

Northern Virginia Stream Restoration Bank- Colvin Run- Forest Edge North and South

Fairfax County, Virginia
WSSI #20010, Task I2

Mitigation Monitoring Report First Growing Season (2011)

November 29, 2011

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Introduction

Colvin Run – Forest Edge North and South of the Northern Virginia Stream Restoration Bank are located between Baron Cameron Avenue (Route 606) and Lake Fairfax and are bisected by North Shore Drive, in Fairfax County, Virginia (Exhibit 1: 38°58'20"N, 77°19'48"W). Restoration of Forest Edge North and South of Colvin Run occurred in 2010 and early 2011, 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, 2006¹, and the subsequent Nationwide Permits 27 and 42 verifications². 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 Colvin Run – Forest Edge North and South during the first growing season, as set forth in the MBI and associated mitigation plans.

Colvin Run – Forest Edge North and South of the Northern Virginia Stream Restoration Bank, include a total of 1,944.2 and 2,926 linear feet of stream restoration, respectively, resulting in a total of 4,870.2 Stream Condition Units, per the As-Built Surveys, dated June 2011 (Forest Edge North) and April 2011 (Forest Edge South).

Monitoring Success Criteria

According to the MBI (§V.E.2) the monitoring success criteria shall follow the guidelines below:

- (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.*
 - (iii) *Woody plant coverage (from live-stakes, tublings, container grown material, and volunteers) along stream banks shall achieve a density of at least 5*

¹ The Concept Plan was approved by the U.S. Army Corps of Engineers (COE) and Virginia Department of Environmental Quality (DEQ) on June 22 and 30, 2009, respectively.

² Colvin Run – Forest Edge North, Nationwide Permit 27, COE #2010-2052, dated September 29, 2010, and Colvin Run – Forest Edge South, Nationwide Permit 27 and 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.

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.

(b) Stream and Riparian System

- (i) Dimension – 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) Pattern – 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) Profile – 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) Structures – 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%.*

Methods

Vegetation monitoring field work was conducted between August 11, 2011 and August 18, 2011 by Beth Clements, WPIT, CT³, Chelsea Trant, CT⁴, and Mark Navarro to collect vegetation data and take photographs at seven vegetation monitoring stations. Field surveys to document the required dimension, pattern, profile and structure criteria were completed in November 2011. The following general supporting documentation is included at the end of this report: Mitigation Monitoring Map (Exhibit 2); and representative monitoring photographs (Exhibit 3). Additional supporting data is available in separate Appendices⁵ including: monitoring photographs; percent cover data; woody stem density data; pebble count and bar

³ Wetland Professional In-Training, Society of Wetland Scientists Certification Program, Inc. and North American Benthological Society (NABS) Certified Family Level Taxonomist: All Phyla. ISA Certified Arborist MA-5101A.

⁴ North American Benthological Society (NABS) Certified Level 1 Taxonomist: All Phyla. ISA Certified Arborist MA-5177A.

⁵ This information is included in separate Appendices due to report size limitations as set forth in COE Regulatory Guidance Letter 06-03.

sample data, stream survey data for dimension, pattern, profile and structure criteria; and bank pin, scour chain, temporary wetland impact photographs and associated percent cover data and woody stem density data.

In addition to the success criteria listed above, the DEQ § 401 certification also requires the monitoring of the restoration of temporary wetland impacts for Colvin Run – Forest Edge South in years one and two (Appendix F). This is to be accomplished by ground photographs and vegetation data plots at the temporary impact locations⁶. Temporary wetland impact photographs are included within Exhibit 4 and Appendix G. Temporary wetland impact vegetation data plots, percent cover data, and woody stem data is included within Appendix H.

Monitoring Program Protocol and Results

In accordance with the guidelines of §VI.B of the MBI, the 2011 monitoring program and results are as follows:

1. With respect to the riparian buffer areas:

- a. Visual description – ground level photographs shall be taken at each monitoring station, an aerial photograph shall be taken the 3rd or 5th 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 seven permanent monitoring stations during the August 2011 monitoring field work. The representative photographs (Exhibit 3) demonstrate that both herbaceous and woody vegetation are becoming established throughout the Colvin Run – Forest Edge North and South reforestation areas. An aerial photograph of the site will be provided in year 3 or year 5. All photographs from the riparian monitoring plots are provided within Appendix A.

