Understanding Nutrient Management Planning

USDA-NRCS 590 Nutrient Management Standard for Wisconsin
PNAAW Level 1 Training
Understanding Manure Credits

Using the chart provided, answer the following questions:

1. If surface applying 6,000 gal/ac of dairy manure (4-11% dry matter), how much N, P, and K are you applying per acre? (manure will NOT be incorporated within 3 days)

   N ______   P ______   K ______

2. If injecting 6,000 gal/ac of swine manure (finish, outdoor pit), how much N, P, and K are you applying per acre?

   N ______   P ______   K ______

3. What is the maximum rate of surface applied dairy manure (4-11% dry matter) per acre that can be applied to a corn field that needs 190 lbs of N for the upcoming growing season? (manure will NOT be incorporated within 3 days)

   \[ \text{UW Corn Recommendation (lbs N/ac) ÷ } \text{lbs N/1000 gallons} \times 1000 \text{ gallons} = \]
Using the chart provided, answer the following questions:

4. What is the **maximum rate** of dairy manure (4-11% dry matter) that can be applied to a poor alfalfa stand on medium textured soil that will be terminated with less than 8 inches of regrowth and planted to corn in the upcoming growing season? (note: corn nitrogen recommendation of 190 lbs/ac, manure analysis per 1,000 gallons of manure = 7-6-17)
Understanding 590 Field Restrictions

Using the information on the following page to answer the following questions:

5. If a field that is NOT contour plowed and has a pink slope area covering the majority of the field, can winter manure be spread on the field? □ Yes  □ No

5a. What if the field is contour plowed? □ Yes  □ No

6. If a field that is contour plowed and has a red slope area covering the majority of the field, can winter manure be spread on the field? □ Yes  □ No

7. A Surface Water Quality Management Area (SWQMA) is an area within________feet from a lake or pond, and _________feet from a stream or river.

8. Can a field within a SWQMA receive manure applications during the spring or fall season? □ Yes  □ No

8a. If so, list one restriction:

________________________________________________________________________________________

9. If a field has a speckled pattern indicated on the restriction map, what does this mean?

________________________________________________________________________________________

10. How many pounds of nitrogen from manure can be applied on a speckled area during the fall season if the soil temperature is higher than 50°F (after Sept 15th)?

_____________________________ lbs N/ac

11. Can manure be applied within 50 feet of a residential well? □ Yes  □ No
SUMMARY OF RESTRICTIONS (USDA-NRCS 590 NUTRIENT MANAGEMENT STANDARD FOR WISCONSIN)

Why do some soil types have a “Fall N Restriction”? Spckled pattern on map

Areas identified by a spckled pattern on the map are believing to be hazardous because of strong possibility that they are direct conduits to groundwater. These soils fit into at least one of the following categories:

Highly permeable, allowing water to infiltrate very quickly, or
Have less than 20 inches to bedrock, or
Have less than 12 inches to the water table.

How does a fall N restricted soil affect my farm management? Spckled pattern on map

For fields containing an N restricted soil type, the general rule of thumb is to restrict the majority of crop N applications to the spring. The following restrictions also apply and must be followed:

Fall application of commercial N to these soils is prohibited, except for establishment of fall-seeded crops, in which case applications may not exceed 30 lbs of available N/acre.

Manure N restrictions:

When manure is fall applied and soil temperatures are higher than 50°F:

Use a nitrification inhibitor with liquid manure and limit rate to 120 lb N/acre, or
Apply after Sept. 15 and limit rate to 90 lb N/acre, or
Apply to perennial or fall-seeded crops and limit rate to 120 lb N/acre or crop N need, whichever is less

When manure is fall applied and soil temperatures are lower than 50°F:

Limit the application rate to 120 lb N/acre or the crop’s N need, whichever is less
On irrigated fields:
Split N applications, applying the majority of N after crop establishment, or
Use a nitrification inhibitor with ammonium forms of N

Why do some soils have Winter Application restrictions? Red on map

Winter application of nutrients are prohibited on slopes greater than 12% due to high risk of erosion and nutrient losses (unless effective incorporation can occur at the time of application). Winter conditions are defined as having either frozen and/or snow covered soil. Areas that have been identified as having slopes greater than 12% are depicted in red on these maps.

