



CONSERVATION TODAY

Sibley Soil and Water Conservation District & USDA

Summer 2019



Drainage Water Management (DWM): Re-Thinking Tile

By Jeremy Buckentin, District Technician

With the uncertainty of current weather patterns, many farmers are searching for ways to maintain some control over their cropland. Wet springs the past couple of years has left many landowners looking to invest in pattern tile drainage for their cropland acres to help combat the excessive moisture. Recently, a modern drainage technique has been developed that provides the same aspects of traditional pattern tile but with added benefits of greater water quality and a potential for increased crop yields. As landowners are taking a serious look into adding drainage tile to their acres, they should really be considering drainage water management as a water control strategy.

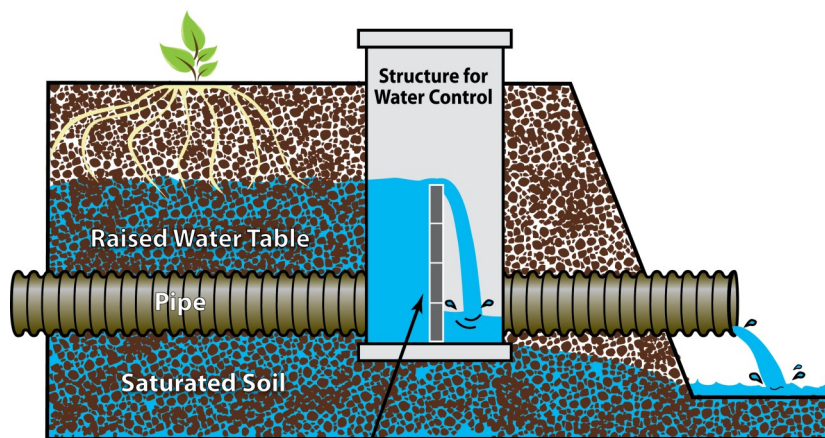
Drainage water management (DWM) is the practice of using water control structures within a pattern tile system to control the drainage outlet at varying depths. This allows farmers to have more control over their drainage, giving them the ability to not only drain a field during planting or harvest, but also retain water for crop use during the growing season. A DWM system can help to reduce as much as 15-75% of nitrates from entering into surface waters, as well as provide a safety cushion for crops during periods of drought. Land managers can control water levels based on the crop rooting depth or release the water as needed during excessive rainfall events. Research has shown a properly managed DWM system can even help to boost yields by 5% or more. A DWM system can be designed as a new drainage network or it can be retrofitted into existing pattern drainage with some limitations based on the pre-existing layouts and grades.

The ideal landscape for a DWM system is flat to gently sloped cropland that has an adequate outlet. A single outlet control structure can effectively control 10-20 acres of drainage, while multiple control structures can be used within one system. A typical outlet control utilizes stacked planks or gates that can be manipulated by the land manager within the structure housing. Additional "in-line" control structures are often buried upstream of the main outlet which provide the ability to control higher elevations, usually in one foot increments. Farmers can manually set the water levels or utilize the newer automatic technology that has become available for DWM systems.

Overall, the cost of installing a DWM system is relatively low. Assuming grades are flat enough for one structure to control 20 acres, initial costs range from \$20 to \$110 per acre. Because of the great conservation benefit to water quality, there are many free resources and potential financial assistance available to landowners who are interested in the design and installment of DWM systems. The USDA-

NRCS and Ecosystems Services Exchange have developed a partnership to assist landowners with the implementation of drainage water management systems. For free DWM design assistance for new and retrofitted systems, as well as program recommendations, landowners can take the first step by contacting the Sibley County USDA-NRCS at 507-237-5435.

NRCS Conservation Solutions...
Drainage Water Management



Flow Control Mechanism



Sibley SWCD

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SWCD Board

Kathleen Thies - District 1

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Loren Evenson - District 3

Wayne Grams - District 4

Robert Nielsen - District 5

Board Meetings

Second Tuesday
4 p.m., SWCD Office

USDA - NRCS

April Sullivan,
District Conservationist



Office Hours

Monday - Friday
8 a.m. - 4:30 p.m.



