

Maine Farm-A-Syst

Farmstead Assessment System

Worksheet 11

Assessing the Risk of Groundwater Contamination from Irrigation Wells

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 your family, your livestock, and your neighbor's health at risk.

There are documented cases of well contamination from farmstead activities. The condition of your well and its proximity to contamination sources determine the risk it poses to the water you drink. For example, if there isn't a backflow system in place for chemigation it is far too easy for chemicals to contaminate well water.

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 the drinking water for you, your neighbors, and the public. It is not used for, nor is it related to, any type of enforcement action from any agency.

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 supplies.
- ◆ 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 you fill out the worksheets?

Focus on the well that provides drinking water for your home or farm. If you have more than one drinking water well on your farmstead, fill out a worksheet for each one.

- ◆ Use a pencil. You may want to make changes.
- ◆ 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.)

- ◆ 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.”
- ◆ Directions on overall scoring are explained in the next section “What do you do with the rankings?”
- ◆ Allow between 20-45 minutes to complete the worksheet to figure out your risk ranking for management practices and complete the Farmstead Improvement Action Plan.

What do you do with the rankings?

Step 1: 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

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 & 2's and list them under “High Risk and Medium-High Risk Practices” in the Farmstead Improvement Action Plan section following the worksheet.

Step 2: Read Fact Sheet # 11, Irrigation Wells, and consider how you might modify your farmstead practices to better protect the public and your drinking water. This may help with filling out the Farmstead Improvement action Plan.

Step 3: Fill out the Farmstead Improvement Action Plan (FIAP). Contact your local Soil and Water Conservation District for technical assistance and help with the FIAP if needed.

Step 4: Implement the FIAP- Contact NRCS for possible designs and/or funding for practices. Funding availability depends on the practice installed and the current USDA farm programs.

Glossary Irrigation Wells

These terms may help you make more accurate assessments when completing Worksheet #11.

Abandoned well: A well, the use of which has been permanently discontinued and which has been decommissioned according to the rules and regulations of the Department of Health and Human Service section 504.0.

504.1 General Standards: Abandoned wells or boreholes shall be sealed in a manner appropriate to prevent the entry of contaminants and from the mixing of waters from separate water bearing zones.

504.2 Sealing: Well casings shall not be removed without the borehole in bedrock having been permanently sealed, using practices currently accepted by the water well industry.

504.3 Open borehole filling: Open boreholes shall be filled in a manner appropriate to prevent the possibility of personal injury, contamination of groundwater or future collapse of the area around the borehole.

504.4 Time frame: When a new well is to be drilled to replace a contaminated drilled well the abandoned well shall be sealed within a reasonable length of time, at the owner's expense. It shall be the responsibility of the driller to inform the homeowner of this action in writing. The notice shall be signed by both parties and shall include a statement of acceptance of these conditions by the homeowner as a requirement of remaining in compliance with these rules. Wells ordered abandoned by the commission shall be abandoned within thirty (30) days of the date of determination at the expense of the homeowner if the well has been found by the commission to be a threat to public health or contamination of groundwater or at the expense of the well driller if a determination is made by the commission that the well was installed in violation of any part of these rules.

Active well: A water well which is in use and is not an illegal well.

Annular space: The space between the wall of the drilled well and the outside of the well casing.

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

Aquifer: Saturated underground formations that will yield usable amounts of water to a well.

Backsiphonage: Backflow caused by formation of a vacuum in a water supply pipe.

Bentonite: A processed natural clay material that when hydrated will increase its volume more than seven times. It is commonly used in a mixture with water as a grout for sealing the annular space of a well.

Casing: Pipe (steel, plastic, or fiberglass) installed when a well is drilled to prevent collapse of the well bore hole and entrance of contaminants and to allow placement of a public or pumping equipment.

Decommissioning: The act of filling, sealing, and plugging a water well in accordance with the rules and regulations of the Department of Health and Human Services Regulation and Licensure.

Groundwater: Water that occupies voids, cracks, or other spaces between particles of clay, sand, gravel, or rock within the saturated formations.

