

Barnyard Conditions and Management

WHY BE CONCERNED?

The barnyard is often the first place to look for sources of sediment, bacteria, nitrogen, and phosphorus that can contaminate surface water and, in some cases, groundwater. Barnyards are busy places that can be difficult to manage. Mud and manure in a barnyard are not only a source of pollutants, but also sources of microbes that can cause animal health problems. Good management involves three basic principles. The first is to divert clean water flow (from upslope fields, pastures, driveways, and barn roofs, etc.) away from the barnyard, which will reduce the volume of contaminated runoff to manage. The second principle is to divert polluted runoff from the barnyard into a storage area, where its effect on surface water or groundwater will be minimal. The third principle is to reduce the amount of time the animals spend in the barnyard to minimize the traffic that can erode soil and create muddy conditions.

The goal of Pennsylvania Farm•A•Syst is to help you protect groundwater and surface water, shared resources which are important to everyone.

HOW TO RANK GROUNDWATER AND SURFACE WATER PROTECTION USING THIS WORKSHEET

- You can select from a wide range of barnyard conditions or management practices that are related to potential groundwater or surface water contamination.
- You can rank your barnyard conditions or management practices according to how they might affect groundwater or surface water.
- Based on your overall ratings, you can determine which of your conditions or practices are reasonably safe and effective, and which might require modification to better protect groundwater and surface water.

HOW TO COMPLETE THE WORKSHEET

Follow the directions as listed on page 2 of the worksheet. It should take 15 to 30 minutes to complete the evaluation and determine your barnyard management ranking. Space is provided to rank up to three sites on your farmstead where barnyard conditions or management could directly impact groundwater or surface water. If you have more than three sites, please use another worksheet. If you are unfamiliar with any of the terms used, refer to the glossary provided with this worksheet.

Information derived from Pennsylvania Farm•A•Syst worksheets is intended only to provide general information and recommendations to farmers regarding their own farmstead practices. It is not the intent of this educational program to keep records of individual results. However, they may be shared with others who will help you develop a resource management plan.

WORKSHEET # 4: BARNYARD CONDITIONS AND MANAGEMENT

Use a pencil, in case you want to change an answer later. For each feature listed on the left that applies to your farmstead, read across to the right and circle the statement that most closely describes your situation. Leave blank any features which don't apply to your farmstead. Find the corresponding "rank number" (4,3,2,1) for each description you circled and enter that number in the blank under "your rank." If the conditions

and practices in any one description do not match your situation exactly, use an in-between score of one-half unit; for example, 2.5 or 3.5. Directions for overall scoring appear at the end of the worksheet. Allow 15 to 30 minutes to complete the worksheet and determine the level of groundwater and surface water protection you are providing through your barnyard conditions and management practices.

BARNYARD MANAGEMENT

	4 Best	3 Good	2 Fair	1 Poor	RANK (up to 3 sites)
LOCATION OF BARNYARD					Site Identification
					#1 #2 #3
1. Distance from water well	More than 300 feet.	200-300 feet.	50-200 feet.	less than 50 feet.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2. Distance from a stream, waterway, or body of water	More than 400 feet.	200-400 feet.	100-200 feet.	Less than 100 feet.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Site Identification #1. _____ #2. _____ #3. _____					

					Site Identification
					#1 #2 #3
3. Clean water management	All water from roof and upslope area, fields, impermeable surfaces, etc. is diverted away from barnyard.	Most clean surface water is diverted.	-----	All water from roof and upslope areas, fields, impermeable surfaces, etc., runs through barnyard.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
4. Barnyard runoff control system	No runoff or all runoff goes to a manure pit.	Curbed concrete barnyard collects all solids. Liquids directed to a vegetative filter strip.	Uncurbed concrete barnyard collects most solids. No filter strip is used for liquids.	Unpaved barnyard with no collection of solids or liquids.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
5. Yard cleaning and scraping practices	All barnyard manure is directed to a manure pit.	Barnyard is scraped twice per week and spread on fields according to a nutrient management plan.	Barnyard is scraped once per week and spread on fields.	Barnyard is scraped once per month or less and spread on fields.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
6. Vegetative cover on earthen exercise lots	More than 90% ground cover.	75-90% ground cover.	25-75% ground cover.	Less than 25% ground cover.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7. Animal access to barnyard areas or earthen exercise lots	Animals have access to earthen area only when it is dry, to prevent muddy spots and destruction of vegetative cover; or animals have access to a concrete barnyard.	Animals occasionally have access to earthen area in wet conditions.	Animals frequently have access to earthen area in wet conditions.	Animals have access to earthen area at all times regardless of weather and ground conditions.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