New Sibley County Well Sealing Program Available

Did you know that 21% of Minnesotans get their drinking water from private wells? That number is even higher in Sibley County. Groundwater has been a hot topic as of late in the conservation world and for a good reason! Groundwater is critical to Minnesota's economy and ecosystems. Shifting attitudes are leaving the "out of sight out of mind" mentality of groundwater use and treatment behind. Businesses and the general public have felt the impacts of degraded groundwater and even groundwater shortages within the state.

Some examples of potential groundwater hazards that could negatively affect the quality of groundwater include leaking storage tanks, industrial waste, feedlots, holding tanks above and below ground, agricultural chemical applications, non-compliant floor drains or septic systems, etc. A variety of BMPs can be implemented such as; CRP, reduced nutrient application on agricultural fields, cover crops, feedlot runoff structures, and well sealing.

In rural areas, most landowners depend on private wells for their own drinking water supply system. Typically, wells are drilled into aquifers that provide a rural resident with drinking water. The deep clay soils of Sibley County have done a great job keeping contaminants from reaching drinking water aquifers but the threat is always present. Unused and/or abandoned wells provide an opportunity for pollutants, runoff, and other waste materials to contaminate groundwater due to the relatively easy pathway for entry. When the contaminants reach groundwater, drinking water quality becomes compromised and the resulting treatment needed to remove the contaminants becomes difficult and expensive. The sealing of unused and/or abandoned wells significantly reduces the risk for pollutants and contaminants to reach groundwater used for drinking water thus reducing the health risks for the citizens of Sibley County.

This past December, Sibley SWCD was awarded \$11,000 in Clean Water Fund (CWF) money to use towards sealing unused/abandoned wells. The two-year project goal is to help landowners seal 15-20 wells within the county by providing 50% cost-share, not to exceed \$1,000 per well. If you have an unused well, stop by at the office (112 5th St., Gaylord) or call 507-702-7077 for more information about this program.



United States Department of Agriculture **Conservation Financial Assistance Programs:**

CRP (Conservation Reserve Program)

Sign-up runs through August 23, 2019

CSP (Conservation Stewardship Program)

Continuous Sign-up

Now Accepting Applications for FY2020 Funds

EQIP (Environmental Quality Incentive Program)

2020 applications are currently being accepted

WRE (Wetland Reserve Easements)

Continuous Sign-up

For more information,
contact the Sibley NRCS Office in Gaylord:

(507) 237-5435



MIN CREP and CCRP: Two Options for Landowners

Landowners interested in setting aside marginal cropland or protecting sensitive areas once again have two options available to them; Conservation Reserve Enhancement Program (CREP) and Continuous Conservation Reserve Program (CCRP). CREP and CCRP enrollment re-opened this past June after a brief pause that began last fall. CREP and CCRP applications must be received by August 23, 2019 to be considered for CRP funding this federal fiscal year. Both programs rely on the USDA Conservation Reserve Program (CRP) as a starting point, with CREP adding a state-funded permanent easement administered by the Board of Water and Soil Resources (BWSR) to the CRP contracted acres.

Competitive enrollment through CREP is a voluntary state/federal program designed to improve water quality and habitat through permanent conservation easements. CREP's program goal is to protect and restore up to 60,000 acres of marginal cropland across 54 southern and western Minnesota counties using buffer strips (CP21), wetland restorations (CP23/CP23a), and drinking water wellhead area protection (CP2). Native plantings on those acres will filter water, prevent erosion, and provide critical habitat for grassland dependent species. Landowners simultaneously enroll land in a 14 to 15 year federal Conservation Reserve Program (CRP) contract and a permanent Reinvest in Minnesota (RIM) Reserve program conservation easement. One of the most common questions we receive is if the easement would then be opened to the public. Landowners maintain ownership, including the right to control access to the land covered by the CREP easement. Also, the enrollment of CREP (permanent easement) lowers the taxes on the parcel. As in all land transactions, a clean title will streamline the process.

