	0.9%	56%
8 - 16	8	7.3%	64%
16 - 32	15	13.6%	77%
32 - 64	17	15.5%	93%
64-128	8	7.3%	100%
128-256	0	0.0%	100%
256-512	0	0.0%	100%
512-1024	0	0.0%	100%
1024-2048	0	0.0%	100%
2048-4096	0	0.0%	100%
Bedrock	0	0.0%	100%
Total	**110**	**100%**	**100%**
		Summary Data	
		D50	**1.4**
		D84	**44**
		D95	**76**


601 North II
Pebble Count Percent Cumulative
Cross Section 9 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 Cumulative %
MY2 Cumulative %


601 North II
Pebble Count Percent Individual
Cross Section 9 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 % by Size Group
MY2 % by Size Group

601N II			
Cross Section 10 - Riffle			
Monitoring Year - 2014; MY2			
Bed Surface Material Particle Size Class (mm)	**Number**	**% Individual**	**% Cumulative**
0 - 0.062	21	19.4%	19%
0.062 - 0.125	0	0.0%	19%
0.125 - 0.25	0	0.0%	19%
0.25 - 0.5	0	0.0%	19%
0.5 - 1.0	1	0.9%	20%
1 - 2	15	13.9%	34%
2 - 4	1	0.9%	35%
4 - 8	0	0.0%	35%
8 - 16	9	8.3%	44%
16 - 32	12	11.1%	55%
32 - 64	22	20.4%	75%
64-128	18	16.7%	92%
128-256	9	8.3%	100%
256-512	0	0.0%	100%
512-1024	0	0.0%	100%
1024-2048	0	0.0%	100%
2048-4096	0	0.0%	100%
Bedrock	0	0.0%	100%
Total	**108**	**100%**	**100%**
		Summary Data	
		D50	**24**
		D84	**96**
		D95	**150**


601 North II
Pebble Count Percent Cumulative
Cross Section 10 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 Cumulative %
MY2 Cumulative %

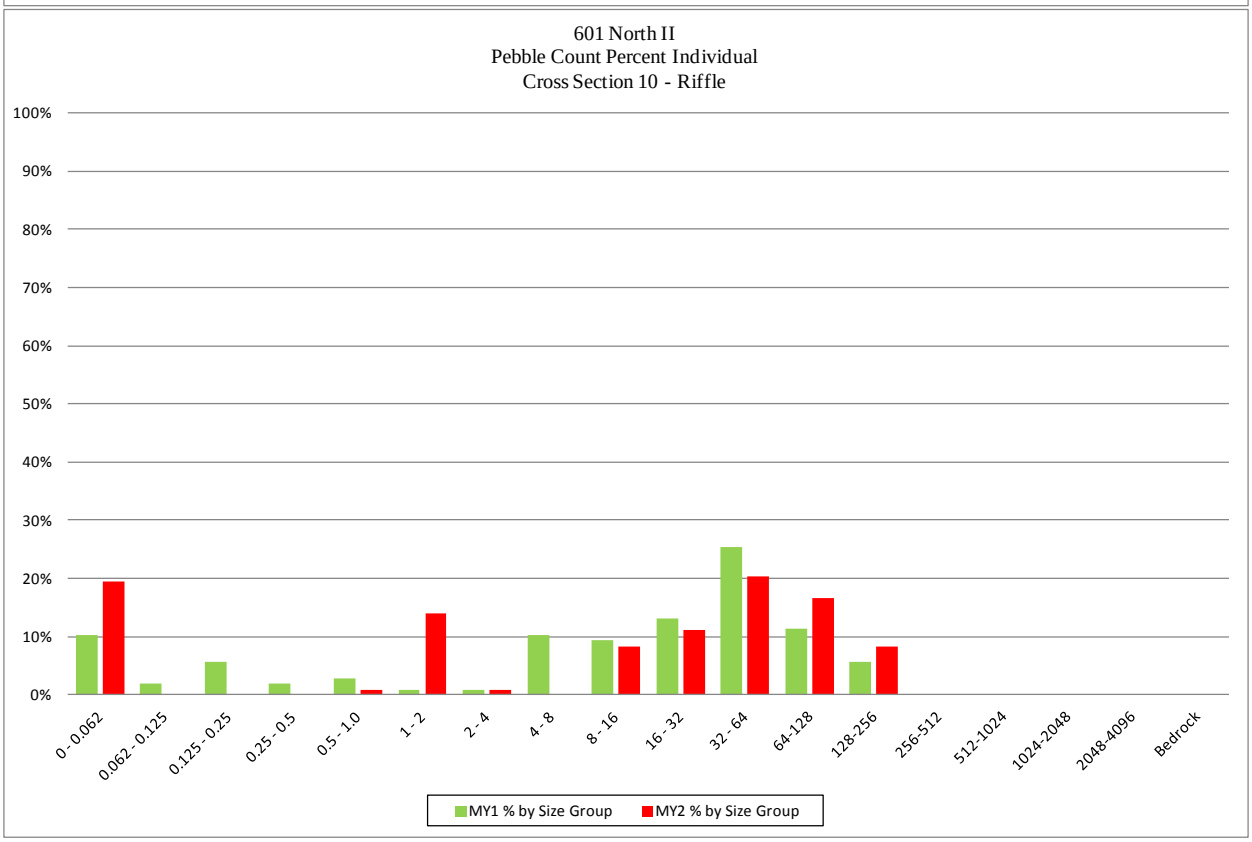

601 North II
Pebble Count Percent Individual
Cross Section 10 - Riffle
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 - 0.062
0.062 - 0.125
0.125 - 0.25
0.25 - 0.5
0.5 - 1.0
1 - 2
2 - 4
4 - 8
8 - 16
16 - 32
32 - 64
64-128
128-256
256-512
512-1024
1024-2048
2048-4096
Bedrock
MY1 % by Size Group
MY2 % by Size Group

