

February 2026

Groundwater Well User Manual

A comprehensive guide to properly using
and maintaining a well in Sonoma County.



SANTA ROSA PLAIN • PETALUMA VALLEY • SONOMA VALLEY

GROUNDWATER
SUSTAINABILITY AGENCIES



www.sonomacountygroundwater.org
www.permitsonoma.com

Acknowledgements

We thank the following people and organizations for their contributions to this manual:

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Funders: Funding for this project has been provided in full or in part from The Budget Acts of 2021 and 2022 and through an agreement with the California Department of Water Resources.

Special Thanks to the County of Napa, Public Works Department for allowing us to adapt content from Napa County's Well Resources Guide and to Pete Dellavalle for the front and back cover photos.

This manual is available on the Sonoma County Groundwater Sustainability Agencies (GSAs) website at: www.sonomacountygroundwater.org.

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Introduction

This manual is intended to provide information and guidance to private well owners and users about local groundwater supply and the installation, operation, and maintenance of groundwater wells.

The manual is designed to:

- Introduce new well owners and users to the basics of well construction, maintenance, and destruction;
- Alert well owners and users to the potential for contamination and the need for water quality testing;
- Provide information to well owners and users on ways to optimize well longevity and productivity;
- Introduce well owners and users to groundwater sustainability programs available to them; and
- Provide tips and resources to advance groundwater sustainability.

This publication is meant to serve as guidance. The recommendations made here may not work in every situation or address every possible scenario or contaminant. Any reference to trade names and companies does not constitute an endorsement.

Groundwater Protection is a Shared Responsibility

Approximately 40% of Sonoma County's total water supply comes from **groundwater**.

Groundwater is widely used by cities and towns, rural residents, commercial and industrial operations, and agriculture. There are more than 40,000 wells in Sonoma County, the second most of any county in California and the most per capita.

Groundwater is widely used because **aquifers** serve as an inexpensive and efficient water storage, treatment, and distribution system. Aquifers provide natural treatment and filtration as water percolates through soil and rock. It also transmits large quantities of water underground over long distances without the need for tanks, pipes, and pumping plants.

The main threats to groundwater quality and supply are contamination and overuse. Groundwater moves very slowly, often only a few feet per year. If groundwater is polluted by a man-made chemical, it can take decades or longer for it to be naturally flushed clean. Our drinking water **basins** can be impacted from accidental spills, leaking underground storage tanks, misuse of chemicals on the land, untreated sewage, and more. Water quality problems can be worsened by the presence of improperly constructed wells, abandoned wells, or wells located too near a contaminant source, like a septic system. These wells can act as vertical pathways, allowing chemicals and pathogens on the surface or in shallow aquifers to seep into our deep drinking water aquifers. Manually cleaning pollutants out of groundwater can be extremely costly and difficult.

Groundwater 101

Groundwater: Water that collects and is stored underground in aquifers.

Aquifer: Areas below ground where the spaces between sediments and rock fractures are saturated and provide water to wells and springs.

Basin: Aquifer or stacked aquifers with a reasonably well defined boundary.

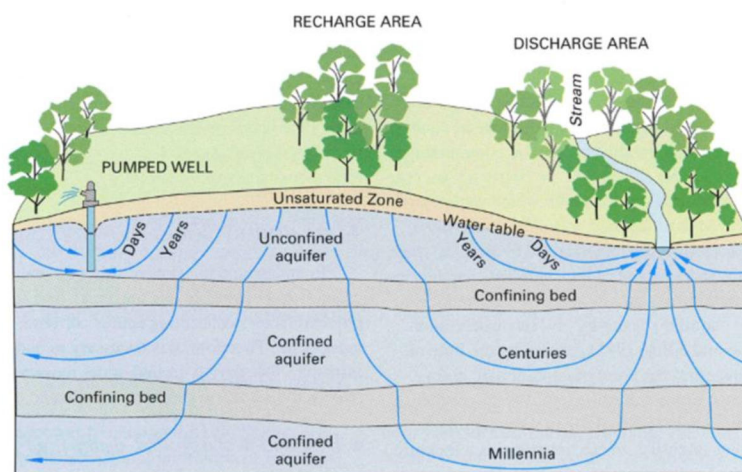
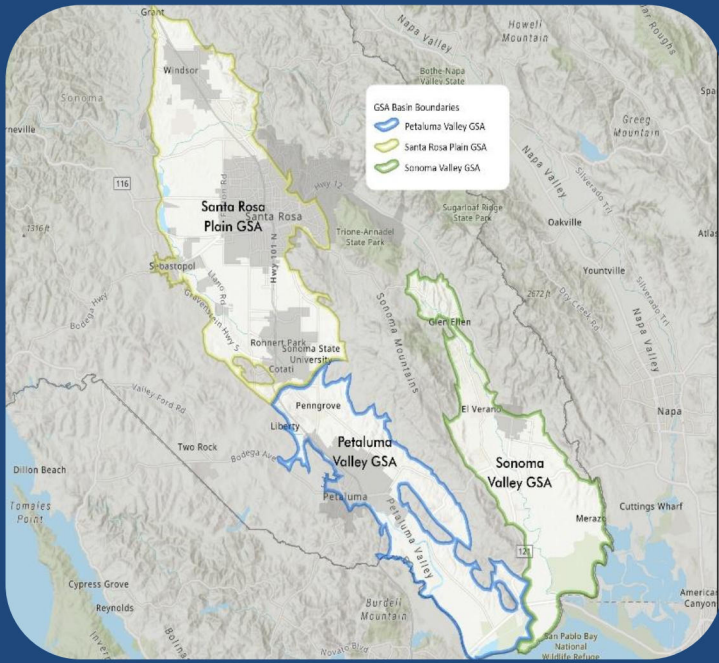


Image from US Geological Survey Circular 1139

In addition to protecting groundwater quality, it is important to maintain stable groundwater levels. If too many people use too much water too quickly, an aquifer can be depleted. A depleted aquifer can take decades or longer to recharge. Over pumping groundwater can lead to dry wells, poor water quality, reduced streamflow, and, in extreme cases, land subsidence.

Often, the immediate solution to these groundwater problems is to find an alternative source of water. This is why taking care of your well and using groundwater responsibly is so vital to Sonoma County. As groundwater users, we have a shared responsibility to conserve groundwater and protect it from contamination, ensuring we always have access to this important resource.



Did you know?

There are three agencies dedicated to groundwater sustainability in Sonoma County: Santa Rosa Plain, Petaluma Valley, and Sonoma Valley Groundwater Sustainability Agencies (GSAs). Not sure if you are in one of the three basins? Use our Data Dashboard at bit.ly/SoCoDataDashboard and type in your address or APN.

Well Permitting Requirements

To protect public health and maintain the high quality of our drinking water aquifers, well owners are required to comply with various state and local laws. Well construction, modification, or abandonment requires a permit and must conform with both local and state regulations.

“For most well owners, groundwater is their only source of water for drinking and other uses. Therefore, it should be protected.”

In Sonoma County, [permitting](#)¹ for water supply wells is administered by the County’s building and planning department, Permit Sonoma. Note that only a licensed C-57 Well Drilling Contractor may apply for a well permit and perform work on a well. Below are some key considerations for a well permit.

- A complete well application package must comply with the provisions of the [Sonoma County Code, Chapter 25B](#)², and includes:
 - Site Plan, showing the proposed and existing well locations, GPS coordinates, and nearby potential contamination sources.
 - Water Conservation forms.
 - Water Resources Monitoring application, if metering or groundwater level monitoring is required.
- To prevent contamination from surface water or shallow groundwater, wells must be sealed and maintained to prevent the introduction of pollutants and to protect drinking water aquifers.
- Installation of a water flow meter and reporting of water use is required of new wells, except for wells serving a single residential parcel with total groundwater use of 2.0 **acre-feet** or less per year. Monitoring of groundwater depth is also required for wells using more than 5.0 acre-feet per year.
- Proposed wells near known sites of soil or groundwater contamination are prohibited unless a report prepared by a geologist or hydrogeologist is submitted and finds the proposed well will be safe from potential contamination.
- New wells on parcels using greater than 2.0 acre-feet per year and located within the designated [Public Trust Review Area](#)³ may be subject to an additional permitting process that considers impacts of groundwater use on streams and rivers.
- Abandoned or unused wells must be properly destroyed in accordance with Sonoma County and State standards to prevent them from becoming conduits for contamination.

Definition

Acre Foot: 326,851 gallons. The amount of water to cover an acre of land at a depth of one foot.

For detailed application instructions and downloadable forms, visit the Permit Sonoma Well & Septic Permit Submittal Requirements page: permitsonoma.com/instructionsandforms/wellandseptic, or contact Permit Sonoma at: (707) 565-1900.

