



Self Assessment Of Water Resources: Fact Sheet 4

GOAL: Identify risks to water resources from your small acreage livestock farm and develop personalized action steps to reduce these risks.

Small Acreage Livestock Farm Risk Assessments:

Many geographic characteristics play key roles in determining potential land contaminants and impact on water resources. You can save time and money while practicing better environmental stewardship by implementing small changes on your farm to reduce these risks.

The following information and self-assessment worksheets will take you step-by-step through the factors that pose potential risks to water resources, including livestock yards, manure storage, or composting areas. Risk factors include location, site characteristics, design and management. Each section will help you navigate through determining a “Low,” “Medium,” or “High” potential risk to water resources. This guide will identify potential risk(s) on your property; it is NOT a conclusive assessment of risk. It will help you identify some beneficial small changes you can make on your farm to reduce potential risks. The worksheets have been designed with small acreage livestock and horse owners in Rhode Island, and were adapted from the USDA Natural Resource Conservation Service (NRCS) Farm*A*Syst Program materials from various states.

These worksheets provide a summary of each section and a table to walk you through the assessment. Although some choices may not correspond exactly to your situation, check the response that best describes your manure storage situation.

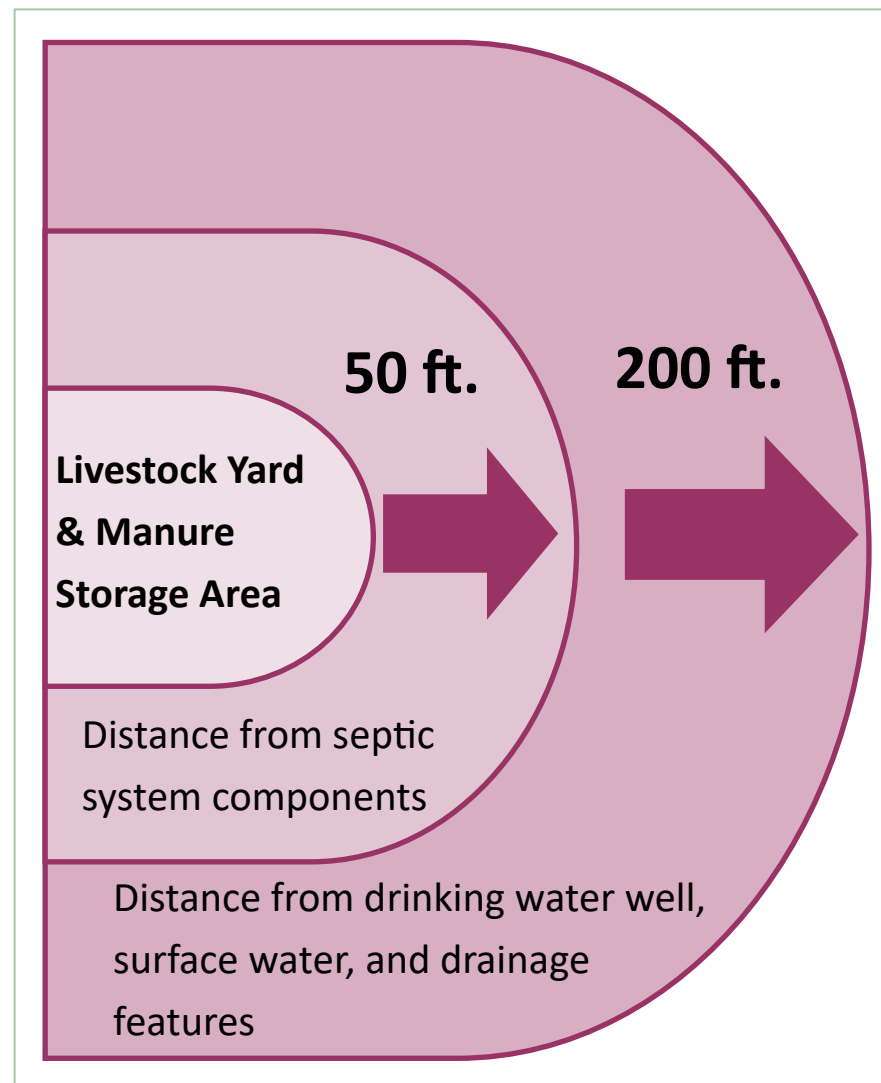
Please Note: Your local Conservation District can assist you in this assessment and help you evaluate your property further. These worksheets are to help you get an idea of best practices that you can implement on your property.

