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## Assessing the Risk of Groundwater Contamination from Household Wastewater Treatment

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### Why should I be concerned?

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Virtually all farms use a septic system or similar onsite wastewater treatment system. While these systems are generally economical and safe, household wastewater can contain contaminants that degrade water quality for such uses as drinking, stock watering, food preparation and cleaning.

Potential contaminants in household wastewater include disease-causing bacteria, infectious viruses, household chemicals, and excess nutrients, such as nitrate. Viruses can infect the liver, causing hepatitis. They can also infect the lining of the intestine, causing gastroenteritis (vomiting and diarrhea). If coliform organisms (a group of indicator bacteria) are found in your well water, they show that the water is potentially dangerous for drinking and food preparation. Your septic system is one potential source, along with livestock yards and others.

The **quantity** of wastewater can also present an environmental concern. Too much water entering the home treatment system reduces the efficiency of the system and can shorten its life.

Your drinking water is least likely to be contaminated if you follow appropriate management procedures or dispose of wastewater in any location that is **off the farm site**. However, proper offsite disposal practices are essential to avoid risking contamination that could affect the water supplies and health of others.

**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?

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- It will take you step by step through your household wastewater treatment practices.
- It will rank your activities according to how they might affect the groundwater that provides your drinking water supplies.
- It will provide you with easy-to-understand rankings that will help you analyze the “risk level” of your household wastewater treatment 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.

### 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 this worksheet and figure out your ranking.

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Information derived from 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.

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# Glossary

## **Household Wastewater Treatment**

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*These terms may help you make more accurate assessments when completing Worksheet #6. They may also help clarify some of the terms used in Fact Sheet #6.*

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**Approved disposal site:** A site for land application of wastewater or tank pumpage that meets state standards and is approved by the New Mexico Environment Department.

**Cesspool:** Covered excavation in the ground that receives sewage directly from a building's sanitary drainage system. It is designed to retain the organic matter and solids and permit liquid to seep into soil cavities. Cesspools are prohibited in New Mexico.

**Clear water infiltration:** Entry of water into a system that does not need treatment, such as rainfall or tile drainage, through unsealed joints, access ports and cracks.

**Design capacity:** Maximum volume of liquid that can be treated in a particular wastewater treatment system. For systems that include subsurface wastewater disposal and distribution, capacity is also based on the soil's ability to accept and treat sewage effluent. In filling out the worksheet, if you don't know the design capacity of your system, use 150 gallons per bedroom per day as an estimate.

**Effluent:** Liquid discharged from a septic tank or other treatment tank.

**Holding tank:** An approved watertight receptacle for the collection and holding of sewage.

**Hydraulic loading rate:** The volume of waste discharged per unit area per unit time.

**Off-site disposal:** Disposal of wastewater or sludge off the farm, as at a municipal treatment plant or approved disposal site.

**Scum:** Floatable solids, such as grease and fat.

**Seepage pit (dry well):** Underground receptacle constructed to permit disposal of septic tank effluent, treated wastes or clear wastes by soil absorption through its bottom and walls.

**Sludge:** Settleable, partially decomposed solids resulting from biological, chemical or physical wastewater treatment.

# Household Wastewater Treatment: Assessing Drinking Water Contamination Risk

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.) For categories separated by "OR," choose only one category.

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.
5. Allow about 15-30 minutes to complete the worksheet and figure out your risk ranking for household wastewater treatment practices.

	RANK 4	RANK 3	RANK 2	RANK 1	YOUR RANK
<b>Quantity of wastewater</b>	Conservative water use (less than 20 gallons per person per day). Good maintenance of water-conserving fixtures. Whole house use is less than design capacity.*	Moderate water use (20-60 gallons per person per day). Fair maintenance of fixtures. Some water conservation fixtures. Water softener recharges twice a week or less. Whole house use is near design capacity.*	High water use (60-120 gallons per person per day). Poor maintenance of fixtures. Water softener recharges more than twice a week. Whole house use occasionally exceeds design capacity.*	Excessive water use (greater than 120 gallons per person per day). Leaking fixtures. No water-conserving fixtures. Whole house use frequently exceeds design capacity.*	_____

<b>Quality of wastewater</b>					
<b>Settleable solids</b>	No use of garbage disposal unit in kitchen sink.	Minimal use of garbage disposal unit (1-2 times per week).	Moderate use of garbage disposal unit (3-5 times per week).	Daily use of garbage disposal unit.	_____
<b>Dissolved solids</b>	Minimal use of household chemicals (cups per week). No disposal of solvents and toxic cleaning agents. No water softener, or not recharged on site.	Careful use of household chemicals (pints per week). Minimal disposal of solvents and toxic cleaning agents. Water softener used, recharged on site.	Moderate use of household chemicals (quarts per week). Moderate disposal of solvents and toxic cleaning agents.	Extensive use of household chemicals (gallons per week). Extensive disposal of solvents and toxic cleaning agents.	_____

<b>Floatable solids</b>	No disposal of grease or oils into sewer. Domestic wastes only.	Minimal disposal of grease or oils. Oil and grease wiped from cooking utensils before washing.	Moderate disposal of grease or oils. No attempt to reduce disposal of grease and oil from household, but little generated.	Extensive disposal of grease or oils.	_____
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\* If design capacity of your treatment system is unknown, estimate at 150 gallons per bedroom per day.