¹ <https://permitsonoma.org/divisions/engineeringandconstruction/wellandsepticssystems/waterwells>

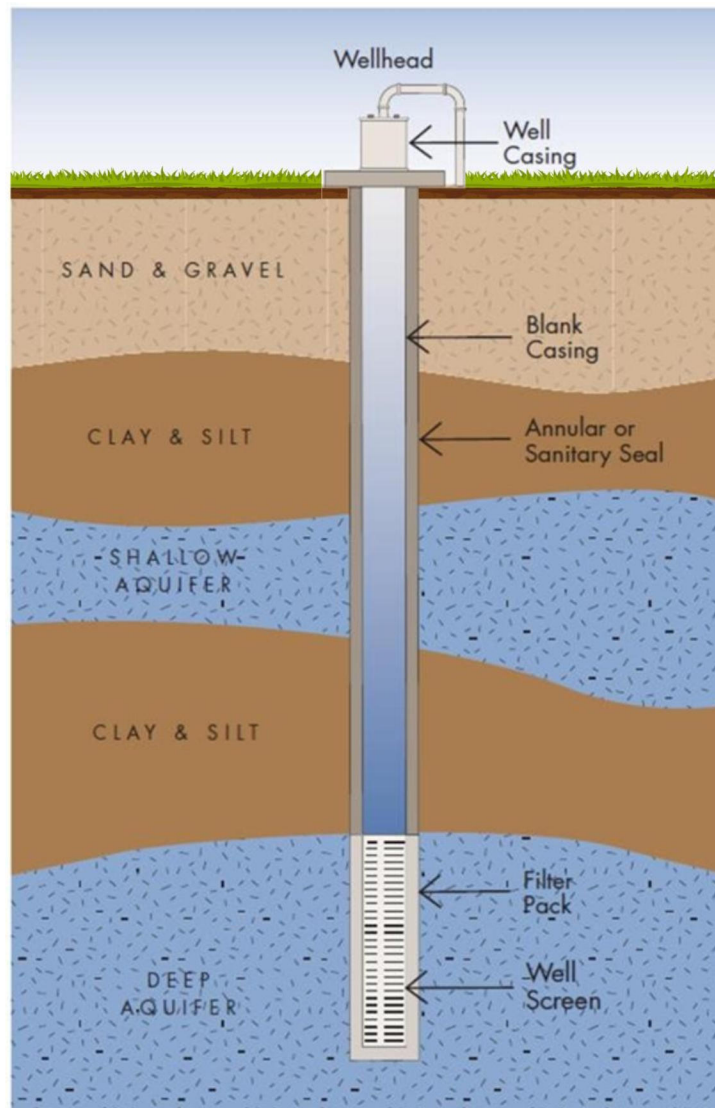
² https://library.municode.com/ca/sonoma_county/codes/code_of_ordinances?nodeId=CH25BWAWECOST

³ <https://permitsonoma.org/divisions/engineeringandconstruction/wellandsepticssystems/waterwells/publictrustreview>

Well Construction

Properly constructing wells protects water quality for the individual groundwater user, neighboring wells, and the basin as a whole. A typical domestic well in Sonoma County is constructed by drilling a hole in the ground to a depth of 100 to 500 feet. As the well driller is drilling the hole, they record the depth and the various soil and rock materials encountered. This information is documented on a driller log (also called a well completion report), which is filed with the CA Department of Water Resources (DWR) and Permit Sonoma, and provided to the well owner.

The well is constructed once the driller finds a suitable aquifer that meets the well owner's needs. The driller then builds the well by installing a perforated casing referred to as a well screen at depths with water producing layers. Solid or blank casing is installed in the upper section of the well near the ground surface and in areas where materials such as clay or silt were encountered that will not produce significant quantities of water. The well casing keeps the hole from collapsing and allows pumping equipment to be installed.



To keep fine sediment from passing through the well screen and into the well, the well driller installs a sand or gravel "filter pack" between the well screen and the borehole wall. The filter pack and well screen allows water to pass through, but limits sediment from traveling into the well that can reduce the life of the well and pump.

Above the well screen and filter pack, the driller installs a concrete or cement seal (annular or sanitary seal) between the blank casing and the borehole. The seal prevents surface water, which is often not fit for drinking, from flowing easily along the smooth well casing into the aquifer and protects against groundwater contamination. In Sonoma County, the minimum seal depth is 20 feet or at least two feet into the first impervious layer, whichever is greater. In the case of a shallow well where no water-bearing layer is encountered below 20 feet, the seal must extend to a minimum depth of 10 feet. For

water wells that will serve a public water system, the seal must extend to a minimum depth of 50 feet, or two feet into impervious soil, whichever is greater.

The sanitary seal extends to the ground surface, where it is incorporated into a concrete pad or collar around the well casing. These surface features make up what is called the wellhead. At the wellhead, the casing extends at least one foot above the ground surface and is securely capped to prevent anything, including surface water, from entering the well. The concrete pad is sloped away from the casing to protect the well from damage and surface water contamination.

“Your well is a direct connection between you and your water supply.”

A submersible pump is installed in the lower section of the well and connected to a drop pipe that extends to the surface and connects to a flow meter, storage tank and/or a pressure tank and other equipment. The pump is cycled on and off by switches monitoring water level or pressure in tanks. All of these components work together to ensure that water is delivered safely and without contaminants. Once the well is fully constructed, the well and pump contractors will clear any residual sediment created during construction and sample the water to ensure it is safe and help determine if water treatment is necessary. To learn more about potential groundwater contaminants and treatment options, see the Water Quality Sampling and Testing section. The next section details how to properly maintain your well to ensure safe and reliable delivery into the future.

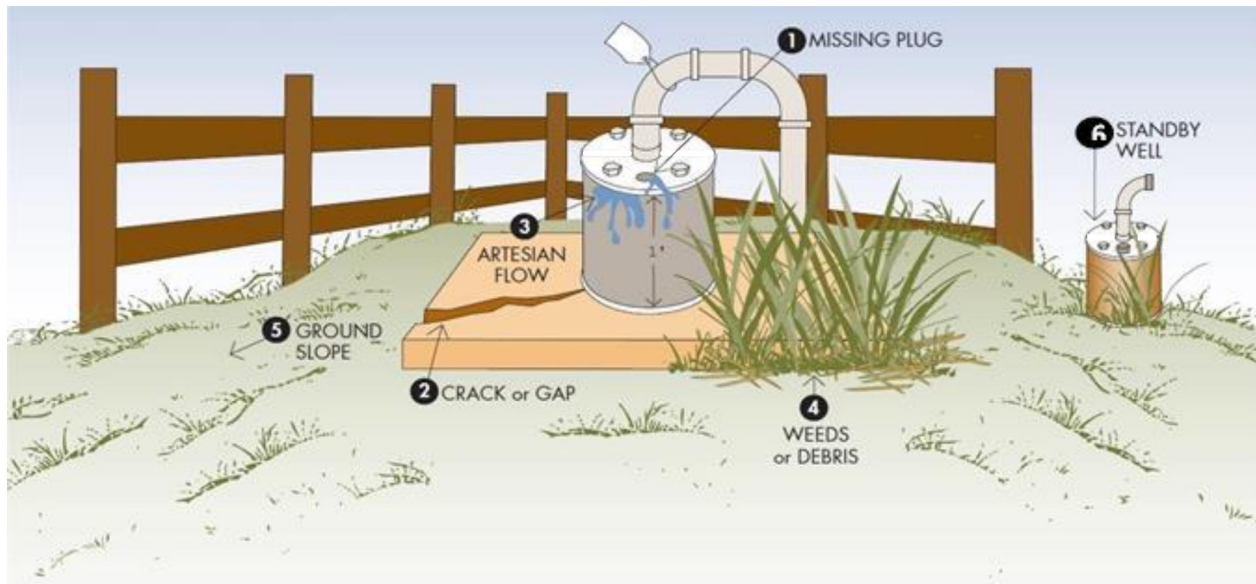
Well Maintenance

A poorly maintained well can lead to poor water quality and reductions in the amount of water your well can produce. To minimize these potential problems, a well maintenance routine is recommended. This section details ways to inspect your wellhead, create a zone of protection around your well, maintain complete well records, maintain your septic system, and understand what can cause well deterioration. It also provides guidance on what to do if your well runs dry, and what to do if you need to abandon your well.

Inspect your Wellhead

You should inspect your well at least once a year – but more often is better. A quick visual check every few months can help catch small issues before they become bigger problems.

- Every few months: Take a quick walk around your well. Look for cracks in the concrete pad, signs of animal activity, or anything that looks out of place.
- Seasonally or after major events: Check that the ground still slopes away from the well, the well cap is secure, and no damage has occurred.
- Annually: Do a full detailed inspection of your wellhead and the area around it, as detailed below.



1. Look for openings that insects, rodents, water, or anything else can enter. Cap, seal, or otherwise plug any openings.
2. Look for cracks in the concrete pad that would allow water, and any contaminants it may be carrying, to enter the well casing and flow down into your drinking water. Seal any cracks or re-pour a new concrete pad.
3. If water is flowing out the top of the well, call a licensed well and pump contractor to investigate. If water can leak out, contaminants may be able to seep in.

4. Remove weeds, leaves, and other debris from around your well. These can create shelter for rodents and other pests. Do not use herbicides or chemicals near the well to control weeds.
5. Make sure the ground slopes away from your well so that surface water does not collect or flow near the well.
6. If you have an inactive well, turn the pump on several times during the year to make sure that the well is functioning properly. Inspect and maintain your inactive well following the same guidelines as an active well. If you plan to never use the well again, you are legally required to properly destroy it (per Sonoma County Code Chapter 25B).

Regular maintenance helps protect your water supply and can save you money in the long run. If you're ever unsure about your well's condition, contact a licensed well and pump contractor.