Table 10. Baseline Stream Data Summary
601 North II Stream Restoration Site – EEP Contract No. 003991- Segment/Reach: Wicker Branch Reach 1 (Sta 0+00 – 6+60)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data (UT to Rays Fork)						Design			Monitoring Baseline					
Dimension and Substrate - Riffle	LL	UL	Eq.	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Med	Max	SD[5]	n	Min	Mean	Max	Min	Mean	Med	Max	SD[5]	n
Bankfull Width (ft)	---	---	6.8	---	11.7	---	---	---	1	---	8.2	---	---	---	1	---	6.0	---	---	11.4	---	---	---	1
Floodprone Width (ft)				---	15.6	---	---	---	1	---	105.0	---	---	---	1	25	30	35	---	59.7	---	---	---	1
Bankfull Mean Depth (ft)	---	---	1.0	---	0.5	---	---	---	1	---	0.8	---	---	---	1	---	0.9	---	---	0.7	---	---	---	1
[1]Bankfull Max Depth (ft)				---	0.8	---	---	---	1	---	2.2	---	---	---	1	---	1.2	---	---	1.3	---	---	---	1
Bankfull Cross Sectional Area (ft^2)	---	---	8.8	---	5.5	---	---	---	1	---	6.3	---	---	---	1	---	5.5	---	---	7.9	---	---	---	1
Width/Depth Ratio				---	24.9	---	---	---	1	---	10.6	---	---	---	1	---	6.5	---	---	16.6	---	---	---	1
Entrenchment Ratio				---	1.3	---	---	---	1	---	12.8	---	---	---	1	4.2	5.0	5.8	---	5.2	---	---	---	1
[1]Bank Height Ratio				---	2.6	---	---	---	1	---	1.0	---	---	---	1	---	1.0	---	---	1.0	---	---	---	1
d50 (mm)				---	<2.0	---	---	---	1	---	6.5	---	---	---	1	16	24	32	---	28.7	---	---	---	1
Profile																								
Riffle Length (ft)				The existing stream channel did not display riffle-pool sequencing due to historic dredging and straightening.						3.3	7.5	---	15.5	---	---	5.0	8.0	15.0	4.2	12.3	11.5	33.3	6.0	22
Riffle Slope (ft/ft)										0.007	0.042	---	0.085	---	---	0.008	0.023	0.040	0.001	0.017	0.017	0.043	0.013	22
Pool Length (ft)										9.0	13.0	---	19.0	---	---	9.0	13.0	19.0	4.7	10.8	10.4	20.0	4.2	20
Pool Max depth (ft)										0.8	1.3	---	1.9	---	---	---	2.0	---	1.4	1.9	1.9	2.2	0.2	20
Pool Spacing (ft)										14.0	21.0	---	32.0	---	---	14.0	30.0	65.0	18.4	30.7	26.9	57.8	10.0	19
Pattern																								
Channel Beltwidth (ft)				The existing stream channel did not display plan form geometry due to historic dredging and straightening						12.0	19.0	---	23.0	---	---	12.0	19.0	26.0	13.4	20.1	20.2	29.7	4.0	21
Radius of Curvature (ft)										10.0	16.0	---	39.0	---	---	12.0	18.0	39.0	14.4	17.9	16.4	27.7	3.9	23
Rc:Bankfull width (ft/ft)										1.2	2.0	---	4.8	---	---	1.9	2.9	6.5	1.3	1.6	1.4	2.4	0.3	23
Meander Wavelength (ft)										31.4	45.3	---	61.4	---	---	36.0	53.0	73.0	13.7	51.5	51.8	87.9	15.3	21
Meander Width Ratio										1.5	2.3	---	2.8	---	---	2.0	3.1	4.4	1.2	4.5	4.5	7.7	1.3	21
Substrate, bed, and transport parameters																								
[4]d16 / d35 / d50 / d84 / d95 / dip / disp (mm)				<2	<2	<2	<2	<2	<2	<2	6.3	10.6	17.3	57.9	113.9	76.0	123.0							
Reach Shear Stress (competency) lb/f^2				---														0.5	0.4					
Max part size (mm) mobilized at bankfull				---														74.6	77.5					
Stream Power (transport capacity) W/m^2				---														1.6	1.0					
Additional Reach Parameters																								
Drainage Area (SM)				0.3						0.19														
Impervious Surface estimate (%)				<1						<1														
Rosgen Classification				F6						E4								E4	C4					
Bankfull Velocity (fps)	---	---	---	HEC-RAS: 2.8 (1.3-3.9)														HEC-RAS: 3.5 (3.3-4.1)	3.5					
Bankfull Discharge (cfs)	---	---	34.7	19.6																				
Valley length (ft)				610						240														
Channel Thalweg length (ft)				630						284								707	660					
Sinuosity (ft)				1.0						1.2								1.2	1.1					
BF slope (ft/ft)				0.009						0.016								0.008	0.009					
BEHI VL% / L% / M% / H% / VH% / E%				100	0	0	0	0	0	---	---	---	---	---	---									

Table 10 cont'd. Baseline Stream Data Summary
601 North II Stream Restoration Site – EEP Contract No. 003991- Segment/Reach: Wicker Branch Reach 2 (6+60-24+35)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data (UT to Rays Fork)						Design			Monitoring Baseline					
Dimension and Substrate - Riffle	LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Max	Min	Mean	Med	Max	SD	n
Bankfull Width (ft)	---	---	8.4	10.8	12.0	12.0	13.1	1.6	2	---	8.2	---	---	---	1	---	8.0	---	11.5	11.6	11.6	11.6	0.1	2
Floodprone Width (ft)				30.3	78.3	78.3	126.2	67.8	2	---	105.0	---	---	---	1	35.0	47.5	60.0	69.2	69.5	69.5	69.7	0.4	2
Bankfull Mean Depth (ft)	---	---	1.2	0.9	1.0	1.0	1.0	0.1	2	---	0.8	---	---	---	1	---	1.3	---	1.1	1.1	1.1	1.1	0.0	2
[1]Bankfull Max Depth (ft)				1.3	1.4	1.4	1.5	0.1	2	---	2.2	---	---	---	1	---	1.7	---	1.7	1.8	1.8	1.8	0.1	2
Bankfull Cross Sectional Area (ft^2)	---	---	12.5	10.5	11.1	11.1	11.7	0.8	2	---	6.3	---	---	---	1	---	10.5	---	12.1	12.6	12.6	13.0	0.6	2
Width/Depth Ratio				11.0	12.9	12.9	14.7	2.6	2	---	10.6	---	---	---	1	---	6.1	---	10.4	10.6	10.6	10.8	0.3	2
Entrenchment Ratio				2.3	7.0	7.0	11.7	6.6	2	---	12.8	---	---	---	1	4.3	5.9	7.5	6.0	6.0	6.0	6.0	0.0	2
[1]Bank Height Ratio				1.3	1.6	1.6	1.8	0.4	2	---	1.0	---	---	---	1	---	1.0	---	1.0	1.0	1.0	1.0	0.0	2
d50 (mm)					23.0				1	---	17.3	---	---	---	1	16.0	24.0	32.0	19.3	21.4	21.4	23.5	3.0	2
Profile																								
Riffle Length (ft)				The existing stream channel did not display riffle-pool sequencing due to historic dredging and straightening.						3.3	7.5	---	15.5	---	---	5.0	15.0	25.0	6.3	17.3	18.1	38.7	7.5	33
Riffle Slope (ft/ft)										0.0073	0.0422	---	0.085	---	---	0.005	0.016	0.03	0.001	0.017	0.013	0.062	0.013	33
Pool Length (ft)										9.0	13.0	---	19.0	---	---	5.0	22.0	40.0	6.1	24.2	23.7	62.0	11.9	33
Pool Max depth (ft)										0.8	1.3	---	1.9	---	---	---	2.8	---	1.7	2.9	2.8	3.8	0.4	33
Pool Spacing (ft)										14.0	21.0	---	32.0	---	---	30.0	52.0	80.0	25.5	53.6	53.2	103.3	19.5	32
Pattern																								
Channel Beltwidth (ft)				The existing stream channel did not display plan form geometry due to historic dredging and straightening						12.0	19.0	---	23.0	---	---	16.0	33.0	50.0	18.3	31.1	30.6	49.5	8.8	24
Radius of Curvature (ft)										10.0	16.0	---	39.0	---	---	21.0	38.0	67.0	28.3	40.2	37.8	61.8	10.1	28
Rc:Bankfull width (ft/ft)										1.2	2.0	---	4.8	---	---	2.6	4.8	8.4	2.4	3.5	3.3	5.3	0.9	28
Meander Wavelength (ft)										31.4	45.3	---	61.4	---	---	61.0	104.0	148.0	13.7	114.4	113.3	226.5	46.9	24
Meander Width Ratio										1.5	2.3	---	2.8	---	---	1.9	3.7	5.7	1.2	9.9	9.8	19.5	4.0	24
Substrate, bed, and transport parameters																								
[4]d16 / d35 / d50 / d84 / d95 / dip / disp (mm)				2.9	9.2	23.0	75.8	92.4	100.0	68.	6.3	10.6	17.3	57.9	113.	76.0	123.0							
Reach Shear Stress (competency) lb/f^2				0.5															0.7				0.5	
Max part size (mm) mobilized at bankfull				88.0															116.9				91.3	
Stream Power (transport capacity) W/m^2				2.3															3.2				1.8	
Additional Reach Parameters																								
Drainage Area (SM)				0.5						0.19														
Impervious Surface estimate (%)				<1						<1														
Rosgen Classification				E1/C1						E4									E4				E4	
Bankfull Velocity (fps)	---	---	---	HEC-RAS: 2.7 (1.2-5.2)															HEC-RAS: 4.3 (3.3-5.1)				4.0 (XS6) – 4.1 (XS9)	
Bankfull Discharge (cfs)	---	---	50.1	48.5																				
Valley length (ft)				1400						240													1550	
Channel Thalweg length (ft)				1356						284									1653				1775	
Sinuosity (ft)				1.0						1.2									1.2				1.2	
BF slope (ft/ft)				0.009						0.016									0.009				0.007	
BEHI VL% / L% / M% / H% / VH% / E%				7	0	0	48	10	35	---	---	---	---	---	---									

