



Prairie
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North Dakota
Natural Resources Trust

Conservation, Management Help Lessen Potential Effects of Tile Drainage

Responsible water management is everyone's business. People are especially reminded of this during wet cycles when flooding, property damage, and human impacts are everywhere. Unfortunately, it is often forgotten during dry times or when apparent gain exceeds risk.

This is evident in the practice of tile drainage. Tile drainage to remove excess water from agricultural land has a long history in the Corn Belt states such as Iowa, and its impact on agricultural productivity has been examined extensively. "I don't think anyone could dispute that properly installed tile drainage benefits agricultural producers. It enhances the investment in land by making it more productive, lengthening the field season and providing more options for crops, among other things," says Keith Trego, executive director of the

North Dakota Natural Resources Trust. "But that's just one part of the picture. Full public policy assessment of the impacts of agricultural water management and tile drainage, in particular, involves assessing broad impacts to others including downstream landowners, towns and other political subdivisions, and public values that affect everyone. In addition, potential costs to taxpayers of bad outcomes need to be examined. We tend to skip this step on most issues, and tile drainage is no exception. Looking long term and big picture is really hard."

One of the big picture impacts Trego is speaking of is the impact of tile drainage on wetlands. Before an area can be tiled, producers must have a certified wetland determination performed by the Natural Resources Conservation Service (NRCS). In order for a wet area to





Before farmers can tile a wet area on their field, they must undergo a certified wetland determination performed by the NRCS.

be certified as a wetland, it must have wetland vegetation, pond water for a certain amount of time, and possess wetland soils. If the area in question does not meet these criteria, it is not deemed a wetland, and farmers are legally allowed to tile through it.

USGS scientists have also identified wetlands as recharge, discharge or pass through relative to ground water. An NRCS certified wetland determination only identifies the presence of a wetland and does not get into this level of detail about the wetlands present. So tiling in the proximity of wetlands can have unknown and surprising consequences to other surface water and ground water depending upon how the wetlands function with regard to water movement.

If an area proposed for tile drainage does end up being certified as a wetland, the NRCS requires a setback with a distance that is calculated using the area's soil and topography. Once the setback is determined, tile cannot be any closer than that distance. This is done so that the tile has minimal impact on the wetland.

In addition to its work with wetlands, the NRCS works with landowners and communities to improve the nation's soil, air, plant, wildlife, energy, and water resources. "It has been proven that water quality decreases as the amount and intensity of tile drainage increases," says Paul Sweeney, senior project leader for the NRCS, "so the NRCS set out to focus on what it can do to help farmers make these systems better. We're not in the business of promoting tile drainage, we're simply

focusing on what we can do to improve the systems that are already in place."

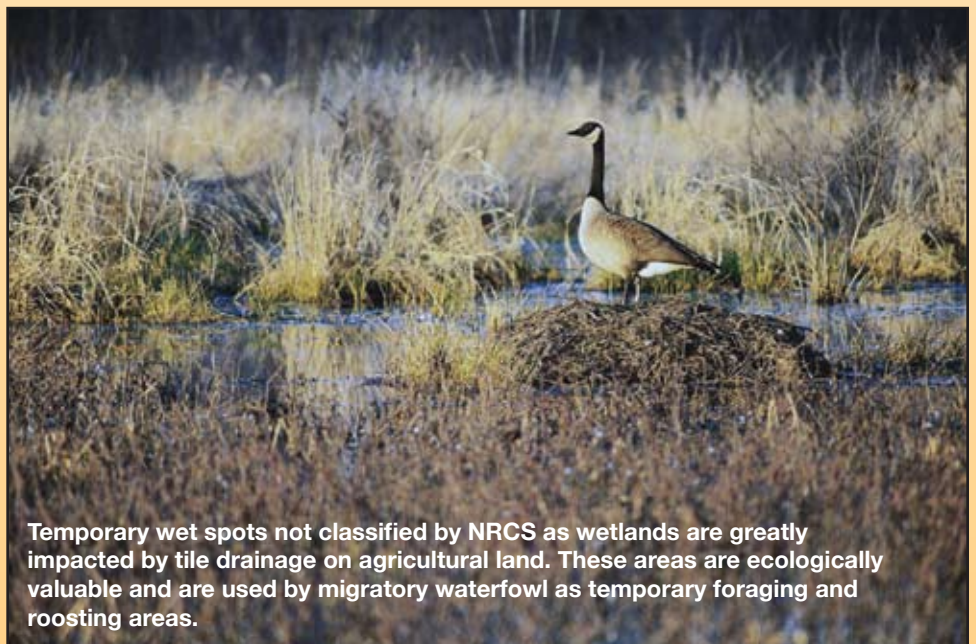
Sweeney says that one of the most effective ways to improve these systems is through drainage water management, which uses control structures to time releases from the field and hold that water in the soil profile. In the spring, producers can pull the stop plug to drain the water so they can get into their fields to plant. After the field is planted, they plug the system back up and allow the water to reach the root zone. As the roots move down, the crop uses the water and the water level drops so that at harvest time, the field will be dry.

