Minnesota Pollution Control Agency

Regional Division
Feedlot Program

Reviewing Manure Management Plans - FAQ

Water Quality/Feedlots 8.15, October 2005

Contents:

MPCA Area Offices

Brainerd:
218/828-2492

Detroit Lakes:
218/847-1519

Duluth:
218/723-4660

Mankato:
507/389-5977

Marshall:
507/537-7146

Rochester:
507/285-7343

St. Paul:
651/296-6300
800/657-3864

Willmar:
320/214-3786

Does the MMP need to be reviewed prior to issuing permits?

NPDES permits should not be issued until the MMP is reviewed and adequate. MMP review prior to issuance of other permits is at the discretion of the CFO/MPCA.

What checklist should I use when reviewing MMPs?

Use the checklist in the guidelines "Manure Management Plan Requirements and Checklist" available at: www.pca.state.mn.us/hot/feedlot-management.html. An electronic version of this checklist with spaces available for writing your comments is available from your regional MPCA staff (on MPCA intranet).

What types of problems need to be corrected before issuing permits?

The MMP can be approved if the most important items are complete. If minor items are missing or inadequate, we should notify the producer or person assisting the producer of the shortcomings, but not necessarily hold up permit issuance. The types of major problems listed below should be corrected before the MMP is approved, since these deficiencies may result in specific violations of land application requirements found in 7020.2225 subparts 2,3,6,7 or 8. These areas are flagged by a ☼ symbol on the checklist in attachment A.

- Manure testing frequency is not described or does not show testing at least once every four years for non-CAFOs and annually for CAFOs;
- Estimated amount of manure generated is much lower in comparison with expected amounts, and past hauling records are not available to substantiate estimated amounts;
- Summer applications and no indication of cover crops;
- Winter application to fields with too many tile intakes to practically achieve the required 300 foot incorporation zone;
- winter application at CAFOs without meeting all NPDES winter application restrictions;
- Field maps or aerial photos are not attached or the total field acreage is not available;
- Identified acreage is not sufficient to handle the nitrogen from manure (where ownership of manure is not transferred);
- Crop rotations are not described;
- Crop nitrogen needs are not described or deviate substantially from University of Minnesota recommendations;
- Manure is applied two years in a row to non-legumens (i.e. corn or small grains) and nitrogen credits from the previous year are not accounted for;
- Manure rates, combined with fertilizer additions, provide substantially more nitrogen than the crops need or remove.
- The sum of all manure to be applied to individual fields is far less than the expected manure generated at the feedlot;
- Setbacks to sensitive features such as waters, wells, sinkholes, etc. are not described or do not meet minimum requirements in rules;
- Plans or evidence of soil phosphorus testing is not evident;
- Manure is applied in special protection areas at a frequency that will build soil phosphorus levels on soils with

already more than 21 ppm Bray (e.g. where manure applied over a six year period based upon crop phosphorus removal rate will potentially allow an increase in the soil phosphorus levels);
- Manure is to be applied to soils exceeding 75 ppm Bray near tile intakes, lakes, streams, intermittent streams or wetlands over 10 acres; or exceeding 150 ppm Bray in other areas, and a phosphorus management strategy was not submitted or is inadequate.

What if we miss something during our initial review and later discover a problem?

The producer is required to fix the deficiency upon our request at any time.

Do producers need to follow their MMP?

All producers need to meet manure rate and setback requirements in 7020.2225. Also, MMPs must be updated annually to reflect changes in management. In many cases, the producer can deviate from their plan and still meet the state rule requirements.

The MMP is an enforceable part of NPDES permits. NPDES permitted facilities are required to follow their most recently approved plan in order to be exempt from precipitation induced discharges to waters. NPDES permitted sites will be providing information to the MPCA in annual reports regarding the nature of any changes made to the MMP during the past year. Staff always have the option to ask to see the updated plan.

1. Manure Storage, Handling and Testing

1.1 Manure storage description
(7020.2225 subp. 4, item D(1))

Can the producer just reference the permit application instead of restating the manure storage information in the MMP?
While it is more clear and convenient to have the manure generation and manure application information in the same document (i.e. MMP), we should not require producers to go back and add this into the MMP if sufficient detail is already included in the permit application.

What if they seem to have inadequate storage? New or modified manure storage areas for NPDES facilities need to have 9 months of capacity. All others must have enough storage to apply manure in accordance with their MMP. For example, if they indicate fall months of application, yet they only have 6 months of storage, then the plan should be modified to reflect at least two periods of land application.

