



Farmers' cover crops aid nitrate reduction

Clean Water Funds cut risk of trying soil health practices that benefit drinking water supply management areas

PIPESTONE COUNTY — The cover crop greening up in Tom Griebel's field just outside Holland will reduce nitrate levels in the shallow aquifer that supplies drinking water to some of Lincoln Pipestone Rural Water's 4,700 customers.

The 114-acre field is part of Pipestone Soil & Water Conservation District's nitrate reduction effort targeting 1,912 acres of ag land here and in other highly vulnerable drinking water supply management areas affecting Edgerton's municipal treatment systems.

Pipestone County farmer Tom Griebel, above right, planted cereal rye in a field that lies within Lincoln Pipestone Rural Water's Holland Drinking Water Supply Management Area. On March 31, Griebel, who is also a member of the Pipestone County Farm Bureau, checked on the crop, at top. Lincoln Pipestone Rural Water serves about 4,700 customers. Its Holland treatment plant, above left, draws from a shallow aquifer. **Photo Credits:** Ann Wessel, BWSR

A Clean Water Fund grant from the Minnesota Board of Water and Soil Resources offset the cost for Griebel to buy seed and hire someone with the expertise and specialized equipment necessary to plant cereal rye and winter wheat in different parts of the field after last fall's soybean harvest.

"I was interested in trying it anyway, and the funding just pushed me over the edge," Griebel said. The reason: "Of course to improve profits, but also to improve soil health and to keep the nutrients such as nitrates out of the water system."

For their three-year commitment, farmers who plant cover crops receive \$40 per acre per year; those who plant perennial vegetation such as alfalfa or Kernza receive a one-time \$200-an-acre payment. The \$299,520 grant runs through 2023.

To date, 17 producers within Holland and Edgerton's drinking water supply management areas have enrolled 22 parcels ranging from 6.7 acres to 263 acres.

“ There is a potential to improve the situation and still be able to utilize the water without that treatment, and that’s the goal. ”

— Laura DeBeer,
Pipestone SWCD

All told, farmers enrolled 875 acres in perennial vegetation and 746 acres in cover crops. Another 291 acres were slated for cover crop enrollment this spring.

"The ultimate goal would be to have the majority of these drinking water supply management areas in some sort of soil health practices," said Laura DeBeer.

A Pipestone SWCD-based water resources technician, DeBeer's position is partly funded by the Minnesota Department of Health for one-on-one work with producers and water suppliers throughout the six-county region.

"Nitrates are quite mobile in the soil profile," DeBeer said, explaining the value of perennial vegetation and cover crops.



Nitrates that aren't taken up by growing root systems can leach into the groundwater. Shallow aquifers beneath gravely and sandy soils are more susceptible. Perennial crops use nitrogen as they grow. Cover crops use nitrogen and then, as plants decompose, release it to fertilize the next season's cash crop.

"Ultimately we just would like to see more growing roots in the area, being it either perennial vegetation or cover crops between cash crops," DeBeer said, "and really having the producers in the area know and understand their role in drinking water protection."

The Minnesota Department of Health links nitrates to blue baby syndrome. The U.S. Environmental Protection Agency's

standard for nitrates in drinking water is 10 parts per million (ppm). For treatment to stop, nitrate levels must remain under 7 ppm.

Edgerton spends about \$5,000 a month to remove nitrates from drinking water. Levels have fluctuated — decreasing when land was in permanent cover through the federal Conservation Reserve Program, increasing when it was farmed. With more land back in perennial cover — and with less rain — nitrate levels have decreased from about 20 ppm to 12 ppm over the past year.

Lincoln Pipestone Rural Water took four of its eight wells at Holland and North Holland offline in 2017 because a byproduct of its nitrate treatment had the potential to cause a different type of pollution. An experimental treatment that reduced nitrate levels to zero was discontinued because it was cost-prohibitive, and Minnesota Pollution Control Agency funding was available to help connect to South



Holland residents get their drinking water from Lincoln Pipestone Rural Water. Some farmers with land in drinking water supply management areas near Holland and Edgerton are working with Pipestone SWCD to implement soil health practices meant to reduce nitrates. **Photo Credit:** Ann Wessel, BWSR



Lincoln Pipestone Rural Water's Holland treatment plant draws water from a shallow aquifer. LPRW also buys water from sources in South Dakota and Iowa. **Photo Credit:** Ann Wessel, BWSR.

