



## Assessing Your Fertilizer Storage and Handling

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The goal of this *Farm•A•Syst* factsheet is to help you protect and improve the groundwater that supplies your drinking water as well as the ponds, lakes, rivers, and streams that make Tennessee beautiful.

The following questions are designed to help you pinpoint potential problem areas on your farmstead. These problem areas may contribute to the contamination of your drinking water if they are not managed properly.

If your answer to any of these questions is YES, or if you don't know the answer, you may have a high-risk situation in your home or on your farmstead. Refer to the fact section with the same number as that question (under the heading, "**What you should know about . . .**") for more information.

Don't be alarmed if you answer YES to many or even all of these questions. That does not automatically mean you have a water-quality problem. It may,

YES	NO	
<input type="checkbox"/>	<input type="checkbox"/>	1. Are fertilizers stored on your farmstead?
<input type="checkbox"/>	<input type="checkbox"/>	2. Are stored fertilizers kept on soil, a wood floor, or another permeable surface (capable of letting water pass through)?
<input type="checkbox"/>	<input type="checkbox"/>	3. Are the tags or labels on some bags, bins, or liquid storage tanks hard to read, faded, or missing?
<input type="checkbox"/>	<input type="checkbox"/>	4. Is fertilizer stored in tanks that are designed for other purposes?
<input type="checkbox"/>	<input type="checkbox"/>	5. Is the storage area open and accessible to children, livestock, or pets?
<input type="checkbox"/>	<input type="checkbox"/>	6. Do you load or store fertilizers closer than 100 feet to or upslope from your water well?
<input type="checkbox"/>	<input type="checkbox"/>	7. If water is used in a tank mix with fertilizer, does the water come directly from the well via a hydrant and hose?
<input type="checkbox"/>	<input type="checkbox"/>	8. Does the person overseeing the loading site ever leave the site during filling, even for a short period of time?
<input type="checkbox"/>	<input type="checkbox"/>	9. Are any rinsates from application equipment dumped instead of being applied in the field?

however, tell you that change is needed to avoid potential problems. In the same way, answering **NO** to every question does not mean you are *not* at risk.

## Why should you care?

**Groundwater** is the underground water that supplies wells and springs and recharges surface water bodies. It is the source of drinking water for many Tennesseans. Up to 20 million gallons of groundwater may be stored under the typical farmstead—stored within 100 feet below fertilizer and pesticide storage areas, fuel tanks, livestock pens, and septic systems, all potentially major sources of pollution. The management decisions you make on your farmstead can significantly affect the quality of your drinking water and your family’s health. These decisions can also affect your potential legal liability and the value of your property.

**Surface water** includes bodies such as ponds, lakes, rivers, and streams. Besides their aesthetic and recreational value, they are often an important source of drinking water for livestock.

Fertilizers play a vital role in agriculture. The major components of commercial fertilizer are nitrogen, phosphorus, and potassium. Of these three, nitrogen, in the chemical form of nitrate, most easily **leaches** (moves *with water* down through the soil) to groundwater. The improper handling of fertilizers can affect surface and groundwater by allowing nitrate to seep through the soil after a leak or spill.

Nitrate levels in drinking water above federal and state drinking-water standards of 10 parts per million (ppm) may pose a risk to infants. Infants under the age of six months are particularly susceptible to health problems from high nitrogen levels; nitrate may also affect adults, but the evidence is much less conclusive. While it is possible that livestock can tolerate nitrogen concentrations several times the 10-ppm level, levels of 20 to 40 ppm may be harmful under certain conditions, especially in combination with high levels of nitrate from feed sources.

If very small amounts of fertilizers are stored on your farm, there is little danger of groundwater contamination. The risk increases as more fertilizers are stored for longer periods of time. It is best to reduce both the amount of fertilizer you store and the amount of time you store it, if possible. Using good manage-

ment practices during fertilizer handling will further protect groundwater.

*Farm•A•Syst* is only for your own use and benefit. It is a voluntary program intended to provide general information about protecting and improving water quality. Information from a *Farm•A•Syst* assessment will not be collected by Extension or any other outside agency and should remain in your private records.

## What you should know about . . .

### 1. Fertilizer storage

If fertilizers are stored on your farmstead, there is always a possibility of surface or groundwater contamination if they are not managed carefully. Closely evaluate where fertilizers are stored—on what type of surface, how close to your well, etc. A few precautions taken now can prevent costly accident cleanup later.

If you never store fertilizer on your farmstead, you are not at risk.

### 2. Storage surface

Storing fertilizers, especially in liquid form, on a permeable surface increases the likelihood of groundwater contamination. Impermeable surfaces like concrete or asphalt with **berms** (earthen mounds or walls) and **sumps** (drainage pits) should be installed under liquid storage tanks.

### 3. Container labels

Clearly label all fertilizers as you put them into storage. Be sure that the labels and tags are attached and easy to read—without adequate labeling, it is difficult to use these stored products safely. Keep an inventory of all fertilizers you store.

Fertilizer bags slowly degrade in storage. The longer they are stored, the higher the probability that holes or tears will develop. Reducing the length of time fertilizers are stored also reduces the risk of labels becoming faded and unreadable.

