LAND APPLICATION OF MANURE

A supplement to Manure Management for Environmental Protection

Manure Management Plan
Standard Format

To Be Completed and Retained
By All Farms That Land Apply Manure

Commonwealth of Pennsylvania, Harrisburg, Pennsylvania
Department of Environmental Protection

PREFACE

This publication supersedes all previous *Field Application of Manure* supplements to the *Manure Management for Environmental Protection* published by the Pennsylvania Department of Environmental Protection (DEP). Due to changes in recommendations and practices, copies of the previous manuals should be discarded.

The Manure Manual for Environmental Protection and its supplements provide guidelines that comply with DEP regulations concerning animal manures. Some farmers may have operations that are Concentrated Animal Operations under the Nutrient Management Act Regulations, or Concentrated Animal Feeding Operations under Pennsylvania's NPDES CAFO program. These farmers must follow requirements in addition to those found in this manual. Farmers who do not follow the practices in this publication are required to obtain DEP approval or a water quality management permit. Farmers who do not follow these requirements or do not have a permit or approval from DEP will be in violation of state, and in some cases federal water pollution control laws.

Commonwealth of Pennsylvania
Department of Environmental Protection
Bureau of Watershed Management
Harrisburg, Pennsylvania
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*** These 3 documents are used in the "day to day" operation of the farm**

This checklist should be used to verify that you have completed all necessary sections of your manure management plan

REQUIREMENTS FOR MANURE MANAGEMENT PLANS

Every farm in Pennsylvania that land applies manure is required to have a written manure management plan. This includes manure application by various types of equipment and/or direct application by animals on pastures and in animal concentration areas. By following the application requirements, the farmer will optimize yields and protect streams, rivers, ponds and groundwater. The attached Manure Management Plan format must be used for the written manure management plan unless the farmer gets approval from the DEP for an alternative plan format. The farmer must also complete and maintain records to demonstrate compliance with the Manure Management Plan.

The Manure Management Plan format includes five sections.

Section 1 General Information. This section provides general information about the farm. This section is always required in a manure management plan.

Section 2 Manure application rates and timing for mechanical application of manure. This section is always required in a manure management plan

Section 3 Managing Manure Storage in Structures and Temporary Stockpiling/Stacking Areas. This section is only necessary if the farm has a manure storage facility or stockpiles or stacks manure.

Section 4 Managing manure in pastures. This section is only necessary if the farm has one or more pasture fields.

Section 5 Managing manure in Animal Concentration Areas ("ACAs") This section is only necessary if the farm has an Animal Concentration Area.

Manure Management Plans can be prepared by the farmer although assistance is also available from a variety or sources including certified nutrient management specialists, certified manure brokers, county conservation districts, NRCS staff and farm organizations.

Farms defined as Concentrated Animal Feeding Operations ("CAFOs") and Concentrated Animal Operations ("CAOs") are required to develop written plans as well, but nutrient management plans for these higher intensity animal operations follow a different more detailed process and must be developed by a Certified Nutrient Management Specialist. Animal operations that do not want to follow the planning process outlined in this manual may obtain the assistance of a certified planner and utilize the nutrient management planning process under Act 38 used by the CAFOs and CAOs. This alternative planning process may provide for some added flexibility in the application of manure on the farm.

The following sections provide a summary of the information to be included in a Manure Management Plan.

SECTION 1 GENERAL INFORMATION

This section includes a cover sheet for the plan listing the farm name and address, the plan preparer name and address and the date the plan was developed or updated. The operation information portion documents general information about the farm and, depending on the responses, directs the farmer to the other sections of the plan.

SECTION 2 MANURE APPLICATION AND TIMING FOR MECHANICAL APPLICATION

This section of the plan must describe the manure application rate by crop group, identifies setback distances from environmental features and includes special requirements for farmers that plan to apply manure over the winter. The Manure Application Plan Summary is a summary sheet of the manure application amounts and timing developed using the process described below. This summary is used by the manure applicator to establish field application rates.

Application Rates and Timing

In determining manure application rates, farmers have three options.

1. Use "book values" from the Manure Application Rate Chart based on the crop group and manure type;

2. Establish application rates based on the applicable Nitrogen or Phosphorus Balance Worksheets; or

3. Have a certified nutrient management planner develop this section of the plan using the "Pa. Phosphorus - Index".

As you move down this list of three options, the planning process and record keeping requirements are more detailed but these more detailed processes may provide additional flexibility to the farmer in the application of manure.

Application Setbacks

Except where the Farmer uses the "Pa. Phosphorus Index" to develop application rates, Farmers may not mechanically apply manure within the following setback areas, regardless of the slope of the land or the ground cover:

1. Within 150 feet of the top of the bank of a perennial or intermittent stream with a defined bed and bank, a lake or a pond.

2. Within 100 feet of an existing open sinkhole.

3. Within 100 feet of an active private drinking water source such as a well or a spring.

4. Within, at a minimum, 100 feet of an active public drinking water source. In some cases state and federal laws may establish greater distances.

5. Within concentrated water flow areas in which vegetation is not maintained such as a gully or a ditch.

Farmers that use a Certified Nutrient Management Specialist to develop this portion of their plan using option "3" above ("Pa. Phosphorus Index") will often have reduced manure application setback areas that will range from 35 to 100 feet from streams and other surface water bodies, based on the management practices used on the near stream areas. For example, if there is a vegetated buffer along a stream, you may be able to apply manure closer to the stream.

Winter Application

For purposes of this portion of the Manure Management Plan, winter includes:

1. December 15 through February 28;

2. Anytime the ground is frozen at least 4 inches; or

3. Anytime that the ground is snow covered.

Farmers that choose to apply manure in the winter will need to follow the below criteria:

1. The maximum application rate for the winter season is 5,000 gallons of liquid manure or 20 tons of dry manure per acre. As an alternative maximum rate, a farmer can choose to calculate and apply manure to the phosphorus removal rate for the coming year's crop.

2. An additional setback of 150 feet from an above ground inlet to an agricultural drainage system (such as inlet pipes to pipe outlet terraces) if surface water flow is toward the above ground inlet is required.

3. All fields must have at least 40% crop residue at application time or an established and growing cover crop, hay, or pasture crop. The 40% cover provision would generally exclude application to corn silage fields that do not have an established cover crop, corn grain fields where a significant portion of the fodder has been removed, and soybean fields. Fields with a cover crop or sod crop should be used first.

4. Because slope is an important factor, all winter application must be done consistent with an agricultural erosion and sediment pollution control plan meeting the requirements of 25 Pa. Code Section 102.4(a) of the DEP regulations. Manure may not be applied during winter on fields with slopes greater than 15% ("A", "B" or "C" slopes).

Farmers using a Certified Nutrient Management Specialist to develop a Nutrient Management Plan for the farm under Act 38, or obtaining approval from the DEP or county conservation district, may be provided some added flexibility in the application of manure during the winter.

SECTION 3 MANAGING MANURE STORAGE IN STRUCTURES AND TEMPORARY STOCKPILING/STACKING AREAS

Manure Storage Facilities

Manure management must assure that manure not immediately applied is properly stored. Manure storage facilities are used for safely containing manure until it is able to be properly applied or processed. Manure storage facilities include structures such as earthen ponds with various liners such as concrete, bentonite, and/or membrane products like HDPE, concrete tanks located outside or under the barn, above ground steel tanks and roofed stockpiling/stacking facilities.

The plan must list all existing manure storage facilities (and any planned expansion or additions). For liquid or semi-solid manure storage facilities, the plan must document the type, date of construction, estimated capacity, and documentation of the environmental evaluation of the structure as outlined below.

Liquid or semi-solid manure storage facilities must be evaluated by the operator, on at least a quarterly basis, to assure that they are not producing potential discharges. The operator must document that there is:

1. No evidence of overtopping or leakage from the manure storage facility. The operator must maintain a minimum 12-inch freeboard for all ponds and a minimum 6-inch freeboard for all other manure storage facilities at all times.

2. No visible cracking or other problems with concrete structures that would lead to leakage

3. No visible slope failures, deterioration of any liner, or knowledge of any local water pollution issues associated with the storage facility.

Any discharges or potential discharges need to be addressed immediately. In addition, liquid or semi-solid manure storage facilities built in the year 2000 and later must be designed by a registered Pennsylvania Professional Engineer, and the farmer should maintain a copy of a certification from the engineer indicating that the storage facility was built according to the appropriate standards.

