

TMDL Project Closeout Report

WILLIS RIVER WATERSHED

Virginia Nonpoint Source MANAGEMENT PROGRAM

Project Location and Background

The Willis River watershed is part of the James River Basin (HUC 02080205, both VAC-H35R and VAC H36R). The land area is approximately 177,936 acres. The watershed is comprised of forested (75%), water (1%), wetlands (2%), agricultural (21%), and urban (1%) land uses. Located approximately 60 miles west of Richmond in the Piedmont, the Willis River and its tributaries in Buckingham and Cumberland Counties, Virginia, were placed on Virginia's 1996 Section 303 (d) Total Maximum Daily Load (TMDL) Priority List and Report due to violations of the State's water quality standards for fecal coliform bacteria. The original impairment stretched from the confluence with the James River upstream to Reynolds Creek (14.53 miles). The segment was extended in the 2004 cycle to include the entire Willis River from the headwaters to the mouth (61.34 miles). The fecal coliform TMDL for the Willis River was completed in 2002. In 2005, a TMDL implementation plan (IP) was completed for the watershed. An implementation project began in August 2005 with a grant from the Virginia Department of Conservation and Recreation (VADCR) to the Peter Francisco Soil and Water Conservation District (PFSWCD, District) and it ended in December 2015.

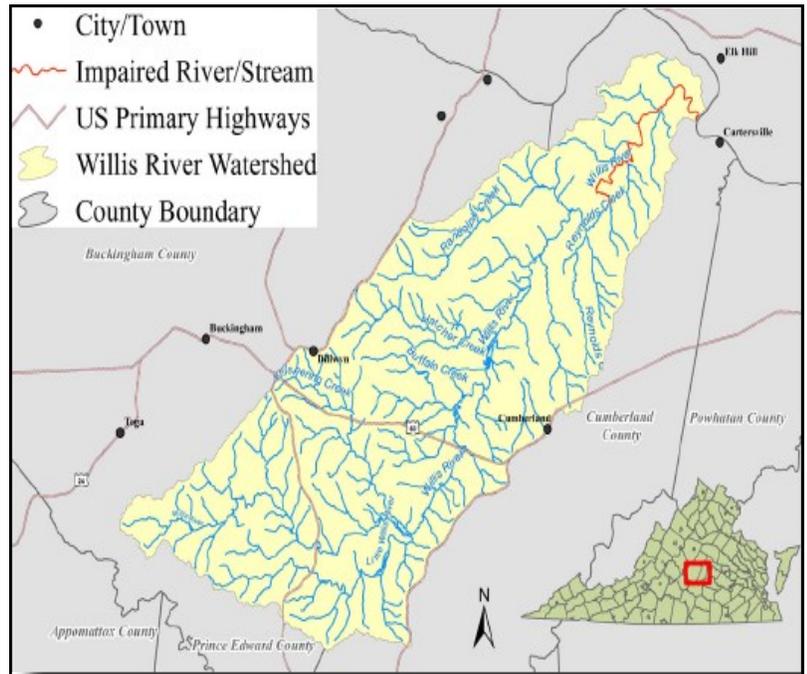


Table 1: Willis River BMP Summary: August 2005-December 2015

Control Measure	Units*	Goal	Installed	%
Agricultural				
Livestock Exclusion	F	476,190	235,963	50
Stream Exclusion Fencing	S	318	94	30
Riparian Buffer Established	A	N/A	38	N/A
Stream Crossing & Hardened Access	S	76	12	16
Loafing Lot Management	S	N/A	1	N/A
Animal Waste Storage Facility	S	N/A	4	N/A
Composting Facility	S	N/A	3	N/A
Permanent Vegetative Cover on Cropland	A	N/A	76	N/A
Residential Septic				
Septic Tank Pump-out	S	100	70	70
Septic System Repair	S	3	12	400
Septic System Installation	S	2	9	450

A = Acres, F = Linear Feet, P = Program, S = System

Implementation Highlights

This project was administered by PFSWCD in concert with partnerships between the District and Virginia Cooperative Extension, VA Farm Bureau, the VA Cattlemen's Association, the USDA—Natural Resources Conservation Service (NRCS), VADCR, and the Virginia Department of Environmental Quality (DEQ).

Through the joint efforts of the District and its partners, various agricultural and residential BMPs have been installed in Willis River watershed. The project was relatively successful in implementing different types of BMPs. The agricultural BMPs include: 94 livestock stream exclusion with grazing land protection systems resulting in approximately 47 miles of stream exclusion and stream protection, four animal waste control facilities, and one loafing lot management system. In addition, 104 acres were planted under afforestation of erodible crop and pastureland, 2,886 acres under small grain and mixed cover crop, 877 acres under harvestable cover crop, 76 acres of long term vegetative cover on cropland and six projects supporting extension of CREP watering systems were completed in the watershed.