What does it mean to have a soil labeled with “Winter Restrictions (if slope >9%)”? Pink on map

The 590 Nutrient Management Standard prohibits manure applications on slopes > 9% (unless it is contour plowed, in which case manure applications can be made on slopes up to 12%). Many areas in Wisconsin have been mapped as having slopes between 6-12%; these soils are depicted in pink on the 590 NM Application Restriction maps. Fields labeled with this (pink) restriction must be checked to determine their actual slope.

What is a SWQMA? blue crosshatch on map

A Surface Water Quality Management Area, or SWQMA, is defined as the area within 1,000 ft of lakes and ponds or within 300 ft of perennial rivers and streams. These areas are given special consideration due to the higher likelihood of soil and nutrients applied to these areas entering and polluting the water body.

How does a SWQMA designation affect how I apply nutrients to my fields?

Nutrient application restrictions within a SWQMA are different for winter and other parts of the year

Winter:
Nutrient applications are prohibited on frozen and/or snow covered soils in SWQMA (fields within 1,000 ft of lakes/ponds, or within 300 ft of perennial streams).

Non-winter:
Nutrient applications on unfrozen/non-snow covered ground by SWQMA are restricted in the following ways:

Maximum acceptable rates for unincorporated liquid (less than 12% solids) manure applications are shown in the table on page 14. If these rates are not enough to meet the desired nutrient application rate (consistent with the 590 standard), you can apply sequential applications. Wait at least 7 days or use the “allowable soil moisture description” below to make sure that the soil is dry enough for another application.

What other spreading restrictions should I be aware of? various symbols

Manure should never be mechanically applied to areas within 50 feet of a potable drinking water well

Nutrients should never be applied to the following features:

Surface water, established concentrated flow channels (including grassed waterways), or non-harvested permanent vegetative buffers
Any non-farmed wetland, sinkhole, nonmetallic mine, or well
Areas contributing runoff within 200 feet upslope of direct conduits to groundwater such as well, sinkhole, fractured bedrock at the surface, tile inlet, or nonmetallic mine, unless the nutrients are effectively incorporated within 72 hours

Land where vegetation is not removed mechanically or by grazing

Fields exceeding tolerable soil loss (T)
12. Which fields can receive manure applications in the winter? __________

13. Which fields can receive manure applications in the spring, summer, and fall? __________

13a. Do any of these fields have limitations on the amount of nitrogen they can receive during the fall season? □ Yes □ No

14. Which fields are in a SWQMA? __________
15. If surface applying manure on Field 6 in the spring or fall with no plans for incorporation, what is the maximum application rate that can be applied if the soil is a medium soil texture and the field has ≥30% residue? (use the chart below)

____________________________gal/ac

Table 1. Maximum unincorporated liquid manure application rate within a SWQMA.

<table>
<thead>
<tr>
<th>Soil Texture Class¹</th>
<th>Maximum Application Rate</th>
<th>Allowable Soil Moisture Description for Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 30%²</td>
<td>3,000 5,000</td>
<td>Easily ribbons out between fingers, slick feel.</td>
</tr>
<tr>
<td>&gt; 30%²</td>
<td>5,000 7,500</td>
<td>Forms a ball, very pliable, slicks readily with clay.</td>
</tr>
<tr>
<td>Fine</td>
<td>5,000 7,000 10,000</td>
<td>Forms a weak ball, breaks easily.</td>
</tr>
<tr>
<td>Medium</td>
<td>7,000 10,000</td>
<td></td>
</tr>
<tr>
<td>Coarse</td>
<td>7,000 10,000</td>
<td></td>
</tr>
</tbody>
</table>

¹ Fine – clay, silty clay, silty clay loam, clay loam; Medium – sandy clay, sandy clay loam, loam, silt loam, silt; Coarse – loamy sand, sandy loam, sand. The coarse category also includes peat and muck.

² Crop residue or vegetative cover on the soil surface after manure application.
Blue-lined areas: **SWQMA**s

**What is a SWQMA?** An area that is 300 feet from a stream/river or 1000 feet from lakes/ponds; the acronym stands for Surface Water Quality Management Area.

Note: SWQMA is often pronounced as swik-muh.

**In the winter, nutrient applications are prohibited in SWQMA**s (Winter is defined as being unable to effectively incorporate due to frozen soil or snow cover).

**In non-winter conditions, nutrient applications are restricted in SWQMA**s. Any nutrient applications must also be accompanied by one of the following:

- Establishment of permanent vegetative buffers **OR**
- Maintenance of greater than 30% residue or vegetative cover **OR**
- Incorporation of nutrient within 3 days **OR**
- Establishment of cover crops after application **OR**
- Unincorporated liquid manure application rates are restricted to those in the table.