Temporary Manure Stockpiling/Manure Stacking

Daily hauling operations typically have one or more temporary stockpiling/stacking areas in the field to handle situations when direct manure application is unacceptable. These conditions could be due to severe weather, limits due to application from other criteria set forth in this document or field conditions unsuitable for spreading equipment. Some poultry as well as other operations also include temporary stockpiling/stacking of manure in outdoor areas. The requirements relating to stacking of manure include:

1. Keeping all stockpiles/stacks at least 150 feet from sensitive areas such as streams, lakes and ponds, 100 feet from any open sinkhole, 100 feet from any drinking water well (public or private) and not within an area of concentrated water flow.

2. Stockpiling/stacking manure on properly constructed improved stacking pads whenever possible. When stockpiling/stacking in fields, the stockpiles/stacks cannot be in the same location each year. Use the same area only once in four years and re-vegetate the area with grasses or legumes.

3. Placing these areas at the top of a hill (within 100 feet from the top of a slope), where possible, diverting upslope water away from stockpile/stacking areas.

4. Placing stacks on areas with less than 8% slope and orienting stockpiling/stacks up and down the hill.

5. Having sufficient bedding in the manure to allow for stacking at least 5 feet in height and when stacked on the application field, limit volume to the amount that can be spread on fields nearby to the stack.

6. Covering temporary stockpiled/stacked manure within 15 days if it will be in place for more than 120 days.

SECTION 4 MANAGING MANURE IN PASTURES

All pastures on the farm must be included in the manure management plan. Farms with a grazing plan meeting the requirements of the Pennsylvania Technical Guide do not have to complete this section of the plan. No detailed planning is required for a pasture that:

1. Is located at least 150 feet from a perennial or intermittent stream, lake, pond or other surface water. This setback can be reduced to 50 feet if the area between the pasture and surface water is a non-grazed permanent vegetated buffer strip; and

2. Is composed of dense vegetation. Dense vegetation means a pasture that is managed to minimize bare spots and keep vegetation height to at least 3 inches high throughout the year or maintain an 80% permanent uniform vegetative cover.

For pastures that do not meet both of these requirements, the farmer must follow a more detailed pasture management approach using either nitrogen or phosphorus Stocking Rate Tables or a nitrogen or phosphorus based Pasture Balance Worksheet.

SECTION 5 MANAGING MANURE IN ANIMAL CONCENTRATION AREAS ("ACA'S")

ACAs (sometimes also called "Animal Heavy Use Areas") are barnyards, feedlots, loafing areas, exercise lots or other similar animal confinement areas that will not maintain the dense vegetation of a pasture. ACAs do not include areas managed as pastures or other cropland. Animal access ways, feeding areas, watering areas, shade areas or walkways are not considered

ACAs if they do not cause a direct flow of manure contaminated runoff to streams, lakes, ponds, or sinkholes.

ACAs located within 150 feet a perennial or intermittent stream, lake, pond or other surface water need to be managed to:

1. Divert clean water flow from upslope fields, pastures, driveways, barn roofs etc. away from the ACA.

2. Direct polluted runoff from the ACA area into a storage facility or treatment system such as a correctly sized and well maintained vegetative buffer or treatment area.

3. Limit animal access to surface waters to only properly implemented livestock crossings. Animals may not have free access to streams adjacent to ACAs.

4. Minimize the size of denuded areas such as sacrifice lots.

5. Keep areas where animals congregate, such as feed racks and shade, as far away from a water body as possible.

Farms that have ACAs must address the ACA in the Manure Management Plan. The plan needs to identify Best Management Practices ("BMPs") that are currently being implemented to prevent pollution and, where necessary, include a schedule for obtaining assistance to develop and implement additional BMPs that require expert planning or where additional time is needed to obtain the financial resources to implement the necessary BMPs. Farmers working with a design professional (conservation district, NRCS, certified nutrient management planner, etc.) can be provided up to 2 years to develop a plan and up to 3 years to implement that plan.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATERSHED MANAGEMENT

MANURE MANAGEMENT PLAN FORMS AND INSTRUCTIONS

The following Manure Management Planning forms and instructions serve as the standard plan format for farms using manure on their operations. Alternative formats include those approved for use under Pennsylvania's Nutrient Management Act and the Concentrated Animal Feeding Operations programs. Other planning formats and procedures require DEP approval. Questions concerning the manure management plan should be directed to either the county conservation district or the DEP regional office serving the county. Requests for approval of alternative formats should be directed to the DEP Division of Conservation Districts and Nutrient Management, PO Box 8465, Harrisburg, PA 117105-8465, phone number 717-787-5367.

The Manure Management Plan has five sections:

Section 1 General Information. This includes general information about the farm. **This section is always required in a manure management plan.**

Section 2 Manure application rates and timing for mechanical application of manure. **This section is always required in a manure management plan.**

Section 3 Managing Manure Storage in Structures and Stockpiling/Stacking Areas. **This section is only necessary if the form has a manure storage facility or stockpiles or sacks manure.**

Section 4 Managing manure in pastures. This section is **only necessary if the farm has one or more pasture fields.**

Section 5 Managing manure in Animal Concentration Areas ("ACAs"). This section is **only necessary if the farm has an Animal Concentration Area.**

The Farmer must complete all required and necessary worksheets and retain this document to demonstrate compliance.

Please note that these forms are only relevant to address mechanical manure application that is at least 150 feet from every stream, lake or other water body. If you would like to apply manure to fields within 150 feet from a stream, or if you would like to apply at rates higher than phosphorus removal on fields having soil test levels of over 200 ppm phosphorus, you will need to consult with a certified nutrient management specialist to fully assess the potential phosphorus loss from these areas using DEP approved assessment tools.

Section 1 General Information (All farms must complete this section)

1. **Cover Page**. Insert the contact information for the farm, and the date of the plan below. If the plan is prepared by someone other than the farmer, include the name, address and phone number of the person that prepared the plan on the cover page.

Operation name _____
Farmer name _____
Street address _____
City, State and Zip Code _____

Phone number (business) _____
(cell) _____

Email address _____

Prepared By

Name of person preparing the Manure Management Plan (where applicable)

Preparer name _____
Street address _____
City, State and Zip Code _____

Phone number (business) _____
(cell) _____

Email address _____

Date of Development _____

Note that the manure management plan must be reviewed annually and updated when necessary to keep the plan consistent with farm management practices

2. **Operation Information Page. Fill in responses on the Operational Information Page at the end of this section.**

    a. List the number of acres, owned and rented or leased, available for **mechanical manure application**. This number should equal the sum of all of the crop acre groups listed on the Manure Management Plan Summary on page 23.

    b. List the animal information in the spaces provided.

    c. List the crop rotation used on the farm.

    d. Identify any **environmentally sensitive areas** located on the farm or on leased or rented land. If you have any environmentally sensitive areas, you must complete the worksheet on page 11 and mark these areas on a map to be used by the manure applicator.

    e. Indicate whether there will be **winter application** of manure on the crop lands. If so, the farm must complete the winter application worksheet on page 12. Winter application is the mechanical application of manure from December 15 through February 28, anytime the ground is frozen at least 4 inches, or anytime that the ground is snow covered.

    f. If the farm has **manure storage facilities**, including concrete tanks, metal or other fabricated tanks, and under-building structures as well as earthen and synthetically-lined manure storage ponds, you must complete Section 3.1 beginning on page 24.

    g. Indicate whether the farm has **manure stockpiling/stacking areas.** If the farm has manure stockpiling/staking areas, you must complete Section 3.2 beginning on page 27.

    h. If the farm has or uses pasture areas, list the number of acres, owned and rented or leased, used for **pastures.** If the farm has or uses pasture areas, you must complete Section 4 beginning on page 27.

    i. If the farm has **animal concentration areas ("ACAs")**, list the number of acres, owned and rented or leased, used for ACAs. ACAs (sometimes also called "Animal Heavy Use Areas") are barnyards, feedlots, loafing areas, exercise lots or other similar animal confinement areas that will not maintain a densely vegetative pasture. ACAs do not include areas managed as pastures or other cropland. Animal access ways, feeding areas, watering areas, and shade areas or walkways are not considered ACAs if they do not cause a direct flow of manure contaminated runoff to streams, lakes, ponds, or sinkholes. Forms with ACAs must complete Section 5 beginning on page 29.

