# **Northern Virginia Stream Restoration Bank- The Glade-Reaches 1 and 1A** Fairfax County, Virginia

WSSI #20030, Task I6

**Mitigation Monitoring Report** Seventh Growing Season (2015)

November 20, 2015

Prepared for: Northern Virginia Stream Restoration, L.C. c/o Wetland Studies and Solutions, Inc. 5300 Wellington Branch Dr., Suite 100 Gainesville, VA 20155

Prepared by: Studies and Solutions, a DAVEY . company 5300 Wellington Branch Drive, Suite 100 Gainesville, Virginia 20155 Tel: 703-679-5600 Email: contactus@wetlandstudies.com www.wetlandstudies.com

#### Northern Virginia Stream Restoration Bank, The Glade – Reaches 1 and 1A Mitigation Monitoring Report Seventh Growing Season (2015) WSSI #20030

#### **Introduction**

The Glade – Reaches 1 and 1A of the Northern Virginia Stream Restoration Bank are located between Steeplechase Drive and Colts Neck Road, immediately upstream of Colts Neck Road, in Fairfax County, Virginia (<u>Exhibit 1</u>: 38°55'49''N, 77°21'57''W). Restoration of Reaches 1 and 1A of The Glade occurred in early 2009, in accordance with the Northern Virginia Stream Restoration Bank Mitigation Banking Instrument (MBI), dated February 17, 2006 (modified April 2007, June 2009, and June 2010), the Concept Plan dated May 15, 2006<sup>1</sup>, the subsequent Nationwide Permit 27 verification<sup>2</sup>, and the corresponding construction plans. Periodic monitoring to evaluate the success of the stream restoration is required by the MBI. This monitoring report documents that all success criteria have been met at The Glade – Reaches 1 and 1A during the seventh growing season, as set forth in the MBI and associated mitigation plans.

Northern Virginia Stream Restoration Bank, The Glade – Reaches 1 and 1A includes a total of 1,995.5 linear feet of stream restoration, resulting in a total of 16,407.4 Stream Condition Units, per the As-Built Survey, dated May 2009, revised May 15, 2009.

#### **Monitoring Success Criteria**

According to the MBI (V.E.2) the monitoring success criteria shall consist of the following:

- (a) Reforested Riparian Buffer Areas
  - (i) Plant density of at least 400 living woody stems (including volunteers) per acre of trees and shrubs must be achieved by the end of the first growing season following planting and maintained through the end of the monitoring period or until canopy coverage is greater than 30%.
  - (ii) Herbaceous plant coverage of at least 60% must be achieved by the end of the first growing season and at least 80% each monitoring year thereafter. Said criterion shall not be applicable if canopy coverage is greater than 30%. Canopy coverage shall be visually estimated at each plot and photodocumented to determine whether coverage has exceeded 30%. If canopy coverage exceeds 30%, herbaceous coverage shall continue to be assessed and documented each monitoring period for reporting purposes only.<sup>3</sup>
  - (iii) Woody plant coverage (from live-stakes, tublings, container grown material, and volunteers) along stream banks shall achieve a density of at least 5 l.f./stem (i.e., 1 stem per 5 l.f.) by the end of the first growing season and for each monitoring year thereafter.

<sup>&</sup>lt;sup>1</sup> The Concept Plan was approved by the COE and DEQ on June 22 and 30, 2009, respectively.

<sup>&</sup>lt;sup>2</sup> COE # 2009-0064, dated January 26, 2009, and DEQ Notification of No Permit Required #08-1919, dated January 26, 2009.

Note that the later criterion was incorporated into the MBI in Modification #3 ([MBI §V.E.2(e)], dated June 2010) and was not included in the 2009 Monitoring Report.

