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# Assessing the Risk of Surface and Ground Water Contamination From Livestock Yards Management

Utah State University Extension

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***FARM • A • SYST***  
*Farmstead Assessment System*

***Assessing the Risk of Ground Water  
Contamination from  
Livestock Yards Management***

January 2000

Utah Farm • A • Syst - Worksheet #8

***Why should I be concerned?***

Livestock yards, such as barnyards, holding areas and feedlots, are areas of concentrated livestock manure. They can be a source of nutrient and bacterial contamination of surface and/or ground water. This is especially true if there is no system to divert clean water flow from the livestock yard or to collect polluted runoff from the yard for diversion to an area where its effect on ground water or surface water is minimal. The potential for livestock yards to affect ground water is greatest if the yard is located over coarse-textured permeable soils, if the water table is at or near the surface, if bedrock is within a few feet of the surface or when polluted runoff reaches surface water sources.

Nitrate-nitrogen ( $\text{NO}_3\text{-N}$ ) levels in drinking water above federal and state drinking water standards of 10 milligrams per liter (mg/l) can pose health problems, including the condition known as methemoglobinemia (blue baby syndrome). This is of concern especially for infants using formula. High levels of nitrite ( $\text{NO}_2\text{-N}$ ) or ammonia ( $\text{NH}_3\text{-N}$ ) can also indicate health concerns.

Young livestock are also susceptible to health problems from high nitrate-nitrogen levels. Levels of 20-40 mg/l in the water supply may prove harmful, especially in combination with high levels (>1,000 ppm) of nitrate-nitrogen from feed sources.

High phosphorus levels contribute to algal blooms in streams, lakes and reservoirs. When these algae die and decompose, oxygen is removed from the water often causing the death of aquatic life. Phosphorus can reach surface water or ground water supplies through movement in the soil solution with surface water runoff or on eroding soil particles.

Bacteria in livestock manure can contaminate surface or ground water, leading to infectious diseases such as dysentery, typhoid and hepatitis. Some organic materials may cause an undesirable taste and odor in drinking water but are not known to be dangerous to health. However, their presence may suggest surface or ground water contamination.

*The Farmstead Assessment System is a cooperative project of Utah State University Extension, Utah Department of Agriculture and Food, Utah Department of Environmental Quality, Utah Farm Bureau, Utah Association of Conservation Districts, Natural Resources Conservation Service*

## ***How will this worksheet help me protect my surface and ground water?***

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- It will take you step by step through an evaluation of your livestock yards management practices.
- It will rank your activities according to how they might affect surface or ground water.
- It will provide you with easy-to-understand rankings that will help you estimate the risk posed by your livestock yards management practices.
- It will help you to identify your practices which are reasonable safe and effective, and practices which might require modification to better protect surface and ground water.

### **Glossary** ***Livestock Yards Management***

***These terms may help you make more accurate assessments when completing Worksheet #8. They may also help clarify some of the terms used in Fact Sheet #8.***

**Filter strip:** A gently sloping grass area which can serve as a buffer around some types of short-term solid manure storage systems. Filter strips are not meant to handle all of the contents of a short-term storage facility, rather, these grass strips are used to help filter only a limited amount of runoff. In these systems, overflow manure is distributed uniformly across the high end of the strip and flows down the slope. Nutrients and suspended material remaining in the runoff water are filtered through the grass, absorbed to the soil, and ultimately absorbed by plants. To be effective, filter strips must be designed and sized to match the characteristics of the storage system. They do not replace a properly designed long-term storage facility, nor do they eliminate the need for proper manure management practices.

**Infiltration:** The downward entry to water through the soil surface.

**Milligram per liter (mg/l):** Concentration in water of parts per million

**Percolation:** The downward movement of water through the soil.

**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, roof runoff systems, yard shaping, settling basins and filter strips or buffer areas.

**Soil drainage class:** The conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soils, as opposed to human-altered drainage. Different classes are described by such terms as “excessively drained,” “well drained,” and “poorly drained.”

**Soil permeability:** The characteristic of the soil which determines the rate at which water will percolate toward ground water. Slowly permeable soils have fine-textured materials, like clays, that permit only slow water movement. Moderately or highly permeable soils have coarse-textured materials, like sands, that permit rapid water movement.

