NONPOINT SOURCE SUCCESS STORY

Maryland

Baltimore County Stream Restoration Project Helps Restore Scotts Level Branch to its Natural State

Waterbody Improved

Scotts Level Branch is a small creek in Baltimore County, Maryland. The Scotts Level Branch drainage area has been affected by urbanization as land use shifted to high-density residential and commercial land. Restoration projects have included stream restoration efforts aimed at reducing sediment and nutrient runoff into the stream. The Scotts Level Branch stream restoration project uses natural design principles with floodplain and wetland enhancements. Monitoring has documented wetland soil and vegetation development, stream morphology changes, and sediment movement.

Problem

Scotts Level Branch runs along McDonogh Road just west of the city of Baltimore. It flows into the Gwynns Falls watershed, which eventually drains into the Chesapeake Bay (Figure 1). Prior to restoration, the Scotts Level Branch channel was deeply incised and had lost connection to its floodplain. Its primary sediment source was soil eroded from the stream banks. The riparian zone was sparsely wooded, and the majority of the floodplain vegetation was composed of invasive reed-canary grass. Restoration planning for Scotts Level Branch is included in the 2014 Middle Gwynns Falls Small Watershed Action Plan (Action Plan) and Watershed Characterization Report. The purposes of the Action Plan include examining human impacts on the watershed (e.g., urbanization and land use development), identifying restoration strategies, and considering environmental justice concerns while working to improve water quality.

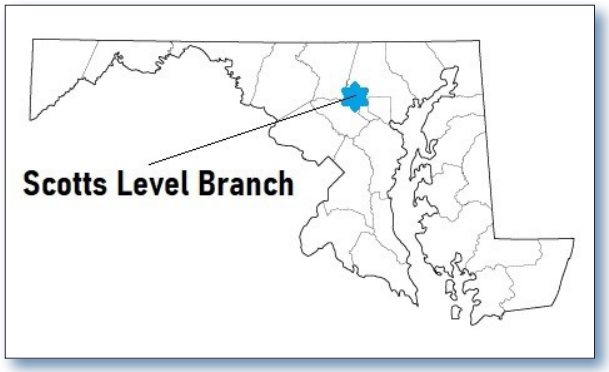

Figure 1. Scotts Level Branch is an urban stream near Baltimore, Maryland.

Story Highlights

EA Science, Engineering, and Technology, Inc. (EA) staff conducted an initial, independent watershed assessment (report dated 2010) during which they assessed the condition and restoration potential of the entire Scotts Level Branch watershed. The outcome of the report was a reach-level restoration prioritization guide for selecting and designing further projects. The McDonogh Road project was one of the prioritized projects. Engineers and ecologists from EA collected physical and ecological data from the McDonogh Road reach, and then they designed and oversaw construction of the restoration.

The area treated by best management practice (BMP) implementation included 1,973 linear feet of stream restoration, 1.51 acres of floodplain plantings, and 3.2 acres of wetland establishment and restoration (Figures 2 and 3). The Scotts Level Branch floodplain was excavated to re-establish floodplain connection and reduce erosive flows. Bank heights were reduced to approximately bank-full elevation to promote frequent inundation of the floodplain. An aggressive canopy, shrub, and herbaceous layer planting was installed after construction. Specific BMPs installed include imbricated stone walls (i.e., layers of stacked angular rock built into stream banks); log and stone cross vanes; J-hooks and J-hooks with logs; cascades; constructed runs; riffle grade controls; and landscaping with grasses, forbes, and trees.

Figure 2. Typical floodplain conditions before (top, 2011) and after (bottom, 2020) restoration.

Figure 3. Example of streambank conditions before (top, 2011) and after (bottom, 2020) restoration.

Results

Monitoring has shown that the project restored wetland soils and hydrology. Nutrient and sediment cycling and use of the site by herpetofauna were examined for signs of habitat restoration. The research showed that nutrient and sediment cycling were beginning to re-establish to their natural state 2 years after construction. Plants and soils were showing trends toward nutrient and sediment use that was similar to unrestored, reference wetlands within the Scotts Level Branch watershed. Eight amphibian and four reptile species were observed during the herpetological surveys at the site. Most of these species were observed in multiple years. Volunteer birders documented over 100 species of birds using the newly created forest and wetland habitat.

Partners and Funding

EA is the project engineer and has been a key partner in watershed assessment, project design, and in further physical and ecological monitoring and research in the Scotts Level Branch watershed. The project contractor, Environmental Quality Resources (EQR), won a competitive bid to build the McDonogh Road restoration. EQR, a long-time provider of ecological construction services in the Mid-Atlantic region, has collaborated on several projects. The projects have encompassed a variety of different approaches, including floodplain reconnection (as at McDonogh Road) and natural channel design.

U.S. Environmental Protection Agency
Office of Water
Washington, DC

EPA 841-F-22-001P
August 2022

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