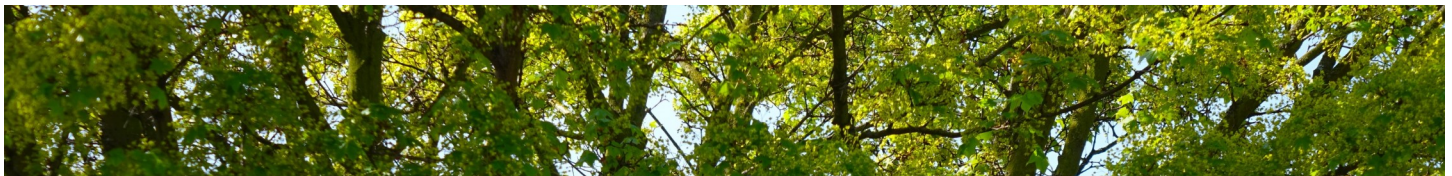
Landowners typically sign up CREP for one of five reasons. First, it provides fair compensation. CREP combines USDA Conservation Reserve Program contract payments and Reinvest in Minnesota easement payments, covering close to 90% of the land's township value. Second, CREP is an attractive option on land that is marginal and produces lower yields because of wet ground, soil type, or other challenges. The third reason is due to additional incentives paid through CREP, payments are 52% to 120% greater with CREP compared to CCRP. The fourth reason is the conservation elements. Enrolling land in CREP directly benefits water quality and creates new wildlife habitat. Lastly, CREP enrollment can help you create a legacy for future generations.

Landowners who enroll in CCRP enter into contracts that last 10 to 15 years. The USDA provides landowners with annual rental payments and cost-share assistance. CCRP pays landowners who remove sensitive lands from production and plant certain grasses, shrubs, and trees that improve water quality, prevent soil erosion, and increase wildlife habitat. CCRP is not a permanent easement and can be put back into production or re-enrolled back into CRP after the expiration of the contract.

To learn more about CREP and CCRP, stop by the SWCD office or call Eric Miller at 507-702-7077.



Newly restored Sibley County CREP easement. Photo Taken by Eric Miller.



Modern Tillage Systems: Making “Cents” of Field Work and Soil Health

By Jeremy Buckentin, District Technician

With the onset of modern technology, today’s agricultural equipment is ever evolving to increase crop yields, save time, and make farming more efficient than it has ever been before. Advances in nutrient sciences and GPS technologies coupled with modern equipment have paved the way for agricultural success and consistent yields that were once thought un-feasible to obtain. With modern sciences and technologies as the main drivers behind our high yield success, ultimately when the dust settles, it is the farmer who faces the toughest challenge in adapting to these advances to ensure they maintain a successful harvest.

The decisions each farmer makes can have a direct impact on their business, their land, and their livelihood. Major decisions, such as a change to their management system, is not something that they can afford to gamble on without completely understanding the risks and benefits of doing so. For many it comes down to what makes the most financial sense for their business and what the best investments are they can make for their land and for the future. One such investment that should be worth heavy consideration is changing from a conventional/mulch tillage strategy to a no-till/strip till management strategy.

According to publications from MN, IA, and ND University Extensions, a reduced tillage system can provide comparable yields to chisel plow operations with less cost input, increased soil health aspects, and heavily reduced erosion rates. In fact, a UM Extension research study over four locations in ND and MN from 2005 to 2012 indicated that no-till/strip-till soybeans averaged higher yields than chisel plowed soybeans on those locations. The same study for corn had comparable no-till/strip-till/chisel plow yields across the majority of the test plots. Furthermore, these yields were obtained costing up to \$30 less per acre on soybean ground and \$24 less per acre on corn ground when compared to traditional chisel plow operations. There are also additional benefits to cost savings, nutrient efficiency, water infiltration, erosion control, microbial activity, and increased organic matter as well as potential USDA financial assistance and SWCD cost share programs to help with the transition into a reduced tillage system.