- (b) Stream and Riparian System
  - *(i)* <u>Dimension</u> The analysis of each permanent cross-section specified on the Stream *Restoration Site Plan shall indicate that:* 
    - 1) The Width/Depth Ratio (defined as the width at bankfull divided by the mean riffle depth at bankfull) did not increase or decrease by an amount greater than 1.2 of the as-built cross section.
    - 2) The bankfull Cross-Sectional Area did not increase or decrease by an amount greater than 20% of the as-built cross-section.
    - 3) The Bank Height Ratio (defined as the low bank height divided by the maximum riffle depth) did not increase or decrease by an amount greater than 0.2 of the as-built cross section.
  - *(ii)* <u>*Pattern*</u> *The analysis of the plan-view survey of field measurements shall indicate that:* 
    - 1) The Sinuosity of the stream (defined as the stream length along the thalweg divided by the valley length) did not increase or decrease by an amount greater than 0.2 of the as-built pattern.
    - 2) The Radius of Curvature/Width ratio did not increase or decrease by an amount greater than 0.2 of the as-built condition.
  - (iii) <u>Profile</u> The analysis of the longitudinal profile shall indicate that the slope of the longitudinal profile did not increase or decrease by an amount greater than 0.3% of the as-built slope.
  - (iv)  $\underline{Structures^4}$  The analysis of each instream structure shall indicate that:
    - 1) The angle of any rock vane, j-hook, or cross vane did not increase or decrease by an amount greater than 3 degrees from the as-built angle, and remains between 20 and 30 degrees from the streambank.
    - 2) The slope of any rock vane, j-hook, or cross vane did not increase or decrease by an amount greater than 2% from the as-built slope (i.e. if the design slope was 5%, than any slope from 3% to 7% would be acceptable) and remains between 2% to 7%.

#### <u>Methods</u>

For the 2015 monitoring year, vegetative, photographic, and survey photo monitoring is required to assess the success criteria. Vegetation monitoring field work was conducted on September 22, 2015 by Neil Gutherman, WPIT<sup>5</sup> and Melissa Letosky to collect vegetation data and take photographs at the three vegetation monitoring stations. The following general supporting documentation is included at the end of this report: monitoring locations map (<u>Exhibit 2</u>) and representative monitoring photographs (<u>Exhibit 3</u>). Additional supporting data is available in separate <u>Appendices<sup>6</sup></u>, including: monitoring photographs; percent cover data; woody plant data; and structure photographs.

#### **Monitoring Program Protocol and Results**

In accordance with the guidelines of §VI.B of the MBI, the 2015 monitoring program results are as follows:

<sup>&</sup>lt;sup>4</sup> Note that this criteria is only required for Year 1 and not subsequent years, based on June 16, 2010 MBI modification . [MBI §V.E.2(b(iv))].

<sup>&</sup>lt;sup>5</sup> Wetland Professional in Training, Society of Wetland Scientists Certification Program, Inc.

This information is included in separate Appendices due to report size limitations as set forth in COE Regulatory Guidance Letter 06-03.

- 1. With respect to the riparian buffer areas:
  - a. Visual description ground level photographs shall be taken at each monitoring station, and an aerial photograph shall be taken the 3<sup>rd</sup> or 5<sup>th</sup> year following final grading.

Photographs were taken in four standard directions (upstream, downstream, left bank, right bank) as well as overhead at the canopy coverage at each of the three permanent monitoring stations during the September 2015 monitoring field work. The representative photographs (Exhibit 3) demonstrate that herbaceous and woody vegetation has become established throughout The Glade – Reaches 1 and 1A reforestation areas. All vegetation and canopy coverage photographs from the riparian monitoring plots are provided within <u>Appendix A</u>.

b. Vegetation – sample plots shall be randomly located over reforested riparian buffer and streamside areas at a rate of 1 plot per 750 linear feet of stream length in order to sample all habitat areas of buffer area locations adjacent to each photo location marker. Each plot shall include no less than a 100-foot x 3-foot belt transect (or equivalent area) for woody riparian plants, a 3-foot diameter for riparian herbaceous plants, and a 100-foot long line transect along stream banks (and adjacent to the belt transect) to assess the stream bank woody plants criteria. The vegetation data shall include: dominant species identification, coverage assessment, number of woody plant stems (total and #/acre), and indicator status.

