

# Guarding Our Groundwater

**Groundwater** is one of our most precious resources, although it is one we often take for granted. Groundwater supplies drinking water for our household use and feeds most of our lakes, rivers and streams. It is the “hidden water” resource. Protecting groundwater from contamination means protecting your family’s health, as well as the health of the lakes, rivers and streams we enjoy living by.

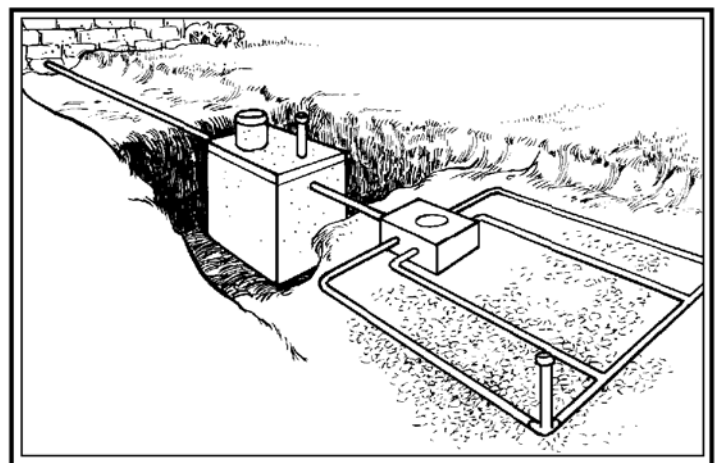
**Private Wells** - In Wisconsin, about two-thirds of all residents get their drinking water directly from groundwater, and an even higher percentage of shoreland property owners in northern Wisconsin have their own private wells. Don’t assume your well water is safe to drink! Private well owners are responsible for testing their own wells. Periodic testing is recommended (every one to three years). Sewage disposal systems, leaking underground fuel tanks, and improper disposal and use of household or agricultural chemicals are all possible sources of pollutants like bacteria, nitrate, pesticides, or other contaminants.

Many private wells on waterfront property are shallow because groundwater is often close to the surface near shores of lakes and streams. Shallow wells may be more susceptible to groundwater contamination than deep wells, and the sources of contamination can be on your own or your neighbor’s property. Deep wells can draw water that entered the ground farther away from the well, which may or may not be an advantage depending on what is located farther upslope. Sandy and gravelly soils, which are common throughout much of Wisconsin, allow groundwater and groundwater pollutants to flow very quickly. Areas with these soils are very susceptible to contamination.

Direction of groundwater flow can be critical. Some counties have groundwater contour maps available that illustrate, like a topographic map, the generalized direction of groundwater flow. For properties on drainage, drained or spring lakes, groundwater is often flowing toward the lake. On seepage lakes, groundwater may be flowing into the lake on one side, but away from the lake on the other. Groundwater flow direction can also vary seasonally, with water flowing into a lake during some times of the year, but flowing away from the lake at other times (common with some dammed lakes that experience high water level fluctuations). Although county-level groundwater contour maps provide a general idea of groundwater flow, the direction can differ because of local variations in groundwater recharge and discharge, and seasonal changes in groundwater flow.

According to state law, wells must be located at least 25 feet from a septic tank and 50 feet from a sewage system drain field. This distance alone however, won’t guarantee well water safety if the well is located down flow from the effluent discharge. Site your well upslope from any nearby septic drain fields. Many homes have some type of drinking water treatment system. In general, these are designed to remove compounds from the water such as iron or hardness (calcium and magnesium) that create aesthetic or taste problems. Most of these treatment systems will not remove contaminants that might be a health concern, such as nitrate or arsenic. If you are trying to treat your water for health reasons, make sure you understand what contaminants you are trying to remove and use an appropriate treatment device.

**Septic Systems** - Most waterfront homeowners in Wisconsin also utilize a private on-site wastewater treatment system, although some densely developed lakes have converted to public sanitary systems. Owners of private systems have a responsibility to protect their family’s health, as well as to protect surface and groundwater from contamination. Properly functioning systems are designed to remove most disease-causing human pathogens, but generally are not designed to remove or treat many water-soluble nutrients or pollutants. Recent research at the University of Wisconsin-Stevens Point on septic systems located in sandy soils has found both phosphorus and nitrates in contaminant plumes over 150 feet down gradient from drain fields. Aquatic weed growth and algae blooms in lakes and streams can result from these excess nutrients.