4 Best	3 Good	2 Fair	1 Poor	RANK (up to 3 wells)
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CONCENTRATION OF ANIMALS ON BARNYARD

Site Identification
#1 #2 #3

8. Density of animal concentration^a	No barnyard; or animals are confined to a barn or a roofed area.	Low density of animals. On a concrete surface or pad. If on earthen lot, it is rarely muddy.	Medium density of animals. An earthen lot has occasionally muddy conditions.	High density of animals. An earthen lot has frequently muddy conditions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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^aFor more detailed information and numbers in square feet per acre (sf/a) that define "low," "medium," or "high" densities depending on the animal, refer to the following section on "Estimating Animal Density in a Barnyard."

TOTAL
Use this total to calculate overall performance ranking.

HOW TO USE THESE RANKINGS

- Step 1.** Now that each feature has been ranked, add all these rankings together and put that value in the "Total" box at the end of the worksheet. Transfer that number to the box below.
- Step 2.** Divide the value in the "Total" box by the number of features ranked.
- Step 3.** Repeat for each additional site. Calculate the average ranking for all sites combined.

<div style="border: 1px solid black; padding: 5px;"> <p>_____ divided by _____ equals _____ (total of rankings) (# of features ranked) (average ranking)*</p> <p><small>*carry your answer out to one decimal place</small></p> </div>

- Step 4.** Evaluate the overall management practices and site conditions.
 - 3.6-4.0 = best management
 - 2.6-3.5 = good management
 - 1.6-2.5 = fair management
 - 1.0-1.5 = poor management

This ranking indicates how milkhouse waste conditions and management practices as a whole might affect groundwater and surface-water quality. This ranking should serve only as a general guide, not a precise diagnosis. Since it represents an average of many individual rankings, it can mask any individual rankings (such as 1's and 2's) that should be of concern.

- Step 5.** Look over the rankings for individual features of each site:
 - Best (4's):** best management according to current guidelines
 - Good (3's):** provides reasonable groundwater and surface water protection
 - Fair (2's):** inadequate protection in many situations
 - Poor (1's):** poses a high risk of polluting groundwater

Regardless of the overall ranking, any individual rankings of "1" should receive immediate attention. Some problems can be taken care of right away; others could be major or costly projects, requiring careful planning before action is taken.
- Step 6.** Consider how farmstead management practices or site conditions could be modified to better protect groundwater and surface water. Contact the local Conservation District, Penn State Cooperative Extension office, or the USDA Natural Resources Conservation Service for ideas, suggestions, or guidance.

ESTIMATING ANIMAL DENSITY IN A BARNYARD

The definitions of "low," "medium," and "high" can be used to complete Feature #8, Density of Animal Concentration. (Square feet per animal is abbreviated "sf/a.")

