Evaluating Appropriate Application Sites

Depth to water table and bedrock

Manure should not be applied to lands that may frequently flood and have a shallow depth to groundwater. Manure should not be applied to soils that the NCRS classifies in a county soil survey as occasionally, frequently, or very frequently flooding or describes as having brief, long, or very long flooding duration (areas flooded longer than two days during each event). Manure should also not be applied when the water table is within 36 inches of the soil surface for surface-applied or irrigated manure and 42 inches for injected or incorporated manure. Where subsurface tile drainage systems are used, manure should not be applied while drains are flowing. Monitoring of the water table depth through tile drains, field ditches, drainage structures, or shallow monitoring wells may be necessary if manure is to be managed properly, restricting losses of manure nutrients.

Fields that contain areas of fractured or fissured bedrock need to be closely managed to protect groundwater resources. Manure should not be applied to areas with less than the following depths to bedrock:

- Sand: 36 inches
- Loam, sandy loam, clay loam: 24 inches
- Clay: 12 inches

Slope

For a site to be suitable for manure application, its slope must be gentle enough to allow manure infiltration at the design application rate. The slope of the land affects the application rate; the higher the slope, the lower the application rate must be to reduce runoff. Slopes exceeding 10% generally have several limitations for surface application of wastewater. Areas not meeting these criteria must be excluded from consideration.

Slope can be determined from soil surveys or by measurement using the inclinometer and abney level instruments. The instruments observe an object at eye level at the steepest point up or down slope and read the percent slope on a scale.

Slope can also be calculated. To calculate the percent slope, the horizontal distance (run) and vertical change (rise) between two points must be known. Once these two distances are known, the following formula is used to calculate the percent slope:

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FORMULA

$$\text{Percent (\%) slope} = \frac{\text{Vertical change}}{\text{Horizontal distance}} \times 100$$

EXAMPLE

You have determined that the vertical drop between two points is 10 ft. The horizontal distance between those two points is 85 ft.

SOLUTION

$$\text{\% Slope} = \frac{10 \times 100}{85} = 11.7\%$$

Other site information

Additional information is needed to evaluate site suitability since there are problems that can occur if a site is not properly located. The site location must be considered with respect to

- Lakes, ponds, rivers, or streams.
- Wetland recreational areas.
- Residential developments.
- Roads.
- Airports.
- Schools.
- Industrial facilities.
- Churches or other places of public assembly.
- Dry runs, intermittent streams, or blue line streams.
- Flood plains.
- Mines, quarries, caves, sinkholes, or surface bedrock.
- Potable water wells.
- Residences.
- Abandoned wells.

Specific setbacks from these areas or locations are determined by state regulations or local ordinances. Check with the local conservation district office, state water quality agency, or local health department to verify the setback or buffer distances that apply to your farm. Examples of various setbacks are included in Table 33-3, page 14.

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Landowner agreement

Typically, the livestock producer will own the land on which manure is applied. There are, however, some instances in which a separate landowner may be involved. In these instances, a landowner agreement must be used. No standardized agreement form exists for these situations. However, the agreement form must have enough detail and explicitly state who is responsible for which management items, enabling the permitting agency to issue an enforceable permit. In some states, a landowner agreement form must be notarized and included as part of the permit application.

Other site considerations

Previous land use on the proposed site is very important. If the selected land has been used as farmland, crop nitrogen and phosphorus requirements, crop yield goals, and other soil test criteria will determine the quantity of manure you can apply. More than one site may be needed, depending on the characteristics of manure generated and the storage capacity located on the farm.

If the site is not agricultural land, previous uses of the site should be considered. Environmental audits may be necessary unless the specific uses of the site are known. If site clearing is required for wastewater application, an erosion control plan and control measure may need to be developed and constructed as part of the clearing operation. Clearing methods to minimize compaction and reduce infiltration should be used during the site-clearing operation.

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Table 33.3. Separation distances for land application: A survey of state regulations.

State	Separation for edge of application field to property lines	Separation for edge of application field to residences or other buildings	Buffer requirements for surface waters	Separation distances for wells
Alabama	General: 25 ft Public road, solid manure/ litter: 50 ft Public road, irrigated wastewater: 100 ft	Solid manure/litter: 100 ft Wastewater (not irrigated): 200 ft Wastewater (irrigated): 500 ft	General: 50 ft Public water supply or outstanding water resource: 200 ft	Non-potable: 100 ft Potable well: 200 ft
Arkansas	50 ft	No requirements	100 ft	100 ft
California	No requirements	No requirements	No requirements	No requirements
Georgia	**1,001-3,000 AU** Irrigation: 150 ft Injection: 50 ft **> 3,000 AU** Irrigation: 200 ft Injection: 200 ft	**1,001-3,000 AU** Irrigation: 300 ft Injection: 150 ft **> 3,000 AU** Irrigation: 750 ft Injection: 200 ft	**1,001-3,000 AU** 100 ft **> 3,000 AU** 150 ft	**1,001-3,000 AU** 100 ft **> 3,000 AU** 200 ft
Illinois	No requirements	Surface application: 1/4 mile Injection/incorporation: 0 ft	200 ft	150 ft
Iowa	Irrigation: 100 ft from manufacturer's wetted perimeter	Liquid manure: 750 ft Low-pressure system: 250 ft	Recommended: 200 ft	Well buffered by a vegetative filter strip: 50 ft If manure is not injected or incorporated within 24 hrs: 200 ft
Kansas	No setback requirements, general recommendation of 100 ft			
Minnesota	Vary by county and township ordinances	Vary by county and township ordinances	General: 50 ft Special practices: 26 ft-300 ft	50 ft
Nebraska	No requirements	No requirements	30 ft If < 1,000 ft, may require (1) buffer strip, (2) P-based application rates, OR (3) immediate incorporation.	No requirements
New Mexico	No requirements	No requirements	100 ft	Public well: 200 ft Private well: 100 ft
New York	No requirements	No requirements	100 ft for CAFO permits	100 ft for CAFO permits
North Carolina	75 ft	75 ft	50 ft	100 ft
Oklahoma	No requirements	No requirements	Intermittent: 50 ft Perennial: 100 ft Perennial w/> 8% slope: 200 ft	No requirements
Pennsylvania	No requirements	No requirements	Above slope: 200 ft Below: 100 ft	100 ft
Texas	No requirements	Daytime application: No requirement Nighttime application: 1/4 mile or written agreement	100 ft	Public well: 500 ft Private well: 150 ft
Virginia	No requirements	200 ft if not waived by neighbor	General: 50 ft injected or incorporated: 25 ft	100 ft