NONPOINT SOURCE SUCCESS STORY

Ohio

Restoring Stream Channel and Riparian Areas Improves Aquatic Habitat in Upper Big Darby Creek

Waterbody Improved

Channelization, destruction of riparian habitat and road construction degraded water quality in Upper Big Darby Creek. As a result, this watershed assessment unit (AU), known as the Headwaters of Big Darby Creek, was placed on the 2006 Clean Water Act (CWA) section 303(d) list of impaired waters for failure to attain its exceptional warmwater habitat and coldwater habitat designated uses due to hydromodification and habitat alteration. From 2007 to 2011, The Nature Conservancy worked on more than a mile of Big Darby Creek, restoring riparian areas and stream hydrology. Water quality and aquatic habitat have improved as a result; therefore, the Headwaters of Big Darby Creek AU will be removed from the CWA section 303(d) impaired waters list for hydromodification and habitat alteration in the 2016 integrated report.

Problem

The Big Darby Creek watershed covers about 555 square miles, beginning in Logan County before flowing to the Scioto River in Pickaway County (Figure 1). Some of the tributaries to the Big Darby are not meeting attainment of their aquatic life designated uses, partially due to habitat alteration. Portions of the headwater reaches of Big Darby Creek are impaired as a result of channelization, habitat alteration and nutrient enrichment, which is degrading warm and coldwater habitat.

Ohio Environmental Protection Agency (Ohio EPA) measures designated aquatic life use using a set of bioindicators. The Qualitative Habitat Index (QHEI) measures physical habitat conditions. The Index of Biological Integrity (IBI) measures relative health of fish communities and the Invertebrate Community Index (ICI) is a measure of the health of the macroinvertebrates in a waterway. Ohio's water quality standards for exceptional warmwater habitat require ICI>46, and IBI>50 (indices measuring stream health as indicated by benthic macroinvertebrates and fish, respectively). Data collected by Ohio showed failure to attain these standards in the Upper Big Darby Creek watershed, resulting in the addition of these waters on the 2006 CWA section 303(d) list (listed as the Headwaters of Big Darby Creek AU: Waterbody ID OH050600011901), for failing to attain warm and coldwater habitat designated uses due to hydromodification and habitat alteration. A total maximum daily load to restore these impaired designated uses was completed for the watershed in 2006.

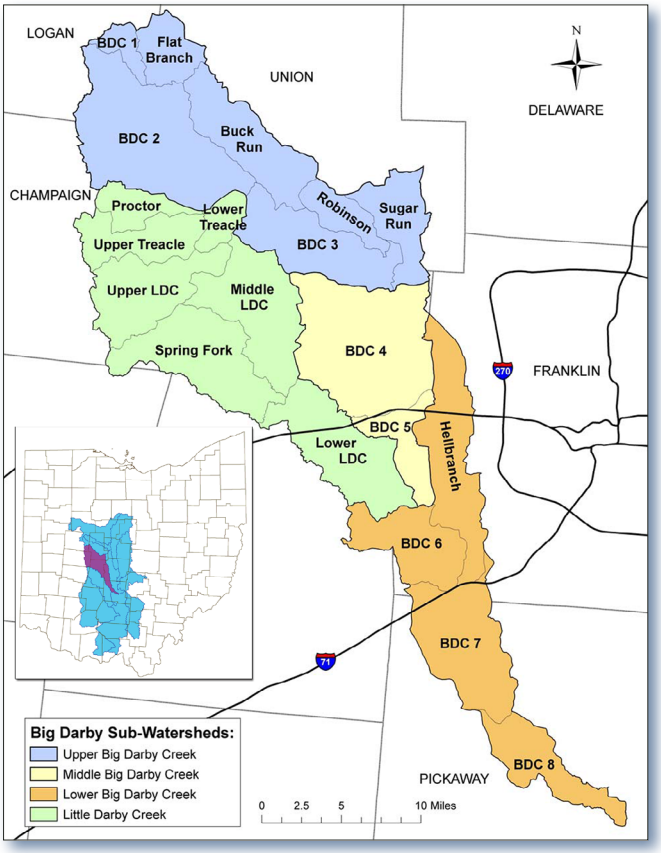

Figure 1. The 555-square-mile Big Darby Creek watershed, in central Ohio, includes four subwatersheds: Little Darby Creek, and the Upper Big Darby, Middle Big Darby, and Lower Big Darby creeks.

Photo: Anthony Sasson, The Nature Conservancy

Figure 2. In 2011, partners completed a restoration project along this section of Big Darby Creek, establishing a new floodplain along a formerly channelized, entrenched section.

Photo: Anthony Sasson, The Nature Conservancy

Figure 3. By 2015, grasses and other riparian vegetation had become re-established on the floodplain of Big Darby Creek, providing enhanced wildlife and aquatic habitat.

Project Highlights

In response to the impaired conditions of the headwaters of the Big Darby Creek watershed, The Nature Conservancy, in partnership with Ohio EPA via the CWA section 319(h) grants program and the Water Resources Restoration Sponsorship Program (WRRSP), completed restoration and re-naturalization of more than a mile of the headwaters of Big Darby Creek. The Nature Conservancy was the prime partner in the project. Restoration work by TNC began in 2007 and was completed in 2011. Specific restoration actions implemented by The Nature Conservancy included:

- 5.7 acres of riparian wetland restorations.
- 7,086 linear feet of stream restoration with reconnection to channel floodplain and additional hydrologic features (riffle/pool sequences, rootwads, etc) installed.
- 24 acres of riparian area plantings (grasses and 34,094 trees and shrubs).
- Gravel grade control in three tributaries, including directing discharge to a wetland.
- Public education and outreach project.

Results

As a result of the above restoration efforts, conditions have improved in the headwaters of Big Darby Creek. Riparian vegetation has recovered and flourished along the restored sections of the creek (Figures 2 and 3).

Post-restoration QHEI scores ranged from just below 60 up to 70 (QHEI > 60 is correlated to support of exceptional warmwater habitat). IBI and ICI indices in 2014 were all greater than 50 (out of a max of 60), indicating exceptional warmwater habitat. Based on these data, Ohio plans to delist the Headwaters of Big Darby Creek AU (19.2 square miles) for hydromodification and habitat alteration in the 2016 integrated report.

Partners and Funding

The restoration of Upper Big Darby Creek was the result of collaboration between The Nature Conservancy, Ohio EPA and the WRRSP. The Nature Conservancy sponsored and implemented the restoration projects using $532,000 in CWA section 319 grant funding and $1,000,000 in Ohio EPA's WRRSP funds.

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