NONPOINT SOURCE SUCCESS STORY

Iowa

Watershed Work Leads to Improvement in Silver Creek

Waterbody Improved

Silver Creek, located in Clayton County, was placed on Iowa's Clean Water Act (CWA) section 303(d) list of impaired waters in 2002 due to a decline in the biological community based on biological index scores. In 2007, the Iowa Department of Natural Resources' (DNR) Stressor Identification (SI) process found that increased sedimentation from the watershed was the primary cause of impairment. Through the Silver Creek Watershed Project, farmers and landowners installed conservation practices that reduced the amount of sediment reaching the creek and improved the habitat for aquatic life. Further monitoring now shows major improvements in biotic index scores, demonstrating the ongoing recovery of the biological community due to the locally led efforts.

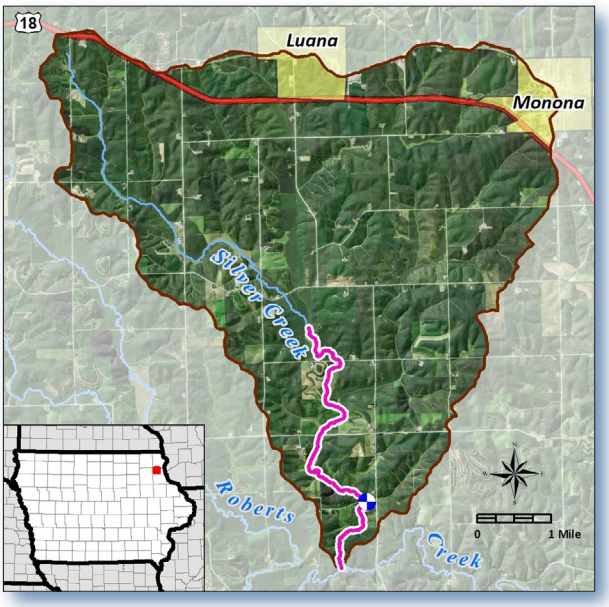
Problem

Silver Creek is a warm water stream in Clayton County, Iowa, within the Turkey River basin. The Silver Creek watershed includes a total of 17,909 acres (28.1 square miles) (Figure 1). The watershed represents one of the most intensely cropped portions of Clayton County, and steep cropland slopes are the dominant feature.

The karst (shallow, fractured limestone bedrock) geology of the watershed further amplifies the threat of agricultural pollutants. Over 60 sinkholes have been found in the watershed, including locations in or near to the stream channel that can divert streamflow underground and cause the stream to lose water.

The 2007 SI identified sedimentation as a primary cause of the low index of biotic integrity (IBI) scores for both fish (FIBI) and benthic macroinvertebrates (BMIBI) in Silver Creek (Figure 2). Benthic macroinvertebrates are aquatic animals like insects, snails, mussels and crayfish that live on the stream bottom.

Sediment in waterways can completely bury or fill in gaps around many stream habitat types like rocks and gravel that are important to fish and benthic macroinvertebrate survival. This metric is also known as stream embeddedness, which is often evaluated in riffles or shallow runs where currents are normally high enough to prevent excessive fine sediment accumulation. As embeddedness increases, the large and small spaces between rocks become filled with



Map: Andy Asell, Iowa DNR

Figure 1. The Silver Creek watershed with biosampling site.

sediment, making this important habitat less suitable for invertebrates and fish, which use the spaces for feeding, shelter, spawning and egg incubation.

Sedimentation is caused by soil erosion and runoff from tilled agricultural ground, streambank collapse, and from active gullies across steep terrain, all of which were found in the Silver Creek watershed. Sediment delivery to the stream was estimated to be 14,930 tons per year in 2007.

Story Highlights

The watershed project was launched in 2007 by the Clayton County Soil and Water Conservation District (SWCD). The interest demonstrated by Silver Creek landowners and farm operators over the 14 years of the project has been outstanding (Figure 3).

Practices adopted included terraces (238,190 feet), cover crops (11,484 acres), grassed waterways (35 acres) and streambank protection (830 feet). New filter strips now buffer over two miles of the stream and its tributaries, and cattle were excluded from a mile of the stream corridor. The diversity and number of practices adopted far exceeded expectations and have reduced sediment delivery to Silver Creek by an estimated 60 percent.

Results

Improvements have been seen in all sediment-related measures. Embeddedness of rocky substrates decreased by half. Additionally, the percent stream bottom as silt and the percent composed of soft sediment both decreased by one third. The decrease in sedimentation is responsible for much of the improvement seen in the FIBI and BMIBI scores (Figure 4). Based on the biological monitoring, scores have more than doubled. Silver Creek now meets the impairment delisting criteria for the benthic macroinvertebrates, but it remains just below the minimum threshold for fish.

Partners and Funding

The Silver Creek Watershed Project was funded and supported by Iowa DNR through U.S. Environmental Protection Agency CWA section 319 grants ($1,106,700) and the Clean Water State Revolving Fund ($410,000) and local landowners/farmers ($1,385,806). This money was used to leverage an additional $2,125,727 for the project. Other major project partners included the Clayton SWCD, the U.S. Department of Agriculture's Natural Resources Conservation Service and Farm Service Agency, and Iowa Department of Agriculture and Land Stewardship. Funding from all sources totaled $5,028,233.

Photo: Jen Kurth, Iowa DNR

Figure 2. Silver Creek is in Clayton County.

Figure 3. Silver Creek Project Coordinator Eric Palas moderates a panel on soil health with three conservation farmers from the Silver Creek watershed.

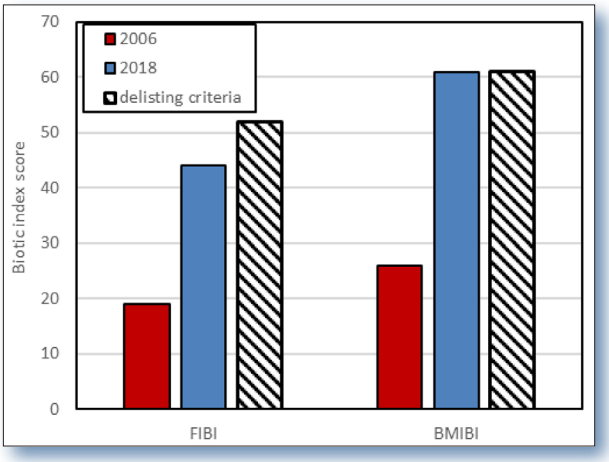


Figure 4. Index of biotic integrity scores for Silver Creek (FIBI=fish, BMIBI=benthic macroinvertebrates).

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

EPA 841-F-20-001DD
November 2020

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