Three vegetation monitoring plots were established in the reforested area within Reach 1 and 1A. The average density of living woody stems (as measured by the number of stems per acre) is 6,098. On individual plots, the number of stems per acre ranged from 4,646 to 6,824. These results meet and exceed the success criteria [MBI V.E.2(a)(i)] of an average of 400 living woody stems per acre in reforested areas. Species are provided within <u>Appendix C</u>.

The average percent cover by herbaceous vegetation was 100. On all individual plots, percent cover was 100. All of the plots meet and exceed the success criteria [MBI §V.E.2(a)(ii)] of greater than 80 percent cover by the end of the second growing season. Because the aerial canopy coverage exceeds 30% at all plots, the percent cover criteria is provided for reporting purposes only. Dominant species and indicator status are provided within <u>Appendix B</u>.

- 2. With respect to the stream system:
  - a. Woody plant coverage shall be quantified by species and density (1 stem per 5 l.f. along the stream edge).

The average density of woody stems along the stream banks was 1.33 stems per 5 linear feet of stream bank. On individual plots, the number of stems per 5 linear feet ranged from 0.9 to 1.9 stems. These results meet and exceed the success criteria [MBI §V.E.2(a)(iii)] of an average of 1 stem per 5 linear feet. Species are provided within <u>Appendix C</u>.

b. Exposure of bank pins shall be quantified to provide an assessment of bank erosion.

Monitoring of this criterion is not required in the seventh growing season.

c. Scour chains shall be assessed to provide data on movement of sediment.

Monitoring of this criterion is not required in the seventh growing season.

*d. Pebble counts and bar samples will be collected and analyzed to document changes in streambed material size.* 

Monitoring of this criterion is not required in the seventh growing season.

e. Each stream stabilization structure shall be surveyed in Year 1, photographed and a narrative statement provided as to whether or not specific Success Criteria have been violated. Surveying is not required in subsequent years (Years 3, 5, and 10) unless the photo monitoring and/or visual observation indicate a possible erosion or stability issue<sup>7</sup>.

Per MBI modification #3, surveying is not required following Year 1 unless the photo monitoring and/or visual observation indicate a possible erosion or stability issue, in which case a field survey may be requested by the Interagency Review Team (IRT; formerly the Mitigation Bank review Team) for the Stream Stabilization Structure(s) experienced the erosion and/or stability issues. However, photo monitoring of the stream stabilization structures is to be conducted in the 2<sup>nd</sup>, 3<sup>rd</sup>, 5<sup>th</sup>, 7<sup>th</sup>, and 10<sup>th</sup> year following restoration.

Structure photographs taken during the 2015 monitoring year indicate no erosion or stability issues. See <u>Appendix D</u> for structure monitoring photographs.

*f.* One cross section per 1,000 l.f. shall be provided, with a representative mix of riffles and pools.

Monitoring of this criterion is not required in the seventh growing season.

g. A surveyed profile of the stream shall be provided immediately following completion, and in years 1, 3, 5, and 10.

Monitoring of this criterion is not required in the seventh growing season.

*h.* Location of any riparian areas with excessive erosion that needs replanting or protection shall be identified.

No riparian areas with excessive erosion were identified during this monitoring year.

<sup>&</sup>lt;sup>7</sup> Note that this criteria is only required for Year 1 and not subsequent years, based on June 16, 2010 MBI modification [MBI §VI.B.2(e)].

*i.* An assessment of biological conditions (habitat) shall be provided prerestoration and in years 1, 5, and 10.

Biological assessment reaches are not located within Reaches 1 and 1A of the Glade, due to the non-perennial nature of the streams, thus no post-construction monitoring was conducted. Biological Conditions Assessments for perennial stream reaches within The Glade watershed will be provided in separate monitoring reports.