Operation Information Page

a. Acres of the operation: Owned _____
Rented _____

b. Animals on the operation:

Animal type	Animal #	Animal weight (avg.)	Days on farm	Approximate amount of manure produced (if known)

c. Crop Rotation used on the Operation: _____
_____

d. Environmentally Sensitive Areas:

Private or public drinking water wells	Yes ____	No ____
Streams, lakes or ponds	Yes ____	No ____
Sinkholes	Yes ____	No ____
Areas of concentrated flow	Yes ____	No ____

All farms containing environmentally sensitive areas must complete the Environmentally Sensitive Areas worksheet on page 11 and develop a map of environmentally sensitive areas.

e. Winter Application: Is manure applied during the winter Yes ____ No ____
If yes, you must complete the Winter Application Spreadsheet on page 12.

f. Manure Storage Facilities. Is manure stored in a manure storage facility (concrete tank, metal tank, under building structure, earthen or clay lined pond, etc.) Yes ____ No ____
If yes, you must complete Section 3, Managing Manure Storage in Structures beginning on page 24.

g. Manure Stockpiling or Stacking
Is manure stockpiled or stacked in outdoor areas Yes ____ No ____
If yes, you must complete Section 3, Managing Manure Stockpiling/Stacking Areas beginning on page 27.

h. Pasture Areas: Owned _____
Rented _____
All farms containing pastures must complete Section 4, Managing manure in Pastures beginning on page 27.

i. Animal Concentration Areas (ACAs): Owned _____
Rented _____
All farms containing ACAs must complete Section 5, Managing Manure in ACA beginning on page 29.

Section 2 Mechanical Manure Application (All farms must complete this section)

This portion of the plan identifies the application rates and timing for each crop group, identifies fields containing environmentally sensitive areas, and includes plan requirements for winter application.

The information developed under this section is placed on the Manure Management Plan Summary provided on page 23. You should use this summary when you apply manure to be sure that you meet your Manure Management Plan Requirements.

1. **Environmentally Sensitive Areas Worksheet**

   a. Identify each field (both owned and rented) that contains or borders on an environmentally sensitive area.

   b. Identify the environmentally sensitive feature and setback distance for mechanical application of manure (see page 2). If manure is to be applied in the winter, manure applications are also required to be setback 150 feet from an above ground inlet to an agricultural drainage system (such as inlet pipes to pipe outlet terraces) if surface water flow is toward the above ground inlet.

   c. These setback areas need to be identified on a farm map. An excellent map to use is your Agricultural Erosion and Sediment Control Plan (or Conservation Plan) map under the requirements of 2 Pa. Code Section 102.4(a). You can also use a USGS map or even a "hand drawn" map.

Field Identification	Environmentally Sensitive Area (stream, lake, pond, sinkhole, drinking water source, concentrated flow area)	Setback distance See page 2	Type of map to be used to show these setbacks (E&S Plan, Conservation Plan, USGS, hand drawn, etc.)

2. Winter Application of Manure Worksheet

a. Identify each field (both owned and rented) where there will be winter spreading by mechanical means.

b. Identify whether the manure is liquid or dry.

c. Identify the application rate of manure for each field during the winter (see application charts on pages 14 – 21, using the "winter manure: all applications" row). As an alternative winter manure application rate, a farmer can choose to calculate and apply manure to the phosphorus removal rate for the coming year's crop determined using the Nutrient Balance Sheet worksheet available from the conservation district office.

d. For each field, identify the percentage of crop residue (or the previous year's crop and the chosen field management practices) or the type of cover crop that will be growing on the filed in the winter. All fields must have at least 40% crop residue at application time or an established and growing cover crop, hay, or pasture crop. The 40% cover provision would generally exclude application to corn silage fields that do not have an established cover crop, corn grain fields where a significant portion of the fodder has been removed, and soybean fields. Fields with a cover crop or sod crop should be used first.

e. Identify the slope of the field where winter application will take place. The slope cannot be greater than 15% (fields with a slope designation of A, B or C would be acceptable). Field slope designations will generally be identified in your Agriculture Erosion and Sediment Pollution Control plan (conservation plan). Further assistance may be available through your local National Resource Conservation Service ("NRCS") office, conservation district, or a certified nutrient management specialist.

f. In the chart on page 11, and in the plan map, identify any environmentally sensitive features in the field and the applicable setbacks remembering that there is an additional winter application setback for above ground inlets to an agricultural drainage system (such as inlet pipes to pipe outlet terraces) if surface water flow is toward the above ground inlet.

WINTER APPLICATION

Field Identification	Type of Manure (from the manure application charts)	Winter Season Application Rate	Percentage of Crop Residue	Type of Cover Crop (if applicable)	Field Slope Percentage

3. **Manure Application Rates –** Application rates and timing are required for each crop group. There are three options for establishing application rates: 1) use book values from the **Manure Application Rate Charts** on pages 14 – 21**;** 2) calculate application rates using either a nitrogen or phosphorus **Nutrient Balance Sheet** (available from the county conservation district), or 3) work with a certified nutrient management specialist to calculate rates using the phosphorus index screening tool.

This section provides instructions for use of the Manure Application Charts. Using the charts is suitable for most farmers. However, if you import manure from a CAO or CAFO, grow a crop not listed in these charts, or want additional precision in the calculation of application rates, you can use the Nitrogen or Phosphorus Nutrient Balance Sheets that are used by certified haulers and applicators. These Balance Sheets and instructions for filling them out are available from the county conservation district office. You can use a combination of approaches (charts for some fields and balance sheets for others).

a. **Manure Application Rate Charts** To use the following charts, you must know at least the type of manure,the crop to be grown and the realistic expected crop yield. These charts have only been developed for certain manure types and certain crops. For other manure types or other crops, the **Nitrogen or Phosphorus Nutrient Balance Sheet** (available from the conservation district) or the **Phosphorus Index** must be used.

b. If you have not done a soil test for phosphorus in the past 3 years or if the soil test results show phosphorus levels greater than 200 ppm, you must use the phosphorus removal charts on pages 18 - 21. If you have done a soil test in the past 3 years which included an assessment of phosphorus levels in the soil and the results show phosphorus levels of less than 200 ppm, you can use the nitrogen based charts on pages 14 – 17.

c. Enter the application rate on the **Manure Management Plan Summary** on page 23.

Corn Silage Manure Application Rate Charts: Nitrogen-based

Solid Cattle & Horse Manure	Corn Silage Yield		
	17 to 20 ton/A	21 to 24 ton/A	25 ton/A or more
Spring manure: Incorporated in 1 day	15 ton/A manure and 35 lb N/A	20 ton/A manure and 30 lb N/A	25 ton/A manure and 40 lb N/A
Spring manure: Incorporated in 7 days	25 ton/A manure and 25 lb N/A	30 ton/A manure and 25 lb N/A	35 ton/A manure and 45 lb N/A
Spring manure: Not incorporated	40 ton/A manure and 30 lb N/A	40 ton/A manure and 50 lb N/A	40 ton/A manure and 85 lb N/A
Fall manure: All applications	40 ton/A manure and 30 lb N/A	40 ton/A manure and 50 lb N/A	40 ton/A manure and 85 lb N/A
Winter manure: All applications[1]	20 ton/A manure and 30 lb N/A	20 ton/A manure and 50 lb N/A	20 ton/A manure and 85 lb N/A

Liquid Cattle Manure	Corn Silage Yield		
	17 to 20 ton/A	21 to 24 ton/A	25 ton/A or more
Spring manure: Incorporated in 1 day	6,000 gal/A manure and 25 lb N/A	7,000 gal/A manure and 55 lb N/A	9,000 gal/A manure and 40 lb N/A
Spring manure: Incorporated in 7 days	8,500 gal/A manure and 30 lb N/A	10,000 gal/A manure and 35 lb N/A	13,000 gal/A manure and 40 lb N/A
Spring manure: Not incorporated	15,000 gal/A manure and 25 lb N/A	15,000 gal/A manure and 50 lb N/A	15,000 gal/A manure and 85 lb N/A
Fall manure: All applications	15,000 gal/A manure and 25 lb N/A	15,000 gal/A manure and 50 lb N/A	15,000 gal/A manure and 85 lb N/A
Winter manure: All applications[1]	5,000 gal/A manure and 55 lb N/A	5,000 gal/A manure and 75 lb N/A	5,000 gal/A manure and 110 lb N/A

Liquid Swine Manure	Corn Silage Yield		
	17 to 20 ton/A	21 to 24 ton/A	25 ton/A or more
Spring manure: Incorporated in 1 day	3,000 gal/A manure and 35 lb N/A	3,500 gal/A manure and 40 lb N/A	4,500 gal/A manure and 50 lb N/A
Spring manure: Incorporated in 7 days	5,500 gal/A manure and 30 lb N/A	6,500 gal/A manure and 35 lb N/A	8,500 gal/A manure and 40 lb N/A
Spring manure: Not incorporated	11,500 gal/A manure and 25 lb N/A	13,500 gal/A manure and 30 lb N/A	15,000 gal/A manure and 55 lb N/A
Fall manure: All applications	11,500 gal/A manure and 25 lb N/A	13,500 gal/A manure and 30 lb N/A	15,000 gal/A manure and 55 lb N/A
Winter manure: All applications[1]	5,000 gal/A manure and 30 lb N/A	5,000 gal/A manure and 50 lb N/A	5,000 gal/A manure and 85 lb N/A