# Guarding Our Groundwater, continued

Private wastewater systems include conventional at-grade sewage systems (typically a septic tank with drain field), mound sewage systems (tank with elevated drain field), and holding tanks (requiring regular pumping and trucking for treatment). Additional options now permitted, such as aerobic digesters, recirculating sand filters, and other effluent filtration systems, may do a better job of treating wastes, and some might be designed to remove nutrients and other contaminants. These options could be considered at the time a replacement system is needed. Failed systems (is the grass greener over your septic system?) are especially harmful. Effluent from failed systems can result in direct contamination of well or surface water, and could cause serious human health risks.

**Household Hazards** - Household and other hazardous wastes are potential sources of groundwater contamination. Gasoline, oil, solvents, old paints, thinners, fertilizers, pesticides, cleaners, and many other products can cause groundwater and surface water pollution if not properly used, stored and disposed of. Old wells can be direct conduits for contaminants to flow into groundwater if they are not filled and abandoned properly. Underground or above ground fuel tanks are extra causes for concern as possible sources of pollution. Land use practices that limit impervious surfaces and infiltrate runoff can also help maintain the natural hydrologic cycle (see the *Controlling Runoff and Erosion* guide).

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## Guarding Our Groundwater - Assessing Your Property

Conduct a self-assessment of three major areas – your private well water system, your wastewater treatment system (septic system or sanitary system) and possible threats from hazardous household and yard chemicals. *Use arrows to mark the direction of groundwater flow through your property (if known).*

**Private Wells** – *Mark the location of your well and label it on the site map.*

Well type (check):  drilled (diameter of casing = \_\_\_\_\_ inches)  
 driven (sand point)  dug well  
Well depth: \_\_\_\_\_ feet  unknown  
Well age:  less than 20 years old  20-50 years old  more than 50 years old

Distance measured to septic tank: \_\_\_\_\_ feet (minimum 25 feet)  
Distance measured to septic drainfield: \_\_\_\_\_ feet (minimum 50 feet)

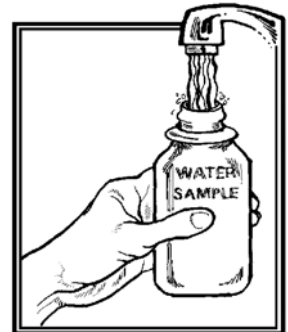
Date drinking water was last tested: \_\_\_\_\_ (month/day/year)  
Any prior known problems (bacteria, nitrate, etc.)? \_\_\_\_\_  
\_\_\_\_\_

Any observed problems (taste, odor, color, etc.)? \_\_\_\_\_  
\_\_\_\_\_

Any old wells on property? *(If so, mark location on map)*

	<input type="checkbox"/> properly filled with bentonite or cement	<input type="checkbox"/> not filled
Well cap:	<input type="checkbox"/> missing <input type="checkbox"/> present, but loosely fitting	<input type="checkbox"/> present and tightly attached
Well casing / pipe:	<input type="checkbox"/> cracks or holes visible	<input type="checkbox"/> no observable problems
	<input type="checkbox"/> casing is 12" or more above ground	<input type="checkbox"/> casing is less than 12" above ground

Water softener or other well water treatment device (specify): \_\_\_\_\_



# Guarding Our Groundwater - Assessing Your Property, cont.

**Septic Systems** – Draw and label the location of the septic or holding tank, extent of any drain field, mound system, etc. on the site map (locating the septic tank cover is very important anyway for pumping and inspection of the system!).

Type of system:  holding tank  septic tank (with:  drain field  mound  dry well)  
 other wastewater treatment device (specify): \_\_\_\_\_

Date last inspected: \_\_\_\_\_ (month/day/year)      Date last pumped: \_\_\_\_\_ (month/day/year)

Measure distance to shoreline from drain field: \_\_\_\_\_ feet (minimum 50 feet, more is better)

Evidence of malfunctioning sewage system:

- water ponding on surface
- backing up into drains / basement
- sewage odors in the home or yard
- biodegradable dye flushed through your system is detectable in the lake
- dense stand of aquatic plants along only your shoreline
- greener grass over drain field
- slow draining drains or toilets
- bacteria or elevated nitrate in well water test

## Household Hazards

Where do you store boat, lawn mower and other gas and oil? (leaking or spilled gas in a boat house is a much closer threat to the lake or stream than in the garage) \_\_\_\_\_

Do you regularly fill your boat motors away from the lake shoreline?  no  yes

Do you regularly purchase household hazardous substances: (choose one)

- only as much as needed for immediate project?
- usually have some left over from immediate project?
- usually have a lot left over that is stored indefinitely?

If you have left-over hazardous wastes, when was the last time you disposed of unused paints, thinners, solvents, cleaners, etc. at a hazardous waste collection? \_\_\_\_\_ (month/day/year)

Do you use any alternative cleaners such as baking soda and vinegar instead of more toxic products?