For more information, please visit: www.nricd.org/manure/




Self-Assessment: LOCATIONS ON SITE

The Location describes where a livestock yard or manure storage area is situated in relation to various water resources or septic systems on your property. The location of your manure storage or compost pile, livestock yard and/or how livestock access water resources can determine the potential risk of runoff and leaching. Drinking water wells, surface waters, drainage features, and your septic system should be upslope from livestock yards and manure storage or composting areas. Ensuring that these features are upstream prevents runoff or leaching from directly entering a water resource, and allows for filtration through the soil. See *Fact Sheet 2: Manure Management* for more details.

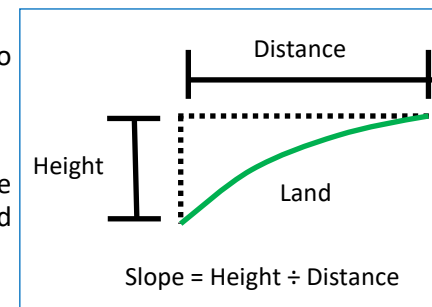
The distances listed in this assessment provides general ranges to determine potential risk to a water resources. The other factors listed can also affect water quality. This information does not directly correspond with specific setback distances that are required by various Federal, State, and Local laws for activities within or near to these water resources, except where noted. If you plan to do any activities in close proximity to water resources, be sure to check with all laws that may apply. Contact the Rhode Island Department of Environmental Management Office of Water Resources at (401) 222-3961, www.dem.ri.gov and your local town hall from more information. If you live near a coastal water resource, contact Rhode Island Coastal Resources Management Council at (401)783-3370, www.crmc.ri.gov.






Self-Assessment: LIVESTOCK YARDS

<i>Location</i>			
Assessment Category	 Low Risk	 Medium Risk	 High Risk
Distance from a drinking water well.	More than 200 feet. _____	100—200 feet. _____	*Less than 100 feet. _____
Distance from surface water: pond, stream, wetland, or coastal water.	More than 200 feet. _____	100—200 feet. _____	Less than 100 feet. _____
Distance from a drainage feature: Storm drain, drainage ditch, etc.	More than 200 feet. _____	100—200 feet. _____	Less than 100 feet. _____
Distance from septic system components: septic tank, distribution box, leach field, cesspool, dry well.	Greater than 50 feet. _____	25-50 feet. _____	Less than 25 feet. _____
**Slope of livestock yard to the nearest surface water and drinking water well.	2%-5% slope	6% - 10% slope	10% or greater slope

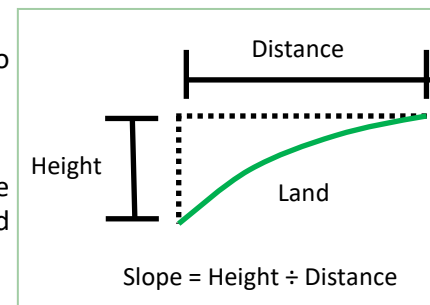
- *As a private well owner you are responsible for making sure your home water supply is safe for you and your family to drink. Your livestock should be located more than 100 feet from your well per State of RI Rules and Regulations.
- **To determine the slope of the livestock yard to the nearest surface water and/or drinking water well, calculate the height (the highest point to the lowest point) of the slope and divide it by the distance between the livestock yard and the surface water and/or drinking water well.



