

## REDUCING DITCH SYSTEM MAINTENANCE COSTS IN THE RED RIVER BASIN OF MINNESOTA

Managing water appropriately is one key to reducing maintenance and clean-out costs in private ditch systems and public ditch systems adjacent to agricultural fields in the Red River Basin (RRB) of Minnesota. A comprehensive approach to managing the water leaving fields can reduce downstream damages to neighboring lands and may reduce the need for costly maintenance in the future. Impacts to downstream landowners may be lessened and damage to the outlet of public and private systems can be avoided by implementing certain drainage practices, (during normal weather patterns).

**Control Structures** – When new subsurface drainage (pattern tile) systems are being installed, structures should be included to control flows during floods and to meter water as needed during the growing season. Holding water within the soil profile during times of drought or abnormally dry conditions can bolster crop yield and increase overall profit. Consideration should be given to retrofitting uncontrolled gravity flow systems so that control structures can be installed.

**Drainage Water Management Plans** – The ability to manage water on fields can reduce downstream flows and impacts to drainage system and outlets, thus lowering maintenance costs. Drainage Water Management (DWM), developed by the USDA Natural Resources Conservation Service (NRCS) can be used to control soil water table elevations and the timing of water discharges from subsurface or surface agricultural drainage systems for one or more of the following purposes:

- Reduce nutrient, pathogen, and/or pesticide loading from drainage systems into downstream receiving waters.
- Improve productivity, health, and vigor of plants.
- Reduce oxidation of organic matter in soils.
- Reduce wind erosion or particulate matter (dust) emissions.
- Provide seasonal wildlife habitat.
- Peak discharge modification.

**Re-establish Buffers** – Installing or maintaining buffers will reduce soil erosion from adjacent fields and sediment losses into ditch systems can be reduced. Redetermination of Benefits (ROB) is an opportunity for local drainage authorities to inventory where existing drainage practices are located and to determine where additional practices are needed to reduce long-term maintenance costs for the ditch system. There are several programs available to landowners that are interested in installing additional buffers above and beyond the 1 rod (16.5 foot) buffer that is currently required via Minnesota Statutes 103E or the 50 foot buffer required via Minnesota Rules 6120 (shoreland). Contact your local Soil and Water Conservation District (SWCD) office for more information about buffer program options or your local drainage authority with questions about ROB.

**Water Storage** – Wetland restorations can be done at strategic locations on your land or adjacent to the ditch system to store water during spring flooding or when high rainfall events occur during the growing season. Wetlands also have the ability to assimilate nutrients and sediments which can reduce maintenance costs on the ditch system. Minnesota also has an agricultural wetland bank where wetland credits can be bought or sold. There may be opportunity to restore wetlands adjacent to or near private ditch systems on marginal agricultural lands. Local SWCDs can be contacted for more information about wetland restorations and more detailed information about the agricultural wetland bank can be found here: <http://www.bwsr.state.mn.us/wetlands/agbanking/>



*Typical ditch cleanout in the RRB.*

**DWM Plan Purpose** - To provide farmers with a framework for implementing DWM goals and objectives on fields. Landowners should consider an overall, comprehensive approach to managing water resources to reduce downstream impacts and maintenance costs. More information about DWM can be found at this NRCS website:

<http://www.nrcs.usda.gov/wps/portal/nrcs/site/mn/home/>

Several other state and federal agencies also have programs that can fund wetland restorations. Local SWCD offices can provide information about additional funding opportunities to restore wetlands or to implement other drainage practices. Large scale water storage impoundments are possible, but costs can be significantly higher to construct larger impoundments compared to wetland restorations. However, it is one option that can provide long-term benefits and can reduce overall impacts to downstream landowners, thus limiting some maintenance needs for the ditch system.

**Side Inlet Controls** – Side inlet controls can help manage flows and control/reduce erosion where open field surface ditches enter larger public surface ditches. Water can be metered out by sizing the pipe appropriately, potentially reducing maintenance costs. Landowners should work with their local SWCD and NRCS offices as well as the local drainage authority to determine where to strategically locate side inlet controls for optimum benefit. The photograph at right illustrates a standard side-inlet control that includes vegetation and rock rip-rap.



*Example of a side inlet control in Wilkin County, Minnesota.*

**Removing Open Tile Inlets** – There are several options that exist to remove open tile inlets. Open tile inlets are a direct conduit for sediments and agricultural chemicals to potentially enter a ditch system. The photograph at right illustrates the extent to which sediments can enter tile inlets/lines and then be deposited in a public ditch system, and ultimately to downstream surface waters. Open tile inlets in the RRB should be removed when possible to reduce sediment loading in local ditch systems. Contact your local SWCD to discuss financial and technical assistance options for removing open tile inlets.



*Example of a typical open tile inlet.*

**Keep Soil in Place** – There are several other practices that are available to implement within or adjacent to a ditch system to keep soil in place on the landscape. Wind-blown sediments or those deposited by water can affect the operation of open surface ditches. While cover crops and field windbreaks may not always work in the RRB, efforts should be made to consider practices that move towards reducing ditch system maintenance costs including water and sediment control basins, grassed waterways, and saturated buffers. Contact your local SWCD and NRCS office for both technical assistance and financial incentives for these types of practices.

**Permits** – Keep in mind that some projects may require local, state or federal permits. It is recommended that you work with local drainage authorities and other regulatory agencies early during any project to avoid un-necessary delays or possible fines. Drainage authorities may require specific conditions as part of permits that are issued for drainage projects.

**Parting Message** – Water management at any level is complex. There are no “silver bullets” to alleviate all water management issues. A multi-purpose approach that utilizes a combination of practices to address ditch system maintenance needs is recommended. Landowners in the RRB of Minnesota have the opportunity to work with local drainage authorities to manage water in local ditch systems. Improving or maintaining ditch systems is costly and every effort should be made to reduce maintenance costs by implementing drainage practices.

#### **Drainage Weblinks:**

MDA:

<http://www.mda.state.mn.us/protecting/conservation/drainage.aspx>

MN BWSR:

<http://www.bwsr.state.mn.us/drainage/index.html>

U of M Drainage Website:

<http://www1.extension.umn.edu/agriculture/water/>

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