2023 MN Watersheds Project & Program of the Year

Detailed Award Information Form

1) Award Category (check one)

Project Program *X*

2) MAWD Region (check one):

One *X* Two Three

3) Watershed District: BOIS DE SIOUX WATERSHED DISTRICT (BdSWD)

4) Project/program name: MULTIPURPOSE DRAINAGE MANAGEMENT PROGRAM

5) Nominator (if different from above watershed district)

6) Project/Program Summary (Limit 150 words) to be read at the awards program during the annual meeting banquet:

In the BdSWD, landowners lead projects – and one of the clearest priorities for our landowners is modernization of legal drainage systems. These projects become a gateway to add Clean Water features on the landscape. Since 2017, the BdSWD has implemented a rolling thee-year program, under which the District continually plans, develops, and constructs an annual drainage system repair or improvement that includes significant water quality enhancements. These projects represent a collaboration with landowners, township officials, road authorities, county commissioners, soil and water conservation districts, MnDOT, utilities and railroads. These projects demand close attention to Minnesota drainage law statutes, including multiple legal notices and hearings. Project costs are dependent upon size, and have ranged from $600,000 - $3.6 million.

Landowners provide the majority of project funding through repayment of county bonds, but funding partnerships are also critical to project success. Clean Water elements of the projects receive significant funding through partnerships with the Red River Watershed Management Board, BWSR (through the Legacy Act Clean Water Fund), and BdSWD Culvert Sizing and Clean Water grants. Project activities supported by clean water funds include installation of side inlet culverts, berm construction and vegetation/seeding, resulting in significant sediment transport and phosphorous reductions. Through implementation of their rolling phased program, the Bois de Sioux Watershed District has modernized the following public systems: Traverse County Ditch #37 (2017), Wilkin County Ditch #8 (2018), Wilkin County Ditch #9/#10 (2019), Judicial Ditch #11 (2020), Judicial Ditch #6 (2021), Traverse County Ditch #35 (2022), Wilkin County Ditch #Sub-1 (2023).

7) Define need:

A vast majority of the legal ditch systems within the BdSWD were designed and constructed in the early part of the 20th century, using the rudimentary technology available at that time. These systems often feature a mismatch of road crossings and channel sizes, causing localized flooding and significant adverse economic implications. In addition, due to climate change, as well as changes in production agriculture, these systems no longer meet the functionality of their original construction. Further, original designs did not contemplate channel stability, sediment transport, and other water quality and natural resource considerations. As a result, existing systems are often experiencing instability in the form of downcutting, bank slumping, and other types of erosion. Finally, the existing systems do not include features that limit sediment transport from the farmed landscape.

8) Goal/purpose of the project/program:

The purpose of this program is to achieve Comprehensive Watershed Management Plan (CWMP) goals for sediment transport reduction, water quality enhancement, natural resource enhancement, and flood damage reduction for the benefit of BdSWD residents and the State of Minnesota. This is done with the support of landowners who are partners in the projects. Lastly, these projects will also reduce the frequency and cost of future maintenance activities.

9) Describe project/program: As landowner project petitions are received and processed according to statute, District staff identify opportunities to implement water quality and flood risk reduction best management practices. These features are included in project plans and designs. Both internal and external Clean Water Fund cost-share opportunities are pursued by the District on behalf of landowners, with the timing of applications paired with statutory legal requirements and construction bid timelines. As Clean Water Fund awards are determined, bond issuances are coordinated through partnerships with associated County Boards, and are later constructed according to project plans.

10) Describe public benefit: The program provides significant flood damage reduction and water quality enhancement benefits. The project designs incorporate the recommendations of the Red River Basin Technical and Scientific Advisory Committee (BTSAC) Briefing Paper #3. This design concept includes strategic channel and culvert sizing criteria in combination with maintaining floodplain connectivity that mitigates localized flooding without increasing downstream peak flows during extreme flood events. Significant economic benefits to both public infrastructure and the agricultural economy are the result. Further, a reduction in the frequency and cost of future maintenance activities provides another significant economic benefit. Finally, the water quality and natural resource enhancements associated with improved turbidity conditions, reduced

sediment transport, channel stability, and wider grassland corridors are tremendous.

11) Watershed plan reference (where is the problem/solution identified in the watershed plan, does it address stated problems, objectives and goals)

Pages 3-9 & 3-10; Action Tables #2 & #3

12) Was project goal achieved? If so, how was the success measured?