Solid Layer Manure	Corn Silage Yield		
	17 to 20 ton/A	21 to 24 ton/A	25 ton/A or more
Spring manure: Incorporated in 1 day	3 ton/A manure and 30 lb N/A	4 ton/A manure and 20 lb N/A	5 ton/A manure and 30 lb N/A
Spring manure: Incorporated in 7 days	5 ton/A manure and 30 lb N/A	6 ton/A manure and 30 lb N/A	8 ton/A manure and 35 lb N/A
Spring manure: Not incorporated	9 ton/A manure and 60 lb N/A	9 ton/A manure and 80 lb N/A	9 ton/A manure and 115 lb N/A
Fall manure: All applications	9 ton/A manure and 60 lb N/A	9 ton/A manure and 80 lb N/A	9 ton/A manure and 115 lb N/A
Winter manure: All applications[1]	4 ton/A manure and 35 lb N/A	5 ton/A manure and 40 lb N/A	7 ton/A manure and 40 lb N/A

Solid Broiler Manure	Corn Silage Yield		
	17 to 20 ton/A	21 to 24 ton/A	25 ton/A or more
Spring manure: Incorporated in 1 day	2 ton/A manure and 30 lb N/A	3 ton/A manure and 15 lb N/A	3 ton/A manure and 50 lb N/A
Spring manure: Incorporated in 7 days	3 ton/A manure and 30 lb N/A	4 ton/A manure and 20 lb N/A	5 ton/A manure and 30 lb N/A
Spring manure: Not incorporated	5 ton/A manure and 30 lb N/A	6 ton/A manure and 35 lb N/A	8 ton/A manure and 40 lb N/A
Fall manure: All applications	5 ton/A manure and 30 lb N/A	6 ton/A manure and 35 lb N/A	8 ton/A manure and 40 lb N/A
Winter manure: All applications[1]	2 ton/A manure and 50 lb N/A	3 ton/A manure and 35 lb N/A	4 ton/A manure and 40 lb N/A

[1] For winter applications: If manure will be used to meet additional nitrogen requirements, the NBS worksheet must be used to determine the appropriate application rate and season.

Corn Grain Manure Application Rate Charts: Nitrogen-based

Solid Cattle & Horse Manure	Corn Grain Yield		
	100 to 124 bu/A	125 to 149 bu/A	150 bu/A or more
Spring manure: Incorporated in 1 day	15 ton/A manure and 15 lb N/A	15 ton/A manure and 40 lb N/A	20 ton/A manure and 45 lb N/A
Spring manure: Incorporated in 7 days	20 ton/A manure and 20 lb N/A	25 ton/A manure and 30 lb N/A	30 ton/A manure and 40 lb N/A
Spring manure: Not incorporated	35 ton/A manure and 20 lb N/A	40 ton/A manure and 35 lb N/A	40 ton/A manure and 65 lb N/A
Fall manure: All applications	35 ton/A manure and 20 lb N/A	40 ton/A manure and 35 lb N/A	40 ton/A manure and 65 lb N/A
Winter manure: All applications[1]	15 ton/A manure and 30 lb N/A	20 ton/A manure and 35 lb N/A	20 ton/A manure and 65 lb N/A

Liquid Cattle Manure	Corn Grain Yield		
	100 to 124 bu/A	125 to 149 bu/A	150 bu/A or more
Spring manure: Incorporated in 1 day	5,000 gal/A manure and 20 lb N/A	6,000 gal/A manure and 30 lb N/A	8,000 gal/A manure and 30 lb N/A
Spring manure: Incorporated in 7 days	7,000 gal/A manure and 20 lb N/A	9,000 gal/A manure and 25 lb N/A	11,000 gal/A manure and 35 lb N/A
Spring manure: Not incorporated	12,000 gal/A manure and 25 lb N/A	15,000 gal/A manure and 30 lb N/A	15,000 gal/A manure and 60 lb N/A
Fall manure: All applications	12,000 gal/A manure and 25 lb N/A	15,000 gal/A manure and 30 lb N/A	15,000 gal/A manure and 60 lb N/A
Winter manure: All applications[1]	5,000 gal/A manure and 35 lb N/A	5,000 gal/A manure and 60 lb N/A	5,000 gal/A manure and 85 lb N/A

Liquid Swine Manure	Corn Grain Yield		
	100 to 124 bu/A	125 to 149 bu/A	150 bu/A or more
Spring manure: Incorporated in 1 day	3,000 gal/A manure and 10 lb N/A	4,000 gal/A manure and 10 lb N/A	5,000 gal/A manure and 15 lb N/A
Spring manure: Incorporated in 7 days	5,000 gal/A manure and 15 lb N/A	6,000 gal/A manure and 25 lb N/A	7,000 gal/A manure and 40 lb N/A
Spring manure: Not incorporated	9,000 gal/A manure and 25 lb N/A	12,000 gal/A manure and 25 lb N/A	15,000 gal/A manure and 30 lb N/A
Fall manure: All applications	9,000 gal/A manure and 25 lb N/A	12,000 gal/A manure and 25 lb N/A	15,000 gal/A manure and 30 lb N/A
Winter manure: All applications[1]	4,000 gal/A manure and 25 lb N/A	5,000 gal/A manure and 30 lb N/A	5,000 gal/A manure and 60 lb N/A

Solid Layer Manure	Corn Grain Yield		
	100 to 124 bu/A	125 to 149 bu/A	150 bu/A or more
Spring manure: Incorporated in 1 day	2 ton/A manure and 35 lb N/A	3 ton/A manure and 30 lb N/A	4 ton/A manure and 30 lb N/A
Spring manure: Incorporated in 7 days	4 ton/A manure and 25 lb N/A	5 ton/A manure and 30 lb N/A	6 ton/A manure and 45 lb N/A
Spring manure: Not incorporated	9 ton/A manure and 40 lb N/A	9 ton/A manure and 65 lb N/A	9 ton/A manure and 95 lb N/A
Fall manure: All applications	9 ton/A manure and 40 lb N/A	9 ton/A manure and 65 lb N/A	9 ton/A manure and 95 lb N/A
Winter manure: All applications[1]	4 ton/A manure and 15 lb N/A	5 ton/A manure and 25 lb N/A	6 ton/A manure and 30 lb N/A

Solid Broiler Manure	Corn Grain Yield		
	100 to 124 bu/A	125 to 149 bu/A	150 bu/A or more
Spring manure: Incorporated in 1 day	2 ton/A manure and 10 lb N/A	2 ton/A manure and 35 lb N/A	3 ton/A manure and 25 lb N/A
Spring manure: Incorporated in 7 days	2.5 ton/A manure and 20 lb N/A	3 ton/A manure and 30 lb N/A	4 ton/A manure and 30 lb N/A
Spring manure: Not incorporated	4 ton/A manure and 25 lb N/A	6 ton/A manure and 20 lb N/A	7 ton/A manure and 30 lb N/A
Fall manure: All applications	4 ton/A manure and 25 lb N/A	6 ton/A manure and 20 lb N/A	7 ton/A manure and 30 lb N/A
Winter manure: All applications[1]	2 ton/A manure and 25 lb N/A	3 ton/A manure and 20 lb N/A	4 ton/A manure and 20 lb N/A

[1] For winter applications: If manure will be used to meet additional nitrogen requirements, the NBS worksheet must be used to determine the appropriate application rate and season.

