

## Winter Spreading One-liners

- Disposal of manure or wastewater to frozen or snow-covered ground is generally not a beneficial use for agricultural purposes (EPA 2001).
- Fall-winter applications may result in 25%-50% total nitrogen loss from leaching and denitrification (Midwest Plan Service 1993).
- The risk of causing water pollution from land applied manure decreases in the order: winter > late summer > late fall > early summer > spring pre-plant (Mulla, *et al.* 2001).
- Considerable research has demonstrated that runoff from manure application on frozen or snow-covered ground has a high risk of water quality impact (EPA 2002).
- Large nutrient losses can occur in spring runoff from land where manure was applied on frozen ground (MWPS 1993).
- Nutrient losses in runoff from manured fields are usually excessive when land application to snow or frozen soils occurs (Mulla, *et al.* 1999).
- Fecal bacteria counts in surface runoff are significantly greater after application of manure to snow or frozen soil than after application at any other time of year (Mulla, *et al.* 1999).
- The amount of nutrients lost varie(s) directly with the volume of runoff. Winter and spring manured plots ha(ve) more runoff volume than fall manured plots (Converse, *et al.* 1976).
- Winter spreading of liquid manure resulted in considerably higher concentrations of nitrogen, phosphorus, and potassium in runoff compared to spring and fall applications (Phillips, *et al.* 1981).
- Wastes shall not be applied to frozen or snow-covered ground (NRCS 1999).
- While ground is frozen, apply animal wastes to relatively level land remote from surface water (MWPS 1993).

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