



Upstream battle



Each boulder and log is placed to curb velocity and direct the flow of a 500-foot-long, remeandered stretch of an unnamed Deer Creek tributary. A floodplain remains visible on July 14, 2017, as native grass grows through straw and coconut fiber mats. After a red clay dam built here in the 1970s failed, the tributary cut through an embankment. The Minnesota Board of Water and Soil Resources awarded Carlton SWCD \$271,800 over three years to deal with the dams.

Stream restorations, removal of failed '70s dams feed hopes of brook trout, stanch flow of red-clay sediment into Lake Superior



CARLTON – The chocolate river, Tim Michaelson called it.

After the dam failed, every rainfall churned Deer Creek chocolate-brown with the sediment that washed over its slumping, red-clay banks. Deer Creek fed the Nemadji River, which deposited 98,000 tons of sediment a year into Lake Superior. The U.S. Corps of Engineers dredged 33,000 tons a year out of Superior Bay to keep the shipping channel open.

Michaelson had seen that red-clay stripe

reaching into Lake Superior. On the stretch of Deer Creek that cuts across his 80-acre hunting property, he had seen visibility reduced to 3 inches.

A red clay dam on an unnamed Deer Creek tributary – one of 20 built in the 1970s to keep the highly erodible soil out of Lake Superior – did its job for 30 years. When it failed, it unleashed 30 years' worth of accumulated sediment.

With more than \$297,000 in Clean Water Fund grants awarded over three years, the Carlton Soil & Water Conservation



Melanie Bomier, Carlton Soil & Water Conservation District water resources technician, puts into perspective the size of a project that replaced a failed red clay dam.

Photo Credits: Ann Wessel, BWSR



Aspen logs stacked two high and anchored by rocks form steps in a 500-foot-long segment of remeandered stream. Technical Services Area No. 3 staff engineered the project.

Stream Work

NEW TECHNIQUE: Aspen logs stacked two high and anchored on both ends by rocks form the “steps” of the remeandered tributary that empties into Deer Creek. It’s the first project of its kind for the Technical Services Area 3 staff, which provides engineering services to the SWCD.

The contractor chose aspen because it was readily available from a local logger.

STOCKING PLANS: Based on creeks’ length and size, the DNR plans to stock 6,750 brook trout fingerlings in Skunk Creek, 2,625 in Duesler Creek and 2,250 in Elim Creek. The adipose fins will be clipped so DNR staff can determine if fish start to reproduce naturally.

District assessed all 20 structures, removed four (including Michaelson’s), started work on a fifth site this fall, and prioritized the rest. Five dams in the Skunk Creek Watershed are failing; one in the Deer Creek Watershed is a high priority.

“Some of them are in really good shape and they’re far enough in the watershed that they’re not impeding fish passage,” said Melanie Bomier, Carlton SWCD water resources technician.

The cost of each of the next five high-priority sites varies widely, from about \$41,090 to about \$751,760.

“The initial investment into stream restoration is expensive. Cost-wise, maybe it would be cheaper to patch the ones that aren’t totally failed and blown out,” Bomier said. “Eventually you’ll have

to replace them – just like a road structure. But the long term I think is less expensive because you don’t have to do maintenance. Once the trees are established and they’re holding that bank in place, then that’s it. You kind of get to walk away and not worry about it.”

Taming torrents

In mid-July, Bomier visited the recently finished Michaelson site, and two other red clay dam sites in different stages of development.

Although landowners don’t contribute financially because they weren’t involved with the 1970s installation – a project of the Soil Conservation Service, Environmental Protection Agency and the SWCD – the SWCD needs their consent to proceed.

Michaelson was among those who agreed. After the dam on his property failed, the tributary cut through an embankment. The resulting 25-foot-tall, nearly vertical slopes sloughed off after heavy rains. The engineer remeandered the tributary within the existing, eroded valley. Building a new channel would have cost far more.

The 2012 flood caused more erosion at the site. Two Great Lakes Commission grants totaling \$105,275 covered the resulting cost increase.

By mid-July, a 500-foot-long segment of the tributary spilled over rocks and logs designed to tame torrents. Sprigs of planted willows and red osier dogwood poked up along the banks, which gave way to a floodplain. Foot-tall spruce trees studded the hillside,

which was swaddled in a layer of straw and coconut fiber. A seeding of native plants and grasses eventually would overtake the oats cover crop.

Michaelson hoped to see something else: Fish.

“For the first time since we have owned it, I believe it can sustain fish. I feel great about that. We have never fished in the creek. We have heard from some of the community elders, ‘Oh, there used to be trout in the creek,’” Michaelson said.

“That’s one of our hopes, that maybe there will be again,” Michaelson said. “I fully believe at the condition the creek is in now, it will happen.”