Create a Zone of Protection

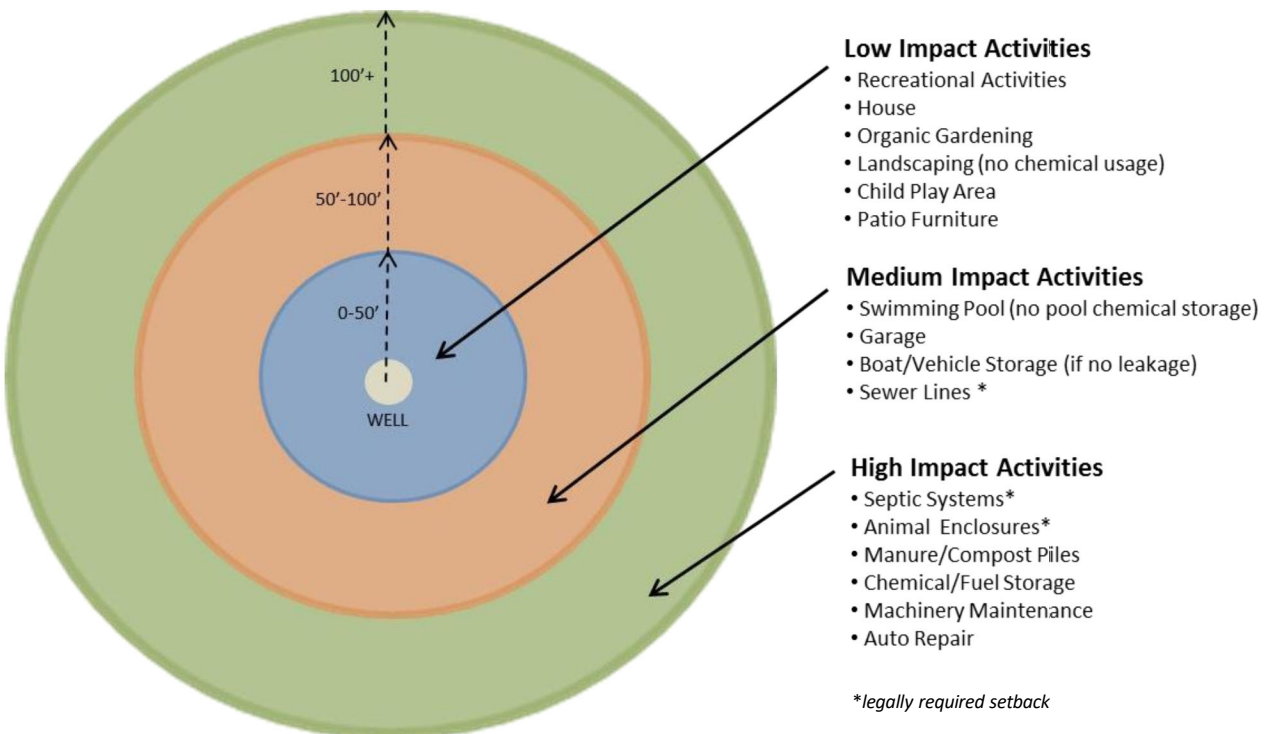
The safest way to protect your well from being damaged is to build a small structure or fence around it. Lock the well enclosure to minimize the chance of vandalism. If you don't have a structure around your well, then clearly mark it so you can still find it when plants grow tall in the spring.

Water and contaminants carried by that water can potentially flow down an improperly protected well. Keeping contaminants far from your well will prevent potential groundwater quality impacts. Create a circle at least 50 feet in diameter around your well where you don't store, mix, spray, spill, bury, or dump anything that you don't want to drink.

If your neighbor's well is near your property line, try to have an open dialogue about well maintenance, because any contamination in their well can travel into your well and vice versa.

Some activities legally require more than a 50-foot zone of protection. In most cases, high impact activities such as septic tanks, leach fields, and animal enclosures must be located at least 100 feet away from any well to ensure that no waste products reach your drinking water. Irrigation with graywater (wastewater collected from showers, bathtubs, bathroom sinks, and washing machines) should also be at least 100 feet away from your well.

Well Setback Distances



Maintain Complete Well Records

You should work with your water well and pump contractor to keep complete records and establish routine inspection and maintenance schedules based on you and your well's needs. Complete well records should include:

1. **The driller log (well completion report):** This document describes the construction of the well—how deep it is, from what depth it draws water (the screened interval), and the soil types encountered while drilling. This information is important to help troubleshoot any future problems.
The drilling contractor should provide you with a copy of the driller log following completion of the well construction and testing. If you do not have a copy of the driller log (well completion report), it may be available from state or local records. Visit: water.ca.gov/Programs/Groundwater-Management/Wells/Well-Completion-Reports to learn how to obtain the record for your well, or check with Permit Sonoma by calling (707) 565-1900.
2. **Distribution map** - Draw a map showing the location of all the buried water pipes connected to the well. If you share a well with adjacent properties, it is a good idea to have a map of the plumbing on all properties connected to the shared well. This information can be invaluable as the properties change hands, as repairs are needed, or as new wells are added.
3. **The physical location of the well** - Measure the distance to the well from permanent structures and property lines (e.g. the centerline of the road or corner of the house). GPS coordinates should be recorded if available.
4. **Maintenance records** - Record whenever you have maintenance done on your water supply system, such as replacing the pump, controls, or check valves. This is important information to keep track of how old the various components are, and who repaired them last.
5. **Water quality data** - Keep all of your past water quality testing information in one place. By comparing results from one year to the next you will be able to better detect changes which may indicate potential problems or need for maintenance.
6. **Disinfection history** - If you disinfect your well, keep track of when, why, and how it was done.
7. **Pump test data** - A pump test provides an estimate on how much water the well can produce. This information is useful to assess well performance as the well ages. More information on how to conduct a pump test is included on page 16.
8. **Static water level data** - Measure the depth to water of your well with a water level meter in the spring and fall. This measurement is best taken after not using your pump for 10-12 hours, at a minimum after two hours. Knowing this information helps you understand your local aquifer levels and if you could be impacted in a drought. To learn how you can measure your depth to water level visit sonomacountygroundwater.org/voluntary-monitoring/ or see the Level Up section of this manual.
9. **Pumping water level data** - This is similar to a static water level measurement, but is instead measured during or after using your pump. It measures how quickly the aquifer levels rise to

“Effective maintenance begins with complete records on the construction, testing, and maintenance of your well.”

normal levels after pumping out water. This helps you understand the efficiency of your well in relation to what the aquifer can produce. This data can be more difficult to obtain, but it can help you monitor performance trends and anticipate repair needs and cost.

10. **Gallons per kilowatt of energy** - This is another measure of your pump's efficiency. Every month, look at your totalizer meter on your well to see how much water you pumped in the past month, then compare with your energy bill to see how many gallons you were able to pump per kilowatt of energy. This is only applicable if you have a separate electrical meter for your well. As your pump becomes less efficient, it will slowly get more expensive, but if there is a sudden change, then your well screen may be clogged.

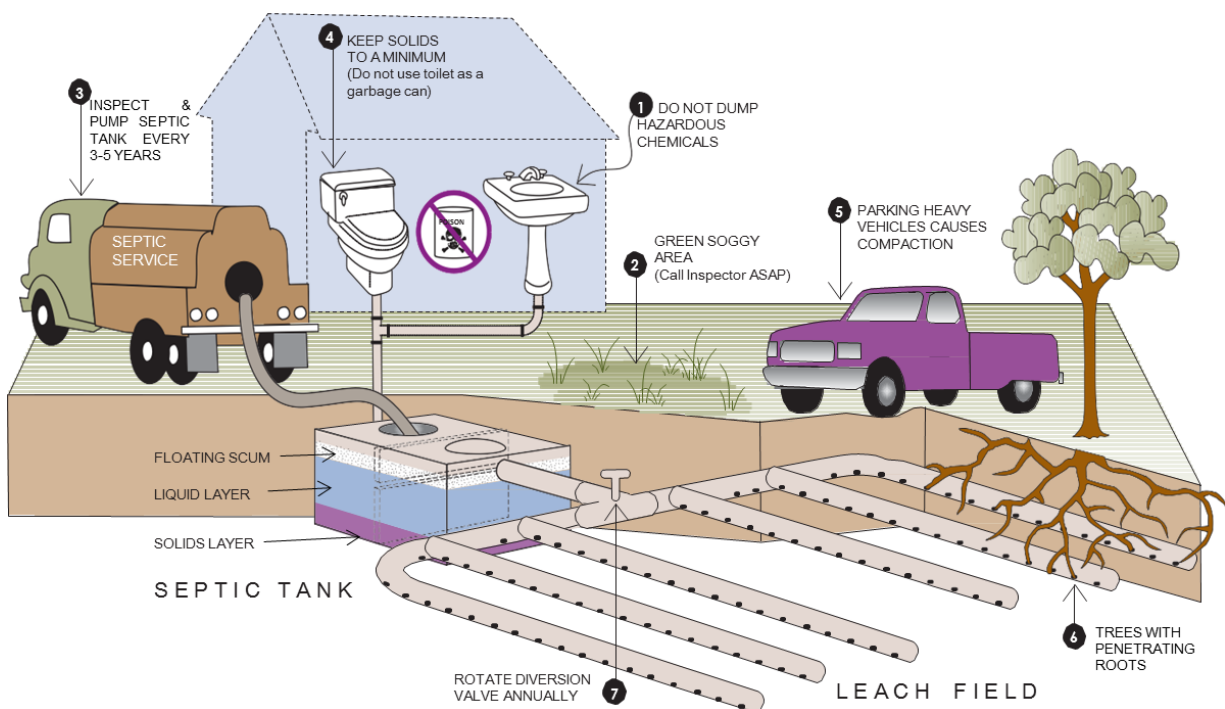
Maintain your Septic System

If you have a septic system, whatever goes down the drain may find its way into your drinking water. When your septic system is working properly the effluent is filtered and the system protects against contamination with bacteria and viruses. The required 100-foot setback between wells and septic systems adds additional protection. However, septic systems and setbacks are not designed to protect against some potentially harmful chemicals like hazardous household cleaners, paint and paint cleaners, automotive wastes, hazardous art supplies, pesticides, flushed medications, and other hazardous chemicals that may not break down and filter out easily.

Did you know?

If you have a septic tank, all the wastewater from inside the home flows into the first compartment where the solids settle to the bottom. Bacteria and other microorganisms break down the solid material. As the liquid separates from the solids, it overflows into the second compartment where more separation and decomposition occurs. This flows into the leach/drain field, a network of perforated pipes within a trench of washed drain rock buried about one to one and a half feet deep. The liquid waste flows out of the perforated pipe, trickles into the drain rock and filters down through the soil. If the septic system is operating properly, by the time wastewater reaches groundwater, few impurities remain, and no pollution occurs.