Getting right down to it in terms of spring soil temperatures, strip tillage actually shows to warm equally, if not faster, than chisel plow ground. This is because the crop residue under strip tillage is placed along side the planting berm, allowing for more sunlight penetration into the soil verses chisel plows broadly distributing crop residue. Strip till shows great promise with soil moisture as it allows the planting berms to dry similarly to chisel plowed land, while maintaining higher moisture below the undisturbed areas between the berms. This can help carry a crop through a dryer period longer than chisel plowed land. With the resulting well-drained warmer seed bed, strip-till crops tend to have faster plant emergence and establishment which can greatly increase yield potential. The added residue values of reduced tillage also promotes good soil structure which can provide better infiltration during high rainfall events and more strength for traffic compared to more aggressive tillage systems that demote soil structure.

Reduced tillage practices embrace farming from the viewpoint of healthy soils, which in turn will help promote more cost effective land management and better biodiversity for crop health. While maintaining good soil structure as a result of reduced tillage; farmers can expect benefits ranging from increased aggregate stability, resistance to soil compaction, reduced bulk density, improved water infiltration and drainage, enhanced retention of plant available water, reduced nutrient leaching, less soil erosion, enhanced biological activity, and increased soil organic matter. Research has shown building and maintaining soil organic matter is very important as it is directly related to soil fertility, soil structure, and agricultural productivity potential.

(Below: Table’s from the UM Extension research study depicting yield averages under multiple tillage systems with Corn/SB.)

Table 2: Average soybean yields for three tillage systems

Values are for four locations in North Dakota and Minnesota, from 2005 to 2012. Source: Nowatzki et al. (2011).

Tillage system	Average soybean yield: Fargo (five site-years)	Average soybean yield: Carrington (four site-years)	Average soybean yield: Prosper (four site-years)	Average soybean yield: Moorhead (four site-years)
Chisel plow	28 bushels per acre	28 bushels per acre	52* bushels per acre	33 bushels per acre
No-till	29 bushels per acre	29 bushels per acre	--	--
Strip-till	29 bushels per acre	30 bushels per acre	48 bushels per acre	40** bushels per acre

*Chisel plow yields were statistically higher in one of the four years.

**Strip-till yields were statistically higher than chisel plow yields in three of the four years.

Table 3: Average corn yields for three tillage systems

Values are for four locations in North Dakota and Minnesota from 2005 to 2012 (Nowatzki et al., 2011).

Tillage system	Average corn yield: Fargo (five site-years)	Average corn yield: Carrington (five site-years)	Average corn yield: Prosper (four site-years)	Average corn yield: Moorhead (four site-years)
Chisel plow	130 bushels per acre	145 bushels per acre	184 bushels per acre	161 bushels per acre
No-till	124 bushels per acre	144 bushels per acre	--	--
Strip-till	128 bushels per acre	145 bushels per acre	198* bushels per acre	40* bushels per acre

*Chisel plow yields were statistically higher than strip-till only in the study's first year. For the following three years, strip-till yields were significantly higher than chisel plow yields.



Modern Tillage Systems: Making “cents” of field work and soil health. (Continued from previous page)

Knowing some of the benefits to a reduced tillage system creates a value to base any potential drawbacks that one must consider when switching to a reduced tillage management system. Initial equipment cost and upgrades are the first hurdle to get past. However when considering the return on investment in regards to overall cost savings and potential financial assistance from conservation programs, getting that return on investment may not take as long one thinks. One must also consider that once they are fully comfortable with a reduced tillage system (which takes practice and patience), they may be able to recoup some additional dollars from selling off the equipment they no longer utilize.