*j.* Within one week after any storm event that exceeds 3.2 inches in 24 hours or 2.0 inches in 2 hours, the subject stream reach shall be visually inspected for damages. Any damage noted shall be reported to the Corps in writing.

Since the submission of the Year 5 (2013) monitoring report, two major storm events meeting the criteria of §VI.B.2(j) occurred. Neither storm caused any damage to in-stream structures or created any issues requiring maintenance. A copy of each of these reports is included within <u>Appendix E</u>.

The first of these occurred on April 30, 2014, during which 3.99 inches of rain fell within a 24 hour period. On May 7 to 9, 2014 WSSI personnel inspected The Glade watershed and submitted a detailed monitoring report describing the inspection results, in the aforementioned report entitled "Northern Virginia Stream Restoration Bank – Monitoring Report for the 9<sup>th</sup>, 2 – Year Storm Event," dated May 13, 2014, which was submitted to the COE.

The second major storm event was recorded on May 15, 2014, during which 3.48 inches of rain fell within a 24 hour period. All stream reaches were inspected by WSSI personnel from May 20 to 23, 2014 and a report of their inspection of the restored reaches, entitled "Northern Virginia Stream Restoration Bank – Monitoring Report for the 10<sup>th</sup>, 2 – Year Storm Event," was submitted to the COE on June 2, 2014.

#### Maintenance/Corrective Measures

Only minor maintenance activities and corrective measures were undertaken in 2015. These activities included spraying invasive species including mile-a-minute weed (*Persicaria perfoliata*), multiflora rose (*Rosa multiflora*), and Japanese hops (*Humulus japonicus*) during July, 2015. Note, however, that the success of the NVSRB is **not** predicated upon the presence/absence of invasive species. In addition, fallen trees were removed from the stream on an as-need basis.

#### Mitigation Credit Analysis

The MBI requires a summary of credits created by the bank and the permits that have been debited against these credits. A credit ledger for the entire NVSRB is provided annually to the chair of the IRT.

#### <u>Summary</u>

This investigation indicates the successful restoration of The Glade – Reaches 1 and 1A in the seventh growing season. Monitoring of these reaches confirm the successful reforestation/revegetation of riparian buffers and the successful establishment of a stable stream system.

#### **Limitations**

This study is based on examination of the vegetation and geomorphology at the referenced site. Field indicators can change with variations in hydrology and other factors. Therefore, our conclusions may vary significantly from future observation by others. This report assesses the presence of vegetation and the stability of geomorphic features at the site at the time of our review and does not address conditions prior to our review or at a given time in the future.

Our review and report have been prepared in accordance with the MBI and with generally accepted guidelines for the conduct of monitoring reports for mitigation banks.

WETLAND STUDIES AND SOLUTIONS, INC.

Neil Gutherman, WPIT Environmental Scientist

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Benjamin N. Rosner, PWS, PWD, CE, CT Manager - Environmental Science

Frank Graziano, PI Director - Engineering

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# EXHIBIT 1

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Copyright ADC The Map People Vicinity Map Permitted Use Number 20711184



Northern Virginia Stream Restoration Bank The Glade - Reaches 1 & 1A WSSI #20031 Original Scale: 1" = 2000'



Lat: 38° 55' 49" N

Lon 77° 21' 57" W

# EXHIBIT 2



# EXHIBIT 3

# NORTHERN VIRGINIA STREAM RESTORATION BANK – THE GLADE REACHES 1 AND 1A REPRESENTATIVE MONITORING PHOTOGRAPHS SEPTEMBER 22, 2015 **EXHIBIT 3**