CONCENTRATION OF ANIMALS ON BARNYARD^a

	"Low"	"Medium"	"High"
Dairy cows	<ul style="list-style-type: none"> > 75 sf/a on fenced, curbed concrete pad. > 400 sf/a on graded earthen surface. > 1,800 sf/a in exercise area. 	<ul style="list-style-type: none"> > 50 sf/a on concrete. > 200-300 sf/a on earthen surface. > 1,200 sf/a in exercise area. 	Some concrete (less than 50 sf/a) and earthen surface (less than 100 sf/a).
Dairy replacements	<ul style="list-style-type: none"> > 40 sf/a on fenced, curbed concrete pad. > 150-200 sf/a on earthen surface. 	<ul style="list-style-type: none"> > 20 sf/a on concrete. > 75 sf/a on earthen surface. 	< 75 sf/a on earthen surface.
Beef feeders	> 50 sf/a at barn and/or paved lot.	> 40-50 sf/a for a paved lot, but no shelter.	< 30 sf/a for paved area. < 150 sf/a for earthen area.
Beef cows/heifers	<ul style="list-style-type: none"> > 60 sf/a for barn with paved lot. > 600 sf/a for earthen area. 	<ul style="list-style-type: none"> > 30 sf/a for paved lot. > 300 sf/a for earthen area. 	< 200 sf/a for earthen area.
Sheep/ewes	<ul style="list-style-type: none"> > 20 sf/a for barn and paved lot. > 40 sf/a for earthen area. 	<ul style="list-style-type: none"> < 15 sf/a for a barn and paved lot. < 25 sf/a for earthen area. 	< 10 sf/a for earthen area.
Feeder lambs	<ul style="list-style-type: none"> > 10 sf/a for barn and paved lot. > 25 sf/a for earthen area. 	<ul style="list-style-type: none"> > 5 sf/a for barn and paved lot. > 10 sf/a for earthen area. 	< 10 sf/a for earthen area.
Hogs/sows	> 30 sf/a for shed and paved lot.	< 15 sf/a for shed and earthen lot.	< 10 sf/a for shed and earthen lot.
Horses	> 2,500 sf/a for earthen exercise lot. No pasture.	> 1,500 sf/a for earthen lot. No pasture.	< 1,000 sf/a for earthen lot. No pasture.

^a animal concentrations derived from Midwest Plan Service publications and other sources.

> indicates "greater than"

< indicates "less than"

GLOSSARY

Barnyard: A livestock confinement area outside the barn. Does not include a “housing” area.

Drainageway: A part of the landscape, usually vegetated, where surface water occasionally collects and moves from an upslope area.

Exercise lot: A grassy or impermeable area intended to give the animals a place to move around, but not intended as a source of forage.

Feedlot: An area where feed and water are provided for livestock.

Filter strip: A gently sloping grassy area used to filter runoff from a barnyard. Runoff is distributed uniformly across the high end of the strip and allowed to flow down the slope. Nutrients and suspended material remaining in the runoff water are filtered through the grass, absorbed by the soil, and ultimately taken up by the plants. To maximize effectiveness of the filter strip, the vegetation should be removed through grazing or harvesting. Filter strips must be designed and sized to match the characteristics and wastewater flow of the barnyard.

Groundwater: Water beneath the earth’s surface that supplies wells and springs.

Pasture: An area for livestock to graze and consume a measurable portion of their forage needs from the vegetation in the pasture.

Runoff control system: A combination of management practices that can be used together to prevent water pollution from livestock yard runoff. Practices may include diversion of runoff from the yard, yard shaping, providing roof runoff systems, settling basins, upslope diversions, and filter strips or buffer areas.

Surface water: Water at the earth’s surface, such as ponds, lakes, streams, or ditches.

Upslope/downslope: Refers to the position of the barnyard in relation to the direction of water flow.

Vegetative cover: Grass or a mixture of grass and other vegetation covering the soil surface that effectively protects the surface from runoff.

Waterway: A grass or rock-lined channel that collects water and reduces erosion by directing the waterflow to a safe outlet. Helps prevent large amounts of water running through a field or barnyard, which would carry sediments and manure with it.

ACKNOWLEDGMENTS

The Pennsylvania Farm•A•Syst package contains the following worksheets:

- Introduction
- Farmstead Map
- Preliminary Screening Quiz
- Worksheet #1 - Water Well Condition and Construction
- Worksheet #2 - Pesticide and Fertilizer Storage and Handling
- Worksheet #3 - Household Wastewater Treatment System
- Worksheet #4 - Barnyard Conditions and Management
- Worksheet #5 - Milkhouse Wastewater Management
- Worksheet #6 - Stream and Drainageway Management
- Overall Farmstead Ranking

Material for the Pennsylvania Farm•A•Syst package was developed by revising Farm•A•Syst material from the University of Wisconsin Cooperative Extension Service, University of Minnesota Extension Service, and the National Farmstead Assessment System Program. The format and style for the Pennsylvania package was based on the Ontario Environmental Farm Plan published by Ontario Farm Environmental Coalition, Ontario, Canada.

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