**Soil texture:** The relative proportions of soil particles (clay, silt, sand) in a soil. Described by such terms as “sandy loam,” and “silty clay.”

## ***How do I complete the worksheet?***

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Follow the directions at the top of the chart on the next page. It should take you about 15-30 minutes to complete the worksheet and determine your ranking.

## Utah Farm•A•Syst Worksheet #8

### Livestock Yards Management: Assessing Surface and Ground Water Contamination Risk

*Information derived from Farm•A•Syst worksheets is intended only to provide general information and recommendations to farmers regarding their own farmstead practices. Keep this as your private record.*

1. Use a pencil. You may want to make changes.
2. For each category listed on the left that is appropriate to your farmstead, read across to the right and circle the statement that best describes conditions on your farmstead. (Skip and leave blank any categories that don't apply to your farmstead.)
3. Then look above the description you circled to find your "rank number: (4, 3, 2 or 1) and enter that number in the blank under "your rank."
4. Directions on overall scoring appear at the end of the worksheet.

	<b>LOW RISK (rank 4)</b>	<b>LOW-MOD RISK (rank 3)</b>	<b>MOD-HIGH RISK (rank 2)</b>	<b>HIGH RISK (rank 1)</b>	<b>YOUR RANK</b>
<b>LOCATION</b>					
<b>Distance from surface water or well.</b>	More than 200 feet.	100-200 feet.	50-100 feet.	Less than 50 feet.	_____
<b>Position in relation to surface water or well.</b>	Downslope from surface water. No lot runoff reaches surface water or well.	At grade with surface water. No lot runoff reaches surface water or well.	Upslope from surface water. High potential for lot runoff to reach surface water or well. Slope 1-2%.	<b>Upslope from surface water. Lot runoff reaches surface water. Slope &gt;3%.</b>	_____
<b>DESIGN AND MANAGEMENT</b>					
<b>Surface water diversion.</b>	All surface runoff and roof water is diverted.	Surface runoff is diverted. Roof water collected or diverted.	No surface water diverted. Roof water is not diverted.	All surface and roof water runs through the yards.	_____
<b>Lot runoff control system.</b>	No yard runoff, stock kept inside a barn or in a curbed area under roof.	Most runoff collected from curbed lot and directed into a holding facility. Any overflow is directed to filter strips.	Lot runoff is collected by earthen ditches. No filter strips used. Overflow occurs after heavy precipitation.	<b>Lot runoff is not collected and is not controlled.</b>	_____
<b>Yard cleaning or scraping practices.</b>	Daily.	Weekly.	Monthly.	Rarely. Two to three times per year or less.	_____
<b>Milking center waste water.</b>	Waste water delivered directly to liquid manure storage or treatment system..	Waste water drains outside to grassed area.	Waste water drains outside to ditch or area with no vegetation.	<b>Wastewater drains directly to a ditch or water source.</b>	_____

## **Action Plan Based on Activities of Concern from Livestock Yards Management**

1. List any **individual activities** or structures that you ranked as “2” (moderately high risk) or “1” (high risk).
2. For each activity you listed, fill in the “**response options**” and “**taking action**” sections.

**Response options:** Check one of the two boxes: either “immediate action possible” or “further planning required.” This should be a quick assessment of whether the response will require a change in practice that can be achieved relatively easily at little cost or whether it requires major effort and money.

**Taking action:** Decide right now on a possible first step to begin to address each concern listed. It might be as simple as making a first phone call to get information. It is important to take an initial step to begin to address each of the moderately-high and high risk concerns you have listed.

Keep this list handy and refer to it often. It provides important information for you as you plan how to more effectively protect surface and ground water.

<b>Individual activity identified as moderately high risk (2) or high risk (1)</b>	<b>Response Options (check one)</b>		<b>Taking Action (proposed first step to address concern)</b>
	Immediate action <sup>(a)</sup>	Further planning required <sup>(b)</sup>	

(a) Change in practice only; cost is not a factor

(b) Requires major structural improvement or relocation, major effort or high cost

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