In 2009, the Pennsylvania Department of Environmental Protection (PADEP) awarded the Chester County Conservation District (CCCD), in partnership with the Brandywine Valley Association (BVA) Red Streams Blue Program, a Watershed Renaissance Initiative (WRI). The goal was to install best management practices (BMPs) for significant restoration and measurable results within an impaired watershed on seven private properties. Plum Run, a tributary in the Brandywine Creek Watershed/Christina River Basin, demonstrated impacts of stormwater runoff from urbanized and suburban land uses as well as sediment loading from stream bank erosion, i.e. legacy sediments. The restoration projects proposed were chosen as a result of a thorough study involving water quality assessment using the PADEP ICE protocol which combined biological, chemical and habitat assessments. The projects implemented were deemed high priority based on stream assessments for the development of a restoration plan for the entire Plum Run watershed (Plum Run Restoration Plan, Rettew, Clauser Environmental LLC for Brandywine Valley Association Red Streams Blue, 2008) The ultimate goals were to implement BMPs to reduce sediment, working towards the Christina River EPA TMDL for sediment reduction; to improve water quality; to reduce downstream flooding from West Chester, PA; to create a contiguous riparian buffer; to daylight a tributary; and to educate and engage landowners and citizens within the watershed through highly visible demonstration projects.

The funding requested through this Watershed Renaissance Initiative involved restoration on seven private landowner properties and one private golf course within the Plum Run watershed. The following BMPs and efforts resulted:

- 5400 linear feet restored, realigned, and/or stabilized
- 6 rock deflectors installed
- 27 cross vanes installed
- 27 J-hooks installed
- 6 mud sills installed
- 2 bioretention areas/floodplain benches constructed
- 1 rain garden constructed (120 sq.ft.) plus educational signage
- 200 ft of tributary day lighted.
- 4150 lf of riparian buffer established.
- 1550 trees, shrubs, stakes, herbaceous plants (funded by Tree Vitalize).
- 4150 lf of invasives plants removed.
- 1 educational video produced featuring the project –by Philadelphia Water Department’s Green City-Clean Waters.
- 3 public tours conducted – Brandywine Christina Task Force Annual Bus Tour of the Watershed 2012 and 2013, Longwood Gardens, one neighborhood kick-off meeting, approximately 20 one on one meetings with involved landowners, and multiple tours with interested groups, such as Stroud Water Research Center, West Chester University, municipal representatives, and interested landowners.
- 6000+ hours of volunteer time (labor and services) and in-kind services

The project was successful in that all BMPs were implemented. The weather events during construction, and immediately after, proved challenging. For instance, during the five year period, the watershed had the local effects of Tropical Storm Lee (2011), Super Storm Hurricane Sandy (2012), and the impacts of the 2013/2014 winter, the 15th harshest winter on record. Please note the USGS diagram for rainfall (PA USGS
01480870 East Brandywine Creek below Downingtown, PA) during the last year of construction, March 2013 – February, 2014, and the number of rain events with seven of those rain events reaching flood stage on the Brandywine.

The successes of this effort were due in large part to the Brandywine Valley Association Red Streams Blue team: Robert Struble, Kathy Bergman, and Jane Fava. Red Streams Blue is an original program of the Brandywine Valley Association created to turn impaired waters (mapped in red) to unimpaired (mapped in blue) in Chester County. These three dedicated individuals were the foot soldiers to sign up and secure landowners, unload trees from delivery trucks, plant trees to create new buffers, enlist volunteers for projects, and took baseline monitoring for water quality on each reach. The other key success was the professional engineering, design, and construction work, of Aaron Clauser, PhD, Clauser Environmental, LLC, Schuylkill Haven, PA and the management and equipment operators of Flyway Construction, Inc., Lititz, PA.

The WRI was divided into five phases with targeted stream segments identified per the watershed plan and finalized with willing landowners:

**Phases 1 & 2** – Stream Segment #17 with property owners Ann Strode and Carol Waite, the historic Strodes Mill property, and adjacent property owner Andrew Schaum;

**Phase 3** – Stream Segment 8-11 with property owner Radley Run Golf Course, and Stream Segment 14-15, consecutive property owners Mary Lou Hughes, and Richard Gallagher; and

**Phases 4 & 5** – Stream Segment 19-26 with consecutive property owners Eric Vogel, Thomas Ciccarone, and Gregory Thomas

The District thanks Bob Struble, Brandywine Valley Association/Red Streams Blue, who has worked diligently with the landowners to see to their concerns and to educate them on the proper maintenance and operation of their new structures and buffer.
In the Plum Run WRI, the common denominator for all projects was the continued instream erosion from stormwater runoff. The created floodplains have allowed the water to move out of the banks and slow down, providing for infiltration and reducing the amount of cutting to the stream channel. Riparian buffers are now created where once there were none. In three to five years, with good growth, the roots will stabilize the banks, the canopy will shade the stream and reduce water temperature, and the fallen leaves of native species will provide litter for macro-invertebrates. In Phase 1&2, the stream bank to the historic Strodes Mill was stabilized with rock rip-rap, to curtail bank erosion and the ultimate undermining of the building foundation and structure.

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