1.2 Manure nutrient content
(7020.2225 subp. 4, item D(4) and subp. 2)

Do feedlots with >100 AU need to test every source of manure on the farm?
No. Stockpiles or manure storage areas generated by less than 100 AU are not required to be tested, even where the facility has a total of more than 100 AU. An average book value can be used in these situations. Daily scrape and haul facilities can also use average book values.

Does the producer need to base manure rates on the latest manure test results?
No. The producer may choose to base manure rates on an average from past years or an average of similar farms in the area. While accurate results should be used in the planning process for future years, the MMP reviewer should realize that manure nutrient testing is subject to errors and uncertainties in both sampling and laboratory techniques. Additionally, the lab results are often not returned until after manure is applied.

What if the manure test results seem way high or low?
Manure nutrient content can be highly variable from site to site and can be much higher or lower than average. However, if there is a serious concern you can either ask to see lab results from previous testing to verify the numbers used in the plan, or discuss with the producer what management factors might be causing a more diluted or concentrated manure than other farms.

1.3 Amount of manure generated
(7020.2225 subp. 4, item d(1))

How can I check to see that MMP estimates of manure generation are realistic?
One way is to use the MPCA's MMP spreadsheet (complete the worksheet entitled "manure storage and handling.") The program "Nutrient Planner for Minnesota" or the "Manure Management Plan – step by step guide" can also be used. Note that all computer and hand calculations will only provide rough estimates of the generated manure amounts. The best information will be from past hauling and pumping records.

What if estimates of manure N amounts do not account for the manure N that will be available for the second crop after application?
Where legumes (e.g. soybeans, alfalfa or clover) are grown for the first or second crop after manure application, then this second year manure credit does not need to be considered. If the rotations involve corn or small grains following corn or small grains, then the second year manure credit will reduce fertilizer or manure needs (15% of swine manure N and 25% of other manure N will become available for the second crop after application).

1.4 Method of application
(7020.2225 subp. 4, item d(2))

Should we comment to the producer if manure is not going to be incorporated soon after application?
MPCA rules do not prescribe methods of application, except where manure is to be applied within 300 feet of certain waters and tile intakes. You may suggest immediate incorporation and note that surface application without immediate incorporation has been shown to contribute more pollutants to waters and create more nuisance odor.

What if the MMP does not indicate when the manure will be incorporated?
We can not evaluate the nitrogen rates if we do not know whether manure will be incorporated within 12 hrs, 12 to 48 hrs, 2 to 4 days or more than 4 days. All application after four days is treated the same when determining N rates. Also, if applying in special protection areas, the MMP should specify incorporation within 24 hours (except if using the 50-200' grass buffer option).

What if the MMP does not provide specific information regarding equipment calibration?
At a minimum, the MMP should indicate that manure application equipment will be calibrated. The feedlot owner may not know equipment calibration methods used by hired commercial applicators. You may wish to send a copy of manure calibration procedures to producers who have not included this information in the MMP. One publication is found at www.manure.umn.edu/applied/calibration_of_manure_spreaders/

1.5 Timing of application
(7020.2225 subp. 4, item d(8)(13))

Can manure applications be made in September or early October without a cover crop?
Yes. However, NPDES permitted facilities can not apply to sandy soils until the soil temperature is below 50 degrees F (generally after mid- to late-October). Coarse-textured soils are defined in the NPDES General Permit. If you are unsure about the soil textures at the land application sites, you could remind the producer of the sandy soil requirement in your MMP review notes that you send back to the producer.

When is application during the winter months prohibited? This is answered below under the heading "winter application fields."

2. Field locations and acreage

2.1 Maps or aerial photos
(7020.2225 subp. 4, item D(3)(10))

Do MMP maps need to show where every sensitive feature is located?
The rules require that the maps show areas not suitable for application. Therefore setbacks should be identified. If manure is injected or incorporated on fields with tile intakes, the tile intake locations do not need to be

mapped since setbacks are not required when the manure is immediately incorporated.

Are soils maps required for the land application sites?
Soils maps are not specifically required by the 7020 rules. They can, however, be a good way to submit the mapped locations of the fields. The advantage of the soil survey maps is that the producer can show slopes and areas of sandy soils. Slopes are needed for winter application sites, and sandy soils have some timing restrictions for NPDES permitted sites.

