

Tile Drainage in Vermont: Manure Management Factsheet No. 6

# **Introduction**

There are a variety of management practices that can reduce nutrient loss from tile drained fields. Remember, no one practice will be the best option in every situation or location, nor will effectiveness of a given practice be equal in all locations in all years. Best practices for managing manure are integral to minimizing loss of nutrients into the tile.

## Vermont Laws Pertaining to Manure

To be in compliance with the Required Agricultural Practices (RAPs) do not stack manure 100 feet of tile drains. Refer to the Required Agricultural Practices for a complete list of tile drainage management state laws

(<u>https://agriculture.vermont.gov/rap</u>).

# Nutrient Application Method

Implementation of your nutrient management plan and the 5 Rs (right source, right amount, right place, right time, and right manner), should minimize the risk of nutrient loss from manure to tile outlets.

### Right Source: Consistency of Manure

Liquid manure with less than 2% dry matter increases the potential risk of nutrients reaching the tile line. If manure has very low dry matter, apply less per application, but more frequently.

### Right Amount: Manure and Soil Conditions

Manure application rates developed through a nutrient management plan are based on predicted erosion rates, field management, and soil test recommendations. If applied in good weather and soil conditions, the potential for loss of nutrients is minimized. Follow the rates in the nutrient management plan.

In addition, the RAPs state manure should not be applied in the following circumstances:

- In soil conditions that are snow covered, frozen, saturated with water, or on areas of exposed bedrock.
- Within 10 feet of ditches.
- Within 25 feet of surface waters.
- Within 25 feet of surface inlets, stand pipes, or surface drains.
- Within 100 feet of surface water on annual cropland with 10% slopes.
- Within 50 feet of a private well for non-human consumption.
- Within 100 feet of a private water supply used for human consumption.
- Within 200 feet of a public water supply.

### Or during the winter spreading ban:

- From December 15 April 1.
- Or from October 16 April 14 on annual cropland subject to flooding, as described by the USDA Frequently Flooded Soils map.

### Right Place: Not Over the Tile

If possible, avoid applying directly over the tile line.

### Right Time: Soil and Weather Conditions

If the soil is saturated or tile drains are already flowing, then there is a higher potential for nutrients to reach the tile. Avoid applying nutrients in saturated fields or when tiles are actively flowing. Conversely, soils high in clay content can form cracks when dry. These cracks can act as direct conduits for nutrients to reach tile lines. If possible, disturb cracks with light tillage to reduce risk of flow through macropore.

Short, light rainfall can incorporate manure and reduce potential of loss of nutrients by run-off. However, longer or more intense rainfall can increase manure infiltration to tile line. Check the weather forecast and avoid applying if adverse weather conditions are predicted soon after application.



CULTIVATING HEALTHY COMMUNITIES COLLEGE OF AGRICULTURE AND LIFE SCIENCES Right Manner: Disturbing Macropores There are several application methods that can increase potential risk for manure to enter tile lines with little or no infiltration (Figure 1). Applications that do not disturb the macropore increase this likelihood. These include broadcasting without incorporation, liquid manure injection, knife injection without sufficient tillage, spacing that is too tight on horizontal sweeps, sweep, or knife injectors, or if horizontal sweeps are pulled through the field too quickly. Disturb macropores with light incorporation or an aerator to disrupt nutrient flow.



Figure 1. Potential for nutrient leaching in applications that are A) broadcasted without macropore disruption and B) injection and harrow with macropore disruption (*Illustration by Amanda Gervais*).

## **Other Practices that Decrease Potential Loss**

Bare ground can contribute to nutrient loss because there is not living vegetation to uptake nutrients. Permanent sod, double cropping, or cover crops can act as mechanisms to retain nutrients year-round. Another tool to reduce flow of nutrients from tile drains to surface water is controlled drainage. Controlled drainage structures prevent flow from tile drains before manure application or if rainfall is predicted to occur within a few weeks of application.

### **Accident Preparedness**

Create an emergency plan in the event that large amounts of manure enters a tile drain. Take immediate steps to stop the flow and prevent discharge to surface waters. This can be performed by capping the tile outlet or intersecting the tile system and diverting flow into a collection area away from surface waters. Contact Department of Environmental Conservation (DEC) or the Agency of Agriculture (VAAFM) to report the spill and get assistance.

Agency	Day-Time Phone Number	Evening Phone Number
DEC	(802) 828-1138	(802) 641-5005
VAAFM	(802) 828-2431	(802) 828-2431

#### References:

Cornell Cooperative Extension's Soil Drainage Resources: <u>http://</u> cceoneida.com/agriculture/crop-production/soil-drainage-resources

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Ruark, Matt. E. Cooley, J. Panuska. J. Pagel, & A. Pape. Tile Drainage in Wisconsin. Discovery Farms Wisconsin. University of Wisconsin-Extension. Sep. 2017. <u>http://www.uwdiscoveryfarms.org/UWDiscoveryFarms/media/</u> <u>sitecontent/PublicationFiles/agtiledrainage/TileDrainageinWI.pdf?ext=.pdf</u>

VAAFM. Vermont Subsurface Agricultural Tile Drainage Report. 2017. <u>http://www.vtfb.org/cms-assets/documents/265282-467115.vermont-subsurface-agricultural-tile-d</u>

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