- no       yes (prevents failure of septic system as well as less hazardous for human exposure)

Do you use phosphorus-free soaps and cleaners, including dishwashing detergent? (check labels)  no  yes

Do you use low-flow showerheads and toilets?  no  yes

Do you use pesticides on your lawn or garden? (can leach pollutants into groundwater)  no  yes

Do you use phosphorus-free lawn and garden fertilizers?  no  yes (can prevent leaching phosphorus nutrients into groundwater, lake, and/or stream)

Any old or currently-used petroleum storage tanks on the property? (If so, mark location on map)

- above ground       below ground

# Guarding our Groundwater - Finding Solutions

Following are a few suggestions, strategies, alternatives, and ideas for ways you can maximize protection of your family's health and well being, while also protecting the quality of our groundwater and lake surface water.

## Private Wells

- Test your well water annually for bacteria and nitrate, for metals (lead, copper) if you have soft water, and for arsenic if you found some the first time you tested. Test more often if any problems are detected (such as elevated nitrates, chlorides, etc.). Well test kits are available through your county UW-Extension office. Take immediate action as recommended by the laboratory if any contaminants are found.
- Inspect your well casing for cracks or holes, and make sure the correct cap seal is tightly installed. Old well casings and well pumps may need replacing (before they fail in the middle of winter!).
- If you have a dug well, consider replacing it with a drilled or driven well.
- Find out what direction the groundwater is flowing through your property and identify any potential sources of groundwater contamination on your own or your neighbor's property that may affect the quality of groundwater flowing to your well. Reduce contamination risks by relocating or removing potential hazards.
- Properly abandon any unused wells on your property. Instructions are available at local DNR and UW-Extension offices.

## Septic Systems

- Inspect and have your system pumped a minimum of every three years, or more often if needed depending on the size of the system and quantity of use.
- Investigate installing and regularly maintaining an alternative septic treatment device such as a recirculating sand filter, aerobic treatment unit, effluent filter on the septic tank outlet, or other system to more effectively treat the wastewater.
- Protect the drain field. Avoid planting trees or shrubs, placing a swimming pool, piling logs, or driving heavy equipment or vehicles over the drain field.
- Minimize the amount of solid waste that flows into septic systems through garbage disposals or down the toilet.
- Avoid using caustic chemicals or other cleaners that harm the septic tank microbes. Do not pour hazardous materials down the drains including paints, solvents, acids, oils, and pesticides.
- Commit to conserving water. Reduce water usage by installing low-flow toilets and showerheads, taking shorter showers, repairing leaky faucets immediately, and doing only full loads in dishwashers and washing machines.  
Note: in soft water areas, however, run your water until it is cold before drawing water in a pitcher for drinking.

## Household Hazards

- Make a commitment to read product labels and choose the least hazardous material available, or select non-toxic alternatives.
- Purchase only the quantities needed for a specific job, and follow all safety precautions on the label.
- Store hazardous products out of the reach of children and in their original containers, properly sealed.
- Store boat gas and other petroleum products away from the water and in a structure with cement floor and good ventilation.
- Recycle your waste oil and antifreeze, and commit to disposing of other household hazardous wastes at local hazardous waste collections.
- Explore options for non-chemical pest controls.
- Only apply fertilizers for lawns and gardens after receiving recommendations from a soil test. Store these products safely in non-spill containers.

# Guarding our Groundwater - Action Plan Checklist

Using your property assessment and lists of possible alternative solutions, select action strategies for protecting your private well water, effectively treating your household wastewater, and minimizing your risks from household hazards. Consider where you may have the most impact on protecting both your groundwater and lake water resources. Enter the selected actions in the chart below and set a target date for when you hope to accomplish each of those actions.

Guarding Our Groundwater		Action Strategy	Target Date
Well Water	1.		
	2.		
	3.		
	4.		
	5.		
	Notes:		
Septic System	1.		
	2.		
	3.		
	4.		
	5.		
	Notes:		
Household Hazards	1.		
	2.		
	3.		
	4.		
	5.		
	Notes:		

**References:**

Home\*A\*Syst. Andrews, E. et al. 1997. Cooperative Extension, Ithaca, NY, NRAES-87.  
Life on the Edge. Dresen, M. and Robert Korth. 1997. University of Wisconsin-Extension, College of Natural Resources, UW-Stevens Point.  
Maintaining Your Septic System. 1990. Wisconsin Department of Natural Resources and UW-Extension, PUBL-WR-165.

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