Worksheet #1
Assessing the Risk of Groundwater Contamination from

Drinking Water Well Condition

Why should I be concerned?

About 95 percent of this country's rural residents use groundwater to supply their drinking water and farmstead needs. Wells are designed to provide clean water. If improperly constructed and maintained, however, they can allow bacteria, pesticides, fertilizer or oil products to contaminate groundwater. These contaminants can put family and livestock health at risk.

There are documented cases of well contamination from farmstead activities near drinking water wells. The condition of your well and its proximity to contamination sources determine the risk it poses to the water you drink. For example, a cracked well casing allows bacteria, nitrates, oil and pesticides to enter the well more easily. A spill of pesticides being mixed and loaded right near the well could result in the contamination of your family's drinking water supply. Feedlots, barn yards, septic systems, fertilizer applications and waste storage areas could release large amounts of nitrate, contaminating your well.

Preventing well water contamination is very important. Once the groundwater supplying your well is contaminated, it is very difficult to clean up. The only options may be to treat the water, drill a new well, or obtain water from another source. A contaminated well can also affect your neighbors' wells, posing a serious health threat to your family and neighbors.

The goal of Farm·A·Syst is to help you protect the groundwater that supplies your drinking water.

How will this worksheet help me protect my drinking water?

·It will take you step by step through your drinking water well condition and management practices.
·It will rank your activities according to how they might affect the groundwater that provides your drinking water.
·It will provide you with easy-to-understand rankings that will help you analyze the risk level of your drinking water well condition and management practices.
·It will help you determine which of your practices are reasonably safe and effective, and which practices might require modification to better protect your drinking water.

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Glossary
Drinking Water Well Condition

These terms may help you make more accurate assessments when completing Worksheet #1. They may also help clarify some of the terms used in Fact Sheet #1.

Abandoned well: An unused or inoperative well. Unused/abandoned wells and springs should be permanently closed for safety and vandalism reasons.

Air gap: An air space (open space) between the hose or faucet and water level, representing one way to prevent backflow of liquids into a well, holding tank or water supply.

Anti-backflow (anti-back siphoning) device: A check valve or other mechanical device to prevent unwanted reverse flow of liquids back down a water supply pipe.

Casing: Steel or plastic pipe installed while drilling a well, to prevent collapse of the well bore hole and entrance of contaminants, and to allow placement of a pump or pumping equipment.

Contamination sources: Potential sources of water contamination.

Cross-connection: Any physical connection or arrangement between two otherwise separate piping systems, one of which contains potable water and the other contains water of unknown or questionable safety, steam, gases or chemicals whereby there may be a flow from one system to the other.

Drilled wells: Any hole that is drilled or bored used to extract groundwater. These wells are normally 4 to 8 inches in diameter.

Driven-point (sand point) wells: Wells constructed by driving lengths of pipe into the ground with equipment or by hand. These wells are usually smaller in diameter (2 inches or less), less than 30 feet deep, and can be installed in areas of relatively loose soils, such as sand.

Dug wells: Large-diameter wells often constructed by hand or by backhoe. These wells are lined with stone, concrete tiles or corrugated pipe.

Groundwater: Subsurface water in a zone of saturation.

Separation distances: The minimum recommended distances between the well and contamination sources; for example manure should have a separation distance of 100 feet.

Spring: A groundwater source which naturally discharges to the surface.

Water table: The upper level of groundwater in a zone of saturation. Fluctuates with season of the year, climatic conditions on land surface, and with aquifer discharge and recharge rates.

Well cap (seal): A device used to cover the top of a well casing pipe.

Vermont Farm*A*Syst
Drinking Water Well Condition

Resource Concern	Rank 4	Rank 3	Rank 2	Rank 1	Field Number
					☐☐☐☐☐
LOCATION					
Position of drinking water well in relation to pollution sources	Up slope from all pollution sources. No surface water runoff reaches well. Surface water diverted from well.	Up slope from or at grade with pollution sources. No surface water runoff reaches well.	Downslope from pollution sources. Some surface water runoff may reach well.	Settling or depression near casing. Surface water runoff from livestock yard (such as barnyards or feedlots), pesticide and fertilizer mixing area, fuel storage or farm dump can reach well.	☐☐☐☐☐
Separation distances between well and farmstead contamination sources[1]	Meets or exceeds all state minimum required separation distances.	Meets more than half of separation distances for contamination sources.	Meets minimum separation distances for less than half of the contamination sources.	Does not meet any minimum separation distances for contamination sources.	☐☐☐☐☐
Soil type for area around well	Fine-textured soils (clay loams, silty clay). Water table or fractured bedrock deeper than 20 feet.	Medium-textured soils (silt loam, loam). Water table or fractured bedrock deeper than 20 feet.	Medium- or coarse-textured soils. Water table or fractured bedrock deeper than 20 feet.	Coarse-textured soils (sands, sandy loam). Water table or fractured bedrock shallower than 20 feet.	☐☐☐☐☐
Water table and depth to bedrock	Water table or fractured bedrock deeper than 20 feet.	Water table or fractured bedrock deeper than 20 feet.	Water table or fractured bedrock deeper than 20 feet.	Water table or fractured bedrock shallower than 20 feet.	☐☐☐☐☐
CONDITION					
Condition of casing and well cover (seal)	No holes or crack. Cap tightly secured. Screened vent.	No defects visible. Well vented but not screened.	No holes or cracks visible. Cap loose.	Holes or cracks visible. Cap loose or missing. Can hear water running.	☐☐☐☐☐
Casing depth	Cased more than 100 feet below water level in your well.	Cased 31-100 feet below water in your well.	Cased 10-30 feet below water level in your well.	Cased less than 10 feet below water level in your well. No	☐☐☐☐☐