Station 1: Upstream

Station 2: Downstream



#### NORTHERN VIRGINIA STREAM RESTORATION BANK THE GLADE – REACHES 1 AND 1A

#### MITIGATION MONITORING REPORT

#### **SEVENTH GROWING SEASON (2015)**

#### FAIRFAX COUNTY, VIRGINIA

WSSI # 20030 TASK I6

#### APPENDIX

- A. MONITORING PHOTOGRAPHS
- **B. PERCENT COVER DATA**
- C. WOODY PLANT DATA
- D. SURVEY MONITORING PHOTOGRAPHS
- E. 9<sup>TH</sup> AND 10<sup>TH</sup> 2-YEAR STORM EVENT REPORTS

# APPENDIX A



1. Monitoring station 1: Looking at canopy cover.



2. Monitoring station 1: Looking upstream.



3. Monitoring station 1: Looking downstream.



4. Monitoring station 1: Looking at the left bank.



5. Monitoring station 1: Looking at the right bank.



6. Monitoring station 2: Looking at canopy cover.



7. Monitoring station 2: Looking upstream.



8. Monitoring station 2: Looking downstream.



9. Monitoring station 2: Looking at the left bank.



**10.** Monitoring station 2: Looking at the right bank.



11. Monitoring station 3: Looking at canopy cover.



12. Monitoring station 3: Looking upstream.



13. Monitoring station 3: Looking downstream.



14. Monitoring station 3: Looking at the left bank.



15. Monitoring station 3: Looking at the right bank.

# APPENDIX B

#### Northern Virginia Stream Restoration Bank - The Glade Reaches 1 and 1A End of 7th Growing Season (2015) Percent Cover Data

			1	2	3	Avg % Cover
Overall % Cover by Vegetation		100	100	100	100	
% Bare Ground		0	0	0	0	
% Canopy Coverage**			75	50	50	58.3
Herbs (FAC or wetter)						
Species	Common Name	R1 IND	1	2	3	Avg % Cover
Alnus serrulata	Brookside Alder	OBL	5			1.7
Boehmeria cylindrica*	Small-spike False Nettle	FACW		20	15	11.7
Impatiens capensis*	Spotted Touch-me-not	FACW		2		0.7
Microstegium vimineum*	Japanese Stilt Grass	FAC	100	100	100	100
Nyssa sylvatica	Black Tupelo	FAC		1		0.3
Persicaria hydropiperoides*	Swamp Smartweed	OBL		15		5
% Cover Rated FAC or Wetter			105	138	115	119.4
Herbs (drier than FAC)						
Hedera helix*	English Ivy	FACU	1			0.3
Rubus argutus*	Saw-tooth Blackberry	FACU	1			0.3
% Cover Rated Drier than FAC			2			0.6
Herbs (rated NI or unidentified) - None						
Duchesnea indica*			1			0.3
% Cover Rated NI			1			0.3
Total % Cover			108	138	115	131.7
% Overlap			8	38	15	20.3

\*indicates volunteer species.

\*\* If canopy coverage exceeds 30%, herbaceous percent coverage will be assessed and documented for reporting purposes only.

Species in bold indicate dominant species per the 50/20 rule.

# APPENDIX C

#### Northern Virginia Stream Restoration Bank - The Glade Reaches 1 and 1A End of 7th Growing Season (2015) Riparian Woody Stem Density Data

#### # Stems

Trees						
Species	Common Name	R1 IND	1	2	3	Total Stems
Acer rubrum*	Red Maple	FAC	1			1
Alnus serrulata	Brookside Alder	OBL	7	10	3	20
Amelanchier arborea	Downy Service-berry	FAC			1	1
Carya tomentosa*	Mockernut Hickory	NI	1			1
Corylus americana*	American Hazelnut	FACU		2		2
Liquidambar styraciflua*	Sweet-gum	FAC			15	15
Nyssa sylvatica	Black Tupelo	FAC		1		1
Prunus serotina*	Black Cherry	FACU			1	1
Quercus bicolor*	Swamp White Oak	FACW	1			1
Quercus rubra	Northern Red Oak	FACU			1	1
Robinia pseudoacacia*	Black Locust	FACU		2		2
Salix nigra	Black Willow	OBL	8	5	4	17
Viburnum dentatum	Southern Arrow-wood	FAC		10	5	15
Shrubs						
Species	Common Name	R1 IND	1	2	3	Total Stems
Cornus amomum	Silky Dogwood	FACW	11	17	16	44
Corylus americana*	American Hazelnut	FACU			1	1
llex opaca	American Holly	FACU	1			1
Viburnum dentatum	Southern Arrow-wood	FAC	2			2