Yes. We measure project goals in terms of: increased public ditch system stability (miles); increased public drainage system capacity to convey the Atlas 14 10-year, 24-hour storm event (miles); reduction in nutrient loading (lbs/yr phosphorous); reduction in sediment loading (tons/yr); increased permanent grassed easements (acres). Each of these achievements are realized *annually* following construction.

	↑Stability & Adequacy	**Phosphorous Reduction**	**Sediment Reduction**	**↑Permanent Grassed Easement**
TCD #37	2.5 Miles	85 lbs/yr	340 tons/yr	23.05 acres
WCD #8	7.5 Miles	143 lbs/yr	569 tons/yr	23.91 acres
WCD #9	13.5 Miles	149 lbs/yr	595 tons/yr	51.54 acres
JD #11	9 Miles	117 lbs/yr	569 tons/yr	95.5 acres
JD #6	8 Miles	384 lbs/yr	417 tons/yr	44.96 acres
TCD #35	5 Miles	65 lbs/yr	230 tons/yr	9.72 acres
WCD #SUB-1	8 Miles	90 lbs/yr	450 tons/yr	45.33 acres

13) Watershed or water body name to be protected or improved by project or program (if applicable)

	Waterbody
TCD #37	Twelvemile Creek
WCD #8	Rabbit River
WCD #9	Rabbit River
JD #11	Bois de Sioux River
JD #6	Rabbit River
TCD #35	Twelvemile Creek/Mustinka River
WCD #SUB-1	Bois de Sioux River

14) Watershed or water body information (e.g., size, watershed area, classification, description):

	Drainage Area
TCD #37	4,160 acres
WCD #8	11,729 acres
WCD #9	15,956 acres
JD #11	12,785 acres
JD #6	4,897 acres
TCD #35	3,904 acres
WCD #SUB-1	10,370 acres

15) Project partners (financial or inkind support)

	Partners
TCD #37	BWSR Clean Water Fund thru Traverse SWCD
WCD #8	BWSR Clean Water Fund thru Wilkin SWCD, Wilkin County
WCD #9	BWSR Clean Water Fund, Wilkin County, Red River Watershed Management Board
JD #11	BWSR Clean Water Fund, Traverse County
JD #6	BWSR Clean Water Fund, Wilkin County
TCD #35	BWSR Clean Water Fund, DNR FHM, RRWMB, BdSWD
WCD #SUB-1	BWSR Clean Water Fund, Wilkin County

16) Start date: 2016

17) Project status:

On-going Project/Program X

Completed: Completion date:

18) Project cost (this can be provided as total cash cost or a breakdown can be provided to show the cost of various project elements and partners): For our most recent completed project:

	Project Costs
TCD #37	Cost: $750,000 Partners: $135,000 BWSR CWF; $615,000 Balance Landowners and BdSWD
WCD #8	Cost: $1,130,000 Partners: $171,500 BWSR CWF; Balance Landowners and BdSWD
WCD #9	Cost: $2,730,000 Partners: $114,120 BWSR CWF; $100,000 RRWMB; Balance Landowners and BdSWD
JD #11	Cost: $2,060,000 Partners: 327,000 BWSR CWF; Balance Landowners and BdSWD
JD #6	Cost: $1,800,000 Partners: $504,359 BWSR CWF; Balance Landowners and BdSWD)

TCD #35	Cost: $2,880,000 Partners: $320,000 BWSR CWF; $1,000,000 RRWMB; $800,000 DNR FHM; Balance Landowners and BdSWD)
WCD #Sub-1	Cost: TBD Not Final Partners Not Final: $244,150 BWSR CWF; $112,500 RRWMB; Balance Landowners and BdSWD

19) Letters of support:

Each application may have up to two letters of support. The letters can be from individuals, agencies, organizations, or local units of government. Letters from staff or managers of the sponsoring District will not be accepted. Attach letters to this application as a pdf document.

BWSR articles attached for TCD #37 and TCD #35.

20) Photos:

As noted in the instructions, each nomination must be accompanied by **at least 4 (4) photos**, but no more than eight (8) of the project or program. The photos must be in a digital format.

Traverse County's first ditch retrofit eases flood damage as it improves water quality within the Bois de Sioux Watershed District

'It will demonstrate what we're capable of'

CLEAN WATER LAND & LEGACY AMENDMENT

WHEATON — The Bois de Sioux Watershed District's first ditch retrofit could be the first of many retrofits designed to alleviate flooding and improve water quality.

