



Section 319

NONPOINT SOURCE PROGRAM SUCCESS STORY

District of Columbia Restoration Efforts Stabilize Watts Branch and Reduce Sediment Loading

Waterbody Improved

Urbanization and stream alterations, including channelization and floodplain loss, contributed to increased volumes of stormwater runoff in Watts Branch in the District of Columbia. The runoff severely eroded stream banks and mobilized high levels of total suspended sediment (TSS), which prevented the stream from supporting all of its designated uses. As a result, in 1996 the District Department of the Environment (DDOE) added two segments of Watts Branch (totaling four miles) to the District's Clean Water Act (CWA) section 303(d) list of impaired waters for TSS. Since then, project partners have implemented stream restoration and upland projects that have reduced TSS loading into Watts Branch. Until additional improvements are documented, however, the segments will remain on the impaired waters list.

Problem

Watts Branch begins in Prince George's County, Maryland, and flows three miles northwest from the eastern corner of the District to meet the Anacostia River in Kenilworth Park, a National Park Service landholding. The 3.53-square-mile Watts Branch watershed includes 0.50 square mile of forest and 3.03 square miles of urban residential and commercial land (Figure 1). Approximately 32 percent of the watershed is covered by impervious surface. In this heavily urbanized watershed, frequent and flashy storms caused severe bank erosion and subsequent mobilization of TSS in Watts Branch. Because the stream was incised and disconnected from its natural floodplain, high-velocity flows during rain events caused high stress on the vertical banks and high rates of erosion.

Both the upper and lower reaches of Watts Branch exhibit moderate to high bank erosion. A lack of floodplain over time led to lateral erosion of the channelized stream, causing a higher width/depth ratio and elevated TSS levels. Monitoring conducted in 1997 indicated that the high TSS levels caused poor habitat conditions in the creek. As a result, DDOE added four miles of Watts Branch to its CWA section 303(d) list in 1996 for failing to support two designated uses: (1) the protection and propagation of fish, shellfish and wildlife and (2) the protection of human health related to consumption of fish and shellfish. Impairment was attributed to a number of pollutants, including TSS. DDOE developed a total maximum daily load (TMDL) for TSS in 2003. The TMDL required that the 68-ton annual sediment load be reduced by 90 percent (by 61.2 tons per year).

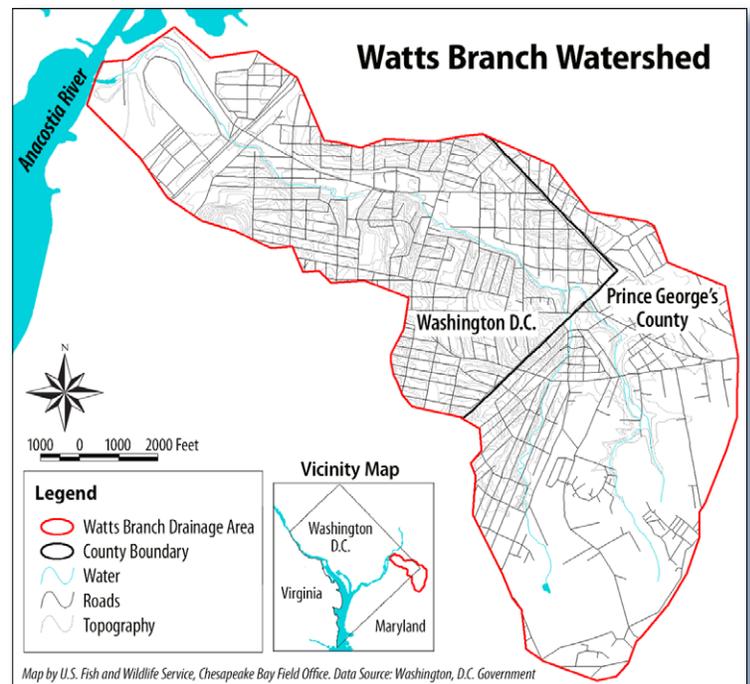


Figure 1. Watts Branch drains a highly impervious watershed that includes portions of Prince George's County in Maryland and eastern Washington, D.C.

