



Minnesota
Pollution
Control
Agency

Regional
Division

Feedlot Program

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877/333-3508

Manure Management Planning Sensitive Areas Guidelines

(In accordance with Minn. Rules ch. 7020.2225 subp. 4 item D(8-13))

Water Quality/Feedlots 6.38, January 2005

This factsheet includes forms to complete the sensitive areas, winter applications and soil phosphorus management parts of a manure management plan (MMP) developed to meet state rules (Minn. R. ch. 7020.2225). For example, if you use a computer program or other forms that provide all required field nutrient management information, but do not include parts of the MMP related to sensitive area management, then these forms can be used to understand your options and complete your plan. A spreadsheet is available for your use in writing all MPCA required parts of MMPs at the website: <http://www.pca.state.mn.us/hot/feedlot-management.html>. At this website, also see the publication "Applying Manure in Sensitive Areas."

Instructions

Step 1. Fields – In the middle of the top row of Table 1, list the field name or identification number (for all fields to receive manure). If more than 9 fields are used, photocopy this form and complete for remaining fields. Make sure that the field acreage and location information for these same field names is listed somewhere in the manure management plan (MMP).

Step 2. Sensitive Areas

For each field listed on Table 1, check all of the sensitive features that are in the field or adjacent to the field. For surface waters, check the box if the water type is within 300 feet of areas receiving manure. For floodplains, only check if manure is to be applied within a floodplain that is more than 300 feet from the water. A "public well management area" can be identified by asking city water managers (check if the fields are within about a mile of a community water supply well).

Whenever one or more fields has a sensitive feature, look at the right hand column to find out which part of the following pages (Sensitive Areas parts 1-12) needs to be completed. For example if a field has an open tile intake, then complete part 4 in sensitive areas (identify the setback option to be used for each field with an open tile intake). If no tile intakes are found in any field, then part 4 of Sensitive Areas does not need to be completed.

Step 3. Soil Test Phosphorus

For each field listed on Table 1 check either a, b, c, or d, based on the field average soil phosphorus test levels. Only one of the four boxes should be checked. If b, c, or d are checked for any of the fields, then follow the instructions in the right hand column (e.g. complete the corresponding parts 13 and/or 14 which can be found on page 5).

Step 4. Timing of application

For each field in Table 1, check one of the five seasons that corresponds to the time manure will be applied onto that field. Follow the instructions in the right hand column of Table 1. For example, if manure is to be applied onto frozen or snow-covered soils, then complete sensitive areas parts 11 and 12.

Step 5. Soil Conservation

All CAFOs and NPDES permitted feedlots must include a description of soil conservation practices. For all fields receiving manure from your CAFO facility, complete part 12 of Sensitive Areas. Part 12 is also required when manure will likely be applied onto frozen or snow-covered soils.

Field name/tract # Show same field name/tract # on maps or aerial photos of fields	Example field A	1	2	3	4	5	6	7	8	9	10	What is needed to complete the manure management plan when one or more fields are checked in the row?
Sensitive areas (check each feature that is within 300 ft of field)												Sensitive areas parts 1-14 are found on the following pages.
a. Lake or Stream												Complete Sensitive Areas part 1
b. Intermittent stream												Complete Sensitive Areas part 2
c. Drainage ditch without protective berms	X											Complete Sensitive Areas part 2
d. Wetlands over 10 acre (public waters wetland)												Complete Sensitive Areas part 3
e. Open tile intakes	X											Complete Sensitive Areas part 4
f. Wetlands under 10 acres												Complete Sensitive Areas part 5
g. Sinkhole, well, mine or quarry												Complete Sensitive Areas parts 6 and 7
h. Floodplain												Complete Sensitive Areas part 8
i. Public well mgmt. area												Complete Sensitive Areas part 9
k. Shallow soil over fractured rock												Complete Sensitive Areas part 10
l. Other conduits to water												Complete Sensitive Areas part 2, if CAFO
Soil test Phos. (ppm) check one (a-d)												Note: Use field average P
a. Under 22 ppm Bray P1 or 17 Olsen												No state restrictions on P applications
b. 22-75 Bray P1 or 17-60 Olsen	X											If field is within 300 ft of sensitive areas a,b,c,or d, above, then complete Sensitive Areas part 13
c. 76-150 Bray P1 or 61-120 Olsen												If field is within 300 ft of the sensitive areas a, b, c, d or e above, then complete Sensitive Areas part 14
d. Over 150 Bray P1 or 120 Olsen												Complete Sensitive Areas part 14
Timing of application (check one)												
June, July or August												Describe cover crop: _____
September to mid/late- October												If CAFO, no application to coarse-textured soils until soil temps drop below 50° F
Late Oct. to soil freeze	X											No added requirements
Frozen or snow-covered soils												Complete Sensitive Areas parts 11 and 12
Spring application to unfrozen soils												No added requirements
Soil Conservation												
Is feedlot a CAFO or NPDES permitted site?	N											Complete Sensitive Areas part 12 if the feedlot is a CAFO