The residential BMPs installed in the Willis River Watershed included: 70 septic tank pump-outs, 12 septic system repairs, eight septic system replacements, and one septic system installation/replacement with pump.

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Pollution Reductions

The pollution reductions as a result of the agricultural and residential BMPs installed in the Willis River Watershed during the project period are summarized in the table below.

Time Period	Pathogens-Coliform (CFU)	Nitrogen (lbs/year)	Phosphorus (lbs/year)	Sedimentation (tons/year)
August 2005—December 2015	1.00 E+16	38,445	51,914	283,095

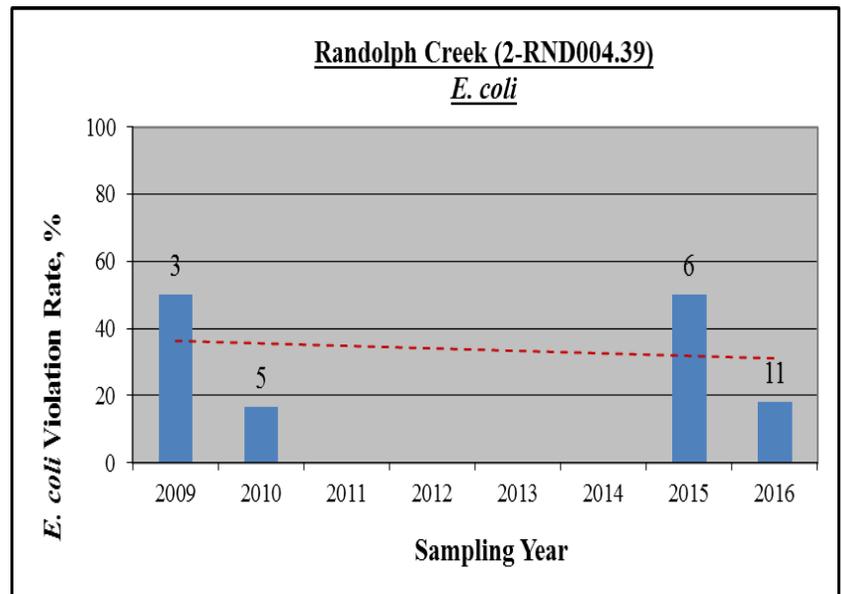
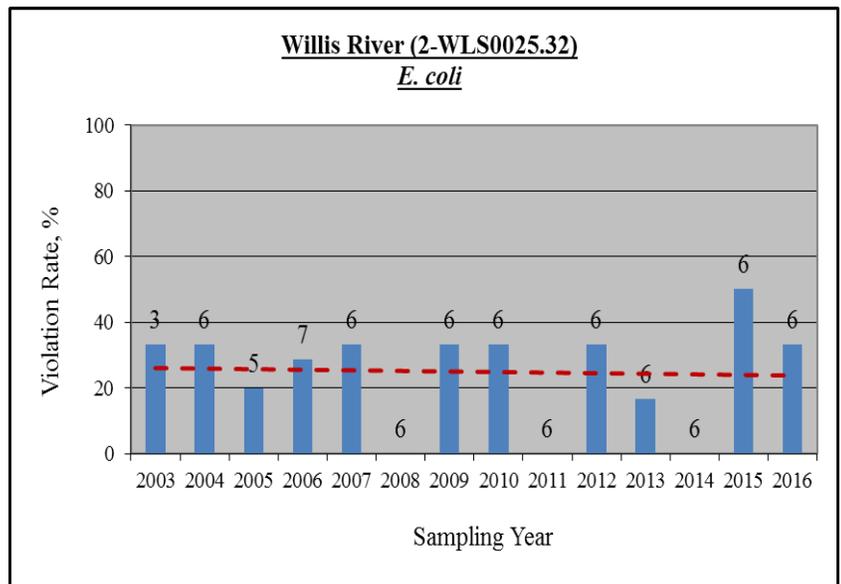
Table 2: Pollution Reductions for Willis River: August 2005—December 31, 2015

Water Quality Monitoring Results

The Virginia Department of Environmental Quality monitors the impaired streams through the agency's water quality monitoring program and monitors several stations throughout the Willis River watershed. The water quality data were analyzed to determine the trend, if any, in water quality improvements in the Willis River watershed.

The bar graphs to the right show the percent violation rate for samples collected annually that did not meet the single sample maximum criterion of water quality standard of 235 cfu/100 mL. The number of samples collected each year is shown above each bar. Plotting the violation rate at monitoring station (2-WLS025.32) during the period 2003-2016 indicated water quality as unchanged with almost flat trends in violations of the single sample maximum criterion. Plotting the violation rate at Randolph Creek monitoring stations (2-RND004.39) during the period 2009 - 2016 indicated a slight decreasing trend in violation rate of the single sample maximum criterion.

