NONPOINT SOURCE SUCCESS STORY

Indiana

Planning, Partnerships and Implementation Restores Fish Community in Stump Ditch and Kilmore Creek

Waterbody Improved

Stump Ditch and Kilmore Creek account for approximately 11.6 miles of stream in the South Fork Wildcat Creek (SFWC) watershed in Clinton and Tipton counties, Indiana. The Indiana Department of Environmental Management (IDEM) listed Kilmore Creek and Stump Ditch on its Clean Water Act (CWA) Section 303(d) list of impaired waters in 2006 due to impaired biotic communities. Following years of best management practice (BMP) implementation paired with education and outreach in the watershed, follow up sampling by IDEM in 2019 on Kilmore Creek and Stump Ditch showed that both segments are now fully supportive of aquatic life. IDEM will propose to remove both biotic community impairments from its impaired waters list in 2022.

Problem

Kilmore Creek (assessment unit INB0732_03) and Stump Ditch (assessment unit INB0733_T1003) are within the SFWC watershed in Clinton and Tipton counties in central Indiana (Figure 1). Land use throughout the watershed is primarily cultivated crops (>80%) and includes minor land uses of grasslands and wooded areas that are heavily fragmented.

In 2004, IDEM conducted a biological study on the SFWC watershed. Monitoring sites on Kilmore Creek and Stump Ditch had failing index of biotic integrity (IBI) scores (i.e., scores less than 36 in Indiana), which indicates that the streams were not supporting a well-balanced aquatic community. The fish community scores on Kilmore Creek and Stump Ditch were 34 and 32, respectively. This caused IDEM to list both streams on its 2006 CWA section 303(d) list of impaired waters for impaired biotic communities. The impaired reach of Kilmore Creek is at the headwaters of the stream in the Shanty Creek subwatershed. Stump Ditch drains directly into a portion of Kilmore Creek in the subwatershed directly downstream.

To address impairments, IDEM developed a total maximum daily load (TMDL) for *Escherichia coli*, total suspended solids, total phosphorus, and nitrate-nitrite in 2008 for the SFWC watershed. The TMDL identified rural runoff as the most significant source of total suspended solids, total phosphorus, and nitrate + nitrite due to the majority of land use being agricultural.

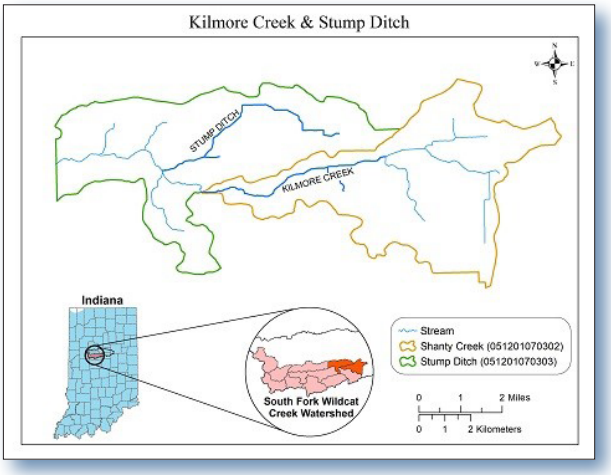

Figure 1. Kilmore Creek and Stump Ditch are within the South Fork Wildcat Creek watershed.

Streambank erosion was also reported as a potentially significant source of sediment loads. According to the 2012 SFWC Watershed Management Plan (WMP), surveys indicated that 90% or more of streambanks were unbuffered along Kilmore Creek, and Stump Ditch lacks riparian buffers almost entirely.

Story Highlights

For over two decades, stakeholders have been working to improve the health of the SFWC watershed. With funding provided by the Indiana Association of Soil and Water Conservation Districts, the Wildcat Creek Watershed Network (now known as the Wildcat Creek

Watershed Alliance) hired an executive director/watershed coordinator to develop a long-term strategic plan for the Wildcat Creek watershed. This served as the foundation for future planning and implementation efforts within the watershed.

The Clinton County Soil and Water Conservation District received a CWA section 205(j) grant in 2009 to draft an extended nine-element SFWC WMP, which it began implementing in 2012. Along with education and outreach efforts throughout the watershed, landowners implemented a range of BMPs in the Shanty Creek and Stump Ditch subwatersheds such as cover crops (3,220 acres), nutrient and pesticide management (39,567 acres), riparian buffers (9 acres), and 3,780 feet of two-stage ditch on Stump Ditch (Figure 2). The combination of these practices reduced harmful pollutants (e.g., nutrients, sediment) from entering the streams, thereby improving the streams' overall quality and health.

Annual surveys conducted on the local communities indicated some notable changes from 2012 to 2014 relating to personal beliefs on water quality. Results showed an increase from 26% (in 2012) to 55% (in 2014) of respondents who strongly agreed that they had a personal responsibility to help protect water quality. Additionally, 55% of respondents in 2014 (compared to only 21% in 2012) strongly agreed that the way they take care of their property can influence water quality in local streams and lakes.

Results

In 2019, IDEM conducted follow-up monitoring, which showed an improved fish IBI score of 42 on Kilmore Creek and scores ranging from 36–38 on Stump Ditch. These are notable improvements from the scores of 34 and 32 in 2004 on Kilmore Creek and Stump Ditch, respectively. Additionally, habitat showed improvements (e.g., deeper pools, higher quality riffles) during the timeframe. Habitat scores on both Kilmore Creek and Stump Ditch showed improvements in categories such as less bank erosion, silt cover, and embeddedness in the streams, which indicates less sediment entering from surrounding landscapes. Due to fish IBI scores indicating a well-balanced aquatic community, IDEM is proposing to remove the IBC impairments from these segments on its 2022 impaired waters list.

Figure 2. Before (left) and after (right) showing BMP implementation on Stump Ditch. The two-stage ditch increases bank stability while improving drainage and ecological functions.

Partners and Funding

The U.S. Department of Agriculture's (USDA) Natural Resource Conservation Service provided technical assistance and funding from various programs for BMP installations in 2004–2019 in the Shanty Creek and Stump Ditch subwatersheds (totaling $261,628). Additionally, USDA's Farm Service Agency provided $16,974 for BMP installations through their Conservation Reserve Program and Conservation Reserve Enhancement Program. The Indiana State Department of Agriculture provided approximately $415 in funding through Clean Water Indiana for cover crop installations within the Stump Ditch subwatershed during the 2004 to 2019 period. In 2009, Clinton County was awarded $166,000 from IDEM's 205(j) program to develop a WMP for the SFWC watershed. Additional funding of $320,950 in 2012 and $158,000 in 2017 was provided to Clinton County through IDEM's CWA section 319 program for implementing the plan. Approximately $63,403 of this funding was used for BMP installations directly within the Stump Ditch and Shanty Creek subwatersheds in 2013–2015. Finally, Clinton and Tipton counties provided $34,402 and $9,912, respectively, for installation of cover crops within their jurisdictions, which includes Kilmore Creek and Stump Ditch.

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For additional information contact:

Indiana Department of Environmental Management
Caleb Rennaker • 317-308-3119 • crennake@idem.in.gov
Angie Brown • 317-308-3102 • abrown@idem.in.gov