### 4. Tank design

If your fertilizer storage tank is not designed to store fertilizers, extreme caution must be used. Fre-

quent monitoring of the tank is essential. Because fertilizers can be **corrosive** (that is, they tend to weaken or destroy their containers by reacting chemically with them), an uncoated metal tank can leak after only a short period of time.

It is best to use tanks designed only for fertilizer storage. Reducing storage time will further protect groundwater from contamination from leaking fertilizer storage tanks. Tanks should be located in a roofed storage area and should not have any leaks or patches.

### 5. Storage security

All fertilizers should be stored away from children, livestock, and pets. Putting up an adequate fence and locking access doors will help prevent damage to stored fertilizer containers and prevent accidents.

Many fertilizers are toxic. Livestock are sometimes poisoned by fertilizers that are accidentally mixed into feed. In most cases this occurs because fertilizers and feed supplements are stored together. Placing all fertilizers in a separate, secure storage area prevents such accidents from occurring.

### 6. Loading location

Fertilizer spills can easily occur during loading. It is very important to locate the loading site as far as possible from the farmstead water well. The loading site should be at least 100 feet from the well, and downhill if at all possible.

### 7. Water-well protection

If you mix fertilizers with water or herbicides, protecting your water well should be your top priority.

The best way to protect your well is to have a separate tank to supply water for the mixing process. A separate tank with an air gap between the water line from the well and the top of the tank protects the well from **backflow** during the filling process. Backflow is the reverse flow of a liquid caused by the sudden creation of a vacuum, much like sucking water through a straw. If the well pump shuts off while you are filling, backflow can suck the mixture back into the well through the hose.

If the water comes directly from a hydrant and hose, your well is at risk of becoming contaminated if backflow occurs during filling. The only way to prevent this is to maintain a six-inch air gap between the end of the hose and the top of the tank, or to install an

anti-backflow device on the faucet. The end of the hose must *never* be allowed below the surface of the liquid in the fertilizer tank.

### 8. Loading supervision









The loading site must be under *constant* supervision when materials are being mixed or transferred. Leaving the site, even for a few minutes to have a sandwich or make a phone call, increases the risk of spills or other contamination occurring. It only takes one spill to contaminate your water supply.

### 9. Rinsate disposal

Dispose of all **rinsate** (rinse water) back on the field that was just fertilized. If herbicides are used in the mix, take care that rinsates are applied only to crops on the herbicide label. Some crops are intolerant of even very low concentrations of particular herbicides; applying rinsate to these crops could result in total crop loss.

Never pour rinsate down a drain or on the gravel driveway of your farmstead. Safely dispose of rinsate by applying it to the appropriate crop.

## Remember:

-  If possible, avoid storing fertilizers at all. Use up as much as you can, or share leftovers with others. If you must store fertilizers, do so for as short a time as possible.
-  Store dry fertilizers above liquid ones to avoid wetting from spills.
-  Store fertilizers, especially liquids, on an impermeable surface such as concrete or asphalt.
-  Make sure all bags and containers are clearly labeled.
-  Use only storage tanks designed specifically to store fertilizers. If you must use another type of tank, monitor it closely to be sure it isn't leaking.
-  Secure fertilizers from livestock, pets, and children. Put up a fence if necessary.
-  Load fertilizers at least 100 feet from the well, and downslope if possible.
-  Use a separate tank to provide water for mixing fertilizers instead of using a hose directly from the well.

- When filling a tank, maintain an air gap of at least six inches between the end of the hose and the liquid level in the tank to prevent backflow.
- Install anti-backflow devices on your faucets.
- Make sure the loading site is under constant supervision while you are transferring or mixing fertilizers.
- Dispose of all rinsate on the field being fertilized, or save as mixing water for later loads.
- Never pour rinsate down a drain or on a gravel surface.

## If you want more information . . .

### Contact:

- Your county Extension office
- Your fertilizer dealer
- U.S. Environmental Protection Agency's Safe-Drinking-Water Hotline (M-F, 8:30 a.m.-5:00 p.m. EST) (800)426-4791
- Tennessee Department of Environment and Conservation  
Division of Water Pollution Control  
401 Church Street  
L&C Tower, 6th Floor  
Nashville, TN 37243-1534  
(615)532-0625

### Read:

*Nitrogen and Water Quality*. PB 1354.  
*Nitrogen Management in Agriculture and Water Quality*. PB 1355.

These publications are available from your University of Tennessee Agricultural Extension Service county office.

### Download:

These sites on the World Wide Web (WWW) are good places to start when browsing the Internet for information about water quality:

- <http://funnelweb.utcc.utk.edu/~utext>  
(University of Tennessee Agricultural Extension Service)
- <http://www.epa.gov>  
(U.S. Environmental Protection Agency)
- <http://www.usda.gov>  
(U.S. Department of Agriculture)
- <http://h2o.usgs.gov>  
(U.S. Geological Survey)
- <http://wwwdtnsh.er.usgs.gov>  
(Tennessee division of USGS)
- <http://hermes.ecn.purdue.edu:8001/server/water/water.html>  
(Nation Extension Water Quality Database Website, Purdue University)

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Billy G. Hicks, Dean