Table 10 cont'd. Baseline Stream Data Summary
601 North II Stream Restoration Site – EEP Contract No. 003991- Segment/Reach: Wicker Branch Reach 3 (24+35-27+08)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data (UT to Rays						Design			Monitoring Baseline					
Dimension and Substrate - Riffle	LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Max	Min	Mean	Med	Max	SD	n
Bankfull Width (ft)	---	---	9.3	---	10.0	---	---	---	1	---	8.2	---	---	---	1	---	10.0	---	---	---	---	---	---	---
Floodprone Width (ft)				---	11.9	---	---	---	1	---	105.0	---	---	---	1	40.0	55.0	70.0	---	---	---	---	---	---
Bankfull Mean Depth (ft)	---	---	1.3	---	1.4	---	---	---	1	---	0.8	---	---	---	1	---	1.4	---	---	---	---	---	---	---
[1]Bankfull Max Depth (ft)				---	1.9	---	---	---	1	---	2.2	---	---	---	1	---	1.8	---	---	---	---	---	---	---
Bankfull Cross Sectional Area (ft^2)	---	---	14.6	---	14.1	---	---	---	1	---	6.3	---	---	---	1	---	14.1	---	---	---	---	---	---	---
Width/Depth Ratio				---	7.0	---	---	---	1	---	10.6	---	---	---	1	---	7.1	---	---	---	---	---	---	---
Entrenchment Ratio				---	1.2	---	---	---	1	---	12.8	---	---	---	1	4.0	5.5	7.0	---	---	---	---	---	---
[1]Bank Height Ratio				---	2.0	---	---	---	1	---	1.0	---	---	---	1	---	1.0	---	---	---	---	---	---	---
d50 (mm)				---	8.0	---	---	---	1	---	17.3	---	---	---	1	16.0	24.0	32.0	---	---	---	---	---	---
Profile																								
Riffle Length (ft)				The existing stream channel did not display riffle-pool sequencing due to historic dredging and straightening.						3.3	7.5	---	15.5	---	---	10.0	20.0	30.0	---	---	---	---	---	---
Riffle Slope (ft/ft)										0.007	0.0422	---	0.0854	---	---	0.009	0.016	0.03	---	---	---	---	---	---
Pool Length (ft)										9.0	13.0	---	19.0	---	---	5.0	24.0	50.0	---	---	---	---	---	---
Pool Max depth (ft)										0.8	1.3	---	1.9	---	---	---	3.0	---	---	---	---	---	---	---
Pool Spacing (ft)										14.0	21.0	---	32.0	---	---	30.0	61.0	95.0	---	---	---	---	---	---
Pattern																								
Channel Beltwidth (ft)				The existing stream channel did not display plan form geometry due to historic dredging and straightening						12.0	19.0	---	23.0	---	---	23.0	41.0	57.0	---	---	---	---	---	---
Radius of Curvature (ft)										10.0	16.0	---	39.0	---	---	30.0	37.0	40.0	---	---	---	---	---	---
Rc:Bankfull width (ft/ft)										1.2	2.0	---	4.8	---	---	3.0	3.7	4.0	---	---	---	---	---	---
Meander Wavelength (ft)										31.4	45.3	---	61.4	---	---	112.0	127.0	142.0	---	---	---	---	---	---
Meander Width Ratio										1.5	2.3	---	2.8	---	---	2.3	4.1	5.7	---	---	---	---	---	---
Substrate, bed, and transport parameters																								
[4]d16 / d35 / d50 / d84 / d95 / dip / disp (mm)				2.0	5.2	8.0	20.3	29.7	34.0	45.0	6.3	10.6	17.3	57.9	113.9	76.0	123.0							
Reach Shear Stress (competency) lb/f^2				0.75														0.73	---					
Max part size (mm) mobilized at bankfull				123														120	---					
Stream Power (transport capacity) W/m^2				3.7														3.6	---					
Additional Reach Parameters																								
Drainage Area (SM)				0.6							0.19													
Impervious Surface estimate (%)				<1							<1													
Rosgen Classification				G4							E4							E4	---					
Bankfull Velocity (fps)	---	---	---	HEC-RAS: 3.6 (2.4-4.8)							---							HEC-RAS: 4.0 (3.2-4.7)	---					
Bankfull Discharge (cfs)	---	---	59.4	69.2																				
Valley length (ft)				360							240								235					
Channel Thalweg length (ft)				414							284							470	273					
Sinuosity (ft)				1.2							1.2							1.2	1.2					
BF slope (ft/ft)				0.009							0.016							0.008	---					
BEHI VL% / L% / M% / H% / VH% / E%				0	0	0	0	0	100		---	---	---	---	---	---	---							