Self-Assessment: MANURE STORAGE AREA

<i>Location</i>			
Assessment Category	 Low Risk	 Medium Risk	 High Risk
Distance from a drinking water well.	More than 200 feet. _____	100—200 feet. _____	*Less than 100 feet. _____
Distance from surface water: pond, stream, wetland, or coastal water.	More than 200 feet. _____	100—200 feet. _____	Less than 100 feet. _____
Distance from a drainage feature: Storm drain, drainage ditch, etc.	More than 200 feet. _____	100—200 feet. _____	Less than 100 feet. _____
Distance from septic system components: septic tank, distribution box, leach field, cesspool, dry well.	Greater than 50 feet. _____	25-50 feet. _____	Less than 25 feet. _____
**Slope of livestock yard to the nearest surface water and drinking water well.	2%-5% slope	6% - 10% slope	10% or greater slope

- *As a private well owner you are responsible for making sure your home water supply is safe for you and your family to drink. Your livestock should be located more than 100 feet from your well per State of RI Rules and Regulations.
- **To determine the slope of the livestock yard to the nearest surface water and/or drinking water well, calculate the height (the highest point to the lowest point) of the slope and divide it by the distance between the livestock yard and the surface water and/or drinking water well.



Self-Assessment: SOIL CHARACTERISTICS

Site Characteristics describe the natural site conditions on your property, including soil texture and drainage. Soil texture is how fine or coarse a soil may be. Finer, deeper soils tend to provide more groundwater protection as they slowly filter out potential pollutants such as pathogens and nutrients. Soils with a seasonal high water table or shallow bedrock have rapid drainage which poses a greater risk of potential groundwater contamination. Soils with finer texture and medium to slow drainage are more prone to surface runoff.

Livestock yards tend to be compacted due to heavy foot traffic, leading to more runoff. When livestock yards or manure storage areas are near a surface water resource or storm drain, there is cause for concern. Refer to *Fact Sheet 1: Protecting Water* and *Fact Sheet 3: Pasture and Grazing* for more details.

Answer the following questions about the surrounding soils even if the livestock yard, manure storage or compost area is paved or the floor is lined. Not only can paved and lined areas deteriorate, crack, or experience problems due to the underlying soil type, but other factors listed under the design and management category are also affected by the surrounding soil type.

Determining Soil Type:

Method A: Soil Texture

One way that you can determine the soil type on your farm is to dig a hole in a representative area within or near the livestock yard or manure storage area. If this area contains a lot of manure/mud, find an area just outside the yard. To determine soil texture, collect some of the soil from the upper 6 to 12 inches (often called the topsoil) in your hand. Rub the soil between your fingers to feel the soil particles. Lift the sample to your ear and check out the sound. Compare what you feel/hear with the soil assessment on the next page.






Method B: Web Soil Survey

Another way to determine the types of soil(s) on your property is to use the Web Soil Survey through the USDA Natural Resources Conservation Service (NRCS). A soil map will provide you with a map that will characterize your soil types. Keep in mind maps may not show small variations, and it is important that you verify the information with what you know about your property.

To access the Web Soil Survey online, you can go to: <https://websoilsurvey.nrcs.usda.gov/app/>. Click the green “Start WSS” button on the top right side of the page to get started.

Self-Assessment: LIVESTOCK YARDS & MANURE MANAGMENT

Site Characteristics

Assessment Category	 Low Risk	 Medium Risk	 High Risk
<p>Soil Texture within the yard area. If the yard area is paved, indicate the original and surrounding soil type.</p> <p>Livestock yard: _____</p> <p>Manure Storage Area: _____</p>	<p>Silt loam (feels like talcum powder, smooth, silky).</p> <p>_____</p> <p>_____</p>	<p>Fine sandy loam (not as smooth as silt loams, sounds gritty when rubbed between figures).</p> <p>_____</p> <p>_____</p>	<p>Sandy loam, loamy sand (coarse texture, feels gritty).</p> <p>_____</p> <p>_____</p>
<p>Soil drainage within the yard area. If the yard area is paved, indicate the original and surrounding soil drainage.</p> <p>Livestock yard: _____</p> <p>Manure storage area: _____</p>	<p>Well-drained, high water table 6 feet or more below the surface.</p> <p>_____</p> <p>_____</p>	<p>Moderately well-drained, high water table within 18-36 inches of the surface.</p> <p>_____</p> <p>_____</p>	<p>Excessively drained, rapid drainage; or, poorly drained, high water table at or near the surface.</p> <p>_____</p> <p>_____</p>

