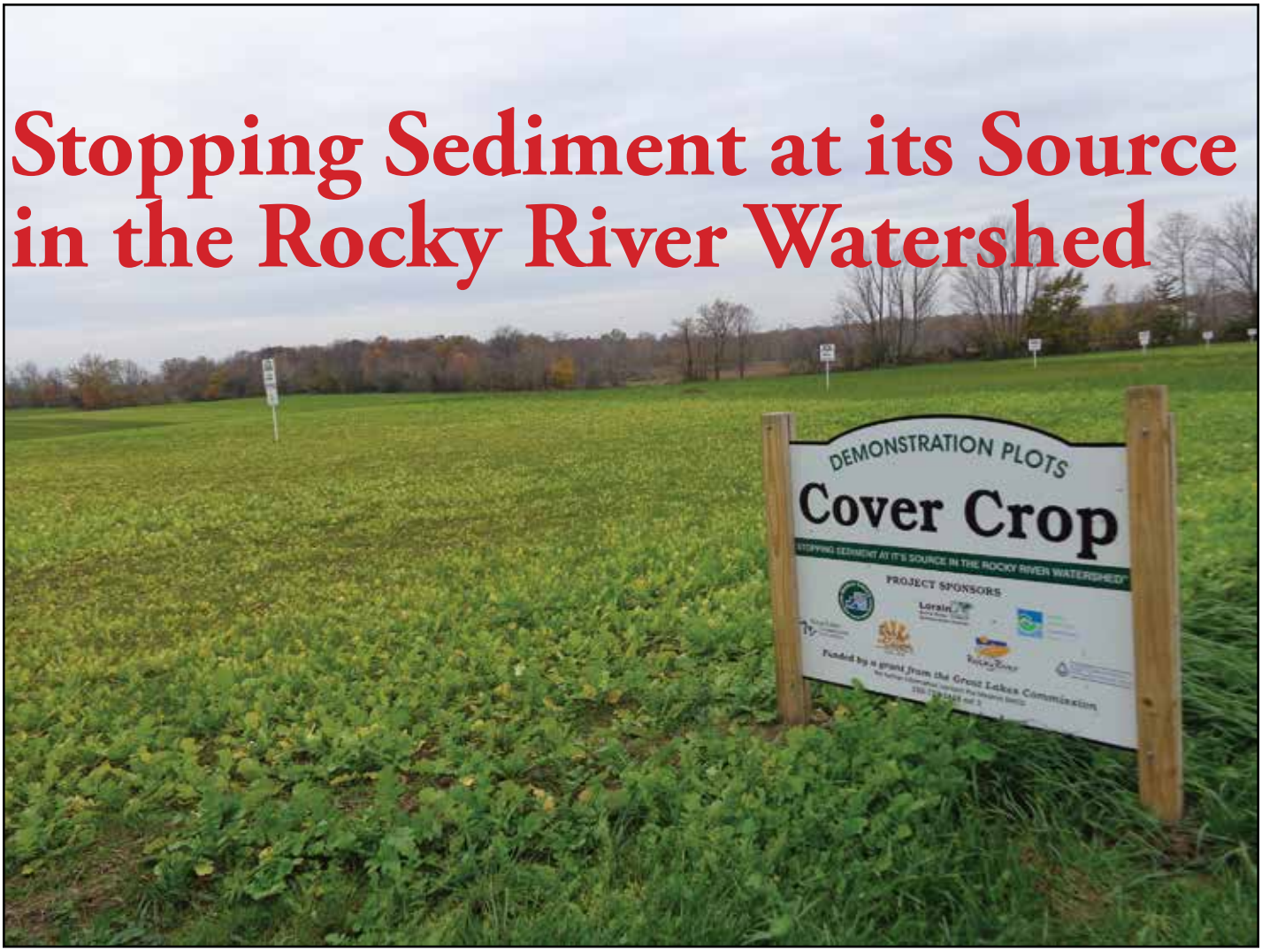
Stopping Sediment at its Source in the Rocky River Watershed



A cover crop demonstration plot in the Rocky River's Mallet Creek subwatershed in Medina County, OH.