Table 10 cont'd. Baseline Stream Data Summary
601 North II Stream Restoration Site – EEP Contract No. 003991- Segment/Reach: UT to Wicker Branch Reach 5 (8+40-14+86)

Parameter	Regional Curve			Pre-Existing Condition						Reference Reach Data (UT to Rays						Design			Monitoring Baseline					
Dimension and Substrate - Riffle	LL	UL	Eq.	Min	Mean	Med	Max	SD	n	Min	Mean	Med	Max	SD	n	Min	Mean	Max	Min	Mean	Med	Max	SD	n
Bankfull Width (ft)	---	---	5.1	---	8.6	---	---	---	1	---	8.2	---	---	---	---	---	6.0	---	---	11.0	---	---	---	1
Floodprone Width (ft)				---	12.4	---	---	---	1	---	105.0	---	---	---	---	20.0	25.0	30.0	---	65.5	---	---	---	1
Bankfull Mean Depth (ft)	---	---	0.8	---	0.6	---	---	---	1	---	0.8	---	---	---	---	---	0.9	---	---	0.8	---	---	---	1
[1]Bankfull Max Depth (ft)				---	0.9	---	---	---	1	---	2.2	---	---	---	---	---	1.2	---	---	1.3	---	---	---	1
Bankfull Cross Sectional Area (ft^2)	---	---	5.6	---	5.4	---	---	---	1	---	6.3	---	---	---	---	---	5.5	---	---	8.5	---	---	---	1
Width/Depth Ratio				---	13.7	---	---	---	1	---	10.6	---	---	---	---	---	6.5	---	---	14.1	---	---	---	1
Entrenchment Ratio				---	1.4	---	---	---	1	---	12.8	---	---	---	---	3.3	4.1	5.0	---	6.0	---	---	---	1
[1]Bank Height Ratio				---	2.3	---	---	---	1	---	1.0	---	---	---	---		1.0		---	1.0	---	---	---	1
d50 (mm)				---	49.4	---	---	---	1	---	17.3	---	---	---	---	16.0	24.0	32.0	---	25.7	---	---	---	1
Profile*																								
Riffle Length (ft)				The existing stream channel did not display riffle-pool sequencing due to historic dredging and straightening.						3.3	7.5	---	15.5	---	---	5.0	10.0	15.0	5.1	12.8	12.4	23.2	4.5	16
Riffle Slope (ft/ft)										0.0073	0.0422	---	0.0854	---	---	0.010	0.025	0.060	0.001	0.016	0.016	0.035	0.010	16
Pool Length (ft)										9.0	13.0	---	19.0	---	---	4.0	12.0	27.0	3.2	12.4	12.3	29.5	6.3	18
Pool Max depth (ft)										0.8	1.3	---	1.9	---	---	---	2.0	---	1.6	2.2	2.3	2.6	0.3	18
Pool Spacing (ft)										14.0	21.0	---	32.0	---	---	20.0	30.0	45.0	14.5	30.2	31.7	42.2	6.9	17
Pattern																								
Channel Beltwidth (ft)				The existing stream channel did not display plan form geometry due to historic dredging and straightening						12.0	19.0	---	23.0	---	---	13.0	20.0	28.0	15.7	24.3	25.6	29.8	4.7	18
Radius of Curvature (ft)										10.0	16.0	---	39.0	---	---	12.0	17.0	30.0	12.3	19.9	18.8	31.4	5.8	19
Rc:Bankfull width (ft/ft)										1.2	2.0	---	4.8	---	---	2.0	2.8	5.0	1.1	1.8	1.7	2.9	0.5	19
Meander Wavelength (ft)										31.4	45.3	---	61.4	---	---	46.0	55.0	81.0	23.3	54.3	52.3	88.5	15.6	18
Meander Width Ratio										1.5	2.3	---	2.8	---	---	2.1	3.3	4.6	2.1	4.9	4.8	8.0	1.4	18
Substrate, bed, and transport parameters																								
[4]d16 / d35 / d50 / d84 / d95 / dip / disp (mm)				10.6	23.6	49.4	75.3	82.7	86.0	78.0	6.3	10.	17.3	57.9	113.9	76.0	123.0							
Reach Shear Stress (competency) lb/f^2				0.50														0.6	0.6					
Max part size (mm) mobilized at bankfull				91.0														107.0	107.0					
Stream Power (transport capacity) W/m^2				2.1														2.6	1.4					
Additional Reach Parameters																								
Drainage Area (SM)				0.2						0.19														
Impervious Surface estimate (%)				<1						<1														
Rosgen Classification				B4						E4								E4	C4					
Bankfull Velocity (fps)	---	---	---	HEC-RAS: 3.0 (2.0-4.0)														HEC-RAS: 4.4 (3.8-5.1)	3.9					
Bankfull Discharge (cfs)	---	---	22.7	23.1																				
Valley length (ft)				530						240														
Channel Thalweg length (ft)				534						284								646	646					
Sinuosity (ft)				1.0						1.2								1.2	1.2					
BF slope (ft/ft)				0.012						0.016								0.011	0.011					
BEHI VL% / L% / M% / H% / VH% / E%				34	25	17	24	0	0	---	---	---	---	---	---									

Table 11a. Baseline Morphology & Hydraulic Monitoring Summary
601 North II / Project No. 95025