Self-Assessment: Livestock Yards DESIGN & MANAGMENT




The Design and Management of your livestock yard, manure storage, or composting area can greatly reduce pollution and health risks. A primary manure management goal is to prevent rain and snow from mixing with animal waste. Another important management factor to consider is the handling of runoff that mixes with animal waste. Runoff can contain sediments, nutrients and pathogens that can pollute surface and groundwater. Manure storage and compost areas can also generate leachate (liquids that drain from within the pile) containing nutrients and pathogens that can move into groundwater. This pollution can negatively impact human and animal health. You can refer to *Fact Sheet 1: Protecting Water* for more information.

Designing and managing your livestock yard, manure storage area and/or a composting area with practices that can reduce water quality risks can be easily accomplished after the identification of potential design and management risks to water quality.






Photo courtesy of USDA NRCS.

Self-Assessment: LIVESTOCK YARDS

<i>Design and Management</i>			
Assessment Category	 Low Risk	 Medium Risk	 High Risk
Upslope surface runoff and roof runoff (Runoff flowing into the livestock yard).	No surface water runoff or roof runoff flows into the yard. _____	Some surface water and/or roof runoff flows into the yard. _____	All surface and roof runoff flows into the yard. _____
Livestock yard runoff (Runoff flowing from the livestock yard).	No runoff leaves the yard, the area is roofed. _____	Most of the yard is directed to well-vegetated areas (woodlands, buffer strips, cropland, pastures), runoff does not leave the property or enter water resource areas. _____	Yard runoff is uncontrolled, travels through poorly vegetated areas, gravel or paved areas, water resource areas, or leaves the property. (There is no buffer, or roof management systems covering the livestock yard). _____

Self-Assessment: MANURE STORAGE

<i>Design and Management</i>			
Assessment Category	 Low Risk	 Medium Risk	 High Risk
Type of floor surface for manure storage.	Poured concrete floor. _____	Plastic liner, tarpaulin, wooden bin, or concrete . _____	Earthen, gravel, natural ground. _____
Type of covering for manure storage area.	Manure storage area contains a roof structure. _____	Manure storage area is covered with a plastic liner or tarpaulin or other secure covering. _____	Manure storage area is not covered. _____
Upslope surface runoff and roof runoff (Runoff flowing into the manure storage area).	No surface water runoff or roof runoff flows into the storage area. _____	Some surface water and/or runoff flows into the storage area. _____	All surface and roof runoff flows into the storage area. _____
Manure storage runoff (Runoff flowing from the manure storage area).	No runoff and leachate leaves the storage area. The area is roofed, the floor surface is poured concrete and/or the storage consists of a water-tight geotextile or steel design. _____	The storage area is covered with a plastic liner and/or contained by walls (concrete, wooded, earthen). Runoff and leachate flowing from the storage area travel to well-vegetated areas (woodlands, buffer strips, pastures), runoff does not leave the property or enter water resource areas. _____	The storage area is not covered or contained. Runoff and leachate are uncontrolled, and travel through poorly vegetated areas, gravel or paved areas, or leave the property. _____

Self-Assessment: LIVESTOCK AREA

The Concentration of Animals your livestock yard impacts the level of risk to surface and groundwater contamination. If the values calculated in this assessment exceed the minimum animal concentration parameters, your property has higher amounts of manure and waste that the land cannot naturally recycle. This means that the site has an increased potential to impact water quality.




Most small acreage livestock farms have a natural earthen yard (natural field). Paved yards usually consist of a poured concrete pad and are typically used when raising cattle and pigs. The minimum square feet per animal (sq. ft./ a) for a paved yard is much less than that needed for an earthen yard, and this can be useful when space is limited or for outdoor concentrated feeding areas.