Michaelson, 56, of Carlton, works in Minnesota Power’s forestry department. He visits the hunting property with his wife and three children, and hopes one day to fish Deer Creek with his grandchildren.

Trout stream restoration is one long-term goal of the SWCD.

Stream sampling showed Deer Creek was cold enough for brook trout, said Duluth-based Area Fisheries Supervisor Deserae Hendrickson. But a mud volcano, a natural fissure that spews sediment into the groundwater, currently makes the creek too murky to support spawning habitat.

The Minnesota Department of Natural Resources has no record of trout in Deer Creek.

Anticipating trout

Today, it’s difficult to find Elim Creek in the 5-foot-tall grass and tangle of flowers that obscure the narrow,



Top: A tree planting was part of the restoration of Elim Creek, where three failing red clay dams were removed and a one-third-mile-long segment of stream was restored in 2014. The streambanks are no longer grazed. **Middle:** Bomier visits Elim Creek in July 2017. The grasses and forbs have grown up to the point that locating the stream is difficult. **Bottom:** Grasses bend over a reameandered stretch of the creek.

winding stream from view. The sound of water trickling over rocks is the best indicator.

It’s even more difficult to imagine the three structures that once dammed one-third mile of a channelized stream

where grazing animals muddied the water. Only someone keenly attuned to the landscape would realize each of the rocks in the stream was intentionally placed, would realize the occasional boulder was an anomaly.

“That’s one of the goals, is to walk away from these things and a few years later have them be a stream again. Our goal isn’t to leave this big stamp on the landscape and say, ‘We’ve been here,’” said Keith Anderson of Duluth-based Technical Services Area 3. The TSA assists member SWCDs.

One of the three dams had failed, releasing 300 tons of sediment. The two remaining threatened to release 965 tons more. The dam removals and brook trout habitat restoration were completed in 2014.

The U.S. Fish & Wildlife Service’s National Fish Passage Program, which restores natural fish migration, provided \$30,017.

Today, the stream is fenced off. Trees clad in protective tubes grow on a hill above 2,000 feet of reameandered stream. Elim Creek empties into Skunk Creek, which joins the Nemadji River.

The DNR plans to stock brook trout in Skunk Creek and two of its tributaries – Duesler Creek and Elim Creek

“It’s hard to say if there ever were trout in there before the red clay dams went in,” Hendrickson said. “Certainly if there were trout in there previously, they were wiped out by 2007.”

No trout turned up in a 2007 sampling. A single brown trout turned up in the DNR’s 1985 Skunk Creek sampling.



It was between the mouth of the creek and the dam about a mile upstream.

“The connectivity issue can be a really big one in sustaining populations and having them be viable,” Hendrickson said. “The more you segment and disconnect the stream as a whole, you’re creating smaller, isolated populations that cannot sustain themselves because they can’t move around to react to environmental conditions.”

The reintroduction was delayed a couple of years ago after flooding hit the southern Minnesota hatchery that raises a wild strain of brook trout. The hatchery is re-establishing its brood stock.

“We’re hopeful that’s in the next year or two,” Hendrickson said of the stocking schedule.

Fixing washouts

By early October, engineers were drawing up initial



Top: Before the dam blew out 10 or 15 years ago, an Elim Creek tributary flowed through a culvert here, eventually feeding the Nemadji River and Lake Superior. The Nemadji deposited 98,000 tons of sediment a year into Lake Superior. Landowner Wendell Lund helped clear the land when the dam was constructed in the 1970s. **Above:** Because landowners weren’t involved when the dams were built, they don’t contribute financially. Carlton SWCD must have landowners’ permission to pursue projects on their property.

designs for a third failed red clay dam site. There, slumping banks of an Elim Creek tributary widened the gap, revealing rusted culverts through which water once flowed. Upstream, cattails choked a once-open pond.

Wendell Lund, 59, helped

to clear this land for the red clay dam construction in the 1970s.

Back then, he farmed the land with his father.

“We wanted to stop the erosion in Lake Superior. They had a program to fence off all the ravines and try to

stop the sediment,” Lund said during a break from his power-washing and wood restoration businesses. “It worked good at first, and through time something happened and it washed out.”

Lund figured the dam blew out all at once, 10 or 15 years ago. He hadn’t seen signs of erosion, hadn’t seen water cut a new channel around the spillway.

Today, he grazes beef cattle on the 73-acre Black Hoof Township property.

The earthen dam serves as a crossing between farm land and pasture. Maintaining the crossing is one reason Lund agreed to the project. A \$24,000 Enbridge Ecofootprint grant will match BWSR funds.

After a couple of years, Lund said he hoped to see an end to deep gully washouts.

“Our place is our retirement. So we take care of our place,” Lund said.



The Minnesota Board of Water and Soil Resources’ mission is to improve and protect Minnesota’s water and soil resources by working in partnership with local organizations and private landowners. Website: www.bwsr.state.mn.us.