Named one of the "150 Best Places to Fish in America" by *Field and Stream* magazine, the Rocky River in Northeast Ohio is known mainly as a regional fishing destination, especially for steelhead trout. With over 25 miles of its Main Stem and East Branch owned by Cleveland Metroparks, it has a reputation as a relatively healthy river. However, the Rocky River and its tributaries have not been spared the impacts from changes in the landscape due to agriculture and urbanization. Runoff from farm fields, parking lots and construction sites delivers sediment, nutrients and other pollutants to neighboring creeks.

Although the 2001 Rocky River Total Maximum Daily Load (TMDL) report does not directly address sediment, the Rocky River Watershed Action Plan (RRWAP) identifies siltation, embedded substrate or sediment loading as a problem in well over 70% of the watershed. Furthermore, research indicates that sediment loading to Lake Erie from the Rocky River is over 70,000 tons/year, or the equivalent of 240 tons per square mile per year. This is 15 times the estimated background, predevelopment loading of 4700 tons, or 16 tons per square mile per year (Whiting, 2003).

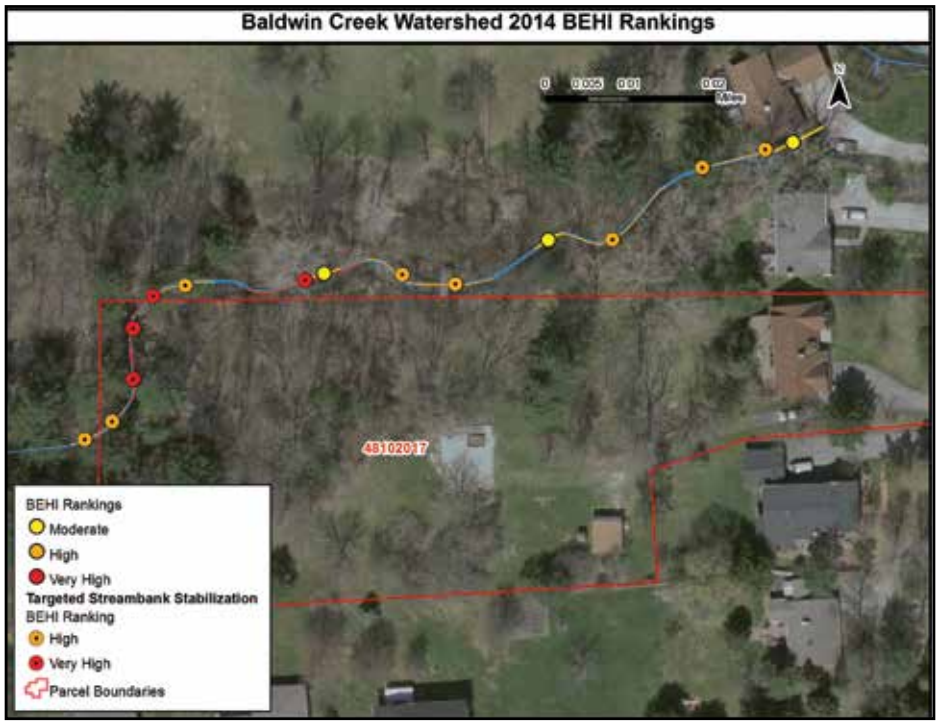
Sediment sources in the watershed vary by land use. Urban and suburban development is the most important factor impacting water quality and aquatic habitat in the Rocky River Watershed. New housing developments, both large and small, have been commonplace for more than 50 years. The lower portion of the watershed, including the Baldwin Creek

subwatershed, is almost entirely urban and suburban. Channel destabilization caused by storm water runoff is a major source of sediment in urban and suburban areas. Sediment contributions from construction sites have historically been issues in these areas, as well.

In the watershed's rural areas, which are mainly located in Medina and Lorain Counties, soil loss from fields in row crop production, especially during periods of the year when the soil is bare, is an issue of primary concern. Stream bank erosion is also an issue in rural areas, usually in association with inadequate riparian buffers bordering fields, historical ditching or other stream modification, and housing developments.

