



KY-A-Syst for the Home

Environmental Stewardship for Homeowners

Management of Wells for Drinking Water

Why Should You Be Concerned?

Wells are a source of drinking water for more than 200,000 homes in Kentucky and are intended to provide clean, safe drinking water from groundwater sources. (Figure 1 shows how the wells are distributed across the state.) However, improperly installed or poorly maintained wells can create a direct pathway for contaminants to enter the water supply. Contaminants such as fertilizers, pesticides, and bacteria often have no odor or color and are therefore hard to detect.

In addition to problems that can be caused by the wells themselves, over 50 percent of Kentucky's land contains sinkholes, large springs, or "sinking" streams. These areas, limestone regions known as karsts, are easily contaminated by impurities in runoff that directly enters groundwater supplies. This contaminated water then can enter your well water supply.

By managing your well and activities on or near your property, you can greatly reduce the risk of a contaminated water supply.

How Can KY-A-Syst Help?

A good understanding of your well is a step toward a protected water supply. This publication has been designed to help you better understand the factors that affect the condition of your well and how to take care of it. After you have read this publication, walk around your home and property and answer the questions in the boxes, circling the answers that best apply. Your answers will help you identify any potential problems.

If you answer all questions with choice A, you have few risks associated with your well for drinking water. If you answer any question with choice B, there may be a problem. If you answer any question with choice C, you will want to consider making changes. Use the action checklist in this publication to help you.

If you would like more help in assessing your management of your well for drinking water, contact your local office of the Cooperative Extension Service.

Well Location

Your well's location in relation to other components of your property or those near your property can determine some pollution risks. Where your well is located on the land surface is important, but the critical factor is where it is located in relation to potential sources of pollution. Wells located downhill



from a septic system, animal feeding lot, over-fertilized farm field, or leaking fuel storage tank have a greater risk of contamination than does a well located uphill from these pollution sources. Changing the location or depth of your well may protect your water supply, but any condition likely to cause groundwater contamination also should be addressed.

Where is your well located in relation to potential pollution sources?

- My well is uphill from all potential pollution sources. Surface water does not reach the well or is diverted.
- My well is level with or uphill from most potential pollution sources. Some surface water runoff may reach the well.
- My well is downhill from potential pollution sources or is in a pit or depression. Surface water runoff reaches the well.

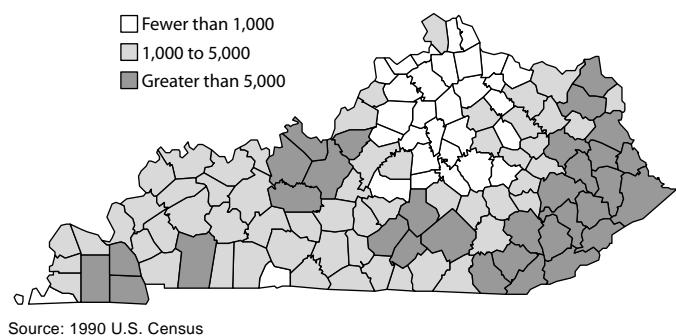
Subsurface Conditions

Contamination of groundwater is more likely if soils are shallow (a few feet above bedrock) or if they are highly porous (sandy or gravelly). A shallow soil increases risk of pollution because contaminants do not have far to travel before reaching groundwater. If bedrock below the soil is fractured so that water can seep down rapidly, the chance of groundwater contamination increases.

What are the subsurface conditions around your well?

- The water table or fractured bedrock is deeper than 20 feet.
- The water table or fractured bedrock is 15 to 20 feet deep.
- The water table or fractured bedrock is shallower than 15 feet.

Figure 1. Kentucky private well owners by county.



Age of Your Well

The age of your well is key to the likelihood of contamination. Wells built more than 50 years ago are more likely to be shallow and poorly constructed than those built recently. Older wells also are more likely to have thinner casings that may be cracked and likely to leak lubricating oils that can pollute the water. If your well is several years old, you may want to have it inspected for any possible defects.

What is the age of your well?

- A. My well is less than 20 years old.
- B. My well is 20 to 50 years old.
- C. My well is more than 50 years old.

Types of Wells

There are three basic types of wells—dug, driven-point, and drilled.

A dug well is a large-diameter hole that is usually more than 2 feet wide and often is constructed by hand. Dug wells are usually shallow and poorly protected from runoff of surface water.

Driven-point wells are constructed by driving lengths of pipe into the ground. These wells can be installed only in areas with loose soils such as sand, and they have a moderate risk of contamination.

Drilled wells are typically the least likely to become contaminated. Kentucky has set construction standards for installing drilled wells. (See Figure 2 for an illustration of a properly constructed drilled well.) A certified well driller must be used, and there are set guidelines a driller must follow. The Kentucky Division of Water certifies well drillers and enforces construction standards.