- 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.*

Seven vegetation monitoring plots were randomly located in the reforested area within Colvin Run – Forest Edge North and South.

The average density of living woody stems (as measured by the number of stems per acre) for Colvin Run – Forest Edge North and South is 20,660. Within the individual plots, the number of stems per acre ranged from 2,468 to 66,502 (due in part to a high rate of volunteers). These results meet and

⁶ Per correspondence from Mike Rolband to Bettina Sullivan dated August 26, 2009 and approved by Ms. Sullivan on August 28, 2009 (see Appendix F for details).

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 Appendix C.

The average percent cover by herbaceous vegetation within Colvin Run – Forest Edge North and South was 77. On individual plots, percent cover ranged from 50 to 100. All of the plots in Colvin Run – Forest Edge North and South exceed the success criteria [MBI §V.E.2(a)(ii)] of greater than 60 percent herbaceous cover by the end of the first growing season; however, the herbaceous cover criterion is not applicable if canopy coverage is greater than 30%. Note in Colvin Run – Forest Edge South, monitoring plot FES-2 had 50% herbaceous cover, however, the canopy coverage at this monitoring plot was visually estimated to be 70%. Since the canopy coverage exceeds 30%, the herbaceous plant coverage criterion of at least 60% by the end of the first growing season is not applicable. Dominant species and indicator status are provided within Appendix B.

2. With respect to the stream and riparian 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 in Colvin Run – Forest Edge North and South was 9 stems per 5 linear feet of stream bank. On individual plots, the number of stems per 5 linear feet of stream bank ranged from 4 to 15. These results exceed the success criteria [MBI §V.E.2(a)(iii)] of an average of 1 stem per 5 linear feet. Species are provided within Appendix C.

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

This data is provided within Appendix E.

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

This data is provided within Appendix E.

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

This data is provided within Appendix D.

- e. *Each stream stabilization structure shall be surveyed, photographed and a narrative statement provided as to whether or not specific Success Criteria have been violated.*

All the success criteria were met for the Dimension, Pattern, Profile, and Structures parameters [MBI §V.E.2(b)] for Forest Edge South. Cross sections 1-1 and 1-2 (within Forest Edge North) exceeded the 20% limit on change from the baseline survey due to the movement of sediment resulting from the September

2011 storm event⁷. However, the dispersal of accumulated sediment is anticipated to occur naturally and to distribute through the reach over time and adjust to the restored flow regime. See Appendix E, Sheet 9 (Forest Edge North) for details. Additionally, Forest Edge North met all success criteria for the Pattern, Profile, and Structure parameters [MBI §V.E.2(b)]. See Appendix E, Sheets 3-11 (Forest Edge North) and Sheets 3-14 (Forest Edge South) for numerical survey data and photographs supporting the achievement of the other success criteria.

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

Five cross sections have been provided within these Reaches. See Appendix E, Sheet 8 (Forest Edge North) and Sheets 9 and 10 (Forest Edge South), for cross section details.

Several of the pool cross-sections show that deposition of streambed material has occurred since the as-builts of the stream reaches were performed. Note that such deposition is expected to occur as the stream naturalizes and adjusts. The use of small particles in the bed mix allows for sorting to occur during significant flow events, and such particles are expected to deposit in pools. These particles will also move out of pools during significant flow events and be deposited on point bars and in other pools.

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

This data is provided within Appendix E.

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

WSSI personnel inspected the Colvin Run – Forest Edge North and South watershed after a “catastrophic” level storm event, that occurred from September 5 through 8, 2011. This inspection determined that some erosional damage occurred and should be repaired. A detailed report of the inspection, entitled “Northern Virginia Stream Restoration Bank – Monitoring Report for the 5th, 2 – Year Storm Event,” dated September 19, 2011, describing the location and extent of the damage is provided within Appendix I. The repair work was completed on November 4, 2011.