1. Lake or perennial stream

Option A

- inject or incorporate within 24 hours and prior to rainfall (within 300 feet), and
- 25 foot setback with no manure applied
- avoid long term soil P build-up

Option B – 100 ft wide non-manured grassed buffer

Option C – 100 foot non-manured setback with at least one rod (16.5') as grassed buffer

Option D – other (describe) _____

Field _____ Option ____

Field _____ Option ____

Field _____ Option ____

Field _____ Option ____

Field _____ Option ____

2. Intermittent stream or drainage ditch without protective berm

Option A

- inject or incorporate within 24 hours and prior to rainfall (within 300 feet), and
- 25 foot setback with no manure applied
- Avoid long term soil P build-up

Option B – 50 ft wide non-manured grassed buffer

Option C – 100 foot non-manured setback with at least one rod (16.5') as grassed buffer

Option D – other (describe) _____

All fields..... Option ____

Field _____ Option ____

Field _____ Option ____

Field _____ Option ____

Field _____ Option ____

Field _____ Option ____

3. Public waters wetland (i.e. >10 acres)

Option A

- inject or incorporate within 24 hours and prior to rainfall (within 300 feet), and
- 25 foot setback with no manure applied
- avoid long term soil P build up

Option B – 50 ft wide non-manured grassed buffer

Option C – 100 foot non-manured setback with at least one rod (16.5') as grassed buffer

Option D – other (describe) _____

All Fields..... Option ____

Field _____ Option ____

Field _____ Option ____

Field _____ Option ____

4. Tile intakes

Option A

- inject or incorporate within 24 hours and prior to rainfall (within 300 feet of intake)
- 25 foot setback with no manure applied
- avoid long term soil P build-up

Option B

- inject or incorporate within 24 hours and prior to rainfall (within 300 feet of intake), and
- Use a riser pipe that allows at least 75% solids settling in ponded area surrounding the intake*

Option C – 35 foot non-manured grassed buffer

Option D – 100 foot non-manured setback with at least one rod (16.5') as grassed buffer

Option E – other (describe) _____

* Note: needed if NPDES permitted facility

All fields..... Option ____

Field _____ Option ____

Field _____ Option ____

Field _____ Option ____

Field _____ Option ____

5. Wetlands under 10 acres

No specific state-wide requirements. Check which practices will be followed to meet any permit conditions and/or to voluntarily protect water quality:

- Setback of ___ ft
- Grassed buffer ___ ft wide
- No long term soil P build-up
- Incorporate manure within ___ ft
- Soil conservation practices
- Other _____
- Other _____

6. Sinkhole

Option A

- inject or incorporate within 24 hours and prior to rainfall (upslope and within 300 ft), and
- 50 setback with no manure applied (100 foot setback for CAFOs)

Option B – Diversion berm to prevent runoff into the sinkhole

Field _____ Option ____

Field _____ Option ____

Field _____ Option ____

Field _____ Option ____

Field _____ Option ____

Field _____ Option ____

Field _____ Option ____

7. Wells, Mines, Quarries

50 ft setback – minimum required
(100' if CAFO applying near agricultural wellhead)

Field _____ setback _____
Field _____ setback _____
Field _____ setback _____
Field _____ setback _____
Field _____ setback _____
Field _____ setback _____

8. Floodplains extending beyond 300 ft of waters

- No minimum state-wide requirements.
Check which practices will be followed:
 Avoid manure application during peak flooding periods
 Incorporate or inject manure when there is a risk of flooding
 Avoid winter-time manure applications
 Other _____