How no-till, cover crops worked for one farmer

Tom Griebel is among the Pipestone County producers who will plant cover crops for three years as part of Pipestone SWCD's Clean Water Fund grant-supported effort to reduce nitrates by targeting ag land within a drinking water supply management areas.

By early June, Griebel plans to bale or chop the cover crop — cereal rye on part of the field, winter wheat on the rest — for livestock feed, and then plant teff grass, which he expects will produce two crops of hay this season. He'll follow with no-till corn.

Griebel, who raises feeder cattle and sheep, gradually incorporated no-till on 300 of the 1,500 acres he runs with his wife, Barb, and parents, John and Corlys Griebel. Cover crops grow on about 200 of the 300 no-till acres. He plans to buy a no-till drill, and eventually convert the whole farm. The benefits are twofold. No-till eliminates the time, expense and machinery required for spring and fall tillage. It's also a way to maintain the size of his operation after his parents retire.

"My plan is to eliminate some machinery and time and hopefully end up with more money in my pocket and end up with better soil on top of it all," Griebel said.

Out of necessity, Griebel tried no-till for a short time

Dakota-based Lewis & Clark Regional Water System.

Closing the four wells reduced production from the Holland water treatment plant by about 40%. Customers nearest that plant off U.S. Highway 75 still get their drinking water from the four wells that don't require nitrate treatment. Some customers farther south receive water from other sources.

Lincoln Pipestone Rural Water buys water from Lewis & Clark, South Dakota's Brookings-Dueul Rural Water System and Iowa's Osceola County Rural Water System.

"Water keeps people in the region," said Jason Overby, Lincoln Pipestone Rural Water general manager.

Growth in agriculture — particularly hog operations — and in towns drives demand. LPRW connects about 50 new rural customers a year. It recently connected

“ Water is limited in this area. It always seems we're searching for water to meet demands of the region. ”

— Jason Overby,
Lincoln Pipestone Rural Water



an entire community. Other communities with aging infrastructure or compliance concerns have expressed interest.

"Water is limited in this area," Overby said. "It always seems we're searching for water to meet demands of the region. It's a hard pill to swallow ... if the water that is available can't be supplied without treatment."

The closed wells could reopen if a cost-effective nitrate treatment emerges, or if changes on the landscape sufficiently reduce the nitrate load in the aquifer.

"What this grant is hoping to achieve is to have positive impacts before necessary treatment

costs," Overby said. "If all the producers were to participate in this and there is huge impact, the nitrogen load lessens, the benefit would be that Lincoln Pipestone would not have to necessarily seek treatment, would not have to incur huge costs for developing a new treatment process to eliminate nitrates."

DeBeer said she hoped the practices implemented would show a trend in nitrate reduction after the three-year grant period.

Meanwhile, Griebel said he expected neighbors to take notice.

"They are watching to see what my results are, to see if they're going to try it or not," Griebel said.

“ There is no right, wrong, definite way to do it. You’ve just got to try what you think will work with your mind-set, operation, money — and then adjust as you go. ”

— Tom Griebel, Pipestone County farmer, on tailoring cover crops, no-till to his operation



in the early 1990s after a hailstorm. A prevent-planting after a wet spring that kept farmers out of the field led him to try cover crops a few years ago. His advice to others? Start slowly and talk to neighbors.

The following excerpt from that conversation is edited for clarity.

How does a person get into cover crops and no-till?

As many different farms as there are, there are that many different ways to use cover crop and no-till. One thing that I have noticed by doing it all across the different soil types that I have: There is no right, wrong, definite way to do it. You’ve just got to try what you think will work with your mind-set, operation, money — and then adjust it as you go.

If you want to try it, I would say go in and talk to Laura (DeBeer of Pipestone SWCD), try it on a small basis. And (try for) numerous years. When I

first did no-till a long time ago, I wished I would have kept it going.

How have those practices affected yields?

It seems like the longer I do it the more they keep coming up, compared to other pieces that I farm other ways. There’s a lot of things that go into the yield: the kind of year, the maturity, soil type. (We farm within) a 20-mile-diameter circle. In that 20 miles, there’s a lot of soil differences and moisture differences.