	1	2	3	Avg Stems
# Stems	32	47	47	42
# Stems/Acre	4646	6824	6824	6098

\*volunteer woody species

Plots consist of a 100' x 3' belt transect

#### Northern Virginia Stream Restoration Bank - The Glade Reaches 1 and 1A End of 7th Growing Season (2015) Streamside Woody Stem Density Data

#### # Stems

Trees						
Species	Common Name	R1 IND	1	2	3	Total Stems
Alnus serrulata	Brookside Alder	OBL	3	2	4	9
Crataegus sp.*	Hawthorn	NI	3			3
Liquidambar styraciflua*	Sweet-gum	FAC			14	14
Salix nigra	Black Willow	OBL	8	9	10	27
Shrubs						
Species	Common Name	R1 IND	1	2	3	Total Stems
Cornus amomum	Silky Dogwood	FACW	10	7	10	27

	1	2	3	Avg Stems
# Stems	24	18	38	26.67
# Stems/5 l.f.	1.2	0.9	1.9	1.33

\*volunteer woody species

Sample consists of a 100' belt transect

### APPENDIX D



1. Reach 1, Structure 1





3. Reach 1, Structure 3





5. Reach 1, Structure 5





7. Reach 1, Structure 7





9. Reach 1, Structure 9





11. Reach 1, Structure 11





13. Reach 1, Structure 13





15. Reach 1, Structure 15







<sup>18.</sup> Reach 1, Structure 18



19. Reach 1A, Structure 1





21. Reach 1A, Structure 3





1. Reach 1, Structure 1





3. Reach 1, Structure 3





5. Reach 1, Structure 5





7. Reach 1, Structure 7





9. Reach 1, Structure 9





11. Reach 1, Structure 11





13. Reach 1, Structure 13





15. Reach 1, Structure 15





17. Reach 1, Structure 17





19. Reach 1A, Structure 1





21. Reach 1A, Structure 3



## APPENDIX E



May 13, 2014

VIA Email: <a href="mailto:ron.h.stouffer@usace.army.mil">ron.h.stouffer@usace.army.mil</a>

Mr. Ron Stouffer, Jr. U.S. Army Corps of Engineers Northern VA Field Office 18139 Triangle Shopping Plaza Suite 213 Dumfries, VA 22026

> Re: Northern Virginia Stream Restoration Bank Monitoring Report for the 9<sup>th</sup>, 2-Year Storm Event WSSI #20000

Dear Mr. Stouffer:

Pursuant to Section VI.B.2.(j) of the Northern Virginia Stream Restoration Bank (NVSRB) Mitigation Banking Instrument (MBI), and the subsequent Nationwide Permits 27 and 42 verifications<sup>1</sup>, this letter serves as the monitoring report to document the performance of the completed stream restoration reaches following a major rain event. On April 30, 2014, 3.99-inches of rain fell in a 24-hr period. The overall rain event spanned from April 29<sup>th</sup> – May 1<sup>st</sup>, 2014 yielding 5.06-inches of rainfall during a 2.5 day period (5:00 pm April 29<sup>th</sup> – 3:15 am May 1<sup>st</sup>).

All restored streams were visually inspected between May 7-9th, 2014 by WSSI staff (Bryce Aiken, Marshall Willis, and Hannah Largen). From these inspections, the streams once again handled the bankfull storm flows very well with only minor additional maintenance items noted that included one down tree in Snakeden Reach 9 (Photo 4) and one down tree in Snakeden

The Glade Nationwide Permit 27 – (Reaches 1, 1A, 2, 3, 4A, & 4B): COE #2009-0064, dated January 26, 2009, and DEQ Notification of No Permit Required #08-1919, dated January 26, 2009. (Reaches 5 & 6) – COE # 2009-2210, dated October 21, 2009, and DEQ Notification of No Permit

Required provided via email, dated October 26, 2009.

