



NONPOINT SOURCE SUCCESS STORY

Indiana

Implementing Agricultural Best Management Practices Revitalizes the Fish Community in Boyles Ditch

Waterbody Improved

Boyles Ditch is a roughly 6-mile-long tributary of Kilmore Creek within the larger South Fork Wildcat Creek (SFWC) watershed.

The Indiana Department of Environmental Management (IDEM) listed Boyles Ditch on its 2006 Clean Water Act (CWA) section 303(d) list of impaired waters due to high levels of *Escherichia coli* and impaired biotic communities (IBC). Agricultural activities related to crop cultivation and livestock-rearing contributed nonpoint source pollution to a stream already lacking in quality aquatic habitat. Over the years, project partners developed two watershed management plans (WMPs) and implemented agricultural and conservation best management practices (BMPs) to improve the water quality of the SFWC watershed. The Boyles Ditch tributary now supports its aquatic life use; therefore, IDEM will propose to remove the IBC impairment from this segment in 2020.

Problem

Boyles Ditch is a small stream in the northern portion of the Kilmore Creek subwatershed, which is in the SFWC watershed in Clinton County (Figure 1). Boyles Ditch is surrounded almost entirely by cultivated crops. While the main stem of Kilmore Creek contains a substantial amount of forested stream buffer, the Boyles Ditch segment remains largely unbuffered. According to the 2012 SFWC WMP, roughly 14 of the 21.5 miles of waterways in the Kilmore Creek subwatershed are listed as impaired, including all of Boyles Ditch and downstream portions of Kilmore Creek. A volunteer windshield inventory conducted during WMP development noted sites with active erosion, livestock with access to waterways, and areas of trash dumping.

In 2004 IDEM conducted a biological study on the SFWC watershed. The three sampling sites on Boyles Ditch had failing index of biotic integrity (IBI) scores (i.e., scores less than 36 in Indiana), which indicates that the stream is not supporting a well-balanced aquatic community. The fish community data collected at these three sites showed IBI scores on Boyles Ditch ranging from 12 to 34. This caused IDEM to list the stream on its 2006 CWA section 303(d) list of impaired waters for IBC. To address this and other existing impairments, IDEM developed a total maximum daily load (TMDL) for *E. coli*, total suspended solids, total phosphorus and nitrate-nitrite in 2008 for the SFWC watershed.

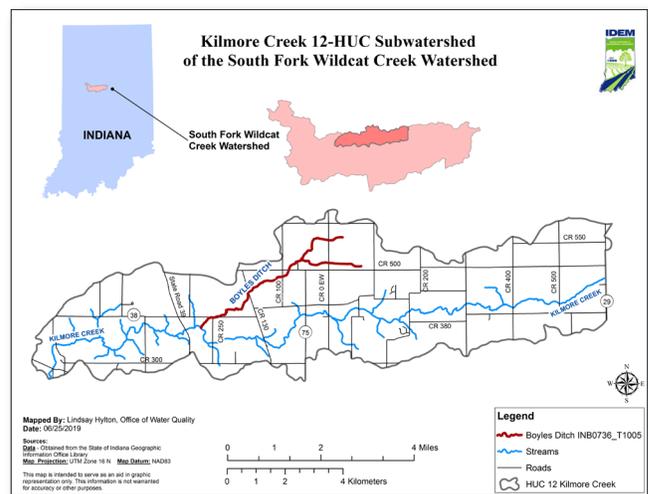


Figure 1. Boyles Ditch is in the Kilmore Creek subwatershed.

Story Highlights

For over two decades stakeholders have been working to improve the SFWC watershed. With funding provided by the Indiana Association of Soil and Water Conservation Districts (IASWCD), the Wildcat Creek Watershed Network (now known as the Wildcat Creek Watershed Alliance) hired an executive director to develop a long-term strategic plan for the Wildcat Creek watershed to serve as the foundation for future planning and implementation efforts.

