Coon Creek Watershed District links habitat, stormwater work

CLEAN WATER LAND & LEGACY AMENDMENT

Clean Water Funds from BWSR backed three Coon Creek-related projects:

$376,090, 2019; CCWD and Coon Rapids; biochar- and iron-enhanced sand filter to treat a tributary's runoff. Annual reduction estimates (ARE): 80% E. coli; 69 pounds phosphorus.

$395,000, 2020; 1.1-mile Coon Creek Park stream restoration, Andover. ARE: 237 tons sediment, 201 pounds phosphorus.

$345,000, 2022; CCWD and Coon Rapids; biochar- and iron-enhanced sand filter to treat a tributary's runoff. ARE: 23 pounds phosphorus, 404 billion organisms.

COON RAPIDS — On a stream that carries stormwater runoff from a densely populated suburb, the Coon Creek Watershed District (CCWD) overcame constraints of its urban setting to improve habitat, reduce the likelihood of flash flooding, and curb pollution bound for the Mississippi River.

The two-phase, $1.3 million Sand Creek restoration project leveraged $577,930 in Clean Water Funds from the Minnesota Board of Water and Soil Resources (BWSR), and $560,540 in U.S. Environmental Protection Agency funding through Section 319 of the Clean Water Act. Work focused on a 1.2-mile-long stretch.

"When we work to address our aquatic life impairments in these urban streams, it's really twofold. The heavy anthropogenic impact on the land has led to in-stream factors: poor habitat, straightened channels, a lot flashier water, altered hydrology," said Justine Dauphinais, CCWD water quality coordinator. "Also, you have to deal with all of the regulated urban stormwater that is washing off the landscape into the creek — and the quality of that water itself."

As space, partnerships and funding allow, the CCWD pairs in-stream restoration and bank stabilization to reduce sediment-loading with best management practices to reduce peak flows and filter out dissolved phosphorus and bacteria.

Annual reduction estimates show the Sand Creek project, which finished in 2021, will curb sediment-loading by 468 tons and cut phosphorus by 420 pounds. One pound of phosphorus can feed 500 pounds of algae.

Sand Creek starts in Blaine as a series of stormwater ditches, and flows 8.3 miles to Coon Creek, a Mississippi River tributary. The downstream 2.2 miles function as a stream. The rest, bordered by hundreds of private properties, functions as a ditch.

The Sand Creek work set the stage for projects on Coon Creek.

"We started our work in Sand Creek for a couple of reasons," Dauphinais said. "It's a bit closer to meeting water quality goals. It's nice to be able to move that needle. It buys momentum. We can receive this grant money, pair it with our own and make a measurable difference. It's realistic and it's within reach (of being removed from the state's impaired waters list).

"Second is it's a major tributary to Coon Creek, which has worse impairments. Anything we do in Sand Creek helps Coon Creek."

The two years of drought conditions that followed Sand Creek project construction allowed the bank-stabilizing native vegetation to grow deep roots. Accurately

Left: *Contractors backfilled the existing Middle Sand Creek channel and restored the stream, following a natural, meandering channel design. Two BWSR Clean Water Fund grants supported the Sand Creek work: $195,160 awarded in 2018 for Lower Sand Creek corridor restoration; and $382,770 awarded in 2019 for Middle Sand Creek corridor restoration.* **Middle:** *An aerial view of the remeandered Middle Sand Creek looks upstream from the BNSF Railway stream crossing on April 1, 2021.* **Right:** *An upstream view from the pedestrian bridge at Sycamore Circle Northwest depicts native plants' growth the summer after work on a segment of Middle Sand Creek was complete.* **Photos courtesy of Coon Creek Watershed District**

VIDEO: Lower Sand Creek project



Left: *The first stage of the CCWD's Clean Water Fund-supported work on Sand Creek in Coon Rapids focused on Lower Sand Creek corridor restoration. Construction included five backwater pools, and six rock cross vanes designed to control the grade and direct stream flow. The project incorporated toe wood protection, resloping, and vegetated rock riprap streambank stabilization techniques.* **Middle:** *CCWD Water Quality Coordinator Justine Dauphinais walked along Sand Creek in fall 2019.* **Right:** *Most of Sand Creek functions as a ditch; only the downstream 2.2 miles function as a stream.* **Photo Credits:** Ann Wessel, BWSR

measuring the project's success will take about five years of phosphorus, sediment and E. coli sampling.

