

MAINTAINING PRIVATE WATER WELL SYSTEMS

Adapted with permission from *Maintaining Your Home Well Water System*.
Wisconsin Cooperative Extension. 2001

Construction, maintenance, and protection of private water wells are the keys to safe drinking water

You should have few problems with water quantity and quality when your well system is suitably located, properly constructed and installed, correctly maintained, and regularly tested. Make sure to record and save vital information about your well and well water. This information will be valuable to any professional advising you about your water system. It should be filed with other documents about your home and property, and passed on to future owners. A copy of your well construction report will provide much of the basic information you need to record. If a report cannot be located, it becomes more important to record information about the well as opportunities arise. For example, if a pump must be replaced, the pump installer may be able to measure the depth of the well and depth to water at that time.

The hydrologic cycle—your water source

The hydrologic cycle, or water cycle, is simply how water moves around the earth in its various forms (as rain, snow, rivers, oceans, and clouds). We have the same water on Earth as when the dinosaurs roamed.

The water cycle in Arizona is pretty complex. The following is a simple description of how water moves in Arizona. When rain or snow fall to the earth's surface in Arizona, most of the water runs off into streams and arroyos. Some soaks into the soil (see Figure 1). Plants will use some of this water, while evaporation and runoff will claim the largest portion. That which soaks into the earth trickles slowly downward through the soil until it reaches the saturated zone where all the spaces between rock and soil particles are filled with water. The top of this zone is called the water table. Water below the water table is groundwater. Typically, wells extend below the water table to collect groundwater for use.

Groundwater flows slowly underground from high to low areas or due to some kind of pressure. The slope of the water table often parallels the slope of the land surface. Groundwater becomes surface water again when it discharges into lakes, streams, and springs. Arizona stream systems can have groundwater surfacing, going back under ground, and resurfacing miles away from each other. Surface water may then evaporate to form clouds and begin the cycle again. So groundwater, far from being new water from within the earth, is water that has been recycled many times since the earth was young.

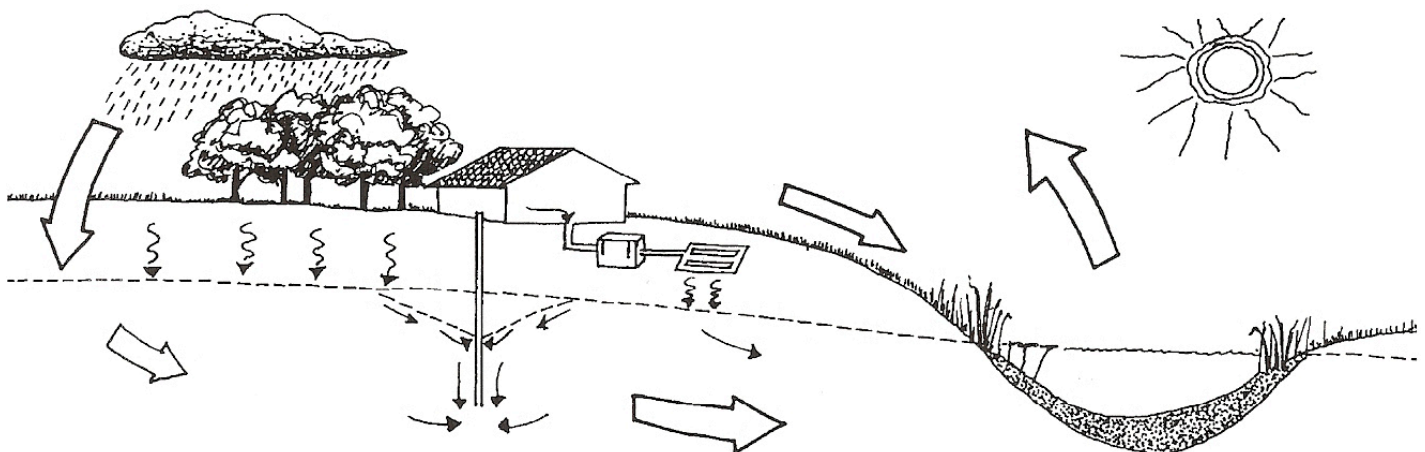


Figure 1. The hydrologic cycle: water moves through the air, over land, through the ground.

Protect your water supply

Proper well siting and construction are a landowner's first defenses in assuring a safe water supply. The Arizona Department of Water Resources (ADWR) administers a well code through the Arizona Administrative Code (A.A.C.), which provides minimum standards for well depth, construction materials, and distance from potential pollution sources. In addition to meeting separation distances, it's important to locate your well upgradient (usually uphill) from potential pollution sources (http://www.azsos.gov/public_services/Title_12/12-13.htm).

If a groundwater supply is initially adequate and safe, you must protect it by installing a proper withdrawal and distribution system. You can also protect your water supply with the following measures.

- Grade your lot so surface water runs away from the well.
- Check to make certain that the well cap or seal is in place and tightly secured. Ensure that insects and other vermin cannot enter. A vermin-proof well cap is one solution. To learn more about the components of your private water well, please review the Extension publication *Private Water Well Components* (AZ1486b).
- Avoid using gasoline and lawn, household, or agricultural chemicals near the well.
- Protect basement wells from flooding and sewers which may back up. **NOTE: Basement wells are now prohibited in Arizona.**
- Protect wells in pits from surface water flooding. Pits subject to flooding should be abandoned. Contact the ADWR for assistance.
- Properly abandon unused wells by filling them from bottom to top with grouting clay or cement. Call a pump installer or well driller for advice or assistance.
- Avoid improper plumbing connections that could allow contaminants to back-siphon down your well or distribution system.
- Clean sediment screen or perform other maintenance recommended by your well installer.
- Plan ahead to replace your well should it become necessary.