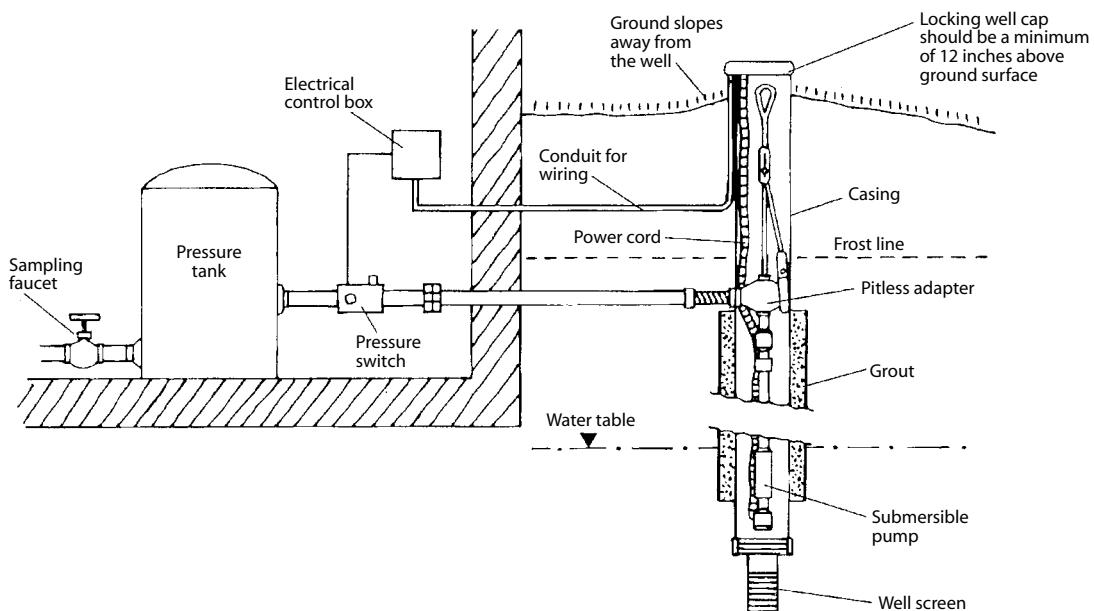
What type of well do you have?

- A. I have a drilled well.
- B. I have a driven-point (sand-point) well.
- C. I have a dug well.

Well Casing and Cap

Well drillers install a steel or plastic pipe casing to prevent the collapse of the well hole during drilling. The space between the casing and sides of the hole is a direct pathway for contaminants and surface water to reach the water table. The driller seals this channel by filling it with grout. Visually inspect the portion

Figure 2. A properly constructed drilled well.



of your well casing that extends above the ground by removing the cap and inspecting the inside with a flashlight. If the casing moves with light pressure, you may have a problem with the ability of the well casing to keep out pollutants. The well casing should extend at least 12 inches above the ground surface. If there are occasional floods in your area, the casing should extend 1 to 2 feet above the highest flood level recorded for the site. Also, the well cap should be attached firmly to the casing with a vent that allows only air to enter. If your well has a vent, make sure it is connected tightly to the well cap or seal, faces the ground, and is properly screened to keep out insects.

How high is your well's casing?

- A. The casing is 12 or more inches above the surface and 1 to 2 feet above the highest recorded flood level.
- B. The casing is at the surface or up to 12 inches above the surface.
- C. The casing is below the surface, in a pit or depression, or the well has no casing.

What is the condition of your well's casing and cap (seal)?

- A. No holes or cracks are visible. The cap is tightly sealed. A screened vent faces the ground.
- B. No holes or cracks are visible. The cap is loose.
- C. Holes or cracks are visible. The cap is loose or missing. I can hear or see running water.

Well Inspections and Record Keeping

Hold on to information about your well's construction and keep detailed records of inspections and maintenance visits. Visually inspect your well often, and have it inspected by a qualified well driller or pump installer every 10 to 15 years. Regular well inspections can help you ensure that your water supply is safe.

When was your well last inspected?

- A. My well has been inspected within the last 10 years.
- B. My well was inspected 10 to 20 years ago.
- C. My well was inspected more than 20 years ago, or I do not know when the well was last inspected.

Do you have records from well inspections and maintenance?

- A. I have copies of all inspection and maintenance reports.
- B. I have some records on inspections and maintenance.
- C. I do not have any inspection or maintenance records.

Water Testing

Water testing helps you monitor water quality and identify possible risks to your family's health. Contaminants enter drinking water from a variety of sources, and many cannot be detected without a water test. Your water should be tested at least once a year for bacteria, nitrates, pH, and total dissolved solids. If pesticides are used on or near your property, you also may want to have a broad-spectrum test done to detect any pesticide residues. See Figure 3 for general steps to follow when collecting a water sample.

What type of water testing schedule is followed for your well, and what are the results?

- A. My water is tested at least once a year. Test results are consistent and indicate good water quality. Results meet standards for bacteria, nitrate, and other contaminants.
- B. My water is tested once a year, but some results do not meet standards.
- C. My water is not tested. Water is discolored after a rainstorm, and it changes noticeably in color, odor, and taste.