The watershed spans 1,400 square miles in parts of six west-central Minnesota counties. The district serves as the ditch authority for 420 miles of ditches in Traverse County plus parts of Wilkin and Grant counties.

The retrofit on Lateral 1 of Traverse County Ditch 37 benefits water quality as well as cropland.

Scott Gillespie sees it as a showpiece.

"It's huge. It will demonstrate what we're capable of and what the other ditches can be," Gillespie, a farmer and Bois de Sioux board member, said during a late September site visit.

John Mathias sees it as a solution.

Top: *John Mathias' farm borders Traverse County Ditch 37, Lateral 1. A Clean Water Fund grant helped pay for elements of a ditch retrofit with clean water benefits. Mathias said the fix alleviated flooding in his field.* **Left:** *None of the road crossings changed. "We increased the capacity of the ditch itself to hold more water, and we stabilized the banks so we wouldn't have … dirt going downstream," said Scott Gillespie of the Bois de Sioux Watershed District board.*

Photo Credits: Ann Wessel, BWSR

Lateral 1 borders Mathias' 320-acre Dollymount Township field, where he said past flooding had cost him about $50,000 a year.

"I would lose from a third to half of my crop," Mathias said, describing the damage caused by 2 feet of standing water during the growing season. "Last fall was extremely wet, and it really did a great job. We had 11 inches at harvest time. It was really devastating, but the ditch kept up. It wasn't overflowing. It did a great job."

The work on 2.5-mile-long Lateral 1 is part of a $637,600 retrofit and repair on 7-mile-long Traverse County Ditch 37.

A $135,000 Clean Water Fund grant from the Minnesota Board of Water and Soil Resources helped pay for clean-water aspects of the Lateral 1 retrofit, which reins in sediment loss. (Traverse Soil & Water Conservation District received $10,000 of the grant for project development.) The 30-plus landowners whose 4,860 acres of cropland benefit from the entire Traverse County Ditch 37 project will pay $512,600 in taxes levied by the watershed district over 15 years. A redetermination of benefits increased from $18,990 to $2.86 million the maximum amount the watershed district could levy to pay for repairs.

Contractors finished the project in 2017.

Chad Engels of Moore Engineering in Fergus Falls described the retrofit:

Contractors flattened the channel's side slopes to create more stability. Material excavated from the channel was used to construct a berm adjacent to the ditch. Side inlet culverts were then installed through that berm to allow water to drain from adjacent fields into the ditch. The design results in less ditch-bank erosion and keeps more topsoil in the field.

Top: *The Mustinka River flows north of Wheaton in Traverse County. Water from Traverse County Ditch 37 flows into Twelvemile Creek, the Mustinka and Lake Traverse — headwaters of the Bois de Sioux River.* **Left:** *Engineer Chad Engels, left, and Assistant Engineer Jim Guler stand on a buffer installed in conjunction with a Traverse County Ditch 37 retrofit in the Bois de Sioux Watershed District. The buffer was separate from work done through a Clean Water Fund grant. The district used ditch assessment proceeds to pay landowners for permanent right-of-way easements, installing buffers on both sides of Traverse County Ditch 37.*

"By installing the culvert, you are armoring that side slope," Engels said. "The side-inlet culvert meters the flow. So when we have a large rain event that results in high runoff, the culvert will meter the flow and allow silt that's being carried in the runoff to settle out in the field."

Previously, Mathias said field after field would flood during the spring snowmelt when north-flowing water overran tree-shaded, ice-filled ditches.

Agricultural production accounts for about 93 percent of land use in the watershed, which lies in the flat bed of Glacial Lake Agassiz. Here, volume — not peak flow — drives flooding as snowmelt and north-flowing rivers send water into iced-up regions.

From Traverse County Ditch 37, water flows into Twelvemile Creek, the Mustinka River and Lake Traverse — headwaters of the Bois de Sioux River. The Bois de Sioux and Otter Tail rivers join to become the Red River at Breckenridge.

Built by horse-drawn equipment in 1902, Traverse County Ditch 37 had received only minor repairs. Before this project, the only maintenance since 1988 consisted of silt and cattail removal. Cottonwood trees exceeding 3 feet in diameter grew in the channel.

"The project was really twofold," Engels said. "There was a hydraulic component to restore

the original capacity and there was a water-quality component with the retrofit."