Grout: A fluid mixture of cement and water (neat cement), cement and sand (sand cement), cement, sand and coarse aggregate (concrete), or bentonite and water used to form a permanent impervious watertight seal in the annular space of an active well or to seal an abandoned well.

Inactive water well: Any water well that is in a good state of repair and for which the owner has provided evidence of intent for future use by maintaining the well in a manner which meets the following requirements:

1. The water well does not allow impairment of the water quality in the water well or of the groundwater encountered by the water well.
2. the top of the water well or water well casing has a water-tight welded or threaded cover or some other water-tight means to prevent its removal without the use of equipment or tools to prevent unauthorized access. To prevent a safety hazard to humans and animals, and to prevent illegal disposal of wastes or contaminants into the water well.
3. The water well is marked so as to be easily visible and located and is otherwise marked so as to be easily identified as a water well and the area surrounding the water well is kept clear of brush, debris, and waste material.

Worksheet # 11

Irrigation Wells : Assessing Drinking Water Contamination Risk

	Low Risk (Rank 4)	Low-Mod Risk (Rank 3)	Mod-High Risk (Rank 2)	High Risk (Rank 1)	Your Rank
Well Location					
11.1 Position of well in relation to pollution sources	Upslope from all known pollution sources.	Slightly upslope or at same grade as potential pollution sources.	Downslope from potential pollution sources.	Downslope from known significant pollution sources.	_____
Topography of site	Surface water cannot reach or is diverted from site.	Surface water unlikely to reach site.	Some surface water may reach well site.	Surface water can reach the well site. Well is located in a depression.	_____
11.2 Well location in relationship to cropland	Location outside cropped area and no chemicals used adjacent to well.	Immediately adjacent to cropland but a chemical non-application buffer zone is maintained at well site.	Immediately adjacent to cropland on which ag chemicals are applied.	Located within cropland on which ag chemicals are applied.	_____
11.3 Type of cropping system used at well site	Crop rotation with little or no ag chemicals used (nutrients and pesticides).	Crop rotation used, integrated pest management and good fertility management practiced.	Some crop rotation with intensive pesticide and nutrient application or monoculture with integrated pest management and good fertility management.	Monoculture with intensive pesticide and nutrient application.	_____

	Low Risk (Rank 4)	Low-Mod Risk (Rank 3)	Mod-High Risk (Rank 2)	High Risk (Rank 1)	Your Rank
11.4 Soil and/or subsurface potential to protect groundwater	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- to 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.	_____

Well Construction

11.5 Surface protection at well site	Reinforced concrete platform around casing extends at last one foot beyond bore hole diameter. No cracking in platform.	Platform in place but does not extend beyond bore hole diameter.	Platform in place but is cracked.	No wellhead platform.	_____
11.6 Type of casing	New steel well casing will have a minimum wall thickness of .250 inches and plastic well casing shall be schedule 40 or heavier. *	_____	Concrete casing, joints not sealed.	No casing or casing is a source of pollution.	_____
11.7 Type of well construction	_____	Drilled	Driven	Dug	_____

Power Unit and Pump

11.8 Type of lubrication for turbine pump	Water lubrication.	Soybean-based oil lubrication.	Petroleum-based oil lubrication.	_____	_____
11.9 Type of energy	Electric.	_____	LP-propane Natural gas	Diesel Gasoline	_____

* Plastic well casing also must meet the standards for potable water use by the National Sanitation Foundation, including but not limited to PVC, CPVC, or ABS.

Low Risk
(Rank 4)

Low-Mod Risk
(Rank 3)

Mod-High Risk
(Rank 2)

High Risk
(Rank 1)

Your
Rank

Fuel Management for Internal Combustion Engine power units

11.10 Fuel storage tanks at well site	Regular fuel tank maintenance, secondary containment provided, inspection indicates no leaks or spills.	Inspection indicates no evidence of leaks or spills. No secondary containment.	No obvious leaks, but evidence of past leaks and spills. No secondary containment.	Obvious leaks and spills, fuel on soil surface, no vegetative growth. No secondary containment.	_____
11.11 Fuel tank location	More than 100 feet from well.	50-100 feet from well.	10-50 feet from well.	Less than 10 feet from well.	_____
11.12 Handling of used oil and filters	Used oil collected and recycled. Filters properly disposed.	_____	_____	Disposal at site on land surface.	_____