[1]Separation distances vary from practice to practice: Manure Stacking 100', Herbicide Application 50', Pesticide Mixing 200', Rights of Way (highway, rail road, utility) 100'.

				casing.	
Casing height above land surface	More than 18 inches above grade (ground level).	12 - 18 inches above grade.	Less than 12 inches above grade.	Below grade or in pit or basement.	☐ ☐ ☐ ☐ ☐
Well Age	Less than 20 years old.	21-50 years old.	51-70 years old.	More than 70 years old.	☐ ☐ ☐ ☐ ☐
Well type	Municipal or town water supply	Drilled	Dug well	Driven-point (sand point)	☐ ☐ ☐ ☐ ☐
MANAGEMENT					
Backflow and cross contamination prevention	Anti-backflow devices (such as check valves) installed on all faucets with hose connections. No cross-connections between water supplies.	Anti-backflow devices installed on some faucets with hose connections.	No anti-backflow devices. Air gap maintained.	No anti-backflow devices. Air gap not maintained. Cross-connections between water supplies.	☐ ☐ ☐ ☐ ☐
Abandoned or unused well	No abandoned, unused, unsealed wells.	Abandoned or unused wells are capped and protected.	Abandoned or unused, unsealed well in field. Not capped or protected.	Abandoned unused or unsealed well(s) directly on farmstead and unprotected.	☐ ☐ ☐ ☐ ☐
Water testing	At least annual testing of water. Consistent satisfactory results for bacteria, nitrate and other tests meet standards.	Bacteria, nitrate and other tests frequently meet standards.	Bacteria, nitrate and other tests frequently do not meet standards.	No water tests done. Water discolored after rainstorms or during spring thaw or noticeable changes in color, clarity, odor or taste.	☐ ☐ ☐ ☐ ☐

What do I do with these rankings?

Step 1: Begin by determining your overall well management risk ranking. Total the rankings for the categories you completed and divide by the number of categories you ranked:

_____ divided by _____ equals *	
Rankings total from previous page	number of risk ranking categories ranked (11 if ranked all)

*Carry your answer out to one decimal place.

Example:
26 ÷11 = 2.36
Use 2.4.

Risk Ranking	Description
3.6 - 4.0 =	low risk
2.6 - 3.5 =	low to moderate risk
1.6 - 2.5 =	moderate to high risk
1.0 - 1.5 =	high risk

This ranking gives you an idea of how your well condition, **as a whole**, might be affecting your drinking water. This ranking should serve only as a **very general guide, not a precise diagnosis.** Because it represents an **averaging** of many individual rankings, it can overlook any **individual** rankings (such as 1's or 2's) that should be of concern. (Step 2 will focus on individually ranked activities of concern.)

Enter your boxed well condition ranking in the appropriate place in the table on the front of Worksheet #12. Later you will compare this risk ranking with other farmstead management rankings. Worksheet #11 will help you determine your farmstead's site conditions (soil type, soil depth, and bedrock characteristics), and worksheet #12 will show you how these site conditions affect your risk rankings.

Step 2: Look over your rankings for individual activities.

- **4's - Best:** low-risk practices
- **3's - Provide reasonable groundwater protection:** low- to moderate-risk prac-tices
- **2's - Possibly inadequate protection:** moderate- to high-risk practices
- **1's - Inadequate protection with relatively high groundwater contamination risk:** high-risk practices

Regardless of your overall risk ranking, any individual rankings of "1" require immediate attention. You can take care of some of the concerns right away; others could be major or costly projects, requiring planning and prioritizing before you take action.

Find any activities that you identified as 1's and list them under "High-Risk Activities"on Worksheet #12.

Step 3: Read Fact Sheet #1, "*Improving Drinking Water Well Condition*," and give some thought to how you might modify your farmstead practices to better protect your drinking water.

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