**9. Public Well Management Areas
i.e. Those vulnerable to contamination**

- No state requirements specifically for these areas.
Check which practices will be followed:
 Follow practices recommended in city wellhead protection plans
 Maintain a setback of ____ ft
 Soil nitrate test will be used to refine nitrogen rate management decisions
 Apply no earlier than late October, or when soil temperatures are less than 50°F
 Use crops that mine nitrogen out of the soil (e.g. alfalfa, legume grasses, etc.)
 Other _____

**10. Shallow soil over fractured bedrock
(i.e. < 3 feet above limestone)**

- No specific state requirements
Check which practices will be followed:
 Use composted manure or other processes which kill bacteria
 Till manure into soil
 Maximize separation between fractured bedrock and manure
 Other _____

11. Winter Application Sites

Fields used for winter application

Field	Slope	Distance to nearest water

Check which practices will be followed for **winter application fields.**

- Required for all sites:
 I will not apply manure to frozen or snow-covered soils within 300 feet of lakes, streams, intermittent streams, public waters wetlands, drainage ditches without berms, and open tile intakes.

- Management Options Check which will be followed (all are Required for CAFOs)
 Avoid spreading during snowmelt that creates runoff or when rainfall over ¼ inch is expected within 24 hrs
 Spread liquid Manure to slopes less than 2 percent and solid Manure to slopes less than 6 percent.
 Spread manure where tillage is on the contour (if slopes >2%)
 Apply liquids at rates that prevent runoff during the application process
 Find alternative fields or management where MPCA determines that water will be polluted

12. Conservation Practices

- Check which conservation practices will be used:
 grassed waterways
fields: _____
 field edge buffers
fields: _____
 contour stripcropping
fields: _____
 chisel or disk tillage w/residue
fields: _____
 contour buffer strip
fields: _____
 no-till
fields: _____
 sediment control basin
fields: _____
 terrace
fields: _____

12. Conservation Practices (continued)

- cover crop fields: _____
- rotations that include crops other than row crops fields: _____
- meets tolerable soil erosion losses “T” as defined by NRCS
- Other _____

13. High phosphorus soils near waters

*Over 21 ppm Bray P1 (weak Bray);
Over 16 ppm Olsen; or
Over 30 ppm Mehlich III*

If applying manure to high phosphorus soils that are within 300 feet of lakes, streams, intermittent streams, public waters wetlands (i.e. over 10 acres), and drainage ditches without protective berms, check the box and insert the planned frequency of application.

- I will maintain or reduce my soil P levels when applying manure within 300 feet of waters by applying manure no more than _____ times during a six-year period. Additionally, I will test my soils and further reduce manure rates and/or frequency of application if soil test levels are found to continue to increase.

To determine the number of times that manure should be applied during a six year period to prevent long-term soil P build-up follow the three steps below.

Step 1. Determine average P uptake during the crop rotation (multiply expected yields by the crops’ P₂O₅ removal rates as listed in attached table).

Example: Corn/soybean rotation with 160 bushel corn and 45 bushel beans -
Corn – [160 * 0.34] = 54 lbs P₂O₅ removed per year
Soybeans [45 * 0.82] = 37 lbs P₂O₅ removed per year
Average – 45 lbs P₂O₅ removed per year

Step 2. Determine the amount of P₂O₅ that is typically applied in manure applications (multiply rate of application times manure P₂O₅ content times 0.80).
Example: 4000 gals/ac * 28 lbs P₂O₅ /1000 gals * 0.8 = 90 lbs P₂O₅ applied

Step 3. Divide result of step 2 by result of step 1.
Example: 90/45 = 2 (i.e. manure can be applied on average once every 2 years or three times in a 6 year rotation without expecting soil P build-up).

14. Extremely high phosphorus soils (anywhere)

Proximity to waters*	Bray P1 (ppm)	Olsen (ppm)	Mehlich III (ppm)
<i>Within 300 ft of waters or open tile intakes</i>	>75	>60	>90
<i>All other land away from waters and intakes</i>	>150	>120	>180

Circle the option(s) that will be used for soils exceeding the thresholds in the above table for extremely high P soils. Check appropriate boxes and fill in other needed information.

Option A. Discontinue manure applications to the following fields.