	Cross-Section 1 (Riffle) UT to Wicker (Reach 4)						Cross-Section 2 (Pool) UT to Wicker (Reach 5)						Cross-Section 3 (Riffle) UT to Wicker (Reach 5)						Cross-Section 4[1] (Riffle) Wicker (Reach 1)						Cross-Section 5[1] (Pool) Wicker (Reach 1)					
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
Record Elevation (datum) Used	616.5	616.5	616.5				604.0	604.0	604.0				603.9	603.9	603.9				604.5	604.5	604.5				604.4	604.4	604.4			
Bankfull Width (ft)	8.9	8.3	8.0				17.6	15.4	17.1				11.0	10.8	10.8				11.4	12.5	12.3				14.2	15.4	15.5			
Floodprone Width (ft)	23.1	>23	>23				64.1	>100	>100				65.5	>100	>100				59.7	>100	>100				65.6	>100	>100			
Bankfull Mean Depth (ft)	0.5	0.5	0.5				0.7	0.9	1.0				0.8	0.9	0.9				0.7	0.6	0.8				0.8	0.8	0.8			
Bankfull Max Depth (ft)	0.7	0.7	0.8				1.7	1.8	2.1				1.3	1.3	1.3				1.3	1.1	1.2				1.8	1.7	1.8			
Bankfull Cross Sectional Area (ft^2)	4.2	4.1	3.9				12.8	13.6	16.4				8.5	8.5	9.5				7.9	7.2	8.2				11.5	6.1	9.4			
Bankfull Width/Depth Ratio	18.5	16.9	16.4				24.5	17.5	17.8				14.1	14.6	12.3				16.6	21.7	18.1				17.6	19.3	19.9			
Bankfull Entrenchment Ratio	2.6	>2.8	>2.9				3.6	>6.5	>5.9				6.0	>9	>9.2				5.2	>8	>8.1				4.6	>6.5	>6.5			
Bankfull Bank Height Ratio	1.0	1.0	1.0				1.0	1.0	1.0				1.0	1.0	1.0				1.0	1.0	1.0				1.0	1.0	1.0			
Cross Sectional Area between End Pins (ft^2)	-	120.4	120.4				-	107	107				-	80.7	80.7				-	49.6	49.6				-	31.8	31.8			
d50 (mm)	-	0.062	0.062				-	0.062	0.062				-	4.9	6.9				-	0.06	0.062				-	0.062	0.062			
	Cross-Section 6 (Riffle) Wicker (Reach 2)						**Cross-Section 7 (Pool) Wicker (Reach 2)**						**Cross-Section 8 (Pool) Wicker (Reach 2)**						**Cross-Section 9 (Riffle) Wicker (Reach 2)**						**Cross-Section 10 (Riffle) Wicker (Reach 3)**					
Dimension	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**	**Base**	**MY1**	**MY2**	**MY3**	**MY4**	**MY5**
Record Elevation (datum) Used	596.2	596.2	596.2				596.1	596.1	596.1				591.3	591.3	591.3				591.0	591.0	591.0				-	587.8	587.8			
Bankfull Width (ft)	11.5	11.9	11.8				12.8	12.8	12.9				12.7	13.3	13.4				11.6	11.5	11.3				-	12.0	11.8			
Floodprone Width (ft)	69.2	>90	>90				69.5	>125	>125				69.5	>200	>200				69.7	>200	>200				_	>200	>200			
Bankfull Mean Depth (ft)	1.1	1.0	1.1				1.8	1.9	2.0				1.6	1.7	1.8				1.1	1.1	1.1				-	1.2	1.2			
Bankfull Max Depth (ft)	1.7	1.7	1.9				3.2	3.2	3.2				2.9	3.1	3.2				1.8	1.7	1.8				-	1.7	1.7			
Bankfull Cross Sectional Area (ft^2)	12.1	12.0	12.9				23.2	24.2	25.5				19.9	22.9	23.5				13.0	12.3	12.4				-	14.4	14.0			
Bankfull Width/Depth Ratio	10.8	11.8	10.8				7.0	6.8	6.5				8.1	7.8	7.6				10.4	10.7	10.2				-	9.9	9.9			
Bankfull Entrenchment Ratio	6.0	>7.5	>7.6				5.4	>9.8	>9.7				5.5	>15	>14.9				6.0	>17.5	>17.8				-	>16.7	>17			
Bankfull Bank Height Ratio	1.0	1.0	1.0				1.0	1.0	1.0				1.0	1.0	1.0				1.0	1.0	1.0				-	1.0	1.0			
Cross Sectional Area between End Pins (ft^2)	-	83.0	83.0				-	105.2	105.2				-	41.2	41.2				-	23.4	23.4				-	39.5	39.5			
d50 (mm)	-	0.062	15				-	0.062	1.7				-	0.062	0.062				-	0.06	1.4				-	24	24			

N/A - Item does not apply.

[1]MY1 data updated to show corrected bankfull width, W/D ratio, and entrenchment ratio calculations.

Table 11b. Monitoring Data - Stream Reach Data Summary
601 North II - Wicker Branch Reach 1 (630 feet)

Parameter	Baseline						MY - 1[1, ^]						MY - 2[1]						MY - 3						MY - 4						MY - 5					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	-	11.4	-	-	-	1	-	12.5	-	-	-	1	-	12.3	-	-	-	-																		
Floodprone Width (ft)	-	59.7	-	-	-	1	-	>100	-	-	-	1	-	>100	-	-	-	-																		
Bankfull Mean Depth (ft)	-	0.7	-	-	-	1	-	0.6	-	-	-	1	-	0.8	-	-	-	-																		
Bankfull Max Depth (ft)	-	1.3	-	-	-	1	-	1.1	-	-	-	1	-	1.2	-	-	-	-																		
Bankfull Cross-Sectional Area (ft^2)	-	7.9	-	-	-	1	-	7.2	-	-	-	1	-	8.2	-	-	-	-																		
Width/Depth Ratio	-	16.6	-	-	-	1	-	21.7	-	-	-	1	-	18.1	-	-	-	-																		
Entrenchment Ratio	-	5.2	-	-	-	1	-	>8	-	-	-	1	-	>8.1	-	-	-	-																		
Bank Height Ratio	-	1.0	-	-	-	1	-	1.0	-	-	-	1	-	1.0	-	-	-	-																		
Profile																																				
Riffle Length (ft)	4.2	12.3	11.5	33.3	6.0	22.0	3.3	6.9	6.3	11.0	2.1	18	1.9	7.8	7.3	12.9	3.3	19																		
Riffle Slope (ft/ft)	0.001	0.017	0.017	0.043	0.0	22	-	-	-	-	-	-	-	-	-	-	-	-																		
Pool Length (ft)	4.7	10.8	10.4	20.0	4.2	20	7.3	14.1	12.0	37.6	6.8	19	6.9	12.3	12.0	19.0	3.5	20																		
Pool Max Depth (ft)	1.4	1.9	1.9	2.2	0.2	20	1.1	1.6	1.6	2.0	0.3	19	1.3	1.7	1.7	2.2	0.2	21																		
Pool Spacing (ft)	13.4	30.7	26.9	57.8	10.0	19	16.4	27.7	26.9	41.8	7.0	19	8.9	26.0	25.8	38.0	7.2	20																		
Pattern																																				
Channel Belt Width (ft)	13.4	20.1	20.2	29.7	4.00	21																														
Radius of Curvature (ft)	14.4	17.9	16.4	27.7	3.90	23																														
Rc: Bankfull Width (ft/ft)	1.30	1.60	1.40	2.40	0.3	23																														
Meander Wavelength (ft)	13.7	51.5	51.8	87.9	15.30	21																														
Meander Width Ratio	1.2	4.5	4.5	7.7	1.30	21																														
Additional Reach Parameters																																				
Rosgen Classification	C4						C4						C4																							
Channel Thalweg Length (ft)	660						557						562																							
Sinuosity (ft)	1.1						1.1						1.1																							
Water Surface Slope (Channel) (ft/ft)	-						-						-																							
Bankfull Slope (ft/ft)	0.0090						0.0094						0.0093																							
Ri% / Ru% / P% / G% / S%	-	-	-	-	-		24%	10%	52%	14%	0%		28%	8%	46%	18%	1%																			

N/A - Information does not apply.
Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step
*Percentages based on riffle and pool pebble counts.
[1]No water present at time of survey; MY1 and MY2 profile values based on bedform only.
^Mean bankfull width, W/D ratio, entrenchment ratio updated to reflect accurate calculations.

