NONPOINT SOURCE SUCCESS STORY

Ohio

Baldwin Run Removed from Impaired Waters List after Channel and Streambank Restoration

Waterbody Improved

Channel erosion and upland cropping practices degraded water quality in the Hocking River-Baldwin Run watershed, which was listed on the 2016 Clean Water Act (CWA) section 303(d) list of impaired waters. Ongoing stream restoration work in the watershed, at the direction of the City of Lancaster's Engineer's Office, has resulted in an improvement of water quality. As a result, the watershed was removed from the CWA section 303(d) list of impaired waters in 2018. Part of this work was funded by a 2014 CWA section 319 stream restoration grant, which was followed-up with a similar 319 grant in 2017 to further improve the watershed.

Problem

The 12.60-square-mile (8,064 acre-) Baldwin Run watershed is formed by the combination of three secondary rivers in south-central Ohio. It is within the Erie/Ontario Lake Hills and Plains Ecoregion. The entire watershed contains approximately 11.2 miles of primary stream, plus more than 24 miles of tributary, for a total of 36 linear miles of stream.

Historical flooding has caused severe downcutting throughout many streams in the watershed, resulting in a loss of flood capacity and a reduction in natural ecological habitat. The non-natural state of the floodplain, due to past human alteration, exacerbated these impacts. In fact, the sinuosity of Baldwin Run is the lowest among Lancaster's streams. At a sinuosity index of 1.04, it is the only stream in Lancaster classified as "straight" under the conventional classification system; most other Lancaster streams are classified as "twisting."

Monitoring in the Baldwin Run reach (Figure 1) before the implementation of the Baldwin Run stream restoration project in 2014 showed that the stream was only partially attaining the Erie/Ontario Lake Hills and Plains Ecoregion biocriteria for aquatic life use fish and aquatic insect metrics (Index of Biotic Integrity [IBI] and Invertebrate Community Index [ICI]). As a result, the Hocking River-Baldwin Run watershed (HUC 050302040402) was added to Ohio's 2016 CWA section 303(d) list of impaired waters.

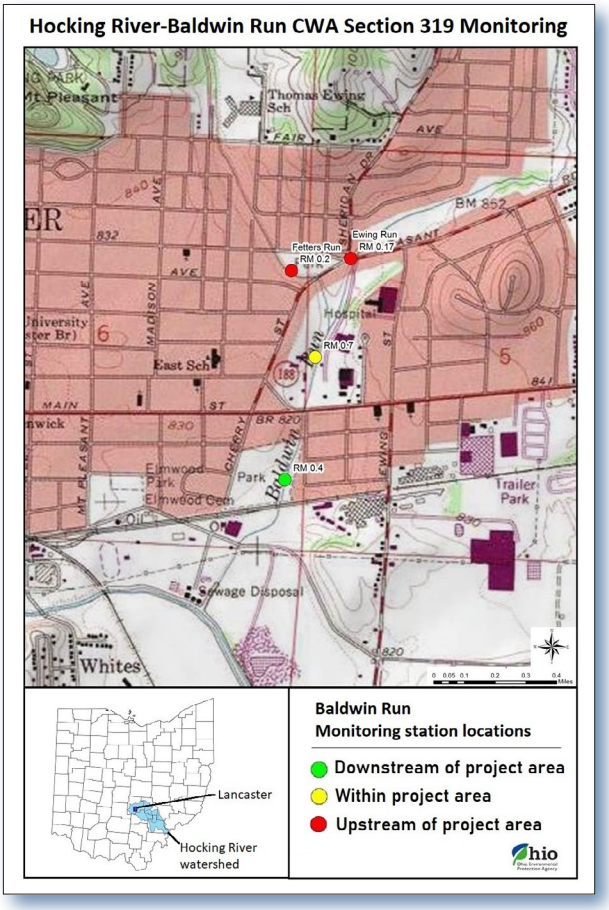

Figure 1. Water quality samples were collected at stations along Baldwin Run, Ewing Run and Fetters Run.

Story Highlights

The City of Lancaster was the lead local group working to restore the Hocking River-Baldwin Run watershed. The city's stormwater department developed Lancaster's *Stream Corridor Master Plan*, which included the work in the Hocking River-Baldwin Run watershed. To inform the public of the importance of their work, the city conducted a public outreach campaign that took the form of a fact sheet and two on-site public meetings.

The first phase of the Baldwin Run restoration effort came in 2005, where 2,000 linear feet of Baldwin Run (downstream of the Phase Two site) was restored. The City of Lancaster coordinated the restoration as part of the Anchor Hocking Brownfield Project. To supplement the funding needed to implement their watershed plan, the City of Lancaster applied for and received a CWA section 319 grant in 2014 for the Baldwin Run Stream Restoration Phase Two project.

The Phase Two project resulted in the restoration of 960 linear feet of Baldwin Run. Restoration activities included installing 23 in-stream habitat structures; regrading and recontouring 250 linear feet of stream bank; and removing 0.35 acres of invasive species that were subsequently replanted with native hardwood trees and shrubs. On-site signage was posted at the location of the restoration work. This project began in spring 2015 and was completed by autumn 2015. The City of Lancaster continued its work in 2017 and was awarded an additional CWA section 319 grant to implement the Fetters Run Stream Restoration project, which included 800 linear feet of stream restoration, 500 linear feet of stream bank regrading, and 0.33 acre of invasive species removal and riparian planting. This project built upon improvements already observed from the Phase One and Phase Two Baldwin Run projects.

The initial CWA section 319-funded work in Baldwin Run was completed in 2015. It included above mentioned stream channel restoration, where riffle pool run development was established using natural channel design concepts (inclusive of numerous in-stream structures) to aid in flow direction and habitat establishment. The streambank in the project area was also restored in numerous locations, which included regrading the streambank in critical locations; removing invasive plant species; planting critical areas, and establishing trees and shrubs. Restoration work in the overall watershed continues with the Phase Two work in the Fetters Run stream reach.

Figure 2. After restoration, Baldwin Run fully supports its WWH designated use.

Results

The monitoring station within the stream restoration area on Baldwin Run showed improvement in biological performance after the stream restoration project was completed. In 2014, during the pre-restoration sampling, the station at RM 0.7 was in partial attainment of the Warmwater Habitat (WWH) aquatic life use, with marginally *good* to *fair* biological community assessment scores. This station was resampled in 2016 after the stream restoration project was completed. The station improved to full attainment with scores showing *good* communities. The stations upstream and downstream of the project area were also in full attainment of the WWH (Figure 2).

Partners and Funding

The work on Baldwin Creek-Hocking River watershed began before the development of a CWA section 319 watershed-based plan. Section 319 funds were used to continue this work and to fund projects specifically identified in the later-developed plan. The total CWA section 319 funding used was approximately $180,000, with another $220,000 in match provided by the City of Lancaster. This work was implemented by the City of Lancaster Engineer's Office.

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