Grass Hay Manure Application Rate Charts: Nitrogen-based

Solid Cattle & Horse Manure

	Grass Hay Yield		
	less than 3 tons/A	**3 to 4 tons/A**	**5 tons/A or more**
Spring/Summer manure: All applications	30 ton/A manure and 20 lb N/A	40 ton/A manure and 75 lb N/A	40 ton/A manure and 200 lb N/A
Fall manure: All applications	30 ton/A manure and 20 lb N/A	40 ton/A manure and 75 lb N/A	40 ton/A manure and 200 lb N/A
Winter manure: All applications[1]	15 ton/A manure and 20 lb N/A	20 ton/A manure and 75 lb N/A	20 ton/A manure and 200 lb N/A

Liquid Cattle Manure

	Grass Hay Yield		
	less than 3 tons/A	**3 to 4 tons/A**	**5 tons/A or more**
Spring/Summer manure: All applications	10,000 gal/A manure and 20 lb N/A	15,000 gal/A manure and 70 lb N/A	15,000 gal/A manure and 195 lb N/A
Fall manure: All applications	10,000 gal/A manure and 20 lb N/A	15,000 gal/A manure and 70 lb N/A	15,000 gal/A manure and 195 lb N/A
Winter manure: All applications[1]	5,000 gal/A manure and 20 lb N/A	5,000 gal/A manure and 95 lb N/A	5,000 gal/A manure and 220 lb N/A

Liquid Swine Manure

	Grass Hay Yield		
	less than 3 tons/A	**3 to 4 tons/A**	**5 tons/A or more**
Spring/Summer manure: All applications	8,000 gal/A manure and 20 lb N/A	15,000 gal/A manure and 40 lb N/A	15,000 gal/A manure and 165 lb N/A
Fall manure: All applications	8,000 gal/A manure and 20 lb N/A	15,000 gal/A manure and 40 lb N/A	15,000 gal/A manure and 165 lb N/A
Winter manure: All applications[1]	4,000 gal/A manure and 10 lb N/A	5,000 gal/A manure and 70 lb N/A	5,000 gal/A manure and 195 lb N/A

Solid Layer Manure

	Grass Hay Yield		
	less than 3 tons/A	**3 to 4 tons/A**	**5 tons/A or more**
Spring/Summer manure: All applications	10 ton/A manure and 25 lb N/A	20 ton/A manure and 40 lb N/A	35 ton/A manure and 85 lb N/A
Fall manure: All applications	10 ton/A manure and 25 lb N/A	20 ton/A manure and 40 lb N/A	35 ton/A manure and 85 lb N/A
Winter manure: All applications[1]	3 ton/A manure and 25 lb N/A	6 ton/A manure and 40 lb N/A	10 ton/A manure and 95 lb N/A

Solid Broiler Manure

	Grass Hay Yield		
	less than 3 tons/A	**3 to 4 tons/A**	**5 tons/A or more**
Spring/Summer manure: All applications	4 ton/A manure and 15 lb N/A	7 ton/A manure and 40 lb N/A	12 ton/A manure and 90 lb N/A
Fall manure: All applications	4 ton/A manure and 15 lb N/A	7 ton/A manure and 40 lb N/A	12 ton/A manure and 90 lb N/A
Winter manure: All applications[1]	2 ton/A manure and 15 lb N/A	4 ton/A manure and 25 lb N/A	6 ton/A manure and 90 lb N/A

[1] For winter applications: If manure will be used to meet additional nitrogen requirements, the NBS worksheet must be used to determine the appropriate application rate and season.

Small Grain Manure Application Rate Charts: Nitrogen-based

Solid Cattle & Horse Manure	Small Grain Yield		
	TBD	TBD	TBD
Fall manure: Incorporated in 2 days	To be determined	To be determined	To be determined
Fall manure: Incorporated in 3 to 7 days	To be determined	To be determined	To be determined
Fall manure: Not incorporated	To be determined	To be determined	To be determined
Winter manure: All applications[1]	To be determined	To be determined	To be determined

Liquid Cattle Manure	Small Grain Yield		
	TBD	TBD	TBD
Fall manure: Incorporated in 2 days	To be determined	To be determined	To be determined
Fall manure: Incorporated in 3 to 7 days	To be determined	To be determined	To be determined
Fall manure: Not incorporated	To be determined	To be determined	To be determined
Winter manure: All applications[1]	To be determined	To be determined	To be determined

Liquid Swine Manure	Small Grain Yield		
	TBD	TBD	TBD
Fall manure: Incorporated in 2 days	To be determined	To be determined	To be determined
Fall manure: Incorporated in 3 to 7 days	To be determined	To be determined	To be determined
Fall manure: Not incorporated	To be determined	To be determined	To be determined
Winter manure: All applications[1]	To be determined	To be determined	To be determined

Solid Layer Manure	Small Grain Yield		
	TBD	TBD	TBD
Fall manure: Incorporated in 2 days	To be determined	To be determined	To be determined
Fall manure: Incorporated in 3 to 7 days	To be determined	To be determined	To be determined
Fall manure: Not incorporated	To be determined	To be determined	To be determined
Winter manure: All applications[1]	To be determined	To be determined	To be determined

Solid Broiler Manure	Small Grain Yield		
	TBD	TBD	TBD
Fall manure: Incorporated in 2 days	To be determined	To be determined	To be determined
Fall manure: Incorporated in 3 to 7 days	To be determined	To be determined	To be determined
Fall manure: Not incorporated	To be determined	To be determined	To be determined
Winter manure: All applications[1]	To be determined	To be determined	To be determined

[1] For winter applications: If manure will be used to meet additional nitrogen requirements, the NBS worksheet must be used to determine the appropriate application rate and season.

Corn Silage Manure Application Rate Charts: Crop Phosphorus Removal

Solid Cattle & Horse Manure

	Corn Silage Yield		
	17 to 20 ton/A	21 to 24 ton/A	25 ton/A or more
Spring manure: Incorporated in 1 day	15 ton/A manure and 35 lb N/A	20 ton/A manure and 30 lb N/A	25 ton/A manure and 40 lb N/A
Spring manure: Incorporated in 7 days	15 ton/A manure and 60 lb N/A	20 ton/A manure and 60 lb N/A	25 ton/A manure and 80 lb N/A
Spring manure: Not incorporated	15 ton/A manure and 80 lb N/A	20 ton/A manure and 90 lb N/A	25 ton/A manure and 115 lb N/A
Fall manure: All applications	15 ton/A manure and 80 lb N/A	20 ton/A manure and 90 lb N/A	25 ton/A manure and 115 lb N/A
Winter manure: All applications[1]	20 ton/A manure and 30 lb N/A	20 ton/A manure and 50 lb N/A	20 ton/A manure and 85 lb N/A

Liquid Cattle Manure

	Corn Silage Yield		
	17 to 20 ton/A	21 to 24 ton/A	25 ton/A or more
Spring manure: Incorporated in 1 day	5,500 gal/A manure and 35 lb N/A	6,000 gal/A manure and 50 lb N/A	7,500 gal/A manure and 60 lb N/A
Spring manure: Incorporated in 7 days	5,500 gal/A manure and 55 lb N/A	6,000 gal/A manure and 75 lb N/A	7,500 gal/A manure and 95 lb N/A
Spring manure: Not incorporated	5,500 gal/A manure and 80 lb N/A	6,000 gal/A manure and 100 lb N/A	7,500 gal/A manure and 125 lb N/A
Fall manure: All applications	5,500 gal/A manure and 80 lb N/A	6,000 gal/A manure and 100 lb N/A	7,500 gal/A manure and 125 lb N/A
Winter manure: All applications[1]	5,000 gal/A manure and 55 lb N/A	5,000 gal/A manure and 75 lb N/A	5,000 gal/A manure and 110 lb N/A

Liquid Swine Manure

	Corn Silage Yield		
	17 to 20 ton/A	21 to 24 ton/A	25 ton/A or more
Spring manure: Incorporated in 1 day	3,000 gal/A manure and 35 lb N/A	3,500 gal/A manure and 40 lb N/A	4,500 gal/A manure and 50 lb N/A
Spring manure: Incorporated in 7 days	3,000 gal/A manure and 65 lb N/A	3,500 gal/A manure and 80 lb N/A	4,500 gal/A manure and 100 lb N/A
Spring manure: Not incorporated	3,000 gal/A manure and 90 lb N/A	3,500 gal/A manure and 105 lb N/A	4,500 gal/A manure and 135 lb N/A
Fall manure: All applications	3,000 gal/A manure and 90 lb N/A	3,500 gal/A manure and 105 lb N/A	4,500 gal/A manure and 135 lb N/A
Winter manure: All applications[1]	3,000 gal/A manure and 60 lb N/A	3,500 gal/A manure and 75 lb N/A	4,500 gal/A manure and 90 lb N/A

Solid Layer Manure

	Corn Silage Yield		
	17 to 20 ton/A	21 to 24 ton/A	25 ton/A or more
Spring manure: Incorporated in 1 day	1 ton/A manure and 85 lb N/A	1.5 ton/A manure and 90 lb N/A	2 ton/A manure and 110 lb N/A
Spring manure: Incorporated in 7 days	1 ton/A manure and 95 lb N/A	1.5 ton/A manure and 105 lb N/A	2 ton/A manure and 135 lb N/A
Spring manure: Not incorporated	1 ton/A manure and 105 lb N/A	1.5 ton/A manure and 125 lb N/A	2 ton/A manure and 155 lb N/A
Fall manure: All applications	1 ton/A manure and 105 lb N/A	1.5 ton/A manure and 125 lb N/A	2 ton/A manure and 155 lb N/A
Winter manure: All applications[1]	1 ton/A manure and 95 lb N/A	1.5 ton/A manure and 105 lb N/A	2 ton/A manure and 130 lb N/A

