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CONTENTS

Introductions

Introduction to Issue Fifteen
By Patrick Nunnally, Editor 4

Guest Editor’s Introduction to Issue Fifteen: We Are Water MN
By Britt Gangeness and Jennifer Tonko 6

Features

We Are Water: Stories and Connections to Nibi
By Paula Maday 9

We Are Water MN: Relationship-Based Water Engagement
By Jennifer Tonko and Britt Gangeness 15

We Are Water UMN
By Tracy Fallon, Douglas Klimbal, Kimberly Long, and Patrick Nunnally 38

Geographies

Whitewater State Park: 100 Years in Paradise
By Sara Holger 53

Misi-zaaga’iganing (Mille Lacs Lake)
By Travis Zimmerman 63

In Review

Woven Ways of Knowing
By Mahin Hamilton 69

Perspectives

Cultivating and Stewarding a Community of “Water People”
By Melissa Miller 75

Primary Sources

A Lake with a Crossing in a Sandy Place
By Ashley Ignatius 80

Strong Relationships Result in Conservation Action
By Jen Schaust, Kevin Kuehner, and Margaret Wagner 94

Teaching And Practice

Water and Equity
By Linda Kingery 103

Community Connections over Water
By Tim Ruzek 118

PRIMARY SOURCES

STRONG RELATIONSHIPS RESULT IN CONSERVATION ACTION

By Jen Schaust, Kevin Kuehner, and Margaret Wagner

In southeast Minnesota, we are fortunate to have an abundant supply of groundwater. It is the water we drink and the source of water in local trout streams. However, the unique geology of

this region makes it vulnerable to contamination. A complex network of cracks, open channels, and caves below the surface provides a quick and direct path for surface water to reach groundwater.