2.2 Number of acres
(7020.2225 subp. 4, item D(3))

How should I evaluate whether sufficient acreage is available?
Producers will generally need between 0.25 and 1.5 acres per animal unit, depending on the situation. You can use a computer program to better estimate acreage needs (MPCA MMP spreadsheet or Extension/NRCS Nutrient Planner for Minnesota). The computer programs do not give the final answer. Instead, they should be used to determine how closely you need to evaluate the entire MMP to ensure adequate acreage.

What if they do not have enough acreage to match crop phosphorus removal?
The acreage should be enough to handle the manure nitrogen. While we do not require enough acreage to handle all phosphorus at crop removal rates, we should flag situations where P build-up will occur. Producers should be made aware of application practices that could eventually result in problematic phosphorus levels. A note should be put in the file to prompt close review of soil test information in the future.

Do they need to include land application agreement forms for use of neighbors' land?
7020 rules do not expressly require the use of land application agreement forms. However, the MPCA can ask for land application agreements when needed to evaluate the potential to achieve compliance with nutrient rate requirements. Where the ownership of manure is transferred for application onto neighboring lands, producers are asked to either submit signed land application agreements, or otherwise describe how adequate acreage will be secured. Producers benefit from the signed agreements by having greater assurance that the land will be available in future years.

How do I evaluate acreage needs for transferred ownership of manure?
If ownership of manure is transferred, then the producer does not always need to show the acreage. See "Manure Management Plan requirements for transferred ownership of manure" at www.pca.state.mn.us/hot/feedlot-management

2.3 Winter application fields
(7020.2225 subp. 4, item D(10))

When should a MMP need revisions due to proposed winter application practices?
For non-CAFOs, the MMP must show slopes, runoff prevention practices, and proximity of the field to waters. Encourage the producer to find alternative fields or to avoid winter application where slopes exceed six percent, the fields are within 1000 feet of a lake or stream, reasons for winter application seem questionable, or they do not use important runoff prevention practices such as contour tillage. Pollutant transport during winter months is particularly high on smooth fields (i.e. no-till) or where tillage is up and down slopes. All application to frozen or snow-covered soils in special protection areas is prohibited.

For CAFOs, reject the MMP if winter application onto land owned, rented or under direct control of the feedlot owner will be on slopes exceeding 2% for liquids or 6% for solids, or if tillage will not be on the contour. Also, the plan must be rejected if the field can not achieve a low rating using the Minnesota soil phosphorus index or if excessive BOD in runoff is predicted by an MPCA hydrologist or soil scientist (see MPCA guidelines on winter application at CAFOs). Note that the additional requirements for CAFOs do not apply when ownership of manure is transferred.

2.4 Soil conservation practices (CAFOs)
(40 CFR Part 122.42 (e) (1) (vi))

What if conservation practices seem minimal?
NPDES-permitted sites must describe the soil conservation practices to be used on fields receiving manure. If it appears that very few conservation practices are in place, then encourage the producer to work with the county soil conservation assistance people. Make a note in the file to look for improved practices during the next MMP review. Since the NPDES permit does not specify conservation standards that must be achieved, we need to allow some flexibility as to how they choose to control runoff.

3. Field specific nutrient management

3.1 Crop rotations (7020.2225 subp. 4, item D(5))

Can the MMP be written for specific crop rotations rather than listing each field individually?
Yes. This is especially practical in areas where a producer may apply manure onto numerous different fields, each with a small acreage. The locations of each field need to be shown on the maps. Yet, the nutrient management section need only include specific rates of application for each field scenario. A field scenario is a grouping of fields with the same: crop rotation, approximate yield goal, soil organic matter category, and frequency of receiving manure.

For how many years does the plan need to be written for?
The submitted plan should at least include rates for the upcoming cropping year. The plan must be updated each year to account for changes in crops, if the MMP does not originally account for the entire rotation.

What if the plan only shows the upcoming crops and no mention is made of other crops in the rotations?
Both the producer and the MMP reviewer will need to understand whether legumes (e.g. alfalfa, soybeans or clover) are planted the year before corn or grains. Legumes will reduce the needed nitrogen during the following year and can also affect the total acreage needs.

3.2 Crop nutrient needs from manure
(7020.2225 subp. 4, item D(5) and subp. 3)

What if listed crop nitrogen (N) needs seem too high?
If crop N needs appear excessive, check the nitrogen needs using the MPCA MMP spreadsheet or University tables. In addition to University of Minnesota table recommendations, producers can base crop N needs on soil test results or recommendations from a neighboring state.