Anecdotally, Dauphinais said evidence of sediment-reduction already exists: After heavy rains, the water no longer resembles tea.

"Prior to this project we had a relatively straightened, shallow, over-widened channel with a sandy bottom, and not a lot of variety. So we're trying to encourage habitat variety and quality. Things like riffles, pools and runs, and then also cover and substrate variety. We want wood in the channel, and rocks along with the sand. And we want areas of faster-flowing water, areas of low-flowing waters, and then areas with overhanging vegetation and nooks and crannies for the macroinvertebrates to live in," Dauphinais said in fall 2019, when the Lower Sand Creek project was finished and the Middle Sand Creek project was being planned.

Dauphinais called the Middle Sand Creek project the "gold standard" in terms of maximizing the potential within urban constraints.

That two-thirds-mile-long segment used natural channel design methods to return the straightened stream to its winding course, adding 625 feet of length via curves that slow the velocity. The design created a 50-foot-wide floodplain, and lowered the floodplain level by as much as 2 feet.

One of the biggest challenges was explaining why it was necessary to thin the trees. The first step in the Sand Creek work — clearing, thinning and dirt-moving — generated dozens of calls to the CCWD office.

"People appreciated this oasis in the middle of Coon Rapids," Dauphinais said.

But under the heavy shade of mature trees, invasive buckthorn crowded out native understory species, leaving bare soil that eroded easily.

"As they learned more about the projects and the benefits and ... the creek and the aquatic life, then things got better. We had a robust replanting plan with both seed and plugs and shrubs and trees," Dauphinais said. "When the leaves started budding and the plants started growing, then people really came around."

Dauphinais said a couple of residents who had opposed the project called the CCWD office to say they were happy with the results.

During the summer, lush vegetation now conceals bits of the narrowed, serpentine stretch. A more open canopy allowed plants to flourish, and drew eagles and owls.

"The biggest challenge (was) the public perception, and trying to explain the need and the long-term benefit of the tree-clearing and the mass excavation," Dauphinais said.

The extensive excavation was necessary to ensure the project would not increase the flood risk to neighboring homes. The design had to avoid negatively affecting existing infrastructure or sensitive areas. Working in a heavily developed landscape required extensive planning and permits — including permits from the U.S. Army Corps of Engineers, the Minnesota Department of Natural Resources (DNR), and the Minnesota Pollution Control Agency.

"In an urban environment, there's a lot of constraints, whether it's utility companies, gas lines, sewer lines, fiber optic — you have the streets and the culverts and then you have private property and bridges and the railroad," Dauphinais said.

Dauphinais credited Nick Proulx, a stream restoration specialist on the DNR's Clean Water Team, with helping engineers to devise a project that adhered to natural stream design principles.

"That was the biggest win — working well with the DNR and building that relationship. That's going to pay off in all of our future projects and (in) training our engineers that don't do that kind of work in these methods," she said.

What CCWD staff learned from the Sand Creek project translated to its recently finished Coon Creek Park restoration on the main branch of Coon Creek in Andover.

A multi-year project situated on Public Ditch 57, a straightened segment of Coon Creek, it incorporated the principles of natural channel design. It considered what the stream would have looked like before European settlement, and then made adjustments based on how much water the stream receives today — including runoff from impervious surfaces. The existing ditch was oversized and too shallow.

The completed project incorporated a two-stage channel that provides better habitat.

"We're really grateful that there's state and federal funding available for this type of work, because to do it right, it's incredibly expensive and we wouldn't be able to do it with just local funds," Dauphinais said.