

Testing Your Drinking Water

Homeowners using wells, springs or cisterns as their water supply should consider having their water tested routinely.



Certified water testing labs are available throughout the state to provide accurate water quality results for homeowners.

Seven Reasons to Test Your Drinking Water

More than one million homes are served by private water supplies (wells, springs, or cisterns) in Pennsylvania. Homeowners using this type of water supply should consider having it tested for the following reasons:

1. Unlike public water systems, private water supply testing is the voluntary responsibility of the homeowner. There are no government agencies or programs that routinely test private water systems for homeowners.
2. Surveys indicate that about half of the private water supplies have never been tested.
3. Additional studies have found that about 50 percent of private water systems fail at least one drinking water standard.
4. Many pollutants found in private water systems have no obvious symptoms and can only be detected through laboratory testing.
5. Water testing is generally economical and convenient with many testing laboratories located throughout the state.
6. Water testing provides vital information to document the quality of your drinking water. Data from previous

tests may be necessary if you ever need to prove in court that a nearby land use has damaged your drinking water quality.

7. The only way homeowners can be certain that their water is safe to drink is to have the water tested periodically.

Tests to Have Done Routinely

While it is possible to have a water supply tested for many things, such a test is very expensive and unnecessary. Instead, homeowners should focus testing on a few standard parameters along with additional tests related to nearby land uses.

Private water supplies should be tested every year for total coliform bacteria and *E. coli* bacteria. Coliform bacteria includes a large group of many types of bacteria that occur throughout the environment. They are common in soil and surface water and may even occur on your skin. Large numbers of certain kinds of coliform bacteria can also be found in waste from humans and animals. Most types of coliform bacteria are harmless to humans, but some can cause mild illnesses and a few can lead to serious waterborne diseases.

If coliform bacteria are found in a water supply, a follow-up test can be done by the laboratory to look for *E. coli* --a type of coliform bacteria found only in human or animal wastes. A positive *E. coli* result is much more serious than coliform bacteria alone because it indicates that human or animal waste is entering the water supply.

Drinking water should be tested for pH and total dissolved solids (TDS) every three years. These tests are similar to a doctor taking your temperature--they are general tests that provide an index to the quality of your drinking water.

Water with a pH lower than 6.5 or greater than 8.5 can cause corrosion of lead and copper from household plumbing or bad tastes. The total dissolved solids content of drinking water should be below 500 milligrams per liter (mg/L), and the value should not change much from one test to the next. Increases in the TDS of water could indicate pollution has occurred, warranting further, more detailed testing.



PennState Extension

Added Tests Related to Local Land Uses

Every three years, additional testing should be done related to land uses occurring or expected to occur within sight of the home. Pollutants related to various common land use activities in Pennsylvania are given in the Table 1 below. Keep in mind that not all laboratories will be able to run all of these tests.

Land Use	Pollutants to Test For
Mining	Iron, Manganese, Sulfate, Aluminum
Gas or Oil Well Drilling	Chloride, Barium
Industry	Organic Scans
Gas Stations	Petroleum Products
Road Deicing	Sodium, Chloride
Homes with Septic	Nitrate, Bacteria
Agriculture	Nitrate, Pesticide Scans

Table 1. Pollutants associated with various land uses that may be located near private water supplies in Pennsylvania.

Added Tests Related to Obvious Symptoms

Sometimes, obvious stains, tastes, or odors in water prompt a homeowner to seek water testing. Many pollutants that cause obvious aesthetic problems occur naturally in groundwater, but some can come from land uses, especially mining. While the presence of these pollutants is apparent from their symptoms, testing through a certified laboratory is valuable to confirm the pollutant and to provide valuable information about the form and concentration of these pollutants that is helpful when determining the best options for treatment. Some common drinking water symptoms and their associated pollutants are given in Table 2.

Symptom	Pollutants to Test For
Orange-brown stains, metallic taste	Iron, Manganese
Black flecks or stains	Manganese, Iron
White/gray film, increased soap use, damaged hot water heater	Hardness
Salty taste	Chloride
Blue-green stains, metallic taste, especially early in the morning, small leaks in metal plumbing	pH, Corrosivity Index, Copper, Lead

Table 2. Pollutants that should be tested when various symptoms are noticed in drinking water.