Solid Broiler Manure

	Corn Silage Yield		
	17 to 20 ton/A	21 to 24 ton/A	25 ton/A or more
Spring manure: Incorporated in 1 day	1 ton/A manure and 70 lb N/A	1.5 ton/A manure and 75 lb N/A	2 ton/A manure and 90 lb N/A
Spring manure: Incorporated in 7 days	1 ton/A manure and 85 lb N/A	1.5 ton/A manure and 90 lb N/A	2 ton/A manure and 110 lb N/A
Spring manure: Not incorporated	1 ton/A manure and 95 lb N/A	1.5 ton/A manure and 110 lb N/A	2 ton/A manure and 135 lb N/A
Fall manure: All applications	1 ton/A manure and 95 lb N/A	1.5 ton/A manure and 110 lb N/A	2 ton/A manure and 135 lb N/A
Winter manure: All applications[1]	1 ton/A manure and 80 lb N/A	1.5 ton/A manure and 85 lb N/A	2 ton/A manure and 105 lb N/A

[1] For winter applications: If manure will be used to meet additional nitrogen requirements, the NBS worksheet must be used to determine the appropriate application rate and season.

Corn Grain Manure Application Rate Charts: Crop Phosphorus Removal

Solid Cattle & Horse Manure	Corn Grain Yield		
	100 to 124 bu/A	125 to 149 bu/A	150 bu/A or more
Spring manure: Incorporated in 1 day	8 ton/A manure and 50 lb N/A	10 ton/A manure and 65 lb N/A	15 ton/A manure and 70 lb N/A
Spring manure: Incorporated in 7 days	8 ton/A manure and 60 lb N/A	10 ton/A manure and 80 lb N/A	15 ton/A manure and 90 lb N/A
Spring manure: Not incorporated	8 ton/A manure and 75 lb N/A	10 ton/A manure and 95 lb N/A	15 ton/A manure and 115 lb N/A
Fall manure: All applications	8 ton/A manure and 75 lb N/A	10 ton/A manure and 95 lb N/A	15 ton/A manure and 115 lb N/A
Winter manure: All applications[1]	8 ton/A manure and 60 lb N/A	10 ton/A manure and 75 lb N/A	15 ton/A manure and 85 lb N/A

Liquid Cattle Manure	Corn Grain Yield		
	100 to 124 bu/A	125 to 149 bu/A	150 bu/A or more
Spring manure: Incorporated in 1 day	2,500 gal/A manure and 55 lb N/A	3,000 gal/A manure and 75 lb N/A	4,000 gal/A manure and 85 lb N/A
Spring manure: Incorporated in 7 days	2,500 gal/A manure and 65 lb N/A	3,000 gal/A manure and 85 lb N/A	4,000 gal/A manure and 105 lb N/A
Spring manure: Not incorporated	2,500 gal/A manure and 75 lb N/A	3,000 gal/A manure and 100 lb N/A	4,000 gal/A manure and 120 lb N/A
Fall manure: All applications	2,500 gal/A manure and 75 lb N/A	3,000 gal/A manure and 100 lb N/A	4,000 gal/A manure and 120 lb N/A
Winter manure: All applications[1]	2,500 gal/A manure and 60 lb N/A	3,000 gal/A manure and 80 lb N/A	4,000 gal/A manure and 100 lb N/A

Liquid Swine Manure	Corn Grain Yield		
	100 to 124 bu/A	125 to 149 bu/A	150 bu/A or more
Spring manure: Incorporated in 1 day	1,500 gal/A manure and 50 lb N/A	2,000 gal/A manure and 65 lb N/A	2,500 gal/A manure and 80 lb N/A
Spring manure: Incorporated in 7 days	1,500 gal/A manure and 70 lb N/A	2,000 gal/A manure and 85 lb N/A	2,500 gal/A manure and 105 lb N/A
Spring manure: Not incorporated	1,500 gal/A manure and 80 lb N/A	2,000 gal/A manure and 100 lb N/A	2,500 gal/A manure and 125 lb N/A
Fall manure: All applications	1,500 gal/A manure and 80 lb N/A	2,000 gal/A manure and 100 lb N/A	2,500 gal/A manure and 125 lb N/A
Winter manure: All applications[1]	1,500 gal/A manure and 65 lb N/A	2,000 gal/A manure and 80 lb N/A	2,500 gal/A manure and 100 lb N/A

Solid Layer Manure	Corn Grain Yield		
	100 to 124 bu/A	125 to 149 bu/A	150 bu/A or more
Spring manure: Incorporated in 1 day	0.5 ton/A manure and 75 lb N/A	0.5 ton/A manure and 100 lb N/A	1 ton/A manure and 115 lb N/A
Spring manure: Incorporated in 7 days	0.5 ton/A manure and 80 lb N/A	0.5 ton/A manure and 105 lb N/A	1 ton/A manure and 125 lb N/A
Spring manure: Not incorporated	0.5 ton/A manure and 85 lb N/A	0.5 ton/A manure and 110 lb N/A	1 ton/A manure and 135 lb N/A
Fall manure: All applications	0.5 ton/A manure and 85 lb N/A	0.5 ton/A manure and 110 lb N/A	1 ton/A manure and 135 lb N/A
Winter manure: All applications[1]	0.5 ton/A manure and 80 lb N/A	0.5 ton/A manure and 105 lb N/A	1 ton/A manure and 125 lb N/A

Solid Broiler Manure	Corn Grain Yield		
	100 to 124 bu	125 to 149 bu	150 bu or more
Spring manure: Incorporated in 1 day	0.5 ton/A manure and 70 lb N/A	0.5 ton/A manure and 95 lb N/A	1 ton/A manure and 105 lb N/A
Spring manure: Incorporated in 7 days	0.5 ton/A manure and 75 lb N/A	0.5 ton/A manure and 100 lb N/A	1 ton/A manure and 115 lb N/A
Spring manure: Not incorporated	0.5 ton/A manure and 80 lb N/A	0.5 ton/A manure and 105 lb N/A	1 ton/A manure and 125 lb N/A
Fall manure: All applications	0.5 ton/A manure and 80 lb N/A	0.5 ton/A manure and 105 lb N/A	1 ton/A manure and 125 lb N/A
Winter manure: All applications[1]	0.5 ton/A manure and 75 lb N/A	0.5 ton/A manure and 100 lb N/A	1 ton/A manure and 110 lb N/A

[1] For winter applications: If manure will be used to meet additional nitrogen requirements, the NBS worksheet must be used to determine the appropriate application rate and season.

Grass Hay Manure Application Rate Charts: Crop Phosphorus Removal

Solid Cattle & Horse Manure

	Grass Hay Yield		
	less than 3 tons/A	**3 to 4 tons/A**	**5 tons/A or more**
Spring/Summer manure: All applications	6 ton/A manure and 65 lb N/A	10 ton/A manure and 135 lb N/A	15 ton/A manure and 250 lb N/A
Fall manure: All applications	6 ton/A manure and 65 lb N/A	10 ton/A manure and 135 lb N/A	15 ton/A manure and 250 lb N/A
Winter manure: All applications[1]	6 ton/A manure and 55 lb N/A	10 ton/A manure and 115 lb N/A	15 ton/A manure and 220 lb N/A

Liquid Cattle Manure

	Grass Hay Yield		
	less than 3 tons/A	**3 to 4 tons/A**	**5 tons/A or more**
Spring/Summer manure: All applications	2,000 gal/A manure and 65 lb N/A	3,000 gal/A manure and 135 lb N/A	5,000 gal/A manure and 250 lb N/A
Fall manure: All applications	2,000 gal/A manure and 65 lb N/A	3,000 gal/A manure and 135 lb N/A	5,000 gal/A manure and 250 lb N/A
Winter manure: All applications[1]	2,000 gal/A manure and 55 lb N/A	3,000 gal/A manure and 120 lb N/A	5,000 gal/A manure and 220 lb N/A

Liquid Swine Manure

	Grass Hay Yield		
	less than 3 tons/A	**3 to 4 tons/A**	**5 tons/A or more**
Spring/Summer manure: All applications	1,000 gal/A manure and 70 lb N/A	2,000 gal/A manure and 140 lb N/A	3,000 gal/A manure and 250 lb N/A
Fall manure: All applications	1,000 gal/A manure and 70 lb N/A	2,000 gal/A manure and 140 lb N/A	3,000 gal/A manure and 250 lb N/A
Winter manure: All applications[1]	1,000 gal/A manure and 60 lb N/A	2,000 gal/A manure and 120 lb N/A	3,000 gal/A manure and 230 lb N/A