What if the yield goals seem out of line?
You may choose to comment on yield goal assumptions if they seem highly exaggerated. Indicate that Minnesota recommends that expected yield goals should be determined by taking an average of the top four yields during the past five years of growing that crop. Note that many farmers are actually able to achieve a much higher yield than county averages.

Does the soil need to be tested to determine crop nitrogen needs?
Typically not. Soil nitrate testing is particularly useful if manure was applied during the previous summer and the upcoming crop is corn. In many situations the University of Minnesota does not promote use of the soil nitrate test. For more information go to: www.manure.umn.edu/applied/soil_testing

How specific do the nutrient needs part of the MMP need to be when the feedlot has not yet been constructed?
For new construction, some uncertainty will exist regarding manure nutrient levels and manure amounts. The fields and general nature of the crop rotations should be known. Less accurate information about crop nutrient needs and rates of application are expected in the initial plan. However, once the feedlot is up and running and manure has been generated and tested over a year, then the MMP should be revised to reflect more accurate nutrient management information.

3.3 Planned rates of manure application
(ch. 7020.2225 subp. 4, item D(5) and subp. 3)

Does each field need to have a separate calculated rate of application? See response to question in section 3.1.

What are excessive rates of application?
As a rule of thumb, you may wish to comment back to the producer when rates (manure plus fertilizer) will result in 20 percent or more nitrogen than the University Extension Service says is needed or removed by the crop. Crop N needs and associated manure rates can be determined using the MPCA MMP spreadsheet, or an Extension Service spreadsheet found at: www.manure.umn.edu/applied/calculating_manure_app_rates/. Note: producers may have legitimate reasons for the increased rates due to many variables.

Are there any situations where the annual rate of application must be limited to crop phosphorus (P) needs?
When P restrictions apply (i.e. >21 ppm Bray in SPAs, >75 ppm near tile intakes, >150 ppm in other areas), producers can apply manure during any single year based on crop nitrogen needs, and then avoid manure applications to that field during the subsequent years until the crops remove the applied P. The only situation where single year applications need to match crop P removal is NPDES permitted sites which are surface applying (without incorporation) onto soils with extremely high P levels.

3.4 Available nutrients from applied manure
(ch. 7020.2225 subp. 4, item D(7) and subp. 3)

What if the total planned manure applications are less than the manure that is generated?
- If the sum of manure applications is well short of expected manure generation, the producer may have to find additional acreage or make other changes to the manure management plan. The producer could also sell some of the manure to others.

3.5 Total nutrients available to crops from all sources (ch. 7020.2225 subp. 4, item D(6))

What should I do if the MMP does not include commercial fertilizer amounts to be applied onto fields receiving manure?
The MMP must include nutrient additions from all sources (at least for fields receiving manure). Often a starter fertilizer is used in addition to the manure rates. You may wish to verify with the producer that no commercial fertilizer will be applied.

3.6 Nitrogen carry-over into following year (ch. 7020.2225 subp. 4, item D(7) and subp. 3)

What if the producer makes no mention about 2nd year nitrogen from manure applications? See response to a related question in section 1.3

4. Sensitive Areas Management

See local requirements, feedlot permit conditions, and the publication "Applying Manure in Sensitive Areas"

4.1 Special protection areas
(ch. 7020.2225 subp. 4, item D(9) and subps. 6 and 7)

What types of wetlands need setbacks? Only those wetlands that are considered public waters wetlands have specific minimum setbacks in 7020 rules. These wetlands are typically over 10 acres in rural areas and are shown on maps at: www.dnr.state.mn.us/waters/watermgmt_section/pwi
BMPs for protecting smaller wetlands need to be described in the MMP, but minimum requirements have not been established for the smaller wetlands.

Are immediate incorporation zones required around rock inlets, blind inlets and other alternatives to tile intakes?
Where research shows that equivalent or better water quality protection is achieved by alternatives to setbacks and incorporation zones established in 7020 rules, the MPCA can approve such alternatives. To date, the MPCA requires the 300 foot immediate incorporation zone around all tile inlets, rock inlets and blind inlets.

What if the MMP is missing the practices for sensitive features?
Producers can use an MPCA guideline entitled "Manure Management Plan – Sensitive Area Guidelines" found at: www.pca.state.mn.us/hot/feedlot-management

4.2 High phosphorus soils
(ch. 7020.2225 subp. 4, item D(11) and subp. 3, item C)

Do soil phosphorus test results need to be submitted along with the MMP?
The MPCA is asking that the soil P results be submitted with the MMP, except that results are not needed for transferred manure ownership or when testing is not feasible for new construction (e.g. winter). Producer records will suffice (i.e.. lab sheets are not typically needed). Each region can determine priorities for follow-up when test results are missing. It is more important to review soil P results in situations where soil P is likely to build, such as annual applications, non-calcareous soils, high manure P content such as poultry manure, past problems at that farm, etc..