From what people tell me, it takes four to five years to really see yield drastically improve. I have seen little improvements — averaging about 5 bushels per acre for beans, about 10 bushels

per acre for corn on fields where yields could be verified — which I am happy with because that means we’re going in the right direction.

The no-till cover crop does take a little bit more management. There’s a little less room for error and assumptions. You have to pay attention to what’s going on and adjust to the conditions.

What questions did you have when you started?

Am I really doing the right thing? Is this the right decision? In farming, if you don’t put that seed in right the first time, you are messed up for the whole year. That was my biggest concern. I had very little experience with it, no hands-on at all. Now I’m not

quite as gun-shy.

What should people consider before trying it themselves?

Talk to people that they trust that have done it — neighbors, friends, the local FSA (USDA’s Farm Service Agency), seed dealers, chemical dealers — just get as much information about it as you possibly can.

And then take a leap of faith. Try it.

Mother Nature forced my hand. I am by no means an expert. Everybody’s got their own take on what works. Go in with as much knowledge as you can, and adjust to the conditions and go in with an open mind.

What are you trying next?

I am side-dressing corn this year. I’m experimenting with that to see if we can cut our nitrogen rates — feed that plant when it needs it, and then there’s less leaching hopefully. If the year looks dry, or too wet, it just opens up a lot more options.



Pipestone SWCD-based Laura DeBeer is a regional water resources specialist who works with landowners within highly vulnerable wellhead protection areas in six southwestern Minnesota counties. On March 31, she visited Tom Griebel’s field outside Holland. He said Pipestone County farmers interested in trying no-till or cover crops should start by calling their county SWCD. **Photo Credit:** Ann Wessel, BWSR



Kernza grows in early April on a field within Edgerton's drinking water supply management area. The perennial crop will help reduce nitrates in drinking water. **Photo Credits:** Laura DeBeer, Pipestone SWCD

With city land purchase, Edgerton gains permanent cover, protection



The Minnesota Board of Water and Soil Resources' mission: Improve & protect the state's water & soil resources, working in partnership with local organizations & private landowners. www.bwsr.state.mn.us

The city of Edgerton this spring bought 37.2 acres within its drinking water supply management area to ensure the nitrate-reducing benefits of perennial vegetation remain intact.

A Clean Water Fund wellhead protection partner grant from the Minnesota Board of Water and Soil Resources covered 90% of the \$360,000 purchase price. The transaction between the city and Carol Brands Living Trust was finalized on April 12, City Clerk Joel Farrington confirmed.

"Our goal is to get it (the nitrate level) back below that 7 ppm, but the main reason that we're really after this is because it's been in wellhead protection for so long that we didn't want to lose it and find out what would happen if the wrong person did end up with the property," said Edgerton Water Supervisor Doug Brands, who is the seller's nephew.

The land lies upslope from the city well, which supplies 550 residential and business customers. It's been part of Edgerton's wellhead protection efforts since 1991. Previously, the city had received Minnesota Department of Health grants to supplement Conservation Reserve Program payments to the landowner. That effort brought nitrate levels down from about 20 ppm to 15 ppm.

When the city rented 10 acres from an

KERNZA RESEARCH: The University of Minnesota this summer plans to run fertilizer trials on a 10-acre test plot outside Edgerton to see how much nitrogen plants can use before leaching occurs.

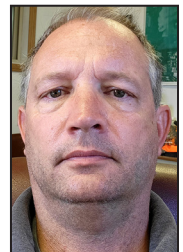
adjacent landowner and enrolled it in CRP for 10 years, nitrate levels met EPA standards. Nitrate levels climbed within a few years after farming resumed. The city in 2018 rented 125 acres from that landowner and planted Kernza on 40 acres. Last year, the entire field was planted into Kernza.

The city chose Kernza partly because of its massive root system.

"Like any grass, it used tons and tons of nitrogen. If there's nitrogen in the soil, it uses it before it has a chance to get down into the drinking water. It's a really good nitrogen scavenger," Brands said.

On his own 230-acre farm in rural Edgerton, Brands raises corn, soybeans and Kernza. With assistance from Pipestone SWCD and its Clean Water Fund grant targeting nitrate reduction, he planted Kernza on the 7 acres of his farm that lie within the city's drinking water supply management area.

Brands said the three-year commitment would give him time to decide whether to expand the crop.



“It's hard to sell it to others if you're not willing to do it yourself.”

— Doug Brands, on growing Kernza