	RANK 4	RANK 3	RANK 2	RANK 1	YOUR RANK
<b>Collection of wastewater</b>	All wastewater collected for treatment. No clear water collected. No leakage loss of water that should be treated. No settling of soil near tank or collection system. Collection system (pipe) more than 50 feet from well.	All wastewater collected for treatment. Some clear water collected. No leakage loss of water that should be treated.	Some wastewater diverted, and clean water infiltration. <b>Some leakage of water that should be treated</b>	Clear water infiltration. <b>Leakage loss of water that should be treated. Collection system (pipe) less than 50 feet from well.**</b>	_____
<b>Pretreatment system:</b>					
<b>Cesspool</b>	_____	_____	_____	<b>Any cesspool or direct discharge of water.</b>	_____
<b>OR</b>					<b>OR</b>
<b>Septic tank</b>	_____	Serial tanks or added solids retention system. No leakage. Pumped at least every 3 years and maintained. Baffles checked. Tanks checked; no leakage.	Single tank. Pumped at 4-6 year intervals.	<b>Leakage losses.</b> Pumped at greater than 7-year interval. <b>Less than 50 feet from well.** Less than 4 feet from saturation or bedrock.</b>	_____
<b>OR</b>					<b>OR</b>
<b>Packaged aerobic system</b>	Maintenance program followed. Loaded at less than design capacity.*	No mechanical failures. Loaded near design capacity.*	Occasional failures.	Frequent system failure. Load exceeds design capacity.*	_____
<b>OR</b>					<b>OR</b>
<b>Holding tank</b>	Not filled to capacity at usual pumping interval. More than 50 feet downslope from well. No leakage.	Filled to capacity at pumping interval. More than 50 feet up-slope from well. No leakage.	<b>Occasional overflow or leakage</b>	<b>Less than 50 feet from well.** Leakage losses</b> Upslope from well.	_____

**Boldface type:** Besides representing a higher-risk choice, this practice also violates New Mexico law.  
 \* If design capacity of your treatment system is unknown, estimate at 150 gallons per bedroom per day.  
 \*\* Illegal for new well installation. Existing wells must meet generation requirements in effect at time of construction.

	RANK 4	RANK 3	RANK 2	RANK 1	YOUR RANK
<b>Additional treatment (all systems)</b>	Aeration, denitrification, filtration and disinfection.	Aeration and/or denitrification.	Filtration and/or disinfection.	No additional treatment.	_____
<b>Disposal of wastewater</b>					
<b>Subsurface application</b> (septic system or other treatment systems)	Offsite disposal.	Pressure or gravity-fed distribution to trench system.	Bed or seepage pit.	<b>Field or silo tile drainage system. Pipe to surface.</b>	_____
<b>OR</b>					
<b>Surface disposal system</b> (constructed wetlands, evaporation beds)	Offsite disposal.	Well maintained, no overflow or leakage..	<b>Some leakage</b> , little maintenance.	<b>Liner badly damaged or not present, leakage losses.</b> No maintenance.	_____
<b>Horizontal separation of waste-water disposal site from water supply</b> (subsurface or surface)	Offsite disposal.	Subsurface disposal downslope more than 100 feet from private well, more than 200 feet from public well.	<b>Subsurface disposal downslope less than 100 feet from private well, less than 200 feet from public well.</b>	Upslope from well.	_____
<b>Vertical separation of waste-water disposal site from water supply</b> (subsurface)	Offsite disposal.	More than 6 feet to saturated soil, coarse material (gravel) or bedrock.	More than 4 feet to saturated soil, coarse material (gravel) or bedrock.	<b>Less than 4 feet to saturated soil or bedrock.</b>	_____
<b>Application rate</b> (Subsurface or surface disposal)	Offsite disposal.	Below design capacity.	At design capacity.	Above design capacity.	_____
<b>Soils</b>	Offsite disposal.	Medium- or fine-textured soils (silt loam, clay loams).	Medium- to coarse-textured soils (sandy loam, sands).	Very coarse sands or gravel.	_____

**TOTAL**

**Boldface type:** Besides representing a higher-risk choice, this practice also violates New Mexico law.

Use this total to calculate risk ranking on back page of worksheet.

## What do I do with these rankings?

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

$$\frac{\text{total of rankings}}{\text{\# of categories ranked}} \text{ divided by } \frac{\text{\# of categories ranked}}{\text{\# of categories ranked}} \text{ equals } \boxed{\text{risk ranking}}^*$$

\*Carry your answer out to one decimal place.

**3.6–4=low risk   2.6–3.5=low to moderate risk   1.6–2.5=moderate to high risk   1–1.5=high risk**

This ranking gives you an idea of how your household wastewater practices **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 mask any **individual** rankings (such as 1's or 2's) that should be of concern. (See Step 2.)

**Enter your boxed household wastewater risk ranking on page W12.1.** Later you will compare this risk ranking with other farmstead management rankings. Worksheet #11 will help you identify 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:

- Low-risk** practices (4's): ideal; should be your goal despite cost and effort
- Low-to-moderate-risk** practices (3's): provide reasonable groundwater protection
- Moderate-to-high-risk** practices (2's): inadequate protection in many circumstances
- High-risk** practices (1's): inadequate; pose a high risk of polluting groundwater

Regardless of your overall risk ranking, any individual rankings of "1" require immediate attention. Some concerns you can take care of 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 pages W12.6-W12.7 of Worksheet #12.**

**Step 3:** Read Fact Sheet #6, *Improving Household Wastewater Treatment*, and consider how you might modify your farmstead practices to better protect your drinking water.