"At this point, control structures are not required, and that's a real concern,"

Sweeney says. "At some point, something will need to be done to control the quality of water leaving these systems. If this isn't done voluntarily, something will eventually happen to bring about regulations."

Sweeney says research shows there is an increase in nitrate levels in the water leaving North Dakota fields. The increase in nitrates seen in the nation's water has led to an ad hoc team being formed to study this issue and develop recommendations on how to deal with it. A group of 18 experts dealing with everything from drainage to water quality, as well as state engineers, cartographers, and planning specialists make up the team. It has already developed an action plan, which will be finalized by the end of the year.

"Doing tile drainage right is clearly a matter of perspective," Trego says. "NRCS's focus on improved



Temporary wet spots not classified by NRCS as wetlands are greatly impacted by tile drainage on agricultural land. These areas are ecologically valuable and are used by migratory waterfowl as temporary foraging and roosting areas.



Filter strips separate surface water from an agricultural field.

drainage water management involves drainage systems that have been around for decades. Most of these systems only had one goal – to drain water from agricultural fields, including wetlands, to enhance agricultural production. What happened downstream in terms of negative water quality or quantity impacts wasn't addressed. This localized approach to water management has pervaded our thinking for generations, and still does to an unfortunate extent."

With decades of experience with agricultural water management, and now the major drainage water management project underway by NRCS headed by Sweeney, what should North Dakota take note of that will help us avoid the problems encountered by others and allow us to "do it right" the first time? Trego suggests the following requirements:

- **Approvals.** Under recently revised North Dakota law, tile drainage of less than 80 acres does not need to be permitted. It would be beneficial if all subsurface drainage required a permit, and all underground tile was documented by GPS coordinates and all those records were filed with the approving governmental entity.

- **Control Structures.** Proponents of tile drainage consistently claim that this type of water management has the potential to reduce flooding, however water flow control of any kind cannot happen without control structures at the outflow points of every tile drainage system. While many agencies recommend installation of these structures, the legal authority and political will to ensure they are installed remains in question. Local water boards, which currently have approval authority over drainage applications larger than 80 acres, or the State Water Commission might have the authority to require such features. Properly constructed, well maintained and well regulated control structures are critical to any semblance of real

water management associated with tile drainage.

- **Wetland Impacts.** NRCS performs certified wetland determinations, locating wetlands and providing setback recommendations for tile, but as previously noted these determinations do not identify the type of wetland (i.e. discharge, recharge or pass through). Certified wetland determinations also cannot predict wetland impacts due to the alteration of surface flows as a result of tile drainage. So while wetlands in tile drained fields may not be completely dewatered by tile drainage, it is impossible to say with certainty how the wetlands will respond to a major alteration of hydrology in the surrounding landscape.

- **Buffers and filter strips.** Vegetative buffers and filter strips around wetlands and along riparian areas have proven to reduce water flow rates, enhance water quality, and provide wildlife habitat. They work if they are present, but lacking a requirement and an effective incentive or cost share program to assist producers, these landscape improvements are often absent.

- **Constructed wetlands associated with tile drainage** systems slow water flows, filter chemicals and sediment, and provide wildlife habitat, but they should not be confused with natural wetland ecosystems or be considered in-kind replacements. However, well-designed constructed wetlands, especially if some suitable upland habitat is associated, can provide some benefit. This is most certainly true in an intensive agricultural landscape like the Red River Valley, where most of the state's tile drainage is taking place.

"The litmus test for whether our handling of modified or additional agricultural drainage has been 'done right' will be evident with what is experienced by neighboring landowners, downstream municipalities, and other states and provinces on the receiving end of our tile drainage water," Trego says. "The farmers who have installed drainage systems will most likely come out fine, with more valuable agricultural land and a higher profit margin. However, if the neighbors are flooded more often, have reduced water quality, and higher water treatment costs, or incur other costs caused by the volume, quality, or timing of the flows we send their way, then we will have come up short on a huge public policy opportunity – the chance to learn from the mistakes of others and "do it right" in North Dakota.

"It is clear the knowledge and tools are available regarding tile drainage to have a reasonable chance of drainage water management success. However, if our past record in managing agricultural drainage is any indicator of future performance, I'm not optimistic. The pressure is so great to respond to short-term profit opportunities and the marketing pitch of tile drainage companies and ignore the "big picture" future costs of water sent downstream. But this is one instance where I'd be very happy to be proven wrong."