The minimum sq. ft./ a recommended for sizing a livestock yard is not the same as the total land area needed to support one animal unit or 1,000 lbs. of live weight (stocking rate). The animal concentration indicates the size of a livestock yard that should ideally support the number of animals on the farm altogether, with lower potential risk to water quality. For more information, refer to Fact Sheet 3: Pasture and Grazing.



Photo courtesy of USDA NRCS.

Self-Assessment: LIVESTOCK AREAS

<i>Design and Management</i>			
<i>(Answer the following sections for the situation that applies or for both if you have a combination paved and earthened yard (natural field)).</i>			
Assessment Category	 Low Risk	 Medium Risk	 High Risk
Paved Yard: Yard cleaning and scrapping management.	Paved yard is roofed, area is cleaned periodically as needed. _____	Paved yard is not roofed and is cleaned at least once per week. _____	Paved yard is not roofed and is cleaned less than once per week. _____
Earthen Yard (natural field): Amount of vegetation cover within earthen yard.	More than 75%. _____	25% - 75%. _____	Less than 25%. _____
Animal access to earthen yard.	Animals only access during dry periods to prevent mud. _____	Animals access periodically during wet conditions, yard is wet and muddy at times. _____	Animals access the yard at all times, regardless of conditions, it is wet and muddy most of the time. _____
Animal access to water resources: pond, stream, wetland, coastal water or well (this includes your entire property, not just the area of the livestock yard. For example, if you have pasture, the animals may have access to surface waters when out on pasture.)	Animals never have direct access to a shoreline or other water resource. _____	Animals have direct access to a shoreline or water resource at times. The access area is limited with most of the shoreline or water resource containing a good vegetative buffer. _____	Animals have access to a large shoreline or water resource area. There is little to no vegetative buffer. _____

Self-Assessment: LIVESTOCK YARDS

<i>Concentration of Animals on Yard</i>			
<p>Determine the total area of the yard in square feet (sq. ft.) (yard area). Determine the length and width of your livestock yard (include pasture or grazing area)</p> <p>Ex. 100 ft. long, 200 ft. wide 100 ft. x 200 ft. = 20,000 sq. ft.</p>	<p>Length of the yard (ft.)</p> <p>_____</p>	<p>Width of the yard (ft.)</p> <p>_____</p>	<p>_____ ft. long x _____ ft. wide = _____ sq. ft. total (one acre is equal to 43,560 sq. ft.)</p>
<p>Determine square feet per animal (sq. ft./a).</p> <p>Ex. 10 dairy replacement heifers occupy a yard that is roughly 50'x 120'. The yard is 6,000 sq. ft. total. 6,000 sq. ft. ÷ 10 animals = 600 sq. ft. per animal (sq. ft./a)</p>	<p>_____ sq. ft. of yard (yard area)</p>	<p>Total number of animals occupying the yard.</p> <p>_____</p>	<p>_____ yard area ÷ _____ total number of animals occupying the yard = _____ sq. ft per animal (sq. ft./a)</p>

Self-Assessment: LIVESTOCK YARDS

Concentration of Animals on Yard			
Compare your answer on the previous page with the minimum recommended sq ft/a listed in			
Animal	Paved Yard minimum sq. ft./acre	Earthen Yard minimum sq. ft./acre	Risk Assessment (LOW, MEDIUM, or HIGH)
Dairy Cows	75	400	
Dairy Replacement heifer	40	150	
Beef feeders	50	500	
Beef cows & heifers	60	600	
Sheep and goats	20	40	
Feeder lambs	10	25	
Hogs and sows; growing/finishing pigs	15	30	
Horses		*>2,500	
Chickens, layers		**4	
Chickens, broilers		**2	
Turkeys		**8	
Ducks		**4	
Multiple types of livestock occupy the yard			

Risk Evaluation:



LOW Risk: If your animals remain confined under a roofed area 100% of the time.



MEDIUM Risk: If the sq. ft./a is equal to, or more than the minimum recommended sq. ft./ animal provided.



HIGH Risk: If the sq. ft./a is less than the minimum recommended sq. ft./a provided.