The watershed district used ditch assessment proceeds to pay landowners for permanent right-of-way easements, installing buffers along both sides of Traverse County Ditch 37. Easements allow the watershed district access for maintenance work.

"Over time, someday all of the landowners in the Bois de Sioux Watershed District will be compensated for these buffers. That's my goal. As we do the redetermination of benefits, that will naturally happen. We're going to put in these easements and they're going to be paid for the easements," Engels said.

Less in-channel erosion will mean less maintenance and less cost to landowners. Ditch clean-outs average about $6,750 a mile and were necessary every five to seven years.

The way Gillespie sees it, everyone wins — and phosphorus and nitrates are kept in check by curbing erosion. The retrofit will keep an estimated 340 tons of sediment — about 26 dump trucks' worth — out of the ditch and downstream waters.

Scott Gillespie, a Bois de Sioux Watershed District board member, stood near the bottom of Traverse County Ditch 37's Lateral 1, where a Clean Water Fund grant covered clean-water aspects of the district's first ditch retrofit.

"We aren't adding to flooding. We are cleaning the water because we're keeping the dirt out of the ditch. We're providing better drainage for the farmer. Buffer strips are getting installed but it is not controversial. So the water is winning. The landowner is winning," Gillespie said.

Mathias, 68, who farms about 3,500 acres, said he'd been working for 30 years to get the ditch fixed.

"The ditch was virtually inoperative," Mathias said. "Now that the water is going the correct direction, it's taken pressure off of other ditches as well and it's improved the drainage and the timeliness of the water getting off the fields and going down the ditches properly."

The watershed district is partnering with the Wilkin Soil & Watershed Conservation District on a related project under construction this year. The SWCD received a $176,500 Clean Water Fund multipurpose drainage management grant to install side-inlet culverts and berms on Wilkin County Ditch 8.

If funding is approved, the watershed district will begin retrofits on Wilkin County ditches 9 and 10 in 2019.

"It's the beginning of retrofitting all of the rest of the ditches. I'm convinced from discussions that the board has had that this is a long-term strategy. Over time, they intend to retrofit all the ditches in the Bois de Sioux," Engels said.

> **"This is where the Clean Water Fund money is the best money spent. It is right on the ground. It directly goes into cleaning water. It directly keeps phosphates and nitrate out of the water. I don't know where you could spend money better than that."**
>
> — Scott Gillespie, Bois de Sioux Watershed District board member

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. www.bwsr.state.mn.us.

Left:*Gently sloped sides are one element of a Traverse County Ditch 37 retrofit. The retrofit will help alleviate flooding in farm fields and improve water quality within the Bois de Sioux Watershed by allowing nutrient-carrying sediment to settle.* **Middle:** *Side-inlet culverts in the berm connect the ditch to the field. When the water level in the ditch is high, the pressure pushes a flap-gate shut. Water then remains on the field until the level in the ditch drops.* **Right:** *Check dams help to reduce the velocity within the ditch.*

Bois de Sioux Watershed District builds on multi-benefit successes

With projects that combine water quality, flood reduction and wildlife habitat improvements, the watershed district at the headwaters of the Red River gained support from landowners and funding sources alike

Top: *From left: James Guler of Moore Engineering; Linda Vavra, BDSWD Board president; and Jamie Beyer, BDSWD administrator; met with landowners Vicky Radel and Steve Berger on Oct. 20, 2022, to discuss the watershed district's Clean Water Fund-backed work on Traverse County Ditch 35, a project tied to Mustinka River* **(left)** *rehabilitation and Redpath Flood Impoundment work. Landowners' permanent easement allowed replacement of the culvert that is the outlet from the ditch to Twelvemile Creek.* **Photo Credits:** Ann Wessel, BWSR

CLEAN WATER LAND & LEGACY AMENDMENT

Clean Water Funds from BWSR support the Mustinka River rehabilitation and Traverse County Ditch 35 projects.

VIDEO: October 2022 site visit

WHEATON — Work is slated to begin this spring on the Bois de Sioux Watershed District's Mustinka River rehabilitation project, part of a $50 million, multi-partner flood-control effort within the Red River Valley that has water quantity, water quality and wildlife habitat benefits.

The rehabilitation will remeander a 5-mile-long stretch of the Mustinka River within a 300-foot-wide two-stage channel and floodplain. Materials excavated during construction will build the north levy of the Redpath Flood Impoundment. That work was split into two stages.