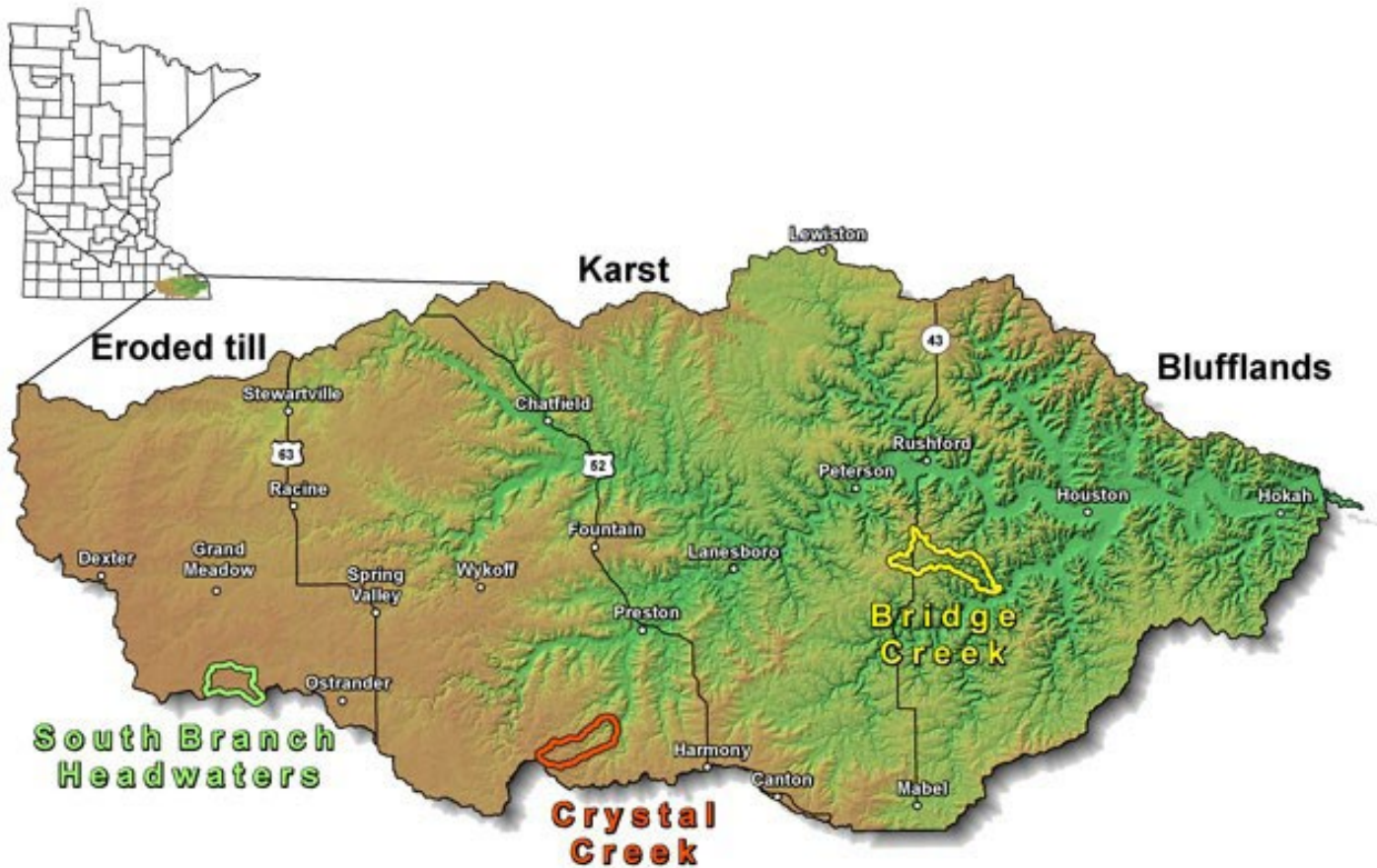


Kevin Kuehner, MDA hydrologist and researcher (left), Wayne DeWall, participating farmer (center), and RRFSP walkover technician Ron Meiners (right) pause at the edge-of-field monitoring station in DeWall's field. Data collected at this station over many years is now informing on-farm management decisions throughout the region. Image courtesy of Paula Mohr, "The Farmer" magazine.

As water travels over the landscape it can carry contaminants, such as bacteria, pesticides, fertilizers, and road salt, underground. One of the most mobile and common contaminants found in Minnesota groundwater is nitrate-nitrogen which comes from natural sources and also from fertilizer, animal waste, and leaky septic systems. Land use decisions and practices we implement can directly impact the amount of contaminants lost to our water resources and the path they take to surface water and groundwater.

In three small watersheds that drain to the Root River, a group of 47 farmers are doing their part to help reduce surface runoff and improve surface and groundwater quality in southeast Minnesota.

Working with crop advisers, staff from the Minnesota Department of Agriculture (MDA), local Soil and Water Conservation Districts (SWCDs), and the Minnesota Agriculture Water Resource Center, farmers are problem-solving and addressing the areas of biggest concern. Together they form the Root River Field to Stream Partnership (RRFSP) and, through an approach founded in respect and shared decision-making, they all are learning from each other. This group of farmers and landowners have demonstrated their immense insight and ability to figure out solutions to environmental challenges when they clearly understand the issue.



Three small sub-watersheds in the Root River watershed were selected for the Field to Stream study. Each watershed is less the 5,000 acres and located within the glacial till, karst, and bluffland landscapes. The strategic selection of these watersheds allows direct application to a large geographic area spanning much of southeast Minnesota. Image courtesy of Kevin Kuehner, Minnesota Department of Agriculture.

To help understand the issue, the partnership has developed one of the most intensive and comprehensive small watershed monitoring programs in the Midwest. The RRFSP measures the amount of sediment and nutrients found in runoff water at both the edge of fields and within the stream. For dissolved nutrients such as nitrate-nitrogen, sub-surface drainage tile and groundwater springs are also monitored. This baseline information quantifies what is actually leaving agricultural fields, the timing of peak losses, and

provides a benchmark to measure water quality change after the farmers' land management changes have been made. To learn more about the monitoring efforts and results visit the [Root River Field to Stream Partnership](#).

To find areas that are most vulnerable to runoff, farm leaders invited their neighbors to participate in an on-farm walkover process they helped design. Cynthia Christensen was one such neighbor and owns farmland in the Bridge Creek



Edge-of-field monitoring stations provide information about the amount of runoff, soil, and nutrients moving off a given field into the waterway. Sites are fully automated to collect water samples whenever runoff occurs. Water samples are analyzed for nitrogen, phosphorus, and sediment and monitoring occurs year-round, 365 days a year. Monitoring has shown that 40 percent of the surface runoff occurs when the ground is frozen. Image courtesy of Kevin Kuehner, Minnesota Department of Agriculture.

watershed. After receiving the letter from her farmer neighbor and a call from Ron Meiners, an experienced conservation specialist who is part of the RRFSP, Cynthia agreed to participate in a walkover. Before visiting her property, Ron first evaluated the fields using aerial photos and precision conservation planning maps produced by the MDA. Ron used this information to help plan and efficiently guide his walkover. Specifically, he was looking to answer: where are conservation practices already in place, are they working properly, where is erosion most likely to occur, and what

areas of the landscape need additional, targeted conservation practices?