Graph 1 (top): Water Quality Data for Willis River 2003-2016 (2-WLS0025.32). Graph 2 (bottom): Water Quality Data for Randolph Creek 2009-2016 (2-RND004.39)



Success Stories and Documentation of Water Quality Improvements

Analysis of data from several sites has shown improvements in the water quality conditions of the Willis River during the 6 year assessment cycles. Subsequently three stream reaches (a total of 34.71 miles) were removed from Virginia's 303 (d)/305(b) listing of impaired waters for bacteria. DCR/DEQ wrote a success story regarding these delistings and they were published in a 319(h) Nonpoint Success Story in 2010. Access the story [here](#). These reaches include:

- VAC-H35R_WLS02A04, 9.92 miles (station 2-WLS004.27) was listed in the 2006 303(d)/305(b) report as attaining bacteria water quality standards.
- VAC-H36R_WLS02A06, 8.11 miles listed in the 2006 303(d)/305(b) report as attaining bacteria water quality standards.
- VAC-H36R_WLS01A00, 16.68 miles (station 2-WLS042.78) was listed in the 2008 303(d)/305(b) report as attaining bacteria water quality standard.

The installation of BMPs also positively impacted the biological benthic conditions in the Willis River. As a result, two segments initially listed for aquatic life impairment were removed from Virginia's 2014 303(d)/305(b) listing of impaired waters. DEQ intends to write a success story for this work and submit it to EPA for consideration. These segments include:

- VAC-H36R_WLS01B08, 4.83 miles (stations 2-WLS023.10 and 2-WLS024.61) was listed in the 2014 303(d)/305(b) report as attaining aquatic life water quality standards.

Partnerships

Residential and agricultural conservation successes have largely been the result of partnerships between the PFSWCD and several state agencies including the DCR, DEQ, Virginia Cooperative Extension, Farm Bureau, Cattlemen's Association, and USDA – NRCS and Virginia Department of Health. Many tours have been held to promote agricultural and residential septic BMPs offered under the implementation plan, along with presentations at civic clubs throughout the watersheds, postcard mailings advertising the program, personal contacts with farmers and residents, and meetings updating the community about the water quality improvements.



Project Funding

The total cost of all agricultural and residential BMPs was \$2,689,052. Out of this, \$1,802,385 was provided as cost-share to landowners from both state and federal funding (a little over \$1 million from Section 319h). State funding source included Virginia Agricultural Cost-Share, Virginia Natural Resources Conservation Fund, and Water Quality Improvement Fund. Federal 319 funds provided a total of \$1,324,686 towards the project, including \$317,686 in technical assistance funds for PFSWCD staff to administer the agricultural and residential programs in the Willis River watershed.

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Closeout Analysis

The Willis River project continued for 10 ½ years and before it was discontinued in December 2015, it achieved success in improving water quality conditions in the Willis River watershed. The project was relatively successful in implementing various agricultural and residential BMPs. The decision to cease targeted Section 319(h) funding for the Willis River project was difficult. However it was determined, after an assessment of water quality conditions, that based upon the likelihood of continued landowner participation, that the project would not be able to meet the necessary level of additional implementation in order to have further impact on water quality conditions.

Highlights of the Willis River Implementation Project assessment included:

- ⇒ Farmers and property owners implemented a variety of BMPs in watershed. Stream exclusion fencing (linear feet) and the number of systems installed met 50% and 30% of goal, respectively.
- ⇒ Under the residential septic program, the project met 70% of the septic system pump-out goal and exceeded the goal for septic system repairs, installations and replacements by an average of 420%.
- ⇒ The Project continued for twice the anticipated period of five years; however the sign-up by farmers and property owners started waning towards the project's end.
- ⇒ In the Willis River watershed, 11 TMDL participants won local Clean Water Farm Awards through DCR. Two of them also received the Grand Basin Award for the James River Watershed.
- ⇒ The higher payment rates by Conservation Reserve Enhancement Program and VA Agricultural Cost Share programs helped with sign ups and interest in the watershed.
- ⇒ An active partnership among state, federal, local agencies and stakeholders helped in completing various agricultural and residential projects.
- ⇒ EPA published a Success Story, authored by VADCR and VADEQ, based on the water quality improvement and resulting bacteria impairment delisting of three segments (a total of 34.71 miles).
- ⇒ In 2017, DEQ is writing another success story for submission to EPA that addresses a proposed aquatic life delisting of 2 segments (20.3 miles) in the Willis River Watershed.

For More Information Please Contact:

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