Another hurdle that can be daunting is learning how the system actually works and how it can be best utilized effectively. There is a learning curve with everything new, and switching to a reduced tillage system is no exception. Managing residue build up, new fertilizing strategies, and pest/weed management practices are all items that must be tailored to fit to each farmer and their land. Seeking out advice from those who are already doing reduced tillage management is a great way to help comprehend the different equipment and management strategies regarding no-till/strip-till. It may also be beneficial to have a small amount of acres custom prepped/seeded with no-till or strip-till systems as well before a land manager is ready to take that next step towards change.

Finally, lets consider some of the benefits of reduced tillage as it related to environmental impacts. As stated earlier, no-till/strip-till management systems can effectively control sheet and rill erosion quite literally by the ton. That in turn also decreases nutrient loading in surface waters by slowing down phosphorous attached to sediment. Limiting the loss of sediment from cropland would mean less frequent ditch cleanouts, increased water quality and clarity, and decreased potential for algae blooms throughout our surface waters.

(Below: Table’s from UM/IA Extension research studies depicting soil temperatures and erosion rates of several tillage systems.)

Table 1.

Simulation results of surface runoff, sediment yield, and phosphorus bound to sediment for different tillage systems in corn-soybean system.

	No-till	Strip-till	Disc-till	Chisel-till	Conventional-till
Runoff (inches per year)	4.64	4.58	4.48	4.60	4.79
Sediment yield (tons per acre per year)	1.14	1.73	5.83	7.45	12.15
Phosph. on sediment (pounds/acre/year)	1.31	1.99	6.66	8.51	13.88

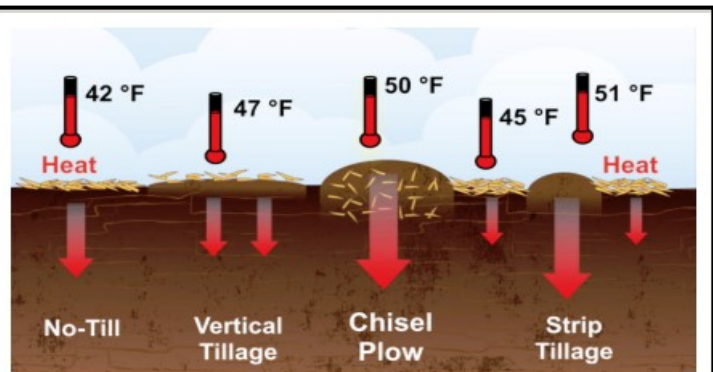


Figure 4: Average soil temperature taken at a 4-inch depth from thaw to crop canopy closure for four tillage systems near Wahpeton, N.D. and Fergus Falls in 2015.

If you would like more information on reduced tillage systems or the programs/cost share available, stop in or give us a call at 507-702-7077 (SWCD) or 507-237-5435 (NRCS).

Sources:

UM Extension:

Economics Tillage:

<https://extension.umn.edu/soil-management-and-health/economics-tillage>

Reducing Tillage Intensity:

<https://extension.umn.edu/soil-management-and-health/reducing-tillage-intensity>

Iowa State Extension:

Strip-till Farmer website article: Strip-Till can Reduce Erosion In Fragile Soils in Iowa Hills

<https://www.stripillfarmer.com/articles/49-news-strip-till-can-reduce-erosion-in-fragile-soils-in-iowa-hills>

NDSU Extension:

Strip Till for Field Crop Production

<https://www.ag.ndsu.edu/publications/crops/strip-till-for-field-crop-production>



Conservation Education at Area Schools

Once again this past May, USDA and the Sibley SWCD had a chance to introduce the vast world of conservation to 3rd-5th graders. This year's programs were held at the Green Isle Community School, Sibley East, and Henderson Hilltop. Discussion topics included native plants and the benefits they provide while focusing on their extensive root systems. Staff gave presentations on the differences between deciduous and coniferous trees, and discussed tree rings with the aid of tree cookies. Focus was also given to pollinators, including beekeeping and what would be lost from our grocery stores and breakfast plates if we lost all of our pollinators. The festivities were capped off by giving kids lilacs to take home or to assist in a planting pollinator habitat at their school.