Chemical Storage and Handling in Relation to Well Site

11.13 Chemical storage and handling at well site	No chemical storage or handling at well site. (skip the next question.)	No storage at site. A mixing pad with containment is located at the site.	No storage at site. Mixing occurs at the site.	Chemicals stored at the well site. Mixing is done at the site; no backflow preventors on water supply.	_____
11.14 Chemical mixing and handling location in relationship to well site	Greater than 100 feet from well site.	50-100 feet from well site.	30-50 feet from well site.	Less than 30 feet from well site.	_____

	Low Risk (Rank 4)	Low-Mod Risk (Rank 3)	Mod-High Risk (Rank 2)	High Risk (Rank 1)	Your Rank
Chemical Application					
11.15 Method of chemical application at well site	Ground application with buffer area around well or well outside of chemical application area. (skip the next three questions.)	Ground application with no buffer area around well. (Skip the next three questions.)	Chemigation with antipollution equipment in place and operable.	Chemigation without anti-pollution equipment.	_____
11.16 Chemigation injection equipment and chemical storage tank location	Greater than 100 feet from well.	50-100 feet from well.	30-50 feet from well.	Less than 30 feet from well.	_____
11.17 Condition and monitoring of chemigation system (tanks, hoses, connections, etc.)	Equipment is inspected before each application. Secondary containment provided for tanks.	Not regularly inspected. Current inspection indicates no obvious past leaks. No secondary containment.	Some equipment is in place but not inspected before each application.	No equipment in place or equipment is inoperable.	_____
11.18 Irrigation management: When to irrigate and how much	Irrigation scheduling and amounts based on site specific crop and soil measurements and weather data.	Aware of crop water use information but do not routinely monitor field conditions. Amount applied is adjusted to fit crop water use.	Irrigations scheduled based on visual crop appearance and water stress indicators. Amount applied is not adjusted to fit crop water use.	No knowledge of crop water requirements or crop water use rates. Soil characteristics not considered in irrigation decision making.	
11.19 Chemigation anti-pollution equipment.	_____	All equipment required by regulation or recommended is in place and inspected before each application.	Some equipment is in place but not inspected before each application.	No equipment in place or equipment is inoperable.	_____

	Low Risk (Rank 4)	Low-Mod Risk (Rank 3)	Mod-High Risk (Rank 2)	High Risk (Rank 1)	Your Rank
11.20 Sprinkler application rate and soil intake rate	Sprinkler application rate less than the soil intake rate. No ponding occurs.	Sprinkler application rate about equal to the soil intake rate; some ponding occurs in low spots but no off-site movement.	Sprinkler application rate exceeds soil intake rate; some water moves off field surface and some ponding in low spots.	Sprinkler application rate greatly exceeds soil intake rate; considerable water movement over field surface.	_____

Other Considerations

11.21 Well age	Less than 20 years old.	21-50 years old.	51-70 years old.	More than 70 years old.	
11.22 Unused wells	No known inactive water wells near irrigation well site.	Unused wells near irrigation well site decommissioned in accordance with Maine law. All inactive wells near irrigation well site in usable condition and properly protected.	Unused well(s) near irrigation well site not sealed and decommissioned or placed into inactive status in accordance with Maine law. (See glossary for inactive status requirements.)	Unused water well (unused, unsealed well) near irrigation well site not decommissioned and sealed.	

Worksheet Section #	List High Risk and Med-High Risk practice(s)	Alternative Low Risk practice (Include potential sources of technical and financial assistance.)	Action Plan	
			Planned completion date	Indicate date when completed

I understand that this farmstead assessment (Farm-A-Syst) and corresponding Farmstead Improvement Action Plan were developed on the basis that I have disclosed, to the best of my knowledge, all information pertaining to my farmstead operations.

Farmstead address:

Street _____

City _____ ME, Zip code _____

Watershed name: _____

___ Aerial map with farmstead boundaries is attached

Producer's signature _____

Date ____/____/____

Farm-A-Syst conducted by:

Name _____

Title _____ Date ____/____/____

Acknowledgments

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