

Factsheet

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Winter Application of Manure and Other Agricultural Source Materials

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INTRODUCTION

Manure and other agricultural source materials (ASMs) are valuable commodities. They are rich in nutrients and organic matter that are important for productive, healthy soil. However, those same nutrients can be detrimental to water quality if they make their way into lakes and rivers.

Winter is not an appropriate time for manure application. Water can't effectively infiltrate frozen soil. Water from melting snow, often combined with precipitation, moves off the field and carries nutrients with it. Research in Ontario indicates that 67%–98% of phosphorus lost from agricultural land leaves during the non-growing season.

The increased risk of nutrient loss or displacement means that fewer nutrients from winter-applied manure are available for crop production. Winter application is widely recognized as unsuitable and can result in negative public perceptions of agriculture.

This factsheet describes manure management strategies that can prevent situations where manure must be applied during the winter and ways to minimize risks when winter application is the only option.

MANURE MANAGEMENT IS A YEAR-ROUND JOB

The traditional manure application windows of spring and fall are a busy time for farms. Wet soils and unpredictable weather combined with the pressures of planting and harvesting crops can result in delays to manure application and necessitate spreading in less than ideal conditions. Changes to your operation can reduce the pressure during these busy times.

Diversify Crop Rotation: Growing cereal crops that are harvested early can provide enough time to apply manure into ideal soil conditions. Forage crops are harvested several times during the season and allow application of manure between cuts (Figure 1).



Figure 1. Adding winter wheat to your crop rotation can provide an additional window for manure application while other crops are still maturing.



Figure 2. New technologies can be used to apply manure to living crops.

Invest in Storage: Constructing additional liquid manure storage capacity or roofing over an existing storage to keep rainfall out can help store manure through the winter.

Invest in Removing Water: Diverting clean water (from roofed areas and areas of the farm that are not in contact with manure) away from manure storages helps avoid diluting manure. Consider roofing over liquid storages to minimize collection of rain.

Expand Timing Windows: Applying manure after planting and/or investing in equipment that allows manure to be applied to growing crops (Figure 2) expands your options.

Consider a Custom Applicator or Broker: Hiring custom applicators to apply your manure quickly and efficiently can allow you to focus on other important tasks. Brokers can ensure that excess manure is put to good use.

Explore Economic Opportunities Through

Agreements with Others: Selling or trading manure for straw or other agricultural products that you need can benefit both parties. Include the value of nutrients in land rental agreements.

Acquire Access to More Land: Owning or controlling additional land through an application, rental or other agreement may provide additional manure use opportunities, including transporting manure to fields farther from the storage where agronomic needs may allow higher application rates.

Plan for the Unexpected: A contingency plan is a written plan of what to do if a nutrient management strategy or plan cannot be followed and addresses what will be done if:

- weather or equipment conditions delay planned storage or application
- more nutrients are available than the nutrient management strategy (NMS) or nutrient management plan (NMP) have addressed
- more nutrients are generated than the storage design capacity
- there is a spill

All farms that are required to have an NMS or NMP are also required to have a contingency plan. Even on farms that are not required to have one, contingency plans are valuable tools for reducing the need for winter spreading and any adverse environmental effects.

OPTIONS FOR EXCESS MANURE DURING THE WINTER

Alternatives to winter spreading include:

- temporary field nutrient storage sites for solid manure (Figure 3)
- transferring materials to a broker or other neighbouring storage facilities with extra capacity
- keeping manure in “pen packs” or mounded bedding packs in outdoor feeding yards for longer periods of time, reducing the need to spread during winter conditions



Figure 3. During winter, manure can be stockpiled in temporary storage sites until appropriate conditions for manure application arrive in the spring.

WHEN SPREADING DURING WINTER IS THE ONLY OPTION

Current regulations

There are several laws that protect the quality of surface and drinking water. These include the [Environmental Protection Act, 1990](#), the [Ontario Water Resources Act, 1990](#), and federally, the [Fisheries Act, 1985](#). If manure enters surface or ground water at any time of year, there is the potential for charges under one or more of these laws, depending on the nature of the impacts that result.

[Ontario Regulation 267/03](#) provides standards for the application of manure between December 1 and March 31 (known as the restricted period) and any other time when the soil is either frozen or snow-covered. Frozen soil is defined as any 5-cm layer of frozen moisture in the top 15 cm of soil. Snow-covered soil is defined as soil with a layer of snow on the surface with an average minimum depth of 5 cm.