Where to Get Drinking Water Tested

It is important that all water tests be performed by a certified water testing laboratory. Be cautious of water test results from any uncertified lab or from water treatment salespeople. The Pennsylvania Department of Environmental Protection (DEP) has a [current listing of accredited drinking water testing laboratories](#). You can search for environmental laboratories or find a quick-reference specifically for drinking water labs on their website.

Water testing on private water supplies is also available through the Penn State Agricultural Analytical Laboratory. Drinking water test kits are now available at participating county extension offices or directly from the [Agricultural Analytical Services lab](#).

Who Should Collect Water Samples?

In most cases, homeowners can collect water samples themselves, after obtaining proper sanitized containers and instructions from the laboratory. Some rare, specialized tests, such as radon, *Giardia*, *Cryptosporidium*, and hydrogen sulfide, usually require that a lab employee visit your home to collect the sample.

In special circumstances where legal action could follow, it is best to have samples collected by an unbiased professional. For example, samples collected prior to mining, gas well drilling, or other land use disturbances meant to document existing drinking water quality should be collected by a disinterested third party. This adds to the cost of water testing but will be vital to the admissibility of the results in any legal action related to pollution of a private water supply.

Collecting a Water Sample

Most water samples are collected at the kitchen faucet since this is where most water is used for drinking and cooking. If you already have treatment equipment installed in your home, keep in mind that collecting a water sample from a kitchen or bathroom faucet will often be influenced by the treatment equipment. If you are interested in determining the raw water quality from your well (as it emerges from the ground), you may wish to collect a sample at the spigot on the pressure tank before the water enters any water treatment equipment or the home plumbing.

Do not take water samples to a laboratory that have been collected in used food or drink containers! Instead, you should arrange to obtain proper sanitized containers and instructions from the laboratory ahead of time. The sample collection instructions provided by the laboratory must be followed carefully in order to ensure an accurate test result. In general, before taking the water sample, the container should be rinsed two or three times with the water being collected. However, testing labs often supply containers that have a fixing compound, which will prevent the loss or breakdown of a certain chemical. In this case, if the bottle is rinsed or allowed to overflow, the fixing agent will be removed. For this reason, sampling instructions must be read and followed carefully.

Special Instructions for Bacteria Samples

For bacteria testing, a sterile container must be used and all chlorine must be cleared from the water system. Containers supplied by water testing labs will have a chemical present to remove any chlorine in the sample. Many labs recommend removing the aerator from the faucet and sterilizing the end of the faucet with a flame or rubbing alcohol before collecting the water sample. Allow the water to run for a few minutes before collecting the water in the sample bottle. Remove the cap from the bottle, but take care to avoid contaminating the cap or the bottle. Do not set the cap down on anything and do not touch the inside of the cap or the bottle with your hands. Run water into the bottle, carefully secure the lid, keep the sample cool, and deliver it to the lab within 24 hours. For this specific test, the shorter the time that elapses between collection and analysis, the more reliable the results will be. Make sure you contact the lab to determine how and when the sample should be shipped or dropped off at the lab to ensure accurate results. Because of the time limits necessary for bacteria sampling, most labs will not accept water samples on Fridays or before holidays.

Special Instructions for Lead and Copper Corrosion Samples

In order to properly test for lead and copper from plumbing corrosion, the water should be allowed to stand in the pipes for at least 12 hours and a "first-draw" sample should be collected. This sample should be taken first thing in the morning before any water has been used. This will collect water that has sat in contact with the pipes for at least 12 hours and will be most likely to accumulate metals like lead and copper from corrosion.

Prepared by Stephanie Clemens, research assistant, and Bryan Swistock, senior extension associate.

Authors

Bryan Swistock

Senior Extension Associate; Water Resources Coordinator

brs@psu.edu

814-863-0194

extension.psu.edu

Penn State College of Agricultural Sciences research and extension programs are funded in part by Pennsylvania counties, the Commonwealth of Pennsylvania, and the U.S. Department of Agriculture.

Where trade names appear, no discrimination is intended, and no endorsement by Penn State Extension is implied.

This publication is available in alternative media on request.

Penn State is an equal opportunity, affirmative action employer, and is committed to providing employment opportunities to all qualified applicants without regard to race, color, religion, age, sex, sexual orientation, gender identity, national origin, disability, or protected veteran status.

© The Pennsylvania State University 2021

Code: ART-1192