Septic Tank Maintenance



Tips on Septic System Maintenance

1. Do not dump hazardous chemicals down the drain. If your drain is plugged, try using boiling water or a drain snake instead of chemical drain cleaners. Try to use less toxic cleaning supplies whenever possible and take all hazardous chemicals to a hazardous waste drop-off for disposal. Hazardous chemicals can be dropped off at the Central Disposal Site (Bldg. 5), 500 Mecham Rd., Petaluma. Find more information at zerowastesonoma.gov/recycle-dispose/residents/household-hazardous-waste-facility. Do not dump old medications down the drain. Take any old medications to a free and secure drop off site, like a police station or pharmacy. To find a safe medicine disposal location near you, use rwwatershed.org/-watershed-map.
2. If you notice a sewage smell, continuously wet area in your yard, unusually lush vegetation around the septic tank or leach field, or liquid waste backing up through your drains, then something is not working properly. Contact a licensed septic tank inspector immediately.
3. Have your septic tank inspected and pumped every three to five years (more often if you have a garbage disposal). If the solid waste in the tank builds up too high, it can flow into the leach lines, plug them, and cause your system to fail.
4. Keep the solids in your system to a minimum. Do not use your toilet as a garbage can. Use toilet paper only and do not flush wipes. Food wastes, feminine hygiene products, and other household solids are better placed in the garbage or compost.
5. Do not park or drive heavy equipment over your leach lines. This may compact the soil around the lines and prevent adequate percolation of the liquid waste, causing your system to fail.
6. Do not plant trees near your leach line. Tree roots often seek out the moist environment inside your leach lines and plug them, causing your system to fail.
7. If you have a dual leach field system, change the diversion valve setting once a year.

“Always keep in mind that you live on top of your drinking water.”

Properly maintaining your septic system will protect drinking water quality and prevent contamination of the groundwater aquifer.

Deteriorating Well Performance

The performance of all wells will deteriorate over time, but proper well construction and maintenance can delay this problem. An average domestic production well can last 75-80 years if properly maintained and repaired, and even longer under ideal conditions. The typical causes of performance deterioration include:

- mineral encrustation or biofouling (bacteriological encrustation) of the well screen;
- physical plugging of the well screen, filter pack, and surrounding soils by fine particles; and
- corrosion of the well casing and pump problems.

Many of these problems can be prevented by proper well design and construction, pump sizing, operation and maintenance, or preventative well maintenance. If addressed early-on, most well performance problems can be corrected. To prevent or correct performance problems, you should work with your licensed water well and pump contractor. If mineral encrustation is suspected as a possible cause for lower yields, consult your well and pump contractor about a possible well rehabilitation (cleaning) to help try to improve the yield of the well.

Well performance can be monitored by conducting a well pump test and calculating the “specific capacity,” which is the ratio of the well’s discharge to the water level drawdown during sustained pumping.

$$\text{Specific Capacity} = \frac{\text{Discharge Rate}}{\text{Drawdown}} = \frac{\text{Discharge Rate}}{(\text{Static Water Level} - \text{Pumping Water Level})}$$

Permit Sonoma’s Policy and Procedure #9-2-28, [Well Pump Test Guidelines in Water Scarce Areas](#)⁴, provides instructions for completing a well yield test and calculating specific yield. Note, if the purpose of the test is to monitor specific capacity, then there is no requirement to get a permit and the test can be completed by a well owner if they have the necessary water level monitoring equipment. It is advisable to conduct a well yield test and record specific capacity once every 5 years (or more frequently). The static water level measurement is also useful for monitoring trends in groundwater levels of the local aquifer.

Trends in static water levels and trends in specific capacity are useful for diagnosing the probable cause when a well has reduced yield or is no longer providing adequate amounts of water. Installing an automated water level monitoring device in the well or taking seasonal water level measurements may help identify potential problems early on.

- If static water levels have not changed, yet the specific capacity of your well has declined, then it is likely that reduced performance is due to clogging or encrustation of the well screen or filter pack.

⁴ permitsonoma.org/Microsites/Permit%20Sonoma/Documents/Policies%20and%20Procedures/9-0%20Engineering%20and%20Construction/9-2-28_Well_Pump_Test_Guidelines_Water_Scarce.pdf

- If both groundwater levels and specific capacity have not changed appreciably, then reduced well yield is likely related to problems with the well pump or other components of the plumbing system.
- If both groundwater levels and specific capacity have declined, then reduced yield and reduced specific capacity could be attributed to multiple factors including pulling water from deeper sections of the local aquifer that may be less productive. However, clogging or encrustation of the well screen or filter pack cannot be ruled out.

Troubleshooting Issues with your Well

If your well is not producing adequate water, then it is recommended to hire a well and pump contractor to diagnose the problem. However, well owners may wish to investigate and attempt to address or diagnose the problem first. Well water systems can fail or provide inadequate water for a variety of reasons including:

- Electrical, pump, or mechanical failures;
- Running the well dry due to:
 - Continuous pumping caused by a leak or increased demand;
 - Reduced performance due to clogging of the wells screen or filter pack; or
 - Lowered groundwater levels in the local aquifer.

Below are basic steps to help diagnose the problem:

Power? If water is not coming out of the tap, the first step is to confirm that electricity is reaching your pump and water conveyance system. You may be able to tell whether your pump and water system are “live” by flipping the switches on those devices on and off and listening for a hum from the pump(s), or by using a voltmeter to test electrical connections. If you have any doubts about your ability to do this safely, call an electrician or a well and pump contractor.

Leaks? If the well has power and appears to be pumping, but no water is coming out of the tap or flow is intermittent or sputtering, it may be that there is a leak and the well or storage tank have run dry due to continuous pumping. If you suspect your well is running dry, and your well is not equipped with an automated low water shutoff, turn off the pump immediately. Running a pump without water can cause serious and irreversible damage.

Find and fix the leak. Some leaks aren’t really leaks but are just a faucet or hose left running. Some leaks have obvious signs including an unexplained wet spot in the yard, soggy soil near the wellhead, or the sound of running water when no fixtures are in use. Common leaks are faulty irrigation valves and timers, broken irrigation lines, and leaking toilets. See the Leak Detection section on page 29 of this manual for more recommendations for finding leaks.

Has Your Well Gone Dry? If there is power, the pump and other mechanical equipment is working, and

there are no leaks, it is possible that your well is running dry due to clogging or encrustation or your well's filter pack or well screen, lowered water levels in the local aquifer, increased well water use, or a combination of factors. If you suspect your well is running dry it is recommended that you contact a well and pump contractor immediately.

Measurements of depth-to water in your well are helpful for diagnosing a potential problem. Depth to water is measured by first turning the pump off, allowing the well to stabilize and equilibrate to a "static water level", and then, before restarting the pump, recording the depth to water. Equilibration to static water level can be considered achieved if the depth to water has not changed by more than 0.1 feet over a one hour period. Typically, a 10-12 hour non-pumping period is sufficient.

If the depth to water is near the same level as the depth to the pump, then your well could be running dry during pumping when the water level drops further. Even if the water level is significantly higher than the pump intake, it may be running dry during pumping depending on the pumping rate and efficiency of your well. You can test this by turning on the well and continuing to take water level measurements to see if the water level drops to the level of the pump.

If your well is running dry, a well and pump contractor may be able to resolve the issue through various measures such as well rehabilitation where the efficiency of the well may improve, by lowering the level of the pump, by reducing the pumping rate, or by adding above ground storage so that the well can be pumped at a lower rate for a longer duration without water levels dropping below the pump intake. These are likely to be lower cost options compared with drilling a new well.

Depending on the situation, drilling a new and deeper well may be the recommended solution. However, deeper water is not guaranteed, and you could still be at risk to run out of water in the future if the basin is not managed sustainably and water levels decline. Contacting a qualified well drilling contractor and a local government agency such as Permit Sonoma or a local Groundwater Sustainability Agency is highly recommended.

If your well runs dry and a new well is determined necessary:

- Initiate emergency permitting: Permit Sonoma prioritizes emergency well replacement permits for wells impacted by drought or other urgent conditions. Contact Permit Sonoma at (707) 565-1900 to begin the process. A licensed C-57 well drilling contractor must submit the drilling application.
- Report dry wells: Reporting helps the County track groundwater conditions and respond to community needs. You can report a dry well to Permit Sonoma at (707) 565-1900 or through the California Department of Water Resources (DWR) Dry Well Reporting System at mydrywatersupply.water.ca.gov/report/.

Well Destruction

Because unused, abandoned wells can act as pathways that allow poor quality surface water or shallow groundwater to move into deeper drinking water aquifers, it is very important that they are properly destroyed. This is especially true if other water supply wells are operating in the area. When a well is being used in the vicinity of an abandoned well, the pumping activity in the operating well can pull poor quality water down the abandoned well, into the drinking water aquifers, and then into the operating well.

“Any well that is no longer being used for its intended purpose is required by law to be properly destroyed.”

To eliminate these vertical pathways for contaminant migration, abandoned wells must be properly destroyed. As with all well construction, modification or destruction, work must be completed by a licensed C-57 contractor and under County permit. Following destruction, the contractor is required to submit a Well Completion Report to both the County and the Department of Water Resources to document that the former well has been sealed according to state and local standards.

Water Quality Sampling and Testing

As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and can pick up contaminants from animal waste and human activity. Contaminants that may be present include:

- Microbial contaminants such as viruses and bacteria that come from sewage treatment systems, septic systems, agricultural livestock operations, and wildlife.
- Inorganic contaminants, such as salts and metals, that can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, animal waste, mining, or agriculture.
- Pesticides and herbicides that may come from urban stormwater runoff and landscape and agricultural application.
- Organic chemical contaminants, including synthetic and volatile organic chemicals that are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems.

More information about contaminants and potential health effects can be obtained by visiting: epa.gov/privatewells.

Common Groundwater Contaminants

The most common groundwater contaminants of concern in Sonoma County are pathogens (bacteria and virus), arsenic, and nitrate. Information about how to test your water for these contaminants is covered on page 24.

Pathogens:

Contamination with pathogens can occur when rainfall or flooding washes waste into surface water or shallow groundwater. Wells that are improperly sealed, poorly constructed, or not disinfected after repairs are especially vulnerable.