Table 11b. Monitoring Data - Stream Reach Data Summary
601 North II - Wicker Branch Reach 2 (1356 feet)

Parameter	Baseline						MY - 1[1]						MY - 2[1]						MY - 3						MY - 4						MY - 5					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	11.5	11.6	11.6	11.6	0.1	2	11.5	11.7	11.7	11.9	0.28	2	11.3	11.6	11.6	11.8	0.4	2																		
Floodprone Width (ft)	69.2	69.5	69.5	69.7	0.4	2	90	145	145	200	78	2	90	145	145	200	77.8	2																		
Bankfull Mean Depth (ft)	1.1	1.1	1.1	1.1	0	2	1.0	1.0	1.0	1.1	0.04	2	1.1	1.1	1.1	1.1	0	2																		
Bankfull Max Depth (ft)	1.7	1.8	1.8	1.8	0.1	2	1.7	1.7	1.7	1.7	0.02	2	1.8	1.9	1.9	1.9	0.07	2																		
Bankfull Cross-Sectional Area (ft^2)	12.1	12.6	12.6	13.0	0.6	2	12.0	12.2	12.2	12.3	0.21	2	12.4	12.7	12.7	12.9	0.35	2																		
Width/Depth Ratio	10.4	10.6	10.6	10.8	0.3	2	10.7	11.3	11.3	11.8	0.78	2	10.2	10.5	10.5	10.8	0.42	2																		
Entrenchment Ratio	6.0	6.0	6.0	6.0	0	2	7.5	12.5	12.5	17.5	7.07	2	7.6	12.7	12.7	17.8	7.2	2																		
Bank Height Ratio	19.3	21.4	21.4	23.5	3	2	1.0	1.0	1.0	1.0	0	2	1.0	1.0	1.0	1.0	0	2																		
Profile																																				
Riffle Length (ft)	6.3	17.3	18.1	38.7	7.5	33	8.1	17.1	15.7	32.9	7.0	31	6.8	16.1	15.2	30.7	6.8	31																		
Riffle Slope (ft/ft)	0.001	0.017	0.013	0.062	0.013	33	-	-	-	-	-	-	-	-	-	-	-	-																		
Pool Length (ft)	6.1	24.2	23.7	62.0	11.9	33.0	12.6	29.2	26.2	57.3	11.3	33	13.7	29.4	25.4	65.0	11.7	33																		
Pool Max Depth (ft)	1.7	2.9	2.8	3.8	0.4	33.0	1.4	2.8	2.8	3.8	0.5	33	1.7	3.0	3.0	3.7	0.4	33																		
Pool Spacing (ft)	25.5	53.6	53.2	103.3	19.5	33.0	24.4	54.0	52.2	112.6	18.3	32	20.1	53.1	48.1	113.5	20.0	32																		
Pattern																																				
Channel Belt Width (ft)	18.3	31.1	30.6	49.5	8.8	24																														
Radius of Curvature (ft)	28.3	40.2	37.8	61.8	10.1	28																														
Rc: Bankfull Width (ft/ft)	2.40	3.50	3.30	5.30	0.9	28																														
Meander Wavelength (ft)	13.7	114.4	113.3	226.5	46.9	24																														
Meander Width Ratio	1.2	9.9	9.8	19.5	4.0	24																														
Additional Reach Parameters																																				
Rosgen Classification	E4						E4						E4																							
Channel Thalweg Length (ft)	1,775						1,777						1,779																							
Sinuosity (ft)	1.2						1.2						1.2																							
Water Surface Slope (Channel) (ft/ft)	-						-						-																							
Bankfull Slope (ft/ft)	0.0070						0.0071						0.0070																							
Ri% / Ru% / P% / G% / S%	-	-	-	-	-		31%	2%	57%	9%	0%		28%	3%	55%	13%	0%																			

N/A - Information does not apply.

Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step

*Percentages based on riffle and pool pebble counts.

[1]No water present at time of survey; MY1 and MY2 profile values based on bedform only.

Table 11b. Monitoring Data - Stream Reach Data Summary
601 North II- Wicker Branch Reach 3 (414 feet)

Parameter	Baseline[2]						MY - 1[1]						MY - 2[1]						MY - 3						MY - 4						MY - 5					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	-	-	-	-	-	-	-	12.0	-	-	-	1	-	11.8	-	-	-	1																		
Floodprone Width (ft)	-	-	-	-	-	-	-	>200	-	-	-	1	-	>200	-	-	-	1																		
Bankfull Mean Depth (ft)	-	-	-	-	-	-	-	1.2	-	-	-	1	-	1.2	-	-	-	1																		
Bankfull Max Depth (ft)	-	-	-	-	-	-	-	1.7	-	-	-	1	-	1.7	-	-	-	1																		
Bankfull Cross-Sectional Area (ft^2)	-	-	-	-	-	-	-	14.4	-	-	-	1	-	14.0	-	-	-	1																		
Width/Depth Ratio	-	-	-	-	-	-	-	9.9	-	-	-	1	-	9.9	-	-	-	1																		
Entrenchment Ratio	-	-	-	-	-	-	-	>16.7	-	-	-	1	-	>17	-	-	-	1																		
Bank Height Ratio	-	-	-	-	-	-	-	1.0	-	-	-	1	-	1.0	-	-	-	1																		
Profile																																				
Riffle Length (ft)	-	-	-	-	-	-	-	27.6	-	-	-	1	-	31.7	-	-	-	1																		
Riffle Slope (ft/ft)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
Pool Length (ft)	-	-	-	-	-	-	-	29.0	-	-	-	1	-	25.7	-	-	-	1																		
Pool Max Depth (ft)	-	-	-	-	-	-	-	2.7	-	-	-	1	-	3.0	-	-	-	1																		
Pool Spacing (ft)	-	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	0																		
Pattern																																				
Channel Belt Width (ft)	-	-	-	-	-	-																														
Radius of Curvature (ft)	-	-	-	-	-	-																														
Rc: Bankfull Width (ft/ft)	-	-	-	-	-	-																														
Meander Wavelength (ft)	-	-	-	-	-	-																														
Meander Width Ratio	-	-	-	-	-	-																														
Additional Reach Parameters																																				
Rosgen Classification	-						E4						E4																							
Channel Thalweg Length (ft)	-						80						79																							
Sinuosity (ft)	-						1.17						1.18																							
Water Surface Slope (Channel) (ft/ft)	-						NA						N/A																							
Bankfull Slope (ft/ft)	-						0.0073						0.0070																							
Ri% / Ru% / P% / G% / S%	-	-	-	-	-		44%	-	46%	10%	-		51%	-	41%	8%	-																			

N/A - Information does not apply.

Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step

*Percentages based on riffle and pool pebble counts.

[1]No water present at time of survey; MY1 and MY2 profile values based on bedform only.

