



## Section 319

# NONPOINT SOURCE PROGRAM SUCCESS STORY

# Maryland

## Stream Restoration Reduces Peak Storm Flow and Improves Aquatic Life in Sligo Creek

### Waterbody Improved

Stormwater runoff and extensive habitat destruction contributed to eliminating all but four of the most pollution-tolerant fish species

in Maryland's Sligo Creek, a tributary to the Anacostia River. The Maryland Department of the Environment (MDE) added the Anacostia River (including the Sligo Creek subwatershed) to the state's Clean Water Act (CWA) section 303(d) list of impaired waters in 2002 for biological impairment, as measured by combined fish/benthic bioassessment. As a result of restoration efforts in the Sligo Creek subwatershed, in-stream conditions improved, as measured by a shift in the fish Index of Biotic Integrity (IBI) from a "poor" to a "fair" rating. Water quality improvements have contributed to progress in meeting the Anacostia River's total maximum daily load (TMDL) limits for phosphorus, nitrogen and sediment.

### Problem

The Sligo Creek subwatershed is home to 82,000 people. It encompasses 11.1 square miles of highly developed land in Montgomery County, Maryland, a northern suburb of Washington, DC (Figure 1). Sligo Creek is one of 14 tributaries to the Anacostia River, which flows into the Potomac River, which in turn empties into the Chesapeake Bay.

Maryland has a narrative water quality standard for freshwater benthic community health that guides how the state assesses the designated use for aquatic life. MDE evaluates fish and benthic IBI data reported in the Maryland Biological Stream Survey to assess CWA section 303(d) listings of impaired waters. In 2000 only four fish species (all extremely pollution-tolerant) were found in Sligo Creek. Consequently, Sligo Creek received a rating of "poor" on EPA's IBI for fish. MDE therefore added the Anacostia River watershed assessment unit (which includes Sligo Creek) to the state's 2002 CWA section 303(d) list for biological impairment. The source of impairment was unknown.

In addition, MDE has listed the Anacostia watershed for the following impairments (with listing years): nutrients (1996), sediments (1996), fecal coliform bacteria–non-tidal waters (2002), toxics–polychlorinated biphenyls (PCBs) (2002), toxics–heptachlor epoxide (2002), fecal coliform bacteria–tidal waters (2004), and debris/floatables/trash (2006). TMDLs have been approved for biological oxygen demand/dissolved oxygen, phosphorus, nitrogen, sediments, fecal coliform, PCBs and trash.



Figure 1. Maryland's Sligo Creek subwatershed drains a densely populated area near Washington, DC.

## Project Highlights

Efforts to address water quality and habitat problems in Sligo Creek began more than 20 years ago. Since the enactment of the Anacostia Watershed Restoration Agreement in 1987, an evolving inter-jurisdictional blueprint has guided restoration efforts across the Anacostia watershed, including Sligo Creek. In 1989 Montgomery County embarked on an ambitious effort to restore water quality and habitat conditions in the creek.

In Phase I (1989), the county transformed a dry stormwater pond that collects runoff from 805 acres into a three-celled, extended-detention wet pond with wetland plantings. The detention wet pond improved appearance, provided fish and wildlife habitat, and captured sediment and trash. Below the pond, the county restored 1,000 linear feet of downstream aquatic habitat by creating two vernal pools for amphibian breeding habitat and repairing 1,200 feet of riparian stream corridor.

In Phase II (1992–1994), another stormwater pond serving 434 acres was rebuilt as a two-celled, extended-detention wet pond/marsh. Other projects included restoring 2.5 miles of aquatic habitat, creating a quarter-acre marsh, replanting five acres of forest, implementing 19 small physical aquatic habitat improvement projects and reintroducing native fish species.

In Phase III (1996), the county constructed a one-acre detention wet pond at a Sligo Creek golf course to capture stormwater runoff from 70 acres, including a one-mile portion of Interstate 495.

In Phase IV (1999), the county created two stormwater wetlands and conducted restoration work in middle Sligo Creek to help return stream segments to more natural conditions that support aquatic life habitat needs (e.g., replacing straight-line concrete channels and pipes with meandering channels with varied stable bottom).



Figure 2. LID project installed during Phase V of the Sligo Creek restoration effort.

In Phase V (2005–2007), the county installed low impact development (LID) stormwater management bioretention systems (Figure 2). The county also established a new goal to improve the fish IBI from “poor” to “fair” through targeted reintroduction of native fish.

Phase VI (2010–present) involves implementing numerous small restoration projects in a 45-acre subwatershed, including integrating upland watershed source control measures, such as LID, with stream/wetland restoration and vegetated control practices (e.g., replacing mowed grass areas with vegetation that has greater potential for stormwater retention, infiltration and evapotranspiration).

## Results

Phases I–V implemented stormwater management practices on 1,425 acres (48 percent) of the upper Sligo Creek subwatershed, resulting in a 41 percent reduction in peak flow discharge. This has led to improvements in water quality, streambed and bank stability, and in-stream habitat. MDE indicates that benthic macroinvertebrate populations have become more abundant and diverse, helping to support increased fish populations. Between 2000 and 2009, IBI scores for fish throughout most of upper Sligo Creek improved from “poor” to “fair” (Figure 3). Monitoring data confirmed the presence of 14 naturally sustaining fish species, including habitat specialists (species that prefer specific types of habitat).

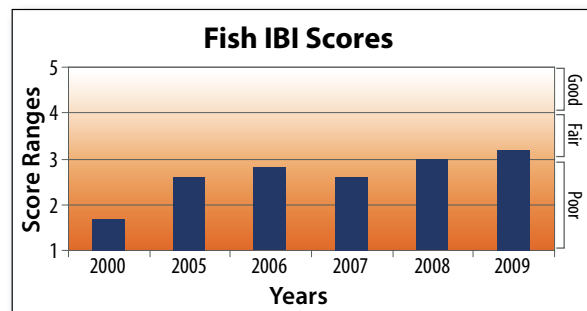


Figure 3. Fish Index of Biotic Integrity scores for Sligo Creek (2000–2009).

## Partners and Funding

The Sligo Creek restoration effort is the result of a cooperative partnership with Montgomery County, MDE, Maryland National Park and Planning Commission, Washington Metropolitan Council of Governments, Interstate Commission on the Potomac River Basin, U.S. Army Corps of Engineers and U.S. Environmental Protection Agency.

Approximately \$3 million (excluding monitoring costs) has been invested in the upper Sligo Creek restoration effort, including \$1.8 million from the Montgomery County capital budget, \$1 million from the MDE’s Small Creeks and Estuaries Reserve cost share program, and \$256,000 from the U.S. Army Corps of Engineers.



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