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

Two biological assessment reaches are located within Colvin Run – Forest Edge North and South as referenced in a separate report entitled “Colvin Run – Forest Edge North and South, Biological Monitoring Report Year-1 (Post Construction)” dated September 2, 2011. This report was sent to the agencies on September 20, 2011.

⁷ See detailed memorandum regarding this event in Appendix I.

- 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.*

One major storm event (meeting the criteria of §VI.B.2(j)) between September 5 through 8, 2011, occurred within the Reston area. The magnitude of this event reached a “catastrophic” level, between a 200 and 500 year storm event. On September 12, 2011 WSSI personnel inspected the Colvin Run – Forest Edge North and South 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 5th, 2 – Year Storm Event,” dated September 19, 2011, which was submitted to the COE. A copy of this report is included within Appendix I.

Additional Reporting Criteria

In accordance with the accepted conditions of DEQ’s §401 certification for the Nationwide Permit 27 and 42 issued for Colvin Run – Forest Edge South, the temporary wetland impact areas were monitored and photographically documented (Appendix G). Vegetation data plots were required for temporary wetland impacts 1 and 8 (Appendix H). Representative photographs provided within Exhibit 4 depict the condition of various temporary wetland impacts following the restoration activities.

Maintenance/Corrective Measures

Various maintenance and corrective actions are required in response to the September 2011 storm event. These activities include: minor re-grading, replanting, top dressing, redistribution of bed material, replacement of some coir matting, and minor bridge repair/stabilization. Information regarding these repairs is outlined in the previously mentioned report sent to the COE. Note that the repair work has been completed and the replanting is currently being conducted, which will reinforce and further stabilize the stream banks. Minor maintenance activities included spraying several invasive species: Asiatic tear-thumb (*Polygonum perfoliatum*), multiflora rose (*Rosa multiflora*), English ivy (*Hedera helix*), and autumn olive (*Eleagnus umbellata*) on June 22 and July 27 2011⁸. Additionally, fallen trees and dead vegetation were removed from within bankfull limits on February 9, 2011.

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 Interagency Review Team.

Summary

This investigation indicates the successful restoration of Colvin Run – Forest Edge North and South in the first growing season. However, due to the September 2011 storm event, minimal damage occurred within the Colvin Run – Forest Edge North and South reaches. The damage

⁸ *Note that the MBI does not require invasive species management and that these actions are being undertaken voluntarily.*

caused by this storm event has been addressed. Additionally, supplemental plantings are currently being planted to reinforce and further stabilize stream banks.

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.

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⁹ *Professional Wetland Scientist #000462, Society of Wetlands Scientists Certification Program, Inc. VA Certified Professional Wetland Delineator #3402-000031, U.S. Army Corps of Engineers Wetland Delineator Certification #WDCP94MD0310114B, LEED® Accredited Professional, 2009.*

**NORTHERN VIRGINIA STREAM RESTORATION BANK
COLVIN RUN – FOREST EDGE NORTH AND SOUTH**

MITIGATION MONITORING REPORT

FIRST GROWING SEASON (2011)

**WSSI #20010
TASK I2**

APPENDIX

- A. MONITORING PHOTOGRAPHS**
- B. PERCENT COVER DATA**
- C. WOODY STEM DENSITY DATA**
- D. PEBBLE COUNT AND BAR SAMPLE DATA**
- E. SURVEY MONITORING YEAR 1:
E1. Forest Edge North (11 Sheets)
E2. Forest Edge South (15 Sheets)**
- F. TEMPORARY WETLAND IMPACT MONITORING
CORRESPONDENCE**
 - 1. 8/28/09 e-mail from Ms. Bettina Sullivan approving monitoring protocol for temporary impacts.
 - 2. 8/26/09 letter from Mr. Mike Rolband requesting approval of monitoring protocol for temporary impacts.
- G. TEMPORARY WETLAND IMPACT PHOTOGRAPHS**
- H. TEMPORARY WETLAND IMPACT VEGETATION DATA**
- I. THE SEPTEMBER 19, 2011 STORM DAMAGE ASSESMENT
REPORT**