Note: Your soil texture can be found by using the Get Info button on the soils layer in the interactive map website.

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**Legend**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>Intermittent Streams</td>
</tr>
<tr>
<td>_</td>
<td>Perennial Streams</td>
</tr>
<tr>
<td>□</td>
<td>Waterbodies</td>
</tr>
<tr>
<td>▲</td>
<td>SWQMA 300 Feet</td>
</tr>
<tr>
<td>▼</td>
<td>SWQMA 1,000 Feet</td>
</tr>
<tr>
<td>☑</td>
<td>Fall N Restriction</td>
</tr>
<tr>
<td>☐</td>
<td>No Winter App. Slope &gt; 12%</td>
</tr>
<tr>
<td>☐</td>
<td>Winter Restriction if Slope &gt; 9%</td>
</tr>
<tr>
<td>☐</td>
<td>Wetland Inventory</td>
</tr>
<tr>
<td>☐</td>
<td>Township-Range</td>
</tr>
</tbody>
</table>

**Max. Unincorporated Liquid Manure Application Rate within a SWQMA on Unsaturated soils**

<table>
<thead>
<tr>
<th>Percent crop residue or vegetative cover on surface after manure application</th>
<th>&lt; 30%</th>
<th>≥ 30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine soil texture</td>
<td>3,000</td>
<td>3,000</td>
</tr>
<tr>
<td>clay, silty clay, silty clay loam, clay loam</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium soil texture</td>
<td>5,000</td>
<td>7,500</td>
</tr>
<tr>
<td>sandy clay, sandy clay loam, loam, silt loam, silt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coarse soil texture</td>
<td>7,000</td>
<td>10,000</td>
</tr>
<tr>
<td>loamy sand, sandy loam, sand, peat, muck</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Yellow dotted areas:  
**Fall nitrogen (N) restricted soils**

**What are N restricted soils?** These soils are considered risky because of the strong possibility that they are direct conduits to groundwater. N Restricted soils fall into one of three categories: 1) highly permeable, 2) less than 20 inches to bedrock, or 3) less than 12 inches to groundwater.

In general, these soils should have N put on as close to crop uptake as possible; in other words, applications should be made in the spring and avoided in the fall.

**Commercial N restrictions:**  
*Fall application of commercial N is prohibited, except for establishment of fall-seeded crops (maximum 30 lbs N/ac).*

**Manure N restrictions:**  
*When manure is applied in the fall and soil temperatures are above 50° F:*  
- Use a nitrification inhibitor with liquid manure and limit rate to 120 lb N/ac,  **OR**  
- Apply after Sept. 15 and limit rate to 90 lb N/ac  **OR**  
- Apply to perennial or fall-seeded crops and limit rate to 120 lb N/ac or crop N need, whichever is less.

*When manure is fall-applied and soil temperatures are below 50° F,* limit the application rate to 120 lb N/ac or the crop’s N need, whichever is less.

*On irrigated fields:*  
- Split N applications, applying the majority of N after crop establishment  **OR**  
- Use a nitrification inhibitor with ammonium forms of N.

Red and pink areas:  
**Winter restricted soils**

**When is winter?** Winter conditions are defined as having frozen or snow-covered soils that prevent effective incorporation at the time of application.

**Red area on map** (soils have slopes over 12%):  
- Applications of nutrients are prohibited on slopes greater than 12%.

**Pink area on map** (soils have slopes between 6 and 12%):  
- If the actual slope of the field is less than 9%, then there are no restrictions.
- If the actual slope is between 9 and 12% then applications are prohibited unless the cropland is contoured or contour strip cropped, then there are no restrictions.
16. A spill is:

- a. Any release that has the potential to threaten ground or surface water
- b. Any release greater than 1,000 gallons
- c. Only if the manure reaches a stream or pond
- d. None of the above

17. Assume you are applying manure in a field, and a spill occurs. As an employee in the field (not the boss), place the following spill response steps in the correct order. (1 being the first step you do, 6 the last step)

- Begin the cleanup
- Call the DNR or appropriate agency
- Control the spill by turning off the pumps
- Determine the best way to contain the spill (plow, chisel, berm)
- Fill out documentation and paperwork
- Notify my supervisor
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This publication is available from the Nutrient and Pest Management (NPM) Program. web (ipcm.wisc.edu); phone (608) 265-2660; email (npm@hort.wisc.edu).