AIS Spotlight: *Phragmites australis*



Phragmites australis, also known as common reed, is a tall, perennial grass. It is found in wetlands, riparian areas, shorelines, and other wet areas such as roadside ditches. Both native and non-native genotypes of *Phragmites* are present in Minnesota. The native and non-native types can be difficult to distinguish from one another. Invasive *Phragmites* is an ecosystem engineer that benefits from human-caused disturbances on the landscape. Invasive populations in North America have been shown to alter the hydrology of wetland systems, lower plant diversity, impact food webs, and reduce diversity and abundance of invertebrates, fish, and waterbirds. In 2017, more than 150 professionals and citizen observers requested kits to participate in the MNPhrag Early Detection Project. Their contributions resulted in the documentation of over 200 unique populations of invasive *Phragmites* throughout Minnesota, two of which are found in Sibley County. Invasive *Phragmites* can spread both sexually (by seed) and asexually (clonally, including by stolon and rhizome fragments). When populations are producing large amounts of viable seed, spread across the landscape is more rapid and control is more difficult and expensive. For more information check out:

<https://www.maisrc.umn.edu/about-phragmites>.





Bee a Part of the Solution and not the Problem!

A buzz term word around the conservation world is “pollinators” or “pollinator habitat”. Pollinators are responsible for 75% of the crop plants grown worldwide for food, fiber, beverages, condiments, spices, and medicine. Studies have shown that 1 out of every 3 mouthfuls of food we eat, and beverages we drink, are directly related to pollinators! They play a significant role in the world economy. Restoring pollinator habitats can also reduce sheet, rill, and gully erosion as well as increase carbon sequestration.

Pollinators come in all shapes and sizes. Most people immediately think of bees, but birds, bats, butterflies, moths, wasps, beetles, flies, ants, rodents and even deer could all be classified as pollinators. Unfortunately, human activities have altered and fragmented pollinator habitat leading to the decline of many species. In fact, monarch butterflies have declined by 90% over the past 20 years. To help alleviate this issue, the Sibley SWCD will now offer a pollinator habitat program. Landowners can sign up to establish areas up to 10ac. in size and receive 75% cost share through a one-time payment. Applications are accepted year-round. To be eligible, the land has to have cropping history or have been inadequately vegetated prior to the contract. The lifespan of the practice is 10 years.

Seed plans for these areas will be provided by the district. Plantings contain a minimum of nine species of pollinator friendly native forbs, but additional forbs (wildflowers) can be added and are encouraged. At least three species shall be from each bloom period-early, mid, and late so that pollinators have continuous food sources. Seed mixes shall also contain a minimum of two native bunch grasses to provide nesting habitat. Maintenance measures must be adequate to control noxious weeds and other invasive species.

Providing wildflower-rich habitat is the most significant action a landowner can take to support pollinators. Native plants, which are adapted to local soils and climates, are usually the best sources of nectar and pollen for native pollinators. Incorporating native wildflowers promotes local biological diversity and provides shelter and food for a diversity of wildlife. If you would like to learn more about the pollinator program or what you can do to support pollinator habitat, call the Sibley SWCD office at 507-702-7077.



Visit our SWCD/USDA booth at the
Sibley County Free Fair in Arlington.
We'll see you there!



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SIBLEY SOIL AND WATER CONSERVATION DISTRICT

Upcoming Dates:

Wednesday-Sunday July 31-Aug, 4.....Sibley County Fair
Monday, Sept. 2, 2019..... Labor Day (Office Closed)
Monday, Oct. 14, 2019..... Columbus Day (Office Closed)
Monday, Nov. 11, 2019..... Veterans Day (Office Closed)
Thursday, Nov. 28, 2019..... Thanksgiving (Office Closed)

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