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.”

**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.
<table>
<thead>
<tr>
<th>Field name/tract #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Show same field name/tract # on maps or aerial photos of fields</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Example field A</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>

### 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)

- **a. Lake or Stream**
  - Complete Sensitive Areas part 1

- **b. Intermittent stream**
  - Complete Sensitive Areas part 2

- **c. Drainage ditch without protective berms**
  - Complete Sensitive Areas part 2

- **d. Wetlands over 10 acre (public waters wetland)**
  - Complete Sensitive Areas part 3

- **e. Open tile intakes**
  - 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

- **j. Shallow soil over fractured rock**
  - Complete Sensitive Areas part 10

- **l. Other conduits to water**
  - Complete Sensitive Areas parts 11 and 12

#### Soil test Phos. (ppm) check one (a-d)

<table>
<thead>
<tr>
<th>Note: Use field average P</th>
</tr>
</thead>
</table>

- **a. Under 22 ppm Bray P1 or 17 Olsen**
  - No state restrictions on P applications

- **b. 22-75 Bray P1 or 17-60 Olsen**
  - 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 50º F

- **Late Oct. to soil freeze**
  - 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?**
  - 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 ___
   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 ___
   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 ___
   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

<table>
<thead>
<tr>
<th>Field</th>
<th>Slope</th>
<th>Distance to nearest water</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

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 strip cropping
   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)

<table>
<thead>
<tr>
<th>Proximity to waters*</th>
<th>Bray P1 (ppm)</th>
<th>Olsen (ppm)</th>
<th>Mehlich III (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within 300 ft of waters or open tile intakes</td>
<td>&gt;75</td>
<td>&gt;60</td>
<td>&gt;90</td>
</tr>
<tr>
<td>All other land away from waters and intakes</td>
<td>&gt;150</td>
<td>&gt;120</td>
<td>&gt;180</td>
</tr>
</tbody>
</table>

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 ______________________

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:
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).

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.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Yield Units</th>
<th>Crop Nutrient Removal (lbs. per unit yield) N1</th>
<th>P2O5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfalfa</td>
<td>Tons (air dry)</td>
<td>50.4</td>
<td>10.8</td>
</tr>
<tr>
<td>Alsike Clover</td>
<td>Tons (air dry)</td>
<td>40.8</td>
<td>10.5</td>
</tr>
<tr>
<td>Barley (grain)</td>
<td>Bushels</td>
<td>0.41</td>
<td></td>
</tr>
<tr>
<td>Barley (grain and straw)</td>
<td>Bushels</td>
<td>0.55</td>
<td></td>
</tr>
<tr>
<td>Birdsfoot Trefoil</td>
<td>Tons (air dry)</td>
<td>45.3</td>
<td>9.3</td>
</tr>
<tr>
<td>Canola</td>
<td>Cwt.</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>Corn (grain)</td>
<td>Bushels</td>
<td>0.34</td>
<td></td>
</tr>
<tr>
<td>Corn (silage)</td>
<td>Tons (as fed)</td>
<td>9</td>
<td>3.8</td>
</tr>
<tr>
<td>Edible Beans</td>
<td>Pounds</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>Grass Hay or Pasture</td>
<td>Tons (air dry)</td>
<td>27.1</td>
<td>8.9</td>
</tr>
<tr>
<td>Grass / Legume</td>
<td>Tons (air dry)</td>
<td>43.5</td>
<td>11.2</td>
</tr>
<tr>
<td>Oats (grain)</td>
<td>Bushels</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>Oats (grain and straw)</td>
<td>Bushels</td>
<td>0.32</td>
<td></td>
</tr>
<tr>
<td>Peas</td>
<td>Pounds</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>Potatoes</td>
<td>Cwt.</td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td>Red Clover</td>
<td>Tons (air dry)</td>
<td>45.1</td>
<td>10.8</td>
</tr>
<tr>
<td>Rye (grain)</td>
<td>Bushels</td>
<td>0.44</td>
<td></td>
</tr>
<tr>
<td>Rye (grain and straw)</td>
<td>Bushels</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>Soybeans</td>
<td>Bushels</td>
<td>3.5</td>
<td>0.82</td>
</tr>
<tr>
<td>Sugar Beets</td>
<td>Tons</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>Sunflowers</td>
<td>Pounds</td>
<td>0.01</td>
<td></td>
</tr>
<tr>
<td>Sweet Corn</td>
<td>Tons</td>
<td>11.0</td>
<td></td>
</tr>
<tr>
<td>Wheat (grain)</td>
<td>Bushels</td>
<td>0.53</td>
<td></td>
</tr>
<tr>
<td>Wheat (grain and straw)</td>
<td>Bushels</td>
<td>0.64</td>
<td></td>
</tr>
</tbody>
</table>

**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.