



NONPOINT SOURCE SUCCESS STORY

Indiana

Recreational and Aquatic Life Use Impairments Removed in the Pendleton Branch of Indian Creek

Waterbody Improved

Indian Creek is a 22-mile-long Ohio River tributary in western Switzerland County, Indiana. The Indiana Department of Environmental Management (IDEM) listed the Pendleton Branch of Indian Creek on its 2008 Clean Water Act (CWA) section 303(d) list of impaired waters due to high levels of *Escherichia coli*. To address this concern and others, partners developed and implemented the Indian Creek Watershed Management Plan (WMP) under the guidance of the nonprofit Historic Hoosier Hills Resource Conservation and Development Council (HHH RC&D). This plan led to the implementation of multiple best management practices (BMPs) in the watershed, ultimately leading to the creek being delisted for *E. coli* in 2014. Bioassessment data collected in 2010 prompted the addition of an aquatic life use impairment in 2014; however, BMP implementation led to improved conditions and this impairment is proposed for removal in 2018.

Problem

The Indian Creek watershed is made up of two 12-digit hydrologic unit code (HUC) watersheds; Pendleton Branch is located midway between upper Indian Creek and the mouth of the creek in HUC 050902030902. The river and its tributaries flow southward through hilly terrain before coalescing with the Ohio River just west of Vevay, Indiana. The watershed is highly forested, with 61.5 percent in forested land use, 22 percent in pasture/hay land use and 7.6 percent in cultivated crops. Livestock in the watershed include goats, chicken, cattle, horses and donkeys.

The WMP notes that several homes within the watershed are serviced by outhouses instead of septic system or sewer. A 6.17-mile reach of Indian Creek known as the Pendleton Branch (assessment unit identification [AUID] INV03M5_01) was added to Indiana's 2008 CWA section 303(d) list of impaired waters for having levels of *E. coli* (217 most probable number per 100 milliliters of water [MPN/100 mL]) well above Indiana's water quality standard for recreational use (geometric mean \leq 125 MPN/100 mL to be considered supporting). Later sampling indicated that aquatic life use was also impaired, as evidenced by a low macroinvertebrate index of biotic integrity (mIBI) score (mIBI scores \geq 36 are considered supportive of biological integrity). In 2010 the mIBI score on the reach was 30, prompting IDEM to add the reach to its

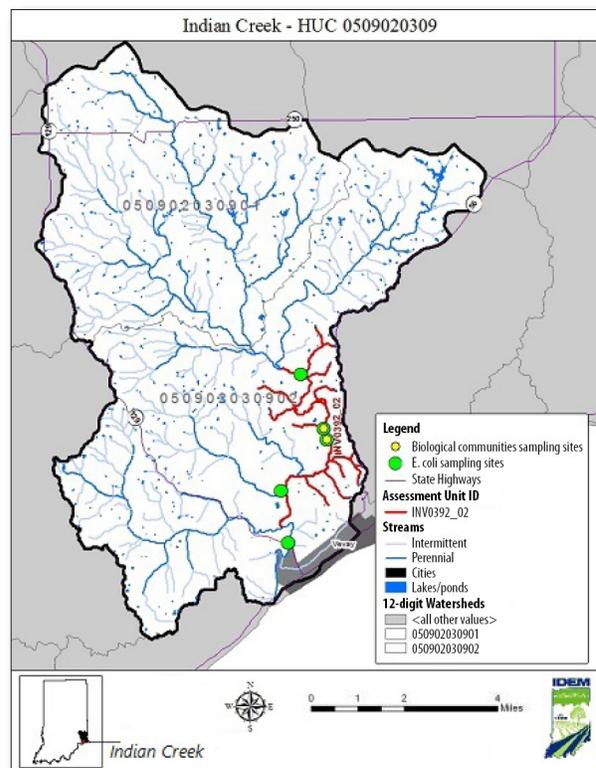


Figure 1. Pendleton Branch is in southeastern Indiana's Indian Creek watershed.

2014 CWA section 303(d) list of impaired waters for impaired biotic communities (note: in 2014 the waterbody was resegmented as AUID INV0392_02).



Figure 2. A fence was installed to exclude livestock from the creek.

Project Highlights

The Indian Creek WMP was completed in May 2008. The Switzerland County Soil and Water Conservation District (SWCD), HHH RC&D, U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), and the USDA Farm Service Agency (FSA) helped implement numerous BMPs and other management activities between 2005 and 2015 (Figure 2). In addition to the BMPs outlined in Table 1, HHH RC&D helped landowners install a pumping plant for water control, a water well, and a water tank; the USDA NRCS helped implement five access control practices, two stream crossings, a developed spring, forage/biomass planting (434 acres [ac]), upland wildlife habitat management (51 ac), early successional habitat development/management (37 ac), wetland enhancement (0.5 ac), and forest stand improvement (32 ac); and the USDA FSA supported planting of permanent native grasses (19.8 ac), grassed waterways (1.5 ac), and hardwood trees (24.3 ac).

Results

IDEM resampled the reach for *E. coli* in 2011 and found geometric means of 15 MPN/100 mL and 47 MPN/100 mL, well below the water quality standard of geometric mean \leq 125 MPN/100 mL to be considered supporting. As a result, IDEM removed Pendleton Branch of Indian Creek from the impaired waters list in 2014 for *E. coli*.

In 2015, after significant restoration work had taken place, IDEM sampled the aquatic community and found that macroinvertebrates had recovered,

Table 1. BMPs implemented in the Indian Creek watershed (2005–2015)

Practice Type	Amount Implemented		
	SWCD	HHH RC&D	USDA NRCS
Cover crops	74 ac	611.4 ac	679 ac
Conservation cover	—	—	2.5 ac
Exclusion fencing	58 ft	—	—
Fencing	—	66,866 ft	70,033 ft
Prescribed grazing	—	93 ac	442 ac
Heavy use area protection	2,143 ft ²	4.55 ac	8.4 ac
Pipeline	130 ft	660 ft	12,088 ft
Pest management	80 ac	8.6 ac	175 ac
Critical area planting	—	2.7 ac	3.3 ac
Pasture and hay planting	—	711.2 ac	—
Roof runoff structure	1	—	9
Underground outlet	1	—	1
Watering facilities	3	14	6
Pond	—	2	5

Notes: ac = acres; ft = feet; ft² = square feet

achieving mIBI scores of 40 and 44 along the reach. The fish community retained its supporting score (IBI = 48 and 42). Because both the mIBI and the IBI scores show full support of aquatic life, this segment's aquatic life use impairment is proposed for removal from the 2018 impaired waters list.

Partners and Funding

A variety of federal, state and local partners contributed to restoration in the watershed. HHH coordinated the WMP planning and implementation events. IDEM awarded \$916,167 in CWA section 319 funding to the effort. Switzerland County SWCD sponsored the 319 grant for the WMP, obtained a Clean Water Indiana grant (\$122,983) from the Indiana State Department of Agriculture to conduct outreach and install BMPs, obtained and administered local funds from Switzerland County (\$26,678) to provide cost-share for BMPs, and was the technical service provider during implementation. NRCS provided BMP promotion, design and installation at a cost of \$1,024,471 through both its Environmental Quality Incentives Program and its Wildlife Habitat Incentives Program. FSA contributed \$6,824 toward BMP design and installation through its Conservation Reserve Program.



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

EPA 841-F-18-001A
January 2018

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