Once the walkover was complete, Ron produced a summary report for Cynthia and met with her to discuss it. Like many of the other participating farmers, Cynthia's property had existing conservation practices and runoff areas identified as low, moderate, and high risk. Ron asked if he could help Cynthia address one of the high-risk areas on her fields. The one they agreed to address was also the area of highest runoff risk



In-stream monitoring stations were installed at the outlets of the small study watersheds. This information combined with edge-of-field monitoring and a wide range of other assessments provides a unique opportunity to evaluate the effects of targeted agricultural conservation practices on water quality. Image courtesy of Kevin Kuehner, Minnesota Department of Agriculture.

in the project watershed. The 75-acre field was a concern because of its very steep slopes and proximity to the creek. Over the course of a few meetings she and Ron discussed a variety of solutions and met with the Root River SWCD and Natural Resource Conservation Services staff. After much thought and financial consideration, Cynthia decided to enroll the entire field into the Conservation Reserve Program (CRP). CRP is a federal land conservation program in which farmers receive a yearly rental payment in exchange for removing environmentally sensitive land from agricultural production. The plants replacing the crops provide year-round cover and

help reduce runoff and improve water quality. Cynthia chose to plant a rare and declining prairie habitat seed mix. In addition to enrolling in CRP, she installed four new water and sediment control basins and several grassed waterways. When the field in CRP completes its ten-year contract, it will be ready for row cropping again. The additional practices she installed will offer added runoff protection. Cynthia truly demonstrated her understanding of the challenge and value of adding conservation practices.

Cynthia's story is just one of several success stories that could be told as a result of the RRFSP



Identified as one the highest runoff risk fields in the Bridge Creek watershed, RRFSP walkover technician Ron Meiners and landowner Cynthia Christensen discuss the various runoff control practices she installed on a 75-acre field that drains directly to Bridge Creek. The highly erodible field was enrolled into the Conservation Reserve Program (CRP) for ten years and planted to native prairie grasses and forbs. In addition to enrolling in CRP, Cynthia installed four water and sediment control basins (basin pictured in the background) and several grassed waterways to further reduce runoff. When the field completes its 10-year contract, it will be ready for row cropping again with less soil and nutrient loss to Bridge Creek. Image courtesy of Kevin Kuehner, Minnesota Department of Agriculture.

walkover approach. A remarkable 100 percent (47 out of 47) of the farmers participated in the walkovers covering 92 percent of the crop acres found in the three small watersheds (10,000 acres). This level of participation is the result of the time taken up front to develop personal relationships and the dedicated time to maintain them. The trust between farmers and partners created the foundation for openness, combined problem-solving, and the opportunity to do what they feel is important. Three farmers share their

reasons for joining the RRFSP and the work done to increase conservation practices on their fields in a recent video.

See video “Root River Field to Stream Partnership: Lessons Learned.”

Like Cynthia, most of the farmers were already using a wide range of practices to reduce runoff on their land. However, each farm also had new opportunities. For instance, about one-third of



Poorly functioning grassed waterway. A grassed waterway is a broad, shallow channel designed to move surface water across farmland without causing erosion. If not maintained properly, they can fill with sediment causing water to flow along the edge, resulting in ephemeral gully erosion. Ephemeral gully erosion is one of the main mechanisms for off-site delivery of sediment and attached nutrients in surface runoff. Image courtesy of Kevin Kuehner, Minnesota Department of Agriculture.

the existing conservation practices documented during the walkovers, especially grassed waterways, were not performing properly. This was the “low-hanging fruit” with regard to prioritization since the practice was already in place, but just needed to be re-shaped and re-seeded. The RRFSP also identified at least two to three high priority conservation resource needs for each farmer. Over 70 percent of the farmers have already addressed or are in the process of addressing their highest priority resource needs. Additional projects are planned through 2020.