Project Highlights

Over the past several years, project partners, including local, state and federal agencies, have collaborated to increase stream channel stability and reduce erosion caused by sediment loading. In 2010 DDOE partnered with the U.S. Fish and Wildlife Service (USFWS) and the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) to



Figure 2. Project partners removed three feet of accumulated sediment and reconnected Watts Branch with its historical stream channel. Before the restoration effort, Watts Branch followed the path denoted by the yellow arrow.



Figure 3. After restoration, vegetation is returning to the Watts Branch riparian restoration project site shown in Figure 2.

restore a 1.7-mile segment of Watts Branch. These partners:

- Planted more than 10,000 trees, shrubs, grasses and herbaceous plants along the stream corridor
- Created floodplain benches to reduce the energy of storm flows that reach bankfull stage by allowing the flows to spread over a larger area
- Re-graded stream banks and installed more than 50 in-stream structures to control stream flows and stabilize the stream channel, including cross vanes, j-hooks and vane arms to relieve stress on the stream banks and to dissipate increased stream energy from high stormwater flows entering the stream (Figures 2 and 3)

- Created pools for fish habitat and improved fish passage
- Installed multiple low-impact development (LID) practices in upland areas to treat more than four acres of impervious surface runoff.

DDOE has leveraged funding from other agencies to support additional projects in the Watts Branch watershed, including:

- A Bandalong® litter trap to prevent floatable trash from washing into the Anacostia River
- A green roof and large cisterns to capture excess stormwater runoff, to be used to flush toilets at a local high school
- A series of bioretention cells adjacent to Watts Branch to capture and filter runoff from more than 1.3 acres of impervious cover
- An upland tree planting project that added 600 canopy trees
- A green street project that integrated LID into a major streetscaping project.

Project partners coordinated stream restoration work with concurrent efforts to rehabilitate sanitary sewers, construct stormwater management facilities and reduce the amount of stormwater runoff from impervious areas. DC Water (the District's water and sewer authority) repaired or replaced five sewer line stream crossings, which helped to reduce bacteria levels in Watts Branch.

Results

The Watts Branch restoration project has improved lateral and vertical stream stabilization and reduced bank erosion. New floodplain benches have helped to reduce stress on stream banks by allowing high stormwater flows to dissipate into surrounding areas. Green infrastructure and LID projects have reduced stormwater runoff, contributing to increased channel stability. In total, these projects have reduced TSS by approximately 46,862 pounds per year (about one-third of the TSS reduction called for in the 2003 TMDL); other reductions include 402 pounds per year of nitrogen and 68 pounds per year of phosphorus. Although Watts Branch remains listed as impaired for TSS, bacteria, organics and metals, these efforts have made progress toward attaining water quality standards.

DDOE will monitor water quality in Watts Branch (including assessment of pre- and post-implementation stormwater samples and macroinvertebrate bioassessments) over the next several years to track ongoing water quality improvements.

Partners and Funding

The Watts Branch restoration effort is the result of a cooperative partnership between DDOE, USFWS, NRCS, DC Water, and the District's Deputy Mayor for Planning and Economic Development. USFWS and Michael Baker, Inc., completed the project designs. The project implementation costs associated with Watts Branch watershed restoration have been covered in part by approximately \$3.7 million in funds from multiple agencies and organizations—U.S. Environmental Protection Agency CWA section 319 project implementation funds (\$910,753), Washington, DC Capital funds (\$1,855,300), National Fish and Wildlife Foundation funds (\$454,000), Chesapeake Bay Implementation funds (\$140,341), and municipal separate storm sewer system permit revenue funds (\$339,605). CWA section 319 funds have also supported wages for staff working on Watts Branch restoration efforts.



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

EPA 841-F-13-001H
February 2013

For additional information contact:

Peter Hill, Branch Chief, Planning and Restoration Branch
District Department of the Environment
Peter.hill@dc.gov • 202-535-2241

Josh Burch, Environmental Protection Specialist
District Department of the Environment
Josh.burch@dc.gov • 202-535-2247