The BDSWD Board in March accepted the low bid, awarding the contract to John Riley Construction of Morris to complete the first half of the

Side-water inlets, **left and right,** *are part of the BDSWD's multipurpose drainage management work on Traverse County Ditch 35 supported by a Clean Water Fund grant from BWSR. The project has water storage, water quantity and water quality benefits. Work finished in fall 2022.* **Middle:** *In Redpath Township, Traverse County Ditch 35 outlets into Twelvemile Creek through a culvert. The ditch, seen here in October 2022, would usually contain water that time of year.*

remeander and embankment construction. The board anticipates soliciting bids for the second half in 2024.

The 3-square-mile Redpath Flood Impoundment will have the capacity to store about 23,000-acre-feet of water — the equivalent of 2 inches of water across the 212-square-mile contributing area. The Redpath will work together with the existing North Ottawa Impoundment in Grant County.

"Having impoundments and places to slow that water down (will) hold the water back so the rivers are able to take that water without it flooding across all the farmland," said BDSWD President Linda Vavra, who also serves on the Red River Watershed Management Board.

Ninety-three percent of land within the BDSWD is in agricultural production. The Mustinka rehabilitation will control how much water enters the river channel and will divert excess flows to the new impoundment. The Mustinka River flows to Lake Traverse, headwaters of the Bois de Sioux River. The Red River begins where the Bois de Sioux and Otter Tail rivers meet in Breckenridge.

An $800,000 projects and practices Clean Water Fund grant the Minnesota Board of Water and Soil Resources awarded to the BDSWD in 2022 supports the river rehabilitation. The work will curb sediment-loading to the Mustinka River by an estimated 253 tons and phosphorus by an estimated 72 pounds each year. One pound of phosphorus can feed up to 500 pounds of algae.

"By putting that meander back in, it will slow that water down. ... By re-doing Ditch 35 and having the side-inlets and the new culverts coming in, it helps us to hold the water in the farm fields so that the sediment can settle out in the field and the clean water can run into the ditch."

— Linda Vavra, Bois de Sioux Watershed District president

The remeander will add about 3 river miles, construct 34 acres of wetland habitat and establish 226 acres of upland buffers within the 260-acre floodplain. The grant-funded work also will install about 30 side-inlet culverts, which regulate the flow of water from field to ditch.

A related BDSWD project completed in fall 2022 realigned Traverse County Ditch 35 to make room for the Redpath Flood Impoundment.

"Traverse County Ditch 35 was a ditch system that was out of repair," said James Guler of Moore Engineering. "This project was an attempt to stabilize the channel and install side-inlet culverts to help keep the sediment in the field and out of the ditch."

A $320,000 multipurpose drainage management Clean Water Fund grant from BWSR supported that work, which was designed to produce water storage and water quality benefits on the existing agricultural drainage system. Annual estimates show a 230-ton reduction in sediment-loading to Twelvemile Creek and the Mustinka River, and a 65-pound reduction in phosphorus.

"Our drainage systems were designed at the turn of the century," said BDSWD Administrator Jamie Beyer. "Bringing these projects into the modern day is really important for the productivity of the land around it, for protection of the people that live in this area. And it's certainly an important climate mitigation tool."

Increasingly frequent and heavy rains have exacerbated flooding in the Red River Valley. Situated within the flat lakebed of glacial Lake Agassiz, the Bois de Sioux watershed drains more than 1,970 square miles across three states. From its headwaters at the confluence of the Bois de Sioux and Otter Tail rivers, the Red River flows north 550 miles to Lake Winnipeg.

"What I'm hoping to see is that we have flood-damage reduction so that we hold (back the) water from our neighbors in the north to help protect them from flooding, so that we also protect our farm fields and our people right here at home, to enhance the value of their properties and to help them raise better crops in the future — and to clean our water," Vavra said.

In October 2022 she and BDSWD staff met in Redpath Township with Steve Berger and Vicky Radel. The couple is among the many landowners whose cooperation was necessary for the Mustinka River and Redpath Flood Impoundment work to proceed.

Berger recalled past flooding where Traverse County Ditch 35 meets Twelvemile Creek.

"I grew up here. I'm well-versed with what happens with the water at this particular point. It's a confluence of actually three different waterways within a mile, including our front yard," said Berger, a retired computer programmer. "So there's a lot of water. When it comes, it comes really quick."