Continued protection of groundwater depends on proper land-use activities. Most residential wells draw water that entered the ground within a few feet or miles of the well depending on the depth and location of the well. How you and your neighbors use the land can be an important factor in the quality and quantity of your water supply. Possible

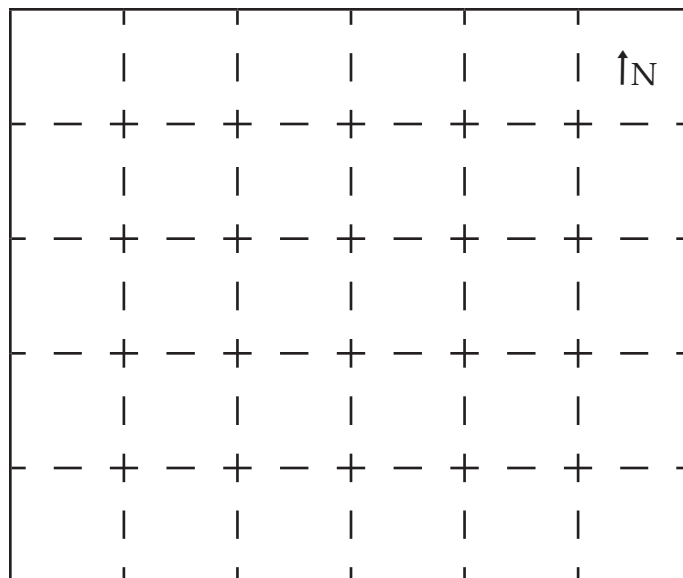
sources of well contamination are animal waste, fertilizers, pesticides, septic tank systems, landfills and dumps, and commercial or industrial "spills" or discharges, including leaking underground fuel tanks.

Detecting contaminated groundwater requires regular testing. You should test your private water supply each year. Consider seasonal tests if one sample shows elevated levels of contaminants. Always test water if unusual odors, colors, or turbidity develop, or if you note an interrupted supply (for example, if the well pumps air or sediment). (Refer to the Extension publication *Well Water Testing and Understanding the Results* (AZ1486f) for more information on how to test your private well water.)

Well drillers and pump installers are required to disinfect and test the well any time they service the well, pump, or plumbing system. Follow the same procedure if you do the work yourself. You should receive a copy of the test results obtained by the driller/installer after disinfecting or testing the well.

Your well site

In the grid below, sketch the location of your home and other structures on your lot in relation to your well. Include distances to your own or your neighbor's septic system, dry wells, barnyards, kennels, abandoned wells, and gasoline or fuel oil tanks. Note any significant differences in elevation on your lot, and the general pattern of surface drainage. If a groundwater contour map is available from your county, use it to draw in the groundwater flow direction. If one isn't available, estimate the direction, remembering that groundwater flow is usually toward the nearest stream, and can follow surface topography. You may also wish to indicate the location of and distance to local landfills or dumps, or industrial, commercial, or agricultural activities. Consult this record when considering any landscaping or construction, or when interpreting well water quality results.



Well log/report

Every modern well in Arizona is registered with the Arizona Department of Water Resources, and a well log is available to the well owner. The well log identifies the type of geology of the aquifer, the construction materials used to construct the well, the well depth, casing length, screen length, the presence (or absence) of a gravel pack, depth to groundwater at the time of installation, and the capacity of the well to yield water at the time of well installation. Every well owner should have a copy of his/her well log. At the end of this publication is an example of a well record that you can use to maintain your own well information.

Your well records

(If it is available, include a copy of your Arizona well construction report with your other documents.)

Well driller

Name _____

Address _____

Phone _____

Maintenance service

Name _____

Address _____

Phone _____

Well construction report

Date installed _____

Depth to water _____

Casing diameter _____

Screen type _____

Pump type _____

Model _____

Well depth _____

Type of well _____

Casing depth _____

Screen length _____

Capacity _____

Setting _____

Water testing services

- Arizona Department of Health Services, Bureau of State Laboratory Services, 3443 N. Central Avenue, Suite 810, Phoenix, AZ 85012-2208; (602) 255-3454; (602) 255-3463 FAX; <http://azdhs.gov/lab/index.htm>.

Well construction reports

- Well driller
- Arizona Department of Water Resources, 3550 N. Central Avenue, Phoenix AZ 85012; (602) 771-8500; http://www.azwater.gov/dwr/Content/Find_by_Program/Wells/default.aspx

Soil and geologic information (well log)

Depth	Type of materials encountered

Arizona well log number _____

Well and plumbing maintenance record

(Also include here information on any water treatment devices installed in your house.)

Date	Work done	Cost	Work done by:	Comments

Well water testing records (Also keep copies of the laboratory reports.)

Date	Total coliform bacteria	Nitrate-nitrogen	Fluoride	Other	Reason for sampling	Laboratory

For Additional Information

Arizona Cooperative Extension (ACE) bulletins contain a variety of information about water, water quality, safe drinking water, and private wells. They are available through your county Extension office or from CALSmart Distribution Center, located in Tucson, at 4101 N. Campbell Avenue; (877) 763-531; (520) 795-8508 FAX; or visit <http://ag.arizona.edu/pubs/>

Arizona Department of Water Resources: www.AzWater.gov/AzDWR

Arizona Well Owner's Guide to Water Supply, (AZ1485)

Source

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This information has been reviewed by University faculty.
cals.arizona.edu/pubs/water/az1486d.pdf

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