Can producers continue to apply manure onto soils with extremely high soil test phosphorus?

See page 8 of publication "applying manure in sensitive areas" or see "Manure Management Plan – Sensitive Area Guidelines" found at: www.pca.state.mn.us/hot/feedlot-management. Also, see MPCA MMP spreadsheet (phosphorus management worksheet) to check on frequency of application needed to prevent long term phosphorus build-up and to understand options for extremely high P soils. Consult the NPDES permit for CAFO requirements, which are more specific when dealing with extremely high P soils.

In general, feedlots over 300 AU will either need to follow NRCS 590 standards or achieve a low rating with the Minnesota Phosphorus index in order to continue limited manure applications onto soils with extremely high soil P levels.

Manure Management Plan Checklist

A manure management plan that meets Minn. Rules ch. 7020 requirements will include the items below. Where feedlot owners transfer manure ownership for application to fields that are not owned or leased by the feedlot owner, see MMP guidelines for transferred manure ownership.

1. Manure Storage, Handling and Testing

1.1 Manure storage description
(7020.2225 subp. 4, item D(1))
- ❑ Type of storage areas are described.
- ❑ Storage capacity and number of months of storage.
- ❑ Type and number of animals contributing to each storage area are included.

1.2 Manure nutrient content
(7020.2225 subp. 4, item D(4) and subp. 2)
- ❑ ☼Testing frequency shows testing at least once every four years and once per year for the first three years (annually for NPDES permits).
- ❑ Sampling procedures and protocol are described.
- ❑ Estimated nutrient content of manure(s) is listed and is based on past laboratory test results (or average book values for new facilities).

1.3 Amount of manure generated
(7020.2225 subp. 4, item d(1))
- ❑ ☼Tons of solid manure and gallons of liquid manure to be land-applied from each storage area per year are listed (based on records of past few yrs).
- ❑ Annual amount of nitrogen available from all manure storage areas is listed (based on records of amount hauled in past years times the manure nutrient content).
- ❑ Annual amount of phosphorus available from all manure storage areas is listed.

1.4 Method of application
(7020.2225 subp. 4, item d(2))
- ❑ Method of application, including number of days between application and incorporation.
- ❑ Equipment calibration practices (if not using a certified commercial applicator).

1.5 Timing of application
(7020.2225 SUBP. 4, ITEM D(8)(13))
- ❑ Expected months of application are listed.
- ❑ ☼For June, July or August applications, type of cover crop to be planted to harvested fields without actively growing crops is described.
- ❑ NPDES permits: manure is applied to *sandy* soils during spring or mid-to late fall (soils less than 50□)

2. Field Locations And Acreage

2.2 Maps or aerial photos
(7020.2225 subp. 4, item D(3)(10))
- ❑ ☼Fields are shown on maps or aerial photos.
- ❑ Maps or aerial photos highlight planned setbacks.
- ❑ Winter application fields are identified on map(s).

2.2 Number of acres
(7020.2225 subp. 4, item D(3))
- ❑ ☼Total number of acres for application is identified.
- ❑ Acreage excludes land not suitable for application (due to setbacks, wetlands, etc.).
- ❑ ☼Identified acreage is sufficient to handle manure nitrogen.
- ❑ Identified acreage is sufficient to receive manure phosphorus (P) without extreme soil P build-up over time.

2.5 Winter application fields
(7020.2225 subp. 4, item D(10))
- ❑ ☼Field locations for winter application are generally those farthest from waters and no applications will occur within 300 feet of waters or tile intakes (i.e. special protection areas).
- ❑ Slopes for winter application sites are listed in the plan and generally are the flattest land available.
- ❑ Conservation practices (e.g. contour tillage) are described for winter application sites.
- ❑ ☼NPDES permits: winter application criteria are met, as required in permit, including 2% slope restrictions for liquid and 6% for solid manure.
- ❑ ☼NPDES permits: Specific information is provided that allows MPCA to conduct winter spreading site evaluations.

2.6 Soil conservation practices (CAFOs)
(40 CFR Part 122.42 (e) (1) (vi))
- ❑ NPDES permits: Soil conservation practices are described.