Colvin Run – Forest Edge North, Nationwide Permit 27, COE #2010-2052, dated September 29, 2010, and Colvin Run – Forest Edge South, Nationwide Permit 27and 42, dated September 29, 2010. The DEQ has issued conditional Section 401 Water Quality Certification for NWP 27 and 42; therefore, no further authorization is required from the DEQ.

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<sup>&</sup>lt;sup>1</sup> Snakeden Branch Nationwide Permit 27 – COE #2007-2790, dated 10/3/07; COE #2007-3620, dated January 16, 2008; COE #2007-4320, dated 1/16/08; COE #2007-4321, dated 1/16/08; COE #2007-4711, dated 1/17/8; COE #2008-1473, dated 1/26/08; COE #2008-207, dated 1/17/08; COE #2008-2556, dated 1/24/08; and COE #2008-2557, dated 1/24/08.

Ron Stouffer May 9, 2014 WSSI #20000 Page2

Reach 10 (Photo 1). The down tree in Snakeden Reach 10 has already been removed (Photo 2) and the down tree in Snakeden Reach 9 is scheduled to be removed during the week of 5/12/2014.

Other than the two downed trees, the  $\pm 40,000$  linear feet of restored streams and hundreds of structures handled the storms extremely well. These restored streams 'continue to sereve an important role, both hydraulically and ecologically, for Reston and The Difficult Run Watershed.

If you have any questions or require additional information regarding the planned course of action for the necessary repairs, please feel free to contact me (703-679-5627 or *jconnelly@wetlandstudies.com*). Thank you.

Sincerely,

WETLAND STUDIES AND SOLUTIONS, INC.

John P. Connelly, P.W.S. Director of Restoration

cc: Bettina Sullivan, DEQ Mike Rolband, WSSI Frank Graziano, WSSI Beth Clements, WSSI Ben Rosner, WSSI Jen Feese, WSSI



Photo 1: Looking downstream in Snakeden Reach 10; down tree before removal.



Photo 2: Snakeden Reach 10; after down tree removal.



Photo 3: Looking upstream in Snakeden at the confluence of Reaches 12 and 16. Rack lines on trees illustrate the bankfull event. No damage observed; no remediation required.



Photo 4: Looking downstream at fallen tree within bankfull in Snakeden Reach 9. No damage observed; tree is scheduled to be removed.



Photo 5: Looking downstream at cross vane structure in Glade Reach 3. No damage observed; no remediation required.



Photo 6: Looking downstream in Glade Reach 5. Rack lines on shrubs and banks indicating bankfull event. No damage observed; no remediation required.



Photo 7: Looking upstream in Colvin Run (Forest Edge North). No damage observed; no remediation required.



Photo 8: Looking downstream at step pool structures in Colvin Run (Forest Edge South). No damage observed; no remediation required.



June 2, 2014

VIA Email: <a href="mailto:ron.h.stouffer@usace.army.mil">ron.h.stouffer@usace.army.mil</a>

Mr. Ron Stouffer, Jr. U.S. Army Corps of Engineers Northern VA Field Office 18139 Triangle Shopping Plaza Suite 213 Dumfries, VA 22026

#### Re: Northern Virginia Stream Restoration Bank Monitoring Report for the 10<sup>th</sup>, 2-Year Storm Event WSSI #20000

Dear Mr. Stouffer:

Pursuant to Section VI.B.2.(j) of the Northern Virginia Stream Restoration Bank (NVSRB) Mitigation Banking Instrument (MBI), and the subsequent Nationwide Permits 27 and 42 verifications<sup>1</sup>, this letter serves as the monitoring report to document the performance of the completed stream restoration reaches following a major rain event. On May 15, 2014, 3.48-inches of rain fell in a 24-hr period (started May 15<sup>th</sup> at 5:00pm and ended May 16<sup>th</sup> at 8:00am), according to WSSI's rain gauge installed in Reston Virginia.

