

MU Guide

Separation Distances for Livestock Manure Management Systems

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The Missouri Department of Natural Resources (MDNR) has established required and recommended guidelines for separation distances for livestock manure management systems. These separation distances apply to both manure storage structures, such as lagoons, and the areas on which manure is land-applied. This publication outlines the primary separation distances as noted in the MDNR regulation. These distances should be considered minimum. Special circumstances may dictate that separation distances be greater than shown, and these are evaluated on a case-by-case basis. The separation distances discussed in this publication are for water quality considerations only and do not apply to separation distance considerations for odor. See MU publication G1884, *Odors From Livestock Operations: Causes and Possible Cures*, for a discussion of odor from livestock operations.

Manure storage structures and confinement buildings

Manure storage structures, such as lagoons, manure tanks, runoff storage ponds, and solid manure storage facilities, as well as confinement buildings have separation distance requirements as noted in Table 1.

See MDNR Fact Sheet *Guide to Animal Feeding Operations* for guidance in determining the size classification (Class IC, etc.) for your feeding operation. The presence of sinkholes or

Table 1. Separation distances for manure storage structures and confinement buildings.

Separation distance from	Separation distance
Non-owned, occupied residence or public building	
• Class IA animal feeding operations	3,000 ft
• Class IB animal feeding operations	2,000 ft
• Class IC animal feeding operations	1,000 ft
• Class II animal feeding operations	No separation distance required unless part of a permit or letter of approval requirement
Well or water supply structure	300 ft

Manure storage structures must be located above the 25-year flood plain. Additionally, the bottom of the storage structure must be located at least 4 ft above the seasonally high water table.

other sensitive groundwater features may affect the location of manure storage structures. A geological evaluation (required for permits) of the proposed site will determine if such features are a factor in locating the manure storage structure. A farm pond is considered a water supply structure if it is a source of domestic water for the farmstead.

As noted in Table 1, a manure impoundment should be located above the 25-year flood level. The 25-year flood level is the highest level an adjacent stream, river or lake is expected to attain once in 25 years. This separation requirement usually has greatest impact on manure impoundments with proposed locations on bottomland or near the elevation of a nearby stream or river. The 25-year flood level may be difficult to determine for many locations. For major streams and rivers, the U.S. Army Corps of Engineers may be able to supply data on the 25-year flood level. In many cases, the best indication of the 25-year flood level may be the memory and experience of individuals who have observed water levels at the proposed site over a period of many years.

The 25-year flood level separation requirement may affect several design considerations, depending on the physical characteristics of the site. In addition to influencing impoundment location, this separation distance may also affect allowable excavation depth, and the associated balanced or unbalanced cut/fill ratios for the excavation. If the impoundment must be "raised" or built largely above-ground to comply with the separation distance, this may require the use of a lift station to move manure into the impoundment if gravity flow is no longer possible.

Separation distances for land application of manure

Certain separation distances are required for the proposed manure application area, or soil/plant filter area. The intent of these separation distances is to reduce the potential for runoff to pollute groundwater or surface water resources. Manure application irrigation equipment should always be managed and operated so that runoff does not occur. Table 2 outlines separation distances for manure land-application areas.

Table 2. Separation distances for land application of manure.

Separation distance from	Separation distance
Losing streams, sinkholes, caves, wells, water supply structures or impoundments, or any other connection between surface and groundwater	300 ft
Permanent flowing streams	100 ft
Intermittent flowing streams	50 ft
Property lines	50 ft
Privately owned impoundment (farm pond) NOT used as a water supply	100 ft
Non-owned dwellings or public use areas	
• If applied by spray irrigation	150 ft
• If applied by tankwagon or solid spreader	50 ft

Areas with flood frequencies greater than once in 10 years should not be the only land available for application of manure.

Notes:

- Losing streams, common in southern Missouri, are those streams in which all or part of the stream flow may run underground depending on climatic and geological conditions.
- Farm ponds are included as water supply structures if they are a source of domestic water for the farmstead.

Good-neighbor policy, odor considerations, and potential for irrigation spray drift may suggest separation distance greater than 150 feet from public use areas and from “non-owned residences,” dwellings not associated with the livestock feeding operation.

A significant effect of the separation distance requirements for land application of manure is to reduce the apparent land available for receiving manure. This requires a close evaluation of any proposed area for manure application to ensure that there is indeed enough land available to meet DNR requirements. For example, consider an 80-acre tract proposed as a soil/plant filter area (see Figure 1).

Further, assume that there is a water supply structure on the property and that a losing stream runs through the property from one side to the other. If the boundary of the 80-acre tract is the property line, a 50-foot separation distance along the property line represents about 9 acres. A 300-foot separation distance from the water supply structure (a circle 600 feet in diameter) represents about 6.5 acres. The losing stream, with a 300-foot separation distance on either side, represents about 18 acres. So, the proposed 80-acre tract has only about 47 acres available for manure application. While this may be an extreme example, it illustrates the need for careful layout and evaluation of the area available for land application of manure.

The presence of features requiring separation distances, such as wells, sinkholes, streams and ponds, usually causes more reduction in land availability than is indicated by the separation distance itself. This is because there are usually small areas between and around these features that, although not within the separation distance, cannot be feasibly reached

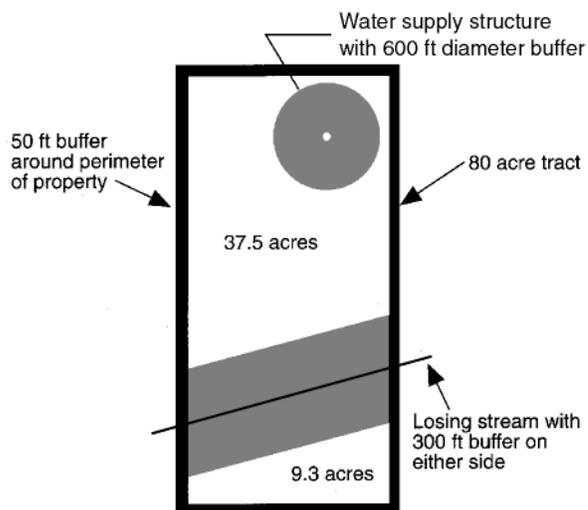


Figure 1. Buffer strips and separation distances decrease the land area available for receiving manure.

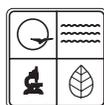
and covered by irrigation or other land application equipment. Note the narrow areas around the water supply buffer in Figure 1. This is especially true if large irrigating guns, or traveling guns, are used for manure application. It is extremely important to “lay out” the irrigation system (traveling gun lanes, solid set gun locations, etc.) to determine how much of the available area can be covered with the proposed equipment.

Separation distances for manure applied with hauling equipment (conventional beater-type manure spreaders, manure tank wagons, etc.) are slightly different than those for irrigated manure. The only difference in separation distance for solid or slurry manure vs. irrigated manure is the separation distance for non-owned dwellings or public use areas. Since surface placement of waste can generally be accomplished more precisely with hauling equipment than with irrigation equipment, and the potential effect of climatic factors is less (little or no wind drift) the separation distance is smaller. However, as with irrigated manure, good-neighbor policy and odor considerations may suggest that this separation distance be increased.

For further information

From the Missouri Department of Natural Resources

- DNR Guide to Animal Feeding Operations*, PUB915, May 1999
- Best Management Practices, Feb. 1996
- General Permit Document MO-G01, Feb. 1996
- Land Application Rule 10CSR 20-8.020(15)
- Well Construction Rules 10CSR 23-3



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