Solid Layer Manure

	Grass Hay Yield		
	less than 3 tons/A	**3 to 4 tons/A**	**5 tons/A or more**
Spring/Summer manure: All applications	0.5 ton/A manure and 75 lb N/A	1 ton/A manure and 145 lb N/A	1.5 ton/A manure and 270 lb N/A
Fall manure: All applications	0.5 ton/A manure and 75 lb N/A	1 ton/A manure and 145 lb N/A	1.5 ton/A manure and 270 lb N/A
Winter manure: All applications[1]	0.5 ton/A manure and 70 lb N/A	1 ton/A manure and 135 lb N/A	1.5 ton/A manure and 250 lb N/A

Solid Broiler Manure

	Grass Hay Yield		
	less than 3 tons/A	**3 to 4 tons/A**	**5 tons/A or more**
Spring/Summer manure: All applications	0.5 ton/A manure and 70 lb N/A	0.5 ton/A manure and 145 lb N/A	1 ton/A manure and 260 lb N/A
Fall manure: All applications	0.5 ton/A manure and 70 lb N/A	0.5 ton/A manure and 145 lb N/A	1 ton/A manure and 260 lb N/A
Winter manure: All applications[1]	0.5 ton/A manure and 60 lb N/A	0.5 ton/A manure and 135 lb N/A	1 ton/A manure and 245 lb N/A

[1] For winter applications: If manure will be used to meet additional nitrogen requirements, the NBS worksheet must be used to determine the appropriate application rate and season.

Small Grain Manure Application Rate Charts: Crop Phosphorus Removal

Solid Cattle & Horse Manure	Small Grain Yield		
	TBD	TBD	TBD
Fall manure: Incorporated in 2 days	To be determined	To be determined	To be determined
Fall manure: Incorporated in 3 to 7 days	To be determined	To be determined	To be determined
Fall manure: Not incorporated	To be determined	To be determined	To be determined
Winter manure: All applications[1]	To be determined	To be determined	To be determined

Liquid Cattle Manure	Small Grain Yield		
	TBD	TBD	TBD
Fall manure: Incorporated in 2 days	To be determined	To be determined	To be determined
Fall manure: Incorporated in 3 to 7 days	To be determined	To be determined	To be determined
Fall manure: Not incorporated	To be determined	To be determined	To be determined
Winter manure: All applications[1]	To be determined	To be determined	To be determined

Liquid Swine Manure	Small Grain Yield		
	TBD	TBD	TBD
Fall manure: Incorporated in 2 days	To be determined	To be determined	To be determined
Fall manure: Incorporated in 3 to 7 days	To be determined	To be determined	To be determined
Fall manure: Not incorporated	To be determined	To be determined	To be determined
Winter manure: All applications[1]	To be determined	To be determined	To be determined

Solid Layer Manure	Small Grain Yield		
	TBD	TBD	TBD
Fall manure: Incorporated in 2 days	To be determined	To be determined	To be determined
Fall manure: Incorporated in 3 to 7 days	To be determined	To be determined	To be determined
Fall manure: Not incorporated	To be determined	To be determined	To be determined
Winter manure: All applications[1]	To be determined	To be determined	To be determined

Solid Broiler Manure	Small Grain Yield		
	TBD	TBD	TBD
Fall manure: Incorporated in 2 days	To be determined	To be determined	To be determined
Fall manure: Incorporated in 3 to 7 days	To be determined	To be determined	To be determined
Fall manure: Not incorporated	To be determined	To be determined	To be determined
Winter manure: All applications[1]	To be determined	To be determined	To be determined

[1] For winter applications: If manure will be used to meet additional nitrogen requirements, the NBS worksheet must be used to determine the appropriate application rate and season.

4. **Manure Management Plan Summary.** This form following this section provides a summary of the mechanical manure application rates by crop group and time of year.

a. List the crop groups (crop type and realistic expected yield) that are grown on the farm and any rented property in the first column. Remember that if the farm uses more than one manure group on the crop, a separate crop listing needs to be provided for each manure group.

b. List the Manure group (this listing will be dependant, in part, on the method used to calculate the application rate). If the **Manure Application Rate Charts** are used, the manure group will be either solid cattle, liquid cattle, liquid swine, solid layer and solid broiler. If the manure does not fit into one of these groups, the Nitrogen or Phosphorus **Nutrient Balance Sheets** (available from the conservation district) or the Phosphorus Index must be used and the manure groups listed in the Pennsylvania Agronomy Guide needs to be listed. Contact a certified nutrient management planner if you want to use the Phosphorus Index.

c. List the application season, Spring, Summer, Fall or Winter. Each field where winter application is planed must be evaluated using the **Winter Application** spreadsheet discussed on page 12.

d. Incorporation timing is number of days after application of manure before the manure is incorporated.

e. List the application rate. For liquid manure the rate is expressed in gallons and for solid manure the rate is expressed in tons.

f. Identify the method for calculating the application rate. Use "C" if the rate comes from the **Manure Application Rate Charts**, "NBS" if the rate comes from a **Nitrogen or Phosphorus Nutrient Balance Management Plan Worksheet,** and "PI" if the rate was developed by a certified planner using the Phosphorus Index.

g. List the fields where the crop group may be used.

SECTION 2 MANURE APPLICATION RATES AND TIMING

MANURE MANAGEMENT PLAN SUMMARY

Use Additional Sheets as Necessary

	Crop Group	Manure Group	Application Season	Application Rate from C, NBS, PI *	Incorporation Timing	Application Rate	Fields where this crop group can be used

* C – The application rate was taken from the charts on pages 14 - 21
NBS – The application rate was calculated using Nutrient Balance Sheet
PI - The application rate was calculated by a certified planner using the Phosphorus Index

SECTION 3 MANAGING MANURE STORAGE IN STRUCTURES AND STOCKPILING/STACKING AREAS (All farms must complete this section)

1. Manure Storage Facilities - Manure management must assure that manure not immediately applied is properly stored. Manure storage facilities are used for safely containing manure until it is able to be properly applied or processed. Manure storage facilities include structures such as earthen ponds with various liners such as concrete, bentonite, and/or membrane products like HDPE, concrete tanks located outside or under the barn, above ground steel tanks and roofed stacking facilities.

The plan must list all existing manure storage facilities (and any planned expansion or additions). For liquid or semi-solid manure storage facilities, the plan must document the type, date of construction, estimated capacity, and documentation of the environmental evaluation of the structure as outlined below.

Manure Storage Facilities (for each facility provide):

Type of storage (concrete tank, metal tank, under building structure, earthen or clay lined pond, etc.) and year of construction.

_____
_____
_____
_____

Size (provide dimensions; also provide volume if handled as a liquid or semi-solid) of existing manure storage facilities (indicate if exposed to precipitation):

_____
_____
_____
_____

Indicate if any additional materials are added to the manure including bedding, wash water, runoff from a barnyard, etc.:

_____
_____
_____
_____

Manure storage related practices needed on the operation to address identified problems (such as inadequate storage volume, leaking facilities, inadequate maintenance, etc):

_____
_____
_____
_____

Liquid or semi-solid manure storage facilities must be evaluated by the operator on at least a quarterly basis to assure that they are not producing potential discharges. The operator must document that there is:

1. No evidence of overtopping or leakage from the facility. The operator must maintain a minimum 12-inch freeboard for all ponds and a minimum 6-inch freeboard for all other manure storage facilities.

2. No visible cracking or other problems with concrete structures that would lead to leakage.

3. No visible slope failures, deterioration of any liner, or knowledge of any local water pollution issues associated with the storage facility. No rodent damage or trees or shrubs growing on the sides of earthen dams.

As part of the manure management plan, a written record of these inspections must be completed and maintained at the farm. The worksheet on page 26 provides the format for that written record.

Any discharges or potential discharges need to be addressed immediately. In addition, liquid or semi-solid manure storage facilities built in the year 2000 and later must be designed by a registered Pennsylvania Professional Engineer, and the farmer must maintain a copy of a certification from the engineer indicating that the storage facility was built according to the appropriate standards.