Planning, engineering, and financing a sudden surge of conservation practices can be challenging for a local conservation office. Ron’s facilitation following the walkovers were key to overcoming some of those challenges. Conservation leaders and board members with the Mower, Fillmore, and Root River SWCDs were also critical to the partnership’s success. Where possible, projects leveraged funding from both state Board of Water & Soil Resources (BWSR) Clean Water Funds and federal Natural Resources Conservation Service (NRCS) Mississippi River Basin Initiative sources to maximize cost-share assistance to the landowner. While some farmers elected to pay for projects on their own, cost-share dollars did improve the rate of practice implementation.

Some of the projects implemented through the field walkover process include:

- Within just two years (2017–2018), new and restored grassed waterways spanning over 100,000 linear feet have been installed in targeted, high priority areas in the study watersheds (three small watersheds within the Root River watershed). For reference, typically 20,000 feet of grassed waterways are installed annually through a county SWCD office in southeast Minnesota. About 25 percent of these new waterways were completed without public cost-share assistance.

- 14 new water and sediment control basins and catchment ponds were installed in targeted locations. Typically, the range is about one to four per year through a county SWCD office in southeast Minnesota.
- A 1950s-era flood control structure was rehabilitated with over 20,000 cubic feet of soil removed, allowing for additional sediment and nutrient trapping for the next 50 years.
- Nearly 200 acres of cover crops have been planted by farmers in the project study area. Cover crops are planted to prevent erosion and to improve the health of the soil. They are typically planted following harvest of the cash crop and left to grow after the crop is harvested. The cover crop is typically terminated in the spring before planting. Examples of common cover crops include winter cereal rye, oats, and clover (i.e., red, white, and crimson clover).
- Over 100 acres of Conservation Reserve Program (CRP) land was targeted on the highest runoff risk fields. Many of these plantings included native prairie plants for pollinator habitat as well as other rare and declining habitats.
- 100 percent of the buffer law setbacks are in place across all three study watersheds. The buffer law, set by the 2015 special session legislature, requires perennial vegetative buffers of up to 50 feet along lakes, rivers, and streams and buffers of 16.5 feet along public ditches.
- Ten acres of perennial vegetation were targeted along a private drainage ditch system in the headwaters of the Root River to reduce impacts from flooding and field erosion.

- Feedlot improvements include an increase in manure storage to eliminate manure applications on frozen soil for two high priority feedlots, installation of three milk house wastewater treatment systems, and abandonment of two feedlots in high runoff risk locations. These changes help reduce the risk of manure runoff (nutrients and bacteria) to the stream and river. Manure applied to frozen soil is not able to soak into the ground. With added manure storage, the farmer can time applications when runoff risk is lower. Feedlot location is also important. Locating them in lower runoff risk areas with adequate buffer setbacks and clean water diversion is key for water protection.
- To date the RRFSP has leveraged over \$1.5 million in private, state, and federal dollars to support accelerated and targeted conservation action.

Conservation work and water monitoring in the Root River watershed is continuing and planning is in place to apply the walkover process in other small watersheds of the Root River. There are also new initiatives in place to help reduce more complex, water-soluble contaminants like nitrate from entering groundwater. It is exciting to anticipate the next phase of monitoring as we look for positive changes in water quality because of the additional conservation practices installed

by participating farmers. This, however, will take a bit of time. Results from this next phase will take a few years. It's also exciting to observe more farmers experimenting on their own with cover crops and no-till practices to improve soil health and water infiltration while reducing labor and input costs.

The time spent building and maintaining relationships, striving for the best customer service, and strengthening communication is key to this project's success. It has helped accelerate the number of practices on the land that would not otherwise be there in a very short amount of time. This has been a win-win for farmers, contractors, resource managers, and for clean water.

The Root River Field to Stream Partnership between local farmers, crop advisers, state and local agencies, and nonprofit partners is an example of the collective efforts a water quality project can have when time is taken up front to develop personal relationships, establish clear communication, and create a respectful working environment. The partnership includes shared decision-making, neighbor to neighbor encouragement, a dedicated walkover technician, and an opportunity to learn from each other.

Funding for this project is provided by the Clean Water, Land and Legacy Amendment.

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