All restored streams were visually inspected between May 20-23<sup>rd</sup>, 2014 by WSSI staff (Bryce Aiken, Marshall Willis, and Jason Beeler). From these inspections, the streams once again handled the bankfull storm flows very well with only minor additional maintenance items noted that included a down tree in Snakeden Reach 6a (Photo 1), a down tree in Snakeden Reach

The Glade Nationwide Permit 27 – (Reaches 1, 1A, 2, 3, 4A, & 4B): COE #2009-0064, dated January 26, 2009, and DEQ Notification of No Permit Required #08-1919, dated January 26, 2009. (Reaches 5 & 6) COF # 2009, 2210, dated October 21, 2009, and DEQ Notification of No Permit.

(Reaches 5 & 6) – COE # 2009-2210, dated October 21, 2009, and DEQ Notification of No Permit Required provided via email, dated October 26, 2009.

Colvin Run – Forest Edge North, Nationwide Permit 27, COE #2010-2052, dated September 29, 2010, and Colvin Run – Forest Edge South, Nationwide Permit 27and 42, dated September 29, 2010. The DEQ has issued conditional Section 401 Water Quality Certification for NWP 27 and 42; therefore, no further authorization is required from the DEQ.

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<sup>&</sup>lt;sup>1</sup> Snakeden Branch Nationwide Permit 27 – COE #2007-2790, dated 10/3/07; COE #2007-3620, dated January 16, 2008; COE #2007-4320, dated 1/16/08; COE #2007-4321, dated 1/16/08; COE #2007-4711, dated 1/17/8; COE #2008-1473, dated 1/26/08; COE #2008-207, dated 1/17/08; COE #2008-2556, dated 1/24/08; and COE #2008-2557, dated 1/24/08.

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12 (Photo 2), a down tree in Glade Reach 3 (Photo 3), and a down tree in Glade Reach 4a (Photo 4). The down trees are scheduled for removal during the week of June 9<sup>th.</sup>

Other than the downed trees, the  $\pm 40,000$  linear feet of restored streams and hundreds of structures handled the storms extremely well. These restored streams 'continue to serve an important role, both hydraulically and ecologically, for Reston and The Difficult Run Watershed.

If you have any questions or require additional information regarding the planned course of action for the necessary repairs, please feel free to contact me (703-679-5627 or *jconnelly@wetlandstudies.com*). Thank you.

Sincerely,

WETLAND STUDIES AND SOLUTIONS, INC.

John P. Connelly, P.W.S, CPESC Manager- Restoration

cc: Bettina Sullivan, DEQ Mike Rolband, WSSI Frank Graziano, WSSI Beth Clements, WSSI Ben Rosner, WSSI Jennifer Feese, WSSI Jennifer Van Houten, WSSI Christie Blevins, WSSI



Photo 1: Looking upstream in Snakeden Reach 6a; down tree scheduled for removal.



Photo 2: Looking upstream in Snakeden Reach 12; down tree scheduled for removal.



Photo 3: Looking upstream in Blade Reach 3, Tributary#2. Tree scheduled for removal.



Photo 4: Looking downstream at fallen tree in Glade Reach 4a. Tree scheduled for removal.



Photo 5: Looking upstream at cross vane structure in Snakeden Reach 3. No damage observed; no remediation required.



Photo 6: Looking downstream in Snakeden Reach 9. Rack lines on shrubs indicating bankfull event. No damage observed; no remediation required.



Photo 7: Looking upstream in Glade Reach 6. No damage observed; no remediation required.



Photo 8: Looking upstream at crossvane structure in Colvin Run (Forest Edge South). No damage observed; no remediation required.