Drinking water is assessed for pathogens by testing for coliform bacteria, which are naturally found in the intestines of humans and animals, as well as in soil. While most coliforms are not harmful themselves, their presence in drinking water indicates that other, potentially dangerous pathogens may also be present. Fecal coliforms, including *Escherichia coli* (*E. coli*), are a subgroup of bacteria associated specifically with human and animal waste. The detection of fecal coliforms in well water is a strong indication of recent contamination from sewage or animal sources.

Groundwater Contaminant Definitions

Pathogen: A bacterium, virus, or other microorganism that can cause disease.

Arsenic: A naturally occurring chemical element, often used in wood preservatives and alloys.

Nitrate: A compound of nitrogen and oxygen naturally found in air, soil, water, and some food.

Electrical Conductivity: A measure of water's ability to conduct electricity through dissolved ions.

Water testing typically includes sampling for total coliforms. If detected, further testing is done to determine whether fecal coliforms or *E. coli* are present. Total coliforms are a general indicator and may not be harmful, but their presence suggests that the water system may be compromised and that harmful pathogens could be present. If *E. coli* is present, the County Department of Environmental Health recommends using bottled water for drinking and cooking until the bacteria is eliminated.

Arsenic:

Arsenic is a naturally occurring element found in some rocks and soil. In Sonoma County, arsenic detected in well water is typically the result of natural weathering of local geologic formations, especially in deeper aquifers. While arsenic has also been used in industrial applications—such as wood preservatives, pesticides, dyes, and semiconductors—these are not the primary sources of arsenic in local groundwater.

The Maximum Contaminant Level (MCL) for arsenic in drinking water, as set by the U.S. Environmental Protection Agency (EPA) and adopted by California, is 10 micrograms per liter (µg/L). Long-term exposure to arsenic above this level can increase the risk of cancer and other serious health effects.

If your well draws from deeper groundwater zones (greater than 200 feet) or geothermal areas—such as those near the Sonoma Valley—testing for arsenic is strongly recommended. If arsenic is detected, point-of-use or point-of-entry treatment systems, such as reverse osmosis or adsorptive media filters, can effectively reduce arsenic levels when properly installed and maintained. The Sonoma County Department of Environmental Health and certified water treatment professionals can help interpret test results and recommend appropriate treatment options.

Nitrate:

Nitrate is a naturally occurring compound, but high amounts of nitrate in groundwater are typically due to human activity such as excessive fertilizer applications, septic systems, animal enclosures, and historic poultry farming. Nitrate in drinking water at levels above 10 milligrams per liter (MCL) is a health risk, especially for infants less than six months of age, pregnant women, and people with certain specific enzyme deficiencies. Nitrate concentrations in groundwater may rise quickly for short periods of time because of rainfall or agricultural activity.

Electrical Conductivity and Total Dissolved Solids (TDS):

Electrical Conductivity (EC) is a measure of water's ability to conduct electricity through dissolved ions. Ions are charged particles from dissolved minerals/solids. A higher EC or TDS means there are more dissolved minerals in your water. By itself, EC does not tell you if your water is safe to drink, but can give you a baseline to compare to. Since electrical conductivity testing is easy and inexpensive, it can be used as an indicator of changing conditions that may require further testing.

Recommended Tests and Frequency

There are dozens of drinking water tests and the options can be overwhelming. This section has three tables: (1) recommended water tests, (2) what to test for if you notice a specific issue with your water, and (3) what land uses could be causing problems with your water. This information should be used as general guidance. We recommend testing for coliform bacteria, arsenic, and nitrate, since they are the most common contaminants of concern in Sonoma County. Testing for electrical conductivity and minerals is recommended to establish a baseline understanding of the water quality in your well and to notice changes. Some contaminants can affect your health (primary drinking standards), whereas some contaminants can affect the aesthetics of the water (secondary contaminants).

Table 1. The most commonly performed tests and their recommended testing frequencies.

Recommended Test			Interpreting your Results	
Test	Recommended Frequency	Cost	If the lab report shows:	Then you may want to:
Total Coliform Bacteria	Annually	\$20 – 60	Total coliform present	• Eliminate cause, disinfect and re-test. • Increase testing frequency. • Install a treatment system or find an alternative water supply. • Consult a water treatment professional for more advice.
Nitrate	Annually	\$15 – 50	≥ 45 mg/l as nitrate (NO ₃) or ≥ 10 mg/l as nitrogen (N)	• Install a treatment system or find an alternate water supply. Reverse osmosis, distillation, or anion exchange will remove some of the nitrate. • Consult a water treatment professional for more advice. • Increase testing frequency.
Electrical Conductivity (EC)	Annually	\$15 – 30	≥ 900 umhos/cm or significantly different from previous year result	• Conduct further testing, such as nitrate and/or minerals to determine the cause of the high EC, or the change in EC.
Minerals: • Aluminum (Al) • Arsenic (As) • Barium (Ba) • Cadmium (Cd) • Chromium, total (Cr) • Fluoride (F) • Iron (Fe) • Lead (Pb) • Manganese (Mn) • Mercury (Hg) • Selenium (Se) • Silver (Ag)	Every 5-10 years, or: • If EC changes significantly. • If taste, color, odor or surrounding land use change.	Package \$90 – 300 Individual \$20 – 35 Mercury \$15 – 60	Al ≥ 1.0 mg/l As ≥ 0.01 mg/l Ba ≥ 1.0 mg/l Cd ≥ 0.005 mg/l Cr ≥ 0.05 mg/l F ≥ 2.0 mg/l Fe ≥ 0.3 mg/l Pb ≥ 0.015 mg/l Mn ≥ 0.05 mg/l Hg ≥ 0.002 mg/l Se ≥ 0.05 mg/l Ag ≥ 0.1 mg/l	• Compare to previous results. • Install a treatment system or find an alternate water supply. The appropriate treatment system is dependent on your overall water chemistry and what constituents you would like to remove. • Consult a water treatment professional for more advice.

Table 2. Common drinking water problems and their possible causes.

Problem	Possible Cause
Water is orange or reddish brown	This may be due to high levels of iron (Fe) or iron bacteria.
Porcelain fixtures or laundry are stained brown or black	This is commonly a result of high manganese (Mn) and/or iron (Fe) levels. As little as 50 parts per billion (ppb) manganese and 300 ppb iron can cause staining.
White spots on the dishes or white encrustations around fixtures	High levels of calcium (Ca) and magnesium (Mg) can cause hard water, which leaves spots. Hardness can also be measured directly.
Water is blue	Blue water or blue deposits may be due to high levels of copper (Cu) , especially if coupled with corrosive water.
Water smells like rotten eggs	This is most likely caused by hydrogen sulfide (H₂S) .
Water heater is corroding	Water can be corrosive, neutral, or noncorrosive. Water that is very corrosive can damage metal pipes and water heaters. The lab can calculate the corrosivity of your water by measuring calcium, pH, total dissolved solids (TDS), and alkalinity .
Water appears cloudy, frothy, or colored	Suspended particulates , measured directly or as turbidity , can cause the water to appear cloudy, frothy, or colored. Detergents and/or sewage waste may also be the culprit.
Water has a turpentine odor	This may be due to methyl tertiary butyl ether (MTBE) .
Water has chemical smell or taste	This may be due to volatile or semi volatile organic compounds (VOCs) or pesticides .
Home's plumbing system has lead pipes, fittings, or solder joints	Corrosive water can cause lead (Pb), copper (Cu), cadmium (Cd), and/or zinc (Zn) to be leached from lead pipes, fittings, and solder joints.

Table 3. Common land uses and their possible contaminants.

Land Use	Possible Contaminants
Landfill, industry, or dry cleaning operation	Consider testing for volatile organic compounds (VOCs) , pH , total dissolved solids (TDS) , chloride (Cl) , sulfate (SO₄) , and metals .
Agricultural crop production	Consider testing for pesticides commonly used near the well (consult the farmer or Department of Agriculture for a list), nitrate (NO₃) , pH , and total dissolved solids (TDS) .
Livestock enclosure, manure, or compost storage area	Consider testing for bacteria , nitrate (NO₃) , and total dissolved solids (TDS) .
Gas station or automobile repair shop	Consider testing for total petroleum hydrocarbons (TPH) ; total oil, grease (TOG) ; benzene , toluene , ethylbenzene , xlenes (BTEX) ; MTBE ; ethylene dibromide (EDB) .

How to Test your Groundwater

Below are local resources for who can help you test your well water:

- Sonoma County offers water quality testing for total coliforms and *E. coli*. Details can be found here: sonomacounty.ca.gov/health-and-human-services/health-services/divisions/public-health/public-health-regional-laboratory/water-testing. They do not test for chemicals, metals, or minerals.
- For more comprehensive testing specific to wells, use Sonoma County's list of State Certified Laboratories for Bacteriological and/or Chemical Analysis at: sonomacounty.ca.gov/health-and-human-services/health-services/divisions/public-health/environmental-health/programs-and-services/well-water-quality/well-water-water-testing.
- If you choose to test your well, contact the lab directly for instructions on how to collect a sample and submit it for testing. Specific containers and methods for refrigeration may be required. Water samples may need to be returned to the laboratory within a specified time period. Failure to follow the instructions provided by the lab can lead to inaccurate results.

Once the water is tested, well users are advised to consult certified laboratories, licensed water treatment professionals, or the Department of Health Services to help you interpret your results.

Water Treatment

Many groundwater sources do not require any treatment. If you have found a water quality problem that you want to treat, there are many different types of treatment available. When choosing a treatment system consider whether a point-of-use (POU) or point-of-entry (POE) installation is more

“Know what contaminants you want to remove and if you will be able to perform the routine maintenance yourself before you invest in a water treatment system.”

appropriate. POU systems treat water at a single tap, typically the kitchen sink, and are generally more water efficient. POE systems treat all water entering the home and may be necessary in cases where multiple contaminants are present, but they tend to use more water and energy. An important note for reverse osmosis (RO) systems is that for one gallon of treated water,

approximately 5.6 gallons are used in the process of removing the contaminant. For large Some water treatment options remove a greater percent of the concentration than others. Talk with the manufacturer or a water treatment professional to guarantee the system will work in your situation.