In 2010, when Cuyahoga Soil & Water Conservation District (SWCD), Rocky River Watershed Council (RRWC) and their partners began formulating a program for addressing sediment loading throughout the watershed, they decided to focus on agricultural activities and streambank erosion, as most communities in the watershed were already addressing construction site erosion controls as part of their Phase II MS4 programs. Further analysis using USEPA's BASINS model indicated that the highly agricultural Mallet Creek and Plum Creek subwatersheds contribute the highest per-acre sediment load to the Rocky River from upland sources, so they were prioritized as targets for agricultural sediment reduction practices.

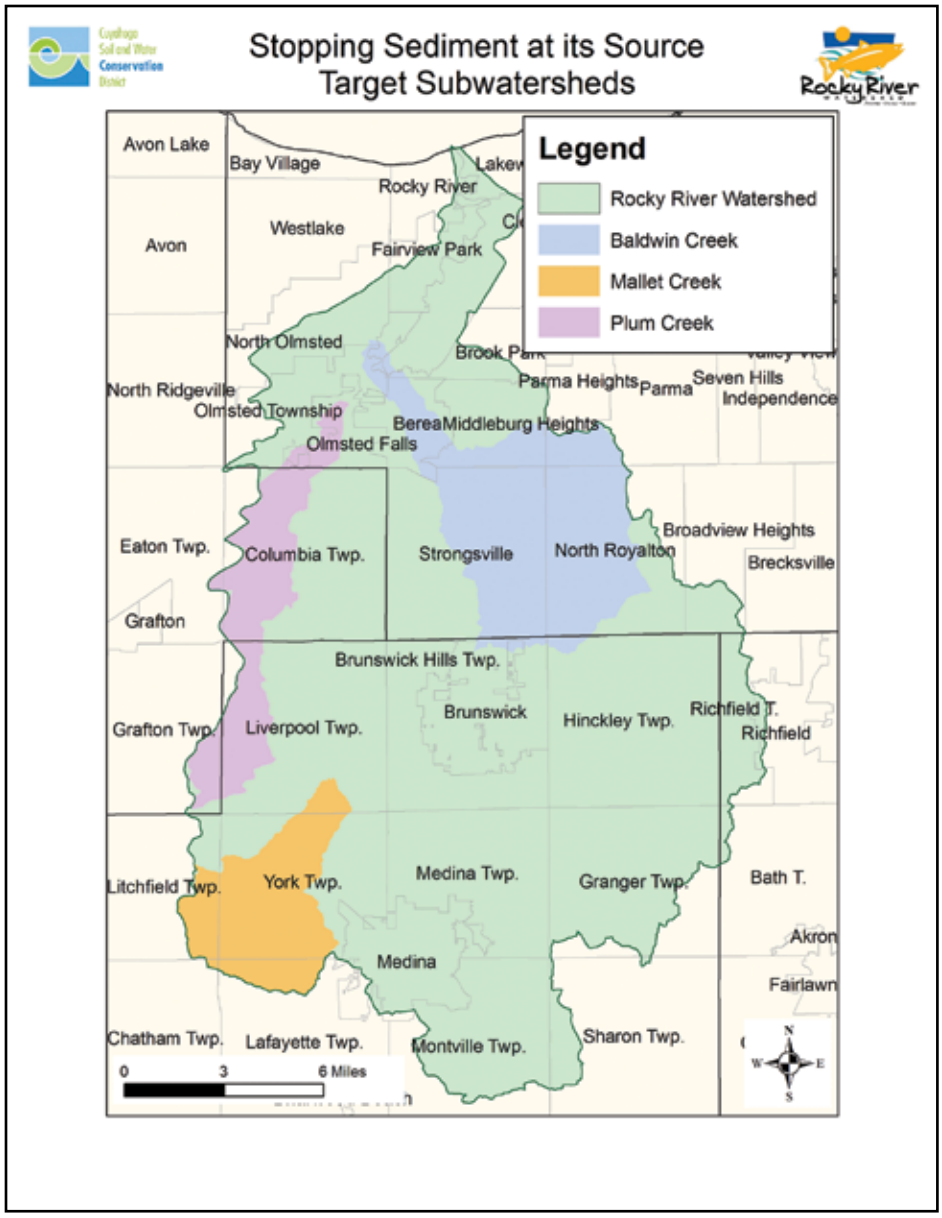
In 2011, Cuyahoga SWCD was awarded a $400,000 Great Lakes Commission grant to reduce sediment loading to Lake Erie from the Rocky River. Through a partnership with the neighboring Medina and Lorain SWCDs, incentive payments have been offered to farm operators for a variety of sediment saving practices, from zone tillage to grassed waterways and cover crops. By far the most popular of these practices has been the cover crops. A cover crop is a crop that is grown during a time of year when the field would otherwise not be in use, for the purpose of protecting the otherwise bare soil from erosion. They have the added benefit of increasing the amount of organic matter and the porosity of the soil, thereby enhancing soil health. In northeast Ohio, cover crops are generally planted in the fall following corn or soy beans, and provide protection throughout the winter. Winter rye, various clovers and tillage radishes are typical cover crops.