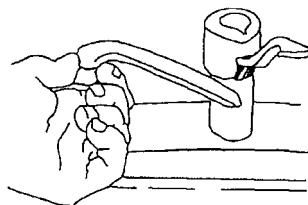
Unused Wells

Many properties have wells that are no longer used, including older homes or sites where homes have stood previously. Unsealed wells not only provide a direct channel for waterborne pollutants to reach groundwater, they also pose a hazard to small children who may be playing nearby. By Kentucky law, a licensed, registered well driller must be used to close this type of well. The cost to close a well varies, but the money spent sealing a well will be a bargain compared to the potential cost of cleanup and potential hazards to your family and others.

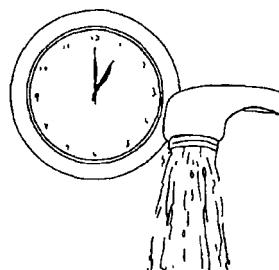
Are any unused wells located on your property or in your area?

- A. There are no known unused wells on my property, or unused wells have been properly sealed.
- B. Unused wells are not sealed, but they are capped and isolated from potential contaminants.
- C. Unused, unsealed wells are located on my property. They are in poor condition, near pollution sources, and/or uncapped.

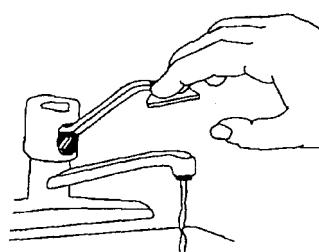
Figure 3. General steps for collecting water samples.



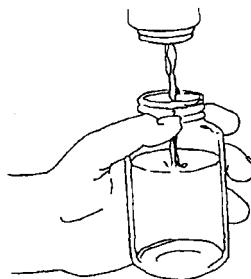
Step 1. Remove the aerator from an indoor, leak-free cold water faucet. If testing for bacteria, flame the end of the faucet with a lighter. (Note: Flaming may discolor chrome or gold-finished faucets.)



Step 2. Let water run for five minutes to bring in water that has not been in contact with household plumbing. (Skip this step if testing for corrosion of household plumbing—see notes.)



Step 3. Reduce the water flow until the stream is about $\frac{1}{4}$ -inch in diameter.



Step 4. Fill a specially prepared laboratory container as instructed by the laboratory. Do not let anything touch the inside of the cap or container.



Step 5. Close the sample container and transport it as instructed by the laboratory.

Notes:

- *Corrosive water may dissolve lead, copper, zinc, or iron contained in household plumbing. If testing for evidence of corrosion, let water stand in the plumbing system at least 12 hours.*
- *Laboratories specially prepare containers for each category of contaminant. Do not rinse laboratory containers or fill them to overflowing.*
- *Always follow laboratory directions.*

For More Information About:**• Well Construction, Inspection, or Repair**

- Kentucky Division of Water, Groundwater Branch (call 502-564-3410).

• Care and Maintenance of Wells

- *Protecting Your Wells and Water Supply: A Groundwater Protection Plan for Domestic Well Owners*, Kentucky Division of Water (call 502-564-3410).
- *Disinfecting Your Well* (ENRI-201) by Denise Hoffman, Linda Heaton, Kimberly Henken, and Jenny Cocanougher, University of Kentucky Cooperative Extension Service.
- *Do's and Don'ts of Taking Care of a Well* (ENRI-200) by Denise Hoffman, Linda Heaton, Kimberly Henken, and Jenny Cocanougher, University of Kentucky Cooperative Extension Service.

• Water Testing

- *Testing Private Water Sources* (IP-5) by Tom Ilvento, Linda Heaton, Joe Taraba, Kimberly Henken, and Jenny Cocanougher, University of Kentucky Cooperative Extension Service.

• Certified Water Testing Laboratories

- Local health department (check local listings).
- County office of the Cooperative Extension Service (check local listings).
- Kentucky Division of Water (call 502-564-3410).

• Drinking Water Quality Standards

- U.S. Environmental Protection Agency Safe Drinking Water Hotline (call 800-426-479 from 8:30 a.m. to 5 p.m. Eastern time).
- County office of the Cooperative Extension Service (check local listings).

• Geology

- Kentucky Geological Survey, map sales (call 859-257-3896).

• Soil Type

- Local conservation district office (check local listings).

What is the KY-A-Syst for the Home Program?

The KY-A-Syst for the Home program is a series of publications that can help you be a good environmental steward of Kentucky and protect the health and well-being of your family. KY-A-Syst for the Home publications provide problem-solving information and also list agencies that can provide help in specific areas.



Action Checklist

Look back at the assessment questions and make sure you have answered all questions. Record all B and C responses and list the improvements or changes you plan to make. You can use recommendations from this publication or from other sources to help you decide on action you are likely to take. Write down a date to keep you on schedule. Read through the assessment questions from time to time to see if any of your responses have changed and take any action needed to address new concerns.

Write all B and C responses below.	What can you do to reduce risk?	Set a target date for action.
<i>Sample:</i> My well was inspected more than 20 years ago, or I do not know when the well was last inspected.	Schedule an inspection by a certified well driller.	October 30.

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