[2]Reach 3 cross-section was added during MY1; no data available for MY0

Table 11b. Monitoring Data - Stream Reach Data Summary
601 North II - UT to Wicker Branch Reach 4 (826 feet)

Parameter	Baseline						MY - 1						MY - 2						MY - 3						MY - 4						MY - 5					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	-	8.9	-	-	-	1	-	8.3	-	-	-	1	-	8.0	-	-	-	1																		
Floodprone Width (ft)	-	23.1	-	-	-	1	-	>23	-	-	-	1	-	>23	-	-	-	1																		
Bankfull Mean Depth (ft)	-	0.5	-	-	-	1	-	0.5	-	-	-	1	-	0.5	-	-	-	1																		
Bankfull Max Depth (ft)	-	0.7	-	-	-	1	-	0.7	-	-	-	1	-	0.8	-	-	-	1																		
Bankfull Cross-Sectional Area (ft^2)	-	4.2	-	-	-	1	-	4.1	-	-	-	1	-	3.9	-	-	-	1																		
Width/Depth Ratio	-	18.5	-	-	-	1	-	16.9	-	-	-	1	-	16.4	-	-	-	1																		
Entrenchment Ratio	-	2.6	-	-	-	1	-	>2.8	-	-	-	1	-	>2.9	-	-	-	1																		
Bank Height Ratio	-	1.0	-	-	-	1	-	1.0	-	-	-	1	-	1.0	-	-	-	1																		
Profile																																				
Riffle Length (ft)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
Riffle Slope (ft/ft)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
Pool Length (ft)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
Pool Max Depth (ft)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
Pool Spacing (ft)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-																		
Pattern																																				
Channel Belt Width (ft)	-	-	-	-	-	-																														
Radius of Curvature (ft)	-	-	-	-	-	-																														
Rc: Bankfull Width (ft/ft)	-	-	-	-	-	-																														
Meander Wavelength (ft)	-	-	-	-	-	-																														
Meander Width Ratio	-	-	-	-	-	-																														
Additional Reach Parameters																																				
Rosgen Classification	-						-						-																							
Channel Thalweg Length (ft)	-						-						-																							
Sinuosity (ft)	-						-						-																							
Water Surface Slope (Channel) (ft/ft)	-						-						-																							
Bankfull Slope (ft/ft)	-						-						-																							
Ri% / Ru% / P% / G% / S%	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-																			

N/A - Information does not apply.
Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step
*Percentages based on riffle and pool pebble counts.

Table 11b. Monitoring Data - Stream Reach Data Summary
601 North II -UT to Wicker Branch Reach 5 (534 feet)

Parameter	Baseline						MY - 1[1,^]						MY - 2[1]						MY - 3						MY - 4						MY - 5					
Dimension & Substrate - Riffle	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**	**Min**	**Mean**	**Med**	**Max**	**SD**	**n**
Bankfull Width (ft)	-	11.0	-	-	-	-	-	11.1	-	-	-	1	-	10.8	-	-	-	1																		
Floodprone Width (ft)	-	65.5	-	-	-	-	-	>100	-	-	-	1	-	>100	-	-	-	1																		
Bankfull Mean Depth (ft)	-	0.8	-	-	-	-	-	0.8	-	-	-	1	-	0.9	-	-	-	1																		
Bankfull Max Depth (ft)	-	1.3	-	-	-	-	-	1.3	-	-	-	1	-	1.3	-	-	-	1																		
Bankfull Cross-Sectional Area (ft^2)	-	8.5	-	-	-	-	-	8.5	-	-	-	1	-	9.5	-	-	-	1																		
Width/Depth Ratio	-	14.1	-	-	-	-	-	14.6	-	-	-	1	-	12.3	-	-	-	1																		
Entrenchment Ratio	-	6.0	-	-	-	-	-	>9	-	-	-	1	-	>9.2	-	-	-	1																		
Bank Height Ratio	-	1.0	-	-	-	-	-	1.0	-	-	-	1	-	1.0	-	-	-	1																		
Profile																																				
Riffle Length (ft)	5.1	12.8	12.4	23.2	4.5	16	3.1	9.7	9.3	18.5	3.9	17	3.2	7.7	6.9	14.5	3.5	17																		
Riffle Slope (ft/ft)	0.001	0.016	0.016	0.035	0.010	16	-	-	-	-	-	-	-	-	-	-	-	-																		
Pool Length (ft)	3.2	12.4	12.3	29.5	6.3	18	6.0	16.0	14.5	38.3	7.3	19	7.4	17.0	15.8	28.8	5.7	19																		
Pool Max Depth (ft)	1.6	2.2	2.3	2.6	0.3	18	1.5	2.0	2.0	2.6	0.3	19	1.8	2.2	2.2	2.7	0.3	19																		
Pool Spacing (ft)	14.5	30.2	31.7	42.2	6.9	17	10.8	28.7	30.8	42.0	8.8	19	10.5	29.1	30.4	48.7	9.9	19																		
Pattern																																				
Channel Belt Width (ft)	15.7	24.3	25.6	29.8	4.7	18																														
Radius of Curvature (ft)	12.3	19.9	18.8	31.4	5.8	19																														
Rc: Bankfull Width (ft/ft)	1.10	1.80	1.70	2.90	0.5	19																														
Meander Wavelength (ft)	23.3	54.3	52.3	88.5	15.6	18																														
Meander Width Ratio	2.1	4.9	4.8	8.0	1.4	18																														
Additional Reach Parameters																																				
Rosgen Classification	C4						C4						C4																							
Channel Thalweg Length (ft)	646						600						591																							
Sinuosity (ft)	1.2						1.25						1.27																							
Water Surface Slope (Channel) (ft/ft)	-						-						-																							
Bankfull Slope (ft/ft)	0.0110						0.0114						0.0113																							
Ri% / Ru% / P% / G% / S%	-	-	-	-	-		30%	5%	56%	8%	-		24%	5%	58%	14%	0%																			

N/A - Information does not apply.
Ri = Riffle / Ru = Run / P = Pool / G = Glide / S = Step
*Percentages based on riffle and pool pebble counts.

[1]No water present at time of survey; MY1 and MY2 profile values based on bedform only.