- Field _____
- Field _____
- Field _____
- Field _____

Option B. I will follow all NRCS 590 standards for extremely high P soils as stated in the three conditions below:

- I will Maintain or reduce soil P levels by applying manure no more than _____ times during a six-year period to all manured fields with extremely high P (use same procedure as described for high P soils near waters).

I will not apply manure to fields with sheet and rill erosion exceeding 4 tons/acre, unless a 100 foot grassed buffer is along all receiving waters and erosion is less than 6 tons/acre (list fields that will not receive manure due to these conditions):

- Field _____
- Field _____
- Field _____
- Field _____

I will not apply manure within 300 feet of waters if soil P exceeds 150 ppm Bray P1 (or 120 Olsen), except if a 100 foot grass buffer exists along the water and erosion is less than 2 tons/acre (list fields that will not receive manure due to these conditions):

- Field _____
- Field _____
- Field _____

Option C

- I have used the University of Minnesota soil phosphorus index and will only apply manure to those fields which show a low or very low rating. The phosphorus index can be found at the following web site: _____

www.mnpi.umn.edu. Attach P index results for fields where manure applications are planned.

☐ Additionally, I will maintain or reduce my soil P levels by only re-applying manure after the manure P is removed by crops planted after the manure application (see attached table of crop P removal).

Crop	Yield Units	Crop Nutrient Removal (lbs. per unit yield)	
		N ¹	P ₂ O ₅
Alfalfa	Tons (air dry)	50.4	10.8
Alsike Clover	Tons (air dry)	40.8	10.5
Barley (grain)	Bushels		0.41
Barley (grain and straw)	Bushels		0.55
Birdsfoot Trefoil	Tons (air dry)	45.3	9.3
Canola	Cwt.		1.3
Corn (grain)	Bushels		0.34
Corn (silage)	Tons (as fed)	9	3.8
Edible Beans	Pounds		0.01
Grass Hay or Pasture	Tons (air dry)	27.1	8.9
Grass / Legume	Tons (air dry)	43.5	11.2
Oats (grain)	Bushels		0.25
Oats (grain and straw)	Bushels		0.32
Peas	Pounds		0.01
Potatoes	Cwt.		0.14
Red Clover	Tons (air dry)	45.1	10.8
Rye (grain)	Bushels		0.44
Rye (grain and straw)	Bushels		0.59
Soybeans	Bushels	3.5	0.82
Sugar Beets	Tons		2.2
Sunflowers	Pounds		0.01
Sweet Corn	Tons		11.0
Wheat (grain)	Bushels		0.53
Wheat (grain and straw)	Bushels		0.64

Definitions of sensitive features

Tile intakes – a direct conduit (e.g. piping) from the ground surface to waters of the state and any other mechanism used to drain surface runoff ponding from fields that does not result in effective treatment or removal of pollutants (i.e. including blind inlets or rock inlets). This also includes side inlets through berms along drainage ditches.

Drainage ditch – edge of field drainage ditches (typically shown on U.S. Geological Survey quadrangle maps), excluding ditches that have berms sufficiently high to prevent runoff into the ditch.

Lakes, River or Stream – Lakes can be generally considered as bodies of waters over 25 acres. Rivers or streams flow continuously.

Intermittent streams – Streams which do not flow all year. They can flow continuously for long or short periods of time, and when a storm or major snowmelt occurs. They are denoted by dashed lines on U.S. Geological Survey Topographic maps.

Wetlands over 10 acres (public waters wetlands) – DNR protected wetlands, which are typically over 10 acres in rural areas.

Wetlands under 10 acres (non-farmed wetlands) – Wetlands under 10 acres, excluding wetlands that are used for agricultural purposes.

Floodplains – Land that regularly floods during the spring or during large storms.

Public well management area – Drinking water supply management areas delineated in accordance with Minnesota Health Department rules, where the aquifer/well is considered vulnerable. The well owner/manager should know whether the land is in such an area.

Shallow bedrock – Areas with bedrock less than 36 inches below the soil surface as identified in the soil survey, field checks, or NRCS evaluations.

Sinkhole – A surface depression caused by a collapse of soil or overlying formation above a fractured or cavernous bedrock.

Well, Mine or Quarry – Active wells, inactive unsealed wells, or any human excavations to remove stone, gravel, sand, iron, or other minerals.

Other conduits to waters – This category can include road ditches, especially those which are mapped as intermittent streams, or other pipes or channels that lead directly to waters of the state.