

Brainerd, Crow Wing SWCD's gully fix stanches erosion, benefits river



Left: Brainerd Public Works Director Mike Habighorst, left, and BWSR Board Conservationist Darren Mayers, who is now BWSR's easement programs and forestry coordinator, explored a rock-armed plunge pool on Oct. 23, 2025, in Brainerd. The pool filters stormwater runoff bound for Little Buffalo Creek. **Middle:** From left: Habighorst, Mayers, Crow Wing SWCD Manager Melissa Barrick and Brainerd City Engineer Jessie Dehn paused at one of 22 manholes, which were installed at every bend of a 1,300-foot-long pipe that runs the length of the gully. **Right:** Erosion control logs help to stabilize the gully, which developed as the result of channelized flow created by a culvert installed under a road in the 1980s. **Photo Credits:** Ann Wessel, BWSR

BRAINERD — A Clean Water Fund-supported gully stabilization completed last summer in the city of Brainerd tamed the runoff that sent pollutants and fine sands into the Mississippi River, and curbed the erosion eating away at 13 properties perched on either side.

HR Green engineers estimated the gully had deposited more than 8,700 tons — nearly 700 dump truck loads — of sediment into Little Buffalo Creek since the Buffalo Hills neighborhood was developed in the 1980s.

Runoff enters the creek about 500 feet upstream from its confluence with the Mississippi River. That stretch of river, from the Pine River to the Crow Wing River, is impaired for total suspended solids. Sediment can carry pollutants, and can contribute to turbidity, which can hurt fish habitat. Much of the

upper watershed remains undeveloped. But the channelized flow created by a culvert installed under a road in the 1980s destabilized the sensitive soils and started the gully formation. Over time, those flows enlarged the gully and continued to send sediment downstream.

A \$975,000 Clean Water Fund grant the Minnesota Board of Water and Soil Resources (BWSR) awarded to the Crow Wing Soil & Water Conservation District (SWCD) in 2023 supported the work, which was managed by the city of Brainerd. The city's 25% match drew from its stormwater utility fund.

The \$1.2 million project replaced the oversized stormwater culvert, and installed 1,300 linear feet of pipe within the gully to handle the stormwater runoff. Following the gully's winding



YOUR Clean Water Fund AT WORK

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course required installing manholes at every bend — 22 of them in all.

To stabilize the 1.4-acre gully, contractors reshaped the slopes, installed erosion control logs to slow rainfall runoff, planted native shrubs at the base of the slopes, installed erosion control fabric and seeded deep-rooted native plants within the channel. A rock-armored plunge pool filters water from the pipe before it enters the creek.

This spring, plans were underway to install additional rock armoring as a reinforcement around the plunge pool.

“If you would look at the overall watershed, you would say, ‘Oh, this looks pretty good. They have trees. They have some wetlands,” said Melissa Barrick, Crow Wing SWCD manager. “But slope matters and the soils matter, too. Even though this area was wooded, the amount of (stormwater entering the ravine) plus the slopes and the sand created a bigger problem.”

Erosion made the site a priority for both the SWCD and the city. Because each sloughing exposed more soil, each subsequent sloughing led to increasingly large volumes of erosion and increasingly steep banks.

The site was a top contributor within the subwatershed that was sending the most sediment into this river reach. The project contributed to the daily 25% sediment reduction necessary to meet clean water standards.

“It was a big priority for the project to be able to stop that erosion and keep not only the stormwater system



From left: Dehn, Barrick and Mayers walked through the Brainerd gully that was repaired with support from a BWSR Clean Water Fund grant. Engineers estimated the gully had deposited more than 8,700 tons of sediment into Little Buffalo Creek, a Mississippi River tributary, since it formed in the 1980s as the result of a channelized flow from a culvert. The gully also had eroded the properties on either side.

clean but keep the sediment from continuing to wash into Little Buffalo Creek and then farther down into the Mississippi River,” said Brainerd City Engineer Jessie Dehn, who worked with HR Green on the project design and with SEH on the inspection.

Tom’s Backhoe Service of Brainerd was the contractor.

“We knew that we had to do something to not only channel that water differently but help protect those slopes to avoid losing people’s property,” Dehn said. “We were losing several feet every time those (slopes) would give way.”

The property owners voluntarily granted easements to allow construction and maintenance access. Marc Marshall was among those property owners. When he moved in about eight years ago, his backyard fence was about 2 ½ feet from the edge of the gully.

“There (were) just trees everywhere, downed trees in the gully, and during rain events there wasn’t anything on the bottom



other than a stream of water ... which would take sediment with it. You could see the sides cave down and replace what was taken away,” Marshall said.

“It’s just good to know that a good resolution for everybody was reached. The scope of the project shifted here and there, but overall, I think everybody is happy that it was completed and looks nice and was functional,” Marshall said. “I wish it was a little bit farther from our back gate, but it’s definitely solid.”

Steep banks and sandy soils restricted options and made the site difficult to access.

In 2021, the city hired HR Green to complete a feasibility study, lead stakeholder workshops, and complete survey and design work. That followed HR Green’s citywide stormwater retrofit analysis, funded by the city, the Mississippi Headwaters Board and the

North Central Minnesota Joint Powers Board.

The study considered several stabilization and treatment options. But the topography, soils and proximity to houses led to the conclusion that piping the relatively clean water from the upper watershed down to the river and stabilizing the ravine was the most effective solution.

In late October 2025, Barrick and Dehn toured the site with Brainerd Public Works Director Mike Habighorst and BWSR Board Conservationist Darren Mayers.

Plants flourished. A line of live stakes ran along the base of the slopes. Wooden stakes marked the erosion control logs. The scene was far different from pre-construction photos depicting a tangle of exposed tree roots, downed trees, bare soil and severely undercut banks. Barrick compared the current, more gently sloped site to a snowboarders’ half-pipe.

“Before, you couldn’t walk up the gully because it was so steep and there was so much erosion. It was very difficult terrain,” Barrick said. “(Now), it’s working. The water is able to infiltrate through the system. And it has eliminated the erosion along those (properties).”

The project withstood its first test while construction was still underway. Dehn said the site held up to a heavy rain after the pipe was installed but before the bank stabilization.

The city will handle necessary maintenance, including the occasional clean-out of the plunge pool.

BWSR staff members write and produce Snapshots, a monthly newsletter highlighting the work of the agency and its partners.