In 2005 the Clinton County Soil and Water Conservation District (SWCD) received a CWA section 319 grant to create the SFWC–Blinn Ditch and Kilmore Creek–Boyles Ditch WMP, which was approved in 2008. In 2005–2012 watershed partners conducted education and outreach through stakeholder meetings, public workshops, field days, newsletters, and community cleanups. Workshop topics included the use of cover crops, proper septic system management, and soil health maintenance.

In 2009 the SWCD received a CWA section 205(j) grant to prepare a new nine-element watershed plan for SFWC, with implementation starting in 2012. Landowners added roof/covers (2), installed heavy use area protection (0.5 acres [ac]), and constructed facilities for animal mortality (3) composting (1), watering (8), and waste storage (1). They added a pumping plant, pipeline (3,560 feet [ft]), access roads (1,710 ft) and fencing (6,500 ft). They also applied a range of other BMPs (Table 1).

Table 1. BMPs implemented in the SFWC watershed.

Practice type	Amount Implemented			
	USDA NRCS	CWA 319/ Clinton Co. SWCD	CRP	Total
Cover/green manure crop	10 ac			10 ac
Critical area planting	1 ac			1 ac
Grass filter strip			4.4 ac	4.4 ac
Grass waterway			5.2 ac	5.2 ac
Manure transfer	1 ac	800 ac		801 ac
Nutrient management	1,101.7 ac	2,594 ac		3,695.7 ac
Pasture and hay planting	34 ac			34 ac
Pest management	1,331.7 ac	2,970 ac		4,301.7 ac
Prescribed grazing	52 ac			52 ac
Residue and tillage management	1,280 ac	3,244 ac		4,524 ac
Riparian buffers	5 ac		5.2 ac	10.2 ac
Soil management	51.7 ac			51.7 ac
Tree and shrub establishment	12 ac			12 ac
Two-stage ditch		2,253 ft		2,253 ft
Underground outlet	651 ft			651 ft
Use exclusion	9 ac			9 ac
Waste utilization	1,746 ac	145.4 ac		1,891.4 ac
Water well/well decommissioning	1	1		2
Wetland restoration			5 ac	5 ac

Notes: ft = feet; ac = acres

Results

IDEM conducted follow-up monitoring on Boyles Ditch in 2017, which showed that the fish IBI score improved to 54, a significant increase from the score of 34 seen in 2004 and well above the minimum IBI score of 36 needed to indicate support. Additionally, the Qualitative Habitat Evaluation Index (QHEI) score was 69 in 2017, up from 47 in 2004 (QHEI scores below 51 indicates poor habitat). On the basis of these data, IDEM is proposing to remove the IBC impairment from this segment on its impaired waters list in 2020.

Partners and Funding

Various partners implemented projects in the SFWC watershed. In the late 1990s, IASWCD undertook efforts to provide strategic planning and technical assistance to the larger Wildcat Creek watershed using \$189,500 in CWA section 319 funding. In 2005, the SWCD received \$96,100 in CWA section 319 funds to write the SFWC–Blinn Ditch and Kilmore Creek–Boyles Ditch WMP; in 2006, the Wildcat Creek Watershed Alliance assumed implementation of the Wildcat Creek WMP using \$150,000 in CWA section 319 funding. The U.S. Department of Agriculture’s (USDA’s) Natural Resources Conservation Service provided additional funding and technical assistance through programs in the Kilmore Creek subwatershed in 2004–2017, totaling \$7,017,438. The USDA Farm Services Agency’s Conservation Reserve Program (CRP) provided \$6,185 in funding for various conservation practices and floodplain restoration. Between 2001 and 2017, the SWCD used funding sources (\$754,628 from private funds and CWA section 205(j) and 319 funds) to write a nine-element plan specific to the SFWC watershed and to provide cost share for BMPs. Lastly, the SWCD used \$337 in local funds to decommission a well.



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