Water Conservation

For most well users, groundwater is the only source of water available to the property. That means every drop comes directly from the aquifer beneath your property and must be pumped to the surface, stored, possibly treated, and pressurized before it's used. Reducing your water use preserves groundwater supply for the future, reduces energy required for pumping, and minimizes wear and tear on your well pump. Using too much water can also have a draw down effect on your neighbors' wells, and put their supply at risk. Reducing groundwater use helps not only you, but also your neighbors and other groundwater users in your basin maintain a sustainable supply.

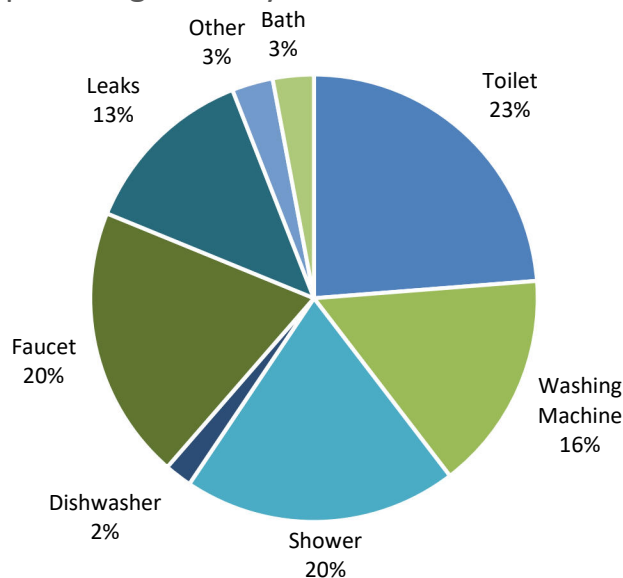
Did you know?

The Well Aware Toolkit offers personalized groundwater savings practices based on your parcel's land use. This interactive tool allows you to explore water saving practices, funding opportunities, installation guides for rain catchment or graywater systems, or find experts to assist you. Use the toolkit at wellawaretoolkit.org.

Indoor Water Conservation

The pie chart below shows the typical breakdown of indoor water use in a single-family home. Toilets, showers, faucets, leaks, and clothes washers account for most indoor water use. Additionally, many of these fixtures use hot water which takes energy for storing and heating. Reducing indoor use through upgraded water-efficient fixtures can save both groundwater supplies and energy.

Typical Single Family Home Indoor Water Use



Source: [2016 Residential End Uses of Water Study](#)

When upgrading appliances or fixtures, look for products that carry ENERGY STAR label. ENERGY STAR-certified appliances are designed to use less energy and water than conventional models, helping reduce both electricity use and groundwater demand. To help residents use less water, the Sonoma-Marín Saving Water Partnership (SMSWP) has partnered with local libraries to offer Do-It-Yourself (DIY) Home

Energy and Water Savings Toolkits. These Toolkits include free water saving aerators and showerheads, toilet leak detection tablets, and tools to help you measure and improve your home's water and energy efficiency. Find locations and more details at savingwaterpartnership.org/programs_list/diy-energy-water-savings-toolkit/.

Table 4. Potential water savings from switching to water efficient fixtures.

Fixture	Typical Water Usage	Efficient Water Usage ⁵	% Water Savings Per Use	Water Use Tips
Toilets 	Models older than 1980 use 6 gallons per flush or more. Models manufactured between 1980-1992 use 3.5 gallons per flush. Models manufactured between 1992- 2014 use 1.6 gallons per flush.	High Efficiency Toilets: 1.28 gallons per flush⁵ Dual flush: 1.1 gallons per flush⁵	20-80%	• Avoid using the toilet as a wastebasket (also not recommended for septic systems). • Check toilets and flappers regularly for leaks.
Washing Machines 	Older top-loading models use 30-45 gallons per load. Newer standard models use 20-25 gallons per load.	High efficiency front-loading models: 16-20 gallons per load	25-50% (Provides Energy Savings also)	• Run full loads for maximum efficiency. • Choose cold water settings when appropriate. • Perform routine maintenance like cleaning filters and dispenser, including inspecting hoses.
Showerheads 	2.5-10 gallons per minute.	1.8 gallons per minute	25-80% (Provides Energy Savings also)	• Limit shower times. • Install a shut-off valve for pausing flow during shampooing or lathering time.
Sink Aerators 	Bathroom sinks use 2.2 gallons per minute. Kitchen sinks use 2.2-2.5 gallons per minute.	Bathroom sink- 1.0 gallons per minute Kitchen sink- 1.8 gallons per minute	30-60% (Provides Energy Savings also)	• Turnoff the tap while brushing teeth, shaving, or washing dishes.

⁵ 2022 California Green Building Standards Code

Outdoor Water Conservation

Water savings aren't limited to inside the home. See the tables below for smart outdoor water use choices. Making water efficient outdoor choices can reduce water use from 18-50%.

“Reducing groundwater use starts in the home, but can extend to the whole property.”

Table 5. Water efficient tools and their benefits.

Water Efficient Tools	Benefits to Groundwater Sustainability and Landscape
Irrigation	• Hand watering delivers water only to the plants that need it. • Drip Irrigation delivers water directly to the plant roots reducing overspray, weed growth, and wind-drift. • Weather based irrigation controllers adjust water times according to plant needs.
Mulch/Compost	Applying around plants helps retain soil moisture, reduce evaporation, and suppress weed growth.
Fire-Wise/Drought Tolerant Plants	Requires less water and increase resilience to dry conditions. Reduce and replace lawn areas that require a lot of water.
Qualified Water Efficient Landscaper (QWEL)	QWEL certified professionals are specifically trained on water efficient irrigation practices.
Water Efficient Landscape	Replace turf and other high-water landscapes with drought tolerant species adapted to local conditions. For high traffic areas, consider hardscapes or mulch in place of lawn.
Rain Gardens	Captures and absorbs rainwater runoff from roofs, driveways, and other surfaces encouraging groundwater recharge.
Rainwater Catchment	Allows for the collection and storage of rainwater for later use in irrigation.
Graywater System	Reuses water from sinks, showers, and laundry to water plants.
Pool Covers	Reduces evaporation loss by as much as 30-50%.

Table 6. Smart outdoor watering practices.

Smart Outdoor Watering Practices	
Adjust Irrigation Timers Seasonally	Adjust watering times each season to accommodate plant needs and avoid overwatering.
Encourage Deep Watering	Water for short periods, multiple cycles per night to encourage water to infiltrate to deeper levels of the soil resulting in healthy strong plant roots. Use the Sonoma Marin Saving Water Partnership (SMSWP) Irrigation Scheduling Tool for assistance. ⁶
Monitor for Leaks and Breaks	Regularly check irrigation systems for leaks, breaks or misalignment.
Replace Controller Batteries	Replace controller batteries regularly to ensure irrigation controllers maintain programmed schedules during power outages.

⁶ savingwaterpartnership.org/watering-times/

Find and Detect Leaks

Leaks can be a hidden, but significant, source of water loss- especially for well users who may not receive a monthly water bill to alert them to changes in use. Identifying and fixing leaks early helps reduce unnecessary wear and tear on your pump and reduce energy use. Some leaks have obvious signs. A sudden drop in water pressure, unexplained wet spots in the yard, soggy soil near the wellhead, or the sound of running water when no fixtures are in use can all point to a leak. Indoors, dripping faucets, damp cabinets, or mold growth may also be signs of hidden plumbing issues. Even small leaks can add up over time, so it's important to address them promptly. Below are several other ways well owners can monitor for leaks using tools and observations available around the home.

Flow Meter

If your well is equipped with a flow meter, it can be one of the most effective tools for leak detection. To learn more about flow meters, see page 33 of this manual.

Toilet Dye Tabs

Toilets are one of the most common sources of indoor leaks. A worn flapper valve can allow water to leak silently from the tank into the bowl. To test for a leak, place a few drops of food coloring or a dye tablet in the tank. Wait 15 to 30 minutes without flushing. If color appears in the bowl, the toilet is leaking and should be repaired. This simple test can save hundreds of gallons of water per day.



Monitor Energy Use

Because most well systems rely on electric pumps, a sudden increase in your electricity bill may mean that your pump is running more often than usual. This could be caused by a leak in the system, a failing pressure tank, or a stuck valve. If your energy use increases unexpectedly and you haven't changed your water use habits, it's worth investigating your water system.

Participate in Groundwater Sustainability

While groundwater is utilized across the county, there are three basins in Sonoma County that have been identified by the state as high or medium priority and are regulated under the Sustainable Groundwater Management Act (SGMA): Petaluma Valley, Santa Rosa Plain, and Sonoma Valley. Each basin has a dedicated Groundwater Sustainability Agency (GSA) and basin-specific Groundwater Sustainability Plan (GSP). Collectively referred to as the Sonoma County GSAs, these agencies implement many projects and activities to achieve groundwater sustainability and connect groundwater users with accessible programs and resources. Whether or not your well is within one of the three GSA basins, you can access these programs or implement these practices to help with regional groundwater sustainability.

Not sure if you are in one of the three basins?

Use our Data Dashboard at bit.ly/SoCoDataDashboard to type in your address or APN.

Sign up for updates!

You can sign up for Sonoma County GSA email updates at: bit.ly/GSA_newsletter



Monitor Groundwater Levels

Why should I measure the water depth in my well?

Like checking your car's fuel gauge to see if you have enough gas for a road trip, checking your local groundwater level compared to the depth of your well pump helps you understand how much water you have access to. This gives you a direct look into the health of your groundwater basin, and helps you be proactive if you notice chronic lowering of groundwater levels. Monitoring groundwater levels over multiple years sheds light on how your groundwater basin responds to winter recharge and use during the dry summer months. Measurements are best taken in the spring and fall over multiple years to understand the long-term seasonal trends.

How is groundwater level data used for groundwater sustainability?