Above: Assessing streambank erosion in Baldwin Creek. Below: BEHI results are sued to target individual properties for streambank stabilization assistance.

Through the grant, farmers are paid $35/acre for the first 25 acres for cover crops. The payment increases to $40/acre for every acre above 25, in an attempt to get farmers to move from small trials to larger scale implementation. To date, over 1500 acres have been enrolled in the program, with estimated sediment savings of over 3000 tons.

In addition to selecting Mallet Creek and Plum Creek for agricultural sediment reduction, the grant project targeted Baldwin Creek for sediment reduction from eroding streambanks, with a goal of stabilizing 2500 feet of eroding streambanks. The Baldwin Creek subwatershed is characterized by medium-high density suburban residential land use that was developed



largely during the 1960s and 1970s, before modern storm water control practices were required. This has led to altered hydrology, channel downcutting and destabilization of streambanks. The Rocky River Watershed Action Plan identified Baldwin Creek as a critical area for the restoration of disturbed riparian areas, and goes on to recommend at least 7500 linear feet of streambank stabilization and channel restoration activities to control sediment loading.

In order to identify and prioritize streambanks for stabilization, Cuyahoga Soil & Water Conservation District (SWCD) performed streambank erosion assessments throughout Baldwin Creek.

Walking the entire Baldwin Creek main stem and a few of the tributaries confirmed that this is indeed a critical area. Meandering through residential, commercial, and park areas, Baldwin Creek lies in a diverse watershed with accelerated streambank erosion. In an effort to preserve existing streambanks many stream property owners have resorted to man-made armoring, utilizing gabion baskets, rip-rap, bricks, or even just pouring cement right over the streambank. This project will serve as an opportunity to communicate and implement more natural methods of streambank stabilization that work with the stream in slowing down streambank erosion.

Over ten stream miles were assessed by Cuyahoga SWCD staff with the help of volunteers from the Cleveland Metroparks Watershed Volunteer Program. The entire main stem of Baldwin Creek and targeted tributaries were evaluated using a modified Bank Erosion Hazard Index (BEHI) protocol. Developed by Dave Rosgen, BEHI is a rapid assessment protocol that considers streambank protection (roots, vegetation, natural armoring such as embedded boulders or bedrock), streambank angle, stratification, and streambank materials. You can quickly score a bank and rank it as having low to extreme potential for erosion. Notably, 24% of banks assessed were ranked high to extreme.

When combined with a visual assessment of near-bank stress, the BEHI results allow us to generate estimates of annual lateral streambank erosion and subsequently the amount of soil lost to erosion each year. Using this method, we have estimated that streambank erosion in Baldwin Creek generates ~5400 tons/year of sediment. Mapping the BEHI results along with parcel boundaries has allowed the prioritization of properties for streambank stabilization practices under the Great Lakes Commission grant. Areas in red on the neighboring map are estimated to have over 100 tons of annual streambank erosion. Property owners in prioritized parcels have been contacted and offered cost-share funds to implement streambank stabilization projects. Recommended practices generally involve grading back streambanks to a gentler 2:1 or 3:1 slope, the installation of live fascines and brush mattresses interspersed with aggressively-rooting fast-growing native trees and shrubs such as willows, sycamores and various dogwood varieties, and simply not mowing up to the edge of the streambank. In some cases, where space exists, newly excavated bankfull benches can help to restore lost floodplain function.

By the end of 2015, the project's installed streambank stabilization and agricultural practices will have combined to prevent over 15,000 tons of sediment from entering the Rocky River and Lake Erie, contributing to the ongoing restoration of these important natural resources. **L&W**

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