Farms with an NMP must follow the standards outlined in Ontario Regulation 267/03. For all other farms, these standards are recommended as a minimum standard. The standards are summarized in Table 1.



Figure 4. Areas subject to ponding are not acceptable locations to apply manure during the winter.

Table 1. Winter application restrictions for agricultural source material (ASM) (O. Reg. 267/03 Part VI)

December 1–March 31 when soil is not frozen or snow covered	Anytime that soil is frozen or snow covered
Prohibition: Vulnerable land No prescribed materials can be applied from December 1 to March 31 or when the ground is frozen or snow covered on land: <ul style="list-style-type: none"> • subject to flooding once or more every 5 years • where water collects during a rainstorm or thaw and flows directly into surface water (Figure 4) 	
Liquid ASM	
Permitted application conditions: <ul style="list-style-type: none"> • injection • incorporation same day (figure 5) • surface application only if 30% of the land surface is covered by a living crop or crop residue Minimum setback* from top of bank of surface water: <ul style="list-style-type: none"> • 100 m if the maximum sustained slope is greater than 3% • 20 m elsewhere 	Permitted application conditions: <ul style="list-style-type: none"> • injection • incorporation within 6 hours of application Minimum setback* from top of bank of surface water: <ul style="list-style-type: none"> • 100 m if the maximum sustained slope is greater than 3% • 20 m elsewhere
Solid ASM	
Permitted application conditions: <ul style="list-style-type: none"> • injection • incorporation same day • surface application only if 30% of the land surface is covered by a living crop or crop residue Minimum setback* from top of bank of surface water: <ul style="list-style-type: none"> • 100 m if the maximum sustained slope is greater than 6% • 3 m elsewhere 	Permitted application conditions: <ul style="list-style-type: none"> • injection • incorporation within 6 hours of application Minimum setback* from top of bank of surface water: <ul style="list-style-type: none"> • 100 m if the maximum sustained slope is greater than 6% • 3 m elsewhere
	OR: Permitted application conditions: <ul style="list-style-type: none"> • surface application • maximum depth of snow in area of application must not exceed 15 cm and • maximum sustained slope in area of application must be less than 3% Minimum setback* from the top of bank of surface water: <ul style="list-style-type: none"> • 100 m

* A minimum setback from the top of bank of surface water must include a minimum 3-m vegetated buffer.



Figure 5. Tilling manure into frozen ground can be a challenging but necessary step in mitigating risks to the environment.

Reducing the risk

In all cases, minimize winter applications with the goal to free up only enough storage space to accommodate the manure that will be produced before appropriate manure application conditions return. Reducing the application rates may decrease the potential for environmental impacts from application when the soil is frozen or snow-covered.

Wherever possible, incorporate manure into the soil, either through direct injection or tillage. Where this isn't possible, choose a site with a living crop or high residue cover. The vegetation and/or residue act as a barrier to particles moving across the soil surface.

Select a site that is relatively flat and located away from steep slopes, surface water, tile inlets or catch basins to reduce the chances that materials will be discharged into surface water. Avoid heavy snow cover that will move manure off-site as it melts.

Research shows that the greatest risk for nutrient loss is when application occurs to frozen and snow-covered soils just ahead of a snowmelt combined with rainfall. Manure applied in early winter to fields with residue and surface roughness (e.g., chisel plowed) will have less runoff than bare frozen fields with relatively smooth surfaces. Avoid manure application if the weather report indicates either precipitation is likely or temperatures will result in significant snowmelt.

If manure does move off-site, call the Spills Action Centre at 1-800-268-6060, and initiate the contingency plan.

CONCLUSION

Manure management requires year-round consideration and planning. Ensuring adequate manure storage capacity and a diverse crop rotation for flexible application opportunities will minimize emergency manure applications and maximize nutrient use. Winter application of manure is not recommended due to the increased risk of nutrient loss. Winter application is widely recognized as inappropriate and can result in negative public perceptions of agriculture.

The information in this factsheet is provided for informational purposes only and should not be relied upon to determine legal obligations. To determine your legal obligations, consult the relevant law at www.e-laws.gov.on.ca. If legal advice is required, consult a lawyer. In the event of a conflict between the information in this factsheet and any applicable law, the law prevails.

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