Groundwater basins are not perfectly uniform underground and are difficult to assess from the surface. This makes it complicated to understand the health of the overall basin. Every time someone measures their groundwater level, it's like a direct view into basin conditions at that location. The more well owners that monitor their groundwater levels, the clearer we can understand overall basin conditions. This helps inform groundwater managers who make decisions for the basin and develop essential programs.

"Groundwater is invisible until it comes out of the tap - unless you measure groundwater levels."

How do I measure the depth to water in my well?

Depth to water is measured with a water level meter or an acoustic sounder, as shown on page 31. Water level meters are like a long measuring tape that tells you the depth to water. Acoustic sounders do the same thing, but are not lowered into a wellhead. Both work well, but acoustic sounders are

significantly more expensive to purchase. Your well and pump contractor can also measure your water level for you, or even install an automated water level monitoring device on your well. If you want to learn more about how to measure groundwater levels without purchasing a tool, read the next section about Sonoma County's **Level Up!** program.

How to measure depth to water with a water level meter



1. Plan to take your measurement after not using your well for 10-12 hours, at a minimum after two hours. This will better reflect static groundwater level conditions.
2. Open the access port/bung on the wellhead, which is usually opposite to the electrical connection.
3. Turn on the water level meter.
4. Carefully lower the tape into the access port/bung. Note that it can get tangled in other parts of the well head if the access port/bung is not individually cased.
5. Lower the tape until you hear it buzz.
6. Write down the number shown on the calibrated tape or cable.
7. Rinse off the water level meter and wipe down to remove any debris and prevent cross contamination of future wells.
8. Record the measurement, time, and date.

How to measure depth to water with an acoustic sounder



(Information also in this video:

[youtube.com/watch?v=17daioGiYdY](https://www.youtube.com/watch?v=17daioGiYdY))

1. Plan to take your measurement after not using your well for 10-12 hours, at a minimum after two hours. This will better reflect static groundwater level conditions.
2. Open the access port/bung on the wellhead, which is usually opposite to the electrical connection.
3. Put the acoustic sounder device in the access port/bung while holding it level. Holding it at an angle could cause an invalid measurement.
4. Turn it on to take the measurement.
5. Take three measurements to ensure accuracy.
6. Turn off and wipe off the sounder.
7. Record the measurement, time, and date.

Participate in Level Up!: Voluntary Groundwater Monitoring Program

Level Up! helps well owners in Sonoma County measure their groundwater level without having to purchase their own equipment. This program organizes measurement of groundwater levels in the spring and fall. These measurements improve the understanding of groundwater for both the well owner and groundwater managers. The program continues to expand the voluntary well monitoring network to areas where additional data is needed.



If you are interested in joining **Level Up!**, sign up at:
sonomacountygroundwater.org/voluntary-monitoring/

The GSAs publish an annual report on the status of groundwater conditions in each of the SGMA basins. These reports can be found by visiting:

- santarosaplaingroundwater.org/annual-reports
- petalumavalleygroundwater.org/annual-reports
- sonomavalleygroundwater.org/annual-reports

Did you know?

The Sonoma County Groundwater **Data Dashboard** shows current and historical water levels for the three SGMA basins. This data is essential information for individual well owners and for the GSA groundwater managers to develop groundwater sustainability programs and projects. You can use the Data Dashboard to see groundwater levels from monitoring wells and **Level Up!** participants. This includes hydrographs that show the year to year changes in groundwater levels. Any information provided by **Level Up!** participants is kept private.

Access the Data Dashboard at bit.ly/SoCoDataDashboard and watch a helpful orientation video at youtube.com/watch?v=cSbZPR66Jlg

Measure Groundwater Usage

Why should I meter water use from my well?

If measuring your groundwater level is like checking your fuel gauge, then measuring your water use with a flow meter is like reading an odometer. Without an odometer, you have no clue how far you have driven, and without a flow meter you don't know how much water you are using. With a flow meter, you can see exactly how much water you use and quickly detect anomalies. This can help you detect leaks and better track well and pump performance.

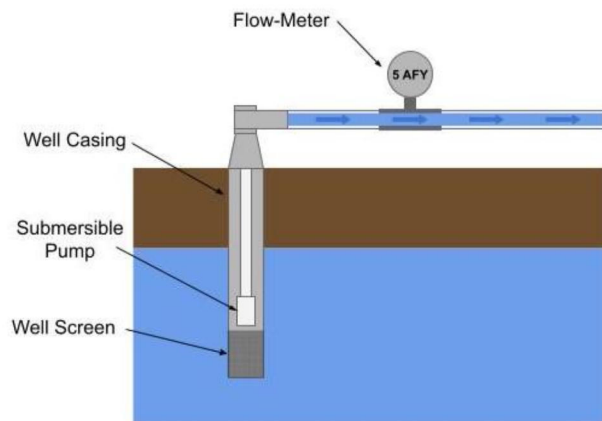
“Flow meters help you understand your water use and detect leaks quicker.”

How is water use data used for groundwater sustainability?

Every well is like a straw that sucks out water from the basin. It is difficult to assess how much water is pumped out of a basin if no one has a meter. Understanding water use helps groundwater managers understand basin health and if a basin is in danger of overdraft. Flow meters also help well owners detect leaks quicker, which reduces wasteful uses.

How do I detect leaks with a flow meter?

If you have a flow meter and it is installed “downstream” of the pressure tank of gravity tank that pressurizes the plumbing system, begin by turning off all water-using appliances and fixtures in the home. If the meter dial or digital display continues to move, water is flowing somewhere it shouldn't be. Some meters also include a small leak indicator that spins even with very low flow. The leak indicator helps you quickly and easily determine if water is flowing through the flow meter. Newer automated meters have digital platforms that can alert you if a leak is detected and store your usage history.



How can I get a water meter?

There are many different types of meters to choose from. Installing meters often requires altering the piping of a well, which should be done by a professional. If you need help from a local professional, consider contacting one of the following local firms (listed in alphabetical order):

- Jerry & Don's Yager Pump and Well Service: jerryanddonsyager.com (707) 542-5242
- Larbre Well and Pumps: larbrewellandpumps.com (707) 996-1819
- Les Peterson: lespetersen.com (707) 545-0246
- PumpMan NorCal: pumpman.com/locations/norcal (707) 584-9191
- RH and Sons Water Services: rhsons.com 1 (800) 675-3569
- Sonoma County Pump and Well: sonomacountypump.com (707) 823-8008
- Weeks Drilling and Pump: weeksdriilling.com (707) 823-3184

Participate in Flow Smart: Voluntary Flow-Metering Program

Flow Smart is a voluntary program that provides well owners in Sonoma County the opportunity to report their groundwater usage and potentially receive free flow meters depending on grant funding availability. This helps groundwater users and the GSAs better understand groundwater usage in Sonoma County. Any groundwater usage information collected through Flow Smart is kept confidential. You can learn more about Flow Smart at sonomacountygroundwater.org/flow-smart/

Did you know?

The Groundwater Users Information Data Exchange (GUIDE) program was developed to provide the GSAs with better information about groundwater use across the basins and to give groundwater users an opportunity to view the available data about their parcel's assumed groundwater use. Access GUIDE at bit.ly/SoCoGUIDE and view your property's data by typing in your address or APN (Assessor Parcel Number). Through the GUIDE program, you can view, correct, or confirm the data the GSAs have assumed for your property.

Increase Groundwater Recharge

Another way that groundwater users can improve the health of aquifers is by letting more water sink into the ground. Groundwater recharge is the process of allowing water on the surface to percolate down into an aquifer, boosting its groundwater levels. In our urban environment, impervious surfaces, like concrete, are widespread and typically direct stormwater runoff into our streets, gutters, and storm drains. This reduces the overall area available for groundwater recharge. You can combat this on your property by implementing “Slow It, Spread It, Sink It!”

Try to find opportunities to **slow** down water when there are excess flows. Instead of letting runoff travel through a gutter and directly into the street and storm drains, try to divert this water to areas it can be used and absorbed. **Spread** out this water on gardens, swales, permeable pavers, or even a shallow depression in the ground. This will give the water time to **sink** into the ground. If you want to learn more about stormwater management practices that could boost groundwater recharge, read this guide created by the Sonoma Resource Conservation District: sonomarc.org/wp-content/uploads/2017/06/Slow-it-Spread-it-Sink-it-Store-it.pdf.

Groundwater Recharge Practices

Permeable Pavers



laturfandpaver.com

Bioretention & Rain Gardens



[flickr.com/photos/oceanflynn/53879260996/](https://www.flickr.com/photos/oceanflynn/53879260996/)

Vegetated Swales, Buffers & Strips



[flickr.com/photos/87297882@N03/52024994356](https://www.flickr.com/photos/87297882@N03/52024994356)

Impervious Surface Reduction & Disconnection



[flickr.com/photos/tracy_olson/2917482360](https://www.flickr.com/photos/tracy_olson/2917482360)

Additional Resources

Local Government and Agencies

Local Non-Governmental Organizations (NGOs) – These NGOs partner with groundwater sustainability programs or projects. Some organizations provide resources to individual property owners or well users, whereas others conduct recharge projects or research groundwater sustainability issues (non-exclusive and listed alphabetically):

- Community Alliance with Family Farmers (CAFF): www.caff.org
- Daily Acts: www.dailyacts.org
- Friends of the Petaluma River: www.fopr.org
- Laguna de Santa Rosa Foundation: www.lagunafoundation.org
- Pepperwood Preserve: www.pepperwoodpreserve.org
- Sonoma County Farm Bureau: www.sonomafb.org
- Sonoma County University of California Cooperative Extension (UCCE): www.ucanr.edu/county/ucce-sonoma-county
- Sonoma Ecology Center: www.sonomaecologycenter.org
- Sonoma Land Trust: www.sonomalandtrust.org