Berger, who moved back with his wife in 2007, recalled the worst year's flooding:

"In 1969, which was our huge flood, we would boat from the house to the barn so we could feed the cattle. One time the current was so quick we got past the barn, and we thought we were going to get swept up. We didn't know where we were going to end up. The current was that fast running through our yard. So '69, huge flood, '97, 2005 and actually 2019 — just three years ago — was another huge flood."

The couple agreed to a critical piece of the project where the ditch outlets into the creek: a permanent easement that allowed access to install a larger culvert and to maintain the site. The Traverse County Ditch 35 project involved 10 landowners along a 5-mile stretch. Handling the road crossings involved collaboration with Redpath Township and the Traverse County Highway Department.

"These projects serve a lot of different stakeholders, and that's what makes them attractive. In our area of the state, we have an extremely flat terrain, and we rarely get precipitation in the amount that the landscape can handle. So we deal with runoff," Beyer said.

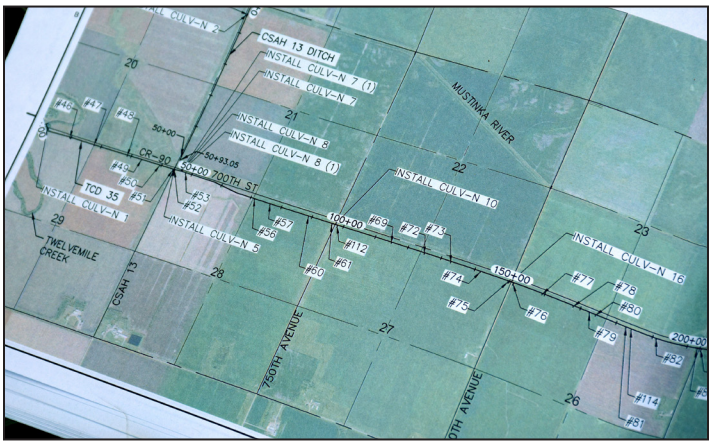
"For both our agricultural producers and for folks who are interested in making sure that our water quality is high, these projects present an opportunity. So we can put certain aspects into the project that help clean the water," Beyer said. "We're able to control where the flooding happens, and that's what's attractive to the agricultural producers."

The BDSWD and the Red River Watershed Management Board support both the Mustinka River project and the Redpath Flood Impoundment. Additionally, the Minnesota Department of Natural Resources' Flood Hazard Mitigation Program supports the impoundment; Outdoor Heritage Fund and Environment and Natural Resources Trust Fund grants support the remeandering.

"Some of the other benefits involved with this project are for our wildlife. It really will enhance that. It will give us an extra 28 acres right along the impoundment itself that will be all wildlife area for deer and pheasants and ducks and geese," Vavra said. "Putting the meanders back in the river will really help for the fish and just generally clean up the water in the river."

Vavra said Clean Water Fund grants help the BDSWD to leverage funds and accomplish large projects.

"Clean Water Funds are really enabling us to get this project going," Vavra said. "As I tell my co-managers on the (Red River Watershed Management Board), everything we do in the Bois de Sioux watershed helps our neighbors to the north. We do not build a project in the Bois de Sioux without it having many facets, and that it also provides clean water in every project."



The outlet from Traverse County Ditch 35 to Twelvemile Creek is to the left, just beyond the bounds of this map showing the location of the side-water inlets.

Clean Water Fund-backed Work

Clean Water Funds from BWSR support other work within the Bois de Sioux Watershed District — and involving Traverse and Wilkin soil and water conservation districts — that contribute to water-quality improvements affecting the Red River. Among them:

MULTIPURPOSE DRAINAGE MANAGEMENT: $1.3 million since 2017 in six additional multipurpose drainage management grants that carry clean water benefits

LAKE TRAVERSE-RELATED: $1.6 million since 2020 in three projects and practices grants for Lake Traverse water-quality improvement work centered on Traverse County Ditch 52 bank stabilization and sediment reduction

Twelvemile Creek is seen near the spot where Traverse County Ditch 35 outlets into the creek, which joins the Mustinka River. A segment of the river will be remeandered, and the soil excavated during construction of a two-stage channel will build the north levy of the Redpath Flood Impoundment. The BDSWD Board in March accepted the low bid for the first half of the remeander and levy construction, awarding a $4.8 million contract to John Riley Construction of Morris.

BWSR

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