[^]MY1 data misreported, numbers updated to reflect accurate riffle length calculations

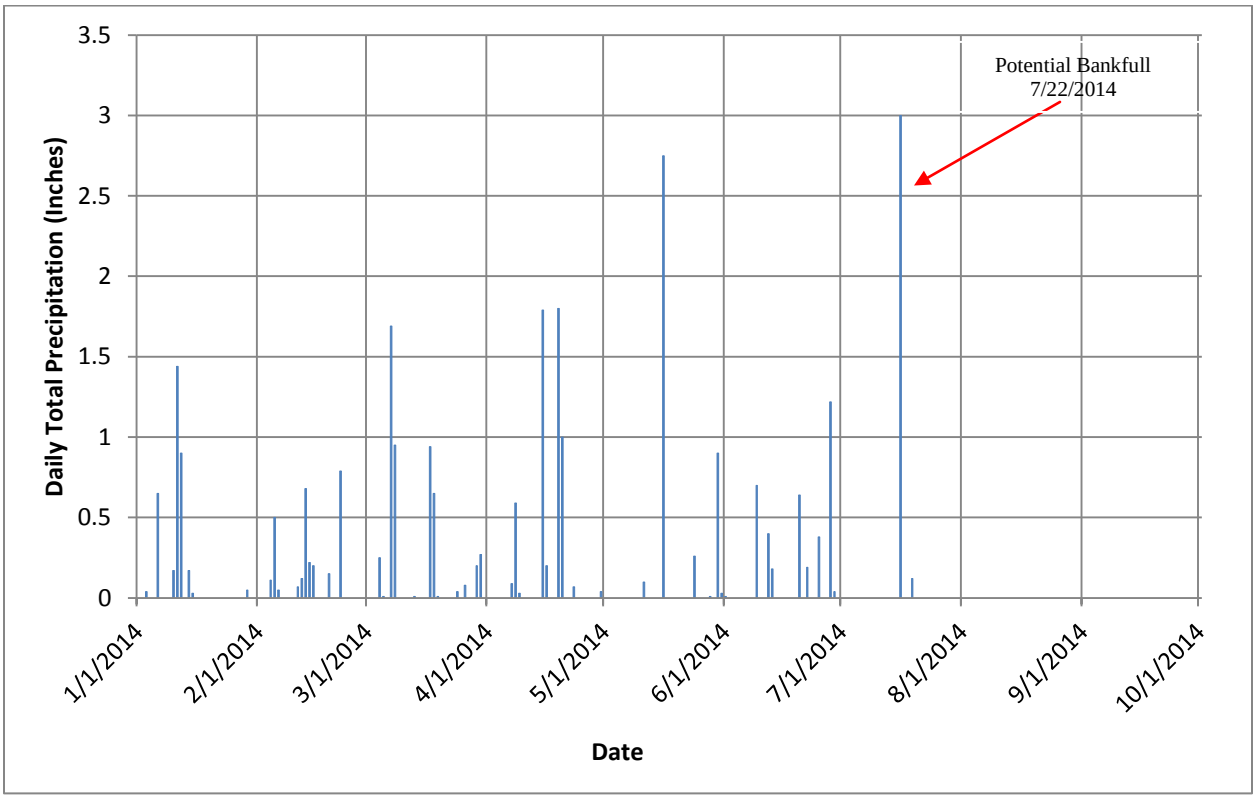
Appendix E
Hydrologic Data

Appendix D

Table 12. Verification of Bankfull Events 601 North II / Project No. 95025				
Date of Data Collection	**Date of Occurrence**	**Method**	**Feet Above Bankfull Elevation**	**Photo # (if available)**
November - 2013	Unknown	Wrack Lines		
September - 2014	Unknown[1]	Crest Gauge	1.5	

[1] Based on precipitation data, suggested date is 7/22/2014

Figure 3. Daily Precipitation Totals for Monroe, North Carolina- NCCRONOS Station No. 315771



Mitigation Project Name	**601 North II Stream Restoration Site**	**County**	**Union**	**USACE Action ID**	2012-00014
DMS IMS ID	**95025**	**Date Project Instituted**	**7/14/2011**	**NCDWR Permit No**	2012-0730
River Basin	**Yadkin**	**Date Prepared**	**4/13/2015**		
Cataloging Unit	**03040105**				

Credit Release Milestone	Stream Credits						Wetland Credits							
	Scheduled Releases (Stream)	Warm	Cool	Cold	Anticipated Release Year (Stream)	Actual Release Date (Stream)	Scheduled Releases (Forested)	Riparian Riverine	Riparian Non-riverine	Non-riparian	Scheduled Releases (Coastal)	Coastal	Anticipated Release Year (Wetland)	Actual Release Date (Wetland)
Potential Credits (Mitigation Plan)		**3,679.5**												
Potential Credits (As-Built Survey)		**3,565.0**												
1 (Site Establishment)	**N/A**				N/A	N/A	**N/A**				**N/A**		N/A	N/A
2 (Year 0 / As-Built)	**30%**	1,069.5			2014	6/11/2014	**30%**				**30%**		N/A	N/A
3 (Year 1 Monitoring)	**10%**	356.5			2015	4/23/2015	**10%**				**10%**		N/A	N/A
4 (Year 2 Monitoring)	**10%**	356.5			2015	4/23/2015	**15%**				**15%**		N/A	N/A
5 (Year 3 Monitoring)	**10%**				2016		**20%**				**20%**		N/A	N/A
6 (Year 4 Monitoring)	**10%**				2017		**10%**				**10%**		N/A	N/A
7 (Year 5 Monitoring)	**15%**				2018		**15%**				**15%**		N/A	N/A
Stream Bankfull Standard	**15%**	534.8			2015	4/23/2015	**N/A**				**N/A**			
Total Credits Released to Date		**2,317.3**												

DEBITS (released credits only)

Ratios	1	1.5	2.5	5	1	3	2	5	1	3	2	5	1	3	2	5
	Stream Restoration	Stream Enhancement I	Stream Enhancement II	Stream Preservation	Riparian Restoration	Riparian Creation	Riparian Enhancement	Riparian Preservation	Nonriparian Restoration	Nonriparian Creation	Nonriparian Enhancement	Nonriparian Preservation	Coastal Marsh Restoration	Coastal Marsh Creation	Coastal Marsh Enhancement	Coastal Marsh Preservation
As-Built Amounts (feet and acres)	**3,169.0**	**225.0**	**615.0**													
As-Built Amounts (mitigation credits)	**3,169.0**	**150.0**	**246.0**													
Percentage Released	**65%**	**65%**	**65%**													
Released Amounts (feet / acres)	**2,059.9**	**146.3**	**399.8**													
Released Amounts (credits)	**2,059.9**	**97.5**	**159.9**													
NCDWR Permit / USACE Action ID / Project Name																
Remaining Amounts (feet / acres)	**2,059.9**	**146.3**	**399.8**													
Remaining Amounts (credits)	**2,059.9**	**97.5**	**159.9**													

Contingencies (if any): None

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2015.07.20 17:14:48 -04'00'

Signature of Wilmington District Official Approving Credit Release | **Date**

1 - For DMS, no credits are released during the first milestone
2 - For DMS projects, the second credit release milestone occurs automatically when the as-built report (baseline monitoring report) has been made available to the NCIRT by posting it to the NCEEP Portal, provided the following criteria have been met:
1) Approval of the final Mitigation Plan
2) Recordation of the preservation mechanism, as well as a title opinion acceptable to the USACE covering the property
3) Completion of all physical and biological improvements to the mitigation site pursuant to the mitigation plan
4) Reciept of necessary DA permit authorization or written DA approval for porjects where DA permit issuance is not required

3 - A 15% reserve of credits is to be held back until the bankfull event performance standard has been met