SECTION 3 MANAGING MANURE STORAGE IN STRUCTURES

Manure Storage Facility Description and Location	Date of Inspection	Date of Repair	Describe any Observed Leaking	Describe any visible Cracking or Other Structural Problems	Describe any slope failures, deterioration of the liner, or other Issues (for example rodent holes)

2. Temporary Manure Stockpiling/Stacking

Daily hauling operations and certain other operations handling solid manure may have one or more temporary stockpiling/stacking areas in the field to handle situations when immediate manure application is unacceptable. These conditions could be due to severe weather, limits due to application from other criteria set forth in this document or field conditions unsuitable for spreading. The requirements relating to stacking of manure include:

1. Keeping all stockpiles/stacks at least 150 feet from environmentally sensitive areas such as streams, lakes and ponds, 100 feet from any open sinkhole, 100 feet from any drinking water well (public or private) and not within areas of concentrated water flow.

2. Stockpiling/stocking manure on properly constructed improved stacking pads whenever possible. When stacking in fields on unimproved areas, the stacks cannot be in the same location each year. Use the same area only once in four years and revegetate the area with grasses or legumes.

3. Placing these areas at the top of a hill (within 150 feet from the top of a slope) or diverting upslope water away from stockpile/stacking areas for stacks that are further down slope than 150 feet.

4. Placing stacks on areas with less than 8% slope and orient stockpiles/stacks up and down the hill.

5. Having sufficient bedding in the manure to allow for stockpiling/stacking at least 5 feet in height and when stacked on the application field, limit volume to the amount that can be spread on fields nearby the stack.

6. Covering temporary stockpiled/stacked manure within 15 days if it will be in place for more than 120 days.

Written records must be maintained as part of the manure management plan to demonstrate that these requirements are being met.

Section 4 Pasture Management (Only farms with pastures must complete this section)

All pastures on the farm must be included in the manure management plan. Farms with a grazing plan meeting the requirements of the Pennsylvania Technical Guide do not have to complete this section of the plan.

All pastures on the operation must be addressed by first assessing their potential environmental impact using an initial screening assessment. A second step is required for those pastures which are identified by screening assessment as having a higher potential for environmental impact to ensure that nutrient management on those pastures minimizes pollution of surface and groundwater.

Step 1 - Screening Assessment Worksheet: The initial screening step involves assessing the location and vegetative cover on the pasture field. Pastures meeting **both** of the initial assessment criteria below do not need to go through the second step of developing a pasture management nutrient balance sheet.

a. The edge of the pasture (excluding access walkways) is at least 150 feet from a stream, lake, pond or other surface water body; or the pasture is at least 50 feet from a stream, lake, pond or other surface water body and there is a non-grazed permanent

vegetated buffer strip of at least 50 feet between the pasture field and the stream. **AND,**

b. The pasture is composed of well managed dense vegetation with no obvious signs of overgrazing. The vegetation must be maintained across the pasture to a height of at least 3 inches throughout the year or must provide an 80% permanent uniform vegetative cover.

If the pasture area does not meet both of the above initial assessment criteria, Step 2 must be followed.

Step 2 – Pasture Stocking Rate: Pastures that do not meet both of the screening criteria in Step 1 must either use the following charts or use the Nitrogen or Phosphorus Pasture Balance Worksheet to establish stocking rates for pastures. Use of the charts is suitable for most farmers. Farmers that want to use the Nitrogen or Phosphorus Pasture Balance Worksheet can obtain the worksheets and instructions from the county conservation district.

Farmers using the charts must also maintain well managed dense vegetation with no signs of overgrazing. The vegetation must be maintained across the pasture to a height of at least 3 inches throughout the year or must provide an 80% permanent uniform vegetative cover.

Soil Tests. If the farmer does not take a soil test of the pasture field to determine phosphorus levels, the farmer must use the Phosphorus Based Stocking Rates. If the farmer takes a soil test which includes an assessment for phosphorus, the pasture soil test is taken to a depth of 4 inches, and will need to represent the entire pasture field by taking various samples throughout the pasture, mixing those sub-samples and then taking one sample from this mix.

a. If the soil test phosphorus levels are **more than 200 ppm** phosphorus, the phosphorus stocking rates listed below must not be exceeded. For each pasture, include the stocking rate on the worksheet on page 28.

Phosphorus Based Pasture Stocking Rates (Pasture Soil Tests: > 200 ppm P)

Animal Type	**Minimum Acres per Animal**
Beef cows	1.5 acres per beef cow
Beef fattening animals	1 acre per beef finishing animal
Dairy cows	1.5 acres per dairy cow
Dairy heifers	1 acre per dairy heifer
Horses	0.5 acre per horse

b. If the soil test phosphorus levels are **less than 200 ppm** phosphorus, the following stocking rates listed below must not be exceeded. For each pasture, include the stocking rate on the worksheet below.

Nitrogen Based Pasture Stocking Rates (Pasture Soil Tests: < 200 ppm P)

Animal Type	**Maximum Number of Animals per Acre**
Beef cows	3 beef cows per acre
Beef fattening animals	4 beef finishing animals per acre
Dairy cows	2 dairy cows per acre
Dairy heifers	3 dairy heifers per acre
Horses	2 horses per acre

SECTION 4 MANAGING MANURE IN PASTURES

Stocking Rates

Pasture Location	Beef Cows	Beef Fattening	Dairy Cows	Dairy Heffers	Horses

Section 5 Animal Concentration Areas (Only farms with ACAs must complete this section)

ACAs (sometimes also called "Animal Heavy Use Areas") are barnyards, feedlots, loafing areas, exercise lots or other similar animal confinement areas that will not maintain a densely vegetative pasture. ACAs do not include areas managed as pastures or other cropland. However, ACAs may exist within areas maintained as a pasture and must be addressed. Minimal sized denuded areas within a pasture such as animal access ways, feeding areas, watering areas, and shade areas or walkways are not considered ACAs if they do not cause a direct flow of manure contaminated runoff to streams, lakes, ponds, or sinkholes. Use the chart on page 31 to identify ACAs and the implementation of BMPs currently being used or planned to be used to manage the ACAs.

1. List each ACA located on lands owned or rented.

2. Describe the Best Management Practices used or planned to be used.

    a. Divert clean water flow from upslope fields, pastures, driveways, barn roofs, etc. away from the ACA.

    b. Direct polluted runoff from the ACA area into a storage facility or treatment system such as a correctly sized and well maintained vegetative buffer.

c. Limit animal access to surface waters to only properly implemented livestock crossings. Animals should not have free access to streams or other water bodies adjacent to ACAs.

d. Keep the size of denuded areas such as sacrifice lots as small as possible.

e. Keep areas where animal congregate, such as feed racks and shade, as far away from a water body as possible.

f. Periodically collect manure from the ACA, generally at least 4 times a year.

3. For each planned BMP, identify the schedule for implementation of the BMP.

Some farms may need technical assistance in order to develop and implement BMPs on Animal Concentration Areas. The DEP proposes providing no more than 2 years from the date of publication of this manual for farms to develop the BMPs and no more than 3 years from the date of developing those BMPs, to implement the BMPs. The DEP believes that most farms will be able to begin implementation on a much shorter time frame but recognizes that time may be needed for more costly BMPs. Farmers with ACAs need to immediately contact the local conservation district, NRCS office, or a private consultant and must document that contact and the time frame for developing and implementing BMPs.

SECTION 5 ANIMAL CONCENTRATION AREAS

List date contact was made to the assisting agency/party to help in these efforts: _____
_____
_____
List who was contacted to assist in these efforts: _____
_____
_____

		List date when each Best Management Practice will be implemented			
Location of ACA	Divert clean water around ACA	Direct polluted water to storage or vegetated treatment area	Limit access to streams through stabilized crossings and watering areas	Limit size of denuded areas	Locate area where animals congregate (feed areas, shade, etc.) away from streams

MANURE MANAGEMENT PLAN
CHECKLIST

	Manure Management Manual Page No.	Completed	Not Needed
Section 1 General Information (Required)			
Cover Page			
Operational Information Page			
Section 2 Manure Application Rates			
and Timing (Required)			
Manure Management In Environmentally Sensitive Areas			
Winter Application			
Manure Management Plan Summary			
Section 3 Managing Manure Storage in Structures			
and Stockpiling Areas Only use if the			
Farm Pastures Animals			
Manure Storage Inspection Record Sheet			
Section 4 Managing Manure in Pastures			
Only use if the farm has pastures			
Step 1 Pasture Screening Assessment			
Step 2 Nutrient Balance Assessment			
Section 5 Animal Concentration Areas			
Only use if the farm has ACAs			
ACA Worksheet			
			.
Please note that all farms with crops or ACAs must			
also have an Agricultural Erosion and Sediment Control			
Plan meeting the requirements of 25 Pa. Code Chapter			
102. Additional information can be obtained from the			
county conservation district.			