3. Field Specific Nutrient Management

3.1 Crop rotations
(7020.2225 subp. 4, item D(5))
- ❑ ☼Crop rotations are described and indicate which crops in the rotation will receive manure.

3.2 Crop nutrient needs from manure
(7020.2225 subp. 4, item D(5) and subp. 3)
- ❑ Nitrogen (N) needs for non-legumes and N removal for legumes are described for fields receiving manure.
- ❑ Range of expected crop yields are listed and realistic.
- ❑ Crop N needs account for previous year legume N credits.
- ❑ Crop N needs account for N credits from alfalfa or red clover grown two years ago.
- ❑ ☼Crop N needs are generally consistent with recommendations from the Univ. of Minnesota or from another University in IA, WI, ND, or SD.
- ❑ Plans for soil nitrate testing are described, where recommended by the University of Minnesota.
- ❑ ☼N credits from the previous year manure applications are accounted for (i.e. continuous corn).
- ❑ Crop phosphorus (P) needs are identified and based on soil phosphorus test results.

3.4 Planned rates of manure application
(ch. 7020.2225 subp. 4, item D(5) and subp. 3)
- ❑ Manure rates specific for each field or cropping situation are described.
- ❑ Rates are consistent with crop nutrient needs and expected manure nutrient content/availability.

3.4 Available nutrients from applied manure
(ch. 7020.2225 subp. 4, item D(7) and subp. 3)
- ❑ Amount of N and P available to the first crop following manure application are described (lbs/acre).
- ❑ ☼The sum of all manure applied to individual fields approximately equals the expected amount of manure generated at the feedlot.

3.5 Total nutrients available to crops from all sources
(ch. 7020.2225 subp. 4, item D(6))
- ❑ ☼Total N amounts per acre available to each crop are described (manure N + fertilizer N + other N).
- ❑ ☼Added commercial fertilizer N does not result in total N additions that are above crop N needs.
- ❑ Total P amounts per acre are listed and include fertilizer P.

3.6 Nitrogen carry-over into following year (ch. 7020.2225 subp. 4, item D(7) and subp. 3)
- ❑ ☼Manure and/or fertilizer additions during the year following manure application are reduced to account for second year N credits. The amount of carry-over N is incorporated into the plan.

4. Sensitive Areas Management

See local requirements, feedlot permit conditions, and the publication "Applying Manure in Sensitive Areas."

4.1 Special protection areas
(ch. 7020.2225 subp. 4, item D(9) and subp. 6)

Protective measures are described when applying manure within 300 feet of:
- ❑ Lakes;
- ❑ DNR protected wetlands (i.e. over 10 acres)
- ❑ Streams and intermittent streams; and
- ❑ Drainage ditches without protective berms.
- ❑ ☼All protective measures for the above areas meet state and county requirements, and otherwise provide sufficient protection of waters.

4.2 Other avenues to surface water
(ch. 7020.2225 subp. 4, item D(9) and subp. 7)

Protective measures are described when applying:
- ❑ In flood plains;
- ❑ Within 300 feet of surface tile intakes, including, at a minimum, injection or incorporation within 24 hours; and
- ❑ Within 300 feet of non-protected wetlands (e.g. less than 10 acres).
- ❑ ☼All protective measures for the above areas meet state and county requirements, and otherwise provide sufficient protection of waters.

4.3 Ground water protection
(ch. 7020.2225 subp. 4, item D(9))

Protective measures are described when applying:
- ❑ In a vulnerable drinking water supply mgmt area;
- ❑ Within 300 feet of sinkholes; and
- ❑ On land with less than three feet of soil above bedrock.
- ❑ ☼All protective measures for the above features meet state and county requirements, and otherwise provide sufficient protection of waters.

4.4 High phosphorus soils
(ch. 7020.2225 subp. 4, item D(11) and subp. 3, item C – requirements if over 300 AU)
- ❑ ☼Soils are tested for P at least once every 4 yrs and results submitted, where required in past.
- ❑ ☼Soil P is managed in special protection areas to prevent increasing P levels over any six-year period (where soil P levels are already high enough for crop needs and a 50-100' buffer has not been established).
- ❑ ☼Manure application is avoided on soils exceeding 150 ppm Bray or 120 ppm Olsen in areas outside of special protection areas, or to soils exceeding 75 ppm Bray or 60 ppm Olsen in special protection areas (if not avoided, the plan includes a strategy to protect water quality, e.g. meet all NRCS standards for high P soils and prevent continued soil phosphorus build-up).