* With proper engineering and maintenance, the minimum recommended area per horse for an exercise yard can be reduced to 600 sq. ft. / a with the use of sand and geotextile materials. Contact the USDA Natural Resources Conservation Services, Warwick, RI at (401) 828-1300 for more information. View the Ohio State University Fact Sheet *Using Geotextile Fabric in Livestock Operations* at <http://ohioline.osu.edu/aex-fact/0304.html> for more information on the use of geotextiles in livestock yards.

**Minimum sq. ft./a is based on medium textured soils, silt loam/fine sand loam. If soils are coarse textured sand loam/loamy sand, enter high for your risk. Animal concentrations derived from Midwest Plan Service publications and other sources.

*** If you have a combination of paved and earthen yard, answer the questions that best apply to the concentration of animals in the yard based on where they spend the majority of their time.

Self-Assessment: LIVESTOCK YARDS

Responding to Livestock Yards—Assessment of Water Quality Risks

Use the action checklist below to list medium and high risks that were identified. Use the information and resources provided in our small acreage livestock fact sheet series to help you plan for practices that reduce these risks. Often a given practice will help to address more than one risk at a time. Your local Conservation District can also help you plan to implement some practices that will help you reduce these risks.

List high and medium risks below.	What can you do to reduce the risk?	Set a target date.
Example: Livestock yard located less than 100 feet from drinking water well.	Keep animals confined to the barn as much as possible until a new livestock yard can be located and fenced.	This weekend: August 14
Example: Roof runoff from south half of barn flows through the livestock yard.	Install a roof gutter system for south side of barn. Direct the downspout to a well-vegetated area.	Late Fall: By November 1
Example: Animals have access to entire pond for drinking, but usually concentrate along the edge that is adjacent to the livestock yard.	<ol style="list-style-type: none"> 1. Investigate watering tubs to be supplied by hose and barn faucet. Visit local farm for fencing and watering ideas. Install a new watering tub in livestock yard. 2. Install fencing around perimeter of pond, leaving a 10 foot buffer. Allow natural vegetation to re-grow. 3. Close gate to pasture area, confine animals to livestock yard until pond fencing is complete. 	Six weeks, end of September Next Spring When new watering tub is installed, 6 weeks

Self-Assessment: LIVESTOCK YARDS

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List high and medium risks below.	What can you do to reduce the risk?	Set a target date.



Self Assessment Of Water Resources: Fact Sheet 4

Takeaways:

- Identify your small acreage livestock farm's water quality risks through completing the Self Assessments of Water Resources of your livestock yard and manure storage area
- Evaluate the completed risk assessment and develop a plan to reduce the potential water quality risks on the farm, adopt new practices that are cost-effective and does not require much time, better the soil and water quality of the land, and increase land stewardship practices.

Resources:

Fact Sheets Series:

- Protecting Water: Fact Sheet 1
- Manure Management: Fact Sheet 2
- Pasture and Grazing: Fact Sheet 3
- Self Assessment of Water Resources: Fact Sheet 4
- Spreading Manure On-farm: Quick Tip

Additional resources and links and available online at www.nricd.org/manure/ under the "Healthy Farms, Healthy Watershed Program," or call 401-934-0840.

For more information or assistance on animal waste management, soil conservation, and other programs, contact:

Northern Rhode Island Conservation District (NRICD)
<https://www.nricd.org/>
2283 Hartford Avenue, Johnston, RI 02919
401-943-0840



For more information on water quality, sustainable landscapes, or other residential pollution prevention, contact:

URI Home*A*Syst Program
<https://web.uri.edu/safewater/>

Program Coordinator Alyson McCann:
alyson@uri.edu.



U.S Department of Agriculture, Nature Resource and Conservation Service (USDA NRCS)
<https://www.nrcs.usda.gov/wps/portal/nrcs/site/ri/home/>
60 Quaker Ln. #46, Warwick, RI 02886
(401) 828-1300



These Fact Sheets were developed in partnership with the Northern Rhode Island Conservation District, University of Rhode Island, Providence Water Supply, State of Rhode Island Department of Environmental Management (RI DEM), Farm Fresh Rhode Island, and ESS Group.

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