Permit Sonoma – Permit Sonoma is Sonoma County's consolidated land use planning and development permitting agency. Virtually any land development or construction in the unincorporated area of Sonoma County (outside the city limits of the nine cities) is reviewed, permitted, and inspected by Permit Sonoma. Permit Sonoma has information on permitting and maintenance requirements for wastewater disposal systems, water wells, water conservation, well metering and monitoring, and general land use planning. (707) 565-1900 | www.permitsonoma.org/wellpermittinginfo

Sonoma County Agriculture Commissioner – The primary goal and purpose of the Sonoma County Agricultural Commissioner is supporting agriculture and farmers in Sonoma County. If you are an agricultural groundwater user, they are available to you. (707) 565-2371 | www.sonomacounty.gov/natural-resources/agriculture-weights-and-measures/divisions/agricultural-division

Sonoma County Department of Health Services – Environmental Health – Environmental Health regulates small public water systems with 5 to 15 connections, issues permits for monitoring wells associated with contaminated sites, and provides information and expertise on drinking water standards, health risks, and drinking water system maintenance and disinfection. (707) 565-6565 | www.sonomacounty.gov/health-and-human-services/health-services/divisions/public-health/environmental-health

Sonoma County Groundwater Sustainability Agencies (GSAs) – The three GSAs, Petaluma Valley, Santa Rosa Plain, and Sonoma Valley, support groundwater users throughout Sonoma County to promote

groundwater sustainability. (707) 243-8555 | www.sonomacountygroundwater.org/

- Data Dashboard: bit.ly/SoCoDataDashboard
- GUIDE Program: bit.ly/SoCoGUIDE
- Flow Smart Program: sonomacountygroundwater.org/flow-smart/
- Level Up! program: sonomacountygroundwater.org/voluntary-monitoring/
- Well Aware Toolkit: wellawaretoolkit.org
- Sign up for updates: bit.ly/GSA-newsletter

Sonoma and Gold Ridge Resource Conservation Districts (RCDs) – The two RCDs within Sonoma County provide support primarily to rural residential well users and agricultural ranchers and farmers. RCD program elements include technical assistance, irrigation system evaluations, and support of groundwater management and stormwater recharge efforts. The RCDs also offer the LandSmart Water Resources Program, which promotes productive lands and thriving streams through planning and on-the-ground implementation of beneficial management practices, including efficient irrigation and alternative water source development. Sonoma RCD: (707) 569-1448 | www.sonomarcd.org Gold Ridge RCD: (707) 823-5244 | www.goldridgercd.org

Sonoma Marin Water Saving Partnership (SMWSP) – The Sonoma Marin Water Saving Partnership represents 13 water utilities in Sonoma and Marin Counties to provide regional solutions for water efficiency. They have information about rebates, a water savings calculator, water smart plants, and landscape design templates. www.savingwaterpartnership.org

Sonoma Water – Sonoma Water is the primary water supplier in Sonoma County for most cities in Sonoma County. Water from Lake Sonoma and Lake Mendocino are the primary sources of drinking water, however, groundwater is also used as a supplementary source, particularly in periods of drought. To increase water system resilience, Sonoma Water is conducting groundwater banking and aquifer storage and recovery projects. (707) 547-1900 | www.sonomawater.org/groundwater

Regional and State Government

California Department of Water Resources (DWR) – Groundwater resources play a vital role in maintaining California's economic and environmental sustainability. During an average year, California's 515 alluvial groundwater basins and subbasins contribute approximately 38 percent toward the State's total water supply. During dry years, groundwater contributes up to 46 percent (or more) of the statewide annual supply, and serves as a critical buffer against the impacts of drought and climate change. www.water.ca.gov/groundwater

The Sustainable Groundwater Management Act (SGMA), administered by DWR, established a framework for sustainable, local groundwater management. SGMA requires groundwater-dependent regions to halt overdraft and bring basins into balanced levels of pumping and recharge. Information

about Groundwater Sustainability Agencies, resources available to local agencies and the public, the latest tools and guidance in managing groundwater basins sustainably can be found at www.water.ca.gov/Programs/Groundwater-Management/SGMA-Groundwater-Management.

Department of Toxic Substances Control – The Department of Toxic Substances Control can help answer questions about what is considered hazardous waste, how to reduce household hazardous waste, where to report spills and illegal dumping, as well as provide information on specific hazardous waste disposal or handling facilities. (800) 728-6942 | www.dtsc.ca.gov

San Francisco Bay and North Coast Regional Water Quality Control Boards – The San Francisco Bay and North Coast Regional Water Quality Control Boards are the branches of the State Water Control Board providing local oversight for Sonoma County. (510) 622-2300 and (707) 576-2220 | www.swrcb.ca.gov/rwqcb2 and www.waterboards.ca.gov/northcoast.

State Water Resources Control Board (SWRCB) – SWRCB’s Drinking Water Program regulates public drinking water systems. SWRCB certifies drinking water treatment devices which claim to treat water for contaminants related to public health, such as lead, bacteria, pesticides and heavy metals. SWRCB maintains a directory of certified residential water treatment devices, which can be found at the link below by searching “Residential Treatment.” (916) 449-5577 | www.waterboards.ca.gov/drinking_water/programs/index.html
SWRCB Well Owner Guide: www.waterboards.ca.gov/gama/docs/wellowner_guide.pdf

Federal Government

Food and Drug Administration - Among other things, the Food and Drug Administration regulates the bottled water industry. Contact the FDA if you have questions about the safety or regulation of bottled water. (888) 463-6332 | www.fda.gov

USEPA’s Safe Drinking Water Hotline - The U.S. Environmental Protection Agency’s Safe Drinking Water Hotline is available to help the public, drinking water stakeholders, and state and local officials understand the regulations and programs developed in response to the Safe Drinking Water Act. More information about contaminants and potential health effects can be obtained by calling the USEPA’s Safe Drinking Water Hotline. The hotline and web page also provide information on testing and protecting private well water and where to find more information. (800) 426-4791 | www.epa.gov/ground-water-and-drinking-water/safe-drinking-water-hotline

EPA private well publications www.epa.gov/privatewells/additional-private-well-publications

Other Resources

California Groundwater Association – The California Groundwater Association is a non-profit organization, whose members include water well drilling and pump contractors, suppliers and manufacturers, geologists, engineers, hydrologists, government employees and others working in the groundwater field throughout California. Contact CGA for information on the quantity, quality, and availability of California's groundwater resources. | www.groundh2o.org

Local Well and Pump Contractors – If you need any assistance with your well, you can contact a local well and pump contractor (non-exclusive and listed alphabetically):

- Jerry & Don's Yager Pump and Well Service: jerryanddonsyager.com | (707) 542-5242
- Larbre Well and Pumps: larbrewellandpumps.com | (707) 996-1819
- Les Peterson: lespetersen.com | (707) 545-0246
- PumpMan NorCal: pumpman.com/locations/norcal | (707) 584-9191
- RH and Sons Water Services: rhsons.com | 1 (800) 675-3569
- Sonoma County Pump and Well: sonomacountypump.com | (707) 823-8008
- Weeks Drilling and Pump: weeksdriilling.com | (707) 823-3184

National Ground Water Association – The National Ground Water Association (NGWA) is a not-for-profit organization whose mission is to enhance the skills and credibility of all groundwater professionals, develop and exchange industry knowledge, and promote the groundwater industry and understanding of groundwater resources. Contact the NGWA for information on groundwater studies and publications nationwide, for answers to frequently asked questions about groundwater, and for the latest groundwater news and legislation. (800) 551-7379 | www.ngwa.org/Pages/default.aspx

National Sanitation Foundation – The National Sanitation Foundation (NSF) is a not-for-profit organization that tests products relating to health and the environment. NSF certifies that home treatment units meet the manufacturers' performance claims. Contact the NSF for a list of treatment units that are certified to remove your contaminant of concern. (800) 673-6275 | www.nsf.org

State Licensed Well Contractors – All well construction, destruction, or modification activities must be completed by a C-57 licensed contractor. To check if a contractor is licensed contact the Contractors State License Board at (800) 321-2752 or go to www.cslb.ca.gov

The Groundwater Foundation – The Groundwater Foundation (GWF) is a not-for-profit that is dedicated to informing the public about groundwater resources. They provide numerous educational programs and publications for all ages on the importance of groundwater and groundwater protection. The GWF also offers recognition and support for the Groundwater Guardian Communities and Affiliates. (800) 858-4844 | www.groundwater.org

The Private Well Class – The Private Well Class provides rural residents with training webinars, events and resources to maintaining and protecting their private well. www.privatewellclass.org

University of California Davis, Groundwater Information & Educational Resources – UC Davis offers groundwater, drought, and groundwater quality information and resources. www.groundwater.ucdavis.edu

Water Quality Association – The Water Quality Association (WQA) is a not-for-profit international trade association. WQA is a resource and information source for residential, commercial and industrial water treatment industry. The website includes a diagnostic tool to diagnose many types of water problems and offer potential treatments and solutions. The website also has a tool to help you find a water professional in your area. (630) 505-0160 | www.wqa.org

Water Systems Council – The Water Systems Council is a non-profit organization that supports Americans who depends on wells and works to educate well owners, consumers, and policymakers at the local, state, and federal levels about the importance of protecting our groundwater resources. Their website has helpful information sheets, a well owner support hotline, and other resources for well owners. (888) 395-1033 | www.watersystemscouncil.org



The three Groundwater Sustainability Agencies, Petaluma Valley, Santa Rosa Plain, and Sonoma Valley, support groundwater users throughout Sonoma County to promote groundwater sustainability.

info@santarosaplaingroundwater.org
info@petalumavalleygroundwater.org | (707) 243-8555
info@sonomavalleygroundwater.org



Permit Sonoma is Sonoma County's consolidated land use planning and development permitting agency. Virtually any land development or construction in the unincorporated area of Sonoma County is reviewed, permitted, and inspected by Permit Sonoma.

PermitSonoma-Well-Septic@sonomacounty.gov | (707) 565-1900

Funding for this project has been provided in full or in part from The